UNIVERSITY OF PAVIA

Doctoral Program in

"Psychology, Neuroscience and Data science"

XXXI Cycle

Accademic Years (2015-2016, 2016-2017, 2017-2018)

"Promoting a scientific education in Early Years. Analysis of research experience in a Nursery school."

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INTRODUCTION

The reasons for a choice

In recent years, the Italian school landscape has been characterized by a revived interest in science education. This interest is demonstrated not only by projects carried out in the different agendas and grades of schooling, but also by documents and initiatives promoted by the Ministry of Education, University and Research (Miur). The latter, under the Decree n. 165 of 30 March 2001, has established the Committee for Scientific and Technological Development with tasks related to the dissemination of scientific and technological culture and the promotion of innovative methods and strategies aimed at facilitating the learning of scientific disciplines in all school agendas. Luigi Berlinguer, president of this Committee, places the task of this working group in a scenario of profound social changes that require a paradigm shift in the understanding of the role of scientific culture in the processes of knowledge, understanding of the world around us and in the appropriate teaching strategies to respond to such a change.

The Experimenta 4 project set up in this framework, was initially aimed at the first and second cycle of education and, from 2014, was extended to the context of the nursery school.

In February 2018, the document "National Indications and New Scenarios" in which the importance of citizenship skills is emphasized and the cultural instruments through which it is possible to promote their development are made explicit was presented to the Ministry of Education. Among these, the document emphasizes the importance of scientific thought understood as the ability to observe, explore, detect phenomena, ask questions, formulate hypotheses to test and collect data. What is said is in continuity with what was written in the Italian document “Indicazioni Nazionali per il curricolo della scuola dell’infanzia e del primo ciclo di istruzione”, in the field of experience “La conoscenza del mondo” in which we want to support the idea of a child who observes, continually explores reality, learns to describe, reflects and elaborates the experiences made by reorganizing them.

This perspective is in line with what the international normative documents on Early Childhood Education express in relation to the field of scientific education.

Te Whākiri Curriculum, New Zealand's first national curriculum for educational services from birth to 5 years, unfolds over five lines, one of which, "Exploration", invites teachers to promote active exploration, thought, and reasoning and to develop a child's ability to construct theories to make sense of the physical and natural world. In Norway, the National

Curriculum Guidelines on Early Education and Care establishes thematic areas of development related to different aspects of a child's life. The "Exploration" paragraph, in particular, contains references to the scientific area and to the way in which a child approaches the world and enters into relationship with it:

> *"Children innately have a sense of exploration to wonder. On exploring, they satisfy their curiosity and have a feeling of belonging to the world and community around them. [...]. Children feel that their explorations, questions, thinking and activity are meaningful. They can take their time experimenting with new things. Experiences of trial and error, and moments of insight maintain and strengthen a child's joy of learning".* (National Curriculum Guidelines on Early Childhood Education and Care, p.23)[1]

In France, the *Socle Commune de Connaissance, de Competences et de Culture*[2] devotes to the development of a scientific approach to the knowledge of the world the area "Les systèmes naturels et les systèmes techniques" in which it is recommended to support the curiosity of children and promote their desire to ask questions, looking for answers, experimenting and inventing.

The decision to start a reflection dedicated, in particular, to identifying the most effective strategies for learning in the field of science education in the context of the nursery school starts from being convinced of a complexity linked to the most appropriate ways and strategies to respond in a coherent way with the idea of scientific education explained in the documents cited above.

Not only. The need to reflect on this theme also derives from the observation that, when the recipients are children of pre-school age, talking about science and science education is always complex because, beyond the declarations of principles contained in the normative documents cited above there are also so many systematic and rigorous researches aimed at highlighting the best conditions that favour the promotion and development of scientific thought in children of pre-school age.

The research that I have carried out has started from these considerations and, moving on an exploratory level, has set as its main purpose, that of elaborating and testing an educational and didactic approach aimed at supporting and promoting the development of scientific thought in the Nursery school.

The setting and implementation of the survey path has been characterized by the following stages.

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[1] From www.ibe.unesco.org curricula Finland.
[2] Document can be consulted on the site www.education.gouv-fr.

Firstly, it was a question of defining the theoretical and cultural framework within which to define the characteristics of the research system. For this purpose, in the first part of the thesis I conducted an in-depth analysis of Italian and international literature on scientific education. The review of the studies present on the national and international scene has shown that there is no clear and unambiguous theme in this field of investigation. Research, studies and experiences on the topic have highlighted aspects that can be traced back to three main lines of investigation.

1. Sensitization towards environmental issues (Environmental Education) (Duhn, 2012, Erdogan, Bahar, Ozel, Erdas, Usak, 2012, Cutter-Mackenzie, Edwards, Moore, Boyd, 2014).
2. The rediscovery of the natural world through a direct relationship with plants and animals (experience of the agrinido, school in the woods) (Faber Taylor, Wiley, Kuo and Sullivan, 1998; Louv, 2005; Peta, Savarese, Ventura, 2010; Bertolino, Morgandi, 2013; Bertolino, Guerra, Schenetti, Antonietti, 2017).
3. The importance of initiating children to the acquisition of a method to investigate the phenomena of the natural world. (Arcà, Guidoni, Mazzoli, 1990; Lind, 1999; Tu, 2006; Lanciano, Lombrici, 2008; Inan, Trundle, Kantor, 2010; Giordano, 2010; Andersson, Gullberg, 2014).

Only this last line of investigation focuses explicit attention on a scientific education intended as support of the relationship between child and nature in cognitive terms and allows to highlight some general suggestions about educational proposals for children. In particular, it emerges that science education in the nursery school can not be reduced to the simple transmission of scientific notions, but that it is important to propose paths aimed at supporting processes typical of a scientific way of relating and getting to know the world, leveraging on the fact that children, even in an embryonic way, activate these processes spontaneously starting from early childhood: in fact, they are immediately, curious and attentive observers, explore through their senses, develop reasoning, know how to ask questions and seek autonomous answers without being conditioned by stereotypes, interact with peers and adults to formulate these responses.

The analysis of European and international literature has proved to be fundamental, but not yet sufficient to provide useful suggestions to prepare a context and an educational/didactic intervention with the characteristics necessary to support cognitive processes in a child's relationship with the natural world of animated and inanimate things.

For this reason, a deepening of the theoretical references that are the basis of an educational approach aimed at promoting critical and reflective thought processes in children to investigate the phenomena of the world was necessary. In particular, John Dewey's theory of inquiry (1933, 1949), Vygotskij's "zone of proximal development" (1956), Bruner's scaffolding (1976), was taken into consideration on the one hand, and, on the other, the psychoanalytic perspective with the thought of Freud, Melanie Klein, Bion and Meltzer and Harris, to focus on the deep psychic processes that represent the engine for the development of curiosity and the taste of research and knowledge. Moreover, the contribution of Susan Isaacs (1930, 1933) was particularly useful because, with her experience at Malting House, she effectively interpreted Dewey's theory and the psychoanalytic one in an expressly pedagogical sense defining an educational context and style suitable to recognize and to support the curiosity and interests of the child to promote learning in the scientific field at the highest possible level.

In order to keep the above-mentioned theories in close interconnection, reference was made to the approach of 'promoting from within' (Bondioli, 2008; Bondioli, Savio, 2009; Bondioli, 2015a and b, Savio), 2003, Bondioli, Savio, 2012, Savio, 2013). In fact, this approach falls within the theoretical framework outlined and has proved to be effective for designing and setting up adult intervention aimed at promoting the development of a scientific attitude.

The research designs.

On the basis of the reference literature examined, in particular the one that shows how it is possible to support infantile epistemophilic impulse by promoting the spirit of observation, the ability to detect problems, formulate hypotheses and verify them, we proceeded to set up an exploratory research in the field with the following purposes:

1. identify which environmental conditions (materials, spaces, times, role of the adult) can foster and promote the conduct of scientific exploration of natural phenomena in children of pre-school age, with particular reference to the educational context of nursery school;
2. detect and describe these behaviours.

Specifically, the research has proposed to test three different environmental conditions characterized by:

- same type of materials selected and proposed in such a way as to encourage free scientific exploration in children;

- a different style of adult intervention, characterized in the three cases, respectively, as a presence that: observes and permits; promotes from inside and supports conversation about what has been done.

The question that led the research was to investigate whether and to what extent children belonging to the same educational context, of the same age and involved in a similar experience of free exploration of 'soliciting materials', manifested, in correspondence with the three styles of intervention indicated, a similar or different richness and variety of exploratory conduct of a scientific nature.

In the realization of the empirical phase of the survey, 3 groups of 4 and 5 year old children were involved, attending the same section of nursery school, composed in such a way as to be balanced by age and gender. For each group, in parallel, a path was proposed consisting of the same number of meetings, conducted in the same space and with the same materials, but with a different adult intervention. Once the groups were formed, by drawing lots, each of them was assigned a type of intervention (promotion from the inside, promotion from the inside and final conversation, *laissez-faire*). Before and after the intervention, each of the three groups participated in two meetings in which the children were able to interact freely with the materials made available, in the presence of an adult who observed and did not intervene except in the case of emergencies or needs. of a practical nature.

The survey plan also included preliminary informative meetings with the Headmaster, teachers, families of the children involved and a phase of restitution of the experience addressed to teachers and parents.

Choosing to conduct research in a nursery school allowed observing the behaviour of children within their "natural" and familiar environment, offering the possibility of extending, even with due caution, considerations about the approach used and some outcomes obtained in educational contexts similar and typical for this age group.

Data collection was made possible: from the video recording of all the meetings and their transcription into observational protocols as a basis for carrying out the analysis work; from conducting an interview with teachers aimed at knowing the characteristics of the educational context that the children involved in the research live on a daily basis. The interview with the teachers was carried out at the end of the research path, as specified in the chapter dedicated to the installation of field research, to "clear" the field of prejudices that could have influenced my way of conducting meetings, to relate with the children and with the teachers themselves.

The analysis of the observational protocols has made it possible to identify the epistemic categories of children and the elaboration of a grid of analysis of infantile conduct in relation to the mode of communication and the social dimension. In addition, a grid analysis of the role of the adult was developed based on the proposed intervention strategies and the activated tutoring functions.

The identification of the categories and the elaboration of the analysis grids required, at the methodological level, the involvement of external observers; this aspect had the advantage both of containing the distortions related to subjectivity and of integrating different points of view that have enriched the moments of reading and analysis of the collected material. The practice of inter-observation (Lucisano, Salerni, 2018, Braga, Tosi, 1995) has in fact offered the possibility of comparing the hypothesis of codification that the construction of the analysis grids and the analysis itself involved.

Data analysis

The quantitative and qualitative analysis of the data was carried out through the counts relating to the various aspects connected with the infantile epistemic behaviours detected (type of conduct, communication modalities, social dimension, time dedicated to scientific activities). The commentary on the data was made by relating the manifestation of child behaviour with the different approaches proposed by the adult.

The interweaving of quantitative data and the comment to them seems to suggest that interventions based on putting into practice the "promotion from within" approach influence the possibility, on the part of children, to show more articulated and complex scientific behaviours, to develop the aptitude to confront and interact with peers and with the adult, paving the way for new paths of investigation.

The aspect that emerges, in particular, concerns the fact that the data relating to the groups to which an intervention based on promotion from the inside has been proposed, show a greater presence of epistemic behaviours through which the observed phenomena are examined in depth. Between the two groups to whom an internal promotion was proposed, the one which was able to take part in the final conversation (group B) showed that a greater percentage of time was spent in epistemic. Not only! Compared to group A (promotion from the inside) and C (*laissez-faire*), the data related to the performance of the experience in

group B (promotion from the inside and final conversation) have highlighted a greater presence of verbal communications and social interactions.

The explorative nature of the research has allowed us to identify some characteristics that make a context favourable to the support and development of a scientific and cognitive attitude towards the things of the animate and inanimate natural world. This opens up the possibility of designing experimentation paths that go on to deepen, the type of correlation present between the manifestation of the observed scientific behaviours and the intervention strategies proposed by the adult.

The analysis and commentary of the data have also suggested further research paths that can help to specify in more detail an educational and didactic intervention aimed at promoting the acquisition of a scientific attitude in a child in relation to the world of natural animate and inanimate things

Considering the new regulations on the introduction of an integrated system 0-6, it would also be interesting to consider the investigation on:

- what are the characteristic of the educational approach which I highlighted that could be effective in groups of children between the age of 0-3 years old;
- what are the approaches that this specific segment of age require as well as the context, which is relevant to their development and learning.

In the chapter dedicated to the conclusions, the differences related to the different situations proposed to the groups will be explained with greater precision, as well as the possible areas of work of which I have mentioned above a single example.

Some editorial notes

The thesis, translated into English, presents parts of the text in Italian.
Specifically, the quotations from an Italian text and written by Italian authors have been transcribed in the original language. I have transcribed in the original language the name of Italian laws and normative documents. I have olso transcribed in the original language the observation reports of the meetings with the groups and I have included as an attachment (Attachment 1).
In the chapter dedicated to the description of the days, only one example of how the analysis grids have been analyzed and described for the conduct of children and adults has been given.

List of abbreviations

Elements of the children's analysis grid

Detecting of the phenomena (RIL.FEN.).
Assembly and construction (ASS/COS)
Exploration (ESP.)
Experimentation (SPE)
Problem Identifying (IND.PROB)
Verbal, Non-verbal (V./N.V.)
Individual, Social (IND / SOC)

Adult strategies

Repeting (Rep.)
Comply (Comp)
Reformulation (Ref.)
Open questions / closed questions (DA / DC)
Introduction of new elements (Introd.)

Functions

Consolidation (Cons.)
Marking critical features (Foc / evid.)
Soliciting (verbalization, hypothesis, continuation of experience) (Sol.)
Emotional regulation (Reg. Emo.)
Frustration control (Cont.)
Social connection (Soc. Conn.)

PART I

“Scientific” education in the nursery school: a review of the literature and some theoretical suggestions

Chapter 1.
Prospects and Developments in Literature.

The relevance of scientific education during the preschool age is put in evidence in several international and European programmatic documents concerning the nursery school which suggest implementing experiences within which children can explore, look at the natural environment, make hypotheses and ask questions, discuss and confront with peers and adults.

By way of example the Te Whariki Curriculum, the first national New Zealand curriculum for educational services from birth up to 5 years old, runs along five lines, one of which, "Exploration", invites teachers to promote active exploration, thinking, and reasoning and to develop the child's ability to build theories to make sense of the physical and natural world. The document, in the section "Early Childhood Education and School Continuity", emphasizes that children at the end of nursery school should have achieved development goals regarding the ability to experiment, observe, research and make assumptions about the physical and natural environment.

In Finland, the National Curriculum Guidelines on Early Childhood Education and Care experience[3] establishes thematic areas of development related to the different aspects of the child's life. The "Exploration" section, in particular, contains references to the way the child relates to the world of natural things, emphasizing the importance of supporting the innate curiosity and tension of doing research to explore, observe and know the world of animated and inanimate natural things.

In France, the Socle Commune de Connaissance de Competences et de Culture[4] devotes the development of a scientific approach to the world's knowledge to the "Les systèmes naturels et les systèmes techniques", in which it is recommended to support children's curiosity and to promote their desire to ask questions, seek answers, experiment and invent.

In Italy, the “Nuove Indicazioni per ilcurricolo della scuola dell’infanzia e del primo ciclo di istruzione” of 2012, dedicate the theme of scientific education to the field of experience “La conoscenza del mondo”. From reading this paragraph a curious child who explores and observes facts and phenomena that characterize the natural world, reflects and re-elaborates

[3] The document is available at http://www.ibe.unesco.org/curricula/finland/fi_ecefw_2004_eng.pdf
[4] The document is available on the website www.education.gouv.fr

experiences with the peer group, and the teacher who designs experiences based on interests and on the questions asked by children during their daily activities emerges.

The analysis of these documents highlights a common focus on supporting a child's relationship with the natural world characterized by free exploration, the development of spontaneous curiosity in investigative paths capable of giving meaning and building knowledge of that world. Therefore, a scientific education understood as the promotion of thought processes that support learning, for research in relation to natural reality.

In order to explore deeper the meaning of the scientific education during the preschool years I did a review of the literature considering several studies and research on the field.

Such a review allowed me to identify three main lines of research and proposals that only partially overlap, each highlighting particular aspects of the relationship of the child with the natural world: a) the so called Environmental Education, b) studies and proposals about experiences in nature (agri and forest day-care and nursery schools) and c) studies and proposals about experiences aimed to promote an active "research" attitude in the processing of knowledge about the natural world.

1.1. The Environmental Education studies and proposals

According to the supporters of the Environmental Education, this represents an important response to develop awareness of ways in which human interactions with the world can damage or enhance the natural resources and ecosystems of different species. This ideological position, historically, has emphasized an ecological - or perhaps – eco-centric perspective (Cutter-Mackenzie, Edwards, Moore, Boyd, 2014).

In order to identify the most significant in the range of studies and proposals in the field of Environmental Education, I will present here only those developed in countries where environmental issues have also taken on significant importance in political choices: New Zealand, Turkey, the United States and Australia.

In New Zealand, a research conducted by Iris Duhn (2012) involved ten day care centers and nursery schools in the city of Auckland with the aim of developing a sensitivity to some "global" environmental issues and, specifically, climate change. The focus of this two-year qualitative study focuses on ecological sustainability from a bicultural point of view, integrating the Western perspective with the Maori. From preliminary interviews with educators many hesitations about the possibility of joining a research program focused on "global" climate change emerged. The educators expressed little knowledge about this topic and did not know how their contribution could have influenced and changed the perspective of children and the community. For this reason, the group of researchers identified the concept of "place" as a territory, a spatially defined area that could be described, within which to place reflections on issues with a wider impact. This step turned out to be effective for many teachers, especially those who felt "overwhelmed" by a global theme as vast as climate change.

For some participants, focusing on the relationship between local and global problems and, at the same time, the interweaving between the two cultures - Western and Maori - has contributed to questioning the notion of the Child Center as a ‘special place ', isolated from the outside and the idea of a teacher who has to protect children from the dangers of what's "outside" the school. One of the strategies that has been shown to be most effective in bringing out the connection between nurseries, children's schools and the external natural and social environment has been to focus on existing practices:

After we attended the initial “hui” [meeting with all participants and researchers]. We did a review of where we are at with ecological sustainability in our Kindergarten. We were

surprised at how many things we already had in place and how green-minded we were as a team. (Duhn, 2012, p. 24).

In this way, the participants realized how many things they were already doing in the day care centers and the nursery schools compared to local environmental issues that, however, had repercussions on global issues. In particular, they have for some time carried out recycling projects of the various materials to avoid the increase rubbish dumps that polluted the ocean. The results of the data analysis show that, following participation in the proposed activities, children acquire specific knowledge about local ecology and greater sensitivity to more general environmental issues.

In Turkey, two studies have, in particular, investigated issues related to strategies and activities to be offered to children to develop greater awareness of environmental issues.

The first survey conducted by Erdogan, Bahar, Ozel, Erdas, Usak (2012) took into account pre-arranged preschool curricula in different cities in Turkey. The research conducted in two different periods, (2002 and 2006) suggests some reflections from a comparative analysis of early childhood curricula in areas related to environmental education. The curriculum documents provided by the Ministry of Education's institutional site have been subjected to content analysis that has led to identifying the aspects that are needed to promote Environmental Literacy5. At the end of the investigation, the authors point out that in the documents examined, between 2002 and 2006, there is increasing attention in the preparation of experiences aimed at developing children's sensitivity to the natural environment. The authors, based on the results of the survey, suggest that teachers promote experiences aimed at supporting children's curiosity and sense of marvels towards nature by allowing them to explore the natural environment and avoid transmitting conceptions and content concepts. This latest way of teaching does not contribute to developing greater sensitivity and awareness to environmental issues, it is more appropriate in preparing informal contexts and making available to children different toys with which they can play.

The second study conducted in Turkey deals with an investigation carried out by Ertürk Kara, Aydos, Aydın (2015). The hypothesis investigated by the authors is that if children are offered opportunities for systematic contact with nature, they will develop behaviors of greater sensibility to the natural environment and the creatures that inhabit it. Research -

[5] Environmental Literacy corresponds to the development of a sense of awareness and awareness of environmental issues and represents the main purpose of curricula oriented to Environmental Education.

conducted under the supervision and monitoring of the Ministry of Education in Istanbul - involved 14 children from four to six years of age in their nursery school. The research plan includes a range of activities aimed at children with the aim of developing sensitivity to environmental issues such as recycling various materials available in the classroom. Another experience was to raise awareness and develop respectful behaviors for animals and plants. In this case, the children planted or looked after plants or small animals found while outdoors in the garden. At the end of the research, the authors emphasize that the analysis of collected data has highlighted changes in the behavior of children in relation to the issues addressed. Specifically, teachers' remarks and reports point out that children seem to have developed sensitivity to recycling practices, taking care of the plants that they sowed observing their growth and caring for the animals found in the garden while looking for the food to feed them.

In the United States, the social and political importance attributed to the "environmental issue" has led to the publication of Guidance Documents for building educational projects and quality contexts focused on Environmental Education. In carrying out these documents, the directives of the Belgrade Charter (UNESCO, 1976) have been adopted, according to which the ultimate objective of environmental education is the development of a citizenship on environmental issues and the formation of individuals able to understand environmental issues using knowledge acquired, also in scientific matters in order to be informed, to make conscious choices that take into account social and political factors. With these references, the North American Association of Environmental Education publishes Early Childhood Environmental Education: Guidelines for Excellence (2010), which defines six key features[6] to guide curriculum design to provide quality environmental education for children up to six years. The guidelines outlined in the paper suggest the idea of a child that has an unusual curiosity that prompts him to observe and explore and emphasize the value represented by the preparation of teachers who must have a basic understanding of the theories of Piaget, Dewey, Vygotskij, Montessori and take care of their training in service.

To assess the quality and effectiveness of programs developed in educational contexts, an Early Childhood Environmental Education Rating Scale[7] (Yash Bhagwanji, 2011) was developed to accompany the implementation of the guidelines outlined above. This tool is

[6] The complete document is available at www.naaee.org and is designed by a team of professionals from different fields (educators, university teachers, environmental experts and natural education).
[7] The complete document is available at www.naaee.org

based on a training evaluation idea whose goal is to provide support to educational staff to build quality environmental education programs. The instrument proposes to evaluate six features on a 7-point Likert scale accompanied by descriptors that guide participants in the evaluation task.

In the United States, Lucia French (2004), in a study, analyzes the Science Start Curriculum, a document adopted in educational services and nursery schools which considers scientific content through an integrated approach that has proven to promote meaningful learning not only in the scientific but also in other areas. The survey has highlighted the aspects in the policy paper that help to develop a scientific attitude towards nature and the environment. Starting from the observation that outdoor activities were very engaging for children, the group of educators with researchers set up outdoor activities and games during which children were stimulated to observe, explore, question and make hypotheses. The author focuses on describing a situation of activity according to a model called "Science Daily" that is structured on the basis of a reasoning cycle (think - ask - plan - make hypothesis - act - observe - report and reflect) that is realized in activity modules of two months, approx. The results of this study underline the improvement of children's performances in different learning areas, such as language assessed by the Peabody Picture Vocabulary[8]. The peculiarity of this research - to highlight the scientific knowledge that can be derived from the relationship between a child and nature - testifies to the fact that, over time, within Environmental Education, research and studies that offer ideas and reflections not, rigidly, focused on an eco-centric perspective, have been welcomed

In Australia, among the studies that deal with Environmental Education, it seems interesting to me to report that of Treagust, Won, Petersen, Wynne, (2014) which refers to a recent reform of curricula. The study carried out by the authors concerns, in particular, the specialist training of those teachers who will perform their work in elementary schools, but it is interesting to note that Treagust and his collaborators suggest that recent curricula reform Australia, has led to the integration of Early Childhood Education curriculum with that of the next school level. This change was not a matter of fact because it involved the inclusion of educators within the same training and assessment system proposed up to that time for primary and secondary school colleagues. The authors conclude their work,

[8] Peabody Picture Vocabulary Test (PPVT) is a standardized tool that is commonly used to assess the cognitive and linguistic level of young children and the impact of intervention programs designed to best prepare pre-school children for school success.

emphasizing the need to propose upgrading and training paths that promote the aspect of inter-discipline over an undesirable speciality in early childhood education but also in the early years of elementary school.

From the reading of the papers and studies I have considered, within Environmental Education, an eco-centric view of the relationship between the child and the things of the natural world emerges; Relationship from which the child, accompanied by an adult, learns to respect and care for the environment and creatures living there.

1.2. The experiences in nature (agri-day care centers and nursery schools): between health and well-being.

A second line of research, partly related to the previous one, developed from the reflections of some authors (Wilson, 1994, 1996; Bixler, Floyd, 1994; Bixler, Carlisle, Hammitt, and Floyd, 1994; Bertolino, Morgandi, 2013; Bertolino, Guerra, Schenetti, Antonietti, 2017) who indicate the risks associated with excessive time (95 %) that children spend at home and the high urbanization of their daily living environments. Some medical research carried out by researchers at the Brien Holden Vision Institute in Canada has highlighted that the consequences of this trend are, on the one hand, an increase in the number of children showing obesity, decreased or lack of vitamin D, and on the other hand, the development of fears and feelings of disgust in relation to natural objects (Louv, 2005).

Despite the results of medical research showing the positive health effects of children who spend time outdoors, many parents and educators are reluctant to design outdoor activities for fear of the risks that can be encountered in parks and in the woods. A study conducted in Canada in 2015 led to the publication of the Position Statement document on Active Outdoor Play, a document prepared in response to the debate on the benefits and risks of outdoor games. The data provided by the Royal Canadian Mounted Police point out that Canadian children are much more likely to experience serious accidents as passengers in cars rather than playing in woods. The study also reveals that children who spend a lot of time at home are more exposed to web-related risks or excessive food consumption increasing the likelihood of contracting heart disease.

In the United States, Illinois, Faber Taylor, Wiley, Kuo and Sullivan (1998) conduct research aimed at highlighting the role played by the physical environment in children's development within cities, focusing in particular on the role of the open spaces in the neighborhood and on two aspects considered fundamental to the normal and healthy development of children: play and interaction with adults. 64 urban spaces of public outdoor residential building (27 with low vegetation, 37 with high vegetation) have been observed on 4 different occasions. Of the 262 children observed (from 3 to 12 years old), most (73%) were involved in a certain type of game: symbolic, invented rules, and conventional rules. Most groups of children (87%) have been shown to be able to interact more or less intimately with adults or adolescents. The research has highlighted that in urban environments interactions and playing levels were reduced by half than those observed in environments richer in greenery and vegetation. The authors, in research findings, recommend that teachers

and educators promote outdoor experiences in green spaces rich in vegetation in order to promote healthy psychophysical development.

In response to medical research and the need for the child to play and to do outdoor activities, some experiences aimed at encouraging projects bringing man-nature closer, from early childhood have been started. These experiences are based on the principles of modern “forest pedagogy”, developed by Joseph Cornell in the 1970s, which aims to support enthusiasm for nature and other living things and allow children to experience an immediate sensory experience and leave freedom for personal discoveries. Among the experiences present in the European territory I will present the case of Denmark and Italy. In Denmark, the first School in the Woods was born by Ella Flatau in Søllerød as a daily experience of close contact with nature, awareness and confidence that this is the environment of life and play, for a better and healthier growth for the children. The peculiarity of these schools is that they do not have a real building, but a haven called Bauwagen ("building carriage") useful as a shelter for children in emergency situations when the weather is particularly adverse (hailstorms, strong thunderstorms) or to shelter the tools, materials and spare parts for children. In Italy, the “School in the Wood” began to be structured in the 1990s, although the roots of this kind of experience can be traced in the teachings of Rousseau, Montessori, Agazzi, Pizzigoni, Freire and Pestalozzi. Such an experience is based on two fundamental principles: the transition from the teacher's centrality to that of the child and the need to open the door to the countryside as a place for healthy growth for the subject.

Recently, a school project in the Wood was born in Bologna, which is an example of how the principles of forest pedagogy, theorized by Cornell, have been reworked and contextualized within the local reality.

A kind of childcare service that has several aspects in common with those described above (seeking direct contact with nature to promote a healthy childhood development) is the one born in farms or zoo-technics. The most significant European experiences that I will consider are those of Sweden, Denmark, United Kingdom, Germany and Italy.

To describe these experiences, I will refer to the study published by the Equal Opportunities Work Group of the National Rural Network (Peta, Savarese, Ventura, 2010) "Childcare and teaching activities in farms and rural areas".

In Sweden, the Segerstads Kooperativa Förskola is a child care service organized as a co-operative by parents and hosts children from 1 to 6 years of age. Educational staff includes, in addition to educators, speech therapists and psychologists who involve children in various

activities, among which the most relevant is recycling education. In Denmark, Fjellerup Børnehavesf is a structure that can accommodate up to 40 children aged 0 to 6 and is located in a rural area. Educational staff consists of nine educators, assistants and trainees with the task of promoting the development of the child's capacity thanks, for example, to activities centered on the discovery of the four natural elements or the processing of various materials including clay, wood and textiles.

In the UK, there is growing attention to the need to seek, experiment and evaluate more innovative learning and training models. In this framework, there are three significant experiences approved by the Office for Standards in Education, Children's Services and Skills: "Loversall farm day", "Beechwoodfarm day nursery", "Coneygarth Farm Day Nursery".

In Germany, the "Bauernhofkindegarten" day care center was born within the homogeneous zoo-technic holding that has large areas dedicated to pasture and this allows to pay particular attention to biodiversity and to the protection of the environment.

The goals that these structures intend to achieve are aimed at raising children in a stimulating environment in order to be able to foster learning through a series of activities in contact with nature.

In Italy, one of the most significant experiences in this field is represented by the Agri day care center instituted by the Marche Region. A feature of this experience is the collaboration with the Chiaravalle-Montessori Foundation which has led to the establishment of an interdisciplinary technical committee of science that has proposed and outlined a set of guidelines to ensure the quality of active childcare education services on farms.

In addition to the experience of the Marche, there are other similar experiences in the Italian landscape: "La Piemontesina"[9] in Turin, "Fattoria Casa Mia" in Ospedaletto di Pescantina in the province of Verona, "Lo Spaventapasseri" in Castelnuovo Garfagnana (LU) and "Villa Colle "located in Bagheria (PA) (Sofo and Calabrese, 2015).

The philosophy that accompanies these experiences is to offer children a real environment to explore and to propose, at the same time, an opportunity to regain the values and traditions of rural territory.

[9] Caterina Rizzardi described, in her thesis work, an experience of agri-business "La Piemontesina". The thesis, reported in the bibliography, has not been published.

The considered literature points out that the experiences in nature and the Agri day center represent, an educational opportunity for children who can live directly in relationship with nature, with animals observing how they live, but it does not offer strong and explicit references to the development of a cognitive relation of the natural world through exploration and investigation processes cannot be traced.

1.3 Scientific education as a development of critical and reflexive thinking.

The researches carried out on the international scene that I will take into account in this paragraph share with the earlier approaches the idea that child has a “natural” propensity to interact with the surrounding environment, to explore it with curiosity and interest, but also propose a different approach to the natural world based on the idea that the contact with the physical world can develop in children a critical and reflexive way of thinking.

Several researches (Lind, 1999, Tu, 2006, Inan, Trundle, Kantor, 2010; Andersson, Gullberg, 2014; Spektor-Levy et al., 2013) point into light the possibility of a scientific education in early childhood. The researches show that in the context of nursery schools it is possible and useful to promote the following abilities: to observe, explore, research, dialogue, expose hypotheses and test them, describe and talk about scientific topics. The research I'm going to illustrate refers to the National Science Education Standard, a document published in 1996 by the National Science Academy and elaborated by a group of experts from various fields and representatives of various educational, scientific and technological associations[10]. The standards outlined in the document relate to teacher training, context and child assessment processes and tools, quality levels related to the system, content and organization of curricula designed for scientific education. In the United States, Karen Lind (1999) publishes an article underlining that the US Department of Education and the National Science Foundation have approved maths and science programs that adopt active methods and promote the process of investigation, problem- solving and cooperative learning. In the process of investigation, says Lind (1999), children engage in skills and scientific knowledge: with scientific reasoning and critical thinking they come to build and develop understanding.

Among the researches that considered the central educational role of a stimulating learning environment characterized by adequate spaces, from a variety of textured and non-material materials, which offers significant opportunities to support the curiosity of children, their need and pleasure to discover, I will illustrate the American ones of Tsunghui Tu (2006) and Trundle, Inan and Kantor (2010).

In a research of 2006, Tsunghui Tu investigates, in particular, the environment-related and material aspects that can foster the development of a scientific approach to the

[10] Among the associations that have signed the document, in addition to the National Science Academy, there are the National Science Education and the National Science Teacher Association

knowledge of the physical and natural world. This study looked at the space dedicated to the scientific laboratory set up in 20 sections of preschool children within 13 Midwest Childhood Centers. This research has used several tools to detect spaces11, availability of materials, equipment and activities of a scientific nature that teachers make available to children. The first results showed that most natural science-related activities took place in places and areas not foreseen by teachers during the programming. From this point of view, Tu says that teachers do not appear to set up suitable environments and scientific experiences, thus losing valuable opportunities. Research, based on the results obtained, provides some helpful information to teachers to prepare environments, materials and experiences useful to trigger inquiry processes through observation, exploration, and problem solving.

Also in the United States, Inan, Trundle, and Kantor (2010) publish the results of an ethnographic investigation to explore the experiences of scientific education conducted in some sections of Ohio's Child Care Section where the teaching method is inspired by Educational model of Reggio Emilia. Among the objectives of the research, the authors intend to highlight the characteristics of Reggio Emilia Approach that seemed to be linked to the possibility of favoring an attitude of problematics of experience, active research of solutions and knowledge building, even in the scientific sphere. Reggio Emilia's approach favors direct experience, involves the cognitive, emotional, social dimension and orientates educators in setting up contexts where children can, for example, observe hypotheses about the characteristics (direction, strength) of the wind produced by a fan and its effects on different materials (stones, feathers, paper).

The survey involved 18 pre-school children and 10 teachers and referred to the National Science Education Standard (formerly cited at the beginning of this paragraph) as a reference for early childhood science learning objectives and related knowledge that preschoolers should develop. The authors collected the data using different techniques: interviews, remarks, documentation and ethnographic notes. The results of the ethnographic study point out that, in designing scientific experiences, the teachers integrated into the project both the educational and methodological choices - expressed in the curriculum - and the interests and curiosity of the children in relation to the things of the natural and physical world. Scientific education, therefore, is considered not as a "discipline" in itself but as an integral part of daily experiences.

[11] Preschool Classroom Science Materials/Equipment Check List, Preschool Classroom Science Activities Checklist and Preschool Teacher Classroom/Sciencing Form

The published results also indicate that the nursery school inspired by the Reggio Emilia model seems to offer a rich context of experience, able to activate and support in children an attitude of inquiry over scientific content in the natural sciences.

Among the studies that have taken into account teachers' attitudes, the aims and objectives of the learning paths in the field of science I consider the following to be particularly relevant: Andersson and Gullberg (2014) carried out in Sweden and Specktor-Levy, Baruch and Mevarech (2013) conducted in Israel.

In Sweden, Andersson and Gullberg published in 2014 a research whose purpose is to highlight how different concepts of teaching and learning scientific skills are necessary for teachers in order to produce different results in the ideas that children have of science and the necessary competence for the teachers. The study involved groups of children between the ages of 5 and 6 and their teachers. In the first part of the survey, researchers offered a floating experience as an example of how two different epistemological perspectives generate different interpretations from the purpose of scientific education and the skills needed for the educator to propose it in nursery school contexts. In the first perspective, the central focus of science teaching is the development of children's conceptual understanding. With this perspective, the authors noted that scientific activities with children were unsuccessful because knowledge of concepts did not develop as expected and sometimes contributed to creating misunderstandings with concepts such as density. The second perspective focuses, on the other hand, on the ability to make the child an active builder of his knowledge in science. The adult does not convey concepts and notions but becomes a facilitator of thought processes. This second perspective has proved to be successful, also, with regard to the development of a sense of empowerment by the group of children. The latter, in particular, have perceived to have “a say” in building their own learning path. Based on these results, Andersson and Gullberg conclude that there are important skills and knowledge when teachers intend to involve children in a scientific course. In particular, the authors identify four of them:

- pay attention to children's experiences;
- grasp the unexpected events that occur when they occur;
- ask questions that challenge children and encourage further investigations;
- "remain" in the situation listening to the children and their explanations.

In Israel, Spektor-Levy, Baruch, Mevarech (2013) conducted a study on the attitudes of nursery school children's teachers in relation to scientific education and the ideas that

educators have on what is curiosity, especially the scientific one, and what the characteristics of a "curious" child are. The aim of the research is to highlight the characteristics and behaviors of a curious child to draw attention to the strategies that the adult can put in place to support scientific interest and promote learning. The authors share the “Deweyan” point of view and are convinced that curiosity is a fundamental aspect of the learning process. On the basis of this premise, they state that scientific curiosity can be defined as the desire to understand and know about natural phenomena. Scientific curiosity leads the subject to make decisions and develop skills that will make it possible to discover new information. The "scientifically" curious people will enrich their scientific knowledge through investigative behaviors, consulting written or expert texts, using tools (magnifying glasses, rulers, meters, telescopes) and designing small experiments by asking questions and hypotheses that will be submitted to tests. With these references, the main hypothesis of this study is that teachers' attitudes influence the involvement of children in the scientific learning process. The survey involved 146 nursery school children's teachers and the data was acquired through qualitative and quantitative methods. The results have highlighted that it is important to propose science education paths from early childhood because children at this age have an innate curiosity that prompts them to explore, observe, ask questions and hypotheses. To propose science education pathways in early childhood has a long-term impact on the formation and development of skills and a scientific attitude. In conclusion, the authors highlight seven guidelines to be taken into account by educators who want to make scientific education in preschool contexts:

> *“ (1) learning science by engaging in the inquiry process; (2) learning through authentic problems that deal with questions that are of interest to the child; (3) learning through experience and what is familiar to the child; (4) providing scaffolding and assistance; (5) embedding the teaching within the social, cultural and physical contexts that is being used; (6) exploring from many angles, across multiple subject domains; (7) using non verbal teaching materials (illustrations, sensory, moto, emotional et)”. (Spektor-Levy et. al., 2013, p. 2248).*

In Italy, reflection and debate on science teaching aimed at enhancing children's curiosity, soliciting and supporting their desire to explore, promote the ability to ask questions, hypotheses and to test them can be traced to the work of different authors (Lanciano, Iacona, Faithful, 2008; Lanciano, Lombrici, 2011; Giordano, 2010; Alfieri, Arcà, Guidoni, 1995; Arcà, Guidoni, Mazzoli, 1990; Bernardini, Masini, 1986).

At the end of the eighties, Bernardini and Masini (1986), in the publication of the proceedings of the Child and Science conference, reported a study conducted in the

municipality of Scandicci lasting three years and involving three nursery schools. The research intends to compare the way of thinking of a scientist (Carlo Bernardini)[12] with that of teachers to "measure both with that of children" (Masini, 1986, p.203). During the first year of research, teachers and researchers worked to build a common language and to identify the attitudes it deemed necessary to enhance and support the scientific skills of children. Subsequently, researchers have devised and proposed experiences aimed at highlighting children's thinking. The observations and reflections made by the group of teachers with the trainers point out that the most effective adult attitude in promoting research pathways and scientific approaches to the world's knowledge is to listen to children, to facilitate confrontation with the group, to avoid giving answers preferring to solicit new questions.

More recently, Lanciano, Iacona, Fedele (2008) and Lanciano, Lombrici (2011) have conducted a study aimed at testing a science education path with the aim of identifying the activities related to the science that can be proposed to children from three to six years and identify the strategies and attitudes that the adult can put in place to solicit the development of reflexive thought. The survey involved children and teachers of 10 Roman nursery schools within the "Roma Educational City" project. The results of the study have enabled us to identify appropriate activities and attitudes to promote the development of critical and reflexive thinking. In particular, the authors suggest to propose activities to which children demonstrate an interest during spontaneous play times and promote an adult attitude that allows the child to independently propose to make a solution to the problem encountered without providing solutions but, more appropriately, soliciting new questions, favoring peer-to-peer comparisons and providing more and more structured materials.

In Milan, Enrica Giordano (2010) describes an experience in line with the idea of scientific education as a development of problem solving and critical thinking skills through the investigation process. The experiences described in its article (shadows, meteorological phenomena, plants, animals, rocks, soil, water and volcanoes) follow some common steps characterized by a first start-up of the section work, with the collection of materials (set in the startup phase), exploration - both free and guided by adult questions - centered on the object of investigation and, finally, the creation of products that document the course.

[12] Carlo Bernardini is a physicist and author of various works of scientific divulgation and of political and social essays on the use of scientific knowledge in the modern age.

Giordano emphasizes that, regardless of the content of the experience, observation, careful listening to children, and group discussion are essential at all stages of the process; strategies through which the adult urges the comparison of different hypotheses and the taking of consciousness from other points of view. In moments dedicated to group discussion with the teacher, each child returns and reflects on experience, compares their own observations and knowledge with those of others to consolidate or build others. Within this framework, emerges the precise adult role, based on the awareness that only by taking into account the interests and problems - truly felt - will the subject be able to initiate a thinking process that leads to learning. Once you have the problem and interest, the teacher welcomes it, he expresses it and shares it with others, urging the children to make assumptions, to seek solutions without directing them and giving them pre-packaged answers. Scientific education, in this perspective, is understood as a possibility of designing "didactic" ~~courses~~ activities in the scientific sphere, without forcing, anticipation, and adapting that go towards a somewhat undesirable “instructing”.

Some final remarks

With regard to the various areas of investigation I have identified from the analysis of the literature considered, some considerations can be made regarding the idea that emerges of "scientific education".

As for Environmental Education, which includes studies aimed at highlighting the relationship between the child and the natural environment in eco-sustainability, the underlying idea behind this prospect is that the child, in contact with nature, learns to respect himself and other living beings. Experiences carried out in this area are intended to promote an attitude of sensitivity to the environment, ignoring the aspect of building knowledge through the investigation process. For this reason, therefore, Environmental Education is not part of we believe to be scientific education.

- Experiences in nature, considered in the second line of studies, have in common with the previous survey, attention focused on the relationship between the child and the natural environment. In this case, focus is on the benefits that psycho-physical development have on the ability to enter into a relationship with nature. The activities carried out in close contact with the rural and natural environment represent significant educational opportunities. Again, the analysis of the literature points out that the aspect of the intellectualization of the experience leading to the building of scientific knowledge on the natural world is not put to the fore.

The reading of the studies considered in the third line of investigation highlights the idea of scientific education as promotion of an investigative attitude, critical and reflective thinking that lead to the construction of knowledge consolidated in relation to living things and not of the natural environment.

Therefore, this is the last line of inquiry to focus attention on scientific education intended to support the relationship between child and nature in cognitive terms.

The studies considered in the third survey line place the emphasis on the following points:

1. Scientific education in the Nursery School can’t be reduced to the simple transmission of scientific notions. Rimondi (2003), in some experiences conducted with children and teachers at all levels of school, presents and proposes an idea of science as a "gym of thinking" that helps to understand the functioning of a complex world in interweaving and relationships which characterize it, is promoted. In this sense, according to the author, it is necessary to teach "to think about problems,

precisely in a world where everything seems packaged and on which there seems to be nothing to say ..." (Rimondi, 2003, p. 7).

2. Reflections on the third stage of study highlight the importance of proposing science education courses from early childhood because the child is ready and particularly sensitive to behaviors designed to observe, explore, ask questions, i.e. to make surveys with respect to the things that interest him. Children have an innate curiosity, they are watchful observers and notice phenomena and things that adults often take for granted and don't notice. Children explore through their senses, are able to interact with peers and adults, know how to ask questions and look for autonomous responses without being stereotyped.
3. Always in relation to the third line of studies, it emerges that aspects from which one can't afford to design science-based learning pathways include the need to set up stimulating and generous environments where children can engage in various recreational activities. The adult will be careful to offer the material, equipment and well organized and intentionally designed space accessible to the children. In this context, the teacher must observe the game in which the children are engaged and carefully write down what happens to be able to grasp the interests, curiosities and issues that emerge. Starting from the interests and the questions that children have placed during spontaneous play, adults consciously propose and plan, situations and experiences aimed at promoting learning paths.

What emerges is therefore a way of "doing sciences" attentive to integrate all the child's emotional, relational and cognitive growth dimensions. In this context, the adult is responsible for ensuring that these dimensions are integrated within scientific learning pathways through interventions designed to:

- set up contexts that may stimulate the children's interests. For example, the adult can propose experiences in the natural environment, outings and walks, animal husbandry and plant cultivation, gathering of natural elements, measurements, comparisons, starting from problems and situations of daily life or raise questions and curiosities from children;
- wait for the child's curiosity and initiative to manifest, and if he does not show any interest, the teacher urges him, without forcing, through questions that lead the child to focus on what is happening;

- listen to the children, grasp the helpful comments, explain them, re-launch them to the group, and ask for explanations.

Taking into account what emerged, in particular from the third line of inquiry regarding the peculiarity characterizing the teaching of scientific education in the nursery school, it may be useful in the future to develop a research aimed at promoting scientific thinking within pre-school educational institutions. The research contribution - which will be developed during my PhD program - could help to define contexts and educational styles aimed at promoting scientific education. The outcomes of the survey could provide useful reference points for schools and teachers, soliciting interest and giving professional tools to those who work directly with children.

Chapter 2.

What does it mean scientific education? Theoretical and cultural reference frameworks.

The analysis of research[13] conducted in the field of science education in pre-school settings and the reflections proposed in reference to the studies considered in the third line of research allow some aspects related to the overall development of the child to be evidenced, in particular the role that the adult takes in order to facilitate learning processes, and the teaching and educational strategies that the latter puts into play to promote the child's skills in science at the highest level.

In this second part, starting from the considerations that I have explained at the end of the bibliographic review, I will elaborate on the cultural reference framework of my work which refers, in particular, to the theoretical thought and contributions of:

1. John Dewey in relation to the process of inquiry;
2. Vygotsky and Bruner regarding the development of the concepts of "zone of proximal development" and of *scaffolding;*
3. Freud, Melanie Klein and Bion, Meltzer and Harris regarding the contribution that psychoanalysis has given to the roots of the psychic processes that represent the engine for the development of curiosity, inclination for research and of the pleasure of knowledge in the child;
4. Susan Isaacs who, with her experience at *Malting House*, has effectively interpreted Dewey's theory and the psychoanalytic one in an expressly pedagogical sense by defining a context and an educative style which is capable of promoting a child's learning, also in a scientific field, at the highest possible level;
5. The approach of 'promoting from within' as a reference that is placed within the theoretical framework of reference and useful for designing and setting up adult intervention aimed at promoting the development of a scientific attitude.

[13] The research which I refer to are those that are placed in the third line of investigation and emerged from the literature which, while sharing with others' research addresses some elements (such as the importance of children's interests, let them free to do the environment experience, for example), put the emphasis on the cognitive process that involves a specific method in which each element in the game has a closely connected role with the different phases of the model.

2.1. Dewey and the inquiry process: scientific education as a development critical thinking.

In the studies considered in the previous chapter , especially in the third line of research, the idea of a curious child, committed to explore the surrounding reality, full of questions, able to initiate investigation paths and find answers, emerges. This research promotes an idea of science understood as a "training of thinking" that helps to understand the functioning of a world, promoting an attitude of research, hypothetical and reflexive thought, using native intellectual resources to understand the world.

This consideration seems to be in line with Dewey's perspective on the development of reflexive thinking as a method of solving problems through observation, the development of ideas and reasoning, the formulation of solution hypotheses and their verification. Dewey (1933) states that the final goal of the educational effort is that mental attitude, that habit of thought, which we usually call scientific. The native and intact attitude of childhood, marked by ardent curiosity, by imagination, and by the love of experimental research is close to the attitude of the scientific method.

2.1.1. Inquiry as reflective thinking

To better clarify how the theoretical perspective of Dewey (1933, 1949) contributes to defining the framework within which paths of scientific education that activate processes of thought and knowledge are laid out, I will focus, in particular, on the process of investigation. In this regard, we need a brief reference to the context in which Dewey has elaborated his theory.

Dewey's thinking and theoretical elaborations are rooted in Darwin's theory of evolution that allows us to rethink the relationship between the individual and the environment in biological terms. The reality in the theoretical model developed by Dewey (1933, 1949) is the result of the innumerable exchanges and the relationship that organisms have with the physical, biological and natural environment in which they live and develop. Each organism establishes a complex integration with the environment in which it lives and by means of which it can grow and develop. In this sense the statement that "a fish lives in water and a bird in the air" is not absolutely complete and correct because the characteristic vital functions of these animals have become such due to the way in which the two environments (water and air) have influenced their respective activities. All living organisms, for the duration of their lives, incorporate, modify, and simultaneously adapt to their environments

to maintain an interaction with them conducive to survival. This complex system of components also comes into play in life and development processes. When the balance of such interactions is interrupted, the need arises to change and modify the terms of the relationship system to re-establish a new equilibrium. The biological model, in this sense, allows us to see the emergence of a problem as a consequence of the failure in the adjustment between organism and environment. Dewey, in this regard, better specifies the relationship between the situation of emerging disequilibrium and the attempt to re-establish conditions of relative stability by stating that the state of altered equilibrium constitutes the need. The movement towards its discovery is research and exploration. Re-establishment is fulfilment or satisfaction.

Research activity to find a new equilibrium involves a modification of the original environment and the implementation of mechanisms of adaptation to the new conditions by the organisms. The investigation, in the process of seeking a new balance in the altered relationship between organism and environment, not only aims at re-establishing a good adaptation, but creates new environmental conditions that, in turn, cause the emergence of new problems. What organisms learn during this process generates the emergence of new perturbations and needs, that push the organism to seek new forms of integration and adaptation to the new relationship with its reference environment.

According to Dewey (1949), the investigation, in fixing the disrupted organism-environment (which determines the doubt), is not limited to remove the doubt by re-establishing the primitive integration of good adaptation. It causes new environmental conditions that are the occasion for new problems. What the body learns during these processes generates new forces that place new demands on the environment.

In man, therefore, the final situation is not configured as a repetition of the original balanced situation, but the result is a new equilibrium in which the organism and the environment relate in a new way. In this sense, a highly evolutionary nature is set up that derives from the perennial mutability of the link between man and the environment.

Animals respond to the needs arising through automatisms and reflex behavioural responses that change only when their survival is in danger. Man responds to a need with thought, which is a tool for finding solutions that are favourable to problematic situations: it is an instrument of inquiry. The task of thought, or logic, is to clarify and organize the confused set of experiences made, and for this purpose the thought makes use of concepts, by reasoning and theories. These are configured as tools that allow us to report what we

know in an intelligible way and to give them meaning. So, for Dewey, knowledge is essentially practical and operative.

The affirmation according to which the environment in which man lives, develops and investigates is not only physical and biological, but also cultural, implies that the problems that lead to research emerge, mainly, from the mutual relations between social individuals and that the ways in which man responds to emerging needs, are culturally determined. This occurs even if the need originally stems from physical conditions since human behaviour is permeated by factors, meanings and conditions of a cultural nature. Dewey (1933; 1949) states that the physical environment is so embedded in a cultural environment that our interactions with the former, the problems that arise in relation to it, and our ways of behaving in this regard, are profoundly influenced.

Dewey (1949) outlines a model of investigation that has connotations that remain constant regardless of the problem to be solved: be it in common sense or inherent to the scientific field.

Before specifying the phases of the process of inquiry, it is necessary to consider the basic dimensions with which Dewey characterizes it.

In the first place, the emotional dimension, which is at the origin of the start of the investigation process. The problematic situation of departure entails emotions of anxiety and strong tension in the subject but also of interest and curiosity, and for this reason it is lived by him as authentic. This implies that the condition of doubt can't be imposed from the outside *"... as the so-called" arithmetic "problem in scholastic work"* (Dewey, 1949, trad it. 1974, page 139). A problem that does not arise from real situations leads to a sterile but "diligent" job. Dewey's investigation begins from this problematic condition and is defined as the controlled or direct transformation of an indeterminate situation into another that is determined, in the distinctions and relationships that constitute it, so as to convert the elements of the original situation into a unified whole. (Dewey, 1949, tr.it. 1974, p.135).

Secondly, the investigation process, according to Dewey, has strong connections with reflective thinking because, as he writes that "…the function of reflective thinking is that of transforming a situation in which an experience of darkness, doubt, conflict, or disturbance of some sort has been experienced, in a clear, coherent, resolved, harmonious situation". (1933, tr.it., 1971, page 172).

Reflection is characterized by a sequential, orderly and controlled series of ideas and does not coincide with what Dewey (1933) defines as "stream of conscience". The latter is more

properly constituted by an uncontrolled sequence of ideas which, if it happens in sleep, originates dreams, while during the day it is associated with those mental processes known as imagination or fantasies. Reflective thinking has no connection even with beliefs to which they refer, but instead, to things and events on which we do not have certain knowledge, that is, they do not derive from a personal mental activity characterized by observation, collection and analysis of data. An example brought by Dewey to clarify the difference between belief and reflective thinking concerns the conformation of the Earth. The ancient belief about the flat conformation of the Earth was based on some data derived from what man had been able to observe, data which, however, had not been analysed and controlled by extending the field of investigation. Columbus formulated a hypothesis different from the one accepted up to that moment; hypothesis, which he tried to support by undertaking a more systematic investigation, expanding the field of observation, making alternative hypotheses. In the latter case, we find ourselves in front of a form of reflective ~~thought~~ thinking because it is characterized by constant and diligent consideration of a belief or hypothetic form of knowledge in the light of the supporting evidence and of the further conclusions to which it tends.

Reflective thinking, unlike other mental processes (imagination, dream, belief) necessarily starts from a state of doubt and uncertainty and involves a research activity through which to identify the elements that will solve the problem and clarify the initial situation of uncertainty. The subject, faced with a problematic situation, may decide to renounce, escape from the condition of uncertainty, take refuge in imagination or he can choose to face the problem. In the latter case, the subject begins to reflect, and this operation involves, first of all, the observation of the aspects that characterize the current condition in order to carry out an analysis as complete as possible of the situation in which it finds itself.

The observation, in this close connection with the reflective thought, represents another basic dimension of Dewey's model of inquiry.

The observation is guided by our dispositions and interests of the subject that push to broaden their knowledge and is not limited to the action of "looking" but originates in the " ... *desire for expansion and self-realization."* (Dewey, 1933, trad.it. 1971, p. 348). For this reason, the training to observe the details of an object (for example, how the hours are indicated on the dial of a watch) without an interest towards a specific end (know what time it is) does not lead to anything since the details detected are captured as a multiplicity of isolated elements. When the observation reduced to an accumulation of data becomes sterile,

it does not lead to anything and this means that it is a "dead work", a waste of time. On the other hand, observation assumes meaning when it is oriented and enlivened by a result that is to be achieved. Observation, therefore:

- is needed to solve problems by following the process that guides the development of the practical and theoretical problem.
- it is analytical insofar as it is guided and motivated by needs arising during the activities carried out;
- it must have a method and become scientific insofar as it does not aim at an isolated accumulation of observational data and information but is proposed, as a means, to reach an intellectual conclusion.

Regarding the last point, Dewey suggests some strategies that the subject can put into action so that the observation is used methodically and represents a precious resource for the research process. The methods indicated by Dewey (1933) provide for the promotion of:

1. active exploration that differs from the operation of recognizing or identifying something that is already known and consists in observing to discover something hidden and unknown;
2. observation must introduce the element of "suspension", of the interest in the plot that occurs every time we are committed to construct something new that has no mechanical character and we do not have the certainty of the result that will be achieved. The authentic observational interest of the conditions in which we find ourselves and the changes introduced by our actions depends on this characteristic. Naturally, the solicitation that derives from the working of inanimate objects and living beings and from changes that occur after our behaviour, are not sufficient. In order for observation to contribute to the development of a logical attitude it is necessary that the various changes be linked to one another and that these connections solicit the intention for subsequent modifications;
3. observation should acquire a scientific character in order to find out what problem we are facing, try to invent possible explanations about the unknown aspects and verify the first hypothetical ideas.

Taking into account he aspects that I have explained up to this point it is possible to outline the five phases that characterize the investigation process better; that is to say, the path,

which leads to the solution of the initial disturbed situation. In detail, the phases are as follows:

1. The suggestion is the first response that the individual gives when it finds itself in front of a problematic situation. Suggestions have received little consideration in logical thinking because, when " *they jump into the head"* (Dewey, 1949, p.143) they have nothing rational. They take the form of ideas that substitute direct action blocked by the condition of doubt and uncertainty. In the example described by Dewey (1933) if we walk along a path and suddenly we are facing a ditch, after having observed and made a first analysis of the current situation (soil conditions, width and depth of the ditch), the first idea we will have is to skip it. In the example the observation of the conditions of the ground allows to put aside this suggestion, to re-examine the situation and to advance new ideas. The suggestions, therefore, serve the investigation process because they guide the observation by pushing to re-examine the situation we are facing and allowing the transition to the next phase of reasoning.
2. Intellectualization. In this phase, from the confused and uncertain situation, we pass, through reflexive activity, to a clearer definition of the problem. In this sense, the problem is not simply "given" from the outside, but its determination is already being looked into: the subject circumscribes the condition of unease which, in this way, is progressively transformed into an " *intellectual problem, not simply an opposition. that keeps us in check in what we are doing"* (Dewey, 1933, tr.it 1971, page 182). The transformation to which Dewey refers is achieved through observation, the inventory of the starting conditions, the verification of the suggestions that gradually arise and which help to clarify the discomfort that caused the blockage of the action.
3. The idea as a guide, or hypothesis. The original suggestion is checked, corrected and modified by observation of the facts and the intellectual penetration of the problem. Referring to the example that I mentioned earlier, if to overcome the ditch we intend to use a tree trunk that we have available we will have to observe its characteristics, those of the ditch, and relate to them in order to decide whether to accept the idea to use it as a bridge. Once accepted, after this screening, this hypothesis will lead to further investigations. The process of checking ideas by observing facts allows to progressively transform the controlled suggestion into a hypothesis of a more defined and potentially reliable solution.

4. Reasoning (in the strict sense) consists in developing the idea up to transforming it into a proposition "if ... then ...".

The development of ideas, connections that arise and reasoning depend very much on the history, culture and experience of the subject involved.

The development of an idea through reasoning helps to discover new terms that link elements that at first appeared to be isolated and " ... *in conflict because they led the mind to opposite inferences"* (ibidem, p.186).

5. The control of the hypothesis consists in the control operated in order to corroborate experimentally, or verify, the conjectural idea.

   From now on the hypothesized solution is only a possibility that should be checked since it is necessary to assess the consequences of the proposition "if ... then ...". Verification can take place through observation or may require recourse to an experiment that is carried out by adapting, in a controlled manner, the conditions to the hypothesis requests to verify if the results indicated by the idea actually take place. If the experimental results agree with the hypothetical ones and it is thought that this can happen only in those conditions, then the confirmation is such that it justifies a valid conclusion until contrary evidences occur, thus requiring a revision.

Not always, evidently, the facts confirm the hypothesis and then we are faced with a failure that, in the perspective of Dewey (1933) is never a mere failure. It is instructive. The reflecting subject learns a lot both from successes and from failures, in particular, if the latter are not occasional but follow the rigorous procedure explained up to this point. In the latter case, in fact, the error leads the person who reflects to question the reasons that led to failure, highlighting the observations to be investigated and the changes to be made to the hypothesis on which he is working. In this way the investigation process can continue until a new and definite hypothesis solution is found.

The management of the error always solicits experiences of discomfort and discouragement in those involved but the individual used to thinking succeeds in transforming the moment of difficulty into stimulus and solicitation to start a new search. The individual who is not used to reflect, easily, renounces or remains blindly attached to pre-packaged and non-original methods and facts.

Dewey points out that the five phases through which the reflective thought unfolds and develops are not followed by rigid methods. In particular, when the inquiry process is in

progress a circularity occurs between the different moments. This aspect is specified by the author who writes that every advance in the idea leads to new observations that lead to new facts and data and help the mind to more accurately judge the importance of the already known facts.

In particularly complex cases it may happen that one of the phases assumes a determining role and a greater extension, including the other phases within it.

At the end of the process the situation which elicited the process of inquiry is more defined: events and objects - first perceived as disconnected - receive a sense, a meaning and acquire knowledge. On the other hand, this acquisition of knowledge is never definitive: a scientist knows that the baggage of meanings understood, and the increase in knowledge acquired is not given once and for all, but involves the emergence of new doubts that he will face precisely thanks to what he already knows and describes the constant spiralling movement of knowledge.

The inquiry process is a fundamental reference for Dewey's educational perspective: education must have as its main objective the support, education and development of reflective thought within all human activities. It is important to bring about reflective thinking to avoid, in this way, forms of thought that derive from an immediate and unreasonable acceptance of the first suggestions that come to mind, which brings wrong solutions and false beliefs that can prove harmful. In particular, according to Dewey, one should avoid:

1. <u>physical and social sanctions of correctly thinking</u> that favour a *"primitive credulity, of a natural tendency to believe all that is suggested, unless there is overwhelming evidence in the opposite direction"* (ibidem, p.186); in other words, the tendency of the mind to accept consequences and conclusions , in the absence of strong evidence, only because they are vivid suggestions, and to discard safe data because it is in contrast with the habits and customs to which a certain human community adheres, must be fought.
2. <u>superstitions</u> that insinuate themselves and become powerful when there is no control of the conditions in which we observe and make inferences. Dewey writes that without the application of a rigorous method dreams, the position of the stars, the lines of the hand, are considered valid signs, and the fall of the cards as an inevitable foreboding at the expense of crucial events that are left out.

3. attitudes of avoiding to believe in what is convenient for us and what is in harmony with our desires. An example is represented by the desire to be in tune with the others, in particular, with those who belong to the reference group. This desire, which in itself is appreciable, can lead to forms of prejudice and weaken the capacity for judgment, leading to accepting anything that falls within the beliefs of that group.

Regarding attitudes, Dewey recognizes their importance as long as they cultivate those that encourage the use of rigorous scientific methods. In short, it is essential to promote a union between attitudes and the method of inquiry because it is not enough to know the best techniques of investigation but at the same time it is necessary to have the will and the desire to put them into practice. The attitudes that, according to Dewey, must be supported are the following.

1. The openness of mind as an attitude that is characterized by the extraneousness to prejudice and those forms of sinister adhesion that close the mind and make it refractory to consider new problems and to host new ideas. The mental openness that we intend to promote here coincides with the ability and willingness to listen - suspending judgment - to more points of view with respect to an event or phenomenon observed, and to consider different possibilities and alternatives related to a question. Therefore, it is not an open mind that passively accepts what is proposed to it from the outside but is active and attentive to what is happening around it and ready to change its beliefs. Working in this direction involves a great emotional effort that the person not used to thinking can't tolerate. The consequence, in the latter case, will be the tendency to look for the less tiring way by accepting replies and pre-packaged solutions.

2. A sincere total adhesion consisting in the possibility of engaging all of himself on a subject or problem to which one is genuinely interested. This attitude is important in the learning processes because it holds together an emotional and intellectual dimension. When this plot is disregarded, a sterile study is pursued, from which the acquisition of labels and notions of no real importance for those involved, is derived. This is still a very controversial and fragile point in the management of the learning processes in the school since, as Dewey (1933) points out, too often we tend to separate the lesson and the subject matter from the interests of the children.

3. The intellectual responsibility that is configured as the readiness to accept the consequences that derive from a position taken and guarantees *integrity*, that is

to say the coherence and harmony in the belief. It is not uncommon to see people who continue to accept beliefs in which they refuse to recognize the logical consequences. Continuing to support and profess beliefs without wanting to accept the consequences that derive from it implies a confusion that weakens the critical capacity of the mind. This condition occurs, for example, when children are offered paths and topics that are too distant from their experience and that do not solicit their interest by forcing them to "study" to please the teacher or their parents. In this way, the subjects involved will begin to refer different values to address school-related issues and those related to their extracurricular interests, encouraging the tendency to avoid deepening the meaning of what they learn by deluding themselves, thus acquiring concepts that in reality are accepted uncritically and unconsciously.

Regarding the education of children to think in a reflective way, Dewey (1933; 1949) says that offering “ready” answers and solutions to children's questions is a way to exhaust their curiosity and interest in a problem. This is true! In this regard, Dewey points out that a way must be found to organize the passage and communication of information without taking the form of concepts imposed from outside. This risk can be avoided by taking some suggestions from Dewey into account (1933).

- Identify essential information that can’t be obtained independently by children.
- Offer children material-stimulus that does not have rigid purposes or oriented towards solutions already "packaged".
- Prepare the material and the information provided by the adult highlighting the relationships they have with the interests and relevant experiences that children have both in school context and in that out of school. In this sense, the teacher should not just ask the child if he remembers what he said or did in school in the previous days but solicit links between experiences made at school that can overlap with everyday life situations experienced in other contexts.

From what has been said up to now emerges an aspect that represents an inborn resource of the individual, particularly powerful in children, and that constitutes a fundamental aspect within the investigation process: curiosity. Dewey (1933) argues that children's minds have an experimental nature because they are free and not yet harnessed and stiffened from an externally imposed point of view. The experience of young children, in particular, is driven by curiosity and a sense of wonder towards the events that happen in the surrounding world; these aspects represent a powerful motor that guides and motivates - together with practical

needs and intellectual dilemmas - the start of a research process. Dewey (1933; 1949) affirms that curiosity is an inborn resource of the individual, but it is necessary to support it and make it become an interest in discovering the solution to doubts and problems that are encountered by entering into a relationship with the surrounding environment. Curiosity, if not adequately supported and developed in interests, risks fading until it gets lost. In this sense, the teacher who provides an immediate response to the child's question adopts a strategy that contributes, with time, to the loss of interest and curiosity. It should be specified that the educator's task is not to give rise to "curiosity" where it was not manifested, but rather to provide material and favourable conditions to enable the transformation of the innate curiosity in the ability to be able to query other people and / or look for them in the available resources (books, magazines, videos). The teacher, therefore, to support children's curiosity must assume a firm attitude that avoids dogmatism or ready answers that give the feeling that everything is already known and that there is nothing more to discover.

2.1.3. Dewey's perspective on science education.

The process of inquiry theorized by Dewey is valid for problems of different types; practical and/or scientific - because, in this perspective, the method overrides the problematic situation. What changes are the means and the tools we use to solve problems of a different nature, but the process remains the same. The authentic learning, in this theoretical framework, is the ability to initiate and complete the investigation process by developing reflective thinking.

In this context, developing a scientific understanding does not require specific knowledge on the part of the educator. The teacher's task is to promote the start of the research path, to be the guarantor of the method and the conditions necessary to allow the child to develop critical-reflective thinking.

The explicit considerations until now allow, in my opinion, to highlight the reasons why some of the research on the base of described in the literature review suggest a way to make science education with young children who seem to be in tune with the Dewey survey model.

At first, the teacher observes the children during daily activities and, in particular, in spontaneous play time allowing them to gain experience, get in touch with the natural environment and its inhabitants. In this way, he creates the conditions for children to bring out their curiosity about the issues they face and the first ideas of interpretation of the reality encountered. Later, the educator offers opportunities for discussion and comparison in

groups during which the children express the observed problematic issues (why do some objects float?). On the base of the first hypothetical solutions expressed by the children that have tried to find (only light items float) they are invited to test and observe the facts (are you sure that only light objects float?). The adult assumes, thus, the responsibility and the task of encouraging the production of hypothetical ideas, their verification, observation and reasoning that together contribute to define and test the most appropriate assumptions for the problem identified (in one research, the children have come to use a Lego platform on which bricks "are loaded" and this led them to think about the characteristics involved in the floating phenomenon).

The moment that the investigation ends appropriately and controlled, means that a sufficiently adequate solution has been found that responds to the problematic situation which implies the acquisition of knowledge and greater awareness than the initial doubts condition. At this point, it is necessary to find an appropriate mode so that the path followed and the knowledge gained can be communicated to other people. To this end, the teacher promotes opportunities for discussion during which he urges the children to identify the moments and the important steps along the path made by asking them questions (remember when you played throwing objects into the tub with water? What happened?) and it promotes talking about the experience. In this way, it recognizes the role that Dewey (1949) attributes to the language as a "cultural tool" that allows you to communicate to others knowledge, right up to that individual moment. The ability to communicate and share the solution found to a problem makes the knowledge acquired subject to further modifications that taken into consideration may constitute new stimulus problems for another research.

2.2. The adult's role: the prospect of Vygotsky and Bruner

The approach that I have considered regarding the role of the investigative process in promoting the scientific attitude and the development of reflective thinking, highlights the precise attitude that the adult should take in fostering curiosity, the interest manifested by the child and the cognitive process. In particular, the adult (parent, teacher, educator) that is emerging is a figure that, according to the prospect of Dewey, avoids any kind of rigidity and dogmatism. The teacher must not give in to the temptation to anticipate solutions and provide ready-made answers to the child's doubts but, more appropriately, should prepare materials, diversified equipment, and a favourable environment which supports children's spontaneous curiosity and childish interests.

The idea of active school promoted by Dewey (1933; 1949) attaches particular importance to the role not only of the environment but also that of the teacher. Vygotsky (1956; 1960) and Bruner et al. (Wood, Bruner, Ross 1976) take up this theme by highlighting - and presenting - the adult's role in the learning process.

2.2.1. Vygotsky and the zone of proximal development.

Vygotsky's approach is based on the belief that human beings are placed within a social plot and, for this reason, the behaviour of the subject can be understood only in reference to that context. From this idea, Vygotsky identifies the child who actively participates in an event in a given context (child –operating in a context) as the fundamental unit for analysis and the study of child behaviour. The mind is of a social nature and its development can't take place independently of the system of relationships that are built into the social, historical and cultural context that the person lives. From these considerations, there emerges an idea of development that can be understood only by directly observing the process of change without having the illusion of being able to understand and describe the behaviour of a static child. Vygotsky (1978), in this regard, states that, for a long time, there was a deep rift between the historical study of the behaviour and the actual forms that it takes. This separation is mainly due to a misreading of the significance of the historical study of the reduced behavioural analysis of some past event. Vygotsky states that to study something historically means to study it in the transformation process; this is the fundamental requirement of the dialectical method. To enclose in research the process of developing a given thing, in all its phases and its transformations essentially means to discover its nature, its essence, because 'it is only in movement that a body demonstrates' what it is. (Vygotsky, 1978 tr.it. 1980, p. 99).

In the perspective mentioned above, therefore, the aspects which characterize the analysis and understanding of the behaviour are constituted by the centrality:

1. of the process with respect to the product of development;
2. Explanatory analysis that reveals dynamic connective causes with regard to descriptive ones based on the object;
3. historical and evolutionary analysis that returns to the origin and rebuilds every point in the development of a given structure.

The question of method that I briefly mentioned, refer to Vygotsky's reflections related to the process that leads to the development of higher mental functions.

Vygotsky's (1978) theoretical approach highlights a relationship between learning and development which is very different from that which until now, had supported the developmental psychology. The internalization of knowledge takes place first through social

learning (co-construction of meanings). This perspective implies that the growth occurs through a process that moves from the outside (inter-psychic) dimension inwards (intra-psychic dimension). The author explains how the internalization process takes place by referring to the development of “indicating” in young children. In principle, the child's gesture is only the attempt to take something, an object, or a toy that is out of his reach. All this change when the mother intervenes and helps the child handing him the object as the indicating becomes a gesture for others. The movement of the child-oriented, initially, to grab something takes on a social significance in the exchange with the mother. At this juncture there is a change in the function of that move: from movement orientated towards an object it becomes movement directed to another person, a means to establish relationships. The movement to grab becomes the act of pointing.

The internalization process, according to this theoretical perspective, is characterized by a series of transformations:

1. external activity is reconstructed and begins to occur internally;
2. the interpersonal process is transformed into intrapersonal, which means that the child's development occurs first at the social level, and only then at the individual level;
3. the transition from the interpersonal plane to the intrapersonal, derives from a series of evolutionary steps, and changes that persist even for a long time, in the form of external actions before being internalized.

From these considerations Vygotsky (1978) reverses the relationships which, until then, were thought to exist between development and learning[14] and it arrives at developing the concept of "zone of proximal development".

Vygotsky (1960, 1978) states that learning and development are not the same and that, moreover, the growth process moves from learning (the outside plane) to development (the inner plane) because, as noted above, the organization of individual mental processes is the result of the internalization of the social and relational dimensions from which they derive. Learning and development are closely dependent on each other from the early days of life since children already learn before they start going to school. Even when it occurs in the

[14] There are three schools of thought: the first that growth is independent from learning and it is a prerequisite. The second refers to those who claimed that learning and development are the same, while the third believes that the two processes are different but development is the biggest and most important learning that stimulates it.

period of the first questions, a child assimilates the names of objects in its environment, it is learning. The author (1960, 1978) puts in evidence the difference between the actual developmental level as determined by self-contained problem-solving, and the level of potential development as determined through problem solving under adult guidance or in collaboration with their more capable peers.

This perspective implies two levels of development: a real one which coincides with the mental functions that the child possesses by virtue of evolutionary maturity reached, the other "potential" represented by what you can learn to do with the help of a more competent individual. The central aspects of the concept of zone of proximal development are:

- the inter-psychic character of the "zone" - the potential level - as the result of interaction that promotes learning;
- the need to take into account both the evolutionary maturity already achieved and those processes that are in an embryonic state and which represent the future prospect of development that could reach the child with adult or group of competent companions help.

These considerations are discussed by Vygotsky (1960) through a study conducted by an American researcher Dorothea McCarthy[15] which shows that among children aged between three and five years, there are two classes of functions:

> *"Those children who already possess, and those who can arrive with guidance, in groups and in collaboration with each other but who are unable, on their own. McCarthy's [1930] study showed that this second group of functions is at the level of the actual development of five to seven years old. What her subjects could do with a guide, in cooperation, and in groups from the age of three to five years old, they could do on their own when they reached the age of five up to seven years old. "(Ibid, p. 128, 129).*

The concept of "zone of proximal development" allows us to propose an innovative point of view compared to previous theories on development and learning. On the basis of this notion, the only "good learning" is that which comes before development. The question of the relationship between learning and development is explained by referring to the birth and development of language and the role of symbolic play. Language is, initially, a form of communication between the child and the external social environment to become, later, an inner function that organizes and directs thinking. About the role of play in the development

[15] The study was conducted in 1930 and described in the article "The Language development of the pre-school child" published in the *University of Minnesota Press.*

process, Vygotsky (1960) writes that it creates a 'zone of proximal development'. In play a child always behaves superior to its average age, above his daily behaviour; in play it is as if he were ‘taller’ than himself. As in the focus of a magnifying glass, play contains all the evolutionary trends in condensed form and is itself a major source of development.

From these considerations, the author highlights one of the characters of learning that she considers essential in creating a zone of proximal development; namely, learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his companions. Once these processes are internalized, they become part of the child’s autonomous developmental outcome.

The claim that learning and development are different but interdependent processes, and that learning, properly organized, produces mental development and active processes that might not otherwise occur, has some important implications:

1. development follows learning and this, plays within the 'zone of proximal development';
2. the acquisition of the meaning of a word, a mathematical or scientific concept does not indicate the completion of the evolutionary process but indicates only the start. This consideration, in particular, changes the traditional school setting that considers concluded a cycle of evolution on the basis of the concepts acquired by the child in order to point out that these acquisitions are the starting point for the development of more complex processes.

The ideas proposed so far have important implications from the point of view of the educational relationship between the child and the adult who takes care of promoting the development of higher mental functions of thought, in particular, through the appropriate organization of learning situations. The educator and the teacher figure that emerges is that of a caring adult able to recognize the current skills of the child, his potentials and make his own approaches acting within that area.

2.2.2. Bruner and tutoring functions.

Bruner (1986) takes up the concept of the Vygotsky's "zone of proximal development" proposing a development starting from the observation that an adult conscious of the boundaries that characterize this area acts "*giving awareness to a child who does not have it"* (Bruner, 1976, trad.it. 1986, p. 91). The question of how and based on what strategies you can implement this step of awareness - or vicarious consciousness - from the responsible adult to the child becomes central in the creation of the *tutoring* process, this latter, which Bruner, Wood and Ross (1976) defined as the set of strategies with which you are allowing the less competent partner to solve a problem that requires superior capabilities to those already held.

The process that allows the exercise of tutoring is indicated by the three authors with the term *scaffolding* and defined as:

> *"That process which enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts. This scaffolding consists essentially of the adult 'controlling' those elements of the task that are initially beyond the learner's capacity, thus permitting him to concentrate upon and complete only those elements that are within his range of competence*". (Bruner, Wood, Ross, 1976, p. 90).

Bruner, Wood and Ross (1976) state that the scaffolding not only provides support for the solution of the problem, but it plays a more complex function that involves the understanding of the structure of the problem; understanding that precedes the production of actions to be put in place to resolve it. This consideration recalls and is closely connected with Vygotsky's reflections about the ways in which the adult interacts with the child within the 'zone of proximal development' to promote learning. The three authors, starting from the famous experiment in which a group of children of three, four and five years old were asked to build a three-dimensional pyramid and observations based on them, have defined some functions carried out by the *tutor* that characterize this process. In particular:

1. *Recruitment.* The first task of the tutor is to arouse the interest of the child in the task and the requirements of the problem;
2. *Reduction in degrees of freedom* is to simplify the task by reducing the amount of possible alternatives for the solution of the task. In this case the adult assumes the function *scaffolding*, and leaves the child the opportunity to take care of the aspects of the problem which it is capable of managing, supporting him in those aspects that require skills not yet acquired;

3. *Direction maintenance.* Often the children make their buildings to show the adult and if attention on the task is not kept alive there is a risk that the child will become disinterested. The role of the adult proposed as a tutor, therefore, is to "stick to the direction" of the task explaining the importance of this stage in order to go ahead and pursue the ultimate goal;
4. *Marking critical features.* The tutor, from a variety of signals, highlights relevant aspects of the task, provides information to reduce the discrepancy between what the child has done and what he should do. In the experiment conducted by Bruner, Wood and Ross (1976) some children, after comparing their output with the one made by the teacher, they realized the differences between the building that they had managed to construct alone, and one made by the ' adult. The task of the tutor, according to the authors, is to "explain" and make these discrepancies explicit;
5. *Frustration control* is an aspect of the role of the tutor connected with the dimension of emotional related fatigue to failure in accomplishing the task. What the authors state is that if the child faces a situation of problem solving supported by a tutor, he should be less anxious than those who are left alone to solve the task. The risk is connected to the fact that you may find it is necessary to carefully consider the possibility of creating excessive dependence on the tutor;
6. *Modelling*. The tutor offers solution models of the task, not simply by showing the correct realization but imitating the solutions proposed by the child with the expectation that the latter reproduces them in a more appropriate form.

The considerations that have resulted from the experiment results clarify the meaning and the complex role function of the adult which intends to interact within the " zone" to promote significant learning. The teacher, in this sense, focuses attention, shows that the task is not impossible, making it easier to glimpse the possible alternatives so that the children can subsequently identify the most appropriate solution. The teacher / tutor who has been able to carry out the function of scaffolding has recognized the borders of the zone of proximal development and allows the child to do with her, what it would not have been able to do alone.

Bruner, Wood and Ross (1976) state that these indications can be very useful for educational planning in different fields of knowledge, and this provides an important food for thought for the planning of science education courses that aim to promote learning and knowledge in the child's relationship to the natural world of living and inanimate things.

2.3. The epistemophilic impulse: characteristics and educational proposals.

The claim that it is important to set up science education courses starting from early childhood finds its reasons in the fact that the child at this age - as claimed by Dewey (1933; 1949) - is ready and is particularly sensitive to behaviour aimed at observing, exploring, asking questions, with regards to the phenomena and objects that interest him. Children are very curious about what is happening around them, are observant and notice phenomena and things that adults often take for granted and to which they no longer pay attention to.

Curiosity is a resource inborn to the individual and a powerful motivational engine that drives one to ask questions, explore their surroundings to find out how to "work" the animate and inanimate beings that inhabit it. Curiosity, on its own, is not enough to maintain and to continue the search path; it is necessary to maintain it to promote the development towards a genuine interest and desire to build new knowledge. Therefore, we need to point out the aspects that can promote it, and those which, in contrast, are likely to inhibit the development of curiosity and taste towards discovery and knowledge.

For this purpose, it may be useful to refer to a 'psychoanalytic vertex'[16] and, in particular, to the theories that have studied the origins of curiosity by explaining the role within a child's mental development. Psychoanalysis is a science and, as such, has knowledge, methods and techniques useful in understanding the emotional processes that can promote or inhibit healthy development, learning and desire for knowledge.

Development, growth and learning are processes with a strong relational component and involve meeting with deep emotions. The survey process, as explained in the chapter devoted to Dewey, has an emotional component connected to the anguish that the individual feels when facing perturbed situations that are confusing, disorientating and uncertain. The research process that will lead to finding the most appropriate solution to the problem requires children and the teacher to be able to "tolerate" a certain degree of anxiety associated with the uncertainty that accompanies its various stages.

The psychoanalytic perspective can, therefore, help to:

- understand the origins of curiosity as a powerful engine that can initiate and support the child's research processes. This understanding can suggest what the most appropriate

[16] Using the term "psychoanalytic vertex" is understood as viewing angle, perspective analysis. The term, conceptualized by Bion has been mentioned, in its broadest sense, in Blandino text, G., Granieri, B. (1995) *La disponibilità ad apprendere. Dimensione emotiva nella scuola e formazione degli insegnanti.* Raffaello Cortina, Milano.

ways are to support and educate this inborn resource that evolves towards authentic forms of interest in relation to the phenomena and events that happen in the world;

- identify the moments of "blocking" involved in the development and learning process to implement the most appropriate interpersonal and teaching strategies in order to overcome them by enabling the development of a research approach that is based on the desire to know and learn.

2.3.1. The contribution of Sigmund Freud: sexual impulse and curiosity.

Sigmund Freud (1905; 1909; 1910) deals with children's drive to knowledge in some of his writings concerning sexual development; but, in particular, in the essay on Leonardo Da Vinci (1910) the analyst highlights the psychic components, as well as the constitutional ones that allow the development of an extraordinary interest in knowledge.

One of the merits that we recognize in Freud is that he revolutionized the prospect that conceived sexual pleasure as a prerogative of adults as it is connected, only, to mature genital organs. The author argues that limiting the presence of sexual drive in puberty is a mistake full of serious consequences because it is the main cause of our present ignorance about the fundamental conditions in sexual life. (Freud, 1905, p. 484).

Freud (1905; 1909) makes clear that sexuality represents the engine of desire to know and the quest for knowledge. In the second of the three essays on the theory of sexuality Freud says that in the same period in which the baby's sex life reaches its first flowering, from the third to fifth year, the child is also overtaken by the beginning of the activity that is attributed to the drive to know. (Freud, 1905, p.502).

The drive for knowledge can't be reduced to a basic need (hunger, thirst), nor completely belongs to sexuality even though its relations with sexual life are important. The relationship between the instinct of knowing, and sex life plays a significant role in the Freudian perspective because we have learned from psychoanalysis that the instinct of knowledge in children attracted by sexual problems is unexpectedly early and intensive, and it is possible that at the beginning it is awakened by them.

In The Five Conferences in Worcester, Freud (1909) points out, once again, that infantile sexuality exists and that it is necessary to recognize its complexity and extreme plasticity. Freud, in emphasizing these aspects, proposes some reflections arising from the study of the case of Little Hans, a five year old child suffering from anguish[17] .

The sexual drive, in a small child, is independent of the reproductive function and its purpose is to achieve a pleasurable sensation whose source is represented by the stimulation of certain areas of the body that have proved particularly excitable. At first, satisfaction is obtained on parts of his body apart from the external object but, alongside the auto-erotic activities components of libido which are seen as parts belonging to somebody else, begin to manifest themselves.

[17] In the case of little Hans. Analysis of the phobia of a 5 year old Chiald. In *Opere,* 1905-1909. Bollati Boringhieri, 1989 Torino.

The sexual impulses to which we refer appear in antithetical pairs, in active and passive form: the pleasure of procuring pain (sadism) with the passive consequence (masochism), and the pleasure of watching, both active and passive; the first, gives rise in the future, to the desire to know, and the second to the tendency towards the artistic and scenic performance. (Freud, 1909, trad.it., 1989, p. 67).

Reflecting on what until now, has mostly involved the sexual life of the child on the grounds of somatic components, the role played by the mental component that involves the evolution of the object relationship between the child and significant figures should be emphasized (first those who take care of it, then other family members). In particular, Freud (1905; 1909) focuses on the period of life in which the Oedipus complex occurs, when the child invests much of his psychic activity to sexual interests. At this stage of development, the typical curiosity of a child is concentrated on the functions of the body and about the origin of babies and relying on clues offered to him he is able to guess the real aspects of the situation which interests him more than adults can imagine.

The problem on which the first investigations of the child is concentrated and on which his questions are focused (not always explicit) has to do with what Freud (1905) calls the riddle of the origin of children. The author defines "enigma" the question of the origin of children because it believes that it can be compared to the riddle of the Theban Sphinx which he considers a symbol of childhood sexual curiosity. Because of the desire for knowledge the child contributes, therefore, to all the situations that have to do with sexual curiosity, in children: arrival of another child, the theories invented on the birth, the discovery of the anatomical difference between the sexes, the development of erogenous zones and the sadistic perception of the sexual act. All these problems represent the interests of investigation that contribute to the intelligence of the child. The theoretical concepts proposed during the Conference held in Worcester urged Freud to making further reflections some of which relate to the way the libido may "undergo" changes towards higher forms of psychic activity. These reflections will find greater systematization and theoretical elaboration in the essay that Freud (1910) dedicated to the figure of Leonardo da Vinci. As anticipated at the beginning of the paragraph, in this paper the author deepens and focuses on the research interests of the child and the emergence of epistemophilic instinct. The hypothesis that Freud explains in the essay refers to the plasticity of libido which is able to sublimate exchanging its immediate goal with other destinations, which can be regarded as higher and non-sexual.

To explain the connection between sexual psychic life of the child and the emergence of epistemophilic impulse, Freud returns on an issue already examined in the writings previously considered: the resistance that is encountered when you intend to attribute sexual urges to small children. Against such resistance, Freud (1910) specifies that young children express the desire to know also through the pleasure of asking questions. Children's incessant questions regarding any subject, according to Freud can be traced back to the desire to know the origin of life itself, having understood a relationship between this and the sexuality of adults. At around three years, the thirst for knowledge does not emerge spontaneously but is urged by the perception of a major event such as, for example, the suspicion or actual birth of a brother or sister; event, this, that threatens the selfish interests of the child.

The survey focuses on the problem of the origin of children as if the purpose was to find the means to prevent the realization of a situation perceived as threatening and unpleasant. In this research, children perceive the presence of the foetus in the mother's body and create their own theories related to the mysterious father function, food, (you eat something that grows in the mother’s stomach), faeces, (the birth is compared to an evacuation). At the end of this first path children form a preliminary idea of the sexual act that once again, takes on characteristics of a violent nature; but at this point, the child realizes that it can’t control the arrival of its little brother and this causes a block in the survey on the enigma that is, therefore, abandoned. Freud (1910) pointed out that the experience called for by this first failure of "intellectual independence" is durable and depressing for the child. This step is central because the psychic mechanisms that accompany the experiences of failure affect the fate of the desire to seek and to know.

Freud (1910) on this aspect, says that if the period of childhood sexual exploration closes under the pressure of an energetic sexual repression, three different possibilities open the way to the future destiny of the search drive, according to its early connection with sexual interests.

The first possibility which the author refers to is the one that leads to a neurotic inhibition which results in a repression, sometimes permanent, to the desire to know. This condition is more likely if the child has received a strict education that leads to a mental fragility and the only satisfaction the subject finds, for example, is taking refuge in mysticism. The second possibility comes about when the removal is only about sexual fantasies leaving the development of the cognitive dimension free. In these cases, however, in puberty when the removed experiences resurface, they might restore a problematic aspect to sex in other areas

of psychic life. Knowledge takes on sexual values with dangerous consequences for intellectual development that require laborious mental operations of splitting and isolation of the understanding of affective components. The acquired knowledge never has the taste of pleasure and conquest since the individual continues to brood, to have doubts and to leave its investigation incomplete.

The third way, indicated by Freud as *most perfect* and in which he places Leonardo, occurs when the libido evades the removal and undergoes, from the start, a sublimation[18] thus, reinforcing the epistemophilic drive. In this case, since it is not removed, the sexual drive invests its energy on intellectual development.

[18] Freud uses the concept of "sublimation" to explain certain types of activities supported by a desire that is clearly not facing a sexual goal as, for example, artistic creation, intellectual inquiry, and in general the most human activities high spirit which the company attaches significant value.

2.3.2. The contribution of Melanie Klein: the epistemophilic impulse.

The theoretical and clinical contribution of Melanie Klein helps to expand and modify Freud's point of view. Initially, Klein (1921; 1923) takes over and follows the Freudian theory that believes the knowledge drive to be a component of libido. The author identifies the spring of the equalization process and symbolization in the principle of pleasure according to which the child establishes relationships with objects by virtue of the pleasure they experience. In this way his libidinous fantasies turn to objects and activities other than primary and this step lays the foundation for all future sublimation.

Subsequently, clinical experience and theoretical reflection have brought us to attribute epistemophilic impulse - understood as a push to investigate in the mother's body - a strong relational value. The desire to know, therefore, no longer depends only on the instinctual vicissitudes but is strictly connected to the relationship with the primary object (the mother).

The concept of epistemophilic drive is developed, the article "The importance of symbol formation in the development of ego" of 1930, but already a few years earlier, Klein (1928) had introduced this theme. The initial relationship between sadism and epistemophilic drive has a great importance for the entire psychic development. Epistemophilic impulse, stimulated by the appearance of Oedipus tendencies, is addressed first mainly to the mother's body, taken as the staging of all processes and sexual manifestations.

In short, the above quote establishes a close connection between sadism and epistemophilic instincts: while the still active libidinal anal-sadistic position pushes the child to want to own what the mother's body contains, the epistemophilic drive on the other hand, stimulates the curiosity to know how it's made inside and how it works. In this way, epistemophilic drive and the desire to possess, together with the sense of guilt deriving from Oedipal conflict are connected. Below I will try to clarify this step. In the reflections that I propose below, it should be emphasized that the first reality with which it engages a very young child is made up entirely of fantasy and objects that it imagines and invests in libidinal energy.

A very small child imagines that its mother's body contains not only faeces and food, but also the father's penis and this means that both parents become the object of his sadistic attacks. The child wishes to enter the mother's body to take it over, despoil everything in it, to master it. The feature of this mental stage of, aggressiveness is seen as extremely dangerous and distressing. Freud thought that such anguish stemmed from the fear of losing the beloved object, but Klein expands the question by saying that the danger is related to the

emergence of primitive, archaic anguish, and is afraid that the weapons used to destroy the object are used against himself.

At this point, Klein (1930) says that the child, since it wants to destroy the organs (penis, vagina, breast) that represent objects, even imagines them; I repeat, as threatening objects. The arising anxiety helps to ensure that he equalizes these organs with other things; through equalizing, these things themselves become objects of anxiety. In this way, the child is forced to continually establish new equalizers, which thus become the basis for his interest in new objects and symbolisms (1930, trad.it., p. 251).

Klein introduces, in this step, the equalization process that is the basis on which curiosity and the ability to interpret the surrounding world develops. This step is explained by the author who emphasizes how the 'image of psychic objects struck by non aggressiveness is fought by the ego through the expulsion mechanism. The force of ejection is such that the external objects are hit and thus become " substituted " by the expelled psychic objects. The process that is emerging is that of projective identification that Klein (1923) considers prior to both the formation of symbols, and the development of language and sublimation.

The symbolizing process assumes, therefore, the role of intermediary between the child's inner world and the real outside world; it is toil that builds the relationship of the subject with the outside world and with reality on the whole.

According to the Klein’s perspective outlined here, the sadistic fantasies directed against the maternal body represent the first fundamental relationship with the outside world and with reality.

As mentioned above, the first reality with which the child enters into a relationship consists of fantasies and the opportunity to build a more authentic relationship with the outside world and with animate and inanimate objects depends on the extent to which ego can tolerate the anxiety that characterizes the period of oedipal development. If this process is completed successfully, the sense of deep distress will give way to a more evolved one linked to guilt, and, in this case, the child will project the desire for amends in the mother’s body and other objects which will involve the formation of new symbols able to arrive at the point of depression. On the contrary, where his ego, under the weight of anxiety was unable to fulfil this evolution, it would remain imprisoned in a continuous process of equalization, or symbolic equation as Hanna Segal (1950) will later define. In the latter case, the subject appears "stuck" and social, emotional and cognitive development, does not progress.

Melanie Klein arrives at these conclusions through different analytical experiences with children, but the clinical case which it considers as having provided major confirmation with respect to the epistemophilic impulse and the possibility that it is from this that the ability to establish a genuine knowledge relationship with the outside world is structured, is the experience with Dick. Dick is a 4 years old but has a vocabulary and intellectual capacity of a two years old. Dick also shows disinterest and lack of affection to the outside world (mother, nanny, toys), disinterest that Klein attributed to an ego inhibition out of the ordinary that prevented symbol formation and development of the ability to distinguish between the symbol and the thing symbolized.

The analytical work conducted by Melanie Klein with Dick, highlights improvements in the child's symbolic ability once the anxiety has been allowed to manifest itself. In particular, when the symbolic capacity begins to appear Dick demonstrates greater willingness to explore his surroundings and this activity, in turn, allows the emergence of new symbols.

Klein noted that the success of this process of growth that brings with it the opportunity to develop a desire to meet and know the outside world depends on a delicate balance that is established between the ego's need to be able to tolerate a certain degree of anguish, which in itself, should not be too strong.

The reflections that Melanie Klein has proposed in this paper allow to highlight how the process of symbolization is the basis of the development of authentic relationships between the ' individual and the outside world and the progressive structuring of ego. The developments of Klein's theory by some of his students (Hanna Segal, Marion Milner, Donald Winnicott) made it possible to highlight the role that covers the relationship between the internal and external world, in the construction of symbols, and, therefore, in the process of knowledge.

2.3.3. The contribution of Wilfred Bion: the origin of thinking and its affective and relational character.

The theoretical reflection on symbol formation as the basis for the development of epistemophilic drive that pushes the child towards the exploration of the outer world and the formation of new symbols by starting, in this way, the process of knowledge, are further expanded and enriched by the work of Wilfred Bion (1962). The reference to Bion's theory allows to highlight the developments of Klein's perspective about the roots of infantile curiosity, but also to emphasize and deepen what are the main aspects that can inhibit the desire to know to be able to face and allow the cognitive process to go ahead.

Bion resumes the Melanie Klein theory proposing, however, some fundamental changes that refer to some central features in the perspective that he develops.

1. The element that triggers off the deepest anguish has to do with the terror facing the "real thought" that the psychoanalyst calls "thought without a thinker". The latter consists of thoughts - but also feelings - that await someone to give them shape and expression. They can be thought of, but also remain in *standby* until the moment someone will accept them, processing them and making them communicable. When there is a mind ready to accept these thoughts/feelings, it starts a series of transformations involving both the thought and the one who receives it. From here, the hypothesis that it is the mind that develops to respond to the solicitation and the need to transform this form of thought and that for this purpose an apparatus for thinking should be formed.
2. The symbol assumes strongly relational connotations so as to be defined as " ... *a conjunction recognized as steadfast by a group"* (Bion, 1970, p.89). In this sense, Bion concentrates more on the function of thought and less on "objects" (symbols) and this in line with the importance of taking the central concepts in his theory of mind (container-contained, contact barrier, alpha function) and I will outline that in more detail later limiting myself to those aspects useful to clarify the issue that I am developing.

3. Projective identification also assumes, a communicative value[19] which starts from the ability to use the womb as a container for the anxieties aroused by the encounter with the thought not thought about; a container that can return these "reclaimed" anxieties by giving them a name. Otherwise, the fear felt by the child is amplified and becomes "nameless dread." In the approach proposed by Bion two minds in relation to each other come into play and this aspect also introduces the question of the capacity of the other (mother, analyst) to accommodate the child's anxieties, process them and transform them in order to return them with a name and enriched with meaning. The projective identification and the response that is given to it play a fundamental role in the formation of thought and in the analytic process that, for Bion, is of a cognitive nature. If the mind of the mother fails in this task the child will be overwhelmed by catastrophic anxieties that prevent him from thinking and start an authentic learning process. In these cases, the child adheres to the object not out of real interest but in a superficial and uncritical way since it has not been able to develop the ability to think.

The Bion theoretical reflection highlights, therefore, that there is not only a push to know, to learn, as I will explain later, but contrary movements intervene which, are real opposition towards understanding processes. The relational aspect which plays a fundamental role is more complex - than that attributed by Freud and Klein - in the development of the ability to learn, think and grow; processes that can be effected only within a relationship which represents the basic element of the mind.

From these preliminary remarks Bion (1962) develops a theory of thinking, learning and knowledge in close relation with the model container/content. The prospect that Bion proposes in "Learning from experience" seems useful because it focuses on certain aspects related to the subject that I am developing in relation to the child's curiosity and strategies needed in order to bring them up to allow the emergence of the desire to learn, to know and understand what is happening around them. Learning and knowledge, according to Bion's point of view (1962) are not derived from the transmission of content and information. What determines real learning is the ability for the individual (the child in this case) – to process

[19] The communication referred to is non-verbal nature and relates to the ability of the mother to experience feelings and emotions that the child can't understand. The communicative value becomes fundamental in the therapeutic relationship, but also in the educational relationship to the extent that tends to promote individual development and the acquisition of lasting learning.

the experience lived through the filter of personal history and in a relationship with other people who for him are meaningful.

In order to systematize and explain the process of learning from experience, Bion (1962) starts by defining some of the concepts that play a central role in the theory of knowledge, theory of which provides a first general formulation. In order to learn from experience, the alpha function must operate on the awareness of emotional experience; from the impressions of that experience spring alpha-elements; these elements are rendered storable so that the thoughts of the dream and the unconscious mind on waking, can use them. The child that tries the emotional experience that we call walking, is able, through alpha function of storing such experience; thoughts which for a time were destined to become conscious become unconscious, so that the child can think of everything needed to walk without having to be conscious anymore (Bion, 1962).

The alpha function (from now on "α") is the characteristic of a thinker when it is able to accept and give meaning to thoughts/emotions and is connected to the relational field because it is in the relationship with other minds that beta elements emerge (from now on "β"), or rather pure sensory data, of which the "α" function is used to produce meanings. If this function fails in the processing of sensory and emotional experiences, then you get the beta elements that are stored as undigested facts whose fate is to be expelled or give rise to forms of manipulative thinking.

The above highlights the connections between the concept of alpha function and the ability of maternal *rêverie* which is configured as the willingness of the mother to accept and assign meaning to emotional experiences that have not yet a name and meaning (beta elements) and that the child transmits through the mechanism of projective identification. Bion refers to the concept of *day-dreaming* as that particular state of mind willing to receive all objects coming from the loved one, that state which is able to incorporate the projective identifications of the child, regardless of whether this is felt by him as good or as bad." (Bion, trad. It., 1972, p. 73*)*

This definition highlights two fundamental aspects of the capabilities of *rêverie:* the first has to do with the possibility of making the deepest anguish tolerable, the second is connected with "*l'offerta, da parte della madre, di un dono di significato che permetta al bambino di tollerare le emozioni negative"* (Semi, 1988, p. 332). To clarify the information given so far, it could be useful to refer to the example of a child who is crying for anxiety and fear of "death" finds a loving and understanding mother who picks him up smiling and

tells him to stay calm. In this case, the child will calm down because he managed to transfer his fear into the mother; (projective identification) fear that was accepted and returned to the newborn in a more tolerable form. A second example is the situation in which the mother responds to the crying child with anxiety and emotional detachment (I do not know what's going on. Why are you crying? What is wrong with you?) thus rejecting the child's projection giving his fear back to him, unchanged.

In the theoretical perspective of Bion with the possibility of relying on *maternal rêverie* you can learn to tolerate painful experiences, an operation which he considers essential to develop the ability to think. The mechanism *maternal rêverie* highlights is the fact that the possibility of thinking is something that was born and developed through the operation of the mother's mind and is, therefore, a relational function. The mechanism represented here is connected with the model container/content that represents, in Bion, the basis of all relationships. Inspired by Klein's thought the container/content theory refers to the relation with the breast understood as an internal object, a fantasy. Bion (1961) at the Edinburgh conference argues that a child is born with a "Pre-conceived idea of the breast", that is, with the idea of something he does not know but is a link between a need (hunger) and something else designed to remove this need (the breast).

According to Bion the baby receives from the breast not only milk (biological gratification) but also love (emotional gratification) and meaning (cognitive gratification). In this way, the author lays the foundation for a theory of thought connected to the first body experiences.

If we refer to the container/content model, the breast represents what the child needs to procure milk and good internal objects (Bion, 1962). The baby, of course, is not aware of these needs, but rather, will notice the lack and frustration conditions which causes anger and anguish. In this situation, the baby fantasizes the existence of a bad breast that is persecutory in nature and must therefore be removed, expelled. The baby at this stage of development, is not yet aware of the discomfort and anger caused by the non - fulfilment of his need because this requires the ability to recognize the anger, the need and dependence on the mother. The inability to recognize these aspects makes the newborn experience "something" bad which must be deleted, precluding, in this way, the opportunity to learn to think. The formation of thought, in this sense, is primarily of a relational nature because it depends on the dynamic relationship between two minds: that of the mother and the baby. In this regard, Bion (1962) writes that the problem about how can *x* know something as an

integral part of the emotional experience I represent by x K y, is manifested by painful characters. An emotional experience with painful characters can initiate or attempt to modify or to escape the pain, depending on how the personality is able to tolerate frustration.

According to Bion's the crux of knowledge within the relationship that develops between the mind of the mother and the baby "*is that if you opt for procedures that avoid frustration or for those wishing to change it: the crucial decision consists in this".* (Bion, 1962, trad.it., 1972, p. 63). In this sense, the development of the ability to think is played over a period of time in which the child feels a need and the object capable of doing so is not present to satisfy this need thus making the child fantasize that there is something bad that threatens and that is a problem to be solved. The possibility of solving the problem is based on the ability to tolerate the suffering that results from an absence (that of the good breast) which, in turn, depends on the mother's ability to provide the newborn its function of thought that allows her to think about and then to transform that suffering.

In the second case explained in the quote (escape from pain) the individual tends to deny the reality that will be distorted, manipulated preventing proper emotional perception of the experience lived and, ultimately blocking the process of knowledge.

In order to know it is necessary for the subject to be aware of the associated emotional experience, also, to the pain of absence and recognizes the lack of breast instead of discarding it as something evil present in his mind.

This emotional experience becomes the centre of mental development through learning from the experience that is different from what happens "around" things. Learning depends on the ability to retain the integrated container without making it rigid. This is the individual's fundamental psychological condition that can conserve their own knowledge and experiences, but also at the same time be ready to rebuild their past experiences in a way that enables them to implement a new idea.

The containment capacity and that of thinking are based on the possibility of re-thinking the experience and be willing to embrace new content (thoughts).

The implications of theoretical concepts proposed so far are significant because if it is true that thought is born from the emotional experience of the lack of recognition in a relationship, then everything related to knowledge is of a purely relational and the opportunity to know, as already pointed out above, is connected with the recognition of need and lack. In this regard, therefore, all the cognitive situations, subsequent to the original, of the relationship with the breast (relationships with siblings, peers, school) can be understood

in more detail when you consider that every new experience returns to a need, with an object that can satisfy and with the pain connected to the first cognitive process lived. This consideration is what Bion bases his reflections with respect to the features that a good analyst must have to promote cognitive function in the relationship with the patient. I refer to the fact that, according to Bion's perspective, the analyst should be able to resist the temptation to:

- remember all that took place in the previous session;
- chase, only the desire to "to heal" the patient.

To adopt the strategies outlined above implies adopting an attitude that focuses on the analyst's point of view; a point of view, however, rigid, and one-way, that prevents one from opening up new perspectives and blocks the curiosity that, on the contrary, allows one to reach forms of knowledge. In fact, the ability to remember what the patient said has to go hand in hand with the ability to forget, so that each session is a new session, and so an unknown situation to be investigated psychoanalytically, without being too clouded by preconceptions and misconceptions." (ibid, p. 79).

Guntrip (1972), in the appendix to Bion's text *Learning from Experience*, says the intent that Bion wants to communicate is that according to which the analyst should avoid imposing their own theory and perspective and give way to the attention of what happens during the clinical experience. The goal, in this sense, is not to "make the patient heal" but to help him become aware of his experiences and understand their meaning. It is, therefore, to allow the other to see already made experiences in a new way, observe them from a new perspective which is not imposed from outside but original and investigated in an autonomous way. By adopting this attitude, the analyst is able to communicate to the patient a genuine interest in him and contributes, in turn, to develop and promote the desire to know the patient. This is a fundamental condition that is based on the ability to suspend judgment, to accept not knowing everything and tolerate the suffering that results from this uncertainty.

Bion (1973), borrowing the term from the poet Keats[20], calls this attitude "negative capability" as the ability to stand in unknown situations when in doubt without being overwhelmed by the anxiety to find an answer, but taking the time necessary to observe what happens, to bring out aspects of the problem before undertaking the search for the "truth".

[20] The full transposition of Keats thought in a letter to his brothers George and Thomas is shown by Bion (1973): "But I mean Negative Capability, that is that ability that when a man is known for being in uncertainties mysteries, doubts, without going to a irritable reaching after fact and reasons."

If this condition does not occur and the analyst gives in to the temptation to give interpretations and premature answers to the needs of the patient, he solicits a superficial learning which aims to label things rather than to become aware of the problem and understand the content.

2.3.4. The contribution of Donald Meltzer and Martha Harris: learning from experience.

The reflections that Bion proposes and that draw on his clinical work have a wider scope that involves substantial areas other than psychoanalysis. From this point of view, Donald Meltzer and Martha Harris (1986), British psychoanalysts – inspired by Klein and Bion - have developed a model[21] that highlights the interactions between individual mental development and the development of collective organizations such as groups, community and family. In this framework, the two authors address the central question of learning and, in particular, propose learning from experience (Bion title of the work to which I have referred above) applied to the educational context. Imbasciati, in the presentation of the essay Meltzer and Harris to which I am referring writes:

> *"Si descrive come l'individuo apprende, secondo quali processi interiori, quali contesti relazionali e sociali, con quali diversificati risultati, e per l'individuo e per le unità sociali, considerate in uno sviluppo di apprendimento che trascende quello del singolo."* (Imbasciati, 1986, p. IX).

Meltzer, Harris, in their essay, emphasize that learning is an interior formation process in which it is not central to remember certain contents, but the "*struttura della mente, che si modula nell'esperienza e di conseguenza di essa farà diverso uso."* (ibidem, p. IX).

In the individual's mental structure not only parents assume a central role (defined as internalized parental couple) but, above all, the social context within which we learn (family, groups, community)[22]. In this complex web of individual and collective processes, the authors put at the centre - as Bion did - the role of emotional suffering and ability to tolerate it. Meltzer and Harris (1986) point out that the possibility of promoting a type of reflexive learning from a superficial one depends on how you answer the question who will assume the suffering. Specifically, the development of thought is related to the modulation of pain and learning is connected to this modulation rather than to a change. In this perspective the direction of the different processes will depend, on interpersonal relationships and on those between the individual and the group entity, on the ability of each to assume a share of suffering, modulating rather than modifying it.

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[21] In according to Meltzer and Harris, the term "model" refers to an organized array of theoretical elements that makes possible the utilization.

[22] When in this essay talking about parents, family, community is meant to refer primarily to these institutions - which play an educational role – and what each individual carries within himself.

The goal, therefore, is to modulate mental suffering and this implies the need to understand the significance of emotional experience and the new and unknown that ensues. When, on the contrary, one tends to change or escape from suffering we encounter attitudes that seek to deny that something important which might require a restructuring of the way we view ourselves and the world, happened.

From these premises, the two authors identify seven different types of learning:

1. learning from experience involves participation in an emotional experience that results in an authentic change in the personality structure. It is a process during which the raw, chaotic, sensory data and anguish that comes from this confusion are put in order. This result depends on whether the child can rely on an adult capable of accommodating the anguish connected to the confusion to return it reclaimed through new meanings. In this case, learning will cover the significance of the experience because *"in addition to the problem solution (secondary learning of a knowledge or skill), you will also learn something about the way of thinking used to solve it (primary learning from which we can go forward, according to Wittgenstein)"* (Meltzer, Harris, 1986, p. 29).
2. The Learning for projective identification involves the omnipotent fantasy of penetrating the other to gain control of its capabilities. This mode of learning has its basis on the concept developed by Melanie Klein, that motivation is envy for the quality of the object and aims to immediately acquire his skills and knowledge. In learning of this type there is no real emotional involvement and the result will not be original behaviour but caricatures.
3. Learning by adhesive identification[23] is characterized by the tendency to identify with the surface quality of the object, socially visible and shareable which refers to a certain mimicry. Meltzer and Harris point out that structured learning is characterized by instability and ease with which you leave an object for another one that looks more interesting and attractive.
4. Learning "picked up" is based on theft and is typical of the envious part of the personality, one that is unable to ask for help, or accept with gratitude. Energies will be

[23] The adhesive identification is a concept proposed by Bick in a 1968 article on the function of the skin and defined as a more primitive narcissistic identification system and based on different reasons related to the inability of the object to provide adequate containment. For this reason, patients were forced to "hold together" dreaming, for example, to adhere to the surface of the external objects.

used to understand the skills and knowledge in an underhand manner in order to keep others under control.

5. Learning through obsessive collecting is typical of a personality that tends to control the objects by depriving them of their intrinsic value through operations of classification, categorization and collecting that rely on surface characteristics.

6. Frenzied learning is based on the belief that everything that can be discovered, in relation to man or nature, is not relevant since what is of value remains hidden.

7. Superficial learning or learning through submission to a persecutor which is in contrast with what came before because it is based on “heteronomous” motivation (the above types are based on an “autonomous motivation”). Often, this type of learning is typical of training situations and is led by an authoritarian strategy - also called "stick and carrot" - the teacher that leverages shyness, competition or the extreme docility of the child. The learning that is carried out is mechanical and the consequences of the method on which it is based can lead to:

- expulsion from the mind of what was learnt as soon as the tyrannical teacher controls less;
- aggressive and despotic use of knowledge and acquired skills (for projective identification with the persecutor).

The different types of learning that the authors describe are associated with processes that belong to the “economic dimension”[24] of personality structure. Meltzer, Harris (1986) emphasize a parallelism between introjection, depressive position and learning from experience, and between projection, paranoid-schizoid position and superficial forms of learning and propaganda. Based on these considerations, the two authors develop a reflection on the links between the way in which children learn and the different ways that families and schools have to perform emotional functions (mode of relationship, states of mind). In particular, Meltzer and Harris identify four emotional “introjective” functions (generate love, instil hope, contain the depressive suffering, thinking) and four “projective” (arouse hatred, sowing despair, transmit persecutory anxiety and confusion). The first group promotes growth because these functions enable one to connect with their emotional experiences, help to contain and modulate anxiety that accompanies the process of learning

[24] The economic dimension refers to the principles of which psychoanalysis serves to describe the internal movements of the psychic apparatus (eg.The pleasure principle-reality, paranoid-schizoid and depressive positions).

from experience. The “projective” functions favour, on the contrary, defensive operations designed to prevent and escape from emotional pain that accompanies growth processes hindering, thus, the development of thought and personality.

The Meltzer and Harris model - which is an elaboration of the theories of Klein and Bion considered previously - emphasizes that no one can speak of learning if they do not take into account the fact that the internal world and the child’s affective-relational dimensions that were formed following the first reports with his mother help to determine the possibilities that the individual has to think, learn and ask to reality. The baby, as is clear from Bion's perspective, expresses relational needs early on, and appears prepared to learn from the relationship with another object without saying from whom it expects not only physical but emotional care. Learning and cognitive knowledge can, therefore, be strengthened if they are carried out within the relationship with a caring person willing to accept the emotions related to the development to think about them and return them with a thinkable meaning that helps the child to tolerate even the most destructive feelings. In this sense, if it is true that the teacher-pupil relationship is not readily comparable to the mother-child relationship it can, however, be noted that there are affective and cognitive emotional dimensions affecting the educational environment of the school and the family. From considerations of Meltzer and Harris (1986) it shows that the teacher's function evokes that of parental containment and ability to think of the aspects of the most difficult emotions connected to the experience of growth and learning. Teaching, therefore, from this perspective pursues the development of the ability to think which has not only to do with disciplinary skills or the amount of notional content, but mainly develops within a relational space in which you must understand and think about the experiences that characterize the learning process and how it puts the child in a position to implement this process.

Studies and psychoanalytic practice have made it possible to highlight issues and thought processes that form the basis for the birth and development of curiosity and the desire to know. Understanding these processes are able to help locate the relational approach and the most appropriate strategies to design education and educational courses that take into account the emotional dimension related to the cognitive process in order to promote it at the highest possible level.

2.4. Toward a scientific education in early age.

2.4.1. The contribution of Susan Isaacs: The Malting House experience

Susan Isaacs, a psychoanalyst, follower of Melanie Klein, is also known as an eminent pedagogue. Her philosophical formation, which took place between 1924 and 1927, was influenced by John Dewey's thought and *learning by doing*. In the same years, Isaacs completed her psychoanalytic training following analysis with Joan Riviere and became a member of the *British Psycho-Analytical Society*. At the time of the *Controversial Discussions* the English psychoanalytic society entrusted her with the task of presenting her work "Nature and the Function of Unconscious Fantasy" - as spokesman of Klein's positions - with the intent of remedying the conflicting climate that was spreading within the *British Society* because of the differences - both in theory and in practice - between the group headed by Anna Freud and that of Melanie Klein's collaborators. The intention of the British analytical society was to try to find scientific justifications to the new theoretical approaches being born, avoiding a comparison between the two currents of thought, and the work of Susan Isaacs, from this point of view, was considered a valid reference thanks to the accrued competence in the field of direct observation of a child during the years spent at the Malting House School for Young Children in Cambridge.

Susan Isaacs' perspective intends to integrate studies of evolutionary psychology with pedagogical perspectives, so as to plan educational interventions aimed at promoting balanced growth on physical, social and psychological levels. In the following paragraphs, I will try to describe Susan Isaacs' educational model and the active organization of her school whose meaning lies in the coherence between educational aims and the means to achieve them. In Isaacs' educational model the role of the environment, of the adult, the methods and strategies are designed according to a precise and explicit idea of the child and of the person to be trained.

<u>The idea of a child and of its development.</u>

Isaacs (1930) argues that a child's mental development is biological but also depends on the educational process since an infant is precociously influenced by social aspects. To support this statement, the author refers to observational data that investigated the habits of afternoon sleep and children's fears, showing that children will prepare themselves more easily and sleep longer if assisted by one person instead of another. In contrast to the

behaviour thesis, Isaacs (1930, 1933) argues that fear is not a simple reaction to a stimulus but comes from the overall situation in which a child finds himself.

Linked to the social aspect is the question of the role played by maturation and learning in contributing to the development of the child. Between the two groups of aspects there is a very complex relationship since both the hereditary factors and those connected to the interdependence between levels of maturation and experience come into play in the development of a child. Specifically, the environment stimulates the maturation of hereditary abilities and the higher the level of innate intelligence, the more important the experience becomes. It is also true that research and observations on children's memory have shown that in the first years of life it is possible that affective experiences, prompted by experience, deviate the whole course of intellectual development and inhibit the maturation of intelligence (Isaacs, 1930). Susan Isaacs, starting from these considerations, underlines some useful aspects on the educational level. In particular,

- environmental differences have more profound and lasting effects especially in the early years of development;
- before a certain age (which Isaacs poses around the age of seven) the balanced development between interests and the emotional dimension is more important than the acquisition of intellectual instruments and concepts;
- some educational purposes are more easily achieved at a certain age than at another. Children first learn to read and write at the end of five or six years and it is unproductive, when not harmful, to try to anticipate the times.

To try to achieve what Isaacs defines as "optimal development", it is necessary to resort to the use of suitable study methods to know the growth processes of the subject considered in its entirety. For this purpose, the author refers to different methods of study (occasional and systematic observation, tests, case histories or psychoanalytic technique) at the basis of which there is direct observation of the child. The documentary material is collected on the basis of some principles that make observational research very close to clinical studies (Isaacs, 1930).

The principles referred to are the attention to detail, the observation of the context and the study of genetic continuity.

The punctual registration of the details of infant behaviour takes on meaning if inserted into a framework that highlights the entire immediate situation in which the behaviour is studied, in its social and emotional dimension.

The study of genetic continuity represents, in the perspective proposed by Susan Isaacs (1948), an instrument of concrete knowledge because it urges not to consider mental behaviours and processes as occasional aspects that suddenly emerge, but as elements of an evolutionary sequence. On the basis of this methodological principle it is important to follow back the signs of the observed phenomena to identify the most embryonic forms since, in a similar way, we can consider the facts as manifestations of a growth process that must be followed up to its more mature forms.

For this reason, the basic methodological question is to try to find techniques able to systematically account for the specific aspects of development and the link that connects each of these with the general elements of growth in its entirety. The study of a child's intellectual development must constantly take into account all facts concerning his inner psychic life, external behaviour and the interdependencies existing between the two sets of aspects.

The development phases that Susan Isaacs identifies (1930) are consistent with a perspective that considers the knowledge and understanding of a child's mental development not only on the psychological level but as a fundamental question of the educational problem. To understand how the two aspects are connected I will focus on some considerations that the author makes explicit about the inner world of a child and how these aspects, if properly considered, can support the educational process and the growth of reasoning and thinking skills.

The internal world of a child is "dramatic", there are intense feelings of anger, hatred, love, anxiety and distress that derive, initially, from the relationship with the mother and that, progressively, affect the development of relationships with other adults. The first nuclei of impulses, fantasies and experiences form the basis of future development. In the first year of life, a child is biologically and psychologically dependent on the reference adult - who is usually the mother - and it is therefore upon her that he can intervene to obtain the fulfilment of his desires and needs. Any experience of gratification and frustration is experienced by a child as the work of maternal action. One of the consequences is the fact that it is not possible for a child to develop an attitude of complete indifference towards the reference figure. In this way, for the newborn the mother becomes everything that is "good" and all that is

"bad"; characteristics that, with a mechanism based on oral experiences, are absorbed by the child. Susan Isaacs (1948) agrees with Melanie Klein in arguing that this mechanism, of absorbing, is the most primitive but also the most important. When the paternal figure is added to a child's mind, this union is experienced by the child in an extremely threatening manner because it is afraid that aggression directed towards the "bad" part of the parents will come back against it in a violent way. At the same time a child is afraid that his attacks on the "bad" parents will damage even the "good" ones, thus destroying the object of love. These initial feelings of anxiety and guilt - which already begin around one and a half years of age and accentuate towards two years old - are the sign of the reparative tendencies that aim to reconstitute what we fear to have destroyed. Equally important is the mechanism of movement that allows the widening of the interests of a child from the parental couple to other adults and children encountered at school and in the broader social context. Isaacs (1948) argues that oral impulses allow the most primitive forms of learning, but the shifting mechanism acts in such a way that the primary acts of putting in the mouth, grasping the breast are gradually shifted to other objects such as the eye and the hands that will become instruments of exploration and knowledge.

In unconscious fantasy the hands and the eye retain an oral meaning that often remains a conscious metaphor for example when we "devour" something with our eyes or we read, we learn and "digest" something inwardly.

The shift leads to the first sublimations of primitive fantasies through play, an activity to which Susan Isaacs (1930; 1933) assigns a fundamental role in the general development of a child which is to allow the active dramatization of the inner world of fantasy as a means for maintain psychic balance.

The perspective on a child's mental evolution is consistent with Klein’s approach to the role of the symbolic function in allowing the development of sublimations in play, in the manipulation and construction of a 'bridge' between the inner world and the curiosity towards things of the external world.

The development of a child, therefore, depends on the endowment of innate drive but, above all, on the experiences that he can make, through the tools and opportunities offered to him to grow. Infant curiosity, for example, is closely connected to the child's inner world but can be sustained or inhibited by the indifference and misunderstanding of adults. Social development, according to Isaacs (1933), can be inhibited or stiffened if the adult does not give children adequate space to express and process their feelings. In short, development is

not just a product of maturation processes, but is articulated and proceeds through the promotion and encouragement of behaviours and attitudes. In particular, Isaacs (1930, 1933) intends to promote those attitudes that allow the formation of a child:

- intelligent, curious and with a scientific attitude towards life. A child, therefore, is able to use his curiosity and his mind as encouragement to find answers and solutions by investigating independently, and socialize their ideas, thoughts, discoveries to others. In this conception, we can find both the idea of Dewey's intelligence and the psychoanalytic one to which Isaacs constantly refers;
- active, since the internal drives of a child needs to manifest themselves through action on things of the external world. The action of a child is, in a certain sense, oriented so that the asocial and primitive tensions find expression towards increasingly socially approved goals. By channelling impulses - not inhibiting them - it is possible to direct the activities of a child in a targeted way towards culturally appreciated forms;
- imaginative, with its own way to manifest the inner world using, in particular, dramatic play. According to Isaacs (1933), the latter constitutes the prototype of expressive activities, of the ability to use symbols to communicate one's internal world. There are other imaginative activities that perform the same function: drawing, music, dance. Isaacs (1933) states that symbolic play is also the prototype of hypothetical reasoning. In fact, pretend play creates, the conditions for the emergence of the first forms of thought "as if" recalling past situations can give meaning to current needs arising from the present situation. This mode of thought does not respond only to an adaptive need but allows the development of a first form of hypothetical thought because it is linked to possible future situations, to the consequences of "if" and, therefore, to the development of a scientific attitude and hypothetical reasoning.
- social. Social development is understood as a process by which a child feels pleasure in being with others, in sharing the lived experience with peers. This development passes through moments that seem to be anti-social such as grouping up against others, seeking out the solidarity of the peer group against the adult. For a 'healthy' social development it is necessary to identify with an adult figure that is 'good', not authoritarian, but authoritative, firm without being too severe.

The school of Susan Isaacs: the purposes.

The considerations made up to this point emerge clearly in the choices and reflections that Susan Isaacs proposes and explains in the two texts "The intellectual development of a child under the age of eight "and "The social development of a child" where she documents in a detailed and systematic way the observation of children in direct contact with the physical and natural environment. From these observations she drew important reflections, in particular, with respect to the development of imagination, intellectual abilities and social behaviour.

The observations involved a group of children aged from two to seven who attended the Malting House[25] , the school founded in Cambridge in which Susan Isaacs set out to train children who are intelligent, active and social, and autonomous in their personal expressions. Isaacs criticizes the traditional school that assigns too much importance to both literacy and expressive activities to the detriment of children's interest regarding the things of the world and the pleasure of investigating them. The idea that Susan Isaacs supports is that it is possible to accompany a child in the research and discovery of natural and social phenomena without compromising the development of imaginative function, expressing or neglecting 'literacy' activities. Intellectual development, the imaginative-expressive and social development take place in a synergistic way because the ability to share ideas, hypotheses, observations, fantasies pertains to all these different growth plans. At *Malting House*, children had the opportunity to engage in various activities that stemmed from their own curiosity and interests to be then enriched by the coherent proposal of the educators. This meant that the different experiences experienced by children were channelled into paths that orientated the initial curiosity of children towards areas of culturally appreciable knowledge. In this way, therefore, the children at the end of the path will have channelled their initial interests to those areas that make up the traditional school disciplines.

Pedagogical principles.

The aims that Susan Isaacs (1930) recognizes in the school she directs, are consistent with the idea of a child, of the person that she intends to form, with the model of development that I have explained in paragraph “The idea of a child and of its development”.

[25] The *Malting House* is an experimental Infant School established by the spouses Pyke and directed from 1924 to 1927 by Susan Isaacs. The school remained operational only until 1929 but the ideas and reflections that emerged from that experience had wide diffusion in the educational field.

From this point of view, the intervention model experimented in the Malting House experience is based on some pedagogical principles.

1. Propose activities that promote the sublimation of impulses favouring construction play, laboratories where you can disassemble objects to understand how they are made and how they work, make decorations or small repairs.

In this way, children can express both constructive and destructive impulses and reparative tendencies. Sexual curiosities can be sublimated with scientific activities that refer to the interests related to the physical or biological world. In this regard, Isaacs points out that the adult tends not to recognize the value linked to the interest that children show towards the animate and inanimate natural world. In particular, Isaacs (1930) warns that if we sentimentalise on the attitude of children to plants and animals we should not be surprised if this causes their interest to gradually fade away.

In general, the school provides the first information on the biological functioning of the human body in adolescence even though the interest in the care of puppies and plants is well present even in young children. According to the reflections proposed by Isaacs, the period between the manifestation of curiosity towards the physical and biological world and the moment in which the school proposes the study of biology and zoology becomes an " *unsuccessful interval"* (Isaacs, 1930). In this regard, the author writes that under certain conditions an active, continuous and cumulative interest towards animal and plant life - but particularly animal - develops easily and continuously, from the first infantile impulses of curiosity and pleasure for these things.

The conditions to which Isaacs refers are connected to the need for the adult to be free of prejudices regarding the modalities, practical situations and the order with which a child observes and experiences the life of animals. The observations documented by the author show that children between 4 and 10 years old show a more active interest for animals than for plants and better understand the life cycle in reference to the animal world rather than the plant world. Particularly interesting are the reflections that Isaacs (1961) makes explicit with respect to the different attitudes that educators show with respect to the study of animals. The author emphasizes that most educators only promote certain experiences with children regarding the study of animals. In general, children are allowed to observe the behaviour of animals, take care of them, feed them and protect them while they are not allowed to be curious about physiological functions (evacuation, digestion) and death. One of the reasons for this attitude lies in the fear that "looking inside" the bodies of animals and

observing their death can disturb children, frighten them or encourage their aggression. Susan Isaacs is of a very different opinion and emphasizes the impossibility of preserving children from the experience of pain and death of animals; experience, this, with which they enter in contact, almost daily (the meat that you eat, the furs worn by some mothers, play killed by hunters). For this reason, Isaacs (1930) considers it more appropriate to allow children to face the death of an animal as a natural event or need for the sustenance of men. Those who have the opportunity to have a garden or raise animals can't avoid meeting death or suffering and Isaacs claims that if children show an intelligent interest in the dead animal and the presumable causes, there is no intellectual or moral reason to divert their gaze, or not to use their interest in order to keep their understanding of the processes of life alive (Isaacs, 1930).

To underline this conviction, the author describes a situation in which two children talked about unearthing a rabbit. Frank - one of the children - claimed that he thought the rabbit was in the sky. They started digging, but soon they got tired and ran to do something else. Later they came back and started digging again. Duncan, at some point, began to endorse Frank's hypothesis and stopped digging. At this point, Susan Isaacs intervenes by starting to dig with the children. At one point, having found the rabbit, the children immediately became interested in the fact that it was still there.

Following the convictions mentioned above, it emerges as at Malting House, the adult educator is available to accommodate every interest and curiosity with respect to:

- animal life processes (eating, digesting, evacuating, heartbeat, etc ...);
- internal composition of the body of a dead animal to try to discover and deepen these processes;
- functioning of the human body.

The choice to adopt this attitude proves to be a positive stimulus to support research and intellectual development but also to develop behaviours of greater sense of responsibility in children both to puppies and to mankind. The aggressive and destructive impulses that, according to common opinion, could be awakened by the experience of death or pain were sublimated in the desire to know and understand in relation to the life processes of animals.

2. Promote the "doing" of the child.

Some examples show an adult who proposes an experience to children in the form of a situation in which they can act concretely, observe, explore, build with the intent of seeking answers and solutions to the problems that they gradually encountered.

The teacher's proposal is inserted within and in continuity with the interests expressed by the children themselves and the solicited conversations are those that originate from the "why" connected to the practical activity. Also in this case, some examples taken from the observational documentation produced by Isaacs can help to understand the way in which the pedagogical convictions were concretised in the methodology and choices made by the educators. One day, some children had asked to be able to grow potatoes and Mrs. I. had consented to do so. The contribution given to the children by the educator was to help them to dig the furrows inside which the children placed the potatoes that, they subsequently, covered with earth. This modality of insertion in the activity of the children has the objective of progressively enriching the experiences born from infantile interests so that they can be expanded and articulated urging and supporting the taste for research and the increase of knowledge.

3. Pay attention to the spontaneous interests of children

Some examples highlight some of the interests that children manifest spontaneously and how the adult intervenes, when necessary, to support emerging curiosity. Isaacs (1961) says that, while the teacher played the piano, Frank (5.9), Dan (4.1) and Priscilla (5,10) began to observe the pedals and noticed their effect on the sound. The teacher opened the front of the piano so that they could see what was happening inside when he lowered the pedals and the children noticed that the piece of felt was pushed against the ropes. In another example, Isaacs describes how Frank (6,0) was interested in the porcelain weight over the lamp in the room asking what it was be used for. Susan Isaacs did not directly answer his question, but lowered the light to Frank's height so that he could look at it better, calling other companions to share the experience. The children then began to ask Madame Isaacs to lower all six lights and they constructed 'houses' under each one. In addition, the children found that the light bulbs were very hot when they touched them.

In the first example, the teacher (Susan Isaacs) captures the curiosity of Frank, Dan and Priscilla regarding the operation of the piano, and even if there is no explicit request, they respond to their need to understand by allowing the children to look at how it was constructed

on the “inside”. In the third example, the teacher answers Frank's explicit question, allowing him to better observe the light and, with the companions involved, play with it and touch it. This intervention not only allowed the children to satisfy their curiosity about the weight on the light, but their statement "feel warm" indicates the emergence of a new interest with respect to the temperature of the light bulbs they could touch.

The adult, therefore, in addition to noting and welcoming the interests that children spontaneously manifest, proposes activities aimed at satisfying such curiosities. I refer, for example, to the interests of the physical world, which focus mainly on: electric lights, switches, the route of telephone wires and the operation of the telephone; the mechanism of the piano, the relationship between the keys and the hammer and operation of the pedals. the bending of the sheet of paper in water during the experiments of floating; the plane flying in the sky and the operation of the different parts of it (propeller, fuel tank and engine).

Other interests concern the melting of ice on hot water pipes and the tests carried out with other objects (plasticine, chalk, paper), the combustion of different substances put on the garden bonfire and the smoke that is produced, the clock mechanism, the bubbles that form if you blow through a pipe inside water and the operation of a Bunsen burner.

4. Give children total freedom of verbal expression.

Younger children enjoyed, within the Malting House, complete freedom of speech with respect to their need to express their feelings and opinions even when they turned out to be unpleasant or socially reprehensible. A greater limitation was, gradually, requested from older children by denying their collaboration when, for example, they expressed distrust or hostility. Adult participation in the conversations was very limited and verbal intervention was aimed at supporting a better definition of the problem or of a thought expressed by a child. If, during a conversation, a conflict arose, the adult's intervention was to promote a constructive confrontation between the children's opinions, urging them to highlight differences and similarities, proposing them to verify the assertion, to try and report the observations made.

Verbal intervention, as described by Isaacs (1930) appears to be oriented at stimulating active research of what children are able to discover for themselves. Even if the assessments made by children prove wrong by leading to incorrect conclusions, the adult never intervenes

by sanctioning, but encourages questions and doubts such as to make children feel the need to go back to reviewing the facts.

The adult, at the same time, knows when the child can't find the necessary information by himself and, in that case, must answer questions directly by providing useful explanations, Isaacs, about the modalities of intervention adopted by the educator, underlines that the group of educators at Malting House used to encourage the exploration of the world, avoiding giving direct and pre-packaged answers to children's questions so as not to overlap the point of view of the adult to the discovery and verification of the facts by the children (Isaacs, 1930).

5. Encourage autonomy by giving children ample freedom in the choice and management of what concerns everyday life within a clear and explicit system of rules.

In this sense, for example, the cook had to know the list chosen for lunch two or three days beforehand. In the second and third year, the children, in turn, chose the courses of each meal from a list of food available to them. The condition given to the children to maintain this right was to prepare the list of the chosen menu in advance and if this was not done in time, the children would have to be satisfied with the dishes that the cook could prepare at short notice (Isaacs, 1930). Moreover, every child had to wash his dishes after the meal, and for this, the teachers had urged the children to decide on the shifts in pairs to wash the dishes. This choice did not prove useful with smaller children and the educators decided to ask each child to wash their own dishes because no one else would have done it for them. In this way, the educators observed that the children began a system of exchanges and shifts (Isaacs, 1930).

6. We must not teach but help children to discover, support and encourage in them a taste for research, observation, reasoning.

Isaacs emphasizes several times that a child possesses a life which is very rich in fantasy and takes the world into consideration from the point of view of his emotions; this is the dimension which gives rise to the curiosity and interests of a child. The latter, if properly supported and encouraged, can develop and cultivate scientific attitudes, for exploration, discovery and knowledge of the physical and natural world that surrounds it. For this

purpose, it is necessary that an adult does not overlap with the children's proposals and does not transmit their already codified and pre-established knowledge.

The educator and the teacher have the responsibility and task of supporting observation, exploration, comparison and sharing of what has been discovered. Furthermore, the adult, in coherence with the children's proposals, can propose experiences aimed at continuing and enriching the previous one.

2.4.1.1. The educational environment: spaces, materials, activities and organization of the educational day.

The descriptive documentation that Susan Isaacs has collected highlights the important educational and relational role assigned to the educational environment direction whose constituent aspects are organized in a congruent manner with respect to the pedagogical principles outlined above. Malting House had a large outdoor garden that was used for gardening and in which, some cages had been placed with animals (mice, rabbits, hens, salamanders, cats, and an aquarium with freshwater fish). In the outer space there were also a shelter for tools, a sandbox, a swing and a small fountain. The space inside the school consisted of a central hall with a staircase by which one could access the upper floor and, in the middle of the room, there was a piano. Hanging from the ceiling there were some structures to allow children to climb and hang. In this same room, used for common activities, a few years after the school was opened, Bunsen tables and beakers were placed. The other internal rooms were multi-functional and, depending on the different needs, were reorganized over the years for different activities (carpentry and scientific laboratory, reading and writing room, modelling, painting). There was also a room set up specifically for younger children with furnishings and materials appropriate to their age and size.

In the school there was an entire wing used for all those children who were staying at Malting House and each of them had a room with a bed. The children were free to move in the internal and external spaces as they thought, but the educators paid attention to the fact that the groups of different ages spent the necessary time in the rooms dedicated to their needs to cultivate, in this way, the most suitable activities for each age.

The materials were designed and carefully chosen to stimulate children's curiosity and activities. Among the materials present in the school there were: paper of all kinds, coloured plasticine, coloured pencils, blackboards and chalk, boards for carpentry, hammers, saws,

nails, lathe, vases of different composition, drills, scissors, glue, paints and brushes of different sizes, ribbons, pulleys, two-armed scales built ad hoc, magnifying glasses, topographic plants of the territory in which there was the school, gramophone, pendulums. In addition to this type of material there was a more specific type of teaching that referred to the Montessori equipment, aids for reading and writing and typewriters for the older children.

All the material was placed on child-sized shelves to allow everyone to use it at any time and allow it to be clearly visible to stimulate their interest.

As for the activities, the children could count on a wide variety of routes available. Activities of movement - both in the interior spaces and in the external ones - which included chasing, climbing, tug of war, the use of tricycles and sports equipment (hoops, football). Other activities included music and singing (also in this case the movement of the body was foreseen), dramatic expression, spontaneous play and, in particular, the symbolic one, modelling activity with clay, carpentry activities, construction with wooden bricks and those in cement. From the second year on, children could perform painting, repair and maintenance of furniture.

1.1.1.1 The role of the adult.

The role and functions of the adult are crucial in the educational model of Susan Isaacs. The adult is not just an 'outfitter' of the environment but influences the behaviour of children in an important way. This is true both when the adult is present, and when not, because the child tends to reproduce - towards teachers - attitudes and patterns that refer to their relationship with the parents; relationship constituted by the complex intertwining of feelings of hatred, love, anxiety. In this sense the behaviour of children is never completely 'natural', but always has connections with what adults expect from them.

When Susan Isaacs (1930) writes that the children were "*left in conditions of relative freedom"* (Isaacs, 1933, Preface) allowing them to experiment, play, express themselves, they do not intend to bring out the "natural" child because psychoanalytic research has shown that development is always a complex intertwining of instinct factors and elements derived from experience and that it is not possible to eliminate the influence that an adult has on a child's behaviour.

The contrasting feelings that characterize the inner world of a young child initially collide with those of the parents and progressively turn to all the other people he meets outside the

family context. A child, at first, has no contact with the world of objective reality, but only with an adult (usually the mother) for whom he can't feel indifference. Because of the mechanisms I mentioned earlier, the relationship progressively shifts from the parental couple to other children and adults, but the relationship maintains some aspects of the modality of "being inside". One of these concerns the impossibility of the adult, an educator, to escape from what the author defines the privilege of being part of the intra- psychic conflict of a child. The attempt not to interfere would be interpreted as a passive parent and an attitude of this kind can:

- make a child believe that he is authorized to do what he wants;
- to solicit a sense of guilt due to the fact of not having been reprimanded with respect to the behaviour implemented.

Isaacs (1933), when she describes the conditions in which children relate to play and experiment as "relatively free", intends to refer to some changes in respect to situations that normally could be observed in other educational contexts.

In particular, the fact of having chosen a working method that allows children to express their deepest fantasie pretend play or in the work of manipulation and construction has allowed to collect a greater amount of material related to the emotional and mental processes represented compared to what could have been done by applying more rigid and restrictive educational methods. Among the changes made, the attempt to "*reduce the degree of inhibition of children's impulses"* (Isaacs, 1930) is sought, for example, in terms of verbal behaviour. Children were given more freedom - compared to what happened in other schools for children - to express feelings and ideas. More restrictions, however, regulated what the children could do and these constraints were connected to practical considerations. What was required of the children was based on concrete reasons, either practical or pedagogical or both. So, they were asked to share some things like the time of entry to school, the time of going out and the time of meals.

The rules imposed were therefore few and generally accepted by the children but in case they were disregarded they followed certain consequences aimed at underlining the non-appropriateness of the behaviour. If, for example, a child was very interested in the game he was doing and, despite the warning, did not show up at table, the educators adopted some systems to make the latecomer find his/her food cold.

Other rules concerned:

- personal hygiene. Due to the importance attached to handling, construction, gardening the children were asked to wash their hands before meals;
- children could climb trees, use work tools (for example a Bunsen burner), climb up ladders etc. and this implied the adoption of some precautions to monitor and ensure their safety. For this purpose, if a child threatened to throw an object at a partner, the tool was taken away from him even if he needed it for the activity he was doing;
- once the children finished the job or play, they were required to put away what was used.

Compliance with these rules was required by virtue of awareness of the value of the reasons underlying the "orders" given - not to achieve obedience as a goal.

In cases where there were no obligations or prohibitions, the children were allowed to express their preferences. The opinion was expressed in a conditional form in order to encourage those behaviours deemed appropriate such as kindness, courtesy, consideration of others and collaboration. In general, teachers never gave orders whose reasons were not clear. Furthermore, categories such as, right/wrong, good/bad, were generally avoided with the aim of encouraging children to take into consideration the wishes and the point of view of others. The adult, in all these situations, is the guarantor of the possibility of enforcing established rules and places himself as a firm, constructive figure which, by preventing injustice, is perceived as an ally of a child's constructive parts.

From what has been said, it emerges that the adult is not a minimum stimulus because children are psychologically oriented towards him and interpret what he does and says on the basis of experiences and fantasies.

These considerations allow us to highlight the functions implemented by the teachers at Malting House to promote the development, and involvement of children. One of the guiding ideas on the basis of which the adult carried out a specific function was that which highlighted the usefulness of taking advantage of the identification of children with adults to present their new interests or urge them to commit themselves. In this sense, new materials were proposed and we began to use them with the children to solicit the curiosity of others who were beginning to engage in the activity with the proposed material. Under the same principle of reference, the adult used the material as a centre of interest when it was necessary to intervene to restore calm in the case of disputes that risked degenerating. In this sense, the educators took an active part in the interests of the children and shared their findings with

genuine curiosity. Malting House teachers explored the outside world together with the children and participated in fantasy games. Another belief was that it was necessary to wait and welcome the research ideas and proposals of the children. Some examples are those documented in the text of Isaacs (1930) in which the teacher, starting from the observation of an airplane and the curiosity to know how to see the world from above, proposes modelling, conversation, observation and work. on topographic maps. Other examples are represented by:

- scientific activities with wax, liquefaction with heat, observations on animals;
- interest in knowing how wood or material is made, kept alive by proposing visits to a sawmill and with the preparation of a loom, or a visit to a fabric shop;
- activity of designing and making ladders
- interest in the pulleys of the swings, that led the teachers to buy others to allow the children to use them and make other discoveries.

In this way, the adult supports and promotes in children the pleasure and taste in dealing with the problems encountered daily. The role of the adult was highlighted and played an intentional role by which it supported the discussion and group confrontation and encouraged carrying out a gradual examination of reality bringing back the sense of rivalry developed among children to a realistic dimension when comparing who was the tallest in the group (promoting measurement activities). Furthermore, adults paid attention to:

- foster continuous connections between practical interests and the resulting knowledge;
- enhance, but not confuse, the need to fantasize and the need to find scientific explanations to the observed phenomena.

Forms of knowledge that were more formalized and connected to education occupied a greater space in the activities of older children, but always starting from the interests and curiosity of the group. History, for example, before assuming the form of discipline had seen the encouragement of children's interest in cars, airplanes, ships, while geography started with gardening activities, modelling, observations on weather conditions and excursions in the territory.

This strategy allowed the knowledge in disciplines not to remain crystallized, but to build a path that started from the curiosity and interests of the children.

Starting from these considerations, Susan Isaacs explains some educational functions that the school must fulfil to support a child's social and intellectual development. In particular,

the author emphasizes two: the first concerns the need to develop expressive, physical and social skills, the second is related to the responsibility to open the facts of the outside world (the real outside world, that is to say, not the school subjects) in such a way that the child can grasp them and understand them. In the latter case, Isaacs makes explicit reference to John Dewey's ideas regarding active education and the belief that the child "learns by doing". The task of school and teachers, in this sense, should be to provide a context, tools and materials to enable a child to understand the phenomena in relation to the natural world. Therefore, it is a question of responding to the second educational purpose that I have explained above and which recalls the need to bring up to the mind of the child those facts that belong to immediate and concrete experience. If, therefore, a child of kindergarten age is greedy for knowledge, deeply intrigued by the facts concerning the world around him and learns only if he can experiment, explore, observe and formulate the first hypotheses, then the practical-theoretical purpose that Isaacs expresses is that of:

1. highlighting the origins of scientific attitudes and of thought in the infantile mind to guarantee the greatest possible development;
2. find the most appropriate ways to satisfy, in addition to the educational objectives normally pursued in the school, the needs linked to the impulse to know and understand the facts of the world.

In these situations, emerges, therefore, the role of the teacher who promotes the autonomy of a child avoiding giving help when you think that the child can reach the goal by himself making an extra effort. In this sense, the explicit intent is strictly connected with the choice not to provide packaged answers to children's questions, asking them to seek out the possible answers and solutions on their own.

The situations that I have highlighted to describe the main educational strategies adopted at Malting House, also provide significant food for thought regarding the specific strategies necessary to support and promote a research attitude in relation to scientific curiosities. I refer, in particular to the adult's ability to:

- <u>curiosity of the child in a targeted way</u>

When Susan Isaacs (1930, 1933) captures the spontaneous interest of children with respect to the piano's mechanism, she intervenes, allowing them to observe the interior. In this way, it supports the children’s curiosity and causes them to understand how it is made and what relationship exists between beating on the keys and the action of the hammer on the string and the mechanism of the pedals. In short, Susan Isaacs not only supported the

child's interest but allowed the emergence of aspects related to the scientific field. Another example that shows how the observation of adults can highlight scientific interests is represented by the discovery that the children have made by observing melting a piece of wax fallen onto hot water pipes. Following this observation, the children began to put wax of different colours onto the pipes and, subsequently, different materials to observe how they behaved.

- To grasp the scientific interests that children manifest in the play

Also, in this case some examples documented in "The intellectual development of a child under the age of eight" are useful. One day, for example, the children, waiting for the end of a storm, ran out to play in the puddles and the educators observed that Phineas (3,4) had a lot of fun making water channels and pointed out that this was disappearing underground.

On another occasion, some children, during family play, modelled complicated telephone installations from one 'house' to another, which gave rise to many discussions about the actual construction and arrangement of wires and fixtures and the functioning of a telephone exchange; discussions that later led to planning a visit to a real power plant. (Isaacs, 1930).

These examples highlight the cognitive value of play and the importance that the adult is able to grasp, within the playful moments, scientific curiosity expressed by the children. In the example, described previously in point 3, the teacher promotes and supports play with pulleys by buying others that the children fix in various areas of the classroom and garden to continue using them and to play until identifying and understanding their functioning. Even in the example of wax melting on hot water pipes, the adult supports scientific curiosity by providing the children with different materials to be used to observe their behaviour when placed on a source of heat.

- Arouse interest

Children do not always show spontaneous scientific curiosities and interests. In these cases, the role of the adult is not that of directly proposing extemporaneous and *ad hoc* activities, but more appropriately, intentionally setting up a stimulating context that offers opportunities for play, exploration and discovery for children. A situation that represents an example of what has been said concerns the intention to develop interest in oscillatory movement. The teachers set a pendulum with a moving weight in the classroom. Lena (4.2) asked Miss C. to start it up. The teacher did not answer directly satisfying Lena's question, but asked how it could be done. This question caused the little girl to push the pendulum slightly, watching it, swinging for a few seconds, and then asking for it to go

faster. Even in this case, the teacher did not answer immediately but asked the child how it could be done and Lena replied to push the weight (Isaacs, 1930).

- Urge to hypothesize and verify them

Isaacs (1930) to highlight the ways in which teachers promoted the ability to hypothesize and test them, describes the situation in which a child (Frank of 5.8 years) had seen a piece of wood floating on water in a pot and started to put other things to see if they floated - a coin, some scissors, a piece of plasticine, a shell, a piece of chalk, some paper, a pencil, a tin lid. After a few moments, Frank said that all the things made of wood floats compartment and took in the garden the jar to show it to others, who, however, at that moment you do not lent attention. Some time later, Duncan (7.10) took up his companion's discovery trying to make various other materials float observing that card placed in the water had rolled up, floated for a while and then sank.

Another experience documented in Isaacs' text (1930) describes the interest children have shown towards eggs hatched by a brooder. The children asked if it would be possible to eat them once they had hatched. The teacher, coherent with the idea that it is more advantageous not to respond directly to the questions but to solicit others, to promote the hypothesis and their sharing, asked the children what they thought. Suddenly a child replied, observing that once the chicks had left, the eggs would be broken. The teacher tried to ask if something remained inside the eggs, and at the children's negative answer asked them if, therfore, it was possible to eat them. At this point, the children observed that they could not eat them because there would be nothing left inside.

The examples I have explained above show how the adult can urge children to make hypotheses about the situation they are experiencing through questions that can be closed and directed to obtaining an answer on which to reflect together or with open questions aimed at clarifying the reasoning which has led to make certain hypotheses rather than others.

In the last example reported, the adult limited to explicitly addressing the same question to the child that he had earlier. This attitude is consistent with the idea of the role of the adult who should not teach or transmit content but rather support the autonomous research of children. To this end, it is not enough to promote the ability to make hypotheses but it is also necessary to urge the children to verify them.

For this purpose, Isaacs (1930) describes an experience that exemplifies the ways in which the teacher can solicit and stimulate a child to test the hypotheses he makes. The

situation concerns the discovery - by a child (Dan) of a rabbit that died during the night. Dan immediately observed that the rabbit's belly was no longer moving.

This observation prompted interventions by his companions, in particular, Paul who said that his father had explained that if he put the rabbit in water, he would come back to life. The teacher asked the children to try their observations. The children observed that it moved inside the water and that, therefore, the rabbit was alive. Susan Isaacs, aware that the conclusion reached by the children was wrong, put a small stick inside the water which began to turn on itself. At this point, the children agreed that the stick was not alive even if it moved in the water.

In the example, the teacher listens to the hypotheses that the children express about the death of the rabbit, how to proceed to ascertain the death and supports the desire and curiosity proposing to verify them avoiding judging the misconduct of the ideas proposed by some of them. Adult intervention is always intentional and aimed at promoting active and autonomous research of the answers and solutions to the dilemmas encountered by children. Isaacs, in the example, intervenes by placing a stick in the water because she is well aware of the inaccuracy of the advanced hypothesis that connected the movement of a body in water with its being alive. To explain the difference verbally and why the hypothesis was wrong would have been difficult to understand for such small children and therefore she chose to allow them to realize, the error by themselves, by offering them the opportunity to self-correct; in fact, they know that a stick is an inanimate object and the comparison becomes immediate.

The considerations and examples described and documented by Susan Isaacs (1930) highlight some fundamental aspects that underlie an educational intervention that takes into account a child's internal world, how to make it a powerful resource that can start the research process and through which it is possible to promote the cognitive process of educational strategies. The examples clearly show the role and the effect that conscious and intentional intervention of an adult has in supporting curiosity - in particular that oriented to scientific questions - and developing it so that it becomes an authentic interest that pushes to undertake a research path.

In summary, the educational strategies that emerge from the documentation related to the educational experience at Malting House refer to the importance of:

- promoting spontaneous interests of children and the " pleasure for exploration" through concrete activities shared by many children;

- to resist the tendency to formulate questions, hypotheses and reasoning;
- to try to satisfy the research attitude of a child to grasp the beginnings of a scientific behaviour and encourage it to maximum development;
- promote the passage from the invitation to carefully observe a phenomenon or object in the ability to identify an explanatory hypothesis on the part of the child;
- to prepare the environment in order to stimulate experimentation activities;
- support and promote pretend play;
- prepare play equipment, allowing the children to play with it or use it within a more meaningful experience (for example the pulleys where the lights were hung);
- Invite the child to find answers to his questions on his own, in an empirical manner.

From the work of Susan Isaacs - emerges the influences that the author has received from the theoretical reflections of John Dewey about learning by doing and Melanie Klein regarding the internal world of a child. The observational documentation that supports the theoretical reflections and the educational choices made by the group of educators, within the Malting House experience, is a significant example of the way in which the different approaches considered in this chapter can be applied to trace out educational paths in order to promote critical thinking and scientific attitude in contexts dedicated to children of pre-school age.

2.4.2. The approach of “promoting from within”

The "Promotion from the inside" approach has been developed by Bondioli and Savio using a series of educational experiences conducted with adults and children in which the trainer does not transmit knowledge, but assumes the role of “facilitator”, rendering those involved in this path co-protagonists.' (Bondioli, 2008; Bondioli, Savio, 2009; Bondioli, 2015a and b, Savio, 2003; Bondioli, Savio, 2012; 2013).

The approach has its roots in the theoretical reflections of Vygotsky (1960) on the relationship between development and learning and in the concept of training tutoring (Wood, Bruner, Ross, 1976) (see: chapter 2). According to Vygotsky, learning takes place within the relationship with a more competent partner who, acting in the area of proximal development of the less competent subject, allows the latter to activate higher levels of skills corresponding to developing capacities which can only occur if recognized and supported (see: chapter 2). In the Bruner’s theory of tutoring (see chapter 2), the adult plays, first of all, a scaffolding function, offering the child a support to the understanding of the problem and its solution, a function that in turn is expressed in a series of strategies that require the less experienced subject to be part of the activity and to share it with the less expert subject; to solicit and keep alive the attention and interest in the task; to help 'keep the direction'; to be ready to contain the frustrations caused by the failures encountered in the process; to be able to complete the most evolved behaviours/reasonings and only outlined by the child 'showing how it can be done' (modeling).

But the application of the Vygotsky theory in the form of tutoring, as presented in the cited essay (Wood, Bruner, Ross, 1976), concerns tasks of a convergent type (a single possible solution), in a dyadic exchange between adult and child.

Through the reflection on a series of field researches, Bondioli and Savio (1990[26], 1994, 1996, 2001, 2003, 2004) re-proposed the model of tutoring in relation to divergent tasks such as the promotion of symbolic play, in situations of group with children under six years in day care centers and nursery schools, defining this approach in terms of "promotion from within".

[26] Savio, D., (1990) “Il gioco simbolico in ambito prescolare: analisi dell’interazione tra adulto e gruppo infantile”, tesi di dottorato non pubblicata.

The basic idea of this approach is that the adult intervenes in play not to teach how to play but to promote, in keeping with what the child proposes, an enrichment and a greater articulation of playful behaviour. The “promote from within” approach provides for the following functions for the adult who interacts with children.

- It does not overlap with the spontaneous proposals of the child but starts from these, awaits them, solicits them and welcomes them. In this way, the adult gives back to the child the idea that what he does is interesting and worthy of attention.
- Promotes the involvement and participation of all children in play, starting, precisely, by listening and enhancing the child's spontaneous behaviour.
- It modulates emotional excitement and contains frustration by attuning to the emotions that go through the game to welcome them making sure that the experience is intense but not so much that it has to be interrupted.
- "Reduces degrees of freedom" because it recognizes the difficult roles the child has to play and takes them in his place allowing the continuation of the play experience.
- Maintains the management by making sure of the rules of the game being played and of the fictitious world that concerns it (for example, if children use chairs to play trains, remember that to get off you have to wait for the arrival at the station otherwise you fall on the rails).
- Resumes, and re-launches, useful ideas of play to favour connections in coherent narrative plots in order to highlight them
- Does modeling: completes, in the first person, evolved conduct and/or reasoning which have only been outlined by the children, according to their potential abilities, thus demonstrating 'how it can be done' promoting their potential for execution and understanding.

With reference to pretend play, the functions explained above can be activated through four adult behavioral modalities (Savio, 2011).

- support, which consists in welcoming and accepting the child's play proposals by participating actively in them;
- the mirroring of the child's playful behaviour, which consists in resuming them and reproducing them verbally or through actions also highlighting their emotional aspects;
- the introduction, which consists in proposing game ideas, also provocative, but in anycase consistent with the playful themes proposed by the children;

- open questions aimed at asking for clarifications on the intentions and contents of the play undertaken.

The approach that, as we have seen, has been set out, above all in relation to the promotion of the symbolic play, can be extended to other educational situations that tend to support divergent thinking, the ability to hypothesize and solve problems in children. This was seen in the work conducted by Susan Isaacs with the children of Malting House (see paragraph 2) aimed at supporting epistemophilic impulse and infantile intellectual development. In this case, the teacher and the educator, refers to an educational approach, which, in my opinion, is very close to "promotion from within": It does not overlap with the child's initiative but awaits its manifestation, welcomes it and widening it through consistent proposals; favours participation and involvement of the whole group. Moreover, the adult assumes the role of cultural mediator that does not limit itself to supporting the emergence of skills that are still embryonic, but recognizes their value and cultural significance, favouring the appropriation of these skills as tools that bring the child closer to the culture to which it belongs.

Looking at "promotion from within" as a wide-ranging educational approach, it can therefore be said that to design and implement one's intervention, the adult must therefore possess particular knowledge and skills:

- knowledge of the area to be promoted, if it is to promote symbolic game, for example, it will be necessary to know what it consists of, what its characteristics are, how it is born and how it develops;
- ability to define the aspects to be promoted; if, for example, what is to be developed is the sphere of communication exchanges, then it will be opportune to know that there are different strategies and paths according to whether one intends to expand childish vocabulary or the ability to tell stories;
- ability to identify and choose the aims of the intervention, always keeping in mind the model of behavioural evolution that one wants to enhance;
- ability to choose the most appropriate tutoring strategies;
- ability to grasp the level of development manifested by children and, at the same time, identify those abilities still in embryonic to promote their full manifestation, taking care to act within the 'zone of proximal development' of the child.

How can the approach of promoting from within be considered adequate to favour the development of a scientific attitude in relation to the construction of knowledge in relation to the physical and natural world?

Bondioli and Savio (2014) tackle this question by relating the characteristics that symbolic play and “scientific" education have in common, following Dewey’s approach (1933), as *“…atteggiamento di ricerca, di problematizzazione dell’esperienza, di pensiero ipotetico e riflessivo, di utilizzo delle native risorse intellettuali per comprendere il mondo*” (Bondioli, Savio, 2014, p.45).

The contribution underlines some aspects that characterize symbolic game as a defined activity, undertaken for the sole pleasure it gives characterized by “divergent thinking that implies originality and openness to”.

Susan Isaacs (1930) states that symbolic play and mental experiment seem to be 'close' to each other because imaginative play is a prototype of hypothetical reasoning that is based on imagining how things could be by changing environmental conditions different possible solutions. Susan Isaacs herself (1930) underlines the analogy between the game of pretend and hypothetical thought because it requires an imaginative thought that can be considered a prototype of mental experiment (for example, pretending that a dish is a hat means to formulate hypothesis: "if this dish is a hat, then I put it on my head").

Also because of the analogy that can be seen between symbolic play and scientific thought, the "promotion from within", as defined by Bondioli and Savio in relation to playful-symbolic conduct, can be a useful reference for educational interventions aimed at fostering and enhancing the development of a scientific attitude as Dewey sees it.

In this perspective, it is useful to deepen the role of language in reference to an educational style based on tutoring and activation of the proximal area of development.

The theoretical elaborations deepened in the previous paragraphs and, in particular, those of Vygotsky (1934, 1978, 1981), Bruner (1966) underline the role that language plays in the intellectual development of a child and how these dimensions are closely intertwined and influence each other. Learning has a social nature and is a process through which children gradually enter into the intellectual and cultural life of the context in which they live. From this point of view, the first competence is social and then it is internalized on the cognitive-individual level.

According to these authors, the relationship between language and thought is complex and can’t be reduced to the affirmation according to which the former would be necessary for the development of the second without examining how this interdependence takes place; that is, without referring to the role played by intentional signs, by symbols, in making possible the communication of a meaning and the reorganization of an experience. The

raison d'être of language, in fact, is primarily that of having an impact on others, on their activities (through the communication of a need, emotion, desire); afterwards it is used to enter into a relationship with others and only later in the development, language is used to consciously communicate a thought or knowledge.

Bruner (1966) emphasizes that social interaction through language, allows the sharing of meanings, the process, which leads to intellectual development.

From an educational point of view, therefore, learning is not a process that is achieved through the transmission of knowledge, but through experiences. The linguistic communicative process, in fact, is not only a communication tool, but also the way in which we represent reality. The purpose of language is to narrate, to recount mediating between experience, culture and one's own internal world (Bruner, 1966). Furthermore, narrative competence allows us to move from representations to meta-representations, that is to say, the ability to represent what the other thinks, choosing what to tell and adapting our story to listeners and contexts.

These considerations on the role of narration in promoting meta-cognition can be resumed in relation to the scope of scientific experience. In this case, in fact, the possibility of communicating and sharing the solution found to a problem makes the acquired knowledge susceptible to further modifications that, taken into consideration, can constitute new problematic stimuli for a subsequent research. This process opens up new possibilities and a comparison that allows the acquisition of a growing autonomy in the search for possible paths to explore that accompanies, with the support of a more competent partner, the development of greater awareness to what is being done and learnt.

A decisive aspect, from this point of view, consists in the role that the adult has in facilitating verbalization and group narration of the experience and activity carried out; an adult who, according to the theoretical framework outlined in this chapter, abandons the role of someone who transmits notions to take on the role of the one who promotes conversation, confrontation, participation and places himself as a cultural mediator.

Part II

Promoting “scientific” behaviours in nursery school children: an explorative research.

Chapter 3
The research design and implementation.

3.1 Work hypothesis and research plan.

On the basis of the reference literature examined, in particular the one that shows how it is possible to support infantile epistemophilic impulse by promoting the spirit of observation, the ability to detect problems, formulate hypotheses and verify them, we proceeded to project and implement an exploratory research in the field with the following purposes:

- identify which environmental conditions can encourage and promote conducts of scientific exploration[27] of natural phenomena in preschool-aged children, with particular reference to the educational context of nursery schools;
- detect and describe these behaviors.

Specifically, the research aimed to test three different environmental conditions characterized by:

1. same type of materials selected and proposed in such a way as to encourage free scientific exploration in children;
2. a different style of adult intervention, characterized in the three cases, respectively, as a presence that:
   - observes and lets do;
   - promotes from within (see paragraph 2.6);
   - promotes from within and supports the conversation about what has been done.

What was intended to investigate was whether and to what extent children belonging to the same educational context, of the same age and involved in a similar experience of free exploration of 'stimulating materials', showed, in correspondence with the three intervention styles indicated, a similar or different kind and variety of scientific conduct.

To this end, the following investigation plan is envisaged:

1. involvement of 3 groups of 4 and 5 years old children, attending the same section of a nursery school, composed in such a way as to be balanced by age and gender;
2. to each group, in parallel, proposal of a path consisting of the same number of meetings conducted in the same space and with the same materials, but with a

[27] It was considered, as a theoretical reference, the experience that Susan Isaacs led to malting House by documenting the materials, spaces and activities proposed and the pedagogical reasons on which these choices are based (see Chapter 2).

different role of the adult. In particular, each group would have tried a different adult intervention:

- group A and adult who promotes from the inside;
- group B an adult who promotes from within and supports the conversation about what has been done;
- group C an adult who simply observes and lets do;

3. before and after the course, for each of the three groups, two meetings in which children can freely move with the materials made available, in the presence of an adult who observed and did not intervene, if not in the case of emergencies or practical necessities;
4. videotaping of all the meetings and their transcription as a basis for carrying out the analysis work.

In the following paragraphs, the salient aspects of the investigation plan will be specified.

3.1.1 Context and subjects.

The research was conducted in reference to a natural/ecological life context such as the nursery school. Referring to the nursery school, and more generally to educational services, in terms of context means adopting an ecological perspective (Bronfenbrenner, 1979) and reflecting on the fact that people, in this case children, behave differently depending on of the environmental situation in which they are located. Bronfenbrenner explains the importance of this consideration in the field of human development research by referring to a series of experiments in which they compare the reactions of children to separation from the mother in different laboratory and family settings. The results of these researches show that the environmental situations in which the observations are conducted influence the child's behavior towards both the mother and the observer. This means that in planning research related to child behavior, it is necessary to take methodological consideration of the context in which these behaviors are observed and to read the results considering the influence that contextual variables have on the behaviors observed. Choosing to conduct the research in a natural environment such as that of the nursery school has allowed to observe the behaviour of children within a context that is familiar to them from the point of view of the role, activities and relationships of all the people who participate in them.

Conducting the experience within a nursery school assumes a further value connected to the objectives that my research has set itself: to develop a modality of educational and

didactic intervention which, based on the literary review taken into consideration (cfr. PART 1), allows to promote a scientific attitude in relation to knowledge in the world of

animate and inanimate natural things. Carrying out the research in the natural context of the nursery school also allows to generalize the approach used and the results in other similar environments.

As for the subjects, I have chosen to involve only 4 and 5 year olds in exploratory research because they share a common scholastic past that has seen them interact between them for two or three years.

The three groups would be composed by random assignment making sure that they were balanced with regard to gender and age variables. It would also have taken into consideration ties of friendship inserting children in the same group among friends.

As for the number in the groups, I have provided 7/8 children for each of the three groups, because this situation would allow to be able to give attention to both group and individual activities. Groups that were not numerous would also facilitate interactions between peers and adults.

The space in which the meetings of all groups would take place should have been the same, set up ad hoc, in order to avoid stimuli (for instance the toys usually used in the section or already characterized) distracting from the experience that would have been proposed.

3.1.2 The materials

The project envisaged preparing a set of materials and objects to be proposed to children who could solicit observations and 'scientific' explorations.

These are the materials chosen and prepared: large tanks of transparent plexiglass of different sizes, flours (white, yellow), sand, stones, caps (metal, plastic, cork), containers, funnels, strainers, bottles of different materials and sizes, ladles and cutlery of different material, bolts, rings (wood, metal, plastic), crepe paper, tissue, cardboard, dried vegetables, seeds, coloured adhesive tape, cellotape, glass marbles, ping pong and rubber balls.

Each child would be provided, from the first meeting, with a kit consisting of: magnifying glass, ruler, notebook, pencil and torch to urge in the child the adoption of behaviour similar to those of an ‘explorer’, thus immediately characterizing the behaviour that I would have proposed it during the journey.

In order to keep the children's curiosity alive and, at the same time, not to introduce too many elements of variability, it is planned to use the same set of materials for two successive

meetings and then proceed to partially change it by introducing new objects but leaving the art of the stimuli already explored.

All the materials had to be placed in such a way as to:

- to be easily accessible and visible to children to solicit their curiosity and interest,
- to be used easily by children without adult intervention, thus promoting movement, free choice and exploration of what is available to them.

3.1.3 The different types of adult intervention.

As already mentioned, it is planned to test 3 different styles of adult intervention in relation to the paths of scientific exploration shown by children towards the materials made available. In particular, the intervention styles implemented by the adult in the three groups of children have been characterized as follows:

- Observer - Laissez faire. The adult maintains the role of observer, does not intervene with the intention of promoting exploration activity, but only in case there are particular problems of a practical order. Adopting this approach, we intend to verify if, and to what extent the condition of full freedom and autonomy, without interference from the adult, affects the manifestation of the carrying out of scientific exploration by children;
- promotion from within. The adult intervenes with the aim of supporting and promoting exploration based on the model of 'promotion from within' (see paragraph 3.1.1). In this condition, the adult awaits and grasps the initiative of the child, urges them to ask questions, 'reflects', verbally or not, on the scientific behaviour implemented by the children on the materials, expands their initiatives' showing how can do ', resumes and amplifies the ideas and exploration of the children's ideas. With this approach we intend to investigate whether and to what extent the intervention of the adult who tends to support the curiosity and the interests of children by accepting their proposals without overlapping or replacing them, influences the manifestation of scientific exploration behaviour;
- promotion from within + final conversation. The position and role of the adult are similar to those of the previous condition but, moreover, at the end of the activities, the researcher encourages the children to retrace, the experience made and to reflect on it verbally. In this case, the adult supports discussion, comparison and reflection through guiding questions (What have we done today? What have we observed?

What has happened? What is needed to continue the experience?). In this case, the intent is to consider whether and to what extent a style of adult who not only promotes from within but supports participatory reflection on the experience gained, affects the manifestation partof scientific exploration behaviour; in this way we intend to investigate the incidence of the meta-cognitive dimension that I have studied in detail in paragraph 2.6.

3.1.4. Times.

As mentioned above, the path, for all three groups, would be preceded and followed by two meetings in which the adult would have maintained an observer role, intervening only where particular practical needs emerged or to guarantee the security necessary to continue the experience. The two preliminary meetings of observatories were aimed at detecting exploratory behaviour implemented by children not yet subjected to an intervention intentionally designed to support and promote scientific conduct.

The observation meetings at the end of the implementation of the three conditions of intervention by the adult were intended to detect any differences with respect to the two observations made in the initial phase, in the scientific conduct of the children.

Between the two preliminary and final observation meetings, four meetings were planned for each group, each characterized by the different approach of the adult, as described in the previous paragraph. The meetings of the three groups, both the two initial ones, the four central ones, and the last two, would have occurred in parallel in order to ensure that the experience took place for all in the same period of time.

The four central meetings (intervention phase) were to be scheduled so that each group participated in the experience once a week, and always with a similar time interval between one meeting and the other. The survey plan included a total of 8 meetings (4 observation and 4 interviews) for each group of children.

3.2 The field experience: the context and the steps of the research.

The field experience was held in a nursery school in Liguria and involved children of 4 and 5 years old from the only section present in that school. The context of the experience - the Mallare Nursery School - and the children involved in the research will be presented below.

3.2.1 The Mallare State Nursary School.

The research experience was conducted in Mallare[28], where one of the 5 nursery schools of the Istituto Comprensivo di Carcare (SV) is located. In particular, the school where I conducted my research welcomes 29 children and the group is run by two teachers assisted by non-teaching staff.

I collected some information on the school through two sources: direct observation and some interviews with teachers conducted according to a 'near' approach to the non-directive directed by Roger's approach (Lumbelli, 1981, 1990; Mignosi, 2002; Rogers, 1989; Bondioli, Gusmini, Schietroma, 2006).

The nursery school is located in the same building where there is also a primary school operating 27 hours a week (from Monday to Friday from 8.15 to 13.00 and with an afternoon return until 16.15). The nursery school has a working time of 40 hours per week (from Monday to Friday from 8.15 to 16.15) and consists of a single section that welcomes children from 2 and a half to 6 years old. The outdoor areas consist of a cemented courtyard and a green part in which there is a greenhouse that is part of one of the laboratories that characterize the Institute's Educational Offer Plan. The Laboratories[29] represent a peculiarity of the Institute and aim to support the educational offer and to act as a means of cultural promotion for the area in which the school operates. They have the task of developing, in a deep and continuous way, interdisciplinary initiatives that are coherent with the paths indicated by the PTOF (*Piano Triennale dell'Offerta Formativa*) and the departments (structures and branches of the Teaching Board with the task of proposing and organizing

[28]The Municipality of Mallare has 1300 inhabitants, is located in the hinterland of Savona but is part of the Diocese of Mondovì and belongs to the Mountain Community of Alta Val Bormida. The main economic activity is based on agricultural activity, woodworking and the furniture industry. The tradition of the territory is based on wood - present in abundance in the surrounding woods has been enhanced in the school project with different routes that led to the setting up of a wood museum in the school building. As for the population present in the territory of this Municipality, there are 149 units whose age is between 0 and 18 years and among these 33 are children included in the age group of nursery school.

[29]The laboratories of the Comprehensive institute are 6: musical laboratory in the Altare complex, Archimedes scientific laboratory in the Carcare complex, Pegaso language laboratory in the Carcare complex, the Colibrì Library in Carcare, the Verde classroom in Mallare and the Fossili workshop in Altare.

projects continuity and training in line with the Institute's PTOF), translating them into training and educational offers

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They consist of physical spaces, tools and subsidies, professional resources, financial resources, formalized collaborations, rules and criteria of use; they are open to regulated use by other schools, associations and territorial realities. Each workshop is organized through a management group and a contact person. The Institute's PTOF also makes explicit the objectives and priorities that the school has chosen as elements that distinguish the educational offer offered to its users. Specifically, the priorities that characterize the Comprehensive Institute to which the Mallare nursery school belongs, focus on the care of the learning environment and on the idea of education and teaching as a path of research and innovation (participation in experimental projects: A.S.C.A.N.I.O.[30], A.L.I.C.E.[31] Argumentation[32]). As for the organization of interior spaces, the Mallare nursery school has a sectional area that includes two rooms: one is furnished with tables, chairs, some furniture containing constructions, shelves with puzzles and a reading corner; the other is set up with corners for symbolic game, building, various toys, a soft carpet and a television with DVD player. The room where there are tables and chairs is used for morning routines, structured activities, lunchtime and board games that engage children in transition times. The other space is used for the reception of the morning where the children can choose the angle of play and for the preparation for lunch. In particular, during the meal preparation, while one

[30] A.S.C.A.N.I.O. is the acronym of "Coordinated Experimental Activity of Launching New Organizational Addresses" for the nursery school and started with C.M. 70 of 1994.
[31] A.L.I.C.E .: "Autonomy: a Laboratory for the Innovation of Educational Contexts" started with the issue of C.M. n 112 of 1999 and was characterized as an itinerary of research, training, documentation, production of materials around the four thematic areas (organization, curriculum, professionalism, interaction with the territory) related to the reform process of the Italian school.
[32]Project of the University of Genoa, Department of Mathematics, "Language and Argumentation in the study of mathematics from kindergarten to secondary school

group carries out the personal hygiene routine in the bathroom, the other children sit on the soft mat to watch DVDs. The carpet is hardly used for motorial activities for which it is preferred to use a special space shared with the Primary school classes in the same building. The information related to the type of proposed education that characterizes the Mallare Nursery School, and the observations that I could make in the moments of sharing with the teachers of the research project go together. The information collected was useful for identifying the elements of the context taking them into account at different times of the research to ensure both the maintenance of the research system and to create an experience that was perceived positively by all the subjects involved.

The choice of a natural context that had not, until now, similar research experiences has characterized the course in a particular way; this path has benefited from a continuous exchange of information between the theoretical references taken into consideration, the actual situation and the modalities of performance.

3.2.2. The first steps of the research

The research itinerary has been characterized by some phases whose details will be better specified in the following paragraphs and which include the following steps.

1. Preliminary meetings: interviews with adults (Head teacher, parents and teachers).
2. Experience with children.
3. The return meetings: the interview with the teachers, the return to parents and teachers.

3.2.2.1 Talks with the Headmaster, teachers and parents.

The itinerary of the research conducted was characterized by steps that proved to be important for the success of the experience. In the period preceding the start of field research, the following steps were taken.

- A meeting with the Headmaster in order to present the research project and define some formal aspects regarding my presence and my intervention within a school complex belonging to the comprehensive institute. The proposal was welcomed in a favorable way and considered an opportunity to promote an experiences that takes research and practice together into the school. This favorable position has made even the most bureaucratic, but necessary, steps to fill in forms on the legislation for the protection of data collected through images much easier.

- Two meetings with teachers: a meeting to present the research and build a first moment of collaboration; a second meeting to agree on some operational aspects such as spaces for carrying out activities with children, the formation of groups of children, the calendar and meeting times. The teachers, after a first moment of hesitancy that was overcome by clarifying the organizational aspects of the experience, welcomed the possibility of offering children an additional experience within their growth path.
- Two meetings with parents to accommodate perplexities and anxieties related to what I would have done with the children during the meetings using images and videotapes. The parents of the participating children expressed some concerns about what I would do with the children and about the fact that the teachers would not be present during the activities carried out with the groups. To make sure that parents acquired the confidence necessary to allow their children to participate in the research, some individual meetings with the most hesitant families were also necessary. Although the formal authorization was granted in time to start the research, an attitude of trust on the part of the parents towards the operator grew gradually when the children spoke about the activities and their experiences.

These meetings proved to be important to create a partnership and a network that allowed children to welcome a new experience in a favorable way and allowed me to make decisions regarding changes and adjustments that were needed during the path more easily.

3.2.2.2. Familiarization with the group of children.

In order to allow the children to get to know me before starting the research, thus avoiding introducing a further element of excessive novelty with respect to the daily context, the preliminary meetings with the teachers were scheduled during the early hours of the afternoon when there are the 4 and 5 years olds (the group of 'little ones' returns home for the afternoon rest)[33], ie the age group chosen to carry out the survey (explained in the following points). In these moments, the children have been able to observe me and ask me questions. I also decided to bring the material, necessary for the first observation meetings, a few days before the start of the research and, on those moments, I had lunch with the children at the invitation of the teachers. These moments were important to make sure that I

[33]The school does not have adequate space to set up for the afternoon rest and for this reason the families were given the opportunity of taking their children home to rest and to have them re-enter, if they so wish, in the afternoon.

was not perceived as a completely alien figure and to gather useful information to better manage the activities subsequently carried out with the children.

3.2.3. The subjects involved and the group formation.

The children involved

Regarding the subjects that participated in the research, it was the 21 children aged between 4 and 5 years. The choice to involve the children of this age group has been determined not only by the reasons already stated, but also by the following reasons.

- In the group of children there were not only 3-year-old children but also a group of 2 and a half year olds who had recently joined the section. Involving these children would have required to foresee different moments during which to make myself known before carrying out the activities foreseen by the research with them.
- The age of the group of 'little ones' would have required me to further change my activity in order to cater for this particular phase of development
- The group of 21 children who participated in the actual research consisted of 12 boys and 9 girls.

Table 1. The children who participated in the experience.

Nomi	Età
Alice[34]	*3 years two months*
Mattia	*4 years two months*
Luca	*4 years four months*
Pietro	*4 years four months*
Arianna	*4 years five months*
Dario	*4 years 5 months*
Ettore	*4 years 5 months*
Francesco	*4 years 5 months*
Giovanni	*4 years 5 months*
Martina	*4 years 5 months*
Jael	*4 years 6 months*
Ginevra	*4 years 8 months*
Andrea[35]	*4 years10 months*
Tilda	*5 years 6 months*
Leonardo	*5 years 6 months*
Valentino	*5 years 8 months*
Fabrizio	*5 years6 months*
Alice	*5 years 9 months*
Eros	*5 years 9 months*
Arianna	*6 years*
Elena	*6 years*

[34] Alice, considering her age and that of her peers, has been put in the group of 4 years olds.
[35] Andrea, although he falls within the group of 4 years olds has been inserted in the group of 5 years olds. The reasons for this will be explained later (cfr. paragraph 3,4,3).

The dividing of children into groups according to the research plan.

The children were divided into three groups of 7, in order to fulfil the three conditions set out above (see paragraph 3.1.1). According to the research plan, the groups were formed maintaining a balance between the gender and age variable by inserting a fair representation of boys and girls of 4 and 5 years old. Furthermore, some information provided by the teachers was taken into account.

Alice (3, 9) and Andrea (4.10) respectively, were considered in the group of children, of 4 and 5 years olds. This choice was agreed with the teachers because the two children had, as part of their schooling, the group of four- and five-year-old friends as a reference. In particular, the following year Andrea started to attend primary school and participated in the project of continuity with his classmates attending the last year of kindergarten. On the advice of the teachers, it was decided to include Elena (6 years) and Arianna (6 years) in two different groups because the strong competition between the two girls, and Elena's exuberant character in general, prevails over that of her partner who tends to be influenced without discussing.

The following table describes the subdivision into groups as designed during the start-up of the research.

Tabella 2. Subdivision in groups of the children according to the plan of the research.

Groups	*Names*
A	*Arianna (6)* *Alice (3,9)* *Leonardo (5,3)* *Valentino (5,8)* *Francesco (4,5)* *Pietro (4,4)* *Ettore (4,5)*
B	*Elena (6)* *Alice (5,6)* *Fabrizio (5,6)* *Giovanni (4,5)* *Luca (5,2)* *Dario (4,5)* *Arianna (4,5)*
C	*Eros (5,9)* *Tilda (5,6)* *Andrea (4,10)* *Ginevra (4,8)* *Jael (4,6)* *Martina (4,5)* *Mattia (4,2)*

The plan of action proposed for each group has been assigned by the adult casually.

3.2.4. The meetings: times, spaces, materials and the task.

Times

Activities with children took place over the period between January and March 2017. Specifically, each group participated in:

- 2 preliminary observation meetings to carry out the intervention: 9 and 16 January group A; 10 and January 17 group B; 11 and 18 January group C.
- 4 meetings during which I proposed to the three groups the different conditions described in paragraph 3.2.3. Specifically, these meetings, on a weekly basis, were carried out according to the following timetable.

Table 3. Organization of meetings with groups.

Groups	1° meeting	2° meeting	3° meeting	4°meeting
Group A *Promotion from within*	23 January (time 10.30/11.30)	30 January (time 10.30/11.30)	6 February (time 10.30/11.30)	13 February (time 10.30/11.30)
Group B *Promotion from within and final talk*	24 January (time 14.00/15.00)	31 January (time 14.00/15.00)	7 February (time (14.00/15.00)	14 February (time 14.00/15.00)
Group C *Observer laissez-faire*	25 January (time 10.30/11.30)	1 February (time 10.30/11.30)	8 February (time 10.30/11.30)	15 February (time 10.30/11.30)

- 2 final monitoring meetings following the intervention: 20 and 27 February group A; 21 and 28 February group B; February 22nd and March 1st group C.
- 1 meeting at the end of the experience, not foreseen by the initial research plan but considered appropriate, to allow the children to take their leave and better understand a completely new experience, conducted in times and spaces inside the school but separated from everyday life which they were used to. The meeting was held for groups A, B and C respectively on 6, 7 and 8 March.

For groups A and C, the meetings were held during the moments of co-presence of the teachers holding the class. This choice allowed me to work with a small group of children and, at the same time, allowed the teachers to carry out the daily activities with the groups not involved at that time. In this case, my activities took place in the central part of the morning (10.30am - 11.30am). Regarding group B, the experience took place in the early afternoon (2.15 - 3.15 pm). During this time, even though the teachers were not present, it was possible to carry out research-related activities thanks to the lower number of children present compared to the morning.

The teachers prepared a billboard to facilitate the organization and identification of the days in which the different groups were engaged in this specific experience. All meetings were videotaped.

The videotapes were accompanied by descriptions pinned immediately after the meetings, and, in the case of preliminary observations and post-intervention, with written notes in situ. The curiosity of the children for the presence of the camera, an instrument not used by teachers to collect data useful for documentation, manifested itself on several occasions and sometimes the children implemented - as I will explain later[36] - cognitive behaviour as to its operation. In two cases, the children, in an attempt to explore how the camera worked, stopped recording for a few minutes, but the immediate transcription of the protocols based on the annotated observations allowed to integrate, in part, what was not recorded.

[36] In the chapter dedicated to the analysis of the material collected during the videotapes I will describe better the conditions in which the children shown cognitive behaviours with respect to the stimuli available and, therefore, also on the functioning of the video camera.
In the chapter dedicated to the analysis of the material collected during the videotapes I will describe better the conditions in which the children shown cognitive behaviours with respect to the stimuli available and, therefore, also on the functioning of the video camera.

Spaces and materials

The activities related to the research were carried out within the space of the nursery school used for motorial activities, environment shared with the children of the primary school which is on the first floor of the same structure. The choice to carry out the meetings in this space is derived from the need to limit, as much as possible, the presence of toys and stimuli that solicit symbolic game or that interfere with the implementation of exploratory conduct on the proposed material. The classroom was set up with one or two side tables on which, from time to time, boxes were prepared with the material designed for that meeting. I chose to keep the space and the times of the meetings unchanged so that the children could identify them as a space-time context connected to the specific experience

- a transparent envelope for each child containing a magnifying glass, ruler, plastic knife, pencil, notebook and flashlight,
- stoppers of different materials (metal, plastic, cork),
- plastic bottles of different sizes,
- tin cans,
- rubber and ping pong balls
- glass marbles
- metal rings and screws.

The table below gives a list of the materials which were gradually introduced in all the groups and in the various phases of the experience.

Table 3. Materials that have been varied at different stages of research with groups of children.

Meetings	Materials proposed
Prelininary observations *2 meetings*	Planks of wood, cardboard cake trays of different shapes and sizes, tins, coloured adhesive tape, plastic bobbins and rolls of paper (eg. Absorbent paper)
Intervention *4 meetings*	Plexiglass bowls of different dimensions, water, metal rings, tins, contructions in wood, plastic glasses, string weighing machine with a dish.
Obervation after the intervention *2 meetings*	Seeds, dried legumes, plastic bowls paper of different types and consistency (card, tissue paper, crepe paper and aluminium), planks of wood, cardboard cake trays and weighing machine with a dish.

The children had free access to all the proposed material and were urged to explore it and interact with it freely. To ensure equal conditions for all the children, the objects eventually built by a group, during the activities, were made available to the children of the other groups, representing a novelty for the groups that did not know them. In this sense, the introduction of new materials was not my initiative but was came from a proposal of the children and was presented to the groups that had not designed it as an idea of the comrades who wanted to share them. The idea, initially designed, to present the same material for the duration of two successive meetings was maintained for the preliminary and post-intervention meetings. In the four meetings of intervention I did not consider it appropriate to propose changes, on my own initiative, since the proposed material prompted curiosity and interest from the groups that had started several projects showing the desire to carry them out.

The task.

The task, made explicit to the children by the researcher at the beginning of the experience, was to freely use the different stimuli made available with the only constraint not to get hurt or damage what they had available and what was in the surrounding environment: “I brought you some material, things that you can use in the way you want without, however, hurting yourselves or damage them.” The adult, during the observation meetings, told the children that "she would be with them to see what they did, and what could be discovered around those materials ". With regard to post-intervention observation meetings, the adult has slightly modified the delivery for groups A and B who had experienced adult involvement in the activities. Specifically, the delivery assigned to introduce post-intervention meetings, similar to the one already explained, underlined that the adult would be present but in the role of observer: "Today I will stay with you, without intervening in the activities, as the past times, but I will observe you from here because I am curious to see what you think you can do with these things that I brought you; some you already know, others are new.”

Being an open task, we wanted to privilege the possibility of grasping the "autonomous" conduct of children towards the proposed material, even if this could have given rise to playful-symbolic conduct rather than exploratory and "scientific".

3.2.5. Post-experience meetings with the teachers.

The interview with the teachers

Once the field research phase with groups of children ended, I held two meetings with the teachers: an interview conducted ‘close to’ the non-directive (see paragraph 3.2.1.) And a first return on the route made.

The interview was useful to gather some more specific information on the educational context and the proposal that was offered to children in everyday life. I chose to carry out the interview with the teachers at the end of the research experience with the children to 'clear' the field of prejudices that could have an influence on my way of conducting the meetings, to relate with the children and with the teachers themselves.

From the interview, some information emerged that allow us to outline the educational context that the children involved in the research experience daily, in particular, in relation to the scientific education experiences that are offered to them.

- The activities proposed to children mainly start from the initiative of the teachers who, for different reasons (above all the fear of the parent’s reaction should the children should get dirty, get hurt), try to ensure a safe and quiet environment, however, limiting the necessary freedom of movement that allows exploration of the world. One of them tells about the floating experience that was proposed to children the previous year: "We had prepared a basin on a table and a box with some objects inside. We proposed that they should 'fish’ for an object one at a time, with closed eyes, touch it, try to say what it was and then, before putting it in the water, say if he thought it would float or not. This done we built a grid where the children would mark if that object floated or not. " another teacher said that the school has a greenhouse in which some plants were sown so that the children could observe and record their changes over time. Also, in this case, the teacher stated: "The observation activity is not done every day but, maybe once a week. When my colleague arrives early, in the morning, before going to school we go to see if the plants in the greenhouse have grown or grown a bit 'and if we saw changes, we brought the children in to observe the change making them notice. these examples show how teachers are at the center of the activity proposed to children who are "led" to make observations in a well-defined situation by adults. Children often do the activities proposed by teachers sitting around a table and, in some cases, the proposed activities "serve" just to restore a situation of tranquility in the class group: "Yes, I can block

them with that. If they are agitated I propose salt or clay paste and I can keep them sitting still.”

- Scientific experience, in what the teachers say, is centered almost exclusively on observation. Often, teachers refer to experiences of scientific observation in describing the activities they propose within the field of experience "Knowledge of the world". A teacher, when asked if there were other scientific education experiences, in addition to that on the floating and the green classroom, he replied: "I do not know if it can be relevant to scientific observation, but we have had two goldfishes. There the children noticed when it was time to change the water in the tank, when they thought the fish were hungry because it was enough to touch the surface of the water and the fish surfaced immediately and opened their mouths. "And again:" Then, I don’t know if making salt dough can be considered a scientific observation activity. One day I got ready and brought all that was necessary to make salt dough from home. I brought all the ingredients: flour, salt etc. and with all the children seated, and they were all good. We started making salt dough, they tried to touch the ingredients, feel the consistency, they observed the difference between flour and salt. Then I told the children the recipe for making salt dough. Everyone had a glass and on it I had written flour to indicate where they had to put the flour, salt to indicate where they had to put salt. We put all the ingredients in a big bowl, I coarsely kneaded then I gave each child a portion of the dough.”

The examples above, fall within the framework of reflections related to a methodology that tends to favour the creation of conditions for the experiences of the most supervised children (children sitting around the table, the children must ask the teachers for the ingredients, cutting and sticking are activities carried out by teachers). An example that confirmed this approach occurred when, at the end of the research experience, a box containing the material and some objects that the groups had built during our meetings to the groups of children who had attended. The box was not made available to children but placed in the teacher’s room to prevent children, free access to it thus being able to create situations of confusion (“We keep it here otherwise the children make confusion and will break them”).

The first return meetings with teachers and families.

At the end of the research in the field with the children, I have foreseen two moments of restitution: one for the teachers, the other for the parents of the children involved. The purpose of the return was to show teachers and parents what the groups of children actually did during the meetings with the researcher. This initiative allowed me, on the one hand to respond to a curiosity and a concern about the way I would have used the videotaped material, on the other hand to gather further observations and information on the experiences of the children compared to the experience they had participated in.

With regard to the moment of return with the teachers, some observations of surprise emerged regarding children who, they defined as less active and involved in daily activities and who showed active participation during the research experience. Another useful piece of information that this moment has allowed me to note is the experiences of the children and parents connected to the experience of the research conducted. The teachers told me that the children were always very happy and were waiting for the day scheduled for our meetings with the desire to continue the activities with the proposed materials and with water in particular.

Likewise, these experiences were returned to me during the restitution meeting designed for parents. The meeting was well attended and even the parents who failed to intervene had 'delegated' their grandparents. The element that emerged most frequently from the comments was the enthusiasm in the stories that the children reported back home and the desire to continue this kind of experience.

This element highlights that the research path, despite having been carried out with fairly tight deadlines (between the first contacts and the moments of the return five months have passed), has left positive experiences in the subjects involved. This goal is also linked to the collaborative climate I have built with teachers and parents, even before the good relationship that has been established with the groups of children.

Chapter 4
Data collection and the elaboration of a grid of analysis.

4.1. Methodological considerations.

Before proceeding with the description of the steps taken to elaborate the analysis grids through which the qualitative analysis of the data collected was then carried out, some reflections on the method of data collection should be made. The observation made during the meetings with the children has in fact placed the researcher in front of some factors that can influence both the conduct of the children and the interpreting of the data (Camaioni, Bascetta, Arturi, 1988; Camaioni, 1990; , 1993; Braga, Tosi, 1995; Benvenuto, Salerni, 2001; Viganò, 2002; Becchi, 1995; Lucisano, Salerni, 2018) such as the reaction of the subjects to the observer and the curiosity linked to the presence of the camera. To reduce the incidence of the first factor, occasions were created in which the researcher shared moments of the educational day to familiarize herself with the group of participants (see 3.3.2) while, with regard to the second, the children were allowed to express their interest (providing opportunities for the children to implement actions aimed at understanding how the tool works)[37].

As for the "reading" of the data, the connection of the role of participant observer /researcher involved the possibility of a lack of distance with respect to what was detected. From this point of view, the use of audio-video recordings has been very useful because it has allowed us to review and listen to the meetings numerous times to catch the many nuances, as well as to involve other observers during the analysis and, in particular, the supervisors of my research path. The involvement of other observers[38] had the advantage both of limiting the distortions related to subjectivity and of integrating different points of view which enriched the reading and analysis of the collected material. The practice of inter-observation (Lucisano, Salerni, 2018, Braga, Tosi, 1995) has in fact offered the possibility of comparing the hypothesis of codification that the construction of the analysis grids and the analysis itself involved.

The first step towards the elaboration of the analysis grids consisted in the transcription of the observational data collected through the video-recorders integrated with written notes.

[37] I will consider some examples in the paragraphs dedicated to the categories of behaviours observed.
[38] In the specific case, the two observers involved were the PhD research supervisors who individually elaborated the analysis grids and then proceeded to a comparison with the researcher until reaching an agreement with respect to the categories and behaviours to be included in each of them.

On the observational protocols thus realized, a first analysis was carried out aimed at establishing, within the plot of the children's behaviour, those that seemed to reveal an epistemic attitude towards the proposed materials and the phenomena observed by those who did not seem to reveal this attitude.

Subsequently, exclusively considering the "epistemic" conduct, we proceeded to:

- identify the type
- define the strategies implemented and the functions performed by the adult in promoting the scientific exploration behaviour of the children.

This work was carried out by the three researchers, who:

- have read and analyzed the protocols individually, identifying the types of behaviours/attitudes recurring and identifiable as 'scientific', according to the meaning highlighted with the analysis of the literature (see chapter 1).
- have often confronted each other by reviewing the protocols together reaching a harmonious definition of the 5 categories that identify the 'scientific' conditions of the children
- have constructed the analysis grid together individuating the categories that define the infantile epistemic behaviours, which concern: a) the phenomena explored, b) the materials used; c) the verbal or non-verbal character d) the individual or social dimension of the behaviours observed.

The following paragraphs will describe in more detail how we proceeded to elaborate the analysis grid.

4.2. The identification of children’s "epistemic" behaviour.

The first 'filter' for the definition of scientific behaviours has been to exclude all those behaviours that do not seem to be exploratory and cognitive in relation to the proposed materials.

All the symbolic playful behaviours of the children using the materials have been included in this category.

Example 1
The group of children have stacked some wooden planks in the corner of the room, Ettore brings pieces of paper of different kinds and puts them on the wooden planks. Leonardo states: "Come on, now let's light the fireplace".

Example 2
Leonardo has taken a roll of kitchen paper and is looking at it. Valentino is circling around Leonardo who is going towards Pietro. Leonardo, suddenly, puts the roll to his eyes, turns it for a while and then looking inside, says to Peter: "Come! Let's play pirates! "

Example 3
Ettore is putting several objects inside one of the smaller water tanks. I approach him, watching him and he tells me: "This is soup!". I ask what he is putting in the water and he answers: "Potatoes, beans, salad ...".

The behaviour of the children towards materials where they showed no intent or interest in relation to what they were doing or to the object they were using have also been considered non-scientific. They are all those situations in which the children, absently, take an object without choosing it in relation to a curiosity or an end.

Example 1
Valentino is walking around the room and picks up some objects from inside the boxes of the materials. Suddenly he takes a ball from the floor and without looking at it holds it in his hand. Continuing to walk around he slides the ball between his thumb, forefinger and middle finger and then drops it on the floor.

Example 2
Jahelha holds two bottles in her hand, looks at them, then puts one down and takes a ping pong ball.

Example 3
Leonardo and Valentino are close to the camera, they watch the screen to see what their mates are doing. Leonardo [...] after a while, begins to pass in front of the camera to make grimaces at his comrades who laugh.

This type of behaviour was not taken into consideration during the qualitative analysis phase, even if some behaviours (for example, a group of children, during the first intervention meeting, started to draw what they had done up to that moment), because of the moment in which they occurred and the environmental conditions that they solicited, were discussed aside because they are thought to be related to the educational context in which the children are used to (see. section 3.2.5).

4.3. The encoding of children's epistemic behaviour.

Through a careful reading of the part of the protocols considered by the three researchers as revealing the children's epistemic behaviour, we proceeded to identify different types of conducts.

1. Detection of phenomenon.

This category includes all those situations in which the children, interacting with the materials, detect a certain phenomenon which, however, is not further explored. They are all those situations in which the children will realize that a certain action performed on an object produces a consequence but such detection does not lead to further exploration and is not retrieved either by a single child nor by the group. Well apart from this category are those behaviours - which have not been taken into consideration for the analysis - that children have on the materials in a distracted way without paying attention to what they are actually doing.

The phenomenon can be detected both through verbal explication and through messages conveyed through non-verbal channels.

During the research with the children, there were several occasions in which a phenomenon or the consequence of an action on an object was observed, without, then, resuming it or exploring it further. Some examples may highlight how to approach the situations that fall into this category.

Example 1

Leonardo takes a rubber ball, looks at it, touches it and - with his eyes on what he is doing - holds it between the two palms of his hands making it roll back and forth, then drops it into the box. At this point, he still looks at the ball in the box and blows on the ball inside the box a couple of times to see if he can make it move.

Example 2

Leonardo looks at the plastic bottles, lies down on the ground, takes aim, blows at one of the standing bottles. He repeats the action a couple of times by blowing harder and harder until he can make it fall.

In these cases, Leonardo shows the intention of wanting to move the ball or to knock down the empty bottle by blowing on it. After reaching his goal, Leonardo shows satisfaction and does not take up the experience, does not explore the connections between the action and the effect produced further

Example 3
Alice and Dario find a torch and try to light it by pointing it on the floor, on the mattress, on the walls and watch the effect that is produced. Alice goes to turn off the light and when she switches the flashlight on again she says satisfied: "Look, you can see more!".
Even if in this case the action is repeated by lighting the torch and pointing it at different surfaces, there are no considerations about the different effects that can be observed and the final statement concerns the greater visibility / light present when the torch is on.

2. Assembly and construction.

The type of approach with the material that falls into this category is characterized by the search for objects that are assembled to make buildings (tracks for marbles, musical instruments). The occasions in which the children take materials and assemble them are numerous but not always is this operation accompanied by interest and intentionality with respect to what is being done or what one intends to achieve. The behaviours that have been considered concern situations in which the children, individually and/or in groups, demonstrate that they have a project, an end which they achieve without meeting particular "hitches".

Below are some situations that can exemplify the behaviours of the children that fall into this category.

Example 1
Elena takes the wooden planks and puts one on top of a reel of decorative tape to give it inclination to the floor. This activity attracts the curiosity of other children who, together, take the wooden planks and begin to build a track in which the first section is inclined. At the end of the track they take the marbles and roll them along the path observing them. Elena, in particular, takes the marbles, places them at the beginning of the track and lets them roll along the path, observing if she can make them complete the entire itinerary.

Example 2
Mattia and Eros take some wooden planks, place them on the floor near the wall where the soft carpets are located. They look at each other and begin to position some according to a cross shape. Eros realizes that it is not good for what they have in mind. Mattia takes other planks and, at this point, Eros says: "This should be put like this and these two in this other way." They position the planks vertically in two parallel rows with two planks resting horizontally over the others.
After the work, Eros says: "It is a stretcher for carrying things."
To cover the points of connection between one wooden plank and the other, the two children place pieces of coloured paper on them.

Example 3
Leonardo places the wooden planks in such a way as to form a square and places a round cake tray on it. On the tray, the children place cork stoppers. The stoppers are positioned following the circumference. At this point, they place a roll of kitchen paper in the centre and drop glass marbles inside.

3. Exploration.

This category includes all the behaviours with which the child not only detects and briefly observes a phenomenon but explores it by activating behaviours that indicate the intention to deepen the knowledge, to understand "how it works"; this, too, in view of the achievement of an objective outside the cognitive one.

The following examples show how the above-mentioned characteristics have manifested themselves in the behaviour of the children who show, in the interaction with the materials, to have a hypothesis of understanding to be verified, a cognitive end in sight.

Example 1
Leonardo looks better at the cardboard cylinder he has been holding for some time, passes his hand over the object and touches the cylinder more carefully. His hand, passing along the cylinder touches a piece of torn cardboard. His finger and gaze linger for a few moments on the torn piece. He touches it and tries lifting it and pressing it down several times.

Example 2
Alice has taken a different roll of adhesive tape and tries to take a piece of it but can not tear it. She tries pulling harder and observes that the tape stretches but does not tear. She tries to rip it off with her teeth but realizes that she can not and puts it back in the box, keeping the cardboard roll in her hand.

Example 3
Jahel puts marbles inside a small bottle and begins to shake it, harder and harder, to hear the noise becoming more intense.

In these situations, Leonardo and Alice, interacting with the available objects, capture features such as the irregular surface of the roll of kitchen paper and the resistance of the material with which the adhesive tape is made. Jahel puts some of the marbles inside a plastic bottle and shaking it, gradually more forcefully seems to want to answer the question "if I shake harder does it make the noise grow louder?". Leonardo, for example, while not accomplishing the idea he has in mind, repositions the piece of cardboard raised on the roll of kitchen paper, trying to see if, in so doing, the pressed part would still come off. Alice,

having observed the resistance of the adhesive tape, tries to pull with ever greater force as if the reasoning were "if I pull harder, and bite it, will it tear off?".

4. Experimentation.

This category includes all the ways through which the child acts and interacts with the material available on the basis of a hypothesis to be tested. The discriminatory aspect in this category consists of verbal expressing of the 'hypothesis that one has in mind' and the implementation of actions useful to test it, observing the effects that ensue.

The behaviours that fall within this category are articulated along a process that falls within the framework of Dewey's investigation process (see paragraph 2.1). In particular, children express a curiosity and verbally express a cognitive intent that is addressed without encountering any hitches.

The following examples highlight some situations in which children have implemented actions that show typical characteristics of experimentation behaviours.

Example 1

The children are doing some experiences with water, scales and different objects and Arianna, after some tests and observations says: "If I fill this bottle more, it will weigh more!". After the statement, Arianna puts the full bottle on the weighing scale, takes it off and puts the empty one on. This sequence of actions is repeated several times by alternating the full bottle and then the empty one on the scale and observing that when the full bottle is weighed, the needle on the dial moves down while it remains still with the empty bottle.

Example 2

A group of children are decanting water from one of the large tanks mainly using smaller tanks, bottles and empty cans. Valentino, who is pouring water from one tank to another using smaller tanks, suddenly takes one of the smallest empty tanks and puts it in the larger one with water. He turns to me saying: "Now it floats, but if I fill it up it will sink to here (he places the palms of both hands on the bottom of the tank to make me understand that it will sink touching the bottom)". Valentino accompanies the words with actions aimed at verifying what has been said and observes that, in fact, as he adds water into the small pan, the latter goes down towards the bottom of the larger container.

Example 3
Leonardo is working in another tank of water but intervenes saying: "Look! This float (indicates a piece of wood) but if I put this on it (a plastic bottle full of water) it will all go down ".

In the situations described above, Arianna, Valentino and Leonardo express a cognitive problem that they try to go into deeper by actually explaining the hypotheses that they intend to put to the test. Arianna goes deeper into the phenomenon of weight assuming that if you fill the bottle more, this placed on the scale, will weigh more. Valentino, during the experience of decanting and floating, reasons that if he fills the small pan, this, weighing more, will go to the bottom. The same reasoning is explained by Leonardo, although using materials different from those of Valentino. In these examples, children proceed in their cognitive purpose without encountering obstacles that put them in difficulty and block their action.

5. Identification of the problem.

This category is very similar to the previous one because it implies a process that falls within the frame of Dewey's investigation process. The aspect that characterizes the behaviours that fall into this category is represented by the fact that the children, during their explorations on the material available, encounter a problem that puts them in front of a 'hitch' or a dilemma.

This condition poses the child in front of a frustrating situation because his research remains 'blocked' by a problem 'imposed' by external reality. The problematic situation is such when the child explicitly identifies the hitch that puts him in difficulty and tries to overcome it.

Example 1
Leonardo notices a piece of card off the roll of kitchen paper. After a few moments he says "It is broken here"". He looks around, approaches a box and takes a roll of blue adhesive tape. He shows me the corner that is raised on the cardboard roll and says: "I have to fix it!". He looks at the roll of tape and tries to find the point where you can lift it to get a piece. Peter and Alice approach him. Leonardo starts to pull the piece of adhesive tape. He pulls hard but is unable to tear it and turns to me [connected to the problem above] asking for help. We try together, and we realize that the tape is rather elastic and does not tear easily.
Leonardo looks at the roll of kitchen paper and the roll of adhesive tape and states: "How do you do it... how do you do it?".
Alice proposes: "If we take some scissors, we can cut it."
Leonardo: "Yes, let's take them, we have them in class".

Example 2

Leonardo explores the material available and realizes that inside a can there is a white ball and tries to get it out but can not. He continues to flip the can and look at the opening until he asks: "How could they have put it inside?". At this point a sequence of actions and interactions aimed at specifying hypotheses and putting them to the test begins.

Valentino: "I do not know!" (Takes the can in his hand and shakes it near his ear)

Leonardo: "Let's put this one in too " (making the gesture to insert a marble inside the can).

Leonardo takes other balls of different sizes and tries to insert them inside the can but he can't and repeats: "How can we make it enter?".

Valentino continues to shake and turn the can over listening to the noise of the ball going up and down ...he tries putting his finger inside the opening to see if he can touch the ball and get it out. Leonardo (addressing me in a questioning tone): "How did you do it?". Then he turns to Valentino and says: "Give it to me and I'll give it two slaps (he flips it, shakes it violently, tries to knock on the back of the can and looks to see if the ball is coming out). When he realizes that he is not able he turns again to Valentino and Ettore: "How did you put it in ?!" Valentino replies that he does not know.

Leonardo does not give up, still tries shaking the can and in the meantime turns to his companions to know how they did it. Ettore answers: "Maybe it's magic."

Leonardo is not satisfied and explicitly turns to Valentino: "Will you show me how you did it?". Then he proposes to take a ping pong ball to put it inside the can but Valentino tells him that you can not and in order to demonstrate the fact he takes the ball and tries to put it in the opening which, however, is too small (Valentino gives the ball a punch to show his partner that it can not enter the hole). Pietro intervenes trying to suggest to Leonardo what to do to try to get the ball out of the can. Leonardo takes some marbles and tries to insert them inside the can; subsequently, he turns the tin upside down, observing that only the marbles come out. He does it again and then comes towards me calling Valentino to show him (the tone is of surprise and satisfaction) "Vale, you can only do it with these (marbles)".

In the previous example, the problem does not have a solution, with respect to the aim that was to be able to extract the ball inside the can, but the behaviours implemented by the children lead to a better definition of the problematic situation identified that leads them to conclude that the ball can't come out of the can because the opening gap is too small.

Example 3

Valentino playing with a marble throws it inside a box containing mattresses used for psycho-motorial activity. The box is slightly taller than the children. The children stand on tiptoe and try to look inside the box to be able to identify the marble. Valentino: "How do we get it?" Both Valentino and Leonardo look inside the box, trying to put an arm inside to try to recover the ball but they can't. They try again and again trying to make themselves as long as they can to see if they can touch the bottom of the box. For a while they move away as if they are no longer interested in retrieving the marble. They look around a bit and get their bag and choose to take the torch.

Valentino: Leo, with these (torches) we can find the ball. The children point the flashlight inside the box, they stand on tiptoe, they look inside but the box is deep and full of rolled mattresses, so they can not immediately identify the position of the ball. Leonardo and Valentino take turns to look into the box.
Valentino: "Here! Here I can see it! "He tries to put his arm inside but can't get the ball and says," I can't reach it! "
Leonardo: It needs someone who reaches here ... Indicates the base of the box ... We reach higher.
Arianna: "You need this!" She takes a ruler from her bag and wants to use it as an extension of her arms. She leans on the box, gets up on her toes and taking the ruler at one end tries to stretch into the box. After a couple of attempts, she realizes that she cannot touch the bottom of the box even using the ruler.

Leonardo takes some rubber tubes that are in another box of gym equipment and starts hitting the box.
Valentino looks back inside with the flashlight and tries to pull out the mattresses but fails. Suddenly he begins to pull the box towards him, tilting it until it falls over. At that point the ball rolls towards the exit of the box, Valentino enters a little 'inside the box itself and when he comes out says: "Got it!"

In the examples shown, the children enunciate a problem they encounter on their path ("This is broken", "How did they put it in?") which constitutes a 'hitch' and puts them in the condition of not knowing how to solve it ("How do you do it? ", How do we get it out?"). Once the problem is identified, the children take some actions to explore possible solutions (Leonardo takes a roll of adhesive tape from the box because he wants to fix the broken roll, Valentino takes smaller sized balls), explicit hypothesis ("Let's take the scissors to cut it "," Let's try with these smaller balls "," With these torches we can find the marble ") and arrive at a solution (Leonardo takes the scissors to cut the adhesive tape necessary to repair the broken piece) or to clarify the core of the problem encountered (Valentino comes to understand that the ball inside the can does not come out because it is too big compared to the opening and it will only be possible to put in and take out smaller marbles).

The order in which the categories were presented does not necessarily correspond to a sequential order of manifestation: it cannot be said that a behaviour of exploration must necessarily arise after the detection of a phenomenon or that a problem arises only while the child experiences it.

The order in which the categories were described, however, is not accidental and highlights a greater complexity and articulation that characterizes the different types of conduct. The category of problem identification, for example, is divided into behaviours belonging to categories of exploration (making use of material with a cognitive purpose in

view), experimentation (specifying a hypothesis, testing it through the exploration of different paths and materials, observing the consequences) with the aim of clarifying a situation of 'stalemate' and arriving at a solution.

4.4. Other elements of the grid

The themes.

The behaviours mentioned above were manifested by the children through actions on objects that aimed to detect particular phenomena, for example: exploration of buoyancy, blowing on an object to push it, weight, etc. We have called the exploration of a particular type of phenomena, “theme”. A theme can be taken into consideration only once or it can be used several times within the same day or during different meetings.

In the comment that will be made with respect to what emerged from the analysis of the individual meeting days, we will highlight some aspects related, for example, the fact that some topics were kept constant during the meetings, others were explored on one occasion, others have undergone changes and developments by articulating more.

The materials used.

In demonstrating the epistemic behaviours related to the exploration of particular phenomena (themes) the children made use of some of the materials made available. It seemed appropriate to indicate which materials the child or the group took into consideration in exploring or experimenting with a certain theme / phenomenon. This is to detect the quantity and the variety of objects used both to identify which types of objects have aroused greater interest in the experience conducted.

Verbal and non-verbal.

Infantile behaviours manifested themselves either exclusively on a non-verbal level, through actions on objects, or accompanying the action with verbalizations. This distinction is important because some behaviours, to be codified in a certain way, require that the child expresses his thought verbally. For example, it is the case of verbally expressing the hypothesis that represents the discriminating factor for identifying experimental behaviours.

Individual or social.

It is also important to note if the type of exploratory conduct referred to a phenomenon implies the participation and collaboration of several children or is carried out by an individual. This component also varies as part of the exploration of the same theme. For example, it may happen that the experience in the construction of the marbles track is characterized by moments of aggregation and by others in which there is only one child who experiences which assembly allows the whole path to be completed without the ball falling off the side.

The situations in which there is one child experimenting and others who are intrigued by what the partner is doing but do not participate actively, are considered as conducts of indirect sociality.

4.5. The children's analysis grid.

On the basis of the elements identified, the analysis grid is subdivided into five columns related to:

- theme (expressed in a descriptive form, for example: ball blow)
- category of conduct:
    - Detecting of the phenomena (RIL.FEN.).
    - Assembly and construction (ASS/COS)
    - Exploration (ESP.)
    - Experimentation (SPE)
    - Problem Identifying (IND.PROB)
    - material (e.g ball)
    - verbal, non-verbal (V./N.V.)
    - individual, social (IND / SOC)

The table below is an example of how the protocol and observations in the occasions of meetings in which the adult did not play a role in promoting infantile scientific behaviour, have been analyzed and coded.

Table 4. Example of analysis grid related to the observation meeting where adult intervention was not planned to promote a scientific attitude.

Theme	Category	Material	V./N.V.	IND / SOC
blow ball	RIL.FEN.	ball	N. V.	IND. (Leonardo)

Theme	Category	Material	V./N.V.	IND / SOC
kitchen roll / marbles	ASS	kitchen roll, marbles, corks.	N. V.	IND. (Alice)

Theme	Category	Material	V./N.V.	IND / SOC
Cardboard roll	ESP.	Cardboard roll	N. V.	IND. (Leonardo)

Theme	Category	Material	V. /N.V.	IND / SOC
Broken roll	IND.ROB.	Cardboard roll, adhesive tape.	V. (Here it is broken) V.(I have to fix it) N. V. (observations and actions) V. (How do you do it, how do you do it) V.(Let's take the scissors) V. (Yes, we have them in the classroom)	IND. (Leonardo) SOC. IND. (Leonardo vs. adult) IND. (Leonardo) SOC.IND. (Leonardo, Alice and Pietro [adult]). SOC. (Leonardo, Alice, Pietro) SOC. (Leonardo, Alice and Pietro).

Theme	Category	Material	V./N.	IND / SOC
Can with ball	IND.PROB.	Can, marbles	N. V. (actions) V. (Here is a ball) V. (How could they have put it in?) N. V. (actions) V. (Let's put this also) V. (How could they have done it) N. V. (actions and observ.) V. (How did you do?) N. V. (Actions) V. (Can you show me how you did it?) N.V. (actions) V. (You can only with these)	IND. (Leonardo) SOC. (Leonardo, Valentino) SOC. (Leonardo, Valentino) SOC. (Leonardo and Valentino) SOC. (Leonardo and Valentino) SOC. (Leonardo and Valentino) SOC. (Leonardo and Valentino) SOC. (Leonardo and Valentino) SOC. (Leonardo and Valentino, Ettore) SOC. (Leonardo and Valentino, Ettore, adult) SOC. (Leonardo and Valentino, Ettore) SOC. (Leonardo and Valentino).

4.6. The analysis of the adult approach.

Also for the construction of the analysis grid of the adult intervention, a comparison was carried out between the three researchers on the basis of:

- reference to the literature on 'promotion from within', bearing in mind that the adult's style has been oriented by this educational approach;
- a first individual analysis of the observational protocols;
- a shared definition of categories for identifying adult intervention strategies.

4.6.1. Intervention strategies

In the work of defining strategies, the interventions of the adult that do not fall within the theoretical framework related to the approach of "promoting from within" have been codified with the label "not appropriate " and have however been commented on with the objective of highlighting the reason why they can't be considered coherent with the theoretical perspective of reference.

The interventions of the adult were defined taking into account the strategies implemented and the specific functions that they were intended to support throughout.

To identify the intervention strategies that the adult has implemented and which fall within the theoretical framework of "promotion from within", reference has been made to the categories developed by Bondioli and Savio (1994, 1996, 2001).

1. Mirrorings: In this case, the adult "mirrors" the verbal and non-verbal behaviour of the children avoiding making judgments. We can identify different ways of reflecting that involve different degrees of flexibility ranging from repeating a physical or verbal behaviour to proposing a reformulation. From this point of view, among the strategies that the researcher has put in place to mirror the physical verbal behaviour of the individual and / or group are: *resume* what the child/group does and/or says without adding anything new, *encourage the* children's proposals by welcoming them and actively participating in them, or by *reformulating them* so as to define and clarify what happened.

Examples of mirrorings

The group notices the reverberations that the pools full of water make on the wall when they are hit by the sunlight coming through the window and start making some assumptions.

Alice: "It's the water"
Fabrizio: "It's the light"
Adult: "It's the water, and the light."

- Encouraging

During the activity with water and the double balance weighing scales:

Dario: "Hold it up!" Handing me the scale and starting to fill the two containers with different objects.
Adult: "Ok." I hold the balance up while Dario tries to see by adding and removing material, what happens to the two containers that represent the scales.

- Re-observations

The children are making some observations on buoyancy and on the characteristics of objects that sink.
Elena: "The caps are light so why don't they stay up "?
Alice: " Perhaps they are a bit light and a bit heavy"
Elena: "Impossible... they do not go up and down ".
Adult: ″ So ... let's see if I understood what we have discovered today and you tell me if you agree and if I have understood correctly. We have observed that there are things that sink and others that float in the water. Alice says that water does not support heavy things that then sink. But Elena has observed that there are tops that are very light but that sink and asked why. "

2. Questions. Making open questions about the child's initiative avoids over-steering children in their responses. The open questions allow, in fact, to leave the possibility of a wide range of replies. Closed questions can be useful for a better understanding of elements that risk being implicit or referring to unshared knowledge.

Examples of questions

- open

During the construction of a boat:
Ettore: "We have to make it float ... of wood."
Francesco: "I once went on a ship."
Adult: "How was the ship made?"

- closed

During the floating experience:
Alice: "They are too heavy and the water does not help them."
Adult: "When you say "they", do you mean glass marbles?"

3. Introduction of new elements.

The introductions refer to interventions that the adult makes and which imply the proposal of novelty elements (materials or activities, for example) that are, however, in continuity with the experience that the child is making at that time. This type of intervention includes, also, adult interventions aimed at enriching the experience in progress by introducing "provocations" that encourage the children to insert other materials and / or evaluate new hypotheses.

Examples of introduction

- New material.

Introducing the daily meeting with the group:

Adult: "I thought about what we said during the experience of last time on objects that are light and those that are heavy, I thought of bringing you this weighing scale."
The children begin to take several items among those available and place them on the scales.

- Provocation

During the floating experience, the children put different objects inside the water tank and observe ... I wait a few minutes, observe what they do and say. At a point, I approach the group, and I notice an empty plastic bottle inside the tub.
Valentino: looks at the tub and what's inside, moving his head slightly up and down and asks in a low voice: *"How come?* "
Adult: I'm close to the group, I also try. I take a bottle of water that Leonardo had previously filled and put it into the tub along with the empty one the children had put into the tub a little earlier.
Leonardo and Arianna: "One stands up and the other goes down ... One is full and the other is empty.

4.6.2. Functions.

The intervention strategies defined above perform precise functions that recall those defined with the scaffolding and tutoring theory (see: chapter 2).

The functions related to recruitment to the task and maintaining the direction set out in tutoring were intended in a manner congruent to the open nature and divergent delivery (see: Chapter 3), that is seen as an invitation to activate the scientific exploration behaviour with regards to the materials proposed: this delivery, made explicit at the beginning of the experience, defines a frame of possible activity with respect to which, however, complete freedom is left to the child with respect to the path to follow. In the event that the children deviate from the proposed frame, for example by dedicating themselves to symbolic-play activities, the adult does not intervene directly to interrupt them and re-propose the experience of scientific exploration of materials, but rather by proposing interventions that are connected to the play context and aimed at focusing attention, for example, on the characteristics of the materials.

Starting from these considerations, the functions performed by the adult throughout the intervention strategies refer to the cognitive, emotional and social sphere.

As far as the cognitive field is concerned, the interventions have been proposed in such a way as to satisfy the following functions.

1. I will consolidate the important concepts that emerged during the different experiences; this function, recalls the Brunerian one of *marking critical features* (see chapter 2), and is activated, in particular, through interventions of filming, reformulation aimed at resuming and clarifying those behaviours or statements that highlighted the emergence of important concepts in relation to the experience conducted by the children.

Examples of ways to consolidate

- Filming

During Fabrizio's experience of exploring opaque and transparent materials that let light pass:

Fabrizio: "Here the light passes, here it passes, but not here."
Adult: I take a torch, do the same as Fabrizio and point the light on transparent and opaque surfaces verbalizing: "Here it passes, here it does not pass."

- Reformulation.

Fabrizio continues the experience and says: "On these it passes because they are made of glass." He indistinctly indicates transparent objects as if they were made of glass even though they know (he has had it explained at other times) that they are made of plastic.
Adult: "If we shine the light on these transparent materials, we can also see it on the floor, if we focus on these, instead, the light does not pass through them."

2. Highlighting and focalizing the attention on crucial elements of the experience that, if re-launched, can permit them to continue, to make a point and enrich the experience. This function recalls the Brunerian concept of *marking critical features* (see chapter 2) and is activated, in particular, by means of filming, introduction and questions.

Examples of intervention aimed at focusing attention

The group of children are telling about an experience made during the morning with their companions when Alice notices the reflection of the water against the wall. She Points with her finger and draws everyone's attention.

Fabrizio, meanwhile, has a torch in his hand and points it against the wall. He turns it on and off by pointing it into the tub with water. He observes what happens and begins to focus on materials with surfaces of different colours remarking " It passes".
Adult: I realize that he explores different materials and checks if he sees the light go on the floor. I take a flashlight and choose transparent materials and accompany the action with the words "It passes". When I point the flashlight onto material with an opaque surface, I say " It doesn't pass."

During the floating experience:
Alice: "The light things stay up and the heavy things go down."
Elena: "so how come the caps that are light have gone to the bottom?"
Adult: "How come these caps that are light have sunk?" I take a cap and place it on the water, it sinks. I repeat the action while the children are next to me.
Elena: "Here ... the cap stays up for a while, then it fills with water and goes down."
Adult: " After a while the cap fills and sinks."

3. Urging and expanding. The action of urging includes those actions aimed at continuing an argument, to continue an exploration or experimentation in relation to an observed phenomenon. Solicitation can also include the possibility of verbalizing in so much as the verbalization implies a process of clarification and is in the form of thought. The expanding function of experience concerns all those interventions through which the adult invites the child to extend the range of opportunities and materials explored. These functions can be activated through strategies for introducing new elements, questions, and filming. Within the functions finalised at expanding the children's initiative, we can also find the function of modelling.

With modelling, the adult recognizes in the child an attempt to explore/solve a problem and, collaborating with him, completes the action taken by the child allowing the child to advance in understanding.

Examples of urging and expansion

During the experience with water:

Giovanni and Fabrizio plunge the cans into a tub of water, empty them and repeat the action observing the bubbles coming out. Arianna looks at them, approaches and looks around.
Adult: "What are you looking for, Arianna?"
Arianna: "I also want to make bubbles but there are no more cans:"
Adult: "What can we use instead of cans?"
Arianna looks around, then takes a plastic bag and dips it into the water but the effect is not what she expected. She looks around again then takes a plastic bottle.

During the floating experience:
Leonardo: "the platform is afloat and is light but if I load it well it will go down."
Adult: I take a cap from the bottom of the water tank and place it on the Lego platform. Leonardo observes that it does not do as he expected and says: "We must put others on it" and accompanies his words with action. I follow him. After taking the caps from the bottom of the tank and positioning them on the platform and observing that there are no changes, Leonardo says: "If I put this on it, it will sink." Saying this he takes the bottle full of water and places it on the platform noting that it sinks and turns over.

Regarding the emotional field, the functions taken as reference are as follows.

4. Readjusting the emotional intensity is the function that is reminiscent of the Brunerian model *frustration control* (cfr. Chapter 2) and is connected to the experience of children with the aim to make it engaging, so as to keep their interest alive. The modulation of excitement, therefore, allows to keep the curiosity alive avoiding excesses that can jeopardize the continuation of the experience. The strategies that seem to activate this function are mirroring and the introduction aimed at highlighting infantile conduct which jeopardizes the continuation of the activity to motivate and propose a limitation that regulates it. This function, as we will see later, is particularly activated in the conduct of group C - in which the adult has the role of observer.

Examples of emotional intensity regulation

Andrea not having received an answer from Eros to his invitation to play with the balls, decides to play by throwing the balls into Eros's pool of water... he drops one from high up and wets Eros. Who shouts "Hey!!!!: The game is repeated a couple of times, then Eros and Andrea decide to play with the balls together. The first launches are too strong and because a few minutes before when he had started throwing the balls against the wall, I had only spoken to Andrea, this time I spoke to everyone.
Adult: "If you want to play this game, it's okay but do not throw so hard against the wall because you might hit some of your friends or the camera when it bounces. Keep playing but we have to respect the rule I gave you at the beginning, so as not to hurt yourselves ".

During the observation meeting at the end of the path with the group:
Eros and Andrea take the wooden planks and start using them as sticks to hit different objects (empty bottles, corks and balls). Tilda and Mattia also take, a wooden board and do the same thing. I intervene because the situation seems risky to me because the children are standing in pairs, one in front of the other, and try to throw an object in the air and then hit it. The children, however, are too close to one another and could hit each other by mistake
Adult *"Listen, if you want to play this game you have to respect some rules in order not to hurt yourself. You should be further apart and, above all, hit objects by putting them on the floor - as you did once before. "I* accompany these words with an example and take a wooden plank and show them how to play with it.

5. Frustration control, this also recalls the function of *tutoring* defined as *frustration control* and can be connected to times when the child or group face a moment of discomfort that they can't cope with alone and that arouses feelings of anxiety that may preclude the possibility of continuing the experience. Situations of this kind have occurred, as we will see later, in the first observation meetings during which the children felt uncomfortable in being in a less structured context that they gave them great freedom with respect to the task. This function was activated through introduction, questions and follow-up strategies (for example, allowing children to carry out the activity that put them in a "safe" condition such as playing at school, proposing a more familiar model for them).

Examples of containment of frustration

During the first preliminary observation meeting, I express delivery of objects to the group.
Adult: "See? I have brought you some things that you can use as you wish. You can choose and decide to do anything, and I will observe you because I am curious to understand what can be done with this material. "
The children stand still, in silence for a few minutes. I feel their discomfort of being in a situation which is new for them with regard to the context to which they are accustomed. Some begin to walk around the table which has the boxes of materials on it.
Adult: "Ok. Let's try to see what's inside these boxes "and I approach a box, I open it and start to pull out an object showing it to everyone.
Arianna: "Can we take these things?"

Adult: "Yes".

During the final observation meeting, the group continues the game of throwing the balls hitting them, on the floor, with a small bottle / bat. Mattia, gets up and takes a plank of wood. He starts to walk around the room, sits down and starts playing with his companions. After a while he gets up to retrieve a ball, but Andrea arrives first. Mattia asks his partner to give him the ball but Andrea refuses and Mattia hits him with the wooden board. I intervene: "Mattia, I didn't bring you these things to hurt yourselves with." Mattia replies: "So why did you bring them?".

As for the social sphere, the function taken as reference is that of a 'social bridge' aimed at promoting the linking of individual initiatives and supporting cooperation. The interventions that seem to activate the social function more are questions, recollections and reformulations oriented to make present to one what the others do.

Examples of social bridge

During the experience with the pools of water:

Alice: these sank *(allen wrenches).*
Adult: "Giovanni, have you seen what Alice and Elena are doing? " I realize that he is still hesitant since it is the first time he is participating in our meetings and without insisting too much I try to involve him.

During the activity with the water tanks:
The children try with all the things they have available to see those that float. I let them try for a while and watch them. Dario (4 years old) dips an empty can in the water, observes it, and notes the bubbles. He empties the can and dips it again, smiling when he sees the bubbles forming. He looks at me.

Adult: " Look, it's making bubbles ".

4.7 The analysis grid of the adult approach.

It should be noted that intervention strategies can activate different functions at the same time (a question can at the same time solicit the continuation of an experience, expand it and promote the comparison and involvement of the group of children.

The analysis of the intervention of the adult, with reference to the strategies and functions outlined, was carried out in strict reference to the analysis of infantile conduct. For this purpose, a further column corresponding to the adult intervention was added to the grid for the analysis of infantile conduct, presented in the paragraph.

Adult intervention strategies and activated functions have been codified and inserted into a column of the analysis grid and related to the behaviour and reactions of the children.

Each strategy and function has been codified through abbreviations, in a similar way to what has been done for the aspects of the grid taken into consideration.

Below is the analysis grid of the meetings in which the adult has carried out a "promotion from the inside"

THEME	**CATEGORY**	**MATERIAL**	**V. / N.V.**	**IND / SOCIAL**	**ADULT**

The column relating to the adult provides the following categories related to:

<u>strategies</u>

- Repeting (Rep.)
- Comply (Comp)
- Reformulation (Ref.)
- Open questions / closed questions (DA / DC)
- Introduction of new elements (Introd.)

<u>functions</u>

- Consolidation (Cons.)
- Marking critical features (Foc / evid.)
- Soliciting (verbalization, hypothesis, continuation of experience) (Sol.)
- Emotional regulation (Reg. Emo.)
- Frustration control (Cont.)
- Social connection (Soc. Conn.)

Table 5. Example of analysis grid related to the observation meeting where the adult intervention was planned to promote a scientific attitude.

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THEME	CATEGORY	MATERIAL	V./ N.V.	IND / SOC	ADULT
Floating	ESP	Tub with water, sticks and caps	V. (I look for what goes down)	IND. (Elena)	
			N. V.	IND (Elena)	
	SPE		V. (You will see that it falls down)	SOC (Arianna, Elena)	D. A. / SOC. Conn.
	ESP		V. (This did not go down)	IND (Elena)	Rep/ Sol. (continuation of experience)
			V. (We must look for heavy things, because water does not hold them and they go down)	SOC. (Alice, Elena, Giovanni)	
	SPE		V.(now let's try the light things will have to stay up)	SOC. (Elena, Alice, Giovanni)	Introd./ Sol. (to continue of reasoning)
			N.V.	SOC. (Elena, adult)	
			V. (I think this floats it's light)	SOC. (Alice, Elena, Adult)	
			V. (I have discovered that light things float and heavy things go down).	SOC. (Elena, Alice, adult)	Rep./ Cons./ Sol.(to continue of reasoning).

THEME	CATEGORY	MATERIAL	V. / N.V.	IND / SOC	ADULT
Bubbles under water	ESP	Tub of water, can	N. V. (dips the can in the water several times and observes smiling every time he sees the bubbles)	Ind. (Dario)	Rep./ Cons. (continue experience)/ SOC. Conn..
		Tub of water, cans, various objects	N.V. (actions, search for objects that make bubbles).	SOC. Ind. (Dario, Arianna, Elena, Alice)	D. A./ Sol. (to continue exploration.
			V. (Your s makes small, small bubbles)	SOC. (Alice, Arianna, Elena, Dario)	Introd./sol.(to continue of experience)
		Tub of water, can and small bottle of water	V. (It almost does not do it)	SOC. (Dario, Elena, Alice)	
			V. (if the bottle has a cap, I can push it underneath but it does not make bubbles)	SOC. (Dario, Giovanni, adult)	Rep./consolid
			N.V. (Actions)	SOC. (Dario, Giovanni)	

THEME	CATEGORY	MATERIAL	V./ N.V.	IND / SOC	ADULT
Enlarge / water	RIL.FEN ESP	Plastic bottle, water, marbles, rings	V. (Look, put it this way, they look bigger) V. (if you take them out ...) N.V. V. Yes, see! It's true, they look bigger if put here	Soc. (Alice, adult) Soc.(Elena, adult, Alice) Soc.(Elena, Alice) Soc. (Elena, Alice, adult)	Rep./Cons./SOC. Conn. Rep. / Cons.

Chapter 5
Data analysis.

The observative data relating to each meeting with the groups of children have been codified, on the basis of the criteria laid down in paragraphs 4.4 and 4.5 and presented in strings which will be taken into account both to describe how each theme has emerged and through which pipelines have been deepened. At the end of each day a table of synthesis was elaborated, highlighting the frequency with which the various 'scientific' pipelines were observed, the communicative modality and the social dimension with which the group deepened the different issues emerged.

5.1. Group A

5.1.1. Group A: preliminary observative meeting.

THEME	CATEGORY.	MATERIAL	V. /N.V	IND/SOC	ADULT
"Ball/blow"	RIL.FEN.	ball	N.V.	IND. (Leonardo)	

THEME	CATEGORY	MATERIAL	V./N.V	IND/SOC	ADULT
Cardboard roll	ESP. IND.PROB.	Cardboard roll Cardboard roll and scotch tape	N.V. (actions) V. (This is broken. I've to fix it) N.V. (actions) V. (How can I do it?)	IND. (Leonardo) IND. (Leonardo) IND. (Leonardo) SOC. (Leonardo, Alice, Valentino, Pietro, adulto).	Rep.question

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Planks of wood	ASS/COS	Planks of wood, murbles, caps, balls, cardboard	N.V. (actions) V. (Put it here) N.V. (actions)	SOC. (Ettore, Valentino, Pietro) SOC. (Ettore, Alice, Valentino Pietro) SOC. (Valentino, Ettore, Alice, Pietro e Leonardo)	

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Scotch roll	RIL.FEN.	Scotch roll	N.V. (actions)	IND. (Valentino)	

THEME	CATEGORY	MATERIAL	V./N.V	IND/SOC	ADULT
Ball in to cans.	IND.PROB	cans, murbles	V. (How did they put it in?) N.V. (actions) V. (We also put this) N.V. (actions) V. (How do you get here in?) V. (How do you get here in?) N.V. (actions) V. (How do you get here in?) N.V. (actions) V. (Can you show me how you didi t?) N.V. (actions) V. (You can only with these)	IND.(Leonardo) SOC. (Leonardo e Valentino) SOC. (Valentino, Leonardo) SOC. (Leonardo, Valentino) SOC. (Leonardo, Valentino) SOC. (Leonardo, Valentino) SOC. (Leonardo, Valentino) SOC(Leonardo, Valentino) SOC. (Leonardo, Valentino) SOC. (Leonardo, Valentino e adulto) SOC. (Leonardo, Valentino) SOC. (Valentino, Leonardo)	

THEME	CATEGORY.	MATERIAL	V./N.V	IND/SOC	ADULT
Magnifying glass 5m e 38 sec.	ESP	Mignifying glass, murbles, different objects ruler	N.V. (actions) V. (Look! They're very great) N.V. (actions) V. (Leo, Vale, look! They are great) V. (If you look at them with this, they're bigger) N.V. (actions) N.V. (actions)	IND. (Ettore) SOC.IND. (Ettore, Leonardo, Alice, Valentino) SOC. IND. (Ettore, Alice, Leonardo e Valentino) SOC. IND(Ettore, Leonardo, Valentino) SOC. IND (Ettore, Valentino, adulto) SOC. (Valentino. Leonardo) IND. (Ettore)	Comp.

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
videocamera	ESP	videocamera	V. (Even here you see bigger?) N.V. (actions) V. (Here I see it)	IND. (Leonardo) IND. (Leonardo) IND. (Leonardo)	

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Blow against bottle	RIL.FEN.	Plastic bottles	N.V. (actions) V. (There we go!)	IND. (Leonardo) IND. (Leonardo)	

THEME	CATEGORY	MATERIAL	V./N.V.	IND/SOC	ADULT
Noise/sound	RIL.FEN.	Plastic box murbles	N.V. (actions)	IND. (Leonardo)	

5.1.2. Group A: Summary table of the preliminary meeting

CATEGORY

Detecting of the phenomena	4
Assembly and construction	1
Exploration	3
Sperimentation	
Problem Identifyng	2

MATERIALS

Roll of cardboard, murbles and ping-pong balls, wood lices, video canera, plastic bottle, magnifying glass, ruler, adhesive tape.

COMMUNICATIVE STRATEGIES

VERBAL	16
NON VERBAL	17

SOCIAL DIMENSION

Individual	14
Social	16
Indirected Social	4

ADULT APPROACH

Repeat	1
Comply	1

5.1.3. Group A: The first meeting (promotion from within).

THEME	CATEGORY	MATERIAL	V./N.V.	IND/SOC	ADULT
Ship	COS. IND. PROB	Wood blocks, water	N.V. (actions) V. (I want to make a ship) V. (I have to float) N.V. (actions)	IND. (Ettore) IND. (Ettore) SOC. (Ettore, adulto) SOC.(Ettore, adulto)	D. A./Sol. (to continue of experience)

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Floating	ESP IND.PROB. ESP	Tanks with water, different types of objetcs, plastic bottle	N.V. (actions/observation) V. (Let's see what it does) V. (Why?) V. (one stand up and the other is down) V. (The one full goes down and the other, empty, is on) V. (One is full and the other is empty) N.V. (actions)	SOC.(Arianna, Leonardo, Alice) SOC.(Arianna, Leonardo, Alice) IND.(Valentino) SOC.(Arianna, Leonardo, Valentino) SOC.(Arianna, adulto) SOC. (Leonardo, Francesco, adulto) SOC. IND. (Francesco, Leonardo, Arianna)	Introd./Sol. (to continue of experence) Rep./SOC.Conn. Rep/Cons. D. A./SOC.Conn. Intervention Non Appropriate

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Water as a magnifying glass function	ESP.	Plastic bottles, water, murbles and metal rings	N.V. (actions) V. (They are bigger) N.V. (observations) V. (They look bigger these N.V. (observations)	IND. (Ettore) IND. (Ettore) IND. (Ettore) SOC. (Arianna, Ettore, Adulto) SOC. (Arianna, Ettore, Adulto)	D. A./Sol. (to continue experience), SOC. conn. Rep./Sol. (continue the reasoning

			V. (Yes, if you look at them from here, the rings look bigger)	SOC. (Arianna, Ettore, adulto)	

5.1.4. Group A: Summary table of the first meeting (promotion from within)

Detecting of phenomena	-
Assembly and construction	1
Exoloration	4
Sperimentation	-
Problem Identifying	2

MATERIALS

Tanks, water, plastic bottles, murbles, metal rings, lego wood

COMUNICATION STRATEGIES

VERBAL	9
NON VERBAL	7

INDIVIDUAL/SOCIAL

Individual	6
Social	10
Indirected Social	1

ADULT APPROACHES

Mirroring	3
Open Questions	3
Introduction	1
Non appropriate	1

5.1.5. Group A: the second meeting (promotion from within).

THEME	CATEGORY	MATERIAL	V. /N.V.	IND./SOC.	ADULT
Floating	ESP	Different objects	N.V. (actions)	SOC.IND. (Leonardo, Arianna, Ettore, Francesco, Alice e Valentino)	
	SPE		V. (Look! Thi floats, buti f I filli t well i twill go down)	SOC. (leonardo e adulto)	Rep./Foc./Sol. (continue of the experience)
			N.V. (actions)	SOC. (Leonardo, arianna, adulto)	
			V. (Look what I found out. If I put the cap that went down above it stays on)	SOC. (Arianna, Leonardo, adulto)	Introd./Sol.(conitnue of the experience and the reasoning)
			V. (It is always on)	SOC. (Leonardo, Arianna, adulto)	
			V. (With the plugs on the wood blocks everything floats.)	SOC. (Leonardo, Arianna, adulto)	
			V. (Wood can float everything)	SOC. (leonardo, adulto)	
			V. (The full should go down because it weighs more.)	SOC. (leonardo, adulto)	Introd. Rep./Sol. (continue the reasoning)

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Ship	COS.	Wood-blocks and water	V. (I'll make a boat) V. (Wii do it together) N.V. (actions)	IND. (Ettore) SOC. (Arianna e Ettore) SOC (Arianna, Ettore)	Comp./Sol. (continue of experience) Rep./Sol. (continue of the experience)
	IND. PROB.	Wood-blocks, water, plastic bottlesa, plastic and wood caps	V. (I have to make it float) N.V. (actions) V. (wood! These wood-blocks) V. (One, I was on a ship) V. (It not wooden though) N.V. (actions)	IND. (Ettore) SOC. (Ettore, adulto) SOC. (Ettore, adulto) SOC. (Francesco, Ettore, adulto) SOC. (francesco, Ettore, adulto)	D. A./ Sol. (hypothesis) (What can be useful?) D. A./Sol. (continue of experience) Rep./Sol.

THEME	CATEGORY	MATERIAL	V./N.V	IND/SOC	ADULT
Weight scale	ESP	Plastic bottles	V. (If we take this in hand, you feel it weighs) V. (The lighter one feels less pull down) N.V. (actions)	SOC. (Leonardo, Arianna, adulto, Ettore) SOC. (Ettore, Leonardo, Arianna, adulto) SOC.(Arianna, Leonardo, Valentino, Ettore, Pietro)	D. C. (Will you help us?)/ SOC. Conn.
	SPE	Different objects	V. (The needle moves) V. (This will weigh more)	IND. (Pietro) SOC. (Leonardo, Ettore, Pietro)	Introd./Sol. (continue of the experience) D. A./ SOC. conn./Sol. (hypothesis)

5.1.6. Group A: Summary table of the second meeting (promotion from within)

CATEGORIES

Detecting of phenomena	-
Assembly and construction	1
Exploration	2
Sperimentation	2
Problem Identifying	1

MATERIALS

Tanks, water, plastic bottle, murbles, metal rings, caps and corks, lego wood, scale.

COMMUNICATIVE STRATEGIES

VERBAL	16
NON VERBAL	6

SOCIAL STRATEGIES

Individual	3
Social	17
Indirected social	1

ADULT STRATEGIES

Mirroring	4
Open questions	3
Closed questions	1
Introduction	3

5.1.7. Group A: The third meeting of group A (promotion from within)

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Weight scale	ESP. SPE.	Scale and a different types of objects Wooden-blocks, weigh scales, tank of water	N.V. (actions) V. (Look! How much I did weigh) V. (Now I did weigh again) N.V. (actions) V. (How come if I push up, the needle move?) V. (Why if you put your hands or things, this goes down to weigh?) V. (If I put these over the scales now, the needle will have to go down) N.V. (actions) V. (This way, the needle doesen't move) V. (It floats because it is light. The needle doesn't move.) N.V. (actions) V. (Doesn't weigh enough) N.V. (actions)	IND. (Leonardo) SOC. (Leonardo, adult) SOC. (Leonardo, adult) SOC.IND. (Leonardo, adult) SOC. (Leonardo, adult) SOC. (Arianna, Leonardo, adulto) SOC. (Ettore, adulto) SOC. (Ettore, adulto) SOC. (Ettore, adult) SOC. (Arianna, Ettore, adult) SOC. (Arianna, Ettore, adult) SOC. (Leonardo, Ettore) SOC. (Leonardo, Ettore)	Rep./ Sol. (continue the reasoning) Non Appropriate. Rep/SOC.conn., Sol. (continue the experinece). Rep./Sol. (continue of reasoning Rep./Sol. (continue the reasoning) Non.Appropriate Introd./Sol. (I put equal bottle, but empty, on the scales.) Introd./Sol. Introd./Sol. (hypothesis, to continue the reasoning)

THEME	CATEGORY.	MATERIAL	V. /N.V	IND/SOC	ADULT
Floating	ESP	Tanks with water, scale, a different tyes of objects	N.V. (actions) N.V. (actions) V. (There are things going on	SOC. IND. (together) SOC. (Arianna, Francesco, Ettore) SOC. (Arianna, Ettore)	Rep./Sol. (continue the reasoning)

			others going down) V. (It's a little there and then he goes down)	SOC. (Arianna, Ettore, adult)	Rep/Sol. (continue of experience) Non. Apropriate

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Scale construction	IND.PROB.	Clothes hangers, plastic cups, string	V. (How can we do that?) V. (My Grandfather had one made like this…two strands with tied a big plate) V. (So, we can we can't weigh two things)	SOC. (Leonardo, Ettore, adult) SOC. (Ettore, Leonardo, adult) SOC. (Ettore, Leonardo, adult)	Rep./Sol. (continue of experience) /SOC. conn.
	ASS/COS		N.V. (actions)	SOC. (Ettore, Leonardo, adult)	
	ESP	Weighing machine, two dish weighing machin.	V. (So, we can weigh two things at ones) N.V. (actions) V. (The one of glass that weighs more and is also tougher) N.V. (actions) V. (with this moves, with this doesn't move)	SOC. (Ettore, adult) SOC. (Arianna, Leonardo, Ettore, adult) SOC. (Arianna, adult) SOC. (Arianna, Alice) SOC. (Arianna e Alice)	D. C. (Do you propose to do this way if I understand. Is that correct?) /Sol. (continue of experience) Non apropriate.

THEME	CATEGORY.	MATERIAL	V./N.V	IND/SOC	ADULT
Broken scales	IND.PROB.	Scale and objects	V. (Ops! The scale has broken.) N.V. (actions) V. (Do you have another?) V. (We can fix it)	IND. (Leonardo) IND. (Leonardo) SOC. (Leonardo, adult) SOC. (Leonardo, adult)	Rep./Sol. (hypothesis) D. A./Sol. Comp./Cons.

5.1.8. Group A: Summary table of the third meeting (promotion from within)

CATEGORIES

Detecting of phenomena	-
Costruzione e assemblaggio	1
Exploration	3
Sperimentation	1
Problem Identifying	2

MATERIALS

Tanks, water, plastic bottles, murbles, metal rings, caps, lego wood, scale.

COMMUNICATIVE STRATEGIES

VERBAL	19
NON VERBAL	10

SOCIAL STRATEGIES

Individual	3
Social	25
Indirected social	2

ADULT STRATEGIES

Mirroring	7
Open questions	2
Comply	
Introduction	3
Emotive regulation	1
Non appropriate intervention	3

5.1.9. Group A: The fourth meeting (promotion from within)

THEME	CATEGORY.	MATERIAL	V. /N.V	IND/SOC	ADULT
Raking	SPE ESP	A different size of tanks	V. (No! Careful, it's too high) V. (All the water comes out if you put even that.) N.V. (actions, observations) V. (You pushed down the bottle and the water is all out) N.V. (actions)	SOC. (Arianna, Alice, Francesco, adulto) SOC. (Leonardo, Francesco, Alice) SOC. (Francesco, Alice, Leonardo) SOC. (Arianna e Francesco) SOC. (Valentino, Arianna, Francesco)	Rep./Sol. (continue of experience) Rep./Sol. (hypothesis and continue the experience)

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Floating	SPE	Tanks, water, wooden blocks, different types of objects Wooden blocks, caps.	V. (Now it floats, buti f I filli t with water come to the bottom) N.V. (actions) V. If I put this here, i twill sink.) V. (If I put this wooden block will float, but if I filli t well, i twill go down). N.V. (actions) V. (Did you see that?) V. (You will see that, now, I load the hull and sink.) N.V. (Ettore looks disappointed) V. (No, it doesn't sink)	SOC. (Valentino, adult) SOC. (Valentino, adult) IND. (Ettore) SOC. (Ettore, adult) IND. (Ettore) SOC. (Ettore, adult) SOC. (Ettore, adult) IND. (Ettore) SOC. (Ettore, adulto)	D. A./SOC. Conn./Sol. Rep./Sol.(continue the reasoning and experience) Rep. (verbal) (It doesn't sink) /Sol. (hypothesis).

			V. (It would take… Here!) N.V.(actions)	SOC. (Ettore, adulto) IND. (Ettore)	

THEME	CATEGORY	MATERIALE	V. /N.V	IND/SOC	ADULTO
Shadows	ESP	Tanks with water, plastic box and body	V. (Look! The sun that bangs here makes it look like water is out on the floor) N.V. (actions) V. (It's a shadow) N.V. (actions)	SOC. (Arianna, Valentino, adult) IND. (Arianna) SOC.(Valentino, Arianna, adult) IND.(Valentino)	Rep./memory and solicit. Rep./Solicit

THEME	CATEGORY.	MATERIAL	V./N.V	IND/SOC	ADULT
Sketches	ESP	Tanks with water and murble	N.V. (actions) N.V. (actions) V.(How many sketches!)	IND.(Ettore) SOC. (Ettore, Valentino, Leonardo) SOC. (Ettore, Valentino, Leonardo)	Comp. /emotional cont./Sol.

THEME	CATEGORY.	MATERIAL	V./N.V	IND/SOC	ADULT
Marble into the box	IND.PROB.	murble, cardoard box, torch, ruler.	V. (How do we take it?) N.V. (actions) V. (Leo, with this we can see where the murble is) N.V. (actions) V. (I saw it! I don't get.) V. (It takes someone with the longest arms) V. (It takes someone who gets here) V. (It takes this) N.V. (actions) V. (We took it.)	SOC.(Valentino, Leonardo) SOC.(Valentino, Leonardo) SOC.(Valentino, Leonardo) SOC.(Valentino, Leonardo) SOC.(Valentino, Leonardo) SOC. (Arianna, Valentino, Leonardo, adult) SOC.(Leonardo, valentino, Arianna, adult) SOC. (Arianna, Leonardo, Valentino, adult) SOC. (Arianna, Leonardo, Valentino) SOC.(Valentino, Arianna, Leonardo, adult)	Comp./Sol. Rep./Sol. (continue of experience)

THEME	CATEGORY.	MATERIAL	V. /N.V	IND/SOC	ADULT
Weight scale	ESP	Weight scale, body	N.V. (actions) V. (No, I weigh myself) V. (How much weight!) N.V.(actions)	IND.(Leonardo) SOC.(Leonardo, Francesco, Arianna) SOC..(Leonardo, Valentino, Arianna, Francesco, adult) IND. (Valentino)	 Introd./Sol. (continue of experience) Rep./Sol.(continue of experience)

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Coloured water	RIL.FEN.	Tanks with water and colourd ruler	N.V. (actions) V. (The water you can see it pink)	IND.(Ettore) IND. (Ettore)	 Rep./Sol. (hypothesis)

5.1.10. Group A: Summary table of the fourth meeting (promotion from within)

CATEGORIES

Detecting of phenomena	1
Costruzione e assemblaggio	-
Exploration	4
Sperimentation	2
Problem Identifying	1

MATERIALS

Tanks, water, body, lego wood, scale, caps, corks, carton box, torch, ruler.

COMMUNICATIVE STRATEGIES

VERBAL	23
NON VERBAL	16

SOCIAL STRATEGIES

Individual	11
Social	28
Indirected Social	-

ADULT STRATEGIES

Mirroring	8
Open questions	1
Introduction	1
Emotive regulation	1
Comply	2

5.1.11. Group A: final observative meeting.

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
mixture	RIL.FEN.	Legumes, water	N.V. (actions)	SOC.IND. (Alice, Arianna, Valentino)	

THEME	CATEGORY.	MATERIAL	V. /N.V	IND/SOC	ADULT
Funnel and legumes	RIL.FEN.	Legumes, funnel, plastic bottle	N.V. (actions)	IND. (Leonardo)	

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Table construction	COS. ESP	Planks of wood	V. (I'll make a table) N.V. (actions) N.V.(observations) N.V. (actions) N.V. (actions)	IND. (Ettore) IND. (Ettore) IND. (Ettore) IND.(Ettore). SOC.(Ettore, Francesco)	

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Carpet leaning against the wall.	IND.PROB.	Murbles, rubber mat	V. (Alt! Falls, you must come) N.V. (actions) V. (If we pull him a little way, he will be on) N.V. (actions)	SOC.(Francesco, Leonardo, Ettore) SOC.(Francesco, Leonardo, Ettore) SOC.(Valentino, Ettore, Leonardo, Francesco) SOC.(Valentino, Ettore, Leonardo, Francesco)	

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Construction stretcher	COS ESP	Planks of wood, cardboard, different types of paper	N.V. (actions) V. (Not this. Here! I'll take this cardboard harder.) N.V. (actions) N.V. (actions) N.V. (actions)	SOC. (Ettore e Alice) SOC. (Ettore, Alice) SOC. (Ettore, Francesco) SOC. (Alice, Ettore, Francesco) SOC. (Ettore, Francesco e Alice)	

			N.V. (actions) N.V. (actions) V. (We are going to finish the stretcher)	IND. (Ettore) SOC.(Ettore, Leonardo) SOC. IND. (Ettore, Francesco, Alice)	

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
shadows	ESP	body, planks of wood. + plastic knife	N.V. (actions and observations) N.V. (actions and observations) N.V. (actions and observations)	IND. (Leonardo) SOC. (Leonardo, Francesco). SOC. (Leonardo, Francesco)	

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Reflexes	RIL. FEN.	Golden cardboard	N.V. (actions and observations) N.V. (Actions and observations)	IND. (Leonardo) SOC.IND.(Leonardo, Valentino)	

5.1.12. Group A: Summary table of the final observative meeting

CATEGORIES

Detecting of phenomena	3
Assembly and construction	2
Exploration	4
Sperimentation	1
Problem Identifying	2

MATERIALS

Legumes, water, planks of wood, murbles, bottiglie plastica, tappeto gomma, carta, cartone e coltellino plastica.

COMMUNICATIVE STRATEGIES

VERBAL	5
NON VERBAL	13

SOCIAL STRATEGIES

Individual	7
Social	14
Indirect Social	3

ADULT STRATEGIES

Repeat	-
Open questions	-
Introduction	-
Comply	2
Emotive regulation	2

5.2.1. Group B: a preliminary observative meeting.

THEME	CATEGORY	MATERIAL	V. /N.V.	IND./SOC.	ADULT
Track of murbles	COS.	Planks of wood, plastic coil	V. (The last time we put these in this way.) N.V. (actions) N.V. (actions)	SOC.IND.(Elena, Arianna, Ginevra, Dario) SOC. (Arianna, Elena, Alice, Ginevra, Dario)	
	ESP.	Murbles, planks of wood, coil, balls	V. (This murble came out) V. (This murble has been in) N.V. (actions)	SOC. (Elena, Arianna, Dario) SOC. (Arianna, Elena) SOC. (Elena, Arianna e Dario	
	SPE		V. (If you put the planks like that, the murble will fall here)	SOC. (Elena, Dario, Arianna)	
	IND.PROB.	Planks of wood, murbles, balls.	V. (How come? It had to go like this, make the curve) N.V. (actions) V. (I want it to make the curve) N.V. (actions)	SOC. (Elena, Arianna, Ginevra) SOC. (Elena, Dario, Arianna) IND. (Dario) SOC. (Elena, Dario, Arianna)	
	SPE		N.V. (actions) V. (Look! These of these kind you'll see that will come to the end) N.V. (actions) V. (If we use them larger, they will pass and will not fall into the hole) V. (Look at mine went louder) N.V. (actions) V. (Let's see if I put these here, the murbles will bounce) N.V. (actions) V. (I remove these if not you fail) N.V. (actions)	SOC. (Elena, Dario, Arianna) SOC. (Elena, Dario, Arianna) SOC. (Elena, Dario, Arianna) SOC. (Elena, Dario, Alice) SOC. (Elena, Dario, Alice) SOC. (Elena, Dario, Alice) SOC. (Dario, Arianna) SOC. (Elena, Dario, Arianna) SOC. (Elena, Dario, Arianna) IND. (Dario)	

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Box to open	IND.PROB.	Plastic box.	V. (How do I open it?) N.V. (actions) V. (Can you open it?)	IND.(Alice) IND. (Alice) SOC. (Alice, adulto)	 Comp./Sol. (to continue the experience)

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Cardboard rolling	RIL.FEN.	Round shaped cardboard	N.V. (actions) N.V. (actions)	SOC. (Alice, Ginevra) SOC. (Alice, Ginevra)	

THEME	CATEGORY.	MATERIAL	V. /N.V	IND/SOC	ADULT
Noise/rattles	COS ESP.	Plastic bottles, balls, murbles, metal rings.	N.V. (actions) N.V. (actions) V. (We make noise) N.V. (actions) V. (actions)	SOC. IND. (Ginevra, Alice, Elena, Dario, Arianna) SOC. IND(Ginevra, Alice) SOC. (Elena, Ginevra, Alice, Dario, Arianna) SOC.(Dario, Arianna) SOC. (Dario, Arianna)	

THEME	CATEGORY.	MATERIAL	V. /N.V.	IND/SOC	ADULT
Light	ESP.	Torch, track of murbles, plastic bottles	V. (What are they for?) N.V. (actions) V. (Watch! You see better) N.V. (actions) V. (They don't see us) N.V. (actions) N.V. (actions) N.V. (actions)	SOC. (Elena, adult) SOC. IND. (Dario, Elena, Arianna, Ginevra, Alice) SOC. IND. (Alice, group) SOC. (Alice, Elena, Ginevra) SOC. (Elena, Alice) IND. (Dario) IND.(Dario) IND. (Elena)	Rep./sol. (continue the experience)

5.2.2. Group B: Summary table of the preliminary meeting

Detecting of phenomena	1
Assembly and construction	2
Exploration	3
Sperimentation	2
Problem Identifying	2

MATERIALS

Planks of wood, bobina di plastica, bottiglie plastica, murbles, caps, corks, torch, metal rings, different object in to the room.

COMMUNICATIVE STRATEGIES

VERBAL	18
NON VERBAL	21

SOCIAL STRATEGIES

Individual	7
Social	26
Indirected Social	5

ADULT STRATEGIES

Mirroring	1
Open question	-
Introduction	-
Comply	1

3.2.3. Group B: the first meeting (promotion from within + final conversation approach)

THEME	CATEGORY	MATERIAL	V. /N.V.	IND./SOC.	ADULT
Floating	ESP	Tanks with water, wooden bolcks, caps.	V. (I'm looking for the objects goes down) N.V. (actions) N.V. (actions) V. (This cap is a little bit down and a littlke bit on)	IND. (Elena) IND. (Elena) IND. (Dario) IND. (Dario)	D. A./ SOC. Conn. Rep./sol. (to continue the experience)
	SPE	Various objects	V. (This you will see that goes down) V. (Didn't go down) V.(We have to look for the heavy things because the water doesn't hold them and they go down) V.(If we look for things to be light, they will stay on) N.V. (actions) V. (I think this floats. It's light) V. (I've found that the light things float, the heavy ones go down) V. (These rings are light but they go to the bottom)	SOC. (Arianna, Elena) IND. (Elena) SOC. (Alice, Elena, Dario) SOC. (Elena, Alice, Giovanni) IND. (Dario) SOC. (Elena, adulto) SOC. (Alice, Elena, adulto) SOC. (Elena, Alice, adulto)	Introd./ Sol. (continue the experience) Rep./Cons.

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Bubbles with water.	ESP	Tanks with water, cans, plastic bottle, plastic bags.	N.V. (actions) N.V. (actions) N.V. (actions) V. (I make bubbles) V. (Yours makes them small, small) V. (It doesn't make them, almost)	IND. (Dario) SOC.IND.(Dario, Arianna, Elena, Alice) SOC. (Elena, Alice) IND. (Dario) SOC. (Dario, adult) SOC. (Dario, Adult)	Rep./Sol. (contiue the experience) D.A./Sol. (continue the experience) Introd./Sol. (continue the experience and reasoning)

25m. e 26 sec./38m. e 47 sec. (12m. e 55 sec.)			V. (Try with this, teacher) V.(If you crush it, do you see the bubbles) V. (If the bottle has the cap, i can pus hit underneath buti t does not boil) N.V. (actions)	SOC. (Dario, adult) SOC. (Elena, adult, Dario) SOC.(Dario, adult) SOC.IND. (Dario, Giovanni)	Rep./cons. (continue the experience) Comp./cons. (continue the reasoning) Rep. Sol. (continue the experience) Rep./cons. (continue the experience)/ Sol. hypothesis.

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Water as a mignifying glass function	ESP SPE	Plastic bottle, water, murbles, metal rings.	V. (Look. Put it into the water look like bigger) V. (If you pull them out, they are normal) N.V. (actions) V. (Yes, it's true. Look, they look bigger) V. (If we remove the water will be equal to before)	SOC. (Alice, adult) SOC. (Elena, adult, Alice) SOC. (Elena, Alice) SOC. (Alice, Elena, adulto) SOC. (Elena, Alice, Arianna, adulto)	D. A./SOC. conn. Rep./cons., (continue the experience) Rep./SOC. conn.

THEME	CAT.	MATERIALE	V. /N.V.	IND/SOC	ADULT
Colored water	RIL.FEN.	Red wooden blocks, water.	V. (Look, the water i sas red as those wooden blocks)	IND. (Giovanni)	Rep./Cons. (conitnue the experience)

5.2.4. Group B: Summary table of the first meeting (promotion from within + final conversation)

Detecting of phenomena	1
Assembly and construction	-
Exploration	3
Sperimentation	2
Problem Identifying	-

MATERIALS

Tanks, water, murbles, balls, lego woods, cans, plastic bottles, metal rings, caps, corks plastic bags.

COMMUNICATIVE STRATEGIES

VERBAL	19
NON VERBAL	9

SOCIAL STRATEGIES

Individual	9
Social	17
Indirected social	2

ADULT STRATEGIES

Mirroring	9
Open questions	3
Comply	1
Introduction	2

5.2.5. Group B: The second meeting (promotion from within + final conversation)

THEME	CATEGORY	MATERIAL	V./N.V	IND/SOC	ADULT
Bubble of water	RIL.FEN.	Tank with water and plastic bottles	N.V. (actions) V. (Look, I make bubbles) N.V. (actions) V. (They are of soap)	IND.(Dario) SOC. (Fabrizio, Dario, adult) IND. (Dario) IND. (Fabrizio)	Rep./cons., sol. (continue the experience and soliciting hypothesis) Rep./sol. (to continue the reasoning)

THEME	CATEGORY.	MATERIAL	V. /N.V	IND/SOC	ADULT
Light	RIL.FEN.	Torch	N.V. (actions) V. (If the light moves, look what it does)	SOC.IND. (Elena, Alice) SOC. IND. (Elena, Alice, adult)	Rep./sol. (to continue the experience)

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Floating	ESP IND.PROB.	Tanks with water and a different types of objects	V. (This is light but it's not going up) N.V. (actions) V. (This with the water, it goes a little further down than the empty one) N.V. (actions) N.V. (actions) V. (How come these are light and go down?) V. (Maybe because they are heavy) V. (If we take them in hand you feel that one pulls down, weighs)	IND. (Elena) SOC. (Fabrizio, Ginevra, Giovanni) SOC. (Fabrizio, adult) SOC. (Fabrizio, Ginevra) SOC. (Elena, Ginevra) SOC. (Elena, Fabrizio, Giovanni, adult) SOC. (Alice, Dario, Elena) SOC. (dario, Fabrizio, Elena, Alice)	Rep./cons. /Sol. (to continue the experience) Non Apropriate. (directive) Introd. /sol. (continue the experience) Rep./sol. (continue the experience) Non Apropriate. Rep./sol. (continue the reasoning, experience) D. A. /Sol. (continue the experience/ hypothesis) Introd. /sol. (continue the experience) Non Apropriate

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Weight scale	ESP	Scale, different types of objects	N.V. (actions) V. (When I put something on, the needle goes down) N.V. (actions) N.V. (actions)	SOC.IND. (Elena, Alice, Dario, Fabrizio) SOC. (Alice, adult) SOC. (Elena, Alice, dario, Fabrizio) IND. (Alice)	Rep. / Sol. (continue the experience)

5.2.6. Group B: Summary table of the second meeting (promotion from within + final conversation)

Detecting of phenomena	2
Assembly and construction	-
Exploration	2
Sperimentation	-
Problem Identifying	1

MATERIALS

Tanks, water, plastic bottles, murbles, metal rings, torch, scale, cans, plastic balls, corks, wood caps.

COMMUNICATIVE STRATEGIES

VERBAL	9
NON VERBAL	8

SOCIAL STRATEGIES

Individual	5
Social	10
Indirected social	2

ADULT STRATEGIES

Mirroring	7
Open question	1
Comply	-
Introduction	2
Non appropriate approach	3

5.2.7. Group B: The third meeting (promotion from within + final conversation)

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Shadows	ESP	Tanks and water	V. (Look!) N.V. (actions) V. (I think it's the water that does it, and the sun) V. (Will be the shadows) V. (Look this shadow!) N.V. (actions) V. (Look!) V. (This, mine doesn't do anything)	IND. (Alice) SOC. (Fabrizio, Elena, Alice) SOC. (Alice, Fabrizio, Elena) SOC. (Alice, Fabrizio, Elena) SOC. (Elena e adult) SOC. (Elena, Alice) SOC. (Elena, Alice) SOC. (Elena, Alice)	 Introd./sol. (continue the experience) Rep./sol. (conitnue the experience and solicitnig hypothesis) Rep./sol. (continue the experience)

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Light	ESP IND.PROB.	Tanks of water and torch Torch and different types of objects	V. (Guarda) N.V. (actions) N.V. (actions) V. (How does it pass?) V. (Because it is glass and passes it) N.V. (actions) N.V. (actions) V. (Look at the light) N.V. (actions) V. (Here pass the light) V. (How does it get through?) N.V. (actions)	SOC. (Fabrizio, Elena, Alice) SOC. (Alice, Elena, Fabrizio) IND. (Fabrizio) SOC. (Fabrizio, adult) SOC. (Fabrizio, adult) SOC. (Fabrizio, Alice, Dario, Giovanni) IND.(Fabrizio) SOC. IND. (Fabrizio, gruppo, adulto) SOC. (Fabrizio, adulto) SOC. (Fabrizio, adulto) SOC. (Fabrizio, adulto) SOC. (Fabrizio, adulto)	 Rep./Sol. (continue the experience) Rep./sol. (continue the experience) Introd./ Sol. (conitnue the experience) Rep. /sol. (conitnue the exp Rep./sol. (conitnue the experience)

			V. (Look! Here doesn't pass) N.V. (actions) V. (Look, look)	SOC. IND. (Fabrizio, gruppo, adult) IND. (Fabrizio) SOC. IND. (Fabrizio, group, adult)	Rep./sol. (continue the experience and reasoning)/ SOC. conn. Introd./sol. (conitnue the experience) Introd./sol. (conitnue the experience) D. A./ SOC. Conn.

THEME	CATEGORY	MATERIAL	V./N.V	IND/SOC	ADULT
Construction rattles	COS ESP	Plastic bottles, murbles, metal rings. Bottles with water.	N.V. (actions) N.V. (actions) N.V. (actions) V. (Your makes different noise) N.V. (actions) V. (You have removed the water, for that one feels more) V. (Hey, how many have you put?)	IND. (Elena) IND. (Elena) SOC. (Elena, Ginevra) SOC. (Elena, Ginevra, adult) SOC. (Elena, adult) SOC. (Elena, adult) SOC. (Elena, adult)	Introd. /sol. (continue the experience) Introd./ Sol. (continue the experience) Introd./ Sol. (continue the experience) Introd./sol. (continue the experience)

THEME	CATEGORY	MATERIAL	V./N.V	IND/SOC	ADULT
Floating	ESP SPE	Tanks with water and various objects	N.V. (observations) V. (Look. This cap as soon as I put it, went down. The other before it stayed a little bit on then went down) N.V. (actions) V. (Now if the water goes in the cork, i twill sink) N.V. (actions) V. (Look!)	IND. (Fabrizio) SOC. (Elena, Fabrizio, adult) IND. (Elena) SOC. (Elena, adulto) SOC. (Elena, adult) SOC. (Elena, adult)	Rep./sol. (continue the experience) Rep./ Cons.

5.2.8. Group B: Summary table of the third meeting (promotion from within + final conversation)

Detecting of phenomena	-
Assembly and construction	1
Exploration	4
Sperimentation	1
Problem Identifying	1

MATERIALS

Tanks, water, plastic bottles, murbles, metal rings, caps, scale, torch, magnifying glass, ruler, paper and pencil.

COMMUNICATIVE STRATEGIES

VERBAL	20
NON VERBAL	16

SOCIAL STRATEGIES

Individual	7
Social	24
Indirected social	3

ADULT STRATEGIES

Mirroring	7
Open questions	1
Comply	-
Introduction	8
Non appropriate intervention	1

5.2.9. Group B: The fourth meeting (promotion from within + final conversation)

THEME	CATEGORY	MATERIAL	V./N.V	IND/SOC	ADULT
Weigh Scale	ESP	Bottle with water, plastic bottle, weigh scale, tanks	N.V. (actions)	IND. (Alice)	
			N.V. (actions)	IND.(Giovanni)	
			V. (So they are full)	IND. (Dario)	D. A./ SOC. conn.
			N.V. (actions)	SOC. (Dario, Elena)	
			V. (I want to see which dish goes down and which stays on)	SOC. (Elena, Dario)	Modeling
	SPE		V. (You have to fill them to find out which one goes down)	SOC. (Elena, Dario)	
			N.V. (actions)	SOC. (Elena, Dario)	
	RIL.FEN.		N.V. (actions)	IND.(Giovanni)	
			V. (This goes a little bit further down)	SOC. (Elena, Dario, adult)	
			N.V. (actions)	SOC. (Dario, Fabrizio, adult)	
			N.V.(actions)	SOC. (Dario, Elena, adult)	Rep./sol. (continue the experience)
			V. (This that's on is lighter than the other)	SOC. (Dario, Alice, adult)	
			N.V. (actions)	SOC. (Dario, Alice, adult)	
			V. (So, will win sure this)	SOC. (Dario, Elena, Alice)	
			V. (If I let it go i twill fall)	SOC. (Fabrizio, Dario, adult)	
			V. (Noooo, let it go)	SOC. (Elena, Dario, Fabrizio)	
			N.V. (actions)	SOC. (Alice, Elena, Dario, adult)	
			V. (My will weigh more because I put so many things)	SOC. (Dario, Elena, Alice)	Rep./sol. (Continue the experience)
			V. (You have to put some more water)	SOC. (Dario, adult)	
			N.V. (actions)	SOC. (Dario, adult)	
			V. (Will weigh a lot)	SOC. (Dario, adult)	
			V. (Yes, because I put more water)	SOC. (Dario, adult)	

			N.V. (actions) V. (What happens if I remove these?) V. (Leave one full and one empty and you'll see what happens) N.V. (actions) V. (I filled this with a lot of things and will weigh more)	SOC. (Dario, Fabrizio, adult) SOC. (Dario, Fabrizio, adult) SOC. (Dario, Alice, Fabrizio) SOC. (Dario, Alice, Fabrizio) SOC. (Dario, Alice, Fabrizio, adulto)	

THEME	CAT.	MATERIAL	V./N.V	IND/SOC	ADULT
Light	ESP	Torch, object of a different type	N.V. (actions) V. (Here passes but no here) N.V. (actions)	IND. (Fabrizio) SOC. (Fabrizio, adulto) SOC. (Fabrizio, adulto)	Rep./sol. (continue the experience)

THEME	CAT.	MATERIAL	V./N.V	IND/SOC	ADULT
Bubbles of water	ESP	Tanks, water, plastic bottles, cans	N.V. (actions) V. (Look at the bubbles) N.V. (actions) V. (This makes the bubbles)	SOC. (Fabrizio, Giovanni) SOC. IND. (Fabrizio, Elena, Alice, Dario) SOC. (Fabrizio, Giovanni) SOC. (Fabrizio, Giovanni, adult)	
THEME	**CATEGORY**	**MATERIAL**	**V. /N.V.**	**IND/SOC**	**ADULT**
Noise used shoes	ESP SPE	Water and shoes	N.V. (actions) N.V. (actions) V. (He walks with sound) V. (Because, I think he's leaning his shoes in the water. If I do I will make a noise) V. (He's got wet shoes because he'll be gone into a pond of water) N.V. (actions)	IND. (Giovanni) IND. (Giovanni) SOC. (Fabrizio, Giovanni, adult) SOC. (Fabrizio, Govanni, adult) SOC. (Elena, Alice, Dario, Giovanni, adulto) SOC. (Alice, Elena, Dario,	D. A./ SOC. Conn./ Sol. (continue the reasoning and experience) Rep./sol. (continue the experience and solicitng hypothesis)

			V. (Mine don’t make a noise) N.V. (actions) V. (Look, now they do) N.V. (actions)	Giovanni, adulto) SOC. (Alice, Elena, Dario, Giovanni, adult) SOC. (Alice, Elena, Dario, Giovanni, adult) SOC. (Alice, Elena, Dario, Giovanni, adult) SOC. (Alice, Elena, Dario, Giovanni, adult)	Rep./sol. (continue the experience and reasoning)

5.2.10. Group B: Summary table of the fourth meeting (promotion from within + final conversation)

Detecting of phenomena	1
Assembly and construction	-
Exploration	4
Sperimentation	2
Problem Identifying	-

MATERIALS

Tanks, water, plastic bottles, murbles, ping-pong balls, metal rings, caps, scale, torch, shoes, notebook and pencil

COMMUNICATIVE STRATEGIES

VERBAL	23
NON VERBAL	21

SOCIAL STRATEGIES

Individual	7
Social	36
Indirected social	1

ADULT STRATEGIES

Mirroring	5
Open question	2
Comply	-
Introduction	-
Modeling	1

5.2.11. Group B: Final observative meeting

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Scale	ESP SPE ESP	Weighing scale Weighing scale and vaious objects, body. Scales, full and empty bottles, plastic containers	N.V. (actions) V. (If we do so, we'll see weigh) N.V. (actions) N.V. (actions) V. (We need more seeds to weigh more) V. (We need to look for heavier bottles of this) V. (Look at Elena, look how much I did weigh) N.V. (actions) N.V. (actions)	IND. (Dario) SOC. (Dario, Giovanni, Elena) SOC. (Dario, Giovanni, Arianna, Elena) SOC. (Dario, Fabrizio, Arianna, Giovanni) SOC. (Giovanni, Alice, Elena, Arianna) SOC. (Giovanni, Alice, Elena, Arianna) SOC. (Alice, Elena, Dario) SOC. (Fabrizio, Alice, Arianna) IND. (Fabrizio)	

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Track of murbles	COS ESP IND.PROB.	Planks of wood, plastic coil Planks of wood, plastic coil, murbles	N.V. (actions) N.V. (actions) V. (It has to go like this, make the curve) N.V. (actions) V. (it should go here, then here and then here) N.V. (actions)	IND. (Elena) SOC. (Dario, Arianna, Elena, Alice) SOC. (Elena, Arianna, Dario, Alice, Giovanni) IND. (Elena) SOC. (Elena, Dario, Arianna, Giovanni, Alice) SOC. (Elena, Dario, Giovanni, Arianna, Alice, Fabrizio)	Social control

	COS SPE		V. (The track must be zig-zag) N.V. (actions) V. (The marble I want to go here and then here) N.V. (actions) V. (You have to do this, follow the curves. Here and then here.) V. (We slide the murbles so, but they serve other plugs) V. (Here above the murbles, they will glide faster) N.V. (actions) V. (Yes!)	SOC. (Elena, Arianna, Dario, Alice) IND. (Elena) SOC. (Elena, Arianna, Dario) SOC. (Elena, Dario, Giovanni) SOC. (Elena, Dario, Arianna) SOC. (Alice, Elena, Dario, Giovanni) SOC. (Alice, Elena, Dario, Giovanni) SOC. (Alice, Elena, Dario, Giovanni) SOC. (Fabrizio, Giovanni)	

THEME	CAT.	MATERIALE	V./N.V	IND/SOC	ADULTO
Light and colours	ESP	Torch, scale, legumes. Legumes, sun light	N.V. (actions) N.V. (actions) V. (Look! The light is more red) V. (It's true) N.V. (actions) V. (Look Giovanni, if I put it from here to here is more red) V. (It's true! It becomes more red) N.V. (actions) V. (It's true, here it's darker)	IND. (Fabrizio) IND. (Fabrizio) IND (Fabrizio) SOC. Arianna e Fabrizio) SOC. (Fabrizio, Giovanni, Arianna) SOC. (Alice, Fabrizio) SOC. (Alice, Fabrizio, adulto) SOC. (Fabrizio, Dario, Giovanni) SOC. (Alice, Fabrizio, Arianna, Dario) SOC. (Fabrizio, Giovanni)	

5.2.12. Group B: Summary table of the final observative meeting

Detecting of phenomena	-
Assembly and construction	2
Exploration	4
Sperimentation	3
Problem Identifying	1

MATERIALS

Planks of wood, murbles, ping-pong balls, paper of a different type, scale, plastic bottles, legumes, plastic coil, torch, plastic boxes.

COMMUNICATIVE STRATEGIES

VERBAL	17
NON VERBAL	15

SOCIAL STRATEGIES

Individual	7
Social	28

ADULT STRATEGIES

Emotive regulation	2

5.3 Group C

5.3.1 Group C: a preliminary observative meeting.

THEME	CATEGORY	MATERIAL	VERB/N.V.	INDIV/SOC	ADULT
Balls/bounce	ESP.	Balls of a different type and size Balls of a different type and size, magnifying glass	N.V. (actions) V. (This does not bounce as well as this. The murble is tougher) N.V. (actions) V. (This bounce, this no and is tougher) N.V. (actions) V. (This is tough and stop right away) N.V. (actions) V. (Mine touched the roof and bounced here)	IND. (Jahel) IND. (Jahel) IND. (Jahel) IND. (Jahel) SOC. (Jahel e Tilde) IND. (Tilde) SOC. (Eros e Tilde) SOC. (Tilde, Jahel, Eros)	

THEME	CATEGORY	MATERIAL	VERB/N.V.	INDIV/SOC	ADULT
Ball in to the cans	ESP	cans, balls, torch	V. (Here's a ball) N.V. (actions) N.V. (actions) N.V. (actions) V. (Let's try to see it with the light)	SOC. (Luca, Jahel) IND. (Luca) SOC. (Jahel, Eros, Luca) IND. (Eros) SOC. (Jahel ed Eros)	

THEME	CATEGORY	MATERIAL	VERB/N.V.	INDIV/SOC	ADULT
Track of the murbles	COS	Planks of wood.	V. (I make a lead for the balls) N.V. (actions)	IND. (Tilde) SOC. (Jahel, Tilde, Martina)	

THEME	CATEGORY	MATERIAL	VERB/N.V	INDIV/SOC	ADULT
Noise/ruttles	COS	Plastic bottles murbles	N.V (actions) N.V. (actions)	IND. (Eros) SOC. IND. (Jahel, Tilde, Luca)	
	ESP	Plastic bottles, murbles, ball in to the cans box of metal rings.	N.V. (actions) V. (It's different) N.V. (actions) V. (They're all different noise)	SOC.IND. (Jahel, Tilde, Martina, Luca) SOC.IND. (Luca, Jahel, Tilde) SOC. (Jahel, Luca, Tilde) SOC. (Eros)	

THEME	CATEGORY	MATERIAL	VERB/N.V.	INDIV/SOC	ADULT
Send the balkl into the hole	ESP.	Cardboard box, rubber balls Plastic box, murbles, rubber balls + plastic bottles	N.V. (actions) N.V. (actions) V. (Noo!) V. (We have to take the bouncts balls) N.V. (actions) V. (Arianna, we have to change basket) N.V. (actions) V. (Now I hit the box)	IND.(Eros) IND. (Eros) IND. (Eros) SOC. (Eros, Arianna) SOC. (Eros, Arianna) SOC. (Eros, Arianna) SOC. (Eros, Arianna) SOC. (Eros, Arianna)	

THEME	CATEGORY	MATERIAL	VERB/N.V	INDIV/SOC	ADULT
Raking/bottleneck 5m. e 50 sec./6m. e 30 sec. (40 secondi)	RIL.FEN.	Plastic bottles, murbles	N.V (actions)	IND. (Martina)	

5.3.2. Group C: Summary table of the preliminary meeting

Detecting of phenomena	1
Assembly and construction	2
Exploration	4
Sperimentation	-
Problem Identifying	-

MATERIALS

Planks of wood, murbles, ping pog balls, plastic bottles, plastic box, cans, torch.

STRATEGIES

VERBAL	13
NON VERBAL	17

SOCIAL STRATEGIES

Individual	13
Social	15

ADULT STRATEGIES

Emotive regulation	1

5.3.3. Group C: The first meeting (*Laissez faire* approach)

THEME	CATEGORY	MATERIAL	VERB/N.V	INDIV/SOC	ADULT
Bubbles of water	RIL.FEN.	Tanks with water and plastic bottels	N.V (actions) V. (Makes bubbles)	IND. (Mattia) IND. (Mattia)	

THEME	CATEGORY	MATERIAL	VERB/N.V.	INDIV/SOC	ADULT
"Into the water".	RIL.FEN.	murble, ping-pong balls, tanks and water	V. (Look!) N.V. (actions) N.V. (actions)	IND. (Eros) IND. (Eros) IND. (Andrea)	

THEME	CATEGORY	MATERIAL	VERB/N.V	INDIV/SOC	ADULT
sketches	ESP	Tanks with water and murbles	N.V. (actions) N.V. (actions) V. (This sketch was high)	IND. (Eros) SOC. (Andrea, Eros). SOC. (Eros, Andrea)	Rep./Emotional control

THEME	CATEGORY	MATERIAL	VERB/N.V	INDIV/SOC	ADULT
Raking	ESP SPE	Tanks with water of a different size and plastic box.	N.V. (actions) V. (Look. We put the water from here to here) V. (No more, Mattia, please. Will be released if you still put) N.V. (actions) N.V. (actions) V. (Ops, I put too much)	IND. (Mattia) SOC. (Jahel e Mattia) SOC. (Jahel, Mattia) IND. (Mattia) SOC. (Jahel, Mattia) IND. (Mattia)	

THEME	CATEGORY	MATERIAL	VERB/N.V.	INDIV/SOC	ADULT
Ball/bounce	ESP	Balls of a different type	V. (Even before the murble didn't bounce and that rubber yes) N.V. (actions) N.V. (actions)	SOC (Eros, Andrea, Jahel) SOC. (Eros e Andrea) SOC (Eros, Andrea, Jahel)	Comply

5.3.4. Group C: Summary table of the first meeting (Laissez faire approach

Detecting of phenomena	2
Assembly and construction	-
Exploration	4
Sperimentation	1
Problem Identifying	-

MATERIALS

tanks, water, plastic bottles, plastic boxes, ping pong balls, murbles, videocamera.

STRATEGIES

VERBAL	10
NON VERBAL	11

SOCIAL STRATEGIES

Individual	11
Social	9
Social Indirectly	1

ADULT STRATEGIES

Comply	5

5.3.5. Group C: The second meeting (*Laissez faire* approach)

THEME	CATEGORY	MATERIAL	VERB/N.V.	INDIV/SOC.	ADULT
Floating	ESP	Tanks with water and different object	N.V. (actions) V. (Look, they went down) V. (Why didi t go down this) N.V (actions) V. (It is put upside down) N.V. (actions) V. (These went down) N.V. (actions)	IND. (Jahel) SOC. (Jahel, adult) SOC. (Eros. Adulto) IND. (Eros) IND. (Eros) IND. (Tilda) IND. (Tilda) IND. (Tilda)	Com. Rep.

THEME	CATEGORY	MATERIAL	VERB/N.V	INDIV/SOC	ADULT
Bubbles of water	RIL.FEN.	Tanks with water and plastic bottles	N.V. (actions) V. (I'll make bubbles) N.V. (actions)	IND. (Tilda) SOC. (Tilda, adulto) IND. (Tilda)	Rep.
					Emotive and social cont.
					Emotive and social cont.
					Emotive and social cont.
					Non apropriate

5.3.6. Group C: Summary table of the second meeting (*Laissez faire* approach)

CATEGORIES

Detecting of phenomena	1
Assembly and construction	-
Exploration	1
Sperimentation	-
Problem Identifying	-

MATERIALS

Tasks, water, murbles, ping-pong balls, plastic bottles, caps, box with metal rings, lego woods.

COMMUNICATIVE STRATEGIES

VERBAL	5
NON VERBAL	6

SOCIAL STRATEGIES

Individual	11
Social	3
Indirected social	-

ADULT STRATEGIES

Mirroring	2
Emotive regulation	4

5.3.7. Group C: The third meeting (promotion from within + final conversation)

THEME	CATEGORY	MATERIAL	VERB/N.V	INDIV/SOC	ADULT
Floating	RIL. FEN.	Tanks with water, palline, murbles + various object	N.V. (actions) N.V. (actions)	IND. (Eros) IND. (Eros)	
					Com.

THEME	CATEGORY	MATERIAL	VERB/N.V	INDIV/SOC	ADULT
Sketches	ESP	Tanks with water, balls, murbles	N.V. (actions) V. (I made the highest sketches) N.V. (actions)	SOC. IND. (Andrea, Eros) SOC. (Eros, Andrea) SOC. (Eros, Andrea)	

THEME	CATEGORY	MATERIAL	VERB/N.V	INDIV/SOC	ADULT
Videocamera	ESP	Videocamera, balls, hands	N.V. (actions) N.V. (actions) N.V. (actions)	IND. (Tilda) IND. (Tilda) IND. (Andrea)	
					Com.

THEME	CATEGORY	MATERIAL	VERB/N.V	INDIV/SOC	ADULT
Castel construction 20m. e 32 sec./22m. e 47 sec. (2m. e 15 sec.)	COS	Wooden blocks of different size and shape	N.V. (actions) V. (I build a castle) N.V. (actions) V. (you knocked me down) N.V. (actions)	IND.(Andrea) IND. (Andrea) SOC (Andrea, adulto) SOC. (Andrea, Mattia) SOC. (Andrea, adulto)	Social control
					social control
					Social control
					Social control

5.3.8. Group C: Summary table of the third meeting (*Laissez faire* approach)

CATEGORIES

Detecting of phenomena	1
Assembly and construction	1
Exploration	2
Sperimentation	-
Problem Identifying	-

MATERIALS

Tanks, water, murbles, balls, caps and corks, wooden blocks, videocamera, notebook and torch.

STRATEGIES

VERBAL	3
NON VERBAL	10

SOCIAL STRATEGIES

Individual	7
Social	5
Indirected social	1

ADULT STRATEGIES

Social control	4
Directive intervention	1

5.3.9. Group C: The fourth meeting (*Laissez faire* approach)

THEME	CATEGORY	MATERIAL	VERB/N.VERB	INDIV/SOC	ADULT
Floating	ESP	Water tanks, balls, murbles, wooden blocks, plugs.	N.V. (actions) N.V. (actions) V. (The light ball, pus hit under and leave it, go back up with little jump) N.V. (actions)	IND. (Eros) SOC. (Andrea, Eros) SOC. (Andrea, Eros) SOC. (Andrea, Eros)	

THEME	CATEGORY	MATERIAL	VERB/N.VERB	INDIV/SOC	ADULT
Noise	COS. RIL.FEN.	bottles, murbles and water	N.V. (actions) N.V. (actions) N.V. (actions)	IND. (Andrea) IND. (Andrea) IND. (Andrea)	

THEME	CATEGORY	MATERIAL	VERB/N.VERB	INDIV/SOC	ADULT
Bounce.	ESP	Murbles, balls of different size and material.	N.V. (actions) V. (Throw it louder on the floor) N.V. (actions)	IND. (Mattia) SOC. (Jahel, Mattia) SOC. (Jahel e Mattia)	
					Com./social control

5.3.10. Group C: Summary table of the fourth meeting (*Laissez faire* approach)

CATEGORIES

Detecting of phenomena	1
Assembly and construction	1
Exploration	2
Sperimentation	-
Problem Identifying	-

MATERIALS

Tanks, water, murbles, balls of a different type, caps, corks, plastic bottles and wooden blocks.

COMMUNICATIVE STRATEGIES

VERBAL	2
NON VERBAL	8

SOCIAL STRATEGIES

Individual	5
Social	5
Indirected social	1

ADULT STRATEGIES

Social control	4
Comply	1

5.3.11. Group C: Final observative meeting

THEME	CATEGORY	MATERIALE	VERB/N.VERB	INDIV/SOCIALE	ADULTO
Noise/ruttles	ASS ESP	Plastic bottles, murbles, metal rings Plastic boxes legumes	N.V. (actions) N.V. (actions) N.V. (actions) N.V. (actions) N.V. (actions)	IND. (Tilda) SOC.IND. (Tilda e Martina) IND. (Mattia) IND. (Martina) IND. (Eros)	
					Mirroring/social control

THEME	CATEGORY	MATERIAL	VERB/N.VERB	INDIV/SOCIALE	ADULTO
Murbles e legumes	ESP	scale, murbles and legumes.	N.V. (actions) N.V. (actions) N.V. (actions)	IND. (Tilda) IND. (Tilda) SOC.IND. (Tilda e Martina)	
					Mirroring/ social and emotional control
					Mirroring/ social and emotional control
					Mirroring social and emotional control

THEME	CATEGORY	MATERIAL	VERB/N.VERB	IND/SOC	ADULT
Racking	RIL.FEN.	Legumes, murbles, plastic box, funnel	N.V. (actions) N.V. (actions) N.V. (actions)	IND. (Tilda) IND. (Tilda) SOC. (Tilda, Martina, Eros)	

THEME	CATEGORY	MATERIAL	VERB/N.VE	IND/SOC	ADULT
Wrapping paper	RIL.FEN	Scrape paper	N.V. (actions) V. (This look like glue, doesn't detached)	IND. (Mattia) IND. (Mattia)	
					Mirroring/ social and emotional control.

5.3.12. Group C: Summary table of the final observative meeting

CATEGORIES

Detecting of phenomena	2
Assembly and construction	1
Exploration	2
Sperimentation	-
Problem Identifying	-

MATERIALS

Plastic bottles, murbles, cardboard, crape paper, scale, legumes, funnel, corks, plastic box water.

COMMUNICATIVE STRATEGIES

Verbal	1
Non Verbal	12

SOCIAL STRATEGIES

Individual	10
Social	1
Indirected social	2

ADULT STRATEGIES

Comply	5

5.4. descriptive analysis of the meetings with groups.

After having been codified in the tables represented in the previous paragraph, the meetings with the groups of children have been described highlighting, the cognitive themes, the communicative modalities and the interactions that have characterized the operation of understanding in a synthetic way. In this section, I will give an example of the way in which I have analyzed - in descriptive terms - the issues outlined above. The examples shown concern, in particular, the first meeting in which the adult - with a different approach in each of the groups - supported the scientific conduct of the children. At the end of the description of each meeting, a summary table has been prepared that highlights the different categories used, how many times they have been observed and the frequency with which the different communication channels are observed and the social and individual dimension that characterize the study. of the various cognitive themes.

Group A: the first meeting with the 'promotion from within' intervention.

The themes that emerged on this first day are 3: boat construction, floatation, magnifying with water.

THEME	CATEGORY	MATERIAL	V./N.VERB	IND/SOC	ADULT
Ship	COS. IND. PROB	Wooden blocks and water	N.V. (actions) V. (I want to make a ship) V. (I have to make it float) N.V. (actions)	IND. (Ettore) IND. (Ettore) SOC. (Ettore, adult) SOC. (Ettore, adult)	D. A./Sol. (conitnue the experience)

Regarding the theme "boat construction" this was solicited by interacting with the tanks of water and observing the reaction of the materials that were immersed in it. Interest in the cognitive theme manifests itself through pipelines that refer to the category of **assembly and construction**, in a first phase of experience. The material used to make the construction includes sticks and water. The realization of the "boat" involves only one child (Ettore) and the communication of the passages and intentions takes place both on the verbal level (I want to make a boat) and on the non-verbal one (trying to keep the sticks close together in the

water). The activity of building the boat and the curiosity towards this theme is manifested, also, with behaviours that fall within the category of **Identification of the problem** when the “difficulty” to be faced ("I have to make it float") becomes explicit. This verbalization is followed by some actions aimed at finding the best solution. At this point, the intervention of the adult is inserted with an open question ("What do we need?") in order to solicit the hypothesis to continue the experience. The conduct is manifested both in terms of verbal communication and behavioural characterized by the exploration of the modalities and useful materials to be assembled to make the boat float. The social dimension of the experience is characterized by the interactions between Ettore and the adult.

THEME	CATEGORY	MATERIAL	V./N.VERB	IND/SOC	ADULT
Floating	ESP	Tank of water differents object	N.V. (actions)	SOC. (Arianna, Leonardo, Alice)	
		Plastic bottle	V. (Let’s see what this does)	SOC. (Arianna, Leonardo, Alice)	
	IND.PROB.		V. (How come?)	IND. (Valentino)	Introd./ Sol. (continue the experience)
			V. (One is down and the other stay up)	SOC. (Arianna, Leonardo, Valentino)	
	ESP		V. (The one filled goes down and the other is on)	SOC. (Arianna, adult)	Verbal Rep/ SOC. Conn.
					Rep/cons.
			V. (One is full and the other is empty)	SOC. (Leonardo, Francesco, adult)	D. A./ SOC. Conn.
			N.V. (actions)	SOC. IND. (Francesco, Leonardo, Arianna)	Non appropriate intervention

Regarding the theme of floating, the interaction and the curiosity to understand how the materials placed in the tanks with water behave, emerges. This activity, repeated several times during this meeting, keeps the children busy for most of the meeting. The interest for this cognitive theme emerges with the manifestation of conducts that fall within the category of **exploration**. The material explored includes tanks with water and various objects that are immersed in no particular order but which immediately prompt curiosity due to their various reactions. The latter manifests itself both through verbal communications ("Let's see what this does"), and through the behavioural and expressive channel (actions and observations of an object placed in the water). The behaviours that show interest in the cognitive issue in question take on a social character and the exploration of the phenomenon sees the formation of a group (Arianna, Leonardo, Alice) who ponder on what happens. One of the children, left to this moment, in observation (Valentino) explains a problematic aspect that further stimulates curiosity on the theme explored ("How come?") And highlights the manifestation of exploratory behaviours that fall into the category of **identification of the problem** . The scientific behavior of the children are manifested both in terms of verbal communication with the expression of 'dilemmas' to which one looks for a response to observations ("One stays up and the other doesn't") and possible explanations ("Because one is full and one is empty "), both through actions and observations that communicate curiosity and interest in relation to the different ways that the materials explored behave in contact with water. The cognitive theme in question solicits moments of aggregation and social interaction that involves quite a stable group of children (Arianna, Leonardo, Valentino, Francesco and Alice). The adult has proposed interventions that fall within the strategies of: introducing new elements (for example, a full bottle placed in water next to the empty one already used by the children) to solicit doubts and questions that would allow the exploration and reasoning to continue; resumption of the children's affirmations to consolidate important aspects, restore the value of what has been said / done and promote the contribution of the comrades; open questions aimed at responding to the social bridge function. An inappropriate intervention occurs at the end of the activity and tends to orientate towards the weight characteristic of the objects (this activity will be considered later). However, the group responds to this intervention by showing an interest in the new instrument with an indirect sociality.

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Mignifying with water	ESP.	Plastic bottles, water, murbles, and metal rings	N.V (actions)	IND.(Ettore)	
			V. (They're great)	IND. (Ettore)	
			N.V. (actions)	IND. (Ettore)	
		Plastic bottle, water, marbles, metal rings	V. (They look bigger these)	SOC. (Arianna, Ettore, Adult)	D. A./SOC. Conn.
			N.V. (actions)	SOC. (Arianna, Ettore, Adult)	Rep./Sol. (to continue the experience)
			V. (Yes, if you look at them from here, the rings look bigger)	SOC. (Arianna, Ettore, adult)	

The cognitive theme "magnifying with water" emerges when Ettore lifts a small bottle containing a little water with two marbles and some metal rings and observes it noting that the objects seem larger in the water than they do out of the water. Interest in this aspect manifests itself through behaviours that fall into the category of **exploration**. The material explored includes a plastic bottle containing water, marbles and metal rings. The exploration of the material initially takes place on the level of non-verbal communication through repeated observation, paying attention to materials, actions and on what is said to explain what has intrigued them. ("They look bigger, inside the water"). The behaviour that manifests cognitive interest on the topic in question initially has an individual dimension (Ettore) who in the end recalls, the curiosity of some comrades (Arianna, Alice, Ettore). The interventions that the adult offers are open questions aimed at favouring forms of aggregation and collaboration; resumption of affirmations with the aim of consolidating the observed aspects and urging the continuation of experience and exploration.

Group B: the first "internal promotion" intervention meeting and final conversation.

In group B, the intervention foresees (see: chapter 3) a moment of sharing and discussion in a group, highlighting the aspects considered relevant at the end of the description of the cognitive themes dealt with.

The themes that emerged in this meeting are 4: floating, water bubbles, magnifiying / water, coloured water.

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC.	ADULT
Floating	ESP	Tanks with water, lego wood, caps, corks.	V. (I'm looking for what goes down) N.V. (actions) N.V. (actions) V. (This cap is a little bit down and a little bit stay up) V. (This you'll see that goes down) V. (Didn't go down) V. (We have to look for the heavy things because the water doesn't hold them and they go down)	IND. (Elena) IND. (Elena) IND. (Dario) IND. (Dario) SOC. (Arianna, Elena) IND. (Elena) SOC. (Alice, Elena, Dario)	D. A./ SOC. Conn. Rep./sol. (continue the experience)
	SPE	Various objects	V. (If we look for things to be light, they will stay up) N.V. (actions) V. (I think this floats. It is lighter) V. (I have found that the light things float, the heavy ones go down) V. (These rings are light but they sink)	SOC. (Elena, Alice, Giovanni) IND. (Dario) SOC. (Elena, adult) SOC. (Alice, Elena, adult) SOC. (Elena, Alice, adult)	Introd. /sol. (continue the experience and reasoning) Rep./cons.

The theme of floating is mainly prompted by the presence of tanks with water and by the observation of how the objects that children throw in them behave. The interest in the theme in question is manifested by behaviours that fall into the category of **exploration** aimed at observing and searching for materials that float. The material with which the children begin the experience includes tanks of water, sticks and bottle caps. The verbal dimension of communication concerns intentions ("I'm looking for things that float."), The non-verbal

one is represented by accomplished actions and facial expressions. The dimension, in this first phase of experience is individual and involves Elena. As explorations continue, behaviours come into play that fall within the category of **experimentation** that manifests itself with the expression of hypotheses about how the different material behaves when immersed in water ("If I put this here, you'll see it goes down"). The hypotheses follow a series of actions aimed at putting them to the test and detecting the results. These experimentation-oriented moments are followed by the expressing of new hypotheses ("This has not gone down, so we have to look for heavy things so the water can't hold them up and they go down"). The material, during the progress of the experience, diversifies and includes more objects than those already in use. The individual dimension gives way to the social dimension of a group that starts to gather around a large tank or several small ones that are close to each other and collaborate with each other. The interventions of the adult are open questions aimed at encouraging the transition from individual to social experience aimed at supporting the children's initiatives and allowing them to continue their reasoning. To these first interventions by the researcher, the experience of understanding the topic in question develops with the explanation of further hypotheses ("If I put this in the water it will float because it is light") and observations that follow the verification of the assumptions made. The conduct implemented, manifest interest and curiosity both in terms of verbal and non-verbal communication. The social dimension is characterized by the participation and collaboration of the group intrigued by the observed phenomenon (Alice, Elena, Giovanni, adult). The interventions proposed by the researcher - following the ones explained above – are of the type: introduction of new elements to arouse doubts, questions and expand the experience; resumed to urge the verification of hypotheses and the continuation of experience.

THEME	CATEGORY.	MATERIAL	V./N.VERB	IND/SOC	ADULT
Bubbles into the water	ESP	Tanks with water, can, plastic bag and bottle.	N.V. (actions) N.V. (actions) N.V. (actions) V. (I'llmake bubbles) V. (Yours make them small, small) V. (It doesn't make them almost) V. (Try with this, teacher) V. (If you crush it, do you see bubbles?) V. (If the bottle has cap, I can pus hit underneath buti t doesn't boil) N.V. (actions)	IND. (Dario) SOC.IND. (Dario, Arianna, Elena, Alice) SOC. (Elena, Alice) IND. (Dario) SOC. (Dario, adult) SOC. (Dario, adult) SOC. (Dario, adult) SOC. (Elena, adult, Dario) SOC. (Dario, adult) SOC.IND. (Dario, Giovanni)	Rep./sol. (continue the experience and reasoning) D.A./sol. (continue the experience andreasoning) Introd./ sol. (continue the experience andreasoning) Rep./cons. Comp./cons. Rep. /Sol. (continue the experience) Rep./cons. Sol.

The theme of the water bubbles is solicited, during the exploration of buoyancy when Dario realizes that a bottle immersed in water produces bubbles. The interest for the topic in question is manifested through behaviours that fall within the cognitive category of **exploration**. The material used is represented by the tub of water and a can which is immersed numerous times in the water, observing happily when bubbles come out. The experience that begins with the involvement of a single child (Dario) is realized on the level of both verbal communication (I'm making bubbles), and on the non-verbal communication that concerns actions and observations not explicit (repeated immersion of the bottle, the can). Here is a first intervention of the adult who verbally takes over what Dario is doing with the aim of focusing the observed phenomenon, urging the continuation of the experience and the participation of other comrades. The experience continues by providing exploratory behaviours aimed at considering the effectiveness of other materials in producing bubbles when immersed in water. The exploratory part of the experience is enriched with the intervention of other companions that allows to highlight a problem related to the lack of material that can be used for the purpose: bottles and cans. The problem is explained by Alice ("What can we use? These are finished.") And the adult, after a few moments, intervenes by resuming and re-launching the question just posed with the intention of soliciting hypotheses and possible alternative materials. The group looks around and Alice proposes the use of a plastic bag that she immediately tries to immerse explaining what she observes ("This makes them."). The adult intervenes by introducing an element of novelty (immersion of a bottle closed with a cap) to arouse further observations and solicit the continuation of the experience, of reasoning. The verbal communication highlights observations on the absence of bubbles when the bottle has the cap on. The social dimension is enriched, with the progress of the experience and involves, at different times, four children (Francesco, Dario, Alice, Elena); towards the end of this experience the exploration of the cognitive theme is realized in an individual dimension (Dario). In this case, the intervention of the adult provides for the recovery of the children's considerations in order to consolidate them, re-launch them and favour further observations and ideas for reflection.

THEME	CATEGORY	MATERIAL	V. / N.V.	IND/SOC	ADULT
Water as a magnifying	ESP	Plastic bottle, water, marbles, metal rings	V. (Look, If I put into the water, look bigger)	SOC. (Alice, adult)	D.A./SOC. Conn.
			V. (If you pull them out, they're normal)	SOC. (Elena, adult, Alice)	Rep./cons.
			N.V. (actions)	SOC. (Elena, Alice)	
			V. (Yes. Look, they look bigger)	SOC. (Alice, Elena, adult)	
	SPE		V. (If we remove the water will be equal to before)	SOC. (Elena, Alice, Arianna, adult)	Rep./SOC. Conn.

The theme "water /enlargement" is solicited by explorations with plastic bottles, marbles and water. The curiosity for the phenomenon manifests itself through conduits, which are gradually more articulated that refer to the cognitive categories of **exploration and experimentation**. The intervention of the adult was to resume the explicit observation as an opportunity to strengthen and involve other comrades. The experience continues and modalities related to exploratory behaviours aimed at observing the different magnifying effect if the objects are inside or outside the water and experiments with explanations of guiding suppositions enter into the field. The conducted behaviours communicate curiosity towards the phenomenon observed both through non-verbal communication and verbalization of observations. The adult proposes interventions for: open questions aimed at encouraging aggregation and collaboration; resumed to consolidate aspects highlighted by children, share them and urge further developments.

THEME	CATEGORY	MATERIAL	V./N.VERB	IND/SOC	ADULT
Coloured water	RIL.FEN.	Red wooden blocks, water	V. (Look, the water i sas red as those wooden blocks)	IND. (Giovanni)	Rep./cons.

The last cognitive theme that emerges is that of coloured water, stimulated by the observation of the release of colour by a piece of red wood immersed in water. The curiosity for the observed phenomenon manifests itself in ways of **detection of the phenomenon**. The coloured water is observed by a child (Giovanni) who, in highlighting the phenomenon, seems to connect the colour of one of the pieces of wood with the colour ("Look! The water is all red like that piece of wood."). The social dimension is present in an indirect form because the comrades observe the phenomenon when Ettore calls their attention to it. The researcher proposes a recovery action to consolidate what was observed by Ettore and re-launch it to the group.

The final group conversation

The adult introduces the moment of conversation and sharing of experiences starting from the question "What have we discovered today?". Primarily, the children take into consideration, the phenomenon of floating, making new observations emerge from the connection between the weight of the material and the possibility or not to float. This observation is questioned by Elena who points out that there are light objects at the bottom of the tank with water. A peculiar aspect of the moment of conversation is that the children continue 'to do things', to implement actions aimed at testing hypotheses and shared observations. The role of the adult, during the moment of discussion, is to propose interventions for the recovery of what was said by the children in order to compare them and solicit contributions from the group. Some questions are aimed at asking for clarifications about an affirmation ("What do you mean when you say that the bottle- top stays up for a while and then goes down?"). At the time of concluding the discussion and the meeting, the adult takes note with the objective of remembering to ask if other materials can be useful to continue the work in the next meeting.

Group C: the first meeting with the "laissez-faire" adult intervention.

In this meeting, five cognitive themes emerged: water bubbles, floating, sketches, decanting, bouncing / balls.

TEMA	CATEGORIA	MATERIALE	VERB/N.VERB	INDIV/SOCIALE	ADULTO
Bubbles into the water	RIL.FEN.	Plastic bottle, tanks of water	N.V. (observations and actions) V. (It makes bubbles)	IND. (Mattia) IND. (Mattia)	

The theme "bubbles of water" is solicited by the exploration of the water contained in tanks and by the immersion of various objects among which some produce bubbles. The interest in the theme in question is manifested through behaviours that fall within the category of **detection of the phenomenon** because, once the desired effect is observed and reproduced, the activity is abandoned. The material used to detect and reproduce the observed phenomenon includes the water tank and plastic bottles. Behaviour occurs both on the non-verbal level (actions performed on the material) and on the verbal level ("make the bubbles") and are realized in an individual dimension that involves a single child (Mattia).

TEMA	CATEGORIA	MATERIALE	VERB/N.VERB	INDIV/SOCIALE	ADULTO
Sketches	RIL.FEN.	marbles, ping-pong balls, tanks of a different size and water	V. (Look!) N.V. (pushes ball down and the looks back afloat) N.V. (actions and observations)	IND. (Eros) IND. (Eros) IND. (Andrea)	

The curiosity for the cognitive theme "up and down in the water" is solicited by the use of tanks with water in which other materials are immersed, observing their behaviour. The curiosity for the topic in question is manifested by conduct referable to the cognitive category of the **detection of the phenomenon**. The material considered in the activity includes plastic balls and water tank. Conducted behaviours show interest both through actions (for example, taking the objects to put them inside the water and observe their behaviour), and verbal ("Look!") And take on an individual character, although there are two

children involved in this experience (Eros and Andrea) they deal with it separately, without interacting with each other.

TEMA	CATEGORY	MATERIAL	VERB/N.V.	IND/SOC.	ADULT
Sketches	ESP	Water tanks and marbles	N.V. (actions) N.V. (actions) V. (This sketch was high)	IND. (Eros) SOC. (Andrea, Eros). SOC. (Eros, Andrea)	Social control

The theme "sketches" is solicited by the exploration of the water and by the observation that a ball pushed on the bottom of the tank, coming back to the surface, produces small sketches. The curiosity for the topic emerged is manifested through behaviours that fall into the cognitive category from the **detection of the phenomenon**. When the ball comes back to the surface, a child near the tank where Eros is, is intrigued by the sketches of water that are formed. The material used initially includes a tub of water and plastic balls and then also considers balls and bouncy balls with the continuation of the experience. Interest is manifested through non-verbal behaviours (they drop the plastic ball and observe the sketches, let it fall from a higher height and then change material trying to let glass marbles fall into the water), making explicit observations ("This splash was higher"). The activity is carried out by a couple of children (Andrea and Eros). The adult in this situation, proposed interventions aimed at regulating the emotional excitement - increasing because the two children began to make sketches with the goal of getting wet ("If you want, you can continue to observe the sketches, but do not get too wet: ").

TEMA	CATEGORIA	MATERIALE	VERB/N.V.	IND/SOC	ADULT
Racking	ESP SPE	Water tanks of a different sizes, various containers	N.V. (actions) V. (Look, we put the water from here to here) V. (No more, Mattia, please. Will be released if you still put) N.V. (action) N.V. (actions)	IND. (Mattia) SOC. (Jahel e Mattia) SOC. (Jahel, Mattia) IND. (Mattia) SOC. (Jahel, Mattia) IND. (Mattia)	

			V. (Ops, I put too much)		Comp.

The "decanting" activity emerges as a cognitive theme through paths that refer to the category of exploration. Initially, the material taken into consideration, are water tanks of different sizes. With the continuation of the experience the material is diversified (plastic bottles and bowls) and behaviours appear that fall within the category of experimentation made evident by the expressing of a hypothesis to be tested ("It's too full, it will come out if you put in more "). The behaviours to know the theme in question are manifested both on the non-verbal and non-verbal level and the experience is conducted by two children who actively collaborate in the observations and explorations (Jahel and Mattia).

The intervention of the adult is limited to restoring the environmental conditions necessary to continue the experience by drying the water which falls on the floor.

THEME	CATEGORY	MATERIAL	VERB/N.V.	INDIV/SOC.	ADULT
Bouncy balls	ESP	Balls of different material	V. (Even before the murble was not bouncing and the rubber one yes) N.V. (actions) N.V. (actions)	SOC (Eros, Andrea, Jahel) SOC. (Eros e Andrea) SOC (Eros, Andrea, Jahel)	Comp./emotional and social control

The cognitive theme "bouncy / balls" is solicited by the game that some children play using balls that are available. At a certain point, the children's attention is focused on how high they are able to make the balls bounce. The curiosity for the theme in question is manifested by behaviours that fall within the cognitive category of **exploration** using balls of different materials (plastic, rubber, glass). The phenomenon in question is explored both by carrying out different actions with the same object (balls dropped from different heights on the floor, by throwing them a little harder on the floor), and by changing them (different objects are thrown on the floor to observe how they behave). The experience has a social character and involves Andrea, Mattia and Jahel. The intervention of the adult, during the activities is oriented at regulating the emotional excitement when the group starts to throw the balls and the marbles with the risk of getting hurt. The intervention is not intended to block the activity

but to reduce the excitement to allow the game to continue. There are still some exploration conduits of possible ways to bounce the balls higher up. Subsequently, the activity continues as a playful moment.

MEETING SUMMARY TABLE

CATEGORIES

Detection of phenomenon	2
Assembly and Construction	-
Exploration	3
Exsperimentation	1
Problem Identifying	-

USED MATERIALS

Tanks with water, plastic bottles, bowls, plastic balls, rubber balls and murbles, videocamera.

COMUNICATIVE MODALITY

VERBAL	7
NON VERBAL	10

SOCIAL DIMENSION

Individual	9
Social	8
Indirectly social	-

INTERVENTI DELL'ADULTO

Emotive regulation	5

SUMMARY TABLE OF THE MEETING

CATEGORIES

Detection of the phenomenon	2
Assembly and construction	-
Exploration	3
experimentation	1
Identification of the problem	-

USED MATERIALS

Tubs, water, bottles and plastic bowls, plastic balls, rubber and glass marbles, video camera.

MODALITY COMMUNICATION

VERBAL	7
NOT VERBAL	10

SOCIAL DIMENSION

Individual	9
Social	8
Social Indirect	-

INTERVENTION OF THE ADULT

emotional control	5

PART III

Presentation, analysis and discussion of data

Chapter 6

Presentation and discussion of data

The observational data that have been codified and presented in the previous chapter are susceptible to both a quantitative[39] and qualitative analysis. In particular, I will count the epistemic categories shown by the children, the communication modalities, the social dimension, the percentage of time devoted to scientific activities, the articulated behaviours with which a given theme emerged and the functions performed by the adult through the strategies implemented for each meeting and relative to the three groups.

I will attempt to make a deeper analysis in relation to the intervention of the adult using the data which emerged from the quantitative analysis.

6.1. Analysis of infantile conduct

A first analysis of the data provided by the exploratory research makes it possible to highlight, for each meeting and within each group, how many times each epistemic category has been observed, the quantity of verbalizations and situations in which the children's behaviours are social or individual. This passage allows a first comparison between the groups and solicits some interesting considerations.

For this purpose, the tables of the counts relating to the epistemic categories, the verbalization and the social dimension and some considerations with respect to what the data highlights will be reported.

Later, through a more detailed analysis that will also make use of specific examples, the elements that can support and give a meaningful framework to the quantitative data and the hypotheses put forward will be highlighted.

[39] The quantitative non-statistical analysis shows the counts relating to the manifestation of scientific behaviors, the percentage of time that indicates the duration of the same behaviors, the number of each type of communication, the social and individual behaviors.

6.1.1 The epistemic categories in the three groups

Table n. 6. Calculations relating to the categories of scientific conduct observed in the various meetings held with Group A - promotion from within.

	Pre-obs	1	2	3	4	Post-obs	TOT
Phenomenon detection	4	-	-	-	1	3	8
Assembling/Construction	1	1	1	1	-	2	6
Exploration	3	4	2	3	4	4	20
Experimentation	-	-	2	1	2	1	6
Identifying a problem	2	2	1	2	1	2	10

Table n. 7. Calculations relating to the categories of scientific conduct observed in the various meetings held with group B - promotion from within and final conversation.

	Pre-obs	1	2	3	4	Post-obs	TOT
Phenomenon detection	1	1	2	-	1	-	5
Assembling/Construction	2	-	-	1	-	2	5
Exploration	3	3	2	4	4	4	22
Experimentation	2	2	-	1	2	3	10
Identifying a problem	2	-	1	1	-	1	5

Table n. 8. Calculations relating to the categories of scientific conduct observed in the various meetings held with the group C - *laissez-faire.*

	Pre-obs	1	2	3	4	Post-obs	TOT
Phenomenon detection	1	2	1	1	1	2	8
Assembling/Construction	2	-	-	1	1	1	5
Exploration	4	4	1	2	2	2	15
Experimentation	-	1	-	-	-	-	1
Identifying a problem	-	-	-	-	-	-	-

A first descriptive comparison with respect to the total calculations relative to the epistemic categories does not show great differences between the groups A, B, C as regards the detection of the phenomenon (A = 8, B = 5, C = 8), the assembly / construction (A = 6, B = 5, C = 5) and exploration (A = 20, B = 22, C = 15). The exploration also turns out to be the most representative category and the one that remains during the meetings in the three groups (A = 20, B = 22, C = 15). As can be seen from the previous tables, in group A and group B the manifestation of conduct relating to this category remains, almost unchanged, throughout the various meetings. In group C, although the category of exploration remains the most representative, the behaviours related to this scientific modality decrease in the different meetings ($^{pre\text{-}obs.}$ =4, C^1=4, C^2=1, C^3=2, C^4=2, C $^{post\text{-}obs.}$ =2).

A different consideration must be made in relation to the behaviours that fall within the epistemic categories of experimentation and identifying a problem and considered more complex than those that precede them (see paragraph 4.3).

In relation to the experimentation behaviour (A = 6, B = 10, C = 1) the calculations show a greater representation of this category in group B (SPE = 10) compared to what can be seen in group A (SPE = 6) and in group C (SPE = 1). Regarding the trend of the manifestation of the behaviour in question in the different groups, in group A it appears in the third meeting with the intervention of the adult) and remains constant until the end of the experience. In group B, the scientific behaviour belonging to the experimentation category already appears starting from the first meeting to remain constant throughout the period of work with the group. About this it is interesting to note what happened in the second and last observation

meeting. In particular, in the second meeting there is no experimental conduct (SPE B = 0), but the conduct reappears from the third meeting to record, on the occasion of post-intervention observation, an increase never recorded in the previous days (SPE group B = 3).

In group C, the experimental behaviours, which I will comment later, are manifested on a single occasion during the first meeting with the presence of the *laissez-faire* adult.

As for Identifying a problem. Observing the totals related to the scientific conduct of Identifying a problem, we note that they are more present in group A (Identifying a problem group A = 10, group B = 5, group C = 0). The children of this group show scientific behaviour of this type from the first meeting and the trend remains constant throughout the duration of the experience ($A^1 = 2$, $A^2 = 2$, $A^3 = 1$, $A^4 = 2$, $A^5 = 1$, $A^6 = 2$)[40]. In group B, the trend with respect to this category is similar to that in the previous case described and is characterized by constancy during all the meetings ($B^1 = 2$, $B^2 = 0$, $B^3 = 1$, $B^4 = 1$, $B^5 = 0$, $B^6 = 1$).

From the data reported in the tables, it emerges that the groups present similar characteristics in relation to the detection of the phenomenon, assembly and exploration; the differences seem to be accentuated, especially among the groups, when referring to the conduct of experimentation and identification of the problem that are almost completely absent in group C. In group A, in particular, the experimentation behaviour appears, as specified above, starting from the third meeting and remain constant. In group B, with regard to the experimentation behaviour, a constant situation can be noted registering an increase in the final observation meeting (SPE = 3). In group C, starting from the second meeting there is a decrease in the themes explored and the absence of complex behaviours[41] (see paragraph 4.3).

It therefore seems that in the two groups to which an approach based on 'promotion from within' has been proposed, in one case, flanked by the group conversation, the conduct relating to the most complex epistemic categories (experimentation and problem identification) remain and in some cases suffer an increase in the following meetings.

[40] The quotes to the letters refer to the group under consideration and are related to the meeting in examination. A1 = preliminary observation, from A2 to A5 are the meetings conducted with the intervention of the adult and A6 indicates the post-intervention observation situation.

[41] The definition of complexity that exists between the different cognitive categories is specified in chapter 4 in section 4.3.

Before entering into the merits of the characteristics and the elements that further distinguish the behaviour implemented in the three groups, it is useful to take into consideration the data related to the communication modalities and the social dimension related to the activated behaviour.

6.1.2 The communication methods.

Table n. 9. Communication modes of Group A - promotion from within.

	Pre-obs	1	2	3	4	Post-obs	TOT
Verbal	16	9	16	19	23	5	88
Non verbal	17	7	6	10	16	13	69

Table n. 10. Group communication methods[42] promotion from the inside and final conversation.

	Pre-obs	1	2	3	4	Post-obs	TOT
Verbal	18	19	9	20	23	17	106
Non verbal	21	9	8	16	21	15	90

Table n. 11. Communication methods of the C - laissez-faire group.

	Pre-obs	1	2	3	4	Post-obs	TOT
Verbal	13	10	5	3	2	1	34
Non verbal	17	11	6	10	8	12	64

[42] The verbalizations were calculated excluding the whole part of the conversation at the end of each meeting.

In the two groups A and B, the verbal communicative modalities seem to be increasing during the continuation of the experience even if one can notice a decrease in the final observation meeting. This decrease, however, is more contained in the case of the group that has experimented moments of discussion, sharing and group conversation together with an intervention of promotion from within. The drop that occurred in the last observation meeting could be related to a form of reaction that the children have shown in front of the change perceived in the attitude of the researcher. The latter, in fact, in this meeting, assumes the role of an observer who, although 'close' to the group, does not act with the same aims as the intentionally designed approach to promote communication and collaboration. Group C seems in line with the trend that characterizes the two groups that have experienced a “promotion from within” to the second meeting from which, both the verbal and non-verbal modes suffer a decline that persists until the final meeting.

In relation to the data referred to the communication modalities, Group B records a rather noticeable drop both in the verbal and non-verbal channel in the second meeting (V. =9, NON-VERB. =8), a situation that is recovered starting from the following meeting. This aspect will be explored later.

What has been highlighted, in relation to the verbal communicative modality, seems to underline some aspects to be explored because they could be connected with the type of approach proposed by the adult.

- Groups A and B show higher scores than what happens in situation C (A = 88, B = 106, C = 34).
- Group B that, in addition to the 'promotion from within' intervention, participated in moments of final conversation at the end of the activities, shows a higher total score than A (A = 88, B = 106) and records a more contained decrease in the last meeting compared to A ($A^{post\text{-}obs} = 5$, $B^{post\text{-}obs} = 17$).

6.1.3 The social dimension.

With regard to the social dimension connected to the scientific behaviour observed, the data shown in the following tables allow further considerations.

Table n. 12. Social dimension of the epistemic behaviour implemented in Group A - promotion from within.

	Oss-pre	1	2	3	4	Oss-post	TOT
Individual	14	6	3	3	11	7	44
Social	16	10	17	25	28	14	110
Indirected-social	4	1	1	2	-	3	11

Table n. 13. Of the data referring to the social dimension of the epistemic behaviour implemented in group B [43] - promotion from within and final conversation.

	Oss-pre	1	2	3	4	Oss-post	TOT
Individual	7	9	5	7	7	7	42
Social	26	17	10	24	36	28	141
Indirected social	5	2	2	3	1	-	13

Table n. 14. Of the data referring to the social dimension of the epistemic behaviour implemented in group C - laissez-faire.

	Oss-pre	1	2	3	4	Oss-post	TOT
Individual	13	11	11	7	5	10	57
Social	15	9	3	5	5	1	38
Indirected social		1		3	1	2	7

[43]The calculations on this dimension were obtained excluding the part related to the conversation conducted at the end of each meeting.

A comparison of the totals related to the social dimension of epistemic behaviour, with regard to the two groups to which an intervention aimed at supporting collaborative modalities has been proposed, highlights a greater presence of situations in which children cooperate and share experiences and interests ($A^{social} = 110$, $A^{individual} = 44$; $B^{social} = 141$, $B^{individual} = 42$). This tendency is reversed if we observe the situation that the data delineate regarding the same dimension found in group C (social = 38, individual = 57).

In group C, moreover, there are different situations in which an epistemic theme is explored exclusively with an individual and non-verbal modality. For greater clarity, I give an example below.

Table 15. Example of grid related to the analysis observation meeting of group C.

THEME	**CATEGORY**	**MATERIALE**	**V./N.V.**	**IND/SOC**	**ADULT**
Videocamera	ESP	videocamera, balls, hands	N.V. (actions) N.V. (actions) N.V. (actions)	IND. (Tilda) IND. (Tilda) IND. (Andrea)	
					Social control

In order to complete the information, even in groups A and B we observe situations in which a cognitive theme is dealt with individually. These occasions, however, refer to themes that children approach through detecting the phenomenon and which last only a few seconds. I will report below an example observed in group A and one in group B.

Table n.16. Grid related to the preliminary observation meeting of group A.

THEME	CATEGORY	MATERIALE	V. /N.V.	IND/SOC	ADULT
Blow on the ball	RIL.FEN.	Ball	N.V. (actions)	IND. (Leonardo)	

Table n. 17. Grid related to the preliminary observation meeting of the group B.

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULTO
Coloured water	RIL. FEN.	Red wooden blocks	V. (Look at the water! It's red, like those lego-wood)	IND. (Giovanni)	Rep./Cons.

Regarding the trend within group A, an increase in the social dimension can be seen from the second meeting to the end where the intervention of the adult was planned ($A^2 = 17$, $A^3 = 25$, $A^4 = 28$). As for group B, in a similar way to what has already been observed in relation to communication methods, we observe a significant drop in social behaviour in the second meeting; decline that is recovered from the next meeting. On the other hand, the sharp increase that the same group recorded in the fourth meeting ($B^4 = 36$) should be noted.

One last fact that records a non-homogeneous situation among the groups that requires in-depth analysis, concerns the time spent on scientific activities in the three different situations.

6.1.4 The duration of epistemic behaviour.

Table n 18. Time spent on epistemic of group A - promotion from within.

	Pre-obs	1	2	3	4	Post-obs
% in epistemic behaviours	37%	18%	51%	28%	41%[44]	42%
% other activities	63%	82%	49%	72%	88%	58%

Table n. 19. Time spent in epistemic activities of group B - promotion from within and conversation.

	Pre-obs	1	2	3	4	Post-obs
% epistemic behaviours	37%	52%	14%	45%	87%	42%
% other activities	63%	48%	86%	55%	13%	58%

Table n. 20. Time spent in epistemic activities of group C - laissez-faire.

	Pre-obs	1	2	3	4	Post-obs
% epistemic behaviours	24%	21%	5%	10%	9%	12%
% other activities	76%	79%	95%	90%	91%	88%

[44] The percentages reported and related to this meeting refer to the last 18 minutes of recording because, during that meeting, the children had inadvertently turned off the camera in an attempt to understand how it worked. The percentage of time during which the children were engaged in scientific activities was therefore calculated on the total recording time (18 minutes).

With regards to the analysis of the times that each group has devoted to cognitive insights through scientific ducts, I have mentioned - thanks to video recordings made - the duration of the different epistemic behaviour put into action in the different meetings. This step made it possible to calculate the percentage of time that the groups have spent in epistemic conduct offering the possibility of considering a plurality of elements able to give an account of what happened in the three groups, and the differences that the data considered have highlighted, until now. In the calculation of time 'dedicated', the total duration of the time in which the children examined each issue emerged without distinguishing between the different epistemic categories. The choice depends on the consideration according to which fragmenting the times for each category considered would not have taken into account the complexity that characterizes the situations that present a greater articulation of the behaviour on the same theme explored (aspect that will be taken into consideration later).

A first consideration that emerges from the data emphasizes how groups A and B spend a greater percentage of time in epistemic type activity with respect to those indicated in the table refers to children who have experienced *the laissez-faire approach*. One can also observe how children in group C, since the third meeting, have spent less and less time in epistemic behaviours ($C^{pre\text{-}obs}$ = 24%, C^{1} = 21%, C^{2} = 5%, C^{3} = 10%, C^{4} = 9%, $C^{post\text{-}obs}$ = 12%).

The data referring to the two groups, A and B, to which a 'promotion from within' approach has been proposed, show similar situations with respect to the two initial observation meetings (A = 37%, B = 37%) and final (A = 42%, B = 42%) in which the adult has an observer role. On the other hand, in the meetings during which the researcher proposes the intervention planned to sustain a scientific attitude with respect to the material and the observed phenomena there seems to be a slight difference in the time 'dedicated' to scientific conduct (B^{1} = 52 % , B^{2} = 14%, B^{3} = 45%, B^{4} = 87%) compared to group A (A^{1} = 18%, A^{2} = 51%, A^{3} = 28%, A^{4} = 41%).

If we observe the percentages of time devoted to epistemic activities, in group A we note a rather constant trend except for a minimum percentage in the first meeting with the adult (A = 18%) and a maximum in the second meeting (A = 51%) and then stabilize around 40% in subsequent situations.

Similarly, group B records a minimum percentage in the second meeting with the adult (B= 14%). This figure is interesting as it seems to confirm a similar trend that has been recorded in the communicative and social modes observed during the same meeting. For this

reason, the data will be commented in relation to the communicative aspects and social interaction referred to the same meeting. At the same time, it should be noted that in the fourth meeting with the intervention of the adult, the group reaches a maximum percentage point of time dedicated to activities of an epistemic nature (B = 87%). This data will be related to what happened during the same meeting, on the level of adult intervention to try to understand if and how this last aspect could have played a role in determining an increase in time dedicated to epistemic activities. In group C it is possible to notice a trend that records a decrease in time dedicated to scientific conduct starting from the preliminary observation meeting ($C^{pre\text{-}obs}$ = 24%, C^{1} = 21%, C^{2}= 5%, C^{3} = 10%, C^{4} = 9%, $C^{post\text{-}obs}$ = 12%).

In group C we can notice a minimum amount of time dedicated to epistemic activities (C = 5%) which will be commented in relation, also, to the data on communication and social modalities related to the group in question and characteristics of the same meeting.

A further element that seems to differentiate the three groups is represented by situations in which the exploration and deepening of the same theme occurs through the use of different epistemic categories. Situations of this type are present in all 3 groups, but, in a different way as we will see later.

Before entering into the merits and commenting on the different occasions in which articulated behaviours were manifested, it may be useful to highlight some counts referring to this aspect.

6.1.5 The articulation of the epistemic categories.

Table n. 21. Articulated epistemic behaviours (to deepen a “scientific” theme) in group A - promotion from within.

	Pre-obs	1	2	3	4	Post-obs	TOT
Articulated scientific behaviours	1	2	3	2	1	2	11
Articulated behaviours[45] and scientific category.	2 artic. EXP/ IND.PROB.	2artic. COS/ IND.PROB. 3 artic. EXP/IND. PROB/ EXP	2 artic. ESP/ SPE 2 art. COS/ IND.PROB. 2 art. EXP/SPE.	2 artic. EXP/SPE 3 artic. IND.PROB/ COS/ EXP	2 artic. SPE/EXP	2 artic. COS/EXP. 2 artic. COS/ EXP	

Table n. 22. Articulated epistemic conducts (to deepen a “scientific” theme) in group B - promotion from within and final conversation.

	Pre-obs	1	2	3	4	Post-obs	TOT
Articulated scientific behaviours.	1	2	1	3	2	2	11
Articulated behaviours and scientific category.	5artic. COS/ESP/ SPE/IND.PROB/SPE.	2artic. COS/IND. PROB. 2artic. EXP/SPE.	2 artic. ESP/ IND.PROB.	2 artic. ESP/ IND.PRO 2 artic. COS/ EXP. 2 artic. ESP/ SPE.	3artic. ESP/SPE RIL.FEN 2 artic. EXP/SPE	3artic. ESP/ SPE/EXP 5artic. COS/ EXP/ IND.PROB/ COS e SPE	

[45] The number of articulations and the type of scientific categories with which the same topic has been studied is indicated in the table row. The same row is also represented in the tables of groups B and C.

Table n. 23. Articulated epistemic conducts (to deepen a “scientific” theme) in the group C - laissez-faire.

	Pre-obs	1	2	3	4	Post-obs	TOT
Articulated behaviours	1	1	-	-	1	1	4
Articulated behaviours and scientific category	2 artic. COS/ESP.	2 artic. EXP/SPE.			2 artic. COS/RIL.FEN.	2 artic. ASS/ESP.	

A first comparison on the totals related to this aspect shows the same number of conducts divided into groups A (11) and B (11), but a difference compared to data relating to C (4). In group A, the most articulated situations are observed in the first and in the third encounter with the adult (A^1 = 2 scientific behaviours, one with 2 and the other with 3 joints; A^3 = 2 scientific behaviours, the one with 2 and the other with 3 joints). Except for the last case, the other situations are characterized by the transition from one epistemic category to another of greater complexity (see section 4.2). First of all, in the B group, the situations where the most articulated behaviour is manifested can be observed in the preliminary observation meeting (1 theme examined in depth in 5 categories) and in the final (theme examined in depth in 5 categories). This aspect will be commented later indicating some observations that may justify this fact. In these situations, the intervention of the adult is not present, but, as can be seen (Tables 21 and 22), although there is a substantial similarity in the characteristics of the groups during the first two meetings, those to whom an intervention was proposed for the promotion of an epistemic attitude (A and B) have maintained the presence of more complex and articulated situations over time. This aspect, as we shall see later, was not observed in the group that experienced a laissez-faire mode of action.

A final fact that should be noted concerns the fourth meeting where the articulated conduct presents a brief transition to a category of 'inferior' complexity (see 4.2) (detection of the phenomenon) compared to the others put into play. The conduct referred to the detection of the phenomenon was activated by a child, Giovanni, who until then had explored different materials and situations. When he observes his companions, who weigh themselves on the scales, he waits for the instrument to be available, approaches and tries to weigh himself, noting how, once standing on the scale, the needle moves downwards. Once this aspect is detected, Giovanni returns to take care of other things without further deepening this experience; experience that, his companions on the other hand, continue to explore. This underlines that the group that had started to tackle the topic related to weight deepens it gradually through more complex categories (from exploration to experimentation).

In general, the data related to the meetings conducted with the intervention of the adult show a constancy in the articulated behaviour up to registering an increase in the articulation in the fourth meeting (B = 2 conduct, one of which with 3 parts).

With regard to Group C, the articulated conducts are significantly lower than those observed in the other two (table No. 23) and the trend remains constant with the exception

of two meetings (the third and fourth) where situations with articulated conducts are not present.

In summary, from the considerations made up to this point, differences emerge between the groups in relation to:

- the epistemic behaviour. Groups A and B differ from group C and in particular are more active in conducts that fall into the scientific categories of experimentation and problem identification.
- times dedicated to epistemic activities. Groups A and B record a greater percentage of time, compared to C, in relation to the time that children engage in carrying out activities that require the activation of epistemic behaviour. The deepening of this aspect, through the analysis of the 'non-scientific' activities carried out by the groups in the residual time will be able to provide further information.
- "characteristic" situations and meetings due to the presence of data that deviate from the general trend of a certain group. In groups A and B there are meetings in which particular situations emerge from some data. In group B, for example, there was a sharp drop in the second meeting in the manifestation of verbal communication methods, in the social dimension and in the percentage of time dedicated to scientific conduct. Likewise, another fact that is highlighted is represented by a very high percentage of time devoted to scientific activities in the fourth meeting (B = 87%) which will be analyzed in relation to the role of the adult. In group A, starting from the second meeting, there are more complex scientific behaviours (see section 4.2). This situation is not observed in group C because the children seem to remain in a situation in which they do not activate more complex epistemic behaviours, verbal communicative modalities and more collaborative social interactions.

From these considerations emerge the first elements that could make one think of an influence that the intervention approach proposed in groups A and B has on the possibility of supporting and promoting cognitive attitudes in relation to the observed phenomena. This, at the moment, is a hypothesis that needs to be deepened to collect further elements that can support it taking into account any alternative work runs.

To this end, the aspects highlighted will be taken into consideration through a more detailed analysis aimed at highlighting elements that can better clarify the relationship between the results obtained in the different groups and the type of context and educational intervention proposed to them by the researcher.

6.2. The experience in the groups: a comment on the data.

From the considerations made until now, a difference seems to emerge between the groups that have experimented a style oriented to developing a scientific attitude, in an intentional way and according to a precise educational approach based on 'promotion from the inside', and that subjected to a laissez-faire intervention. In particular, these differences outline a situation of advantage of groups A and B with respect to C. These aspects can be highlighted, together with the calculations presented in the table, by examples that can support, give meaning to the data and offer useful ideas to understand if and how the intervention proposed by the adult may have influenced the development of a certain type of knowledge with reference to the material presented.

6.2.1. The 'unscientific' behaviours.

To highlight the aspects that may have contributed in characterizing the experience of the groups in the manner outlined by the data and the first considerations made, it may be useful to refer , in addition to the percentage of time - lower in C than the other two groups A and B - that the children have engaged in epistemic behaviours, also what activities have characterized the residual times.

In the residual time during which the children have chosen to engage in behaviours other than scientific, in addition to a distracted and occasional observation of the materials, three types of activities can be identified.

1. Symbolic play.
2. Movement plays.
3. Drawing.

In groups A and B the activities that most often involved children in 'residual' time are symbolic play and the drawing of what they had done.

In one of these situations, for example,

> "Leonardo, Valentino and Pietro are observing the material made available to them and Leonardo, taking a roll of kitchen paper, looks at it, puts it in front of his eye and says to his companion: *<<Come on Peter, let's play pirates! Pietro you are the pirate, I am the boss>>*. Pietro retorts under his breath and I do not hear what he says (impossible to understand even from the recording). Suddenly Leonardo looks more closely at the cardboard cylinder he has been holding for some time, he passes his hand over the object and touches the cylinder more carefully, noticing a piece of torn cardboard. His finger and his gaze linger on the broken piece until he exclaims *<<Here it is broken>>*".

In this case it is evident that a moment of symbolic play can be transformed into an occasion which, according to the analysis grids (see Section 4.5) represents an epistemic conduct. The game of pirates will be resumed, at a later time, by the two children without necessarily leading to an opportunity to put into play epistemic behaviours.

In a subsequent meeting, Ettore is putting some objects in a tub full of water and he says under his breath some things that the adult does not hear. For this reason, the researcher approaches by asking:

> "Adult: <<*What are you doing, Ettore?*>>
> Ettore: <<*I am put these things in the water to make soup*>>.
> Adult*:* <<*Ssoup? And these* (pointing to corks), what *are they?*>>
> Ettore: <<*Potatoes, tomatoes, peas.*>> (Indicating corks, metal, ping-pong balls and sticks). Adult: <<Ok>>".

The adult, as foreseen by the research project, does not intervene to interrupt the activity of the children, even if it does not require the use of scientific conduits, but is set in an observation to understand if the play is resolved independently or to grasp any possible cues of the child useful for orienting that situation on an occasion of epistemic exploration.

> "As Dario continues to work on the track, Elena turns her attention to the box of metal rings from which Alice took some pieces and put them on the ground next to her. Elena takes the metal ring box and says: <<*l will use these as chewing gum*>>. She takes the box and pretends to distribute the chewing gum to her companions. She also offers me one.
> Elena: <<*Do you want a chewing gum? Just pretend to put them in your mouth*>>. Then she goes to Dario and offers one to him saying: <<*Just pretend to eat it. Just do this* (and makes the gesture of opening and closing her mouth a little pretending to chew)>>. Then she drops this game and returns to be interested in the marble track."

In this case, similar to what happened in the situations described above, Elena uses an object present among the material offered to the children to propose a symbolic play in which to involve her companions. In the meeting taken into consideration, the adult assumes the role of an observer who does not propose any targeted intervention and allows Elena to continue her play. The latter, not accepted in a particular way by her classmates and not supported by the researcher, concludes and the girl returns to engage in the project she had already started. On another occasion, Elena invites her friends to play the 'school game' where she will be the teacher.

The second type of activity that does not, according to the theoretical-cultural frame deepened in the first part of the thesis, fall into the scientific field is connected with the choice of the group to dedicate some time, in each meeting, to draw what they had done up to that moment.

A first example occurs in group A when, at a certain point in the first meeting with the adult, the children choose to take a notebook and pencil and draw what they have done.

A similar situation occurs in group B when Alice sits down, takes her notebook and pencil from the kit and starts to draw. Once the drawing is finished, Alice says: "*I have drawn the water tanks and you* (the adult) *shining the torch light into them*".

Even in the third and fourth meeting, at a certain point, Elena, Alice and Fabrizio decided to start drawing by engaging ten minutes in this activity. In particular, Fabrizio in the fourth meeting draws for the duration of the activity that sees the group engaged in understanding how the soles of shoes produced noise when wet.

The adult, even on these occasions, chooses not to interrupt the activity of the group or individuals. This decision is due, in this case, not only to the idea of adopting a welcoming attitude that does not block children's initiatives, but also to a reflection connected to the educational context to which those children had been accustomed and which I will clarify later.

Thus, in all the exemplified cases, the adult chose not to intervene by interrupting or denying the group the possibility to start and carry out autonomous initiatives but, at the same time, she did not propose reflections, repeats or other strategies aimed at promoting them.

As for group C, the activity that engages and involves children in moments not dedicated to epistemic conduct involves movement play (throwing themselves on the carpet, pretending to be the orchestra, ball races, throwing balls and hitting them with plastic bottles or wooden boards). In the first two meetings the group is able to manage these moments while, starting from the second meeting, the opportunities for play increasingly often, requires the intervention of the adult aimed at social regulation and the containment of emotional excitement. I report an example of the second meeting in order to clarify the type of situation that has forced the adult to intervene more often to regulate emotional excitement.

Table n. 24 relating to Group C - second meeting.

THEME	CATEGORY	MATERIAL	V./N.V.	IND/SOC	ADULT
Water bubbles	RIL.FEN.	Tank of water, plastic bottle	N.V. V. (I make bubbles) N.V.	IND. (Tilda) SOC. (Tilda, adult) IND. (Tilda)	Repeat Tilda's question
					Social control
					Social control
					Social control
					I proposed to open "little explorator's kit". Children decide to drow.

The table shows how, while Tilda was busy exploring the phenomenon of water bubbles that were formed by immersing an empty bottle in water, the adult was forced to intervene several times just to perform a function of emotional adjustment on a group of children with the aim of allowing the continuation of the experience in progress while maintaining a security context for the whole group. In this occasion, in fact, Andrea and Eros are putting some objects in the water and they are decanting by filling up plastic bottles and emptying them. Suddenly,

> "Andrea shows a marble in the palm of his hand to Eros and challenges him: *<<Come and get it!>>*. He runs away, and Eros follows him.
> Me: *<<but not like that ... we have already seen that running you slip and you risk hurting yourself>>*.
> They come back to the tub ...fighting for the ball...Andrea takes one and throws it from high up into the water.
> Eros*: <<Hey! You have wet my head!>>*
> Andrea enjoying himself repeats the action and throws it in the water to try to wet *Eros* who complains and gets up to leave and Andrea desists from the idea of repeating the action".
> "Tilda is behind me ... she's trying to get something that she had put into a coke can out, but she can not so she puts it back in the tub without trying to do what she had intended.

> Eros has returned to the large water tank and takes several objects and then drops them back into the water. Andrea wets a ball and drops it on Eros's arm. Then he takes a little water in his hand, I realize that he wants to spray Eros and stop him by telling him not to do it.
> Tilda is always at her water tank but suddenly gets up and says: *<<Boh, I don't want to play anymore because I'm getting too wet!>>*.
> Me: *<<Just take a little more care>>".*

For a few moments the situation returns to normal but soon other situations of potential conflict are created, in particular between Eros and Andrea.

> "Andrea sees a ball bounce on the floor, probably thrown by Eros. Andrea takes it and makes it bounce. Jahel observes, gets up from where he was near the water tank and tries to intercept the ball by kicking it. They start to play by throwing the ball. I observe the situation and at one point a rubber ball hits the camera support, which wobbles a little.
> Me: *<<Remember the rule that you can do what you want without breaking anything>>*.
> Andrea and Jahel resume playing by bouncing the ball on the ground in a more contained manner. Eros, after having put marbles and rings into the water puts ping-pong balls inside without making any observation".

The situation, after a few minutes of apparent quiet, requires, intervention once again to regulate the emotional excitement that results in the choice to offer them an activity chosen by the adult.

> "Andrea continues to play by bouncing the rubber balls and ping - pong balls and, after a while, Eros also joins. After a first moment in which the game is contained, the two children start playing again by throwing the balls against the wall and several times they come close to the camera. I decide to try to move it but am unable! So, I ask the children to move farther away from the camera to continue playing. After a while they start throwing balls that bounce back with too much force. To avoid reprimanding them again or being forced to interrupt their game, I decide to stand in front of the camera and take a ball proposing myself as another player. Now we are all playing ... Tilda has also joined the game. For a while 'playing with them served to contain throws that were too strong ... then Andrea and Eros start to throw them hard on the wall ... I realize that I'm starting to have to repeat *<<Be careful! Slower, not so hard!>>*. Too many times.
> I look at the clock and there is about a quarter of an hour to the end of the meeting, so I decide to clear the table and propose that they draw what we did today ... we sit at the table, take notebooks and pencils and start to draw".

In this case, in the same way as to what happened in the previous examples and those described in the observation protocols and related to subsequent meetings, situations that can offer insights into epistemic behaviours - as happened in the two groups A and B (sketches, for example) - with this grouping of the children becomes a play situation that takes the form of excessive emotional excitement that puts the continuation of the encounter at risk. In this situation, I decided to intervene, assuming a more direct attitude, even though it did not fit within the frame of posture foreseen in this type of intervention. Up until then, the meeting had proved to be rather difficult to manage given the countless situations in which it was necessary for the adult to intervene.

In the conclusive observation meeting a rather interesting situation presents itself because it allows further reflections on this group and, transversally, on the other two.

> "In this meeting, the children are playing at throwing marbles and hitting them with wooden planks, which we agree should be done by hitting the balls with the planks resting on the floor like bats to avoid the risk of hitting their team-mates. Even in this situation, the adult decides to propose himself as a player realizing that, in this way, the game is more manageable and allows others to continue in different activities. Suddenly, Mattia, provoked by a companion, hits him with the wooden plank. The adult intervenes by remembering that the material is available to them, but it is necessary to respect the only rule of not damaging things or getting hurt. To this consideration, Mattia answers: <<*So why did you bring these for us?* (pointing to the wooden planks)>>".

From what has been said so far, it emerges how groups A and B show a situation characterized by the development of similar 'non-scientific' activities related to free play and drawing. Group C has peculiar characteristics since there are no symbolic play situations and the opportunities for observing the material are transformed into games (for example sketches, bounces, etc.) that require adult intervention to guarantee a serene climate. In groups A and B, in addition to the fact that the material offered symbolic play ideas (paper tube that becomes a telescope), occasions were observed in which the use of a material allowed the observation of a detail from which to start an in-depth knowledge (for example, Leonardo, using the scroll as a spyglass in the 'game of pirates', detects a broken piece and poses the problem of finding a way to fix it).

The descriptive comparison between the groups in relation to the epistemic categories fielded by the three groups, the time involved, in each meeting, by the children in cognitive behaviour, the information offered by the 'non-scientific' activities allows, also, to advance

hypothesis interpretations related to the educational context proposed by teachers during scientific experiences.

In paragraph 3.2.5, I described the characteristics of the educational context that teachers set up when they offer children 'scientific observation' experiences. If we refer to the stories of the teachers, some characteristics emerge regarding the type of educational proposal that I have conducted with the group of children involved in the exploration path The descriptions of the teachers bring to light a very structured context in which the group of children are entirely involved and, at the same time, carry out the proposed activity according to methods predefined by the teachers.

> "*We prepared a basin on a table and a box with some objects inside. We proposed that the children "fish" for an object, one at a time, with their eyes closed, touch it, try to say what it was and then, before putting it in the water, say if he thought it would float or not.*"

And again,

> "*When my colleague arrives early, in the morning, before going to school we go to have a look in the greenhouse to see if the plants have sprouted or grown a bit 'and if we saw changes, we took the children to observe the change making them notice It too".*

I also emphasize that at the end of the activities proposed by the teachers, children are asked to draw what they have observed and done.

This context that focuses on the teacher's proposal, leaving the child's initiative in the background, guided rather than welcomed and accompanied, presents considerable differences compared to that proposed in this experience. The educational proposal experimented by the children involved in the research leaves ample freedom within a well-defined rule for social life (do not get hurt and do not damage the material). The first impact with this context, which is unusual for them, has produced some reactions through which the adult has received signals of initial disorientation with respect to this element of novelty to which they had not been accustomed. All three groups, after the delivery of the boxes of materials, had difficulty in starting to explore them. Group A children, in particular, spent several minutes looking at each other, walking around the room and talking to each other in a whisper until, the adult, feeling that the moment of 'discomfort' was too strong, chose to

start opening a box extracting some objects. From that moment, the children started to move but, still with some hesitancy exemplified by what Arianna asks (group A, 5 years) after the researcher has made the delivery in the first meeting with the intervention of the adult.

> "The children are dumbfounded and, after some time during which they look disoriented, I try to put my finger in the water.
> Arianna (5 years old): <<*But can we put these things inside the water?*>>.
> A: I smile and answer: <<*Of course!*>>
> The children start to take the objects and materials they have available and put them in the water. At first, this throwing of the objects inside the water tanks is more tied to the pleasure of being able to dip their hands inside the water, playing with it also using what I have made available to them. For a while (about 15 minutes), I let them try and wait for some ideas which I can catch and re-launch".

A girl asks if she can actually put what she has available in the water because, in a similar experience with the teachers, this possibility was guided and decided by the teachers themselves. The choice to draw what they had observed and done, in the meeting that was about to end, can be assumed to be connected to the difficulty of giving meaning to the educational context they were experiencing for the first time. The hypothesis is that drawing what they had done with me was an element of security that allows the children to have a connection to the context they are used to and that provides, at the end of each activity, the graphic representation of what happened.

This situation of disorientation and confusion, starting from a certain point, is recomposed in groups A and B while it seems to persist, even increase, in children who have experimented with the educational style oriented to laissez-faire. For the children of this group, the adult seems to be an element that confuses them because she proposes deliveries characterized by a wide freedom of choice, something to which they are not accustomed, and which puts them in a position to find new meanings on their own. The adult, in fact, shows disinterest in respect to what the group does except when she is forced to intervene to restore a peaceful environment and this leads the children to look for those situations in which the adult makes her own emotional 'closeness'. Moreover, the type of intervention that she proposes is not what the group experiences with its teachers who tend to penalize the perceived behaviours of disturbance by interrupting the activities and proposing others that they consider more peaceful. To confirm this, in the interview one of the teachers said that certain manipulation and graphic activities are proposed to *"keep the children blocked"*.

6.2.2. Articulated epistemic behaviour.

As a preliminary point, it should be said that the most articulated behaviours, as already specified (see Table No. 22), are observed in group B and, in particular, in the two meetings (preliminary and final observation) in which the adult does not propose the planned intervention. It must be said, as a possible explanation of this fact, that during these meetings the articulated behaviour concerned the same activity (construction of the marble track and rolling marbles) made with the same material (wooden boards and marbles). The assembly of wooden planks and the construction of a track on which to roll the marbles involved the group a lot and the desire to repeat the experience reappeared as soon as I informed the group during the last meeting with the promotion from within, that the next time I would bring them more material than what they had used in recent days. On this occasion, in fact, a child immediately asked: "*But can we build the marbles again?"*.

Other examples have occurred in the meetings conducted with the intervention of the adult and in the groups that have experienced the approach of 'promotion from within' seem to remain constant and present situations in which the articulation involves several steps.

Table n. 25. Group A analysis grid - first meeting with adult intervention (Floating theme)

THEME	CATEGORY	MATERIAL	V./N.V.	IND/SOC	ADULT
Floating	ESP	tank with water, various objects, plastic bottle	N.V. (actions)	SOC. (Arianna, Leonardo, Alice)	
			V. (lets see what this does)	SOC. (Arianna, Leonardo, Alice)	
					Introd./ Sol.
			V. (How come?)	IND.(Valentino)	
	IND.PROB.				
			V. (one stays up and the other goes down)	SOC. (Arianna, Leonardo, Valentino)	Rep./SOC. conn.
	ESP				
					Rep./cons.
			V. (the full one goes down and the other stays up)	SOC. (Arianna, adult)	
					D.A./SOC. conn.
			V. (one is full and the other is empty)	SOC. (Leonardo, Francesco, adult)	Non Apropriate.
			N.V.	SOC. IND. (Francesco, Leonardo, Arianna)	

In the example above, the children of group A are working on the theme of floating that is deepened through an articulation of conducts that fall into different epistemic categories. In particular, the topic in question begins with exploratory behaviours aimed at trying to understand the different behaviour of objects immersed in water.

Arianna, Leonardo and Valentino put an empty bottle into the water asking: "*Let's see what this will do"*, followed by other objects of different sizes. The adult proposes an intervention to introduce an element of novelty (introduces a full bottle next to the empty one inserted by the children shortly before) that represents a 'provocation' aimed at soliciting a doubt that pushes the children to ask questions and take into consideration other working hypotheses (not just the dimension, for example). At the solicitation of the researcher, the children answer by explaining a question that suggests the activation of behaviour referring to the identification of the problem and through which the group continues to explore the characteristics of the two objects coming to perceive a relationship with the weight of the objects. The successive interventions of resuming the observations recorded by the children (for example, "*Did you hear what Leonardo said? One stays up, the other goes down"* and, again, "*One is full and the other is empty"*) brings the group towards exploratory conduct. The adult does not intend to lead the children to a permanent solution to the phenomenon of floating, but to urge the children to continue the experience and reasoning by considering different hypotheses.

Table n. 26. Group A analysis grid - second meeting with adult intervention (Floating theme)

THEME	CATEGORY	MATERIAL	V./N.V.	IND./SOC.	ADULT
Floating	ESP.	Different objects	N.V. (actions)	SOC. IND. (Leonardo, Arianna, Ettore, Francesco, Alice e Valentino)	Rep./ Foc./sol. (To continue the experience=
			V. (Look! This float, but if…it goes down)	SOC. (Leonardo e adult)	
			N.V. (actions)	SOC. (Leonardo, Arianna, adult)	
	SPE		V. (Look! What I've discovered. If I put this top which went down before it remains up)	SOC. (Arianna, Leonardo, adult)	
			V. (It alwayse remains up)	SOC. (Leonardo, Arianna, adult)	
			V. (every thing floats if you put it on a piece of wood)	SOC. (Leonardo, Arianna, adult)	
			V. (Wood makes things float)	SOC. (Leonardo, adult)	Introd./sol. (to continue the reasoning) (I put cork on the wooden blocks).
			V. The full bottle should go down because it weighs more)	SOC. (Leonardo, adult)	

					Introd. (I put the bottle with water on the wooden blocks). Rep/sol. (To continue the experience).

In this experience, the children of group A continue to deepen the understanding of the floating phenomenon on the basis of behaviours that fall into different epistemic categories: exploration and experimentation. The children are exploring the different behaviour of objects immersed in water until Leonardo explains the hypothesis that if he puts other objects on top of the piece of wood it will sink. At this point, the adult proposes an intervention to introduce an element of novelty by taking a metal cap on the bottom of the tub by resting it on the piece of wood. The consequence is immediately taken and explained by Leonardo who claims to have discovered that the wood allows everything to float. At this point, the adult proposes an intervention to introduce an element of novelty consisting in placing a bottle full of water on the wood. Leonardo takes the cue and verbalizes what happens by continuing the experience and reasoning on the phenomenon explored.

A further example of articulated conduct can be observed in the third meeting with the intervention of the adult, as shown in the analysis grid below.

Table n. 27. Analysis grid of group A - third meeting with adult intervention (Weight theme).

THEME	CATEGORY	MATERIAL	V. / N.V	IND/SOC	ADULT
Weight	ESP. SPE.	Scale and various objects	N.V. (actions) V. (Look how heavy I've made it) V. (Now I've made it heavy again) N.V. (actions) V. (Why does the needle move if I press?) V. (because if you put things on it or you press with your hands the needle	IND. (Leonardo) SOC. (Leonardo, adult) SOC. (Leonardo, adult) SOC.IND. (Leonardo, adult) SOC. (Leonardo, adult) SOC. (Arianna, Leonardo, adult)	Rep/Sol. (to continue the reasoning) Non Apropriate Rep. /SOC. conn. sol. (to continue the reasoning and the experience)

		Wooden blocks, scale and tank with water.	moves to show the weight) V. (Like. If I put these here, this should move down.) N.V. (actions) V. (In this way the needle doesn't move) V. (it floats because it is light. The needle doesen't move) N.V. (actions) V. (it doesn't weigh enough) N.V. (actions)	 SOC. (Ettore, adulto) SOC. (Ettore, adult) SOC. (Ettore, adult) SOC. (Arianna, Ettore, adult) SOC. (Arianna, Ettore, adult) SOC. (Leonardo, Ettore) SOC. (Leonardo, Ettore)	Rep./sol. (To continue the experience) Rep./Sol. (to continue the reasoning) Non apropriate Introd. /sol. (hypothesis) (put on the scale an empty bottle) Introd. /sol. (to continue the reasoning) Introd. /sol. (to continue the reasoning)

In this situation the children are exploring the weight through the use of the scale and some connections with the floating activities. The articulation, also in this case, shows the passage from one type of behaviour (exploration) to another more complex (experimentation). The children interact and at the question which Leonardo addressed to the adult, "*Why does the needle move down if I press here with my hands?",* the latter proposes an intervention to resume the application (repeats it) to urge the intervention and the contribution of the group favouring a continuation of reasoning and interaction. After some intervention, Ettore proposes a verbalization that manifests the activation of experimentation behaviour ("*Like now, if I put these on top, this will sink"*) that try to explore the phenomenon of floating in relation to the weight of the objects.

In only one case, in the last meeting with the intervention of the adult, the articulation is characterized by the passage from experimentation behaviour to behaviour belonging to a category of 'inferior' complexity (see 4.2).

Table n. 28. Group A analysis grid - fourth meeting with adult intervention (Racking theme).

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Racking	SPE ESP	Empty tanks, tanks with water.	V. (No, careful, it's too high) V. (I twill overfolw if you put that also) N.V. (actions) V. (you have pushed the bottle down and the water has overflowed) N.V. (actions)	SOC. (Arianna, Alice, Francesco, adult) SOC. (Leonardo, Francesco, Alice) SOC. (Francesco, Alice, Leonardo) SOC. (Arianna and Francesco) SOC. (Valentino, Arianna, Francesco)	Rep./sol. (to continue the reasoning) Rep./sol. (to continue the reasoning)

In this meeting, the activity is characterized by the explanation of a hypothesis and subsequent verifications with observations related to the consequences and the explanation that tries to put in evidence the pressure made on the water by plunging an empty bottle with the raising of the level of water and the resulting overflow.

Regarding group B, in the first meeting with the intervention of the adult, two articulated behaviours were observed, characterized by the activation of behaviours that from exploration evolve into experimentation activities. Of these two situations I report an example characterized by a longer duration compared to the other case.

Table n. 29. Group B analysis grid - first intervention meeting with the adult (Floating theme)

THEME	CATEGORY	MATERIAL	V. /N.V	IND/SOC	ADULT
Floating	ESP	Tanks with water, wooden blocks	V. (I look for the one that has gone down)	IND. (Elena)	
			N.V. (actions)	IND. (Elena)	
			N.V. (actions)	IND. (Dario)	
			V. (this top stays up a little and goes down a little)	IND. (Dario)	
			V. (this one will go down)	SOC. (Arianna, Elena)	D. A. /Soc. Conn.
	SPE		V. (It did'nt go down).	IND. (Elena)	
		Various objects	V. (We have to look for the heavy things because the water doesn't hold them and they go down)	SOC. (Alice, Elena, Dario)	Rep./sol. (to continue the reasoning and the experience)
			V. (If we look for light things, they should stay up)	SOC. (Elena, Alice, Giovanni)	
			N.V. (actions)	IND. (Dario)	
			V. (I think this will float. It's light).	SOC. (Elena, adulto)	
			V. (I've discovered that light things float and heavy ones go down)	SOC. (Alice, Elena, adulto)	Introd. /sol. (to continue the reasoning and the experience)
			V. (these rings are light but they go down)	SOC. (Elena, Alice, adulto)	Rep./Cons.

In this experience, which took place at three different moments during the meeting, the children deepen the epistemic theme of floating by gradually activating behaviour, which is more complex from exploration to formulating hypotheses and putting them to the test (experimentation). The first verbalization of the children ("*The cork stopper goes a bit 'down and a bit' up"*), is taken by the adult with the intention of expanding and re-launching the observation made by the group (" *Have you heard what Dario says? That the cork goes a bit 'down and a bit' up"*). Arianna and Elena intervene with the explanation of a hypothesis ("*You'll see that this, will now go down"*) that the adult repeats ("It *will go down"*). At this

point, the group continues to activate experimentation behaviour and to test them by verbalising the consequent observations.

In the second meeting, we observe only one case of a theme thoroughly examined by way of articulated behaviours that refer to epistemic categories of exploration and identification of the problem. The experience concerns floating; I give below the grid to better exemplify.

Table n. 30. Group B analysis grid - second meeting with adult intervention. (Floating theme).

THEME	CATEGORY	MATERIAL	V./N.V.	IND/SOC	ADULT
Floating	ESP	Tanks with water, various objects.	V. (This is light but it doesn't stay up) N.V. (actions)	IND. (Elena) SOC. (Fabrizio, Ginevra, Giovanni)	Rep./cons., sol. (to continue the reasoning and the experience)
			V. (With water this one goes a bit more down than the empty one) N.V. (actions)	SOC. (Fabrizio, adult) SOC. (Fabrizio, Ginevra)	Non Apropriate.
			N.V. (actions)	SOC. (Elena, Ginevra)	Introd. /sol. (to continue the reasoning and the experience)
			V. (How come these are light but go down?)	SOC. (Elena, Fabrizio, Giovanni, adult)	
			V. (Maybe they are heavy).	SOC. (Alice, Dario, Elena)	Rep./sol. (to continue the reasoning and the experience)
	IND.PROB.		V. (If you hold them you can feel them pulling down. They are heavy)	SOC. (dario, Fabrizio, Elena, Alice)	Non Apropriate Rep./sol. (to continue the reasoning) D.A. / Sol. (to continue the reasoning and the

					experience) / Soc. Conn. Introd./sol. (to continue the reasoning and the experience) NOn paropriate

It should be noted that the identification of the problem is made explicit by Elena, observing the objects inside the tank with water. The adult takes up the aspect highlighted by Elena ("*They are light and go down"*) by emphasizing and raising her tone of voice slightly with the intention of expanding the experience to the companions soliciting interventions and contributions. With regards to the interventions indicated as 'irrelevant' and 'inappropriate' these will be discussed later in relation to the communicative modalities and the social dimension.

In this meeting, the presence of a single situation in which articulated behaviours are manifested, associated with the decline in verbal communication and social interaction seems to support the hypothesis that in the second meeting there has been a condition that has influenced the possibility of maintaining and/or enhancing the aspects considered. This hypothesis will be discussed in relation to the role and intervention of the adult.

In the third meeting, group B shows three situations of articulation of the behaviours characterized by transition to more complex behaviours compared to the one with which it began to deepen the theme faced. Of these examples, I will report the case related to Fabrizio, Elena and Alice's experience when they began to explore the phenomenon of light, intrigued by the different effect that is produced on opaque and transparent surfaces.

Table n. 31. Group B analysis grid - third meeting with adult intervention (Light theme).

THEME	CATEGORY	MATERIAL	V. /N.V.	IND/SOC	ADULT
Light	ESP	Tanks with water, torch	V. (Look!) N.V. (actions) N.V. (actions) N.V. (actions)	SOC. (Fabrizio, Elena, Alice) SOC. (Alice, Elena, Fabrizio) IND. (Fabrizio) IND. (Fabrizio)	
		Torch and various objects	V. (How can light pass?)	SOC. (Fabrizio, adult)	Rep. / Sol. (to continue the reasoning and the experience)
		Torch, transparent and dull objects	V. (because it is glass and the light can pass) N.V. (actions)	SOC. (Fabrizio, adult) SOC. (Fabrizio, Alice, Dario e Giovanni)	Rep./sol./soc. Conn.
	IND.PROB.		N.V. (actions) V. (look at the light) N.V. (actions) V. (here it passes) V. (How can light pass?) N.V. (actions) V. (Look! Here the light doesn't pass). N.V. (azioni) V. (Guardate, guardate)	IND. (Fabrizio) SOC. IND. (Fabrizio, group, adult) SOC. (Fabrizio, adult) SOC. (Fabrizio, adult) SOC. (Fabrizio, adult) SOC. (Fabrizio, adult) SOC IND (Fabrizio, group, adult) IND. (Fabrizio) SOC. IND. (Fabrizio, group, adult)	Introd. /Sol. (to continue the reasoning and the experience) Rep. /sol. (to continue the reasoning and the experience) Rep./sol. (to continue the reasoning and the experience) Rip./soll.and social connection Introd./sol. (to continue the reasoning and the experience)

					Introd./sol. (to continue the reasoning and the experience) Rep./Soc. Conn.

The explicit problem is aimed at understanding why light passes through the objects explored by the children. The interventions that the adult proposes to support Fabrizio's epistemic research include the verbal ("*Here it passes and here no!"*) and non verbal mirroring (*I take a torch and point it on surfaces, both opaque and transparent, looking on the floor to see if you could see the reflection or not*) of observations and behaviours with the introduction of new elements (opaque surfaces, completely transparent) with the aim of increasing the materials to be considered and allowing the continuation of the experience.

The following example refers, once again, to the experience of floating and is characterized by a gradual transition from exploratory behaviours to behaviours referred to categories of greater complexity (experimentation and Identifying a problem).

Table n. 32. Group B analysis grid - fourth meeting with adult intervention. (Floating theme).

TEMA	CATEGORY	MATERIALE	V. /N.V.	IND/SOC	ADULT
Floating	ESP SPE IND.PROB	Tanks with water, lego wood, corks Different objects	V. (I'm looking for one that goes down) N.V. (actions) N.V. (actions) V. (This top goes a little down and little up) V. (you will see this will go down) V. (It didn't go down) V. (We must look for the heavy things because the water does not hold them and go down) V. (If we look for lighter things, they will have to stay on) N.V. (actions and observations) V. (I think, this floats. It's light) V. (I have found that the light things float, the heavy ones go down) V. (These rings are light but they go to the bottom. How come?)	IND. (Elena) IND. (Elena) IND. (Dario) IND. (Dario) SOC. (Arianna, Elena) IND. (Elena) SOC. (Alice, Elena, Dario) SOC. (Elena, Alice, Giovanni) IND. (Dario) SOC. (Elena, adult) SOC. (Alice, Elena, adult) SOC. (Elena, Alice, adult)	D.A. / Soc. Conn./ Sol. (to continue the reasoning and to make an hypothesis) Rep./sol. (to continue the experience and the reasoning) Introd. /sol. (to continue the experience and the reasoning) Rep. / Cons./ Sol. ((to continue the experience and the reasoning)

In this case, some children are observing how different objects that are plunged into the water tank behave. At a certain point the hypothesis according to which all the light things must float begins to emerge. The adult, knowing that this conclusion is not correct proposes interventions aimed at reopening the discussion, not to conclude it and find a solution, but to allow the group to ask other questions, continue the experience and gather other useful elements. The introduction by the adult of an element of novelty represented by placing a metal ring inside the water tank allows children to grasp how this object, although light, sinks. This observation is taken by the children who detect it as a problem to be clarified ("*The rings are light but go to the bottom. How come?"*).

The children in group C, in continuing the experience, have more difficulty in activating more complex and articulated scientific behaviours than what their peers of groups A and B seem to be able to do. In group C (*laissez-faire*) articulation based on the definitions set out in section 4.2, is at a different level - compared to that presented by the peers to whom an approach based on' promotion from within 'has been proposed. In particular, groups A and B show differences with respect to C, both because of the complexity of the activated categories and because, in some cases (tables 26 and 27), there is a shift from one epistemic behaviour to another belonging to a less complex level (based on the provisions of paragraph 4.2).

In group C, most of the articulated behaviours concern the first three scientific categories defined in section 4.2 (detection of the phenomenon, assembly and construction and exploration).

In only one case we observe an articulation characterized by the passage from one behaviour to another which is part of a category of greater complexity (from ESP to SPE) and refers to the first adult intervention meeting. The following grid exemplifies this situation.

Table n. 33. Group C analysis grid - first intervention meeting with the adult (Racking theme).

THEME	CATEGORY	MATERIAL	V. / N.V.	IND/SOC.	ADULT
Racking	ESP SPE	Water tank of different sizes, various containers	N.V. (actions) V. (Look. We take water from here and put it here V. (Please, stop Mattia. I twill come out if you put more) N.V. (actions) N.V. (actions) V. (Ops, I've put too much)	IND. (Mattia) SOC. (Jahel e Mattia) SOC. (Jahel, Mattia) IND. (Mattia) SOC. (Jahel, Mattia) IND. (Mattia)	

The experience concerns an activity of decanting that the group deals with exploratory behaviours until the explanation of the hypothesis *"It's too full, it will come out if you put more in*" from Jahel to his partner, establishes access to behaviours that are part of the experimentation type.

In this meeting, two children are pouring the water contained in one of the larger tanks into another using containers such as bottles and plastic bowls. While doing this, Jahel realizes that the tank is almost full and expects that by adding more water the latter will overflow onto the ground and explains it to his companion. The experimentation experience ends when Mattia observes that, indeed, the water of the large tank comes out wetting the floor.

In this meeting, the adult intervenes by approaching the group to help decant a too full tank that risked overflowing onto the floor. At the same time, the adult takes care of helping a child to change his pants that are wet during the activity accompanying the action with the verbalization of what he is doing.

Unlike groups A and B, the behaviours articulated in C do not manifest themselves in the second, and third meetings only to re-present themselves in the fourth, which I give in the analysis grid below

Table n. 34. Analysis grid of the C group - fourth meeting with the intervention of the adult (Noise theme).

THEME	CATEGORY	MATERIAL	V./N.V.	IND/SOC	ADULT
Noise	COS. RIL.FEN.	Bottles, marbles and water	N.V. (actions) N.V. (actions) N.V. (actions)	IND. (Andrea) IND. (Andrea) IND.(Andrea)	

In this case, for example, the assembly of some materials leads to the construction of rattles that are used individually and the exploration of noise remains at a level of detection of the phenomenon (see 4.3).

It must be said that this activity was carried out in the preliminary observation meeting with articulated behaviours relating to the categories of construction and exploration and in the final observation meeting with behaviours related to the same scientific categories.

6.3. The role of the adult

6.3.1. The functions activated by adult interventions: a descriptive comparison.

In this section I will comment on children's epistemic behaviours, communicative modalities and the social interactions in relation to the intervention that the adult has proposed in the different groups. To this end, I give below the tables related to the strategies proposed by the adult and to the functions performed through the various interventions. In this regard, it should be remembered that more functions can be activated through the proposal of the same type of intervention strategy (for example, the recovery may prompt the continuation of experience, reasoning and consolidating a concept) as specified in paragraphs 4.6.1 and 4.6.2.

Table n. 35a Intervention strategies proposed by the adult in group A in the four meetings.

	I	II	III	IV	TOT
Mirroring (cfr.4.5.1)	3	4	7	10	24
Introductions	1	3	3	1	8
Open/closed questions	3	4	2	1	10

Table n. 35b Inappropriate interventions by the adult in group A in the four meetings.

	I	II	III	IV	TOT
Inappropriate interventions	1	-	3	-	4

Table n. 36a. Intervention strategies proposed by the adult in group B in the four meetings.

	I	II	III	IV	TOT
Mirroring (cfr.4.5.1)	10	6	8	5	29
Introduction	2	2	8	-	12
Open/closed questions	3	1	1	2	7

Table n. 36a. Inappropriate interventions by the adult in group B in the four meetings.

	I	II	III	IV	TOT
Inappropriate interventions	-	8		-	5

<u>The mirroring</u>

At a first comparison of the data shown in the tables, it can be observed that the most representative strategy proposed by the adult in the two groups, A and B, is that relating to the mirroring behaviours (repetitions, reformulations, encouragements). In addition, there is a greater frequency in the proposal of this strategy in group B (29) compared to what the data show in the case of A (24). Similarly, it can be noted that the strategy of introducing a novelty element is more represented in group B (12) than in A (8). The proposal for applications, both open and closed, is slightly more frequent in Group A (10) than the situation outlined in B (7).

The inappropriate interventions (tables in chap. 5) in group A are slightly lower (A = 4) than group B (B = 8) and are spread over two meetings (in the first and third). In group B, on the contrary, the interventions not coherent with the proposed approach are concentrated in the second meeting and, in particular, 5 of these can be observed within a single epistemic theme (floating).

This data, in particular, will be commented on and put in relation to the observations compared to the data that indicate a fairly sharp decline in the verbal communication modalities, the social dimension and the percentage of time devoted to scientific activities in group B in the second meeting (verbalization = 9, social arrangements = 17, percentage of dedicated time = 14%). At the same time, a similar analysis will be made with regard to

the maximum points registered in group B on the same dimensions in the fourth meeting (verbalization = 23, social arrangements = 36, percentage of dedicated time = 87%).

Tutoring interventions

Table n. 37. Functions of *"tutoring"* (see 4.5.2) activated by the adult in group A in the four meetings with the intervention of the adult.

	I	II	III	IV	TOT
Consolidation	1	1	2	1	5
Marking critical	-	-	2	-	2
Soliciting	4	7	12	12	35
Expand	1	2	2	1	6
Emotional regulation	-	-	1	1	2
Social connection	2	2	2	2	8
Modelling	-	-	-	-	-

Table n. 38. Functions of *"tutoring"* (see 4.5.2) activated by the adult in the B group four meetings with the intervention of the adult.

	I	II	III	IV	TOT
Consolidation	6	2	6	4	18
Marking critical	1	-	3	2	6
Soliciting	5	10	15	6	36
Expand	4	2	7	2	15
Emotional regulation	-	-	-	-	-
Social connection	5	2	4	3	14
Modelling	-	-	-	1	1

Regarding group C, the only interventions that fall within the model of *tutoring* and that the adult has proposed - being forced to maintain a serene environment that allows the continuation of the activities - are those of socially distributed regulation and control as represented in the following table.

Table n. 39. Functions of *"tutoring"* (see 4.5.2) activated by the adult in group C in the four meetings with the intervention of the adult.

	I	II	III	IV	TOT
Emotional regulation and social control	2	3	6	2	13

From a first comparison of the tables we note that there are more interventions consistent with the model of 'promotion from within' proposed in groups A and B (to which, we must remember, a final moment of conversation was added on the activities carried out in each meeting). In the two groups, the most representative function performed by adult is that related to solicitation (of further food for thought, to the continuation of the experience, the reasoning and clarifications) (A = 35 and B = 36). In group A the less represented function is that of modelling, while in group B it is that of regulation and control of emotional excitation.

Compared to the groups to which a 'promotion from within' intervention has been proposed, group C is characterized by a high number of social adjustment and control interventions (C = 13); function that has been activated through follow-up interventions (the adult consents to play with the children to be the guarantor of the rules) or with more directives ("*Listen, let's take your kit and see what's in it? Is there something interesting?*).

6.3.2. The role of the adult in relation to communication and social behaviour

Communication

From the comparison of the tables and the considerations made up to here it seems, therefore, that the two groups to which an approach of "promotion from within" has been proposed have developed a verbal communicative modality greater than the children of the group conducted with a style *laissez -faire*. Moreover, as far as group B is concerned, it should be emphasized that the verbalizations are more frequent (B = 106) than, not only to what happens in C (34), but also to those recorded in the case of children belonging to A (88). Considering that the interventions related to filming and re-launching seem to be the same number in the situations of A (Mirroring = 24; Introd. = 8) and B (mirroring = 29; Introd. = 12), one might think that this aspect is not sufficient to explain the greater presence of verbalizations in group B on it is own, and that there may be an element - not proposed to other children - that somehow may have influenced this feature by consolidating it and allowing it to increase during the experience in this group.

Below, I propose a commentary on the data concerning the communication methods and the social dimension observed in the three groups, in relation to the role that the adult has played in the three different situations.

Communication methods.

The quantitative data concerning the appearance of the verbal communication method connected to the epistemic behaviours show, similarly to what has been observed with regard to the epistemic categories, a similar trend in the three groups with regard to the two preliminary observation meetings and the first one with adult intervention. Starting from the second meeting, we note a greater differentiation between the groups that have experimented with an approach aimed at promoting scientific attitudes and verbalization.

If we refer to the total counts related to verbal communication, we highlight a greater quantity of verbalization occasions in group B (= 106) than group A (= 88) and, above all, group C (= 34).

The fact that, in the second meeting, group B (= 9) records data that are closer to those in group C (= 5) where the adult has not proposed any intervention aimed at promoting the development of verbal communication, merits some consideration. If we look at the table

referring to the intervention of the adult in the second meeting of group B, we note that in this meeting the greatest number of inappropriate interventions is concentrated. Moreover, of the 8 inappropriate interventions, 5 are concentrated during the group's experience on the theme of floating. The recordings, moreover, refer to an adult who intervenes, verbally, more frequently during the deepening of the same theme (floating).

From the examples that I will report, interventions emerge that go in the direction of greater directivity that diverts the children from what they were doing.

> "Elena: <<This, for example (the metal cap), is very light but you just can not make it stay up.>>
> Me: <<Elena observes that the metal cap is very light and yet inside the water it does not float. How come?>> Ginevra is near me, standing ... I try to involve her again: <<Do you want to try?>> She takes a ball and throws it into the water but says nothing.
> Elena walks away, takes the flashlight they have in their satchel, lights it and moves it over the water, noting that when the water glows, it shines."

In this exchange between Elena, the adult and Geneva we note how the researcher intervenes in a way which is inconsistent with the children's intentions by highlighting a path that does not correspond to that of the group involved. Elena, on the other hand, demonstrates her discomfort with respect to the adult's request to try to explain what she had observed and moved away from that experience to fetch the torch. Referring to the Vygotsky theory taken as reference (see 2.2.1.), it becomes clear how the request to explain the reason why the light cap does not float lies outside the area of proximal development of children.

> "I head towards the pool where Ginevra, Fabrizio and Giovanni have put some things and say what I observe: *<<So, here I see that you have put some things that float and others that sink in the tank. Do you want to try to put the things that float in this container and those that sink in the other?>>*"

Also, in this case, the adult assumes a directive style that does not take into account the path of the children ending up to divert the group from what it was doing. Acting outside their motivation, the children do not recognize the type of intervention proposed by the adult and show it by moving away from the experience, which had involved them, to satisfy a request from the researcher. This meant that in the classification activity carried out by the children on the precise request of the researcher, it was not possible to detect conduct referring to the identified epistemic categories (see section 4.2). In addition, the directive

intervention and a greater number of verbal 'raids' by the adult may have taken away, in fact, opportunities for verbalization (which in this meeting is less frequent and closer to that of group C), preventing gathering ideas and work tracks suggested by the children.

The examples shown and the reactions of the children suggest that the intervention of the adult who does not accept and does not take into account the children's initiatives leaves this group displaced, having started to experience, from the previous meeting, a listening-oriented approach, welcoming and enhancing their proposals.

The summary table (No. 10) related to the verbal communication methods observed in the second and third B group meetings, if considered in the light of the type of intervention proposed by the adult, seems to show an increase in verbalization where the researcher, while intervening with the same frequency (both in the second and in the third meeting with group B the adult proposes 17 interventions), welcomes the children's cues, taking them up and re-launching them. It should be noted, in fact, that in group B in the second and third meeting the same number of interventions by the researcher is observed, but in the first case half of these (8) are not appropriate to the model provided, while in the second case (third meeting) the activated strategies (17) fall within the framework of the 'promotion from within' model (reflections = 8, introduction of novelty elements = 8, questions = 1).

We observe an example of intervention modality based on welcoming and re-launching the ideas proposed by the children in the third meeting in which the children observe the reverberations of the water on the wall. The group begins to discuss this phenomenon and the adult waits until the children offer different ideas to re-launch. If we look at the tables referring to the interventions proposed by the adult in this meeting (table N. 36a, 36b and N. 38) we can observe some interesting data. In particular, in this meeting the adult proposes 8 mirroring interventions and 8 introducing novelty elements some of which are characterized as 'provocations' aimed at urging the continuation of the experience, further food for thought and alternative hypotheses (when, for example, the children say that all the heavy objects float, the adult takes a metal stopper from the bottom of the tank and puts it back into the water, allowing the children to come to the conclusions they had reached back in play.

Observing the functions performed by adult intervention in the third meeting with this group, the most present is the solicitation (B = 15) that can be activated both by mirroring strategies (repeating, re-launching), and introducing new elements. An example is shown below.

"Alice: <<*Look*!>>Indicates the moving reflection of the water in the pool in the sun on the wall
Elena: < <*Looks like a ghost* >>.
Alice: <<*No! It looks like a mouth is making it, like this* >> simulates the action of a big mouth that opens and closes.
Researcher: I watch and listen to what the children are saying to each other ... right now they do not look at me and do not address me. At a certain point Elena turns to me, approaches and asks me: <<Is it *true that those seem to be ghosts*?>>. Indicates the different reflections caused by the sun that hits the water in the pools reflecting on the wall.
I do not answer right away because I want to understand if anyone in the group, who is currently observing the reverberations on the wall, will offer some food for thought.
Alice proposes the idea of the mouth that opens and closes again and adds the sound that a ghost would make. Elena tries again to ask me to confirm the hypothesis that the one on the wall looks like a ghost.
Fabrizio: in a whisper << *This is water*>> Indicates the reflection on the wall and the water in the tank.
Alice: <<*And the sun*>>.
Researcher: << *It is water and the sun ...*>> *I* emphasize the tone with which I repeat trying to focus the two elements and re-launching them to the group. [...]. The tub after a while is in the shade and the children seem to settle. I move and put the tub, in the sun again. Alice notices the change, waits a while and then tries to move the transparent containers in the shade and in the light".

At the end of the dialogue exchange above, Fabrizio looks around and goes to get the flashlight, turns it on and tries to point the light on the wall where the reverberations previously observed are located. From this moment, Fabrizio begins his experience of exploring the light and the effects that are produced on different materials. This shows how, starting from an experience with some materials (water, sunlight), if appropriately urged and left 'free' to explore, children can undertake alternative routes.

Unlike the other two groups, group C, shows a warming towards verbalizations, connected to epistemic behaviour, starting from the second meeting until the last work opportunity ($C^{2} = 5$, $C^{3} = 3$, $C^{4} = 2$, $C^{post\text{-}obs} = 1$).

This aspect also emerges by observing the grids that I have prepared as an example to comment on the articulated behaviours. Non-verbal communication methods prevail over verbal ones ($C^{totals} = 34$, $C^{totals\ non\text{-}verbal} = 64$) and this tendency concerns most of the meetings (table 11).

The social dimension

The differences between the groups, shown in tables (Table 12, 13 and 14) in particular between A (110) and B (141) compared to C (38), may suggest considerations, in part the same, as those expressed, with regards to communication modalities.

The social and collaborative dimension is more present in the two groups (A and B) to which a model of intervention based on 'promotion from within' (A = 110, B = 141) compared to laissez-faire (C = 38).

In relation to the social dimension, both with respect to the trend followed by group A in the second meeting ($A^2 = 17$), and with respect to the general trend of group B, in the latter case there is a rather decided decrease in ($B^2 = 10$)[46]. This aspect could be connected to the same reasons discussed above with reference to the verbal communicative modality.

In the examples I have described above, the directive interventions and not pertinent with the proposed model had the consequence of removing the children from the experience they were working on, also encouraging the disintegration of the group that had gathered around the activity. This consequence seems to occur, even in group A when it is proposed, during the third meeting, to divide the objects that float from those that do not float into two containers (the same type of directive intervention was proposed in group B, but during the second meeting). The children who were exploring the behaviour of the materials immersed in the water and had begun to talk about objects that float, are diverted by the proposal of the adult, and the classification operation is carried out without the clarification of observations and in an individual dimension or indirect sociability based on which everyone takes care of a part of the task without interacting with the companions.

In situations where the adult proposes interventions in line with the *tutoring* strategies envisaged by the ‘promotion from within' model, social interactions seem to increase with respect to the individual dimension. This aspect could be supported by the same explicit observation by commenting on the communicative modalities in relation to the interventions proposed by the adult.

From this point of view, in the fourth meeting, as can be seen from the summary tables n. 8 relative to group B, we observe a maximum point of social interactions (= 36). If we observe this data in relation to the type of interventions proposed by the adult, we note that there are 5 mirroring and 2 open questions. The functions activated by these meetings are

[46] B^2 means the second meeting of group B.

consolidation (4), focus (2), solicitation (6), expansion (2), social bridge (3) and modelling (the only example that has occurred, both within this group, and with respect to A). The data related to the intervention of the adult in this fourth meeting of group B reveal, first of all, a limited number of adult interventions ($B^4 = 7$) compared to those carried out in previous meetings ($B^1 = 15$ $B^2 = 17$, $B^3 = 17$). Despite the limited number of interventions, these seem to be able to activate all the *tutoring* functions taken into consideration (the only one not present is that of regulating and controlling emotional excitement). From what has been said, it would seem that a smaller number of interventions that perform strategic functions may correspond to an increase in the possibilities of interacting among the children in the group.

This aspect, related to what has already been said in relation to the communicative modalities and to the increase of time dedicated to epistemic activities that I previously reported in group B, suggests a reflection on the role of adult intervention. The suggested hypothesis from the considerations made in relation to the data collected is that by intervening a smaller number of times, the adult leaves more space and possibility to the group to express themselves verbally, to interact and manifest their own initiative, observations and hypotheses regarding the explored cognitive themes.

In particular, the interventions that I have proposed in this fourth meeting and which seem to obtain a response from the group that calls for forms of aggregation and collective participation are mirroring and re-issues in the form of open questions that serve as a social bridge (in addition to soliciting the continuation of the experience, expanding it).

> "Researcher: << *The full bottle sinks and the empty one floats*>>.
> Arianna: << *The filled one goes down and the other empty one stays up.*>>
> I am close to Arianna and I see some children who started running towards the camera attracted by Valentino who had been approaching this instrument for a while and was running around. I try to involve them by raising the observations made by Arianna also to them.
> Researcher*: <<Did you hear what Arianna said?*>> I approached the tub with the water and looked inside.
> Leonardo (5 years) and Francesco (4 years): <<*One is full and the other is empty*>>.
> Valentino approaches the group of his companions and looks inside the water tank."

And again.

> "Researcher: Giovanni has been walking around the room for a while looking at me from time to time. At a certain point, I begin to understand the experience he is making and wants to share, so when it seems to me that my intuition is confirmed by the fact that John continues to walk just to make noise with his shoes I try to attract the group: << Did you hear?>> After a few seconds, Elena intervenes: << *Walk*>>.
> Fabrizio: <<... *with sounds* >>
> Researcher: << *Walk with the sounds!*>> (with a slightly emphatic tone)
> Dario: <<*Because he has put his shoes in the water!*>>
> Researcher*:* <<*Because he has put his shoes in the water!* (the tone is slightly emphatic)>>.
> Elena: << *because he has wet shoes*>>.
> Alice: << *with sounds* >>.
> Elena: << *because he went inside a pool of water on the ground*>>.
> Dario also begins to try to move to hear if he walks making the same noise too. He feels that he succeeds and continues. Elena follows the example, puts the sole of her shoe inside the water tank and begins to try. Everyone begins to walk and their shoes reproduce the same sound as Giovanni's. They try to walk or make different movements with their shoes to hear if the noise is the same".

These examples highlight two situations, referred to groups A (second meeting) and B (fourth meeting), which describe how, starting from an experience characterized by a dimension of individuality, a social and collaborative atmosphere develops that brings the group to collaborate bringing cues that contribute to expand the experience.

This consideration is not observed in the case of children who have been proposed an adult style of laissez-faire type and where the individual dimension remains prevalent with respect to the social one.

In cases where scientific conduct is accompanied by verbalization, reference is made to observations and considerations that refer, at the most, to the category of exploration. In just one case the verbalization is aimed at explaining a hypothesis that indicates a conduct of experimentation (grid already reported as an example of articulation of behaviours from ESP to SPE) which, however, involves only two children and does not evolve merely observing the hypothetical consequence.

In the two groups to which the intervention model based on 'promotion from the inside' was proposed, the interventions aimed at promoting collaboration (A mirrors = 24, A questions = 10, B mirrors = 29, B questions = 7) deviate from such a score as to be able to explain, completely, the difference related to the social dimension A = 110; B = 141).

Taking into consideration the reflection already expressed in relation to the verbal communicative modality with respect to possible characteristics present which are seen as an advantage, also, for the social dimension, alternative hypotheses can be considered in Group B. One of these, for example, would lead to consider the possibility that another aspect that only group B may have experienced intervened. From this point of view, the children of group B, compared to peers who experienced the same model of intervention, had the opportunity to use a quarter of an hour at the end of each meeting to talk and discuss in group on what happened during the activity carried out. The moment of the final conversation will be considered later, more precisely, to consider, also, what role it may have had from the meta-cognitive point of view.

6.4. Language and meta-cognition.

A separate reflection deserves the function performed by the final conversation provided by the intervention model experienced by the children of group C.

With reference to the theoretical framework specified in paragraph 3.1.3 , in group B, in addition to the promotion from the inside approach, a conversation was proposed at the end of each meeting, in order not only to increase the frequency of the verbalizations connected to epistemic conduct, but also to promote greater social interaction: the sharing of observations and solutions to problems that open up to new possibilities.

In the experience with group B, as already underlined above, the high number of verbalizations and socialization occasions that are found with respect to what group C but also A could be related to the possibility of having had to take advantage of this first moment of group processing.

During these moments, the adult leads the discussion starting from some guide questions (see par.3.1.3) aimed at starting a comparison in the group. The role of the adult in these situations is to avoid explanations and direct answers to children's curiosities, but to support dialogue, exchange and encourage the group to express themselves and say what they think about the issue discussed, encouraging them to recount experiences that, consistent with the activities carried out, may also refer to knowledge acquired in other contexts.

A first element that emerges from the conversations concerns the fact that the children, while narrating, continue to 'do' and accompany the story with actions that demonstrate what has been said. An example is observed when the children talk about the experience of floating and Elena rises from the circle, goes to the pool with water, indicates the metal caps and says: "*See? These are light and yet they are on the bottom, why?"*. Alice responds to this solicitation by taking the cap from a plastic bottle that has slightly higher edges, puts it on the water, observes and affirms: "*This stays a bit up, then goes down"*. This exchange, re-launched by the adult, leads the companions to try to make different assumptions until, in a subsequent meeting, trying to do the same thing, the children sense that at some point the water enters the cap with the highest edges making it become heavy and sink.

A further example occurs when children tell about the experience of 'walking to make noise with shoes'. Elena and Alice get up and try, again, to wet the sole of their shoes to reproduce the noise made previously as if to consolidate the hypothesis explored that connects the wet shoes with the production of a particular noise.

In the last meeting where the conversation was scheduled at the end of the activities, while the group continues to tell the experiences (with the weighing machine, the water, the bubbles), Fabrizio observes his hands and draws the attention of the adult sitting next to him. The adult tells his companions what Fabrizio has pointed out, thus recalling the attention of his companions to this phenomenon. The companions refer to knowledge already possessed that allows them to advance hypotheses that may explain why Fabrizio's fingers have rough skin. Alice says: "*It happens to me when I take a shower* ", Eros replies saying: "*It happens to me when I bathe in the sea* ".

Another aspect that seems relevant to me is that, by participating in these meetings, the children seem to assume the function of keeping a memory of a path recalling experiences made in different meetings, more and more.

In this regard, during the conversation at the end of the last meeting, expressing to the group that I would bring them a little different material from the ones used so far in the following meeting and Elena says: *"I remember when you brought us the planks of wood and we built the marble track and we had races to see which marble could get to the end of the path . We tried to use bigger balls that did not fall through the spaces between one plank and the other".*

The examples seem to highlight how the moment of group conversation, supported by adult interventions that solicit the sharing and the narration of what happened, represents an opportunity to consolidate acquired knowledge, to put forward, even more, hypotheses advanced on a phenomenon, building new knowledge (connection between the entry of water into the cap and its going to the bottom, skin becomes rough if held inside the water for a long time), keep in mind what happened among the different meetings and the experiences made (the problem of understanding why the corks, although light, sink was resumed the next time, Elena recalls an experience made in one of the first work opportunities with the group).

From what has been said, we can consider the hypothesis that the final moment of conversation in which group B participated may have influenced the increase in verbalizations that the data point out compared to group A that has experienced the same approach of 'promotion from within' without the conversation at the end of the meetings.

Naturally, we can not overlook the presence of some characteristics present in a group that could put it in a position of advantage with respect to verbal communication methods, but even this hypothesis should be investigated further also considering the fact that the

starting data reported in the tables of counts show a situation substantially similar in the three groups.

6.5. Educational context and role of the adult: some considerations.

The examples and the considerations made regarding the differences that characterize the experience between the groups underline that the children who have been proposed a type of intervention based on 'promotion from within', oriented at supporting and promoting cognitive processes, seem to highlight more capacity, compared to their peers in group C (laissez-faire approach) in manifesting a scientific attitude.

Assuming that this research moves on an exploratory level, the wealth of the material produced and its quantitative and qualitative analysis has provided some useful data to outline what are the characteristics of an educational and didactic approach that seem to contribute to structuring a favourable context to the development of a scientific attitude as defined in the chapters dedicated to the bibliographic review (see section 1.4) and to the theoretical and cultural frame of reference (see chapter 2).

The fact that the scientific conduct of detection of the phenomenon, assembly/construction and exploration are present in all three groups while the most complex (experimentation and identification of the problem) occur and remain constant, during the meetings, only in the two groups A and B (promotion from the inside), can suggest that for the exploratory categories it is enough to offer some material, make some changes and leave freedom of movement for these behaviours to be activated. This situation, however, as shown by the experience of group C (which has experienced a similar context), in the long run causes a decrease, also, of these behaviours. In short, it is important to offer the children different and solicitous materials (in the experience conducted, for example, water, wooden planks, plastic bottles were among the most used objects) and give the opportunity for the children to move them freely in space to explore them, move them, for example, noticing the different colour when exposed to sunlight or a flashlight. These conditions, although fundamental, are not sufficient to explain the differences observed in the three groups of children with whom I worked and for which the conditions were the same except for the intervention style proposed by the researcher.

In fact, the consolidation and strengthening of the experimentation and identification of research behaviours were observed in those groups that did not only have access to the material to be explored freely, but were supported by an adult who proposed interventions

that fall, as specified in paragraph 2.2., in the theoretical and methodological framework of Bruner's *tutoring* , of Vygotsky's zone of proximal development and of the approach of "promotion from the inside". An adult who observes, listens, accepts the initiatives of children through stages aimed at amplifying their value and re-launching the group to encourage them to share and solicit other contributions helps to create the appropriate conditions to deepen the knowledge on a phenomenon based on increasingly articulated behaviours. This seems to be confirmed by the fact that the groups that have experimented with an approach of 'promotion from the inside' show more situations in which a theme is deepened on the basis of behaviours referring to different epistemic categories that, in different cases, belong to a complex cognitive level which seems to follow similar steps to those of Dewey's investigation process (experimentation and problem identification).

The final aspect that can be useful to point out has to do with the emotional and relational dimension connected to the uncertainty that characterizes paths like the one realized with these children. To allow free exploration of a certain type of environment and of the material made available involves not knowing, in the first stages, what the children will observe, which project they will decide to follow and which solutions they will find. This aspect deepened in relation to Bion's theory (see 2. 3.3), involves a certain amount of anxiety that must be managed in order not to give into the temptation to seek a solution, quickly and at all costs. I have already stressed that my role within the groups was not to impose my point of view, not to give direct answers to the children or to transmit information on the theories related to the phenomena that were observed (floating, refraction, etc ...). It has not always been easy to maintain this position because there is a strong temptation to "arrive" in a short time, to an exact and precise solution or answer that can make a result visible which seems evident to the adult eye, (the cap that has the lower edges sinks before the other because water enters more easily) but that can preclude the possibility of continuing the experience, enriching the reasoning, sharing, confronting others and identifying alternatives that are equally valid. This consideration seems to be confirmed by the fact that in the meeting in which I increased the interventions that weren't pertinent to the proposed model, more direct and not coherent with the zone of proximal development of children, Group B has recorded a decrease in verbalizations and social behaviours connected to the scientific behaviours activated.

Avoiding to answer the children's questions directly ("Why the caps sink even if they are light?") with theoretical references which were too abstract for them may have caused an

initial discomfort that, however, was filled by the hypotheses that the group tried to explain and from the "experiments" made to verify them. This aspect seems to me to be significant also because it promotes an important competence such as that of a child's autonomy in the search for possible solutions to the problems it encounters in everyday life.

CONCLUSIONS

To summarize the results of my work, I recall that the research has set itself the objective of testing three different environmental conditions characterized by:

- same type of materials selected and proposed in such a way as to encourage free scientific exploration[47] in children;
- a different style of adult intervention, characterized in the three cases, respectively, as a presence that: observes and permits; promotes from within (see paragraph 2.6); promotes from within and supports conversation about what has been done.

The intention was to investigate whether and to what extent children belonging to the same educational context, of the same age and involved in a similar experience of free exploration of 'stimulating materials', manifested, in correspondence with the three intervention styles indicated, a similar or different richness and variety of scientific researches.

The quantitative and qualitative analysis carried out on the data and related to the comparison between the three types of adult intervention (promotion from the inside, promotion from the inside and final conversation and laissez-faire) highlighted differences between the groups in relation to the event of the different epistemic categories, the mode of communication and the social dimension connected to the conduct.

The examples and considerations (see chapter 6) regarding the differences that characterize the experience between the groups suggest that children who have been proposed a type of intervention based on 'promotion from within' (groups A and B), aimed at supporting and promoting cognitive processes, seem to highlight greater skills, compared to the peers of group C (laissez-faire approach) in manifesting a scientific attitude.

The fact that the epistemic conducts of detection of the phenomenon, assembly/construction and exploration are present in all three groups while the most complex (experimentation and identification of the problem) occur and remain constant during the meetings, only in the two groups A and B (promotion from the inside), can suggest

[47] The experience conducted by Susan Isaacs at Malting House can be considered a theoretic reference when documenting the materials, the spaces and the proposed activities and the educational reasoning on which such a choice are founded (cfr. chapter 2).

that for the exploratory categories it is sufficient to offer some material, to make some changes in the context and to allow freedom of movement for these behaviours to be activated. This situation, however, as shown by the experience of group C (which has experienced a similar context, but an intervention not aimed at promoting scientific skills), in the long run causes a decrease, also, of these behaviours that represent a first level of knowledge in the interaction with the proposed material.

In short, it seems important to offer children different and solicitous materials (in the experience conducted, for example, water, wooden planks, plastic bottles were among the most used objects) and give them the opportunity to move freely in space to explore them, move them by catching, for example, the difference in colour when exposed to sunlight or a flashlight. These conditions, although fundamental, are not sufficient to explain the differences that have been observed in the three groups of children with whom I worked, is the constant presence in groups A and B (condition of "promotion from within") of behavioural categories experimentation and identification of the problem, as opposed to what was found for group C (*laissez-faire* condition). In essence, these behaviours, which can be placed as already underlined (see Section 4.3) within the framework of the Dewey investigation process (see paragraph 2.1), have been observed in those groups that have not only had access to the material to explore freely, but were supported by an adult who intentionally designed an intervention aimed at promoting, consolidating and enhancing them, proposing interventions that fall, as specified in chapter 3, in the theoretical and methodological framework of Bruner's tutoring (1976) and zone of proximal development of Vygotsky (1956; 1960). An adult who observes, listens, accepts the "scientific" initiatives of the children through actions aimed at amplifying their value and re-launching the group to stimulate sharing and solicit other contributions, creates appropriate conditions for deepening knowledge on a phenomenon through increasingly articulated behaviours. It is not by chance that only in the group of "promotion from within" was the study of a phenomenon by children - for example, floating - found and investigated through sequentially different routes connected to each other: from exploration to experimentation and, in some cases, with the identification of a problem to be clarified.

In confirmation of what has been said about the effects of promotion from the inside, the data relating to the meetings in which the adult has involuntarily proposed more direct interventions indicating to the children the activities to do - instead of grasping their suggestions - and providing them with direct answers to the questions, they point out a drop

in the percentage of time devoted to scientific activities, in the verbal modalities to communicate the behaviours expressed and in the willingness to interact in the group. This aspect would seem to suggest that the adult, proposing activities that do not follow the interests of the child, is substituted for him making it more difficult for children to propose hypotheses, verify them and share them with his companions. In other words, it seems that the occasions in which the adult has intervened in a more direct way have produced consequences substantially similar to those observed in the group to which a *laissez-faire* intervention has been proposed. The data related to this group, as already underlined, show that the epistemic categories, the methods of verbal communication, the social dimension and the percentage of time dedicated to scientific study activities suffer a progressive decrease during the meetings. Children who have benefited from this particular condition have experienced difficulties, both in the activation of epistemic behaviours, and in the management of interactions within the group repeatedly requiring the intervention of adults aimed at ensuring a peaceful environment so that the activities could continue. This difficulty did not occur in the meetings with the remaining two groups, to whom an intervention based on promotion from within was proposed, where the adult interacted in a finalized way with respect to the research objectives.

Assuming that this research moves on an exploratory level, the wealth of the material produced and its quantitative and qualitative analysis has provided some useful data to outline what the characteristics of an educational and didactic approach are to set up a favourable context for the development of a scientific attitude, as defined in the first part of the thesis dedicated to the deepening of the literature review (see chapter 1) and of the theoretical and cultural frame of reference (see chapter 2).

But there are still several open questions and multiple possibilities for further study, to be considered with due attention when designing experiences aimed at supporting and promoting the development of scientific skills intended as the development of the taste for exploration, research and construction. of knowledge in relation to the child's relationship with the world of animate and inanimate natural things.

In relation to the aspects that, based on the data collected and analyzed, seem to have an influence on the possibility of children to activate scientific behaviours, it would be useful to carry out further investigations with an experimental set-up in order to try to clarify the type of influence and relationship that occurs. This possibility would allow to highlight the questions to which it is useful to give an answer. Which strategies of the adult are more

effective in favouring the manifestation of increasingly complex scientific behaviours? Which adult strategies are more effective in supporting the verbalization of children and cooperation in investigating a phenomenon? When and why does it become useful to put in place frustration control strategies?

Another question is on how to organize and manage a similar experience in the everyday work at school. In particular, the possibility of dividing children into small groups, the need to document the experience to re-see it through video recordings and paper and pencil observations, evaluate its progress and any adjustments, requires precise choices, on the part of teachers, related to the organization of work (for example, time of co-presence of teachers adequate to the constitution of small groups and moments of planning and evaluation of the shared path).

Regarding the role of the adult, an aspect that opens up to analysis of an exquisitely qualitative character regards the emotional dimension connected to the design of scientific education paths such as that described in this thesis (see chapter 3). To allow the free exploration of a certain type of environment and of the material made available involves not knowing, from the start, what the children will observe, which project they will decide to follow and which solutions they will find. This aspect, deepened in relation to Bion’s theory (see 2.5), involves a certain amount of anxiety that must be managed in order not to give in to the temptation to seek a solution, quickly and at all costs. It is not easy to maintain this position because there is a strong temptation to "arrive", in a short time, to an exact solution or answer to anticipate a result that, to the adult eye, seems evident (the cap that has the lower edges sinks before of the other because water gets into it more easily) but which can preclude the possibility of continuing the experience, enriching reasoning, sharing, confronting others and identifying equally valid alternatives. In nursery school, the goal can not be to set up science education in a formalized way because this would mean using language and learning modalities that are dissonant and not coherent with the 'world' of a child from 3 to 6 years. To yield to the temptation to explain a phenomenon, to answer and to suggest solutions leads to the risk of precocity that are always lurking, even where the teacher's intentions are opposed. This consideration brings out an aspect of the teacher's work on the fact that it is not enough to meet the educational task, to have good intentions, but teachers with cultural and epistemological skills are needed to intentionally design paths that effectively promote an attitude of scientific and cognitive types in relation to the functioning of the surrounding world. This problem opens up to a reflection, which has not been possible

to deepen here, with respect to the training of reflective teachers, able to engage in research with children, aware of the emotional fatigue that uncertainty provokes but are able to 'equip themselves' in order to manage without giving in to the temptation to explain, transmit content and propose ad hoc activities that do not take into account the authentic interests of children.

An additional work track is represented by the possibility of investigating and testing research paths aimed at recognizing, supporting and consolidating scientific thought in other contexts aimed at younger children attending nursery school. In these contexts, there are still strong prejudices with respect to the possibility of designing learning paths aimed at promoting scientific thought. These prejudices are, again, linked to the difficulty of recognizing the manifestations of scientific thought in children so small because they need specific skills and knowledge with respect to their peculiarities of development. To investigate what may be the best context and relational characteristics to support a young child in constructing knowledge of the functioning of the world around him can be a precious opportunity, both to "discredit" the above-mentioned prejudices[48] about the environment of the day-care centres, and to go in the direction of a vertical curriculum 0-6 years (0-14 years?) that allows a child to have a voice in the construction of their own learning and to develop that taste of research that is the basis for building the knowledge that will be formalized in the different school subjects.

A work track, in my opinion, especially important in educational settings 0-6 years concerns the relationship between play and science education that I mentioned in my work, both in reference to some theoretical contributions (Isaacs, 1930, Bondioli, Savio, 2014), both in the comment to the data (see paragraph 6.2.1). The hints given in this work allow us to glimpse a virtuous connection between the learning dimension and the possibility of developing scientific behaviours, but this relation should be better explored to grasp its peculiarities.

[48] I am referring in particular to the idea of a separation between care, education and learning. This aspect leads to believe that only in nursery school we can promote epistemic behaviors; instead, children from 0 to 3 years are considered as needing of care only.

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Sitografia

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ATTACHMENT 1

Observation Reports

Group A (Promotion from within)

Group B (Promotion from within + final conversation)

Group C (*Laissez-faire*)

PhD student

Claudia Lichene

Tutors

Prof.ssa A. Bondioli Bettinelli

Prof.ssa D. Savio

VERBALE OSSERVAZIONE PRELIMINARE

GRUPPO A

I bambini presenti nel gruppo a questo incontro sono 5 (2 maschi di 5 anni, 2 di 4 anni e una bambina di 4 anni). Il periodo durante il quale si sono svolti gli incontri di osservazione che hanno preceduto l'intervento con i tre gruppi è compreso tra la metà di gennaio e i primi giorni di febbraio. È stata necessaria una pausa – tra un ciclo di incontri e quello successivo – a causa delle molte assenze dei bambini a scuola (influenza). In particolare tre bambini hanno partecipato a pochi incontri (meno della metà) con il gruppo nel quale erano stati inseriti. In questo gruppo, Pietro ha avuto un po' di difficoltà a lasciarsi andare e esplorare i materiali mentre gli altri dopo qualche minuto di titubanza sia nel primo che nel secondo incontro, hanno utilizzato tutti i diversi materiali messi a disposizione.

Accolgo i bambini in un'aula che viene utilizzata per attività motorie dai bambini della scuola Primaria (gli incontri con i gruppi si svolgeranno sempre in questo spazio fatta eccezione per il primo incontro di osservazione che è stato effettuato in una delle sezioni a causa del riscaldamento non funzionante della "palestra"). Il materiale che i bambini hanno a disposizione è costituito da *assi di legno, cartoni di forma rotonda (porta-torte), rotoli di scottex di diversa dimensione, tappi di sughero, metallo, plastica, lattine, bottiglie di plastica, biglie di vetro, palline di gomma, palline di plastica da ping pong.* Il materiale è disposto per terra e, gli oggetti più piccoli, dentro a contenitori sopra ad un tavolino.

Introduco l'incontro: Vi ho portato questo materiale…*un bambino che, la volta precedente era stato assente, interviene…*

Lorenzo: Cosa facciamo con questi legni?

Adulto (da ora in avanti indicato con A): Con le cose che vi ho portato potete fare ciò che volete. Sono curiosa di capire cosa si può fare con questi materiali, cosa potete scoprire. Come la volta scorsa io vi osserverò e prenderò appunti così da ricordare bene quello che osservate e fate.

Mentre parlo, Valentino ha in mano una biglia e la fa passare da una mano all'altra facendo in modo che cada al centro di un rotolo di scotch finito. Lorenzo inizia a sbattere per terra un piede, poi l'altro e infine fa un salto sul pavimento. Successivamente, salta ancora e cerca di sbattere più forte i piedi quando li riappoggia per terra. Cerca di coinvolgere Alice che, però, preferisce assistere come anche Pietro. Valentino prende da una scatola una pallina da ping pong blu, un'asse di legno e una lattina…si avvicina ad un compagno. Lorenzo mette una mano sulla spalla di Pietro poi, lentamente, la fa scivolare via e si accovaccia per terra dove inizia a guardare e prendere alcune cose contenute dentro una scatola di cartone. Si avvicina anche Alice e prende una pallina da ping pong bianca, la osserva e poi la lascia cadere dentro la scatola. Lorenzo prende una pallina di gomma, la tocca e la tiene tra i due palmi delle mani facendola rotolare avanti e indietro, la lascia cadere nella scatola e soffia un paio di volte dentro la scatola, sulla pallina osservando se riesce a farla muovere. Prende dalla scatola un rotolo di cartoncino (dimensioni di un rotolo di scottex terminato) e lo porta davanti ad un occhio utilizzandolo come fosse un cannocchiale. Ripete un'altra volta questa azione e chiama il suo compagno che ha accumulato nelle mani un po' di materiale.

Lorenzo: Valeee…

Valentino volge lo sguardo verso Lorenzo e gli cadono dalle mani alcuni oggetti (la lattina, la pallina da ping pong e una biglia). I compagni sorridono e quello accanto a lui si china per terra per aiutarlo a raccogliere le cose cadute. In questo modo anche Ettore ha l'occasione

per prendere una biglia, la tiene in mano, tra il dito pollice e indice facendola muovere avanti e indietro tra le due dita. Lorenzo continua ad utilizzare il cilindro di cartone come cannocchiale e cerca di coinvolgere Pietro. Alice imita Lorenzo utilizzando un cilindro di cartone più piccolo. Ettore prende, oltre alla biglia di vetro, un'asse di legno, una lattina. Comincia a muoversi e guardare nei contenitori del materiale. Valentino si mette nelle tasche dei tappi di metallo e altre palline.

Lorenzo: Pietro, tu sei il pirata. Io sono il capo.

Pietro ribatte sottovoce e non sento ciò che dice (neppure dalla registrazione si riesce a capire).

Valentino e Ettore vanno alla ricerca di altro materiale da prendere senza sapere, ancora, cosa ne faranno. Si mettono per terra, poi Ettore si rialza e va alla ricerca di altro materiale.

Lorenzo e Pietro si scambiano alcune battute che, però, non vogliono che io senta. Ad un tratto Lorenzo passa la mano e tocca con più attenzione il cilindro di cartone e si accorge che un angolo si è strappato. Si guarda attorno, si avvicina ad una scatola e prende un rotolo di nastro adesivo blu. Lo mostra, mi fa vedere l'angolo che si è sollevato nel rotolo di cartone e dice: "Devo aggiustarlo!". Osserva il rotolo di nastro adesivo e cerca di trovare il punto in cui può sollevarlo per prenderne un pezzo. Si avvicinano a lui Pietro e Alice ma dopo qualche secondo Lorenzo, non riuscendo a tagliare il pezzo di scotch si rivolge a me chiedendo aiuto. Proviamo insieme e ci accorgiamo che il nastro è piuttosto elastico e non si spezza facilmente.

Lorenzo: Come si fa…come si fa!?

A: Vediamo se ci riesco…o se c'è qualcosa che ci può aiutare…

Alice ha preso un rotolo di nastro adesivo diverso e cerca di prenderne un pezzetto ma non riesce e lo ripone nella scatola tenendo in mano il rotolo di cartoncino. Ettore e Valentino continuano a cercare oggetti nelle scatole a loro disposizione. Valentino prende palline da ping pong e le mette nella tasca destra del grembiule, in quella di sinistra inserisce un rotolo di spago e quando tenta di metterci anche una lattina si rende conto che non ci sta più nulla. Infine, ripone l'asse di legno per terra e vi appoggia in fila una lattina con sopra una pallina, una bottiglietta di plastica e un'altra lattina leggermente più piccola. Ettore prende materiali simili a quelli di Valentino, raccoglie una lattina e prova a mettersela in tasca ma cambia idea (inizialmente mi sembrava avesse desistito perché la lattina non entrava nella tasca ma, guardando più attentamente, l'idea che dà è quella di aver cambiato idea e di non voler più riporre in tasca la lattina). Alice prende il rotolo di scottex di cartoncino e lo trasporta da una scatola all'altra, poi prende un'asse e la mette per terra posizionandoci sopra alcuni tappi di metallo. Valentino appoggia alcuni oggetti anche sul portatorte rotondo ed Ettore si avvicina e contribuisce. Gli oggetti vengono posizionati seguendo la circonferenza del porta-torte di cartone. Pietro rimane a lato, appoggiato alla parete e non sembra avere voglia di provare i materiali. Alice prende un rotolo di nastro adesivo e tenta di prenderne un pezzo ma si accorge che è resistente e molto elastico e non riesce a strapparne un pezzo neppure utilizzando i denti per tagliare il nastro. Leonardo si avvicina alla sua compagna e prende il rotolo di nastro riponendolo in una delle scatole poi prende il suo rotolo di scottex che utilizza come cannocchiale. A quel punto anche Pietro si avvicina a Leonardo ma quando quest'ultimo propone di muoversi per andare in un altro punto della stanza Pietro non si muove (i due sussurrano tra di loro e presumibilmente Pietro chiede a Leonardo di andare lui) e ritorna ad appoggiarsi alla parete. Leonardo va in fondo alla stanza e quando torna dice a Pietro: "Tu non fai niente".

Alice, intanto, ha preso dalla scatola il rotolo di nastro adesivo che Leonardo le aveva preso. Leo se ne accorge e le chiede dove vuole metterlo. Alice gli mostra il punto del rotolo dove vuole metterlo e lui le dice: "No, ma li fa niente" perché ha pensato che la compagna volesse utilizzare il pezzo di nastro per aggiustare qualche pezzetto di cartoncino strappato. Alice si lascia convincere e ripone il nastro adesivo. Con Leonardo guardano dentro al rotolo di cartoncino mentre Valentino e Ettore continuano a prendere oggetti per appoggiarli sopra le assi di legno che hanno per terra. Leonardo e Alice osservano le biglie di vetro, tappi di sughero e ad un tratto Leonardo chiede ad Alice di passargli una "pallina" (biglia). Viene verso di me e chiede: A cosa serve questa pallina?"

Io: Mah, cosa si potrebbe fare con questa biglia?

Leonardo la osserva, si dirige verso una lattina che i compagni hanno appoggiato sull'asse di legno insieme ad altri materiali. Inizialmente sembra voglia inserire dentro la lattina la sua biglia, poi osserva che dentro alla lattina c'è una pallina bianca. Prova a farla uscire ma non riesce e Valentino gli conferma che non si può perché non riesce a passare dall'apertura.

Leonardo: Come avranno fatto a metterla?

Valentino: Non lo so! (prende la lattina in mano e la scuote).

Leonardo: Mettiamoci anche questa (facendo il gesto di inserire la biglia dentro la lattina).

Valentino: Nooo…(con tono di rimprovero)

Leonardo si allontana. Valentino e Fabrizio continuano a capovolgere la lattina, prova a fare uscire la pallina, Leonardo prende una pallina gialla e prova a inserirla nella lattina dicendo "Come si farà a farla entrare?".

Valentino continua a scuotere e capovolgere la lattina ascoltando il rumore della pallina che va su e giù…prova a mettere un dito dentro l'apertura per vedere se riesce a toccare e far uscire la pallina. Leonardo (con tono interrogativo): Come avete fatto? Poi si rivolge a Valentino: "Dammela che provo io a dargli due sberle (la capovolge, la scuote violentemente, prova a battere sul retro della lattina e osserva se vede fuoriuscire la pallina. Quando si accorge che non riesce si rivolge nuovamente a Valentino e Ettore: "Come avete fatto a mettercela?!" Valentino risponde che non lo sa.

Leonardo non si arrende, prova ancora a scuotere la lattina e intanto si rivolge ai compagni per sapere come hanno fatto. Ettore risponde: "E' una magia, forse."

Leonardo non si accontenta e si rivolge esplicitamente a Valentino: "Mi fai vedere come avete fatto?". Poi propone di prendere una pallina da ping pong per metterla dentro la lattina ma Valentino gli dice che non si può e per mostrarglielo prende la pallina e prova a metterla in corrispondenza dell'apertura che, però, è troppo piccola (Valentino colpisce la pallina con i pugni per far vedere al compagno che non riesce ad entrare nel buco). A questo punto, Leonardo riprende la lattina e Valentino si alza e prende una scatolina con dentro delle brugole e si dirige verso di me per chiedermi di aiutarlo ad aprirla. Leonardo prova ancora a far uscire la pallina da dentro la lattina. Pietro interviene provando a suggerire a Leonardo cosa fare per tentare di far fuoriuscire la pallina dalla lattina. Leonardo prova a prendere delle biglie inserirle all'interno della lattina e, successivamente, la capovolge osservando che escono soltanto le biglie. Lo rifà ancora e poi si dirige verso di me chiamando Valentino (il tono è di sorpresa e soddisfazione) per fargli notare "Vale, si può solo con queste (biglie)".

A questo punto Ettore prende dalla sua busta la lente e prova ad usarla per osservare alcuni oggetti. Leonardo si dirige verso il tavolino dove ci sono l buste con il kit che ho fornito loro

e prende la sua lente. Alice passa il sacchettino con la sua lente a Leonardo per chiedergli di aiutarla ad aprirlo. Una volta fatto questo, Leonardo porge la lente ad Alice e in sottofondo si sente la voce di Ettore che esclama con tono di meraviglia e sorpresa: "Guarda sono giganti, grandissimi!". Anche Leonardo ed Alice sono attirati da questa affermazione e si dirigono dove si trovano Ettore e Valentino. Ettore sta osservando attraverso la lente i tappi di sughero che sono dentro ad una scatola. Ettore rilancia nuovamente la sua scoperta: "Leo, Valentino, guarda come sono grandi". Vengono verso di me, ognuno con la propria lente e Ettore ripete a me: "Guarda, sono grandi"! Valentino mi dice la stessa cosa e io rispondo con un cenno oppure dicendo "Ah, vedo"!

Ettore continua a osservare, con la lente, diverse cose presenti nella stanza e ogni volta accompagna l'osservazione di un oggetto con un'affermazione di stupore: "Guarda, sono più grandi:". Ad un tratto si sofferma ad osservare una biglia di vetro, allontana e avvicina più volte la lente alla biglia. Fa la stessa cosa con altri oggetti ma in prevalenza sceglie biglie di vetro. Valentino coinvolge Leonardo per osservare insieme la stessa biglia. La appoggia sul tavolino, ma rotola e devono inseguirla con la lente, provano a fermarla ma non riescono fino a quando Valentino la prende in mano e la osserva appoggiata sul palmo della mano stessa. Leonardo si avvicina alla telecamera, mette davanti all'obiettivo la biglia avvicinandola e allontanandola alternativamente dall'obiettivo. Dopo la pallina prova ad avvicinare l'occhio all'obbiettivo cercando di capire se accade qualcosa. Rimane davanti alla telecamera e utilizza il proprio corpo per fare il mostro, facce strane e guardando il monitor cerca di posizionare la mano al centro dell'obiettivo in modo da poterla vedere nello schermo.

I bambini passano a vedere quali altri oggetti sono contenuti nel kit che ho fornito loro. Leonardo trova i coltelli di plastica e chiede: "A cosa servono i coltelli?" e dopo qualche secondo…"A mangiare qui?" Ettore continua, invece, ad utilizzare la lente di ingrandimento su diversi oggetti. Ad un certo punto si avvicina a Leonardo che ha il coltellino in mano e dice: "Io ho un coltello vero, a casa.". Poi torna ad osservare le palline con la lente ed esclama, di volta in volta: "Guarda. Una palla gigante!"

Leonardo prova a proporre ai compagni di giocare a strega tocca colore o a 1,2,3 stella ma non raccoglie consensi. Ettore continua le sue osservazioni con la lente, Pietro è seduto al tavolino e Valentino si siede. A questo punto dopo qualche secondo, tutti si siedono al tavolino e prendono il quaderno e la matita per scrivere il proprio nome nella prima pagina. Per un paio di minuti rimangono seduti a disegnare sul loro quaderno il materiale utilizzato in precedenza. Ad un certo punto, entra nella stanza un loro compagno e Leonardo chiede: "Mattia, come hai fatto ad entrare qui? Non puoi stare qui." Mattia guarda il materiale che c'è nella stanza, prende una lente ma Valentino si alza e gli chiede (con tono perentorio) di ridargliela perché è sua. Mattia esce dalla stanza. Valentino raccoglie gli oggetti che aveva trovato nella sua busta e la richiude. Prende uno dei rotoli di nastro colorato e apre la sua busta perché vuole inserire nel suo kit anche il nastro adesivo. Mentre è intento in questa operazione chiama Mattia per fargli vedere qualcosa. Lo chiama ripetutamente poiché non si è accorto che, nel frattempo, Mattia era uscito dall'aula. Leonardo risponde che Mattia lì non c'è.

Al tavolino, Pietro ha aperto anche la sua busta e ne ha prelevato il righello e la lente di ingrandimento iniziando, con la lente, ad osservare i numeri e le lineette sul righello stesso. Alice, Pietro ed Ettore sono sempre seduti al tavolino. Leonardo e Valentino li raggiungono per un po' e Leonardo spiega a Valentino di aver aiutato Alice e Pietro ad aprire la busta dove c'era la lente. Leonardo e Valentino tornano verso il materiale che avevano posizionato

in terra e si mettono a giocare in uno spazio quadrato disegnato dalla luce che entra dalla finestra. Valentino prende biglie e le posiziona nello spazio con la luce dove ci sono già bottiglie di plastica vuote. Leo si sdraia per terra e soffia su una delle bottigliette in piedi facendola cadere. Alice e Pietro rimangono ancora seduti mentre Ettore raggiunge i compagni e osserva ciò che fanno. Leonardo vorrebbe prendere una delle assi ma Valentino la rivendica come sua. C'è un momento di conflitto tra Leo e Valentino fino a che Pietro, cercando con lo sguardo l'approvazione di Alice, propone a Leonardo di prenderne una di quelle che aveva usato Alice. La proposta viene accolta da Leonardo che va a prendere le due assi utilizzate da Alice. Pietro si alza dal tavolino per raggiungere Leonardo e Alice li raggiunge cominciando a guardare ciò che i compagni hanno intenzione di fare. Leonardo ha costruito un supporto di forma quadrata con le assi di legno e vi ha appoggiato sopra il porta torte rotondo. Sul porta torte i bambini appoggiano i tappi di sughero (intorno alla circonferenza). Al centro della forma mettono un rotolo di scottex e al suo interno inseriscono biglie di vetro. Valentino, solleva il rotolo facendo rotolare via le palline biglie. Alice e Pietro cercano di recuperarle. Ettore guarda quello che accade attraverso la sua lente. Un piccolo litigio tra Leonardo e Valentino che voleva tenere per sé tutte le biglie porta Valentino a reagire distruggendo la costruzione fatta dai compagni. Da questa reazione non emerge ulteriore tensione… Ettore prende un coltellino dalla sua busta e lo usa per provare a tagliare a metà il rotolo di scottex. Alice e Leonardo raccolgono le biglie e le ripongono nel contenitore chiudendolo con il suo tappo. Per un momento ho l'impressione che stiano rimettendo a posto e che vogliano tornare in sezione prima del tempo (mancano 10 minuti). Alice recupera le assi di legno e Valentino chiude la sua busta dicendo: "Questa la porto di là con me". Leonardo, ad un certo punto, guardando ciò che fa Alice scuote il cilindro dove sono contenute le biglie. Prima lo fa in modo più distratto ma, quasi subito, inizia a scuotere con l'intenzione di fare rumore e, successivamente, prova a variare il ritmo del suono che può produrre scuotendo il contenitore. Prova ripetutamente questa operazione camminando nello spazio della stanza. Alice e Pietro ricostruiscono la struttura che avevano fatto già prima con assi di legno e il porta torta rotondo poggiandovi sopra i tappi di sughero. Dopo qualche minuto, Leonardo viene verso di me e chiede: "Cosa facciamo noi qui? Quando andiamo di là?" Ormai mancano un paio di minuti alla fine dell'incontro…Valentino chiede di chi è un quaderno con la penna e rispondo che è mio.

Leonardo per un po' ritorna a fare rumore a ritmi diversi scuotendo il contenitore delle biglie mentre Pietro sembra iniziare a partecipare volentieri con Alice alla costruzione della struttura alla quale stavano lavorando. Valentino chiede a Leonardo di cedergli qualche biglia e al rifiuto del compagno tenta di sottrargli il contenitore che però cade rovesciando tutte le biglie. Leonardo, Ettore e Valentino cercano, allora, di raccogliere il maggior numero di biglie fuoriuscite.

Il tempo a disposizione termina e concludo l'incontro dicendo loro che occorreva riporre i materiali e tornare in sezione. Ho detto ai bambini, inoltre, che dalla volta successiva avrei portato loro altro materiale con il quale lavorare e scoprire altre cose.

Note: Pietro, per quasi l'intera durata dell'incontro, rimane distaccato dal resto del gruppo, non partecipa ed interviene soltanto quando Leonardo è solo e interviene per collaborare. Soltanto verso la fine dell'incontro partecipa più attivamente alle attività.

VERBALE 1° INCONTRO

GRUPPO A

Il gruppo è costituito da due femmine (una di 5 anni e una di 4) e cinque maschi di cui uno spesso assente. Dei maschi presenti due hanno cinque anni e due quattro).

Gli incontri durano un'ora e si svolgono in un'aula utilizzata per attività motorie che allestisco, di volta in volta con il materiale proposto. In questi primi due incontri il materiale presentato è costituito da: vasche per l'acqua, tappi di diverso tipo (sughero, plastica, metallo), palline da ping-pong, biglie, palline matte,) bottiglie di plastica, lattine, legnetti di diverse dimensioni.

Quando entriamo con il gruppo nella sala introduco quello che faremo insieme. La consegna è sempre la stessa per tutti i gruppi.

Nota: Il video è pressochè mancante perché non mi sono accorta che i bambini entrati prima nella saletta si sono avvicinati alla telecamera e hanno spento la registrazione. Ho riportato i dialoghi così come li ricordavo e i passaggi principali (del video sono rimasti 10 minuti finali…quando mi sono accorta dell'incidente)

Io: Ciao, sono contenta di ritrovarvi qui perché oggi staremo un po' insieme, come l'altra volta (*ricordano i due incontri precedenti)*. Guardate! Vi ho portato del materiale, delle cose e con queste cose potete fare ciò che volete, tranne farvi male. Sono curiosa…vediamo cosa riusciremo a scoprire su questi materiali.

I bambini sono interdetti e provo a mettere un dito nell'acqua.

Arianna (5 anni) Ma possiamo mettere queste cose dentro l'acqua?

Io: Certo…

I bambini iniziano a prendere ciò che hanno a disposizione e provano a metterli dentro l'acqua. Per un po' di tempo (10 minuti circa) lascio che provino e aspetto qualche spunto al quale potermi agganciare e rilanciare.

Ettore (4 anni) Metto questi per la mia minestra (*prende dei tappi di sughero)* e faccio una minestra.

IO: *prendo un tappo e chiedo*: Che cos'è questo?

Ettore: Sono pomodori. *(non proseguo oltre e dico solo Ok).*

Leonardo, Valentino (5 anni) mettono le bottiglie di plastica nell'acqua…

Leonardo: Guarda. Se metto la bottiglia dentro l'acqua si riempie un po' e se metto davanti la pallina e tiro su la bottiglia l'acqua non esce.

Io: *(al gruppo)* Avete visto cosa ha fatto Leonardo? Ha messo dentro l'acqua la bottiglia e si è riempita un po' e l'acqua non usciva (anche se la bottiglia è rivolta a testa in giù) se si appoggia al posto del tappo una pallina più grande. *(Con il rilancio vorrei vedere se altri hanno osservazioni o ipotesi).*

Arianna (5 anni) Io ho fatto un mare con queste cose

Io: *(mi avvicino e voglio capire meglio se si tratta di riferimento a gioco simbolico o se può esserci un aggancio)* Un mare? E cosa sono queste cose?

Arianna: Sono legnetti, tappi…

Alice (4 anni) Si...alcuni affondano, gli altri stanno su.

Leonardo: Anche i miei…delle cose stanno su e altre vanno giù

Io: *vado dalla vaschetta dove Leonardo dove ci sono oggetti diversi prendo una bottiglia che i bambini hanno riempito e la metto nella vasca dove loro hanno messo una bottiglia vuota.*

Leonardo e Arianna: una sta giù sul fondo e l'altra sta su

Io: *ripeto…*Una bottiglia affonda e l'altra galleggia. Come mai secondo voi?

Arianna: quella riempita va giù e l'altra vuota sta su.

Io: *Alcuni bambini cominciano a correre intorno alla telecamera e provo a coinvolgerli rilanciando anche a loro le osservazioni fatte da Arianna. (e' a questo punto…mancano 10 minuti alla fine, che mi accorgo della telecamera spenta)*. Avete sentito cosa ha detto Arianna? Si è accorta che la bottiglia piena affonda e quella vuota galleggia. Voi cosa ne dite?

Leonardo (5 anni) e Francesco (4 anni) *li vicino* … Una è piena e l'altra è vuota…

Io: proviamo a prenderle in mano? Cosa ne dite? Cosa vi sembra?

I bambini prendono in mano le due bottiglie e sentono che l'una è più pesante dell'altra.

A questo punto l'ora è finita e chiudo l'incontro….

Io: Bene, per oggi abbiamo finito. Se avete voglia, per la prossima volta vi chiederei di disegnare, magari con l'aiuto delle maestre, quello che abbiamo scoperto oggi…che ci sono delle cose che galleggiano e altre che affondano.

Per la prossima volta vorrei portare una bilancia perché mi sembra che sia affiorata anche se in chiusura dell'incontro la questione del peso degli oggetti che affondano….

Dopo questo primo incontro ho deciso di portare, a partire dagli incontri con gli altri gruppi, due vasche decisamente più grandi da posizionare per terra perché il tavolino messo a disposizione non è sufficiente per consentire le esperienze individuali e anche le vaschette da 6 litri sono profonde ma piccole per permettere che vengano utilizzate da due/tre bambini insieme.

VERBALE 2° INCONTRO

GRUPPO A

Lo spazio nel quale svolgiamo l'attività è sempre lo stesso. Nonostante ci sia una vasca più grande posizionata per terra non viene utilizzata quasi mai.

Io: Bene, vi ricordate cosa avevamo fatto la scorsa volta e cosa avevamo scoperto?

I bambini riprendono l'attività mettendo nell'acqua il materiale a loro disposizione…

Leonardo: Sì.

I bambini continuano a mettere oggetti nell'acqua, Ettore (4 anni) non trova una vaschetta piccola per lui e Arianna (5 anni) gli propone di andare a vicino a lei e usare la sua vaschetta più grande.

Ettore (4 anni) Io faccio una barca *(sta mettendo legnetti a forma rettangolare nell'acqua)*

Vengo distratta da Leonardo e Valentino iniziano a prendere alcune cose l'uno nella vaschetta dell'acqua dell'altro e iniziano a tirarsi l'acqua e litigare…

Io: Leonardo cosa stai facendo? Di cosa hai bisogno?

Leonardo: di quelli *(indica tappi di sughero nella vaschetta di Valentino).*

Io: ti servono tutti?

Leonardo: No solo un pochino.

Io: Cosa volevi fare? (*Vedo che riempie e svuota una bottiglia di plastica)*

Leo: Una pozione…

Io: *lascio cadere il suggerimento di Leonardo e riprendo quello che mi ha detto di voler fare Ettore…la barca con l'intenzione di riprendere ciò che avevamo fatto la volta precedente…*Arianna voleva fare una barca? *(mi sbaglio perché in realtà era Ettore ad averlo detto)*

Arianna: Sì…

Io: e come possiamo farla? Cosa fa una barca?

Ettore: Galleggia!

Io: come possiamo farla allora una barca?

Ettore: con del legno

Francesco (4 anni) Io una volta sono andato su una barca

Io: Com'era? Di legno?

Francesco: no, non era di legno.

Io: Non era di legno, però Ettore dice che per fare una barca bisogna prendere qualcosa che…

Ettore: galleggi.

Valentino: anche i tappi *(indica quelli di plastica)* galleggiano.

Io: allora, per fare una barca come possiamo fare?

Leonardo *interviene* Guarda! Questo galleggia (*indica un legnetto)* ma se ci metto questa sopra (*una bottiglietta di plastica piena di acqua)* va tutto giù…

Io: Guardate un po', avete sentito cosa dice Leonardo? Dice che se io metto questa bottiglia che è piena sopra questo pezzo di legno che galleggia, va tutto giù, il pezzo di legno non galleggia più.

Arianna: Maestra, guarda cosa ho scoperto. Se metto questo tappo (di metallo, di una bottiglia di birra) dentro a questo che sta su, allora anche l'altro tappo sta su (prima quello di metallo affondava).

Io: *mi accorgo che anche Leonardo inizia a provare e allora provo a prendere un tappo di metallo sul fondo e lo metto sopra al pezzo di legno che galleggia…e chiedo…*Cosa succede ora?

Leo: *accorgendosi che i tappi non fanno affondare il pezzo di legno dice…*Sta su.

Provo a rilanciare al gruppo…vedo che altri bambini fanno costruzioni usando legnetti e bottigliette di plastica. Avete visto cosa fa Leonardo? Guardate un po'! Ha preso i tappi di metallo che ha preso? Dove sono i tappi di metallo?

Arianna: nella vasca

Io: sono sul fondo o galleggiano?

Arianna: vanno a fondo

IO: e li mette sopra questo legno che galleggia o va a fondo?

Leonardo: galleggiava.

Io: e quando avevi messo la bottiglietta sopra al legnetto cosa era successo?

Leo: andava a fondo

Prendo una bottiglia di plastica vuota e la immergo insieme a quella piena…chiedendo quale galleggia di più

Leonardo: quella li *(indica quella vuota)*

Io: *ripeto...galleggia di più questa.* Come mai?

Leonardo perché è vuota…e se è piena è più pesante e va giù.

Io: *ripeto ad alta voce a tutti.* Sentite cosa dice…Se più pesante, dice, galleggia *(mi rendo conto di aver sbagliato io e mi correggo esplicitandolo)* va a fondo, scusate ho sbagliato io.

Siete d'accordo con quello che ha detto Leonardo? Qualcuno di voi ha provato a vedere se è vero quello che ha scoperto Leonardo?

Leonardo: che le cose pesanti vanno giù e quelle leggere stanno su.

Francesco (4 anni) che ci sono delle cose che vanno giù e delle cose che stanno su.

Io: Anche voi siete d'accordo? *(mi rivolgo a tutti perché qualche bambino ha iniziato a correre intorno al tavolo…).* Avete provato? Vogliamo provare a vedere se davvero le cose pesanti affondano e quelle leggere galleggiano?

A questo punto (trascorsa circa mezz'ora) propongo ai bambini di lasciare le vaschette dell'acqua così come sono con gli oggetti dentro, asciugarsi le mani e osservarle insieme. Provo a proporre di disegnare insieme le cose che vanno giù e quelle che stanno su ma la mia proposta non viene accolta…forse si distacca troppo da quello che il gruppo aveva fatto fino ad ora. Provo, allora, a chiedere: Come possiamo fare per sapere se una cosa è pesante o leggera?

Ai bambini non viene in mente la bilancia ma ne ho portata una e dopo un poco la prendo e la mostro loro chiedendo se sanno a cosa serve. I bambini riconoscono che si tratta di una bilancia e dicono che "serve per pesare le cose pesanti".

*Dopo un po' appoggio la bilancia sul tavolo…e chiedo loro prendendo due bottigliette uguali di cui una vuota e l'altra piena…S*econdo voi è quale delle due è più pesante?

Arianna: questa piena…

Io: E proviamo un po'! Sarà più pesante questo legnetto o questo altro?

Arianna: uguali…

Io: E da dove sei riuscita a vedere che la bottiglia piena è più pesante di quella vuota e che i legnetti hanno lo stesso peso?

I bambini fanno altre prove…mettono sul piatto della bilancia diversi oggetti finchè alcuni bambini si accorgono dell'ago della bilancia che si sposta. Avete sentito cosa ha detto Pietro (che fino ad ora è rimasto più in un atteggiamento di osservazione di ciò che facevano i compagni) quando ho chiesto da dove possiamo accorgerci se un oggetto è più pesante di un altro?

Pietro (4 anni): La lancetta

Il tempo a disposizione è finito e ci salutiamo dandoci appuntamento per la volta prossima. Con le maestre finiranno il disegno iniziato durante il lavoro insieme.

Note Rivedendo il filmato mi rendo conto di alcune cose e tra queste anche di aver lasciato cadere la richiesta di Ettore di costruire una barca che galleggia approfondendo di più come potevamo fare, magari proponendo di fare un disegno/progetto per capire di cosa avevamo bisogno.

Il prossimo incontro sarà il terzo e dovrei cambiare il materiale…si può pensare di riprendere questo suo progetto e come?

VERBALE 3° INCONTRO

GRUPPO A

Oggi ci sono 6 bambini (3 di 5 anni e 3 di quattro) due femmine (una di cinque anni e l'altra di quattro) e 4 maschi (due di cinque anni e due di quattro anni).

Io: L'altra volta vi avevo detto che questa volta, forse, vi avrei portato altre cose, altri materiali…Però ci ho pensato un po' perché mi sono ricordata che avevamo fatto delle osservazioni con questi oggetti…con l'acqua, le bottiglie e volevo dirvi che alcune cose che abbiamo osservato e che volevo riprendere con voi, provare ancora un po' per vedere cosa possiamo ancora osservare, scoprire…

I bambini, mentre parlo, riprendono i materiali a loro disposizione e li mettono dentro la vaschetta dell'acqua.

Io: mi ricordo che, ad esempio, mettendo queste cose nell'acqua avevamo notato che….

Leonardo (5 anni): Ci sono delle cose che stanno su, galleggiano e delle cose che affondano. Tipo questo qui va a fondo…

Io: Avevamo provato e visto che alcune cose galleggiano e altre affondano…Poi avevo portato una bilancia perché, vi ricordate, qualcuno aveva detto che le cose pesanti vanno giù a fondo, quelle pesanti rimangono a galla e allora abbiamo provato a…

Pietro (5): …a pesare…

Io: aspettate che prendo la bilancia…vi ricordate cosa avevamo visto quando mettevamo nel piatto della bilancia gli oggetti? Come facevamo a vedere se pesavano un po' oppure se erano leggeri? *La appoggio sul tavolino e i bambini cominciano a mettere sul piatto due vaschette vuote…Leonardo guarda il quadrante con la lancetta…* Avevamo visto che si muove la lancetta. Poi, mi ricordo, anche che Ettore ci aveva fatto vedere che se mettiamo dentro una bottiglietta con l'acqua delle biglie, queste sembrano più grandi…

Valentino (4): e galleggiano…

Io: Ettore aveva osservato che sembrano più grandi…se galleggiano anche, lo dobbiamo verificare provando…*proviamo a mettere le biglie e qualche anellino nella bottiglietta…*Guardiamo un po'? Cosa ne pensate? Sembrano più grandi di come sono fuori dall'acqua?

Mentre proviamo con alcuni bambini a mettere gli oggetti dentro la bottiglietta e proviamo a vedere cosa succede se la mettiamo in acqua…Leonardo continua a provare a mettere oggetti sulla bilancia….

Leonardo: Guardate quanto ho fatto pesare? *(sopra la bilancia ci sono due vaschette vuote e dentro l'ultima l'ha riempita con lattine vuote, bottigliette…). Lo osservo e mi riprometto che continueremo il discorso sul peso. Ora sto cercando di capire se anche la questione dell'acqua che ingrandisce le cose trova riscontro….*

*I*o: Cosa ne pensate? A me sembrano più grandi…*Ettore non sembra interessato…i bambini continuano ad osservare le cose dentro la vasca con l'acqua e provo a direzionarmi sulle biglie che sono sul fondo della vasca invece che su quelle dentro la bottiglietta.* Forse possiamo guardare se si vedono più grandi le palline e gli anellini che sono dentro la vasca…*I bambini non considerano ciò che gli sto proponendo continuando invece a mettere oggetti nell'acqua, a riempire e svuotare le bottigliette.*

Leonardo: *continua a guardare la bilancia. Preme forte con una mano sul piatto della bilancia, poi preme forte con tutte e due e guarda il quadrante. Prova per un po' fino a che gira la bilancia verso di noi e dice…*Guarda maestra…perché se schiaccio si muove?

Io: *osservo la reazione degli altri e mi sembra che la questione del peso prevalga su quella che sto cercando di proporre ora quindi seguo e ripeto al gruppo la domanda di Leonardo.* Perché se schiaccio si muove? Io avrei un'idea…*prima che la dica…Arianna interviene.*

Arianna (5) Perché se ci metti le mani o le cose…va giù per pesare.

Io: In che senso? Tu stai dicendo, vediamo provo se ho capito bene, che se schiaccio qui sopra, la bilancia pesa e allora vediamo la lancetta che va più giù?

Ettore (4): eh, si …se metto questo quadrato (legnetto) pesante sulla barchetta (è un legnetto rettangolare) va a fondo…

Io: vediamo un po', proviamo? Io prendo il legnetto quadrato e lo metto qui…cosa succede? Affonda?

Ettore: No!

Alcuni bambini fanno altre prove con la bilancia, altri continuano ad osservare gli oggetti che galleggiano e quelli che vanno a fondo…

Io: proviamo a mettere in questa vaschetta le cose che galleggiano e in quest'altra quelle che affondano?

I bambini insieme cominciano a mettere nelle due vasche gli oggetti…quando abbiamo finito..

Io: guardiamo un po' quello che abbiamo messo nelle vaschette…e…Oooh! Aspettate non vi ho dato una cosa che però l'altra volta vi avevo portato *(mi accorgo che non avevo messo tra i materiali i tappini di metallo da birra). Li prendo* Secondo voi, questi galleggiano o vanno a fondo?

Leonardo: Vanno a fondo, vanno a fondo!

Li metto in acqua e osserviamo che affondano…ne prendo un paio e li metto nella vaschetta degli oggetti che affondano.

Io: allora abbiamo detto che le cose pesanti affondano, quelle leggere galleggiano…allora quelle che abbiamo messo in questa vaschetta e che affondano saranno più pesanti delle cose che sono dentro alla vaschetta di quello che galleggia? Cosa ne dite?

Ettore (4) *mentre riempie una bottiglietta con un po' di acqua…*Noooooo!

Io: vediamo…proviamo?

I bambini iniziano a mettere tutti gli oggetti dentro al piatto della bilancia e li invito a provare a mettere una cosa alla volta e di vedere se la lancetta si muove oppure no! Ettore mi passa la bottiglia piena e la mettiamo sul piatto…

I bambini osservano che la lancetta va giù…svuoto una bottiglietta la mostro e chiedo: Cosa succederà se metto questa (bottiglia vuota) sulla bilancia? La lancetta si muoverà?

Ettore (4): No!

Io: Proviamo e vediamo che la lancetta non si muove…Se abbiamo detto che le cose pesanti vanno giù e quelle leggere stanno su, allora se metto nell'acqua questa bottiglia (piena) cosa succederà?

Arianna (5) va giù…

Ettore (4) Non sta su.

Io: proviamo…*metto la bottiglia piena nell'acqua e vediamo che affonda…prendo la bottiglia vuota e chiedo:* Questa, secondo voi, cosa farà?

Arianna: sta a galla…

Io: Proviamo *e la metto nell'acqua e* osserviamo che galleggia. Ora guardiamo un po' le altre cose che ci sono nelle vaschette (prendo una biglia, un tappo…) e continuiamo a provare a pesare? Io vi ho portato un'altra bilancia. *Ne ho costruita una con un ometto appendiabiti agli estremi del quale ho attaccato due spaghi con appesi dei bicchieri di plastica trasparente abbastanza grandi per contenere diversi oggetti. Spero che sia una bilancia un po' più sensibile rispetto a quella ad ago che, ad esempio, non è in grado di rilevare differenza di peso tra i diversi tappi o le cose che hanno un peso inferiore ai 20/30 grammi.* Prendo la bilancia e proviamo…

Ettore (4) ma questa (si riferisce alla bilancia) è a mano…

Io: sorrido e confermo…Sì l'ho costruita io…vediamo un po'…Prendo una pallina dalla vasca con le cose che galleggiano e prendo questa tra le cose che affondano…

Ettore (4) Bisogna metterle qui dentro….

Io: si…Quale peserà di più?

I bambini indicano la pallina che affonda e metto ciascuna pallina in un bicchiere. I bambini osservano che, effettivamente, la pallina che affonda pesa di più.

Io: Perché? *Mi accorgo di aver formulato male la domanda e mi correggo* chiedendo: Da cosa possiamo vedere che pesa di più questa?

Arianna: prende la pallina che pesa di più e dice: Perché questa è dura…*Probabilmente ha recepito la prima domanda che ho posto in modo sbagliato…*

Io: guardate, in questa bilancia (quella con piatto unico e ago) avevamo visto che quando mettevamo delle cose pesanti l'ago si muoveva in basso. In questa bilancia (quella con i due bicchieri) cosa guardiamo per vedere se una cosa pesa più dell'altra?

Arianna: questo (il bicchiere) va più giù…

Io: allora possiamo provare a pesare anche altre cose con questa bilancia…Proviamo ancora?

Continuiamo a provare a pesare gli oggetti e a fare qualche ipotesi di cosa accade agli oggetti pesanti quando vengono messi in acqua e a quelli leggeri…Dopo un po' di prove con diversi oggetti, bottiglie piene e vuote poi mi accorgo che i bambini non sono più così interessati (cominciano a fare altri giochi, fingono di spingere un muro, ecc..). Penso allora di provare a rilanciare l'altra osservazione sulle cose che in acqua sembrano più grandi ma senza forzare perché all'inizio non sembravano aver colto o essere interessati…

Io: Bene! Abbiamo provato e osservato che ci sono oggetti che pesano di più di altri e che se li mettiamo nell'acqua affondano. Io, però, mi ricordo che la volta scorsa qualcuno aveva osservato che *prendo e faccio vedere a tutti una bottiglietta con dentro acqua e biglie)* le cose che sono dentro l'acqua sembrano più grandi. Guardiamo un po'. A me, in effetti, sembrano più grandi. Cosa ne dite?

Ettore (4) Secondo me no!

Io: Ok, allora proviamo! Vediamo un po'! *Metto una delle biglie che ci sono dentro la bottiglia in mano e la mostro…*Guardiamo, quella dentro la bottiglia sembra più grande di quella che ho in mano? Cosa dite? *Aspetto un po'… se emergono ipotesi, osservazioni.* A me sembra di sì, però forse mi sbaglio… non mi ricordo bene e questa cosa non l'avevamo osservata la volta scorsa…

I bambini non sembrano interessati e non insisto dicendo che forse mi ricordavo male e che questa cosa non l'avevamo osservata…

Io: *riprendo allora la questione del peso…prendo spunto dal fatto che c'è una bottiglia con dentro le biglie e l'acqua e prendo una bottiglietta che Arianna riempie con un po' di acqua ma senza mettere dentro le biglie e provo a chiedere* Proviamo a vedere quale delle due peserà di più?

I bambini osservano in quale dei due casi si muove di più l'ago…Propongo di segnarci quello che stiamo facendo così ce lo possiamo ricordare…I bambini prendono il loro quaderno e la matita… Nel frattempo dico ai bambini che il tempo per stare insieme, per oggi, è quasi finito. Mi avvicino con la bilancia "a mano" e proviamo a pesare degli oggetti…

Arianna: Io non sono capace di disegnare l'attaccapanni…

Io: io non penso che dobbiamo proprio disegnare un attaccapanni uguale a questo…

Nel frattempo mi accorgo che sono riusciti a disegnare un arco con ai lati due fili che vengono disegnati, di volta in volta, uno più lungo degli altri laddove ho messo le cose più pesanti.

Io: Ora, però, Ettore aveva detto che questa (bottiglia di coca cola) pesa più di questa (bottiglia leggermente più piccola di Schwepps) perché è più grande…Proviamo a vedere? Prendiamo questa bottiglietta (uguale a quella di Schwepps) e la mettiamo sulla bilancia insieme a quella uguale. Cosa succede?

Proviamo ancora un po', finché la bilancia "a mano" si rompe.

Io: allora…abbiamo osservato che ci sono delle cose che vanno a fondo e cose che stanno a galla. Poi abbiamo detto che le cose pesanti vanno a fondo e allora abbiamo provato a pesare gli oggetti che abbiamo a disposizione per vedere quali sono pesanti e quali sono più leggeri. Abbiamo visto, con la bilancia che ho portato oggi) che vediamo se una cosa è più pesante di un'altra perché fa andare giù lo spago con il bicchiere. Con quelle leggere il bicchiere rimane più su. A me è venuta in mente una cosa…Che le cose pesanti fanno andare il bicchiere più giù proprio come succede nell'acqua che le cose pesanti vanno giù, affondano e quelle più leggere rimangono più su, galleggiano.

Arianna (5) le cose leggere stanno a galla e quelle pesanti vanno giù. *Intanto l'ora è finita…*

Io: Bene! Adesso dobbiamo andare.

Leonardo (5) mi richiede la lampadina che già mi aveva chiesto in precedenza e che gli avevo detto gli avrei dato più tardi…La prendo e gliela do accompagnando i bambini nella loro classe. Valentino (4) mi chiede di darne una anche a lui perché la sua l'ha persa…Potrebbe essere un suggerimento, un interesse che dimostrano verso la luce e potremmo tenerne conto per decidere quale materiale presentare ai prossimi incontri. Con l'esperienza di questo incontro i bambini hanno dimostrato interesse per la questione del peso, la bilancia mentre si è affievolito l'interesse per le prove con l'acqua e i materiali a disposizione…Non hanno fatto altre prove, giochi con l'acqua, si sono concentrati di più sulle prove per pesare i materiali a disposizione.

VERBALE INCONTRO

GRUPPO A

In questo incontro presento ancora lo stesso materiale delle volte precedente…è il gruppo con il quale la volta scorsa avevo guidato eccessivamente i bambini e le attività che sono state proposte, in particolare da me…Questo aspetto cerco di tenerlo presente durante l'incontro… Preparo il materiale e vado in sezione a prendere il gruppo di bambini… Ho pensato di introdurre la presentazione dello stesso materiale come la volta scorsa (Mi ricordo che la volta scorsa avete osservato alcune cose quando abbiamo usato la bilancia e ho pensato di portarvi ancora queste cose per vedere se c'è ancora qualcosa che possiamo scoprire). In realtà appena entrati nella stanza un bambino interviene con una domanda…

Leonardo (5): *Entra, va verso una delle vasche grandi per terra e inizia a mettere dentro dei legnetti e rivolgendosi a me chiede:* Ma perché hai portato sempre lo stesso materiale?

La domanda mi fa pensare che può essere un rimando per me al fatto che la scorsa volta si sono sentiti poco protagonisti e, forse, un po' annoiati per essere stati guidati in attività che non interessavano davvero...Leonardo, inoltre, è il bambino che aveva utilizzato la bilancia per pesare ma, in prima battuta non avevo ripreso subito il suo input e, nel momento in cui l'ho ripreso sono stata io a proporre di provare a pesare.

Io: Ho pensato di portare ancora questo materiale perché mi è sembrato che la volta scorsa aveste fatto osservazioni interessanti e che forse potevamo riprendere le osservazioni fatte e vedere cosa si può osservare e scoprire ancora…

I bambini non dicono nulla ma continuano a giocare…Valentino prende una bottiglietta e comincia a riempirla e svuotarla, Leonardo ed Ettore, dopo aver messo i legnetti nell'acqua, aggiungono tappi e alcune palline. Arianna e Francesco in vaschette più piccole posizionate sul tavolino riempiono e svuotano bottiglie e lattine. Ad un certo punto, mettono nell'acqua palline da ping-pong… Alice e Francesco cominciano a riempire le lattine nella loro vaschetta e a rovesciarle nella vasca un po' più grande di Arianna…

Arianna (5): Nooooo! Attenti è troppo alta! Maestra…

Io: Arianna vi dice di stare attenti perché l'acqua è troppo alta.

Leonardo: *attirato dalla situazione…*Esce tutto fuori se mettete anche quella!

Alice e Francesco svuotano l'acqua che hanno nella lattina dentro ad una delle vaschette vuote…

Valentino (5): *rivolgendosi ad Arianna, Alice e Francesco* Voglio un po' di acqua, la vostra è più alta, la mia più bassa.

Francesco immerge una bottiglia dentro la vasca piena di acqua che trabocca fuori sul tavolo…alza lo sguardo e sembra attendere una mia reazione…

Io: Oh! É uscita l'acqua…

Arianna: Eh, ha schiacciato la bottiglia dentro l'acqua e l'acqua è venuta su e poi fuori.

Valentino si è alzato ed è andato con una vaschetta più piccola sul tavolo per farsi dare un po' di acqua dai compagni, la mette nella sua vaschetta che travasa aggiungendo acqua nella sua vasca…A questo punto Valentino prende la vasca più piccola e la mette dentro quella grande con l'acqua, poi riempie quella più piccola e la rimette dentro la vasca grande. Io sono vicino a lui accovacciata tra la sua postazione e quella dove stanno giocando Leonardo ed Ettore.

Valentino: *svuota la vaschetta la mette nell'acqua e si rivolge a me dicendo:* ora galleggia, se la riempio arriverà fino a qui (*appoggia il palmo di tutte e due le mani sul fondo della vasca per farmi capire che affonderà toccando il fondo) e mentre lo dice prova osservando che effettivamente va giù. Prova altre due o tre volte...*

Io: *rilancio al gruppo visto che ci sono Ettore e Leonardo che si stanno lamentando perché nel fare le sue prove ha schizzato e bagnato i compagni che ora lo stanno "accusando"…* Avete sentito cosa ha osservato Valentino e cosa ha detto? *Aspetto un po'…*Valentino ha osservato che la vaschetta vuota galleggia e se la riempie tocca il fondo.

Leonardo ed Ettore prendono una vaschetta e provano a rifare quanto sperimentato da Valentino, poi tornano ad occuparsi dei travasi…

Arianna: *si avvicina alle vasche grandi dell'acqua dove stanno giocando i suoi compagni…è in piedi…*Guarda! Il sole che sbatte qui (indica la vaschetta) fa sembrare che l'acqua si afuori sul pavimento (mentre lo dice fa il segno con il dito sul riflesso per terra dell'acqua che si muove).

Io: Ah! Avete visto? Arianna ha notato che la luce del Sole fa riflettere l'acqua e sembra quasi che sia per terra.

Valentino: Ma questa è l'ombra.

Io: Valentino dice che è un'ombra…*Mentre lo dice, si trova proprio in una zona dove per terra è proiettata la sua ombra, per un attimo la osserva ma non dice nulla né accenna a giocarci…Aspetto per vedere se qualcuno fa osservazioni su questo aspetto…*

Nel frattempo Ettore lascia cadere dall'alto un legnetto, successivamente due o tre insieme aumentando gli schizzi…Valentino prende delle palline e le getta nell'acqua, Leonardo getta una vaschetta vuota di acqua…. Aspetto un momento nonostante il lago di acqua formatosi per terra perché vorrei vedere se queste operazioni destano input riferiti, ad esempio, a chi ha fatto schizzi più alti e lanciando cosa ma mi sembra che stia diventando un gioco per bagnarsi. Fermo il gioco dicendo loro: Ascoltate, vi ricordate che la regola da rispettare per poter giocare con queste cose è che non dovete bagnarvi troppo e non farvi male.

Leonardo: mah, io non voglio più giocare con l'acqua.

Arianna: nemmeno io!

Leonardo va verso il tavolino e prende la bilancia, la appoggia per terra e, come la volta scorsa, prova a premere le mani sul piatto guardando il quadrante e il movimento della lancetta.

Leonardo: Ora mi peso io *e mentre lo fa si appoggia sul piatto della bilancia.* Quanto peso!

Io: Avete visto? Leonardo prova a pesarsi…*I bambini si voltano e alcuni si avvicinano a Leonardo.*

Ettore: Anche io mi peso!

Anche Francesco vuole provare a pesarsi…I bambini si pesano a turno…

Io: Leonardo, Ettore e Francesco si sono pesati. Anche l'altra volta avevate provato a vedere quanto pesavano le cose che avevate a disposizione e oggi avete provato a pesarvi.

Leonardo, in particolare, prende la bilancia e prova a pesarsi ancora mettendosi a pancia in giù e guardando il quadrante per seguire il movimento dell'ago della bilancia.

Ettore: Metti questo sulla bilancia! *Porta un bicchiere pieno di acqua e lo posa sul piatto.* Io: cosa succederà se mi peso io?

Leonardo: Pesati tu! *Rivolgendosi a me…*

Io: cosa succederà se mi peso io?

Leonardo: dai vediamo! *In realtà non emerge nessuna osservazione sul fatto che la lancetta si muova di più o più velocemente….*

Sono vicino a Leonardo e di fianco c'è una delle vasche grandi dove sta giocando Ettore…mi accorgo che sta facendo alcune prove con oggetti nell'acqua. Mi avvicino un po' di più perché vedo che sta parlando sottovoce e voglio sentire meglio quanto sta dicendo…

Ettore (4): *Mi accorgo che prende dei legnetti e li mette in acqua e poi ne prende due, uno sopra l'altro e li mette in acqua, poi aggiunge un tappo…. Mentre fa queste prove dice*: Scommetto che se metto sopra questo affonda. *Prova, mette in acqua…osserva e dice:* No, galleggia!

Io: ripeto…No, galleggia!

Ettore: Se metto un legnetto sta su…ma se lo carico bene…andrà giù. *Prende tre legnetti uno sopra l'altro, poi prende un tappo di una bottiglia di plastica e lo posiziona sopra la torre…mette in acqua ma il tappo scivola e osserva che la sua costruzione si smonta e galleggia. Ora prova a prendere una scatolina (contenitore delle brugole con il coperchio) lo riempie di acqua e lo pone sulla torre di tre legnetti che ha ricostruito…*Ora andrà giù. *Prova e osserva* Hai visto! Ora è andata un pochino giù poi la scatolina con l'acqua è scivolata e il legnetto è tornato su...

Io: *provo con lui…prendo il legnetto, metto sopra la scatolina con l'acqua e il legnetto sprofonda un po' fino a che il legnetto non si capovolge e torna su, mentre la scatolina va giù…*

Ettore: prende il legnetto e dice: Ora carico lo scafo della nave e affonda…*Mette molte cose sul legnetto (tappi di plastica, palline)…*No, galleggia! *Lo dice con un tono di sorpresa…*

Mentre sono con Ettore, Arianna, Alice e Francesco hanno preso dalle loro bustine il quaderno e la matita e si sono messi a disegnare. Valentino ha in mano una biglia, chiama Leonardo con un tono di sfida, mostra la sua biglia e la rimette in mano scappando. Leonardo lo insegue…Valentino ad un certo punto gli lancia la biglia che rotola sul

pavimento, Leonardo la riprende e iniziano a giocare. Ad un tratto un lancio di Valentino fa andare la pallina dentro uno scatolone a forma di parallelepipedo con dentro dei materassi utilizzati per le attività di palestra. Lo scatolone è alto come loro, permette loro di guardarci dentro…Osservo ciò che accade…Sia Valentino che Leonardo sbirciano dentro, tentano di mettere dentro un braccio per vedere se riescono a recuperare la pallina ma non ci riescono. Per un po' se ne vanno e sembra non interessargli il recupero della pallina…

Dopo un po' prendono le loro bustine e prendono le torce…

Valentino: Leo, con queste possiamo trovare la pallina…*Lo scatolone è profondo e pieno di materassi arrotolati quindi non riuscivano a vedere la posizione della pallina...*

Leonardo e Valentino guardano a turno dentro lo scatolone…

Valentino: Ecco! Ecco l'ho vista! *Mette un braccio dentro ma non riesce a prendere la pallina…*

Questa situazione attira l'attenzione dei compagni che smettono di disegnare e giocare con l'acqua e si avvicinano ai compagni che stanno cercando di recuperare la pallina perduta. Tutti provano a recuperare la pallina…Non ci arrivano!

Arianna: Ci vuole qualcuno che ha le mani più lunghe…*Lo dice rivolgendosi a me.*

Io: dici che io ci posso arrivare? *Sembrano convinti…provo ma non ci arrivo neppure io!* No! Non ci arrivo, come facciamo?

Leonardo: Ci vuole qualcuno che arrivi fino a qui…*Indica la base dello scatolone…* Noi arriviamo prima.

Arianna: Ci vuole questo! *Ha preso il righello dalla sua busta e vorrebbe usarlo come prolungamento delle braccia…Si accorge però che non è sufficiente.*

Leonardo prende dei tubi di gomma che sono in un altro scatolone di materiale della palestra e comincia a colpire lo scatolone…

Valentino guarda di nuovo dentro con la torcia…prova a tirare fuori i materassi ma non riesce…ad un tratto prova a far cadere lo scatolone…ci riesce.

Valentino: Presa!

Io: Ce l'abbiamo fatta!

Ettore ha tenuto in mano il righello che è di un colore verde e trasparente…lo mette davanti agli occhi e guarda attraverso l'acqua. Mette il righello in acqua e poi lo riporta davanti agli occhi.

Intanto è passata l'ora dell'incontro e avviso i bambini…Abbiamo finito il nostro incontro per oggi. Ci vediamo la prossima settimana…

I bambini ricompongono le loro bustine e torniamo in classe….

VERBALE INCONTRO POST-INTERVENTO

GRUPPO A

I bambini presenti nel gruppo a questo incontro sono 6 (5 maschi e 1 femmina poiché la seconda è assente a quell'incontro). Dei bambini presenti tre hanno 5 anni e tre ne hanno 4.

Accolgo i bambini nello stesso spazio nel quale si sono svolte tutte le nostre attività e propongo loro materiale che, in parte, non hanno ancora avuto modo di esplorare (carta di diversa tipologia e consistenza, semi e legumi secchi, forme diverse di cartone).

Io: Introduco l'incontro. "Bene, vi ho portato del materiale che, in parte, avete potuto vedere soltanto durante lo scorso incontro nel quale vi ho chiesto di osservare le cose che avete a disposizione perché ero curiosa di capire cosa si poteva fare con queste cose." Io, come la volta scorsa, prenderò il mio quaderno e cercherò di scrivere ciò che fate, quello che dite ed osservate. Starò qui con voi ma solo per osservarvi. Mi allontano dal gruppo per prendere il quaderno e mi riavvicino a loro poiché mi sembrano un po' titubanti in questa nuova situazione. L'atteggiamento è un po' quello che avevano mostrato nell'incontro di osservazione preliminare, rimangono fermi attorno al tavolo dove ho messo parte del materiale. Soltanto Pietro, che nei primi incontri aveva manifestato maggiori difficoltà a lasciarsi andare all'esplorazione, in questo incontro sceglie di prendere una delle asticelle di legno poste per terra.

Valentino e Alice sembrano avere un attimo di conflitto perché Valentino vorrebbe riempire la sua ciotola con i legumi e per farlo prende il contenitore della compagna la quale risponde riprendendoselo. Valentino reagisce e guardandomi afferma: "Io ne ho pochi però".

Io: "Potresti provare a chiedere ad Alice se ti dà un po' dei suoi semi"

Valentino accetta il suggerimento e la sua richiesta viene accolta positivamente da Alice che cede un po' del contenuto della sua ciotola.

Ettore osserva per un po' ciò che ha a disposizione poi prende un imbuto caduto sotto il tavolino.

Leonardo prende due imbuti, li mette l'uno dentro l'altro e inserisce dentro una bottiglietta proponendo: "Se mettiamo qui dentro un po' di cose possiamo fare una pozione." Poi guarda dentro la bottiglietta e sul fondo nota qualche goccia di acqua, osserva i due imbuti, sembra voglia versare le gocce dalla bottiglietta dentro l'imbuto ma si ferma perché probabilmente si accorge che finirebbero sul tavolino. Nota il tappo che chiude la confezione di biglie e pensa che possa avere la dimensione giusta per ciò che vuole fare, lo prende e lo appoggia sul tavolino e a questo punto versa il contenuto della bottiglietta nell'imbuto e osserva che cade nel tappo e afferma, rivolgendosi ad Ettore: "Ecco la pozione".

Ettore: si sporge e mette in punta di piedi per guardare dentro al tappo poi afferma: “No, quella non è nemmeno una goccia.”

Leonardo: tiene in mano il tappo con la goccia di acqua e si rivolge ai compagni che stanno lavorando con i legumi: “Mi dai un fagiolo, un fagiolino?”

I compagni non vogliono cedere ciò che hanno raccolto nei loro contenitori così intervengo prendendo la confezione di legumi e ridistribuendone un poco a tutti precisando: “Ve ne posso dare ancora un po' ma devo lasciarne anche un po' per i vostri compagni che oggi pomeriggio lavoreranno con me.”

Alice, Valentino e Francesco hanno preso un po' di acqua contenuta in una bottiglietta e l’hanno versata dentro le ciotole contenenti i legumi e con le mani hanno iniziato a impastare il miscuglio, guardandosi, di tanto in tanto le mani e scrollandole per far cadere i legumi che si appiccicano alle mani. Leonardo ha preso la goccia d’acqua contenuta nel tappo e l’ha versata nella bottiglia aiutandosi con l’imbuto e successivamente ha versato nell’imbuto anche i legumi notando però che ad un certo punto si formava il classico collo di bottiglia che non permetteva ai legumi di scendere nella bottiglietta. A questo punto, Leonardo osserva, guarda dentro l’imbuto, lo capovolge e lo sbatte qualche volta sul tavolino sperando di far uscire il fagiolo che impediva il passaggio dall’imbuto alla bottiglia. Infine, prende l’imbuto, porta alla bocca la parte finale e vi soffia dentro riuscendo a far uscire ciò che occludeva il passaggio.

Pietro ha preso un’asse di legno e un pezzo di cartone rettangolare. Lo osserva, lo tocca e lo gira più volte finché non appoggia l’asse sul cartone e cerca di avvolgere quest’ultimo come a voler rifasciare l’asse di legno. Ettore interviene prendendo a Pietro l’asse di legno, Pietro la cede e ne prende un’altra riprendendo l’attività che aveva dovuto interrompere poco prima. Ettore prende l’asse di legno e si sposta sul pavimento dove ce ne sono altre. Ne prende una e la appoggia in verticale sul pavimento, una seconda la appoggia sulla prima parallelamente al pavimento e cerca di prenderne una terza per completare la sua costruzione ma non riesce a mantenere in piedi le altre due. Cerca possibili soluzioni cercando di appoggiare una delle due assi alla spalla per liberarsi una mano ma non funziona e la costruzione cade più volte. Ettore decide allora di appoggiare le assi di legno per terra e dice: “Dobbiamo fare… Sapete cosa dobbiamo fare? Dobbiamo fare un tavolo e poi delle candele.” Francesco si avvicina a Ettore, ha in mano il cilindro con dentro biglie e legumi, lo capovolge diverse volte e dice: “Una clessidra”.

Ettore prova a prendere le assi di legno e a posizionarli a mò di tenda indiana ma non riesce a far rimanere in piedi le due assi che formano i lati della tenda. E’ sempre alla ricerca del modo peri riuscire a far stare in piedi le assi di legno.

Leonardo con i legumi travasati dentro la bottiglietta prova a produrre rumori scuotendo la bottiglia su e giù, poi travasa il contenuto nella scatolina che conteneva gli anellini di metallo. Ad un tratto, Valentino gli prende qualcosa e Leonardo reagisce:” Noooo!!! Mi serviva.”

Pietro sta continuando ad avvolgere l’asse di legno nel cartone e tiene premute le mani ad ogni risvolta per imprimere la forma al cartone che, altrimenti, tende ad aprirsi. Mentre fa questa operazione, osserva ciò che fa Francesco, poi gli dice qualcosa che non capisco ma

sembra riferito al contenitore cilindrico che ha in mano contenente palline di diversa composizione e dimensione. Ad un tratto, Valentino prende a Francesco il contenitore, lo apre e ne prende il contenuto. **Probabilmente Pietro continua a rifasciare l'asse di legno per avere un'attività da svolgere mentre osserva ciò che fanno i compagni. Si tratta di un'attività che lo mette nella condizione di "fare qualcosa" e, al contempo, rimanere in una posizione di osservazione.**

Francesco: "Vale, dai mi serve!". E' girato di schiena rispetto alla telecamera ma osservo che riprende il contenitore, lo riempie con le stesse cose che aveva già utilizzato prima, tappa il contenitore e si allontana andando verso Ettore che si è spostato con le sue assi di legno in un angolo della stanza (forse ha pensato che l'angolo formato dai due muri della stanza potesse aiutarlo nell'intento di costruire la tenda indiana facendo rimanere in piedi le assi di legno)

Leonardo lo aveva raggiunto pochi minuti prima e i due hanno iniziato a costruire quello che Ettore chiama un "caminetto" (la forma che vogliono fare è rettangolare). Leonardo torna dal tavolino un paio di volte per prendere pezzi di cartoncino, cartone e li porta ad Ettore che afferma: "Ora possiamo quasi accendere il caminetto".

Alice, per timore che Valentino le prendesse altre cose con le quali stava lavorando si sposta, dapprima difronte a Pietro e successivamente lontano dal tavolino dove ora sono rimasti Pietro e Valentino.

Si sentono Ettore, Leonardo e Francesco che parlano su cosa possa servire per accendere il fuoco…

Ettore: "No, se metti questo con il fuoco esplode. Ci serve un piccolo fagiolo bianco che se lo mettiamo qui poi esplode."

Alice si dirige verso il tavolo, afferra una delle bottigliette e ne prende un fagiolo bianco portandolo ai compagni(rosso????). A questo punto, il gruppetto composto da Ettore, Alice, Leonardo e Francesco decide di trasportare tutto il materiale dal tavolino all'angolo dove stanno costruendo il caminetto e prende il materiale senza fare attenzione a ciò che prende. Ettore si dirige verso Pietro che, nel frattempo, ha avvolto il rettangolo di cartone dentro al pezzo rettangolare di cartone più grande. Ettore si rivolge a Pietro dicendo: "Questo me lo dai, mi serve proprio." Pietro prova a resistere e trattenere l'oggetto che ha in mano per poi lasciarlo al compagno. Leonardo e Alice seguono l'esempio di Ettore e trasportano altro materiale nell'angolo dove stanno svolgendo la loro attività. Il recupero del materiale avviene, anche in questo caso, in modo arraffazzonato senza prestare attenzione a quali oggetti ci siano nel mucchio.Pietro rimane interdetto e per qualche minuto rimane fermo, in piedi davanti al tavolo ad osservare ciò che fanno. Mi avvicino un po' al tavolino e mi fermo di fronte a Pietro ma noto che ha la testa abbassata e che mi osserva cercando di non farsi vedere. Mi allontano perché mi sembra che lo metta a disagio la mia presenza in quel momento.

Valentino recupera con una ciotola tutti i legumi sparsi sul tavolo e le versa dentro ad una sola ciotola. La stessa cosa fa prendendo le diverse ciotole con i legumi dentro e li versa dentro ad un solo contenitore. Una volta finito tutto il travaso, Valentino prende una bottiglietta con un po' di acqua dentro e la scuote, la appoggia nuovamente sul tavolino e si

dirige verso i compagni. Ettore recupera gli ultimi materiali sul tavolino e torna dai compagni.

Leonardo torna dal tavolo e prende anche la bilancia, poi riporta il piatto della bilancia sul tavolo. Valentino prende il piatto e lo utilizza come contenitore per recuperare i legumi rimasti sul tavolo e, terminato il lavoro, porta tutto nell'angolo dove hanno accatastato tutto il materiale come per formare una pira.

Leonardo: porta un imbuto alla bocca utilizzandolo come un megafono e urlando "Scappateeeee! C'è il fuocooo".

Scappano tutti. Tornano intorno alla catasta di materiale che hanno impilato e Valentino, appoggiato al muro, con un piede spinge la catasta facendo cadere un po' del materiale. Francesco si lamenta: "No, Vale. Ci abbiamo messo tanto!" Mentre lo dice, mi guarda come se mi stesse chiedendo di intervenire per riprendere Valentino.

Ettore: "facciamo un altro fuoco?

Leonardo: tiene sempre in mano la bilancia e due imbuti posti uno dentro all'altro. "No. Chiamiamo i pompieri con la pompa di salvataggio."

Valentino guarda Francesco e con un atteggiamento un po' sfidante, spinge nuovamente con il piede tutto il materiale che era impilato.

Ettore: si abbassa e rimette le cose cadute come erano messe prima che Valentino le facesse cadere e mentre compie questa azione dice: "Rimettiamo come prima." Lo aiuta anche Alice.

Valentino corre via, poi torna indietro e Francesco, preoccupato che il compagno possa intervenire nuovamente per distruggere ciò che avevano fatto, lo guarda e dice: "No, Vale, no!" e con il movimento del corpo (delle mani e del capo, in particolare) sottolinea quanto sta dicendo.

Ettore e Alice appena dopo aver riposizionato la catasta di materiale, la smontano. Ettore prende un'asse di legno, Alice rovista tra il materiale – che ora è sparso in terra – come se volesse cercare qualcosa in particolare e Valentino sposta carta e cartoncino per iniziare a recuperare biglie e palline. Francesco è rimasto in piedi e osserva ciò che vogliono fare i compagni.

Leonardo, prendendo spunto dall'asse di legno presa da Ettore dice: "Montiamo la tenda? La tenda!"

Ettore: prende altre assi di legno e commenta "Io preparo il palo. Preparo il palo"

Leonardo e Francesco si spostano nel posto dove hanno intenzione di portare il materiale. Ettore e Alice prendono altri oggetti mentre Valentino continua a raccogliere le biglie. Io mi avvicino ed intervengo perché il materiale per terra viene calpestato. Chiedo ai bambini di fare più attenzione e di spostare gli oggetti sparsi sul pavimento per evitare di romperli. Dopo un po' sposto l'inquadratura e i bambini hanno spostato il materiale vicino al tavolino ma sempre appoggiato a terra. Valentino continua a cercare biglie nel posto dove i compagni hanno spostato il materiale per costruire una tenda. In realtà il materiale è appoggiato in modo maggiormente ordinato per terra rispetto alla catasta fatta precedentemente.

Si sente la voce di Leonardo, fuori dall'inquadratura che dice: "Che bella tenda!"

Mi avvicino al tavolino e raccolgo la bilancia messa sotto al tavolino… Leonardo si avvicina a me e dice: "Mi serve." Gli rispondo che può continuare ad utilizzarla. Intanto, Ettore e Alice continuano a posizionare il materiale e Valentino ha preso le biglie, le ha messe in una ciotola per versarle, successivamente, dentro ad uno degli imbuti. Osserva che non fuoriescono e capovolge l'imbuto stesso facendo cadere tutte le biglie contenute che rotolano così sul tavolino. Valentino cerca di recuperarle e Francesco lo aiuta. Leonardo raccoglie alcune biglie che trova per terra e le mette dentro ad una bottiglietta di plastica trasparente la chiude e comincia a scuoterla, prima davanti agli occhi, poi la avvicina all'orecchio. Valentino continua a recuperare biglie e palline dentro ad una ciotola. Ettore e Alice hanno preso il materiale e lo hanno messo sopra al tavolino ed Ettore commenta: "Facciamo una casa." Alice lo segue e ripete: "Facciamo una casa."

Valentino raccoglie una pallina per terra e la tira contro il muro, la recupera e la tira nuovamente contro il muro senza verbalizzare nulla. Leonardo si avvicina a Francesco che comincia a cercare una delle biglie rotolate per terra e che sono finite dietro ai tappeti utilizzati per attività motoria. Francesco infila un dito dentro ai fori rotondi per cercare di spostare il tappeto e guardarci dietro ma Leonardo preme verso il muro il tappeto, prima con la mano e poi con la parte finale dell'imbuto.

Leonardo, ad un tratto, grida: "Alt! (prolungando la prima vocale), salvataggio, dovete venire." Si è reso conto che gli spostamenti fatti hanno fatto sì che il tappeto cominciasse a cadere verso di loro. Provano, insieme, a tirarlo su spingendolo verso la parete cercando di trovare la giusta inclinazione che permette al tappeto di rimanere appoggiato al muro. Francesco si accorge che alcuni fori hanno inserito il tassello che si può rimuovere. Per qualche secondo spinge fuori il tassello e lo reinserisce. Leonardo mette la parte più larga dell'imbuto davanti alla bocca ed emette alcuni versi, poi scuote nuovamente la bottiglietta che ha in mano e nella quale aveva inserito alcune biglie. Ettore e Alice hanno preso le assi di legno e hanno formato un quadrato per terra. Poi Ettore le ha prese e riprova a costruire la stessa cosa messa, questa volta, in posizione verticale rispetto al pavimento (cosa che aveva già provato a fare all'inizio dell'incontro). Mentre prova a realizzare questo progetto spiega rivolto ad Alice: "possiamo fare un tavolo anche qui."

Valentino continua a raccogliere palline in terra, poi chiede a Leonardo di cedergli anche quelle che ha nella sua bottiglietta/sonaglio. Ettore e Alice lavorano con le assi di legno ed Ettore, mentre costruisce, spiega ciò che sta facendo: "Questo è il banco dove sopra si mettono le cose che si vendono". Ettore e Alice provano diverse volte a montare la struttura che, però, senza un sostegno cade.

Valentino travasa le biglie che ha raccolto nella sua ciotola dentro ad una bottiglietta che poi inizia a scuotere per sentirne il rumore. Leonardo ha posato sul tavolo la bottiglietta e ora ha in mano un piccolo imbuto dal quale non si separa mai, fin dall'inizio dell'incontro. Ad un tratto sia Leonardo che Valentino escono dall'aula nella quale stiamo facendo l'incontro per rientrare qualche secondo dopo. Ettore porta le assi di legno nella parte della stanza dove sono appoggiati i tappeti e Alice lo raggiunge. Valentino, ad un certo punto, prende una biglia e la nasconde dentro ad una delle mani, fa una giravolta e invita Leonardo e Francesco ad indovinare dentro quale pugno sia nascosta la pallina. Lo rifà una seconda volta chiedendo

a Leonardo di chiudere gli occhi. Valentino mette la pallina in una mano e la chiude a pugno, fa diverse giravolte fermandosi davanti al compagno con le braccia tese davanti a lui. Valentino chiede a Leonardo di mettersi vicino ai tappetoni e di chiudere gli occhi mentre lui va al tavolino, prende la bottiglietta nella quale aveva messo delle biglie e la rovescia dentro la tasca del suo grembiulino facendo rumore. Leonardo lo guarda e dice: "Lo so dove le hai messe. Le hai in tasca!" Mentre fa questa affermazione la verifica guardando dentro la tasca del grembiule di Valentino e grida: "Sìiiiiiiiii! Ho vinto!" (C'è ipotesi che viene verificata).

Ettore ha appoggiato le assi di legno ai tappetoni appoggiati, a loro volta, alla parete. Le assi rimangono in piedi ed Ettore può andare a prendere dei cartoni che pone sopra le assi di legno. Alice dice qualcosa ad Ettore ma questi le risponde: "Queste cose le fanno solo i maschi, non le femmine."

Francesco sta collaborando con Ettore e Alice. Ad un tratto Ettore si alza, va verso il tavolo dicendo: "Cosa ci possiamo mettere? Cosa ci possiamo mettere? Ecco cosa ci possiamo mettere per fare una barella." E così dicendo, prende un cartone di forma rettangolare e lo porta dove ha appoggiato le assi di legno e il pezzo di cartone precedente. Appoggiano un cartone per terra e sopra mettono le assi di legno come a formare una lettiga. Ettore si alza nuovamente, va verso il tavolo, rovista nel materiale e dice: "Questo no, ecco prendo un altro cartone." Lo porta ai compagni e continuano a costruire la barella. Valentino invita, nuovamente, Leonardo a giocare per indovinare dove abbia nascosto la biglia. Mentre Ettore, Alice e Francesco continuano a posizionare le assi di legno, fissarle con il nastro adesivo e progettare dove i medici devono reggere la barella, Valentino prende la busta trasparente e chiede a Leonardo se vuole colorare con lui. Leonardo prende la sua busta trasparente e fanno la stessa cosa Francesco e Alice. Leonardo apre la busta, ne guarda il contenuto per poi andarla a riporre dentro il contenitore nel quale l'ha trovata. Valentino, invece, prende la lente e guarda attraverso essa il pavimento e altri oggetti contenuti nella busta. Alice apre la busta dicendo a Francesco: "Guarda! Ho la matita rosa." Francesco prende la sua matita e controbatte: "La mia è verde." Francesco prende la torcia, la accende e la punta sopra la busta trasparente per poi spegnerla. Alice prende la sua torcia e dice a Francesco: "La mia è arancione e la tua verde." Mentre dice così, avvicina la sua torcia a quella di Francesco per confrontarle. Francesco prende la sua matita, apre il quaderno e inizia a disegnare. Alice si avvicina con la busta a Valentino e chiede cosa stia facendo. Valentino ha fatto alcuni segni poi ha preso la lente e sta guardando attraverso essa i segni che ha fatto sul quaderno con la matita senza verbalizzare nulla. Leonardo è andato da Ettore che sta ancora lavorando con le assi di legno alla costruzione della barella. Mentre si dirige verso il tavolo del materiale, calpesta un pezzo di nastro adesivo che si attacca sotto le suole delle scarpe. Prova a scalciare cercando di fare staccare il nastro adesivo. Prova ancora qualche volta per poi staccare il nastro dalle scarpe aiutandosi con le mani. Leonardo torna a giocare con Ettore, prende due assi di legno, le prende in mano e cammina appoggiandosi alle assi. Ettore lo guarda e afferma: "Queste sono le tue stampelle." Leonardo posa in terra le assi e ci sale sopra (un piede su ciascun asse), poi torna da Ettore, posa le assi di legno in terra e ci sale nuovamente sopra cercando di fissare le scarpe alle assi con uno spago. Ettore si sdraia sulla barella "come un malato" e Valentino si avvicina e interviene nel gioco prendendo due assi dalla struttura costruita da Ettore. Quest'ultimo si lamenta: "Noooo, Vale.!"

Leonardo prende le due assi di legno e si allontana dal gruppetto sbattendo le assi l'una contro l'altra. Valentino si infila le ciabatte al contrario (mettendo la suola nella parte superiore del piede), si gira, appoggia le mani per terra e sbatte le ciabatte per terra.

Leonardo si mette in piedi davanti alla finestra e osserva la propria ombra sul pavimento poi prende le due assi di legno, le appoggia alle orecchie e osserva ancora la propria ombra proiettata per terra. Ettore si avvicina a Leonardo e interrompe le prove che Leonardo sta facendo osservando la sua ombra ed entrambi si avvicinano a Francesco e Alice che stanno disegnando e poi si allontanano. Ettore deve aver portato qualcosa vicino alla bocca perché intervengo dicendo: "No, Ettore non mettete nulla in bocca anche perché ci avete camminato sopra." Ettore si avvicina all'armadietto dove ci sono sopra le buste trasparenti e dice: "Maestra non riesco a prendere il mio quaderno." Io mi avvicino, prendo il contenitore delle buste e lo appoggio per terra. Leonardo si posiziona nuovamente in piedi di fronte alla finestra, prende il coltellino di plastica che era nella sua busta e fa alcuni movimenti osservando cosa accade all'ombra sul pavimento poi si avvicina a Valentino che è seduto sul pavimento e sta cercando di aggiustare le ciabatte dalle quali si è staccata una fettuccia di plastica. Non appena riesce a fissare nuovamente la fettuccia, si alza e raggiunge Leonardo che è dai tappetoni. Valentino si siede con Ettore vicino al contenitore delle buste trasparenti e le passano in rassegna dicendo a voce alta a chi appartiene la busta riconoscendo il simbolo che hanno scelto per identificarle. Leonardo va verso Francesco e con il coltellino fa finta di pettinarlo. Francesco interviene e, in modo seccato dice: "noooo!". Lo fa nuovamente e Francesco reagisce ancora allo stesso modo. A questo punto, Leonardo va verso Ettore e Valentino e prova a far finta di pettinare con il coltellino Ettore anche se è un a "toccata e fuga". Alice segue Leonardo e tornano indietro ridendo. Leonardo ripete l'operazione con un modo di fare che lascia intendere di voler stuzzicare il compagno. Intanto Ettore ha tirato fuori tutte le buste…Io chiedo: "Ettore, hai trovato la tua busta?"

Ettore: mi guarda e risponde "Sì." Io intervengo chiedendo ai bambini di riporre le buste che, nel frattempo, avevano tolto dal contenitore. Valentino prende da una delle buste una torcia e la accende, si alza in piedi e fa qualche passo verso di me con la torcia in mano. La torcia che ha preso ha una manovella che serve per ricaricarla e Valentino la gira più volte. Leonardo prende il suo coltellino, fa qualche verso e corre verso Francesco guardando, però, l'ombra sul pavimento, poi torna indietro, muove la mano con il coltello e osserva nuovamente cosa accade quando passa davanti alla finestra e la sua ombra si proietta sul pavimento poi infila il coltellino in tasca. Ettore si avvicina a Francesco e Alice sempre seduti a disegnare e chiede, rivolto a Francesco: "E' tuo questo righello?" Francesco risponde: "No!". Alice interviene chiedendo a Ettore: "In che busta lo hai trovato?" Ettore risponde: "In nessuna busta." A questo punto, Ettore, Alice, Leonardo si alzano e ripongono il quaderno dentro la busta e la busta nel contenitore sopra l'armadietto. Leonardo prende un imbuto e batte il coltellino sull'imbuto e poi propone di cantare una canzone. Ettore prende un altro imbuto, lo porta davanti alla bocca e produce dei suoni. A quel punto si alza anche Pietro che, fino a quel momento, era rimasto seduto ad osservare quello che facevano i compagni e prende un imbuto. Valentino, sempre girando la manovella della torcia, si avvicina alla telecamera e, ricordandosi che due giorni prima era caduta perché scontrata dai bambini mentre correvano, mi chiede: "Questa l'hai appena presa? Dov'è l'altra?" Io chiedo: "L'altra quale?"

Valentino: “Quella dell’altro giorno.”

Io: “Ah, ti sei ricordato che l’altro giorno era caduta ma per fortuna non è capitato nulla e non si è rotta.” Intanto mi accorgo che il tempo a disposizione è finito e avviso i bambini che occorre riporre tutto per tornare in sezione.

VERBALE INCONTRO PRELIMINARE DI OSSERVAZIONE

GRUPPO B

I Bambini che partecipano all'incontro sono 5: Elena, Alice e Ginevra di 5 anni, Arianna e Dario di 4 anni. Mancano Fabrizio, Giovanni di 4 anni. Negli incontri successivi Ginevra sarà sempre assente per motivi di salute.

Prima di tutto spiego ai bambini che oggi dovremo lavorare in questa stanza (aula con angolo per gioco simbolico, tavolini con sopra costruzioni, macchinine e un grosso tappeto che utilizzano per guardare la tv nei momenti di transizione per dare modo di preparare per il pranzo, la merenda…) perché nello spazio dove facciamo l'attività si è rotto il riscaldamento e fa molto freddo essendo esposto verso l'esterno. Chiedo loro di avere pazienza ma finchè staremo insieme dovranno utilizzare il materiale che ho portato loro evitando di prendere i giocattoli presenti nell'aula (alcuni tavoli con sopra giocattoli li ho coperti con alcuni teli).

Introduco l'incontro dicendo ai bambini che, come la volta scorsa, ho portato loro del materiale con il quale potranno fare ciò che vorranno. Li osserverò, prenderò appunti e riprenderò con la telecamera ciò che faranno e cosa scopriranno utilizzando il materiale a loro disposizione.

Quando faccio riferimento a quanto accaduto la volta precedente con le parole *"come la volta scorsa"* Ginevra mi dice "*Io non c'ero l'altra volta".* Elena comincia a raccontare: "L'altra volta avevamo messo questi così (prende le assi di legno e ne appoggia una sopra una bobina di nastro decorativo per darle inclinazione rispetto al pavimento) e guardavamo quali palline andavano più veloci." I bambini, insieme, prendono le assi di legno e costruiscono una pista nella quale il primo tratto è inclinato. Prendono le biglie e le fanno rotolare lungo il percorso osservandone il percorso. Elena, in particolare, prende le biglie, le appoggia all'inizio della pista e le lascia rotolare lungo il percorso osservandole. Ad un tratto Arianna chiede di poterlo fare anche lei.

Arianna: posso farlo io?

Elena: Sì…

Arianna prende una biglia, la lascia andare all'inizio della pista ma, a differenza di ciò che è accaduto fino ad ora, la biglia esce dal percorso. Elena conferma l'osservazione dicendo che la biglia non è arrivata in fondo al percorso.

Elena: Oh, questa è uscita.

Arianna prende, scegliendola tra altre nella scatola, una pallina diversa per dimensioni e materiale (forse per vedere se e lascia rotolare sul percorso osservando che esce fuori dalla pista ("Questa è andata fuori"). Dario, Ginevra e Alice osservano….

La fuoriuscita delle palline dalla pista diventa l'occasione, anche per, Ginevra, Alice e Dario di recuperarle e provare a farle andare sulla pista. Il gruppo, ora, fa rotolare le palline sulla pista con l'obiettivo di osservare quelle che stanno nel percorso e quelle che fuoriescono. Questo intento è provato dalle osservazioni che esplicitano una volta che la pallina raggiunge la fine della pista.

Arianna prende una biglia di gomma, la fa rotolare lungo la pista osservandola mentre percorre la pista, e si accorge che esce prima di arrivare al termine del percorso. Osserva: "Questa è uscita fuori"

Elena, osserva quello che fa Arianna e sceglie una biglia e fa la stessa cosa osservando alla fine: "Questa c'è stata dentro".

Dario, Arianna e Elena riprovano e osservano, di volta in volta, quando le palline stanno nel percorso fino alla fine e quando, invece, escono fuori prima. Più che al materiale con il quale sono fatte le palline (si accorgono che sia le biglie di vetro, sia quelle di gomma, talvolta stanno sull'intero percorso altre volte fuoriescono) sembrano fare attenzione a dove posizionano la biglia prima di lasciarla rotolare giù (tendono a posizionarla più al centro dell'asse di legno. Ginevra, mentre prova a far rotolare una pallina, sposta involontariamente un'asse di legno ed Elena (con tono di rimprovero) le dice: "No, così le fai cadere (intende le biglie)". Poi posiziona nuovamente l'asse spostata verbalizzando: "Questa va messa dritta." Arianna prova a spostare un'asse in modo che faccia una piccola curva ma Elena interviene, inizialmente nello stesso modo della volta precedente, ma in un secondo momento propone di mettere i pezzi che compongono la pista in modo diverso.

Elena: "Mettiamoli così per fare una curva" e posiziona due assi di legno in modo che si tocchino soltanto due spigoli, in modo da formare una curva nella costruzione.

Nel frattempo Alice ha preso una scatolina con dentro degli anellini di metallo, Ginevra osserva ciò che fanno Elena e Arianna e Dario si è spostato in prossimità della scatola con dentro alcuni dei materiali per guardarne il contenuto. Alice prova ad aprire la scatola ma si accorge subito che la chiusura è difficile da aprire. Guarda la scatolina, prova a tirare via il tappo ma non riesce, passa le dita intorno alla scatolina cercando un'apertura che la faciliti, poi tira con forza il coperchio ma non riesce a toglierlo, riprova per poi venire verso di me chiedendomi di aiutarla.

Alice: porgendomela … "Me la apri?"

Io: "Eh, questa scatola è un po' dura da aprire. Eco qui" e la restituisco ad Alice.

Arianna viene attirata dall'interazione tra me e Alice ma, una volta terminata torna dal gruppetto che si trova vicino alla pista. Dario, Arianna e Elena continuano a far rotolare le biglie lungo la pista modificata per osservarne il percorso (sta sulla pista o esce fuori). Le biglie, una volta modificata la pista che ora presenta interruzioni tra un pezzo e l'altro, escono fuori dal percorso alla prima interruzione. I bambini osservano e provano ripetutamente.

Elena: "Come mai? Deve andare così" (prende in mano una pallina e le fa percorrere la pista seguendone la forma). Successivamente dice: "Perché bisogna fare la curva" e sposta nuovamente alcuni pezzi della pista accentuando l'angolatura della curva. Prova nuovamente a far rotolare le biglie sopra la pista ma osserva che queste fuoriescono tutte una volta che incontrano la prima interruzione.

Dario inavvertitamente sposta un'asse e Arianna esclama (il tono è un po' infastidito): "Ehi! Chi è che sposta sempre tutto."

Elena: “Io perché voglio fare una curva.”

Mentre Dario continua a lavorare alla pista, Elena sposta la sua attenzione sulla scatola di anellini di metallo dalla quale Alice ha preso alcuni pezzi e li ha messi per terra vicino a lei.

Elena: prende la scatola degli anelli di metallo e dice “Questi li uso come cinci”. Prende la scatolina e fa finta di distribuire le cinci ai compagni. Ne offre anche a me.

Elena: “Vuoi una cinci? Facciamo solo finta eh di metterle in bocca.” Poi si dirige verso Dario e ne offre una anche a lui dicendogli: “Fai solo finta di mangiarla. Fai solo così (e fa vedere il gesto di aprire poco la bocca e richiuderla fingendo di masticare). Poi lascia cadere questo gioco e ritorna ad interessarsi alla pista delle biglie. Alice prende anellini di metallo e li pone per terra, poi li appoggia su un porta torte rotondo… Prima prende gli anelli uno ad uno posizionandoli con attenzione, poi come se volesse fare più in fretta, rovescia sul supporto rotondo di cartone tutto il contenuto della scatolina.

Elena, Dario e Arianna modificano nuovamente la pista visto che non riuscivano nel modo in cui l’aveva progettata Elena, a far compiere l’intero percorso alle biglie. Posizionano nuovamente le assi di legno lungo una linea retta. Al termine della pista posizionano un’asse trasversalmente, un poco distaccata da quella precedente (l’intento è quello di bloccare le biglie perché non si disperdano nello spazio una volta arrivate al termine della pista). Provano a prendere le biglie e lasciare rotolare per osservarne il percorso. Questo passaggio viene fatto uno per uno aspettando di vedere tutto il percorso della biglia dall’inizio alla fine. Notano che è rimasto un po' di spazio tra un’asse e l’altro e questo fa si che le biglie cadano tra i pezzi di pista. Intervengono per cercare di attaccare le assi una all’altra facendo combaciare i lati corti ma lasciando l’ultima asse, posta trasversalmente, con un leggero distacco dalle altre. Ora provano a lasciar rotolare anche palline più grandi da ping pong che trovano nella scatola del materiale. Osservano che rotolano rimanendo sulla pista anche dove ci sono dei piccoli spazi tra un’asse e l’altra mentre le biglie vi cadono. Poi riprovano a far rotolare le biglie e finalmente riescono ad osservare alcune biglie che compiono l’intero percorso. Le palline che escono dal percorso vengono bloccate dall’asse trasversale che impedisce alle biglie di spargersi nello spazio circostante.

Ginevra, anche per il fatto di essere stata assente, sia il giorno in cui mi sono presentata ai bambini, sia nel primo incontro è rimasta più nel ruolo di chi osserva quanto accade e partecipa poco. Si assenta un paio di volte dalla stanza per poi rientrare dopo qualche minuto.

Elena continua a sperimentare sulla pista e sembra maggiormente interessata a modificarne la forma e provare con diverse palline a vedere se arrivavano alla fine del percorso costruito. Mentre lascia rotolare le biglie di vetro e le palline di gomma sulla pista esplicita alcune osservazioni.

Elena: provando a far rotolare biglie di diversa dimensione e di diverso materiale: “Guarda (con tono di sorpresa) queste di questo tipo (vetro) vanno fino in fondo…” ma viene smentita quasi subito da una biglia che fuoriesce dal percorso e sembra accorgersene perché scuote leggermente il capo. Finalmente una pallina compie tutto il percorso, fino alla fine ed Elena con tono di soddisfazione commenta: “Finalmente!”

Dario ha scelto una pallina gialla di plastica e di dimensioni un po' più grandi di una pallina da ping pong e la lancia per terra osservandola rotolare. In questo modo si allontana dallo spazio nel quale si era concentrato il gruppetto fino a quel momento. Alice rimane sempre vicino alla scatola del materiale dove ci sono le palline, i tappi e le scatoline con gli anelli di metallo. Ginevra, nel frattempo è rientrata e ha raggiunto Alice vicino alla pista. Elena ha aggiunto alcuni pezzi alla pista: "Ho fatto la pista un po' più lunga, ragazzi."

Elena, Dario, Alice provano a far rotolare sulla pista oggetti di forma diversa (tappi, bobine di nastro e spago) e palline di grandezza e composizione diversa. Osservano sempre se gli oggetti che mettono sulla pista completano il percorso oppure no. Elena prende un tappo di sughero e lo lascia rotolare sulla pista ma nel tratto in piano nota che la velocità diminuisce fino a quasi fermarsi. A questo punto prende il tappo e gli dà una spinta fino a fargli completare il percorso esclamando soddisfatta: "io sono arrivata fino alla fine."

Ginevra prende la sua busta con il kit (quaderno A5 a quadretti, matita, righello, lente di ingrandimento, coltellino di plastica e torcia), viene verso di me mostrandomelo e chiede: " A cosa serve questo?"

Io: "A cosa serve?" Ripeto come per verificare se ho sentito bene… "Guarda un po' dentro cosa c'è"

Ginevra prende il quaderno e io accompagno ciò che fa con le parole "c'è un quaderno dove potete disegnare e segnarvi le cose che avete fatto qui." Elena, si allontana dalla pista e raggiunge Ginevra che è davanti a me e rivolgendosi a me chiede: "Possiamo prendere i nostri quaderni e giocare alla scuola come abbiamo fatto l'altra volta?"

Io: Arianna, Alice e Dario sono ancora interessati alle biglie e alla pista e la scorsa volta Elena aveva chiamato tutti i suoi compagni facendo loro prendere il quaderno per giocare alla scuola. Prima di acconsentire chiedo a Elena se è sicura di aver guardato tutto il materiale che ho portato loro prima di prendere il quaderno per fare quel gioco. "Elena, hai visto tutto il materiale che ho portato? Pensi non ci sia nulla che si può scoprire, ancora?"

Elena: "Ho visto proprio tutto e ho scoperto le palline che rotolano qui. Posso?"

Rispondo: "Se pensi di aver visionato tutto quanto il materiale dentro i contenitori…" Elena interpreta la mia risposta come un No e si dirige verso Alice dicendo "Ha detto di no!"

Intanto torna Ginevra con la sua busta e mi chiede di dirle cosa c'è dentro…Rispondo elencando gli oggetti dentro la busta mentre lei li tira fuori…ad un tratto chiede: "Questa cos'è?"

Io: è una lente di ingrandimento, prova a chiedere ai tuoi compagni che la volta scorsa avevano provato a utilizzarla…

Ginevra: Io ne ho una che serve per guardare gli insetti

Io. Faccio un cenno di conferma e osservo cosa decide di fare Ginevra che sembra indecisa e interessata, ancora, a quanto fanno Arianna e Dario con i diversi oggetti che mettono sulla pista.

Dario ad un tratto corre verso Elena e Alice esclamando entusiasta: “Venite a vedere. La mia è andata un po' più forte.” E le conduce dalla pista mostrando cosa succede alla pallina che pone sulla pista e che fa rotolare imprimendole una piccola spinta in avanti. La pallina, però, a metà pista rallenta, Elena si allontana e in sottofondo si sente la sua voce che dice (in tono perentorio): “Alice, vieni ti preparo la cena.”

Dario e Arianna continuano a far rotolare le palline e le biglie sulla pista lasciandole rotolare oppure imprimendo loro piccole spinte e osservandone gli effetti. Mi accorgo che Alice ed Elena stanno prendendo giocattoli dall’angolo della cucina e intervengo: “Scusate, so che ci sono molte cose e giochi che vi possono attirare in questa stanza. All’inizio dell’incontro, vi ricordate, vi ho detto che avreste dovuto sforzarvi di non utilizzare i giocattoli ma solo il materiale che vi avevo portato e di aver pazienza ma non era possibile fare il nostro incontro nell’altra aula perché il riscaldamento era rotto e avremmo avuto troppo freddo (eravamo a metà gennaio). Elena e Alice, con l’aria un po' delusa, rimettono a posto le cose prese dalla loro cucina ed Elena torna vicino alla pista. Osserva per un momento e quindi prende alcuni tappi di metallo e li pone sopra l’asse inclinato della pista dicendo: “Vediamo se mettiamo questi qui se le palline rimbalzano”. Mentre Elena posiziona i tappi, l’uno davanti all’altro lungo la pista, Dario prova a far rotolare una pallina di plastica da ping pong e osserva che appena incontra uno dei tappi esce dalla pista. La prende e riprova spingendo verso il basso i tappi per lasciare più spazio tra l’inizio dell’asse di legno e l’inizio della fila di tappi. La pallina rotola e quando incontra i tappi esce dal percorso. Elena si avvicina a Dario e, con un tono di rimprovero, dice: “Non si fa così, vanno messi così (rimette i tappi, a partire dall’inizio dell’asse inclinato, lasciando uno spazio che a lei sembra adeguato) perché se no le palline non rimbalzano.”

Ginevra si avvicina a me e chiede nuovamente di poter uscire perché vuole bere. Penso di chiederle se può resistere un poco perché mi sembra che il bisogno di andare in bagno (dopo 2 minuti, poi dopo altri 6 minuti e successivamente dopo 10 minuti possa essere anche un segnale di disagio nel trovarsi in un gruppo che si è formato la volta precedente e che ha iniziato a fare un lavoro di cui lei non è stata sufficientemente messa a conoscenza). In quel momento mi accorgo di non aver detto al gruppo la durata del nostro incontro e come faranno a capire quando sarà ora di tornare in sezione con i loro compagni. Lo ricordo ora: “Mi sono ricordata di non avervi detto che il nostro incontro durerà un’ora e che pochi minuti prima che si concluda io ve lo dirò così potrete finire ciò che state facendo e potremo mettere a posto prima di tornare dai nostri compagni.”

Mentre sto parlando, Elena prende dei tappi di plastica e dice: “E qui sopra (ai tappi di metallo) metto dei tappi (di plastica delle bottigliette di acqua). Mancano ancora venti minuti alla fine dell’incontro ma provo, ugualmente, a chiedere a Ginevra se riesce ad attendere ancora un poco e lei accetta tornando verso Alice. Quest’ultima ha trovato i porta torte per terra e prova a prenderne due (uno in ogni mano) li appoggia bene per terra, li fa arretrare un poco per poi lanciarli facendoli rotolare sul pavimento. Elena se ne accorge e va verso Alice dicendo, con il tono piuttosto esigente: “Mi servono questi.” Alice rifiuta di darglieli ed Elena torna verso Arianna e Dario e prende lo stesso oggetto sul quale Alice all’inizio aveva posizionato gli anellini di metallo. Elena prende il porta torte dal quale ha tolto gli anellini e lo posiziona al fondo della pista costruita in precedenza. Alice, in un’altra parte della stanza chiede a Ginevra: “Vuoi giocare con me?”. Ginevra accetta e iniziano a lanciare

il porta-torta facendolo rotolare sul pavimento, lo seguono con lo sguardo, finchè non oscilla e cade. Durante questa attività le due bambine non verbalizzano e non sembrano porsi domande su come fare a farli rotolare sempre più lontano.

Elena continua ad apportare modifiche sulla pista aggiungendo tappi o cambiando loro posizione, Dario prova a far rotolare le biglie e osserva ciò che accade quando la biglia incontra un tappo/ostacolo lungo la pista. Ad un tratto toglie i tappi di plastica che Dario aveva messo sopra quelli di metallo, ne tiene alcuni in mano, si avvicina a me e chiede: "Ma dove sono le bottiglie?"

In effetti, fino ad ora il gruppo ha esplorato soltanto il materiale che ha attirato immediatamente la loro attenzione e che si trovava per terra lasciando completamente perdere quello che avevo posizionato nelle scatole sui tavolini. Io: ah, le bottiglie…è vero! E indico dove si trovano le bottiglie di plastica avvicinandomi alla scatola su un tavolino.

I bambini prendono le bottiglie. Ginevra prova a metterci dentro una pallina matta di gomma ma è troppo grossa rispetto all'imboccatura della bottiglia e la pallina non entra. Così sceglie le biglie – cosa che fanno anche gli altri bambini – cominciano a riempire le bottigliette con le biglie di vetro e scuotendole, di tanto in tanto per sentirne il rumore. Ad un tratto il rumore, fatto dalla maggior parte dei bambini scuotendo le bottiglie con le biglie dentro, diventa forte perché Elena esclama con l'espressione infastidita e portando le mani alle orecchie: "Piano! Pianooo!".

Alice e Ginevra sono in terra vicino alla scatola con dentro tappi e alcune bottigliette che Elena ha riposto, le prendono e cominciano a riempirle inserendo all'interno dell'apertura biglie e anelli di metallo. Elena trova la scatola dove dentro ci sono altri tappi di sughero e dice: "Ecco la scatola dei murshmellow!" ma non riceve riscontri dai compagni. Arianna e Dario si sono allontanati dalla pista e sono in fondo alla stanza dove ci sono i tavolini e rovesciano il contenuto delle loro bottigliette per vedere rotolare a cadere sul pavimento le biglie. Dario si getta in terra per cercare di recuperarle. Alice, rovistando in una delle mie borse del materiale, trova un sacchetto con sassi che avevo deciso di non mettere nel materiale in questi primi incontri ma, nonostante ciò, lascio che lo usino per non bloccare lo slancio che hanno avuto nell'allontanarsi dallo spazio limitato nel quale erano stati fino ad allora costruendo la pista di biglie. Alice guarda ancora dentro il borsone e trova la scatola dove ci sono altri tappi di metallo e li prende. Ginevra ha recuperato una bottiglietta con le biglie dentro e la scuote muovendola dall'alto verso il basso davanti agli occhi. Elena la raggiunge, gliela prende sollevandola e scuotendola richiamando l'attenzione di Dario.

Elena: "Dario! Dario. Dario!" Dario si volta e Elena aggiunge indicando la bottiglia che ha in mano "Guarda!" Infine restituisce la bottiglietta a Ginevra. La pista non raccoglie più l'interesse dei bambini che si sono spostati in altre parti della stanza dove sono posizionati altri materiali fino a poco prima non considerati. Dario prende distrattamente una bottiglietta di plastica e la sbatte sui tavolini per poi andarsi a sedere vicino ad Alice. Lì si guarda attorno e dice: "Queste sono pietre". Elena si alza e prende la scatola con il materiale che, fino a poco prima, avevano utilizzato per fare esperimenti con la pista costruita con le assi di legno e la trasporta vicino a dove stanno giocando Alice e Dario. Elena cerca di portare, ancora, l'attenzione dei compagni sul gioco del campeggio dicendo che vuole accendere un fuoco ma non sembra trovare consensi se non da parte di Alice… Arianna e Ginevra continuano a

provare le loro bottiglie con dentro le biglie riproducendo diversi ritmi aumentando e diminuendo la velocità intensità con la quale scuotono questi strumenti. Ad un tratto Alice nella borsa del materiale (dentro avevo lasciato le scatole dei tappi, altri rotoli di nastro adesivo e le torce che avrei dato loro alla fine dell'incontro da inserire nel loro kit) trova la busta con le torce e mi chiedono di aprirlo. Prendono le torce, le accendono, le puntano per terra, sul materasso, sui muri e guardano l'effetto che si produce. Alice va a spegnere la luce e quando riaccende la torcia esclama soddisfatta: "Guarda, si vede di più!". Ginevra è seduta in terra e non sembra interessata a ciò che fanno i compagni ma è intenta a riempire del tutto la sua bottiglia con le biglie di vetro. Quando ha terminato di riempire la bottiglietta, mette il tappo, si alza e accende la sua torcia seguendo i compagni. Alice, con la torcia, prova a far passare la luce attraverso una fessura della porta a soffietto che separa lo spazio dove ci troviamo noi dall'aula dove sono i compagni e le maestre, Elena fa la stessa cosa e osserva: "Non ci vedono." (fa questa osservazione perché si accorge che da parte dei compagni nell'altra stanza non vi è alcuna reazione che possa dirle che hanno visto la luce proiettata dalla sua torcia). Si appoggiano alla porta e intervengo chiedendo loro di fare attenzione e di spostarsi dalla porta. Qualche bambino prova a prendere due torce, le accende puntandole sul pavimento e le muove velocemente a destra e sinistra. Per un po' continuano a provare le torce puntandole in diverse parti della stanza, Elena ripropone il gioco del campeggio e di far finta di accendere un fuoco. C'è un piccolo "battibecco" tra Elena e Arianna…

Elena: "No. Quello è il fuoco per accenderlo".

Arianna: "No! Qui c'è il tesoro".

Alice torna a guardare dentro altre borse di materiale dove però ho lasciato ciò che servirà al gruppo che incontrerò nel pomeriggio (ciò che serve per rimpiazzare il materiale che si fosse, eventualmente, rovinato la mattina) e cerca di prendere qualcosa.

Io: "Ascoltate, non prendete quel materiale perché servirà ai vostri compagni oggi pomeriggio ed è lo stesso che avete voi a disposizione."

Dario ha preso il contenitore cilindrico trasparente che conteneva le biglie, ha tolto il tappo, ha inserito la torcia accesa e rimesso il tappo osservando l'effetto che si produceva. Tolto il tappo la torcia è caduta a terra. Successivamente prende la torcia ma invece di inserirla all'interno del cilindro, la punta contro la superficie trasparente e guarda…Posa il contenitore e se ne va. Dopo qualche secondo arriva vicino a me Ginevra (in tutto questo tempo non mi ha più chiesto di uscire) e mi mostra la bottiglietta che ha riempito di biglie fino all'orlo e dice contenta: "E' bella!" Poi prende una torcia che gli porge Dario e la punta sulla bottiglia senza esplicitare nulla e, intanto, si allontana raggiungendo i compagni. Elena la guarda e con un tono di rimprovero afferma: "No quella (la torcia) non è tua! E' di Dario." Ginevra ribatte: "Ma me l'ha data lui" ma Elena si alza e la prende. Dario si avvicina a Ginevra e le dice: "tieni questa." Poi Dario e Arianna vengono verso di me per prendere il sacchetto che conteneva le torce. Alice sta inserendo degli anellini di metallo dentro un rotolo di spago facendo attenzione a che gli anelli finissero proprio dentro al rotolo. Ginevra si avvicina ad Alice e le porge due torce dicendole: "Queste sono tue." Elena che è seduta per terra guarda verso le compagne e le ammonisce: "No, quelle non sono tue nel senso che te le puoi portare a casa." I bambini, a questo punto, (mancano dieci minuti al termine dell'incontro) continuano ad accendere e spegnere le torce osservando cosa accadeva sulle

superfici dove la torcia veniva puntata. Ginevra porta con sé la sua bottiglia piena di biglie ed Elena vorrebbe aprire altre scatole dentro alla borsa del materiale. Spiego a Elena che le cose che ho lasciato incartate serviranno le prossime volte. Mentre parlo con Elena, Dario afferma: “Ho scoperto una telecamera.” Punta la luce della torcia dentro l’obiettivo per vedere cosa accade sul monitor.

Io: Hai scoperto la telecamera, bene! Fate attenzione soltanto a non scontrarla perché, per riuscire a vedere bene tutto lo spazio ho dovuto metterla sopra questo piccolo tavolino e rischia di cadere. Elena prova ancora a puntare la luce dentro l’obiettivo. Elena prende due torce, cammina per la stanza con la luce accesa e muovendo le torce osserva come si muove la luce sul pavimento aumentando e diminuendo la velocità con la quale sposta la torcia a destra e sinistra. Poi vede il porta torta per terra e ricorda che stava giocando al campeggio e chiama a raccolta i compagni: “Sono pronti i murshmellows, venite!” Alice arriva e si siede per terra, prende un tappo di sughero/murshmellow ma Elena la blocca e la redarguisce: “Ehi! Si aspettano gli altri prima di mangiare.” Non riceve riscontro né da Dario e neppure da Arianna e Ginevra così le chiama avvicinandosi a loro. Neppure questo tentativo ha successo. Elena, allora, va a prendere altri porta-torte: “Basteranno questi piatti?” In questo frangente Arianna e Ginevra colgono l’occasione per allontanarsi dal posto nel quale Elena ha allestito il campeggio.

Io: “Allora, è finita l’ora. Vi ricordate che il nostro incontro di oggi durava un’oretta e che vi avrei avvertito quando stava per finire il tempo così potevamo organizzarci insieme per riordinare visto che oggi lavoreranno qui i vostri compagni. Bene! Allora, adesso vi aiuto così mettiamo un po' a posto così potrete preparavi per il pranzo con i vostri compagni.

VERBALE 1° INCONTRO

GRUPPO B

Io: *accolgo i bambini nella stanza.* Guardate vi ho portato delle cose, del materiale e voi con ciò che vi ho portato potete fare quello che volete. Io sono molto curiosa di vedere cosa riusciremo a scoprire insieme anche perché vi ho portato delle cose diverse rispetto all'altra volta.

Giovanni mi dice che deve andare in bagno e gli dico…Ok però quando hai finito torna qui con noi. Elena corre per aiutarlo ad aprire la porta ma mi accorgo che c'è riuscito da solo e la fermo dicendole di aspettare perché era riuscito da solo ad aprirsi.

I bambini iniziano a prendere le cose a loro disposizione e a metterle nell'acqua. Elena ed Alice, mette un legnetto, dei tappi nell'acqua…

Elena ed Alice: io cerco quello che va giù.

Elena: *osservando le cose che ha nella vasca*…Questa non cade…

Arianna (4 anni): La mia cade…

Elena si avvicina, guarda e dice: No, la tua non cade.

Elena: *torna dalla sua vasca e dice mettendo i tappi di metallo dentro l'acqua dice* Guarda! questi sono andati giù, i tappi

Io: *ripeto rivolgendomi a tutti* Alice vuole scoprire tutte le cose che vanno giù. Proviamo?

Alice: questi sono andati giù *(le brugole).*

Io: Hai visto cosa fanno Alice ed Elena? *Mi accorgo che è ancora titubante essendo la prima volta che partecipa ai nostri incontri e senza insistere troppo provo a coinvolgerlo…*

Alice: ci dobbiamo mettere le cose più pesanti perché le cose più pesanti non riesce a reggerle (*l'acqua?)* e quindi vanno giù.

Io: *raccolgo l'osservazione di Alice e la rilancio al gruppo*. Avete sentito cosa ha notato Alice? Che le cose pesanti vanno giù, in fondo.

Elena: "Adesso cerchiamo quelle più leggere."

I bambini provano con tutte le cose che hanno a disposizione. Li lascio provare per un po' e osservo. Dario (4 anni) immerge una lattina vuota nell'acqua, la osserva e nota le bolle.

Io: Guardate, fa le bolle!

Alice: anche io voglio fare le bolle.

Arianna (4 anni) si avvicina e mi guarda. Le chiedo cosa vuole fare e risponde di voler provare a fare le bolle.

Io: Bene! Cosa potresti usare per fare le bolle nell'acqua?

Elena *inizia a passare oggetti ad Arianna senza che ci sia, a me sembra, l'idea di darle cose che potrebbero servire allo scopo…*Prendi, usa questi!

Io: Arianna cosa ne pensi? Hai qualche altra idea di quello che potresti usare per fare le bolle? Vediamo…

Alice: Io voglio usare questo sacchetto di plastica.

Io: Vediamo un po' se questo sacchetto farà le bolle. *Alice lo immerge ma non nota nulla…*

Elena e Alice provano a giocare con un sacchetto di plastica…Alice lo riempie di acqua, lo immerge in una vaschetta e nota che va a fondo. Elena prova a fare lo stesso, riempie il sacchetto ma quando lo tira su nota che è bucato perché esce tutta l'acqua da un buco. Allora riempie il sacchetto con palline da ping pong e nota che galleggia.

Torno da Dario perché voglio riprendere la sua osservazione sulle cose che immerse in acqua fanno le bolle…

Io: *prendo una bottiglia di plastica con il tappo e la immergo nell'acqua*. Guarda Dario, la tua fa le bolle. E la mia?

Dario: le fa piccole, piccole…

Io: *vedo che c'è Giovanni accanto a me…*Guarda Giovanni secondo te la mia bottiglia fa le bolle?

Giovanni: No!

Io: Anche secondo me non fa le bolle. Cosa ne pensate voi? Elena secondo te, questa fa le bolle?

Elena: No!

Osservo che Dario sta continuando le sue prove ha messo una pallina dentro l'acqua e un tappo e decido di riprendere questa osservazione con il gruppo quando faremo la discussione finale. Continuiamo a fare delle prove…

Io: *per riprendere gli spunti che sono emersi fino ad ora…mi sposto vicino alle vasche più grandi per terra dove stanno facendo le loro prove di galleggiamento Elena e Alice e riprendo le loro osservazioni…* Guardate un po' in queste vasche cosa hanno fatto Elena e Alice…hanno messo degli oggetti e hanno scoperto che alcuni galleggiano e altri affondano.

Poi mi sposto vicino a Dario e Arianna che hanno provato a vedere quali cose immerse in acqua fanno le bolle e provo a mettere nuovamente una bottiglietta con il tappo in acqua…

*Nel contempo…*Alice: guarda se metto la bottiglia così (con una pallina come tappo) non le fa più. Se alla coca cola metto il tappo non fa più le bolle. Invece così (senza tappo) le fa.

Io: mi sembra proprio un'osservazione importante la vostra. Le bottiglie con il tappo, chiuse non fanno le bolle se immerse in acqua, se sono senza tappo invece fanno le bolle quando le spingiamo in fondo, sotto l'acqua. *Quindi prendo una costruzione di legno e chiedo*: Secondo voi, se metto questo legnetto nell'acqua cosa succede?

I bambini si voltano e mi guardano…stanno un po' in silenzio poi…

Elena: Galleggia!

Io: Elena dice che galleggia. Proviamo?

Elena prende il legnetto e lo mette in acqua e vede che galleggia.

Ne mostro un altro e chiedo…E questo?

Elena: secondo me galleggia. E' leggero e sta su.

Alice: *interviene dicendo…* Io ho appena fatto una scoperta, che le cose pesanti stanno a galla e invece quelle leggere vanno giù (*mi sembra strana questa osservazione perché proprio lei, per prima, aveva invece detto bisogna cercare le cose pesanti perché vanno a fondo).*

Elena*: interviene guardandola* E no!

IO: Elena dice di no!

Elena: le cose pesanti stanno su e le cose leggere vanno sott'acqua.

Prendo una lattina vuota vicino ad un'altra che galleggia e la schiaccio. La rimetto in acqua e i bambini notano che va giù. Provano anche loro a schiacciare lattine e bottigliette di plastica.

Ritornano sulle cose pesanti e le cose leggere provando con lattine piene e vuote. Sono con loro vicino alla vasca più grande ad un certo punto prendo dal fondo una brugola e dico…

IO: Dite che le cose leggere stanno su e quelle leggere vanno giù? E questo anellino?

Elena: E questi sono leggeri ma vanno giù…guarda anche questi (*riferendosi ai tappi di metallo).*

I bambini sono attorno alla vasca e guardano dentro la vasca…

Io: Allora tutte le cose pesanti vanno giù e tutte quelle leggere stanno su?

Elena, Alice: No…questi sono molto leggeri però vanno giù…

Io: eh sì, esatto! Ci sono delle cose leggere che però non galleggiano…

Lascio cadere per ora questo spunto perché non emerge l'aspetto della dimensione…

Riprendo invece il discorso pesante e leggero chiedendo come si fa a sapere se una cosa è più pesante di un'altra. Non rispondono e riprenderò la domanda durante la conversazione. Vedo Dario che continua a fare le prove con le bottiglie e la lattina per fare le bolle dentro l'acqua nella vaschetta più piccola sul tavolino e c'è Giovanni accanto a lui…Mi avvicino per riprendere e fare con lui con questo "esercizio". Alice è vicina alla vasca grande per terra e ad un certo punto viene verso di me e dice:

Alice: maestra guarda ho scoperto una cosa. Se le guardo dentro l'acqua sembrano più grandi.

Io: Ah! Questa è una cosa interessante! Avete visto cosa ha notato Alice?

Elena: *(interviene subito)* Sì. Ha visto che se le guardi (sono biglie e anellini di metallo dentro alla bottiglietta con l'acqua) sembrano più grandi.

Io: ma come facciamo a essere sicuri che queste biglie che sono qui sembrano più grandi di quelle che sono fuori dalla bottiglia dell'acqua?

Alice: perché se le tiri fuori….

Io intanto mi avvicino alla vasca dell'acqua e prendo dal fondo una biglia e un anellino uguali a quelli messe da Alice dentro la bottiglia e le metto sul palmo della mia mano perché si possano confrontare con quelle che Alice ha dentro la sua bottiglia.

Io: Vediamo un po'…Arianna cosa dici? Guardate un po'…è vero che questo anellino dentro la bottiglia sembra più grande di quello che ho in mano?

Facciamo alcune prove…prendo anche io una bottiglietta e inserisco alcuni anellini e biglie…Mentre sto facendo questo interviene Elena

Elena: Siiiii, è vero! Anche nel mio…

Io: guardiamo quella di Elena…

Mentre sono vicina alle vasche grandi…Dario sta versando con la bottiglia dell'acqua sopra un legnetto rosso che, ma solo mentre usciamo dalla stanza per tornare in classe, si accorgerà aver tinto l'acqua di rosso.

Quando mancano dieci minuti alla fine dell'incontro chiedo ai bambini di asciugarsi le mani e di sedersi in cerchio per dirci quello che abbiamo fatto insieme. Mi accorgo da poco Giovanni aveva iniziato a prendere una bottiglietta, metterla nell'acqua e svuotarla…

Io: Allora, vediamo un po'…Cosa abbiamo fatto oggi?

Elena: abbiamo giocato con l'acqua.

Io: solo con l'acqua? Con quali altri materiali?

Dario (4 anni): io con quelli 8indica con la mano la vasca e le cose che lui ha messo dentro…

Alice: anche con le lattine, i tappi

Elena: costruzioni…

Alice: palline…

Io: e Giovanni cosa stava facendo poco prima che ci sedessimo qui insieme? *Provo a vedere se ha voglia di rispondere ma non insisto visto che è il suo primo incontro….*

Io: riprendo e ripeto i materiali che hanno elencato i bambini e chiedo Cosa abbiamo fatto?

Elena: abbiamo visto le cose che vanno giù e quelle che stanno su…

Io: ripeto…

Alice: E poi che le cose che sono nella bottiglia con l'acqua sembrano più grandi

Elena: e Alice ha scoperto anche che la bottiglia con le palline fa un suono più diverso dall'altra (la bottiglia con gli anellini).

Alice si alza per prendere le due bottiglie…

Io: Dario, tu cosa hai fatto? Nella tua vaschetta?

Dario: Ho fatto le bolle

Io: ecco! Dario ha fatto le bolle con la bottiglia di plastica…Poi abbiamo visto che le cose che galleggiano e quelle che affondano e cosa abbiamo osservato?

Elena: che le cose leggerissime vanno più giù e quelle così così stanno più su…

Io: *chiedo ad Alice che guarda fuori dalla finestra di sedersi con noi e le chiedo se è d'accordo con quello che ha detto Elena….*

Dario: fa il gesto con le mani e inizia a dire che le cose leggere stanno più su…

Alice: le cose leggere stanno su perché l'acqua resiste, quelle più pesanti vanno giù perché l'acqua non gli resiste…

Io: ripeto rivolgendomi al gruppo.

Elena: e allora perché i tappi (di metallo) che sono leggerissimi vanno giù?

Io: Bella domanda! Vediamo…come mai?

Elena: sono leggeri come fanno a stare su (*vuole dire come fanno a non stare su?)*

Alice: perché forse sono un po' leggeri e un po' pesanti…

Elena: impossibile…non vanno su e giù!

Io: *la dimensione non viene presa per il momento in considerazione…e provo a riportare il discorso sul peso degli oggetti che mi sembra più presente…* Dunque…vediamo se ho capito cosa abbiamo scoperto oggi e mi dite se siete d'accordo e se ho capito bene…Abbiamo scoperto che ci sono delle cose che vanno giù e altre che stanno sopra l'acqua. Alice dice che le cose pesanti l'acqua non gli resiste e vanno giù ma Elena ha osservato che ci sono dei tappi che sono molto leggeri ma che affondano e ci ha chiesto come mai?

Alice prova a spiegare…Perché forse per loro i tappi sono pesanti, ma …. *Elena interrompe*

Elena: ma se io li prendo in mano li sento leggeri….

Io: Ma allora, come facciamo a vedere insieme se una cosa è leggera o pesante? Ad essere sicuri che sia più leggera o più pesante di un'altra? *(cerco di rimanere sul peso perché mi sembra che sia l'aspetto maggiormente considerato dal gruppo) …*

Elena: Lo prendiamo in mano…

Io: Ma per esserne proprio sicuri?

Alice: *Ripropone ciò che aveva provato a dire prima*: Forse per loro sono pesanti (*intervengo per capire con "loro" a chi si riferisce.* Loro, cioè per l'acqua sono più pesanti e li lascia andare giù…

Io: si, ma per essere proprio tutti sicuri che una cosa sia più pesante di un'altra…Perché se io prendo una cosa in mano e dico che per me è pesante e poi la prende Elena, ad esempio, e dice No, no, per me è leggera…Allora per essere sicuri tutti cosa possiamo utilizzare? *Mi accorgo che il tempo è finito e devono prepararsi per la merenda quindi riprendo quanto abbiamo osservato proponendo loro di proseguire la volta successiva perché ci sono alcune domande alle quali non abbiamo provato a rispondere…*

In particolare rimaniamo d'accordo che riprendo il discorso degli oggetti che galleggiano e di quelli che affondano perché porterò con me una bilancia…

Altra cosa che riprenderò è l'osservazione sule cose che messe in acqua sembrano più grandi perché un bambino ha collegato l'ingrandimento con la lente che hanno nel kit…Questa osservazione viene fatta alla fine dell'incontro proprio mentre stiamo tornando in classe…Alice riprende le bottigliette e le guarda…dice. Le biglie sembrano più grandi nell'acqua, si ingrandiscono.

VERBALE 2° INCONTRO

GRUPPO B

Siamo già nella stanza dove facciamo la nostra attività e propongo ai bambini di raccontare a Ginevra che è tornata da poco a scuola cosa abbiamo fatto la scorsa volta…

Alice: io lo so (*prende una pallina matta, una biglia e un tappo di metallo*) perché se metto questo che è pesante va giù ma se metto questo che è leggero *(si accorge però che va giù lo stesso).*

Elena: io ho fatto un sonaglio! *Scuotendo una delle due bottigliette con dentro biglie e brugole che avevo conservato perché la scorsa volta avevano sollecitato spunti sul rumore/suono e sulla capacità dell'acqua di ingrandire le cose.*

Alice prende l'altra bottiglietta e la scuote per far sentire il suono che produce la sua…

Io: Oh! Allora vedete la scorsa volta abbiamo fatto tante cose, osservato cosa succedeva se mettevamo gli oggetti che ho portato nell'acqua…*Dicendo così, mi avvicino al tavolino dove ho messo i materiali e prendo una lattina. A quel punto Elena ricorda un'altra cosa..*

Elena: Dario aveva fatto le bolle…

Io: Elena si ricorda che la scorsa volta Dario aveva scoperto che alcune cose immerse nell'acqua fanno le bolle.

Alice: Poi abbiamo visto le cose che vanno in profondità e le cose che vanno giù…

Io ripeto e confermo che avevamo notato che ci sono delle cose che galleggiano e cose che vanno a fondo. Alice ed Elena iniziano a parlare insieme, a voce alta, per dire tutto ciò che si ricordano e in effetti sembra un po' una piccola gara a chi lo dice per prima e a chi riesce a farsi sentire; tanto che Giovanni dietro di loro si tappa le orecchie.

Io: benissimo. Bravi vi ricordate proprio tutto quello che abbiamo scoperto.

Elena guarda meglio la bottiglia con dentro acqua e palline ma per il momento l'osservazione fatta circa la capacità di ingrandire le cose dell'acqua non emerge e aspetto proponendo a Ginevra di provare a vedere cosa altro si può scoprire con le cose che ho portato. La sollecito un po' perché, nonostante sia la prima volta che partecipa mi sembra non troppo a disagio (quando sono arrivata in classe e ho salutato tutti i bambini chiamando i nomi di quelli del gruppo B, Ginevra si è alzata e avvicinata a me tranquillamente…In quell'occasione mi sono avvicinata e le ho detto il mio nome chiedendole se aveva voglia di venire con i suoi compagni e con me per fare una cosa insieme).

Alice: osserva la bottiglia con le biglie e dopo poco dice: Io mi ricordo che quando abbiamo messo le palline dentro la bottiglia e l'acqua e sembravano più grandi.

Io: ecco! Allora possiamo provare e vedere se anche i vostri compagni sono d'accordo? Possiamo provare a vedere un po' cosa vogliono fare e se magari scopriamo cose che l'altra volta non avevamo visto. *Mi avvicino con Giovanni ad una vaschetta e immergo una bottiglietta nell'acqua, la spingo in fondo e la premo sul fondo…escono le bolle…*

Fabrizio: Escono le bolle…di sapone!

Io: Sono di sapone?

I bambini si allontanano e si avvicinano alla vasca più grande dove ci sono i compagni che osservano quanto accade con gli oggetti che sono dentro l'acqua. Elena riprende la bottiglia con le biglie, la scuote e dice questo è un sonaglio…

Io: sì! Questa bottiglietta fa rumore, è come un sonaglio ma (**seleziono io**) mi ricordo, anche, e poco fa lo avete detto anche voi, che l'altra volta ci siamo accorti che guardando le palline dentro sembrano più grandi di come sono fuori dall'acqua. L'acqua ingrandisce le cose…c'è una cosa che avete nella bustina e che fa la stessa cosa…Secondo voi che cos'è?

Elena: la lente.

Io: Brava…*sto per proporre di provare se è così ma Alice dice di voler prendere la lente e aspetto lasciandola fare…Alice prova e si accorge che la lente ingrandisce….comincia a utilizzare la lente per guardare diverse cose anche dentro l'acqua. Propongo loro di ricordarsi questa cosa perché faremo una cosa insieme (l'idea è quella di provare a costruire una lente utilizzando l'acqua e vedere quali soluzioni propongono i bambini).*

Io: Vi ricordate che poco fa Alice, Elena hanno raccontato che avevano trovato le cose che andavano a fondo e quelle che stavano a galla?

Elena: questo, ad esempio, è molto leggero ma proprio non si riesce a farlo stare su…

Io: Ecco! Come mai? Elena chiede questo (tappo) è molto leggero eppure non galleggia…*Ginevra è vicino a me, in piedi…riprovo a coinvolgerla*: Vuoi provare? *Prende una pallina e la butta in acqua.*

Elena prende la torcia che hanno nella bustina, la accende e la muove sopra l'acqua notando che quando si illumina l'acqua luccica, brilla. Lascio cadere un momento il discorso sul galleggiamento e provo anche io ad usare la torcia allontanandola e avvicinandola all'acqua per vedere se emergono osservazioni che si possono riprendere (nel contempo penso, però, che per il tempo che abbiamo a disposizione occorrerà fare una scelta sugli spunti da riprendere) e i bambini si voltano verso la vasca che sto utilizzando per vedere ciò che faccio…Intanto anche Fabrizio e Ginevra iniziano, spontaneamente, a prendere oggetti e metterli in acqua.

Alice prende il suo quaderno e dice: Voglio disegnare quello che stiamo facendo…*La lascio fare…*

Elena: *ha preso il righello e dice*: sono 30 cm.

Io: Cosa? Cos'è 30 cm?

Elena: la vasca…

Elena lascia cadere il discorso e riprende la torcia…fa alcune prove e poi esclama Lo sappiamo tutti che se…*mentre avvicina e allontana la luce dall'acqua…*Guarda!!!fa la stessa cosa!

Io: un momento non lo so se lo sappiamo tutti…Cosa è che fa? Cosa succede? *Prendo la torcia, la accendo e provo anche io cercando di capire cosa sta osservando…e lo esplicito*: fa la stessa cosa in che senso?

Elena lascia perdere (non ho colto, forse, prontamente ciò che voleva fare…magari facendo ipotesi del tipo " hai forse visto che il cerchio di luce diventa piccolo e poi grande? Temevo però di suggerire troppo o dare una lettura mia piuttosto che sollecitare altre ipotesi o domande). Colgo Alice che mi fa vedere il quaderno e le chiedo cosa abbia disegnato.

Alice: ho disegnato la vasca e tu che metti la luce…*In realtà mentre disegna osserva la vasca vicino a lei e successivamente dirà di aver disegnato le cose che stanno a galla e quelle che affondano. La stessa cosa fa Elena…dirà che ha disegnato me che gioco con la luce ma gira ripetutamente lo sguardo verso la vasca mentre disegna…come volesse riprodurre ciò che vede.*

Mi dirigo verso la vasca dove Ginevra, Fabrizio e Giovanni hanno messo alcune cose ed esplicito ciò che osservo…

Io: allora, io qui vedo che avete messo nella vasca alcune cose che galleggiano e altre che affondano *(Fabrizio lo esplicita con me)*. Avete voglia di provare a mettere dentro a questa vaschetta le cose che galleggiano e in quest'altra quelle che affondano?

I bambini accolgono la proposta e iniziamo insieme a fare questo lavoro…Vedo che nella vaschetta delle cose che galleggiano c'è una lattina vuota e una bottiglietta vuota mentre nella vaschetta delle cose che affondano ci sono tappi di metallo, brugole e biglie. Mi avvicino ad una vasca dove è immersa una bottiglia che si è riempita di acqua…C'è Ginevra in piedi davanti a me…le chiedo: questa bottiglia, secondo te affonda o galleggia?

Ginevra: galleggia! *Ha risposto così perché ho messo in piedi la bottiglia e la parte alta spunta fuori dall'acqua… Per rimediare…tappo la bottiglia piena e la immergo, ne prendo una vuota e la immergo vicino all'altra. Chiedo ai bambini quale galleggia e Fabrizio si accorge della differenza tra le due bottiglie. Allora prendo la bottiglia piena e la metto tra gli oggetti che affondano e quella vuota tra quelli che galleggiano.*

A questo punto vado verso il tavolino dove Elena e Alice stanno disegnando…

Alice: Guarda cosa ho fatto *mi mostra il suo quaderno dove sopra al disegno della vasca ha scritto ciò che mi dice:* Ho disegnato tutte le cose pesanti…

Io: *prendo e rilancio lo spunto.* Vieni Alice, puoi farci vedere bene, credo tu abbia fatto una cosa utile. Vediamo un po'…vedete Alice ha disegnato le cose pesanti e le ha disegnate che vanno giù, affondano. Poi ha disegnato le cose…

Fabrizio: (*mi sbaglio a dire il nome e lo chiamo Giovanni)* le cose piccole vanno giù!

Io: ascoltate cosa ha detto Fabrizio. Ci sono delle cose piccole che vanno giù. Proviamo a vedere cosa c'è di piccolo tra le cose che abbiamo messo nella vasca degli oggetti che affondano?

I bambini prendono i tappi di metallo e le biglie mentre altri prendono palline da ping pong che sono nella vasca degli oggetti che galleggiano…Elena dice che sta disegnando le cose

pesanti e chiedo se mi sanno dire come facciamo a sapere se una cosa è più pesante di un'altra…

Elena prende un tappo di metallo e dice: Questo è leggero e dovrebbe stare su e invece va giù…

Io: riprendo la sua domanda…Come mai? *I bambini cominciano a fare qualche ipotesi* "forse perché sono pesanti; qualcuno dice che forse la risposta più logica è che l'acqua ha paura dei tappi (*lascio perdere…).* Metto l'accento sul fatto di come possiamo essere sicuri che una cosa è leggera e una è più pesante di un'altra. C'è qualcosa che possiamo usare per vedere tutti insieme se una cosa è pesante, un'altra leggera? *I bambini dicono che le cose leggere sono vuote e le cose pesanti sono piene…*

Chiedo se in casa hanno qualcosa che magari usano i genitori o i nonni per pesare…I bambini rispondono che hanno la bilancia ma che loro non la usano.

A questo punto prendo quella che ho portato e proviamo a pesare cose diverse osservando che le cose leggere, come dice Alice, quando le mettiamo sulla bilancia non fanno muovere nulla; le cose pesanti fanno muovere verso il basso la lancetta.

Alice: quando metto questa (bottiglia piena) la lancetta va giù…

Provano a disegnare e a segnare le cose che pesano…qualcuno sembra in difficoltà e mi chiede di disegnarlo io…accetto ma prendendo un foglio per me e dicendo che non sono brava a disegnare ma che potremmo cercare di vedere come fare per far capire che stiamo disegnando una bottiglia oppure un legnetto.

Alice: io ho disegnato questo con le righette che c'è sopra questa bottiglia e che quando lo compro la commessa ci passa la pistola (il codice a barre) per pagarlo.

Io: mi sembra una buona idea, così capiamo che stiamo disegnando la bottiglia e non il legnetto…

Mentre sono con i bambini mi accorgo di non aver considerato il tempo trascorso e quando vado a vedere l'orologio è trascorsa un'ora e abbiamo ancora i dieci minuti di conversazione dove vorrei provare a riprendere il discorso della lente…Propongo ai bambini di continuare il disegno con le maestre e di sederci per provare a dirci quello che abbiamo fatto, osservato, scoperto…

Io: cosa abbiamo fatto oggi? Cosa abbiamo osservato?

Elena: abbiamo disegnato le lancette…*Chiedo di spiegare meglio...le lancette di cosa…*

Alice: della bilancia…

Io: cosa abbiamo notato osservando la lancetta della bilancia?

I bambini spiegano che con le cose leggere la lancetta non si muove, sta ferma.

Io: Poi…abbiamo anche osservato che le cose messe dentro l'acqua sembrano più grandi…e Alice aveva detto che era un po' come faceva la lente (che ora ha in mano) … Cosa dite? Proviamo a vedere se è vero? *I bambini (alice e Elena in particolare) accostano l'effetto di ingrandimento della lente con quello dell'acqua.*

Io: proviamo? Possiamo provare a costruire una lente con l'acqua e verificare se davvero ingrandisce le cose piccole? Secondo voi, come si può fare?

Alice prende la bottiglia e indica che le biglie sono sul fondo della bottiglia con poca acqua e dice: questo…

Io: provo ad esplicitare…Tu dici che possiamo provare ad utilizzare il fondo della bottiglia? *(in realtà avevo pensato a fare un'altra cosa, ma raccolgo lo spunto dato dai bambini)* Cosa dite? Proviamo? Cosa serve?

Fabrizio: forbici *(riporto perché nel video non si sente bene)*

Io: allora vediamo…forse ho qualcosa che ci può servire…Questo passaggio di tagliare il fondo della bottiglia lo faccio io…Ok?

Taglio il fondo della bottiglia …mentre taglio i bambini discutono sul materiale con il quale è fatta la bottiglia…

Fabrizio: è di carta…

Un suo compagno risponde: No è plastica.

Io. Ora abbiamo il fondo della bottiglia. Adesso cosa dobbiamo fare? Cosa ci mettiamo?

Una bambina propone di metterci l'acqua e poi di chiuderlo…

Io: Ok. Ci mettiamo un po' di acqua? Proviamo?

I bambini accettano…Propongo loro di provare a vedere se funziona e se ingrandisce cose piccole…prendiamo una bottiglietta e i bambini provano a vedere se quanto scritto sull'etichetta in piccolo riescono con l'acqua a vederlo più grande…

I bambini provano e qualcuno dice. É vero…si può…

Elena: guarda con questo si può fare una lente *e mi porge un ritaglio della bottiglia di plastica più piccolo ma incavo nel quale ha messo una goccia di acqua…*

Io: raccolgo lo spunto: davvero? Proviamo?

A questo punto sta finendo il tempo a disposizione e provo a chiedere di raccontare come abbiamo fatto per costruire la lente con l'acqua…

Io: vediamo chi vuole raccontare come abbiamo fatto per costruire la lente? Abbiamo preso questo pezzetto di bottiglia…trasparente *(lo dice una bambina).* Poi?

Alcuni bambini dicono che abbiamo messo l'acqua…e che ingrandisce.

L'incontro si conclude e ci diamo appuntamento per la settimana successiva…

La prossima volta dovrei portare altro materiale (composti, miscugli?) oppure poiché hanno giocato con la torcia e con il suono si può pensare di dare una continuità all'interesse accennato e che non ho considerato in questa occasione? Fra l'altro questo gruppo aveva già mostrato interesse per il suono facendo giochi con bottiglie riempite di biglie durante gli incontri di osservazione pre-intervento.

VERBALE 3° INCONTRO

GRUPPO B

Entriamo nella stanza con il materiale e inizio ad introdurre perché ho portato anche questa volta le stesse cose delle volte scorse. Elena mi interrompe per dirmi che la mattina lei e alcuni suoi compagni sono andati nella scuola di Pallare. Ascolto e dico se sono andati a trovare i loro compagni di Pallare per il progetto incontro. Annuisce…Non riesco più a concludere l'introduzione come avrei voluto perché Alice nota una cosa e ce la mostra…

Alice: Guardate! *Indica il riflesso in movimento sul muro dell'acqua contenuta nella vasca al sole.*

Elena: Sembra un fantasma.

Alice: No! Sembra una bocca che fa…*simula il verso di una bocca grande che si apre e chiude.*

Io osservo e ascolto quanto i bambini stanno dicendo tra loro…in questo momento non mi guardano e non si rivolgono a me. Ad un certo punto Elena si volta verso di me, si avvicina e mi chiede…

Elena: Vero che sembrano dei fantasmi quelli là? *Indica i diversi riflessi causati dal sole che colpisce l'acqua nelle vaschette riflettendo sul muro.*

Io aspetto un momento…Alice ripropone l'idea della bocca che si apre e si chiude e aggiunge il verso che farebbe un fantasma. Elena riprova a chiedere a me di confermare l'ipotesi che quello sul muro sembri un fantasma. In quel momento Fabrizio interviene…

Fabrizio (5 anni): E' l'acqua questa…*indica il riflesso sul muro e l'acqua nella vasca.*

Elena guarda il riflesso sul muro e assume l'espressione "impaurita" che aveva quando parlava dei fantasmi.

Alice: Sono le ombre Elena!

Io: Sono le ombre! E' l'acqua! *Ripeto quanto hanno detto in modo enfatico. Aspetto…*

Elena: E' l'acqua che fa sul muro…*con le mani e le braccia imita il movimento un po' traballante ed ondulatorio che l'acqua muovendosi riproduce sul muro. Poi si allontana dalla vasca…*

Fabrizio (5 anni): *prende la sua torcia, la accende e la punta sull'acqua dentro la vasca e rivolgendosi ai compagni che sono con lui dice, quasi sottovoce,* Guarda!

Io: *mi avvicino…*Ecco! Mi ricordo che anche la volta scorsa avevamo provato a mettere la luce della torcia nell'acqua e mi sembrava che avessimo fatto osservazioni e per questo ho pensato di portare anche oggi queste cose: l'acqua, la torcia che avete nella busta…perché se siete d'accordo potremmo provare a vedere se ci sono altre cose da osservare.

Alice: si possono fare i disegni!!!

Io*: prendo anche io una torcia e la punto in acqua avvicinandomi e allontanandomi dalla superficie…*

Elena: mi guarda, guarda l'acqua…Io non riesco…

Alice: la mia sì, guarda!

Elena: anche io…faccio così…*si avvicina all'acqua, muove la torcia avanti e indietro, in altro e in basso.*

Alice: un attimo…

Elena: Possiamo iniziare a giocare…allora prendo i tappi.

Prende il contenitore con legnetti, tappi e li rovescia insieme nella vasca dell'acqua. Io poso la torcia e aspetto per capire in quale direzione andranno le osservazioni dei bambini che ora sono intenti a giocare con il materiale dentro la vasca. Mi sposto e scontro una delle vaschette più piccole con l'acqua che, visto il sole che entra dalla finestra, inizia a fare giochi di luce sul muro. I bambini sono colpiti da ciò che accade…

Elena: wow!!! Che ombra!!!! *Nota una vaschetta trasparente vuota (c'era prima dentro il materiale che è stato messo dentro l'acqua) vicino a lei, la prende e la muove. Vede che non succede nulla.*

Anche Alice prende la vaschetta vuota e inizia a muoverla per terra osservando cosa accade sul muro…Nulla. Loro in questo momento si trovano in una zona dove non arriva il sole.

Elena: *prende una piccola scatoletta con il coperchio trasparente, si mette in piedi e inizia ad aprirlo e chiuderlo muovendolo su e giù e intanto osserva ciò che accade sul muro… Ad un tratto (nel punto in cui è c'è un po' di sole) nota un breve luccichio sul muro ed esclama…*Guarda!!! *Il tono e l'espressione sono di sorpresa, meraviglia.*

Alice: *prova ancora con la vaschetta trasparente…la muove facendola andare avanti e indietro sul pavimento e dice* La mia non fa niente!!! (*Io, contemporaneamente sto usando la vaschetta che avevo scontrato casualmente e la muovo facendola colpire dal sole)*

Io: La sua non fa niente! *Lo ripeto a tutti con un tono di constatazione…Aspetto.*

Elena: Si che fa…guarda. *Prende ad Alice la vaschetta e la muove in alto e in basso per poi constatare:* No! Non fa niente.

Io: *istintivamente mi lascio sfuggire la domanda…*chissà perché non fa niente. *Solo ora, riguardando il video, mi accorgo e sento che Elena risponde perché c'è il sole….*

Ora alcuni bambini sono intorno alla vasca dell'acqua dove avevano gettato il materiale (tappi, bottigliette…) mentre Fabrizio punta la sua torcia sul muro proprio in una zona dove batte il sole che entra dalla finestra. Poi si avvicina anche lui alla vasca dell'acqua…

Elena: guarda quante palline (biglie) ho trovato! Le prende e le mette dentro ad una bottiglietta…

Mi sposto verso la vasca e osservo quello che stanno facendo…Sembra stiano passando in rassegna gli oggetti che prima avevano messo nella vasca gettandoli tutti insieme….Ad un tratto Elena prende una biglia, la tira e dice a Fabrizio di andarla a prendere…

Alice: Io vado dal sole. *Si avvicina alle vaschette poste al sole….*

Elena: I nostri sonagli! *Si ricorda che avevano provato a fare sonagli con bottiglie piene di biglie. Prende la bottiglietta.* Questa era mia! *Si rivolge alla compagna di fronte e dice* Tu non li hai fatti i sonagli l'altra volta…non c'eri!

Ginevra è venuta poche volte…anche a scuola…frequenza a singhiozzo.

Elena continua a riempire la sua bottiglietta per fare i sonagli…Fabrizio vicino a lei fa roteare la sua torcia...Alice ora cerca e prende dalla sua busta la sua torcia che aveva già utilizzato dentro l'acqua e che aveva posato…. Ora prova a utilizzarla accesa osservando cosa succede sul muro.

Elena: *prende una bottiglietta e comincia a riempirla di biglie…quando pensa di aver finito la solleva, la scuote e dice:* Ecco! Il mio sonaglio.

Io: *Osservo Fabrizio e Alice che in luoghi della stanza diversi ma con la torcia fanno giochi con la luce e Elena che rovescia le biglie messe nella bottiglietta (l'impressione è che volesse togliere un po' di acqua e che le siano uscite anche le biglie) e ricomincia a riempirla. Intervengo mentre anche io metto in una bottiglietta degli anellini di metallo:* Mi ricordo che anche l'altra volta avevamo provato a mettere la luce della torcia nell'acqua e per terra. Avevamo provato anche a mettere le biglie nella bottiglia per fare i sonagli.

Elena continua a costruirsi il sonaglio, prende il tappo e tappa la bottiglietta. Intanto Fabrizio si avvicina alla vasca. Ha in mano la sua lente e ha messo sulla lente la luce della torcia…Lo guardo…io sono abbassata rispetto a lui perché sto terminando di mettere gli anellini nella bottiglietta…

Fabrizio (4 anni): *guarda dentro la lente…poi guarda per terra. Lo fa un paio di volte poi dice sottovoce…* Come fa a passare? *Si accorge che la luce che lui ha messo sopra la lente passa e la si vede sul pavimento.*

Io: *ripeto la sua domanda a voce alta* enfatizzandola!!! Come fa a passare!? *Intanto mi alzo e mi avvicino a lui…guardo anche io attraverso la lente e poi sul pavimento.* Come fa a passare…

Fabrizio: Perché è di vetro…perché ci passa.

Io: Perché e di vetro…Perché ci passa… *Mi sposto per prendere una bottiglia di plastica trasparente, prendo anche io la torcia e la punto sulla bottiglia in modo che si veda la luce*

che passa e va sul pavimento. Non la vedo, ma Alice è dietro di me e sussurra la parola "passa".

Io: Ripeto a tutti…Passa! *Fabrizio mi guarda…poi va verso il tavolino, cerca qualcosa e mi rendo conto di aver preso io la sua torcia…gliela restituisco. Ora i bambini guardano le loro buste e cercano chi la torcia, chi la lente…*

Elena sta ancora costruendo il suo sonaglio…. Chiude la bottiglia e la scuote. Ehi…senti che rumore! *Passa una bottiglietta con gli anellini alla bambina vicino a lei ed Elena prende quelle con le biglie. Iniziano tutte e due a fare rumore…*

Elena, in particolare, comincia ad alzarsi, saltare, girare con le bottiglie in mano cercando di fare più rumore possibile.

Io: *prendo una bottiglietta più piccola dove c'è più acqua e meno oggetti dentro e inizio a scuoterla…*

Elena: No quella è di Alice piccola…

Io: chi è Alice piccola…*nel gruppo c'è solo una bambina che si chiama Alice…*

Elena: *lascia cadere e prende le tre bottigliette (Le due che già aveva più quella che avevo e che ha preso lei). Poi dice qualcosa su ciò che ha messo nelle bottiglie ma non sento e le chiedo di ripetere.*

Elena: Qui ho messo una biglia e tanti anelli, qui invece tante palline e pochi anelli. Capito!

Io: *vedo Elena che ricomincia a cantare e scuotere le bottiglie per fare rumore. Prendo una bottiglia vicino a me con dentro solo acqua e la scuoto.*

Elena: *si ferma, mi guarda…*La tua fa un rumore più diverso.

Io: La mia fa un rumore più diverso!? *Continuo a giocare con lei…a ritmo. Lei scuote, si ferma e allora mi introduco io con il rumore della bottiglietta….*

Fabrizio (4): *fino a quel momento sta disegnando sul suo quaderno…si avvicina a me con il quaderno aperto e dice:* Maestra qui ci sono tante cose.

Io: *guardo il suo quaderno, indico il suo disegno…*Ci sono tante cose! (il tono è più enfatizzato)

Fabrizio: Si…indica gli oggetti nella vasca e dice…sì, lì ci sono tante cose.

Io: Ah! Tu dici che hai disegnato le cose che sono qui nell'acqua.

Fabrizio: Sì…*e continua a completare il suo disegno…*

Elena prende le sue tre bottiglie, le scuote, si rivolge alle compagne che stanno disegnando per terra e chiede: Venite a giocare con me?

Alice: *si alza va verso Elena e dice* Io voglio la mia bottiglia…

Anche l'altra bambina chiede la sua bottiglia ed Elena gliela porge. Iniziano a girare attorno alla stanza scuotendo le bottiglie, provando ritmi diversi utilizzando oggetti che

hanno preso dal loro kit (coltellino di plastica, matita…). Osservo, ho la mia bottiglia in mano e penso al discorso del rumore/suono diverso che aveva notato Elena poco prima…. Prendo una bottiglia, svuoto l'acqua e metto dentro oggetti senza l'acqua. Elena si avvicina alla vasca, toglie il tappo dalla sua bottiglia e dice: Io metto ancora più acqua.

Riprendono a girare e scuotere le bottiglie.

Elena: Facciamo chiasso!!!

I bambini provano a fare rumore non solo con le bottiglie e gli oggetti che sono dentro, ma prendono legnetti dentro l'acqua per batterli contro le bottigliette.

Io mi sposto…metto nella mia bottiglia biglie di vetro senza che ci sia acqua nella bottiglia e inizio a scuotere…. Si accorgono che nonostante non ne abbia messe tante la mia bottiglia fa molto rumore ed Elena chiede: Cosa hai messo!?

Io: mostro la bottiglia e rispondo che ho messo biglie…

Elena va dove ero io pensando ne abbia messo di un tipo diverso, dice: Anche io le voglio! T*rova le biglie che ho utilizzato e vede che sono le stesse…Vuole la mia bottiglia e la prende.*

Io prendo la sua che nel frattempo ha posato, vado verso la vasca dell'acqua ne rovescio il contenuto trattenendo solo le biglie. Poi la scuoto. Elena si accorge che il rumore è cambiato, più forte. Si ferma, prende la bottiglia che ho in mano e dice: Hai tolto l'acqua… (*il tono è tra la sorpresa e il rimprovero per aver tolto l'acqua dalla bottiglia che aveva utilizzato lei). Prende anche quella bottiglia e la scuote girando e saltando intorno alla stanza. Fabrizio e Alice sono al tavolino e lui disegna, Alice ha in mano righello, matita…*

Io mi avvicino alla vasca, prendo una delle bottiglie lasciate prima dai bambini con dentro gli anelli di metallo, tolgo l'acqua…la scuoto e avvertono il rumore amplificato perché non c'è acqua…

*Elena: si ferma…*Ehi, ma quante palline hai messo!

Io: *mostro la bottiglia e dico:* Quante palline ho messo?

Elena: nessuna!

Fabrizio: *venendo verso di me con la torcia…la punta sulla bottiglia che ho in mano.* Guardate la luce! *Torna al tavolino, posa la torcia e prende la lente…*

Io mi alzo…prendo una torcia vado verso Fabrizio che ha ripreso alcune osservazioni fatte all'inizio e provo con lui…metto la luce sulla lente. Ripropone l'idea che passa perché la lente è di vetro. Prendo una delle loro bustine trasparenti…ci metto sopra la luce…

Fabrizio: Passa…

Io: Passa! *Lo dico enfatizzando…*

Fabrizio: Come fa a passare. *Lo chiede solo a me che sono lì con lui…*

Io: *Ripeto a voce più alta guardando anche gli altri…* Come fa a passare!?

Gli altri bambini si fermano per un attimo poi riprendono a fare rumore…. Io prendo la torcia e la punto sopra la copertina di uno dei loro quaderni…Fabrizio è seduto sul tavolino, guarda, spalanca gli occhi e dice con tono sorpreso e meravigliato Non Passa! Guardate…non passa!

Io: Avete sentito cosa ha appena osservato Fabrizio e che vi vuole far vedere? Ha osservato che se punto la luce qui…non si vede sul pavimento.

Alice: perché è un libro…

Elena: Anche io gioco alla scuola…

Provo ancora a prendere la lente e poi la copertina. Mi accorgo che sto provando io…mi fermo. Mi alzo e subito Fabrizio mi richiama ripetendo la domanda fatta prima.

Fabrizio: *mi guarda…ripete la domanda…* Ma come fa a passare?

Riprendo la torcia e un legnetto che ho vicino, la punto sopra…Fabrizio vede che la luce non passa sul pavimento…aspetta un po'…

Fabrizio: *dopo poco, guarda il legnetto…* Perché non è di vetro.

Io: *ripeto ad alta voce*…Perché non è di vetro (*il legnetto*).

Mi alzo e vado a prendere una vaschetta senza acqua…Fabrizio prende il legnetto e con la sua torcia prova a posizionarla sopra il legnetto stesso. Un paio di volte, la punta sul legnetto e guarda per terra, la sposta e la punta per terra, poi sul legnetto…io la punto sulla vaschetta…Fabrizio guarda sulla vaschetta, poi per terra…Proviamo insieme ancora…Gli altri bambini continuano a giocare con i sonagli ma Fabrizio si gira verso di loro e fa vedere ciò che sta facendo con la torcia e il legnetto…

Fabrizio: Guardate! Guardate!

*Io: mi accorgo che non riesce a farsi sentire e allora provo ad alzare il tono della voce e con la sua enfasi a ripetere a tutti…*Guardate! Avete visto cosa vuole farvi vedere Fabrizio? Cosa ha osservato? Vuole dirvi e farvi vedere una cosa.

I suoi compagni si avvicinano…sento Fabrizio che ripete sottovoce Non passa, non passa. *Lo ripeto ad alta voce ai suoi compagni che ci hanno raggiunti…*

Fabrizio: guardate giù *Ha posizionato la luce sopra il legnetto e chiede ai compagni di gaurdare per terra per vedere cosa succede.*

Elena: Non Vedo niente. *Riprende il suo sonaglio e a far rumore e se ne va…gli altri rimangono ancora un po'.Poi si allontanano tutti…Fabrizio ripone la torcia, prende la lente…mi sembra soddisfatto non mi dà l'idea di chi smette di fare ciò che stava facendo perché non considerato e allora osservo ciò che fanno con i sonagli Elena e le altre bambine…*

Elena: oggi non abbiamo scoperto niente!

Io: Niente? *Il tono è interrogativo, voglio capire meglio…indagare un po' cosa vuol dire quel "niente".*

Elena: Abbiamo fatto musica…

Io: La musica, abbiamo fatto. *Enfatizzo l'affermazione…*

Elena: abbiamo fatto suoni che sono un po' più diversi…*Intanto continua a scuotere ciò che ha in mano…*

Io: mi accorgo che Fabrizio ha preso la lente e sta muovendola piano su e giù e guarda cosa accade sul muro di fronte a lui. Mi alzo e tiro su la persiana della finestra per cercare di far penetrare ancora un po' di sole (sono le 14.50 circa) e il sole non entra più come prima….

Fabrizio: Il sole!!! *Prende la sua lente e va verso la zona di luce che tirando su la persiana fa il sole…poi prende anche la torcia e la accende. La punta sul muro, osserva per un poco poi viene verso di me:* maestra guarda! C'è la luce…*sta avvicinando e allontanando la torcia dal muro e vede che se avvicina l'alone di luce proiettato sul muro è più piccolo e se si allontana diventa più grande.*

Osservo dico: Mi sembra che se la avvicini si vede la luce sul muro più piccola e se la allontani si vede più grande…*L'osservazione rimane lì…I bambini ora sono seduti per terra con il loro quaderno e disegnano…Elena mi fa vedere che Alice ha disegnato le finestre e le persiane su… (probabilmente c'è un collegamento con le persiane alzate e il sole che entra). Si alzano Alice ed Elena per andare a bere…tornano, si avvicinano alla cesta dei palloni. Vicino c'è la telecamera e cominciano a guardare dallo schermo…le lascio fare avvisando solo di fare attenzione a non farla cadere.*

Alice: Io registro…

Elena: anche io voglio vedere…

Alice: ma togliti da davanti…Fabrizio mettiti davanti!

Poi si allontanano…Fabrizio prende il suo quaderno e dice: ho fatto le cose pesanti che affondano…

Io: *mi avvicino a lui che sta disegnando ancora… (la telecamera è rimasta puntata laddove i bambini disegnavano e in questo momento noi siamo nella zona del tavolino e delle vasche dell'acqua). Le bambine in questo momento si sono messe a fare capriole, spaccata…ciò che, mi dicono, fanno a ginnastica. Riprendo quanto dice Fabrizio sul disegno che ha fatto…*

Fabrizio: quelle pesanti affondano, anche quelle piccole che affondano…

Io: *vado vicino alla vasca e prendo un tappo di metallo, e una bottiglia piena di acqua e le metto in acqua…Aspetto eventuali osservazioni. I bambini guardano quello che succede…*

Alice va verso le borse dove tengo rimanenze di materiale che ho dato loro e prende dei tappi di sughero iniziando a lanciarli sul pavimento…Elena la raggiunge e propone di giocare a chi lancia i tappi più lontano. Hanno il muro come riferimento. Anche Fabrizio le raggiunge…Alice va verso il muro e si mette un po' più avanti dicendo: Chi arriva fino a qui, a questa linea ha vinto…

Dopo un po' di prove tornano a giocare a chi manda il tappo più lontano…

Fabrizio: è andata più lontana…si riferisce al tiro di Elena che ha mandato il suo tappo più lontano rispetto a quello lanciato da lui poco prima.

Io: Il tappo di Elena è andato più lontano di quello di Fabrizio…

Fabrizio: *Mi guarda…*come ha fatto?

Elena: *guarda Alice che sta scrivendo i nomi per indicare chi ha lanciato i tappi più lontani… Torna a giocare…Fabrizio si chiede e chiede come abbia fatto. Allora provo a rilanciare la domanda…*

Io: Come ha fatto a mandarlo più lontano?

Elena: l'ho lanciato più avanti del tuo…

Io prendo un tappo e lo lancio molto piano facendolo cadere molto vicino a noi, ne prendo un altro e lo lancio più forte per farlo cadere più lontano del loro ma rimbalza contro il muro e rimbalza più vicino a noi…Aspetto! Continuano a provare ma sono attratti dalla gara a chi lo lancia più lontano…

Dopo un po' smettono questo gioco. Elena è vicino ad una vaschetta con l'acqua dentro. Si alza e viene verso di me mentre sto riprendendo con Fabrizio un disegno che aveva fatto sul quaderno e che avevamo lasciato aperto sul pavimento… Elena viene verso di me e dice: Guarda! Questo tappo appena l'ho messo nell'acqua è andato giù…questo invece ha aspettato un pochino. L'ho scoperto adesso!

Mi avvicino e le chiedo di farmi vedere quale tappo è andato subito a fondo e quale è rimasto un po' a galla…

Elena: questo di metallo è andato subito giù..visto! *Lo fa mentre me lo dice…Poi prende quello di plastica con i bordi un po' più alti, lo mette in acqua e dice:* vedi questo…è stato un po' lì…Vedi, vedi, vedi!

Io: *Lo provo a fare anche io. C*osa sarà successo? *La domanda la faccio con un tono sommesso, quasi per farla tra me e me…*

Elena: c'è andata l'acqua! Si è riempito di acqua…

Io: Ah! *In tono enfatico!*

Mi accorgo che è ora del momento di conversazione su quanto abbiamo fatto. Lo comunico ai bambini e ci sediamo insieme…Fatico un po' a farli sedere, rimango allora in piedi pensando che non è necessario essere seduti…Elena e Alice si muovono, continuano a prendere oggetti, quaderni matite…Concedere ora il tempo per disegnare richiederebbe di posticipare la conversazione e allungherebbe il tempo dell'incontro. Valuto la possibilità ma considero che non c'è il tempo perché alle 15.15 fanno merenda per poi andare a casa… decido allora di invitarli a sederci insieme.

Io: Ascoltate un momento, venite un attimo qui perché come le altre volte che abbiamo lavorato insieme ora stiamo qui insieme e proviamo a dirci che cosa abbiamo fatto, cosa abbiamo osservato.

Alice: Possiamo andare di là che stanno guardando la cassetta di Cenerentola? *(ci sono pochissimi bambini e già quando sono arrivata alle 14.00 i bambini stavano iniziando a vedere un dvd.*

Riusciamo a metterci tutti insieme…prendono i quaderni e le matite e si siedono insieme…

Io: vediamo un po'…Cosa abbiamo fatto insieme?

Elena: Abbiamo giocato.

Io: *dopo un po'…* Con cosa?

Alice: con l'acqua…

Aspetto un po'…silenzio…nessuno aggiunge nulla.

Io: Io mi ricordo che oggi abbiamo fatto i sonagli…

Elena: abbiamo giocato con i tappi a mandarli più lontano…

Fatichiamo a conversare, a differenza delle altre volte…mi chiedo come mai. Aspetto un po', osservo i bambini…Alice esce per andare a soffiarsi il naso…Elena le dice di non uscire perché non abbiamo finito…A questo punto provo a intervenire dicendo io quello che ho osservato e che mi ricordo di quanto abbiamo fatto.

Io: Io mi ricordo che all'inizio, proprio all'inizio mi avete detto "Ci sono i fantasmi!" e qualcuno invece *(Elena e Alice guardano verso il muro e vedono la luce che entra dalla finestra disegnare una forma a triangolo…me la fanno notare e proseguo riprendendo anche ciò che hanno osservato loro sulla forma a triangolo (aggiungo rovesciata perché vedo Elena che fa un movimento strano con le mani…ma la mia aggiunta è in più e infatti Elena dissente…*

Elena: No, non è rovesciata. E' solo un po' storta e questo sembra un bastone….

*I bambini tornano a sedersi…*Abbiamo visto quelle luci (le indico sul muro) e qualcuno ha detto che erano ombre…*Aspetto loro aggiunte, osservazioni. Alice comincia a battere le mani per terra seguita dagli altri bambini…*

Io: Ah! Ecco un'altra cosa che abbiamo fatto!! Musica, rumore…Come avete fatto la musica?

Alice: *prende alcuni oggetti e li sbatte uno contro l'altro.*

Elena: con i sonagli…

Alice: con le matite…i tappi….

Elena e Alice si alzano vanno verso la vasca dell'acqua dove ci sono le bottiglie/sonaglio. Le prendono e iniziano a scuoterle…Prendono altri oggetti come ad esempio un legnetto sul quale sfregano i denti del coltello di plastica….

Fabrizio prende la torcia e la muove…

Io: Fabrizio ha provato con la torcia a fare la luce…

Anche gli altri bambini prendono la loro torcia…la accendono.

Io: mentre voi provavate a fare rumore e musica con quello che avete detto ora, Fabrizio ci ha fatto vedere cosa ha osservato lui con la torcia. Mi ricordo che ci ha fatto vedere che se metteva la luce sulla lente, poteva vedere la luce passare e illuminare il pavimento.

Alice, Elena si alzano e vanno a prendere le loro lenti, rimangono al tavolo, muovono le lenti, guardano sul tavolo attraverso la lente…dico loro che va bene prendere le lenti, provare ma le invito a tornare nel cerchio così possiamo parlarne insieme. Tornano…

Elena mentre riprendo…interviene…prende la lampadina e dice: Abbiamo anche visto che se si fa così è più piccolina…

Io: ci puoi spiegare un po' meglio cosa vuoi dire *(allontana e avvicina la luce al pavimento)* …Come dobbiamo mettere la luce perché sul pavimento si veda più piccola?

Ora i bambini provano…Fabrizio osserva il movimento della torcia e ciò che accade sul pavimento e dice Oh!

Io: cosa è successo? *Aspetto…riprovano…* Provo anche io e quando allontano la torcia dal pavimento---

Alice: Si ingrandisce!!!

Elena: Quando è così si vede più grande e quando si fa così più piccolo! *Mentre lo dice avvicina e allontana la luce dal pavimento.*

Fabrizio e Alice intanto hanno preso la lente e hanno iniziato ad osservare ancora che passa la luce allora verbalizzo e rimando che anche questa è un'osservazione che abbiamo fatto oggi…

Io: *verbalizzo quello che fa Fabrizio* quando facciamo così oppure così (la luce sopra la lente oppure sopra la copertina del quaderno).

Elena: si vede, si vede!!!! *Guardando sul pavimento. Prova anche lei…e dice:* Si vede Fabrizio?

Io: e se faccio così? *Prendo un quaderno e punto la luce sopra perpendicolarmente al pavimento. I bambini osservano, guardando sopra il quaderno, poi per terra…*

Dopo un po' dicono: Non si vede.

*Provano ancora un po'…poi Alice dice di voler fare un disegno…*Io disegno la famiglia… *Per un attimo provo a riportarli a ciò di cui stavamo parlando poi però mi chiedo se sia finito il tempo e in effetti sono le 15.10…Ci salutiamo e vedo che stanno disegnando perciò dico loro che ora dobbiamo tornare dai compagni ma che se hanno voglia possono fare il disegno da soli oppure farlo insieme su quanto hanno scoperto oggi…. Asciugano…li ringrazio ma dico loro che metterò io a posto. Elena mi indica i sonagli e dice:* I nostri sonagli…

Io: volete tenere così come sono i vostri sonagli per la prossima volta? Li metto qui sopra la mensola in alto così non danno fastidio e li ritroviamo la prossima volta. Lo dico anche alle vostre maestre che le metto qui…così lo sanno anche loro.

VERBALE 4° INCONTRO GRUPPO B

(promozione dall'interno e conversazione finale)

Memore del fatto che occorre mettere a disposizione dei tre gruppi lo stesso materiale e, avendo utilizzato la bilancia costruita con l'appendiabiti solo con il Gruppo A, decido di metterla a disposizione del Gruppo B (e successivamente del gruppo C) che aveva avuto esperienza solo della bilancia con l'ago…

Elena: L'acquaaaa…*(esclama entrando nella stanza dove svolgiamo le nostre attività)*

Alice: ….e i sonagli!!! *Sia lei che Elena li prendono e li scuotono per fare rumore…*

Alice trova la bilancia fatta "a mano", la prende…

Fabrizio, Giovanni, Elena cercano le loro bustine….Alice prende la sua bottiglietta/sonaglio e la mette sulla bilancia con un piatto solo e con l'ago.

Fabrizio: *prende la sua torcia e, senza accenderla, esclama* La luce…

Io: la luce, ti ricordi…*mentre dico così, la accende e inizia a puntarla su una bottiglietta con un po' di acqua, sul pavimento, dentro una vaschetta piena di acqua e sul muro.*

Io: Bene! Come la volta scorsa, ho pensato di portarvi lo stesso materiale perché mi ricordo che avevate osservato molte cose interessanti…Abbiamo fatto rumore e musica con le bottigliette di acqua con dentro le palline, abbiamo osservato che la luce del Sole faceva dei riflessi sul muro…Oggi sono curiosa di vedere cosa possiamo ancora osservare con queste cose…

Mentre parlo Elena sta aprendo la sua busta e Dario ha preso la bilancia artigianale (ometto al quale avevo appeso due spaghi alle cui estremità sono agganciati due bicchieri di plastica trasparenti). Ha immerso i due bicchieri in acqua dentro ad una delle vasche grandi…

Elena: Prima avevo detto che quella mi sembrava una bilancia…*intanto prende la sua torcia, la accende e la punta dentro la vaschetta dell'acqua, per terra..*

Fabrizio: Guarda maestra….la bilancia! *Mi indica la bilancia con l'ago che non è nella posizione verticale perché salendoci sopra e provando a pesarsi il meccanismo si è mosso dagli incastri (non essendosi alterato il movimento dell'ago se avverte oggetti pesanti si può utilizzare ugualmente).*

Fabrizio si sposta vicino alla vasca dell'acqua dove Elena e Dario stanno provando ad utilizzare la bilancia con i due bicchieri…Fabrizio e Giovanni sono osservatori di quanto accade…

Dario fa riempire i due bicchieri di acqua ed Elena tiene l'appendiabiti e lo tira verso l'alto per pesare, ma tiene le due spalle dell'ometto per timore che l'acqua possa cadere per terra…Fanno qualche prova…dove un braccio della bilancia lo tiene Elena e l'altro Dario…Io sono vicino a loro…Aspetto che riempiano nuovamente i bicchieri, tirano su la

bilancia nello stesso modo, io prendo in mano il gancio dell'ometto e, a quel punto lasciano le due braccia…

Elena: Ora mettiamoli giù *e versano dentro la vasca il contenuto dei due bicchieri…Io mi allontano un po' per vedere se viene colto il suggerimento di reggere la bilancia dal gancio centrale e un po' perché Fabrizio ha iniziato a puntare la torcia accesa sulla mia maglietta… Nel frattempo Alice che ha osservato le prove con la bilancia interviene…*

Alice: Posso aiutarvi? *Fa quello che ho fatto io prima e prende il gancio dell'ometto…Elena, in prima battuta, rifiuta il suo aiuto…poi Alice riesce nel suo intento.*

Io osservo e intanto interagisco con Fabrizio…: mi ricordo che l'altra volta avevi osservato con i tuoi compagni delle cose con la luce, che passava attraverso alcune cose e che con altre no…

Fabrizio inizia a puntare la torcia dentro l'acqua, poi sul bicchiere della bilancia dove dentro c'è acqua e una lattina, poi la punta sulla schiena di Giovanni. Poi va verso la bilancia a piatto unico e la punta dentro al piatto stesso…

Giovanni comincia a mettere alcune palline dentro la sua vasca dell'acqua…

Mentre sto seguendo quanto stanno facendo Fabrizio e Giovanni, Elena mi chiama: Maestra! Perché non possiamo iniziare a giocare…Perché stiamo già giocando (lo dice con un tono di ovvietà) …*Forse è un modo per richiamare la mia attenzione…mi sono allontanata dal gruppetto troppo repentinamente?*

Io rispondo riprendendo con lo stesso tono e sorridendo quanto detto da Elena…Ora riprendono a giocare tra loro…Mi avvicino un po' senza entrare nel loro gioco…Mi guardano a turno Elena e Dario…a questo punto chiedo loro cosa stanno facendo…

Elena: Volevo sperimentare…voglio vedere quale va più giù e quale più su *indica i bicchieri…. (Questo discorso lo avevo affrontato solo nel gruppo A ma più proposto da me). Si rivolge a Dario…*Devi riempirlo se vuoi vedere quale va più su e quale va più giù.

Io: *a voce un po' più alta*… Elena dice che bisogna riempirlo (il bicchiere) se vogliamo vedere quale va più su e quale va più giù…

Elena e Dario tirano su la bilancia reggendo l'ometto dal gancio centrale…si stacca un bicchiere e lo riattaccano…I due bicchieri rimangono alla stessa altezza perché pur avendo dentro alcuni oggetti leggeri contengono la stessa quantità di acqua. Fanno ancora alcune prove…

Elena: Il mio va più giù…*mi guarda ma la bilancia rimane nascosta al mio sguardo…mi sposto e le dico che non ho visto bene ma è importante che lo abbiano osservato…I bambini sono tutti interessati a quello che fanno Elena e Dario, sono attorno alla vasca dell'acqua grande. Ad un certo punto Dario si alza, va a prendere la bilancia con l'ago e dice:* Proviamo un po' a pesare…

Poi torna alla vasca dell'acqua e continua con Elena a riempire i bicchieri con acqua e diversi oggetti (io sto cercando una bottiglia piena da mettere in uno dei bicchieri per vedere quali osservazioni provoca ma mi fermo un momento perché noto Alice che ha preso una

lattina e con il suo coltello di plastica dentellato fa rumore e dice: Questo è uno strumento! *Prima si rivolge a me e subito dopo va a comunicarlo a Elena e Dario.*

Io: E' uno strumento!

Alice: *Rivolgendosi a Elena e Dario che stanno continuando a pesare con la bilancia* : Se sbagliate faccio così (riproduce un rumore) se invece fate giusto farò così (ne riproduce uno diverso)…*i due compagni non la ascoltano e continuano a provare…*

Elena: *a Dario* Vai a prendere la bilancia (intende quella con l'ago). *Dario prende la bilancia e la mette vicino alla vasca, poi sollevano i bicchieri e provano a metterne uno sul piatto della bilancia che, però, si rovescia (la bilancia utilizzata spesso per pesarsi salendoci sopra ha il piano di appoggio non più del tutto stabile).*

Io: Sì, non è più molto stabile perciò come avete fatto va bene…Lo sappiamo e quando cerchiamo di pesare con questa bilancia delle cose riempite con acqua dobbiamo solo fare un po' di attenzione in più perché potrebbe rovesciarsi tutto il contenuto per terra (*In realtà altre volte non avrei fatto questa considerazione ma l'insegnante oggi, prima di iniziare, mi ha chiesto di non farli bagnare e questo credo abbia un po' influenzato anche il mio intervento pur cercando di trattenermi il più possibile dal fermare l'esperienza dei bambini laddove non strettamente necessario). Mentre dico questa cosa Elena ha già preso il piatto della bilancia e lo ha appoggiato per terra vicino alla vasca, sta mettendoci dentro uno dei bicchieri pieni di acqua. Dario pensa che Elena voglia versare il contenuto del bicchiere dentro il piatto della bilancia e lo fa….*

Elena: Noooooo! Dario! *Scuote la testa in segno di disapprovazione e per indicare che non era questo ciò che lei aveva in mente di fare…Probabilmente avrebbe voluto mettere uno dei bicchieri pieni dentro al piatto e trasportare tutto sopra la bilancia con l'ago. Intanto Elena svuota il contenitore/piatto della bilancia e comincia ad utilizzarlo come contenitore da immergere nella vasca e svuotarlo.*

Fabrizio e Giovanni stanno giocando con la torcia…Fabrizio ha la torcia in mano, la punta in diversi posti (soffitto, muto, acqua) e Giovanni cerca di metterci la mano davanti…Quando Giovanni la punta dentro la vasca piena di acqua, Giovanni mette la mano davanti alla luce ma Fabrizio gli chiede di metterla davanti alla luce però più vicino all'acqua…Continuano con questo gioco per un po'. Ad un certo punto prendono una lattina e una bottiglia di acqua e cominciano a immergerle dentro un'altra vasca grande per terra vicino a quella dove i compagni stanno sperimentando travasi e pesate con le bilance e contenitori diversi…

Elena prendendo il contenitore dove c'è il materiale che ho portato loro ne versa metà dentro la vasca di Fabrizio e Giovanni e l'altra metà nella sua vasca…Alice ha in mano la lattina e il coltello ed ora prova nuovamente a fare rumore sfregando i denti del coltello sopra la lattina…

Elena rivolgendosi a me: Metti quell'acqua li dentro? *Vuole che io prenda il contenuto di una vaschetta più piccola e che lo versi dentro la sua che è più grande…Lo faccio.*

Dario, Elena, Alice continuano a giocare con la bilancia a due piatti (bicchieri) e ad un certo punto Dario mi chiede: Maestra perché l'hai costruita?

Io: *rispondo sinceramente…*Perché abbiamo avuto l'idea con un gruppo di vostri compagni e ho pensato di portarla anche a voi così che possiate provare ad utilizzarla…Vi ricordate…con voi avevamo provato a costruire delle lenti utilizzando l'acqua perché avevate osservato che le cose dentro l'acqua appaiono più grandi…Con altri vostri compagni abbiamo provato a costruire questa bilancia per vedere se riuscivamo a capire meglio se una cosa pesava più o meno di un'altra.

Giovanni riempie una bottiglia di plastica e la mette sulla bilancia con l'ago, poi torna a giocare vicino a Fabrizio che sta riempiendo e svuotando più volte una bottiglia di acqua.

Elena toglie dall'acqua il piatto/contenitore della bilancia con l'ago e lo ripone al suo posto sulla bilancia, mi guarda e mi chiede: Perché l'ago è messo storto? *(si è ricordata che la prima volta che l'avevano utilizzata l'ago era in posizione verticale).* Arianna mi ha detto che anche che ci sono saliti sopra per pesarsi.

Io: Sì, vi ha raccontato perché ci sono saliti?

Elena: No… Non ce lo ha detto! Solo che ci sono saliti sopra.

Io: Si sono pesati!

Elena: Anche noi vogliamo!

Elena, Alice. Dario si avvicinano alla bilancia perché vogliono provare a pesarsi…Alice sta per salirci in piedi. Io di quella bilancia in realtà non mi fido e penso che il rischio di cadere è troppo alto quindi dico loro che i compagni ci sono saliti sopra non in piedi ma in altri modi…Mentre dico questo…Alice si siede sopra il piatto della bilancia…

Io: Questo, ad esempio, può essere un modo per pesarsi.

Elena prova a sedersi e contemporaneamente osserva cosa fa l'ago sul quadrante. Alice si accorge di non aver fatto questo passaggio e dice: Ora tocca a me pesarmi perché io non ho visto *e così si risiede sulla bilancia e guarda il movimento dell'ago sul quadrante poi esclama:* Guarda! Sono più alta io.

Io: Alice ha detto…Sono più alta io…*Nel frattempo interviene Dario che fa spostare Alice:* Adesso tocca a me!

Sia Dario che Alice guardano il quadrante mentre Dario si siede….

Alice: Guarda quanto pesi, guarda quanto pesi.

Dopo questo episodio tornano a fare prove con la bilancia con i due bicchieri…Elena dice tra sé e sé: Ma come è fatta questa bilancia?

Io: *aspetto un po', poi mi avvicino al gruppetto di bambini:* Mi sembra che vogliate sapere come ho fatto a fare questa bilancia…

Alice: Io lo so, lo so…Hai messo questi due attaccati qui (si riferisce alle due corde appese ai gancetti dell'ometto appendiabiti) e poi ci hai attaccato i due bicchieri.

Io: Ho appeso i due spaghi all'appendino e ho attaccato i due bicchieri per poterci mettere dentro le cose da pesare…*intanto li sto aiutando a rimettere i due spaghi che si sono attorcigliati mentre Elena e Dario riempiono ciascuno un bicchiere.*

Dario: Il mio pesa di più…

Io: Dario dice che il suo pesa di più!

Elena: prende la bilancia e la tira su tenendo l'ometto per le spalline…

Mi avvicino e prendo l'ometto reggendolo per il gancio centrale…Elena mi lascia tenere la bilancia…

Ora Alice e Dario provano a riempire con palline e oggetti i due bicchieri…

Alice: vedendo un bicchiere più pieno dice: Vince per forza questo…

Io: Dice Alice che peserà di più questo…*Intanto continuo a reggere la bilancia e Alice vede che i due bicchieri rimangono allo stesso livello…*

Alice: sono quasi uguali…

Mentre reggo la bilancia Dario, Elena e Alice iniziano ad andare a cercare altre cose da metterci dentro…

Elena: Mi serve una bottiglia…*Ne svuota una con la quale avevano fatto i sonagli la volta scorsa e la usa per prendere acqua e travasarla dentro un bicchiere della bilancia. Alice si accorge che era uno dei suoi sonagli ed esprime un po' di disappunto ma Elena la rassicura che glielo rifarà.*

Giovanni e Fabrizio sono sempre impegnati in attività di riempimento e svuotamento di bottiglie e lattine…

Alice ed Elena vanno verso il tavolino anche perché ci siamo dovuti fermare un momento perché provando a riempire i bicchieri l'acqua di un bicchiere e traboccata fuori bagnando Dario e ho dovuto fermarli un momento per togliere il grembiule e mettere un asciugamano per terra…

Finito questa parentesi rimango vicino alla vasca dell'acqua dove dario ha ricominciato l'attività con la bilancia e anche Elena torna alla vasca dell'acqua…Ora è alice che si propone di tenere la bilancia.

Alice si rivolge a Elena: Mi hai rifatto il sonaglio?!

Elena: Sì, il tuo sonaglio è fatto! *Lo scuote facendo rumore…ma non è soddisfatta.* Svuotiamo un po'…ce n'è un po' troppa…*ne svuota un po'…riprova a scuotere…tappa la bottiglia quando si considera soddisfatta.* Senza un po' di acqua si sente di più (scuote nuovamente il sonaglio con le biglie dentro).

*Alice e Dario continuano a provare la bilancia utilizzando le cose che hanno dentro la vasca e l'acqua. Elena si avvicina al tavolino e prende la sua busta, vuole prendere il quaderno…*Dove posso asciugarmi le mani?

Fabrizio: nell'asciugamano…

Elena si asciuga le mani e prende il quaderno e la matita…

Dario: *sta ancora facendo prove riempiendo i bicchieri della bilancia…e dice:* Il mio, questo qui pesa di più. *Mentre lo dice tira su la bilancia…mi tiro su anche io e rilancio ai compagni mentre reggo con lui la bilancia dove i due bicchieri sono riempiti con acqua ed altri oggetti.*

Io: avete sentito…Dario dice che il suo bicchiere…questo qui (lo indico) è più pesante dell'altro.

Dario: Eh, si perché questo l'ho riempito tanto *(dentro oltre a tappi di metallo e plastica e palline ha messo acqua mentre nell'altro bicchiere ci sono meno cose e non c'è acqua).*

Alice: Si…questo pesa di più perché va più giù (*mi sembra un'osservazione in più che integra e arricchisce quella fatta da Dario e la ripeto a tutti)*: Quel bicchiere pesa di più perché è riempito molto e va più giù…

Alice ed Elena prendono l'altro bicchiere e fanno vedere che rimane più su perché leggero ma non lo esprimono e non dico nulla…Ci giocano finchè il bicchiere più leggero non si stacca e cade a terra. Dario poco dopo prende il bicchiere pieno e lo versa dentro la vasca dell'acqua…Io rimango un po' vicino a Dario che sta continuando le sue osservazioni riempiendo ora il bicchiere, ora la lattina…Io ricompongo la bilancia e la appoggio per vedere se è ancora interessato a pesare oppure se sta direzionandosi verso altre esperienze con l'acqua…Rimango li vicino…Dopo un po' riprende l'attaccapanni e vuole tirarlo su e dice: Vediamo un po' il mi0 (bicchiere)…

Io: Quale è il tuo? (bicchiere)…

Dario: Questo…vediamo…

Io: Tiro su? *Mentre tengo l'attaccapanni Dario mette oggetti dentro un bicchiere…verbalizzando ciò che inserisce* "Ancora un po' di acqua…"

Fabrizio si avvicina e partecipa prendendo oggetti dalla vasca dove stava giocando con Giovanni, prende una bottiglietta con un po' di acqua e la versa dentro l'altro bicchiere della bilancia e ripete anche lui sottovoce : ancora un po' di acqua….

Io: Aggiungiamo ancora un po' di acqua e cosa succederà?

Dario: *si rivolge a me e dice*: Eh…ora pesa un po' *e mi indica che devo prendere l'attaccapanni e tirarlo su (Io lo avevo appoggiato per terra).*

Io: Devo tirarlo su io?...Mi dicono di si…E cosa succederà quando lo tirerò su?

Giovanni: Non cade niente…

Io: Non cade niente…(lo ripeto con tono normale…non interrogativo ma quasi per vedere se altri aggiungono ipotesi). *Qualcun altro aggiunge* dondola! *Tiro su la bilancia e ripeto* Non cade niente, dondola!

Elena e Alice hanno disegnato

Alice: ad Elena…Guarda cosa ho disegnato…

Elena: Anche io ho disegnato…Ho fatto Claudia che tira su la bilancia.

Alice: Ora io faccio Dario.

Dario: Ora provo io…*prende la bilancia che intanto io ho appoggiato nuovamente a terra e la tira su dicendo:* il mio pesa un chilo.

Io: Pesa un chilo il tuo!

Dario: si perché ci ho messo più acqua…

Io: Perché ci hai messo più acqua! *Prendo la bilancia e Dario aggiunge ancora acqua nel suo bicchiere e lo osserva andare più giù di quello di Fabrizio…*

Elena si avvicina a me con il quaderno: Guarda, ho disegnato prima Dario che tiene la bilancia, poi tu che tieni la bilancia…

Io: dario mi ha chiesto Pesa un po' e io ho tirato su la bilancia e…

Dario: e pesava un chilo! *Con le braccia fa il gesto di una quantità enorme….*

Io: e Dario dice che pesava un chilo perché ci aveva messo più acqua.

Dario e Giovanni continuano a riempire i loro bicchieri mentre reggo la bilancia e Dario (lo dice sottovoce ed è un momento in cui si accavallano un po' di voci ma penso di aver capito quanto dice): Vediamo la mia che fine fa (o cosa fa) *perché quando è soddisfatto del livello di riempimento del suo bicchiere dice:* Maestra tira un po' su….

Io: e se tiro su cosa succederà?

Fabrizio: Non cade niente!

Io: Non cade niente…

Fabrizio e Dario continuano a riempire i bicchieri utilizzano talvolta palline, talvolta tappi ma l'acqua è una costante…Mi chiedono nuovamente di tirare su…Lo faccio. Se chiedo cosa succederà quando tirerò su la bilancia Fabrizio risponde non cade niente…Tiro su…Giovanni osserva e dice: Pesa di più…

Dario: Il mio si, il tuo no!

Riprendono a svuotare e riempire i loro bicchieri…dopo un po' Dario prende la bilancia e prova prima a riempire poi a pesare…osserva: Il mio pesa di più…è più pieno del tuo (si rivolge a Fabrizio).

Elena e Alice stanno disegnando Elena: Io ho disegnato le tende, le finestre….*Giovanni sembra osservare quello che facciamo noi…Finchè non comincia a girare per la stanza (solo dopo un po' mi accorgo di ciò che sta sperimentando…).*

Giovanni continua a camminare per la stanza perché ha le suole di gomma bagnate e sente il rumore che fanno (infatti mentre cammina guarda dietro di sé, verso il basso forse anche per vedere se lascia impronte sul pavimento)…nessuno se ne accorge e aspetto…mi fermo, mi alzo e mi allontano un po' dalla vasca dove fino a quel momento stavo seguendo le prove e le osservazioni sul peso, sulla capacità dei contenitori (bicchieri)…Lo aveva fatto un'altra volta ma essendo stato un po' meno attivo nella partecipazione alle attività dei compagni è passato inosservato sia a me che ai compagni….

Io: *quando mi sembra che la mia intuizione sia confermata dal fatto che Giovanni continua a camminare proprio per fare rumore con le scarpe provo a rilanciare al gruppo:* Avete sentito?...aspetto un po' per vedere se i bambini si fermano ad ascoltare…riprendo…Avete sentito cosa fa Giovanni?

Elena: Cammina!

Fabrizio: …con i suoni.

Io: Con i suoni!

Dario: perché ha appoggiato le scarpe nell'acqua!

Io: perché ha appoggiato le scarpe nell'acqua!

Non sembra esserci alcuna reazione da parte dei bambini. Dario e Fabrizio sono sempre dalla loro vasca intenti a pesare, Elena continua a farmi vedere il suo disegno e poi dice: Basta! Adesso chiudo. *Chiude il quaderno e lo ripone nella busta. Io non dico nulla, aspetto.*

*Giovanni continua a camminare, mi passa accanto e mi guarda! Mi sembra che voglia attenzione…provo allora semplicemente a ripetere a voce ciò che sta facendo…*Cammina con i suoni…

Elena: perché ha le scarpe bagnate…

Alice: con i suoni…

Elena: perché è andato dentro a un laghetto per terra di acqua.

Anche Dario comincia a provare e sentire se cammina anche lui facendo lo stesso rumore. Sente che ci riesce e continua. Elena appoggia la suola della scarpa dentro la vasca dell'acqua e comincia a provare (Io mentre vedo quello che fa dico: Secondo Elena Giovanni ha fatto così)

Tutti cominciano a camminare e le loro scarpe riproducono lo stesso suono di quelle di Giovanni.

Provano a camminare o altri movimenti con i piedi per sentire se il rumore è lo stesso.

Alice: la mia non lo fa.

Io: le tue non lo fanno! Fai sentire? *Mi sembra interessante e visto che stiamo provando insieme lo rilancio a tutti…ci fermiamo e Alice prova a camminare facendoci vedere che le sue non fanno quel rumore. Riprendo a camminare e dico:* Nemmeno le mie! Quelle di Giovanni, Dario, Elena e Fabrizio fanno rumore, le mie e di Alice no!

Alice: *prova a muovere le punte verso destra e sinistra e dice:* Siiii che lo fanno! Ascoltate!

Ci fermiamo e ascoltiamo…provo a fare lo stesso movimento ma le mie non fanno rumore…Continuiamo a provare e quando sentono che le mie non fanno rumore provano a dire che è perché non le ho bagnate abbastanza, forse devo fare un altro movimento…

Elena osserva che il piccolo laghetto di acqua per terra dove tutti avevamo provato a bagnarci la suola delle scarpe per fare rumore si era, ormai, dissolto. Prende un contenitore

dentro la vasca dell'acqua e ne versa una piccola quantità sul pavimento per riprodurre il laghetto di acqua e continuare a provare…Lo fa ancora un paio di volte….

Dopo qualche minuto comunico loro che ci fermiamo per sederci insieme e raccontarci quello che abbiamo fatto insieme.

Io: Cosa abbiamo fatto oggi?

Elena: abbiamo provato con quella bilancia che si rovescia un po'..abbiamo provato a pesare.

Alice: ci siamo pesati con la bilancia…

Io: ci siamo anche pesati con la bilancia!

Fabrizio: Io non mi sono pesato…

Dario: nemmeno io…

Alice: allora pesatevi! E' importante!

Io: e' importante dice Alice

Fabrizio e dario provano allora a pesarsi…

Io: non si sono pesati però cosa hanno fatto…cosa ci hanno fatto vedere?

Mentre Dario sta provando a pesarsi…Fabrizio che è seduto vicino a me fa vedere a me e Alice le sue mani la cui pelle si è raggrinzinita e Alice ci dice che succede anche a lei quando fa la doccia…mi sembra interessante osservazione da rilanciare al gruppo che è impegnato a guardare le prove di Dario sulla bilancia con l'ago.

Io: Guardate un po' cosa mi sta facendo vedere Fabrizio! *Fabrizio mi ha fatto vedere le sue mani che sono un po' raggrinzinite e Alice ha detto che succede anche a lei quando fa la doccia…*

Alice: Fabrizio ha le mani ruvide sempre…

Io: Ha le mani ruvide sempre…

Alice: Quando facciamo la doccia…

Io: quando vi fate la doccia…*Elena e Dario stanno guardando e pesandosi con la bilancia…provo a richiamare la loro attenzione ma riprendo, con l'intento di comunicare a Dario che ha appena detto* Guarda quanto peso anche io! *Ma contemporaneamente di rilanciare al gruppo quanto ci ha fatto osservare ora fabrizio e commentato Alice…*

Io: Anche Dario pesa…Elena avete sentito cosa stanno dicendo i vostri compagni…cosa hanno notato?

I bambini si gaurdano le mani…non sono "ruvide" come quelle di Fabrizio…Aspetto un po' per vedere se ci sono altri input dal gruppo…poi riporto la conversazione sul Cosa abbiamo fatto…

Io: Oggi abbiamo provato a pesare con la bilancia con i due bicchieri, poi ci siamo pesati mettendoci seduti sulla bilancia con l'ago…

Elena: poi abbiamo messo i piedi nella pozzanghera e li abbiamo girati così (si alza e fa vedere il movimento e sentire il rumore) per fare rumore.

Io: ripeto…li avete girati per fare rumore…

Fabrizio: e camminato…

Io: anche camminato!

Alice: Io ho fatto tutto il tempo così *si alza e riproduce il rumore strisciando le suole delle scarpe per terra.*

Io: anche la volta scorsa avevamo fatto rumore…con che cosa?

Elena: con i sonagli…

Alice: anche con la lattina e il coltello…

Io: All'inizio Alice ha preso la lattina, il coltello e ci aveva fatto sentire

Alice, mentre dice di aver fatto rumore con la lattina e il coltello si alza e cerca ciò che le serve per riprodurre quel suono…Non trova il coltello e mentre lo cerca i suoi compagni ricordano altre esperienze fatte le volte scorse.

Elena: Avevamo fatto anche le bolle con la bottiglia!

Io: sì, mi ricordo…l'altra volta avevamo fatto le bolle con le bottiglie nell'acqua.

Intanto Alice trova il coltello prendendone uno da un compagno e riproduce il rumore sfregandolo contro la lattina.

Io: Ecco! Sentite? Abbiamo fatto rumore in tanti modi…prima avete detto i sonagli. Come li abbiamo costruiti?

Elena: li abbiamo fatti nella bottiglia…

Io: Nella bottiglia…cosa ci avevamo messo?

Dario: Tante cose…

Io: Cosa? Proviamo a prenderne uno e vedere cosa c'è dentro.

Elena: *ne prende uno* ci sono le palline…non ci sono gli anellini (forse non si sente ma Alice aveva detto anellini perché in uno dei sonagli costruiti li avevano messi).

Fabrizio: c'è l'acqua

Elena: abbiamo fatto rumore con le scarpe *e i bambini ricominciano a farlo…*

Io: Bene. Però ora proviamo a dirci come abbiamo fatto senza farlo…abbiamo quasi finito il nostro incontro…

Elena: abbiamo messo i piedi nella pozzanghera di acqua

Io: *vedo i quaderni di Fabrizio e Giovanni aperti per terra…*avete anche provato a disegnare quello che abbiamo fatto oggi…

Elena e Alice vanno a prendere i loro quaderni dove hanno disegnato…Raccontano ciò che hanno disegnato e ad un tratto raccontano un'esperienza fatta durante la fase di osservazione iniziale quando avevano a disposizione assi di legno, biglie e tappi…. Io non lo ricordavo più…

Elena: si quando ci avevi portato quelle assi e guardavamo quale pallina rotolava di più…

Io: Ah, si, ora ho capito a cosa ti riferisci…Quando all'inizio vi avevo portato le assi di legno, le biglie…

Elena: sì e anche quei tappi (delle bottiglie di plastica)

Alice: poi avevi portato le pietre…

Elena: e io volevo mettere i tappi perché volevo che la pallina…fa il gesto con la mano e io penso intenda dire che voleva vedere se la pallina rimbalzava superando i tappi…lo dico!

Elena: sì, ma non ci riuscivo…

Dario: eh, ma così si fermano…

Alice: No, facevano cadere i tappi…

Io: Alice dice di no…che facevano cadere i tappi…

Alice: non si fermavano (le palline).

Io: Sì, mi ricordo che avevate preso i vostri quaderni e lo avevate disegnato…Ora dobbiamo tornare in classe e voi dovete fare merenda. Ci vediamo ancora la prossima settimana…

OSSERVAZIONE POSTINTERVENTO

GRUPPO B

Introduco l'incontro esplicitando ai bambini che io, a differenza delle volte scorse, non parteciperò all'attività ma li osserverò scrivendo sul mio quaderno degli appunti ciò che faranno perchè mi interessa capire e vedere cosa si può fare con gli oggetti e il materiale che ho messo loro a disposizione. Mentre parlo, i bambini hanno iniziato a prendere alcuni oggetti. Dario ha preso la bilancia e vi ha versato le biglie e altri oggetti.

I bambini presenti sono 6: Alice, Elena, Fabrizio di 5 anni e Giovanni, Dario e Arianna di 4 anni.

Elena: "*Possiamo prendere l'acqua che è in questa bottiglietta che oggi è una bella giornata.*" Mentre lo dice indica il riflesso della luce del sole che entra dalle finestre e illumina il pavimento.

Io: "*La bottiglietta è sigillata proprio perché deve rimanere chiusa con l'acqua dentro.*"

Arianna e Alice prendono altre due bottigliette per terra e raggiungono i compagni al tavolino dove c'è il materiale. Dario e Fabrizio continuano a mettere oggetti dentro il piatto della bilancia osservando il quadrante. Il loro sguardo e il controllo dei movimenti dell'ago della bilancia ogniqualvolta aggiungono oggetti sul piatto mostra come abbiano riscontrato che all'aggiunta di oggetti corrisponde un movimento verso sinistra dell'ago.

Elena: *"Ma allora perché quelli dell'altro gruppo hanno messo l'acqua nei semi (legumi secchi?)"*

Io: *"I vostri compagni hanno approfittato del fatto che lavando le bottigliette, erano rimaste alcune gocce sul fondo e le hanno versate sui semi."*

Insieme continuano ad aggiungere cose dentro la bilancia. Elena prende un imbuto, lo avvicina alla bocca e produce dei suoni e cammina un po' distrattamente. Fabrizio recupera la sua busta trasparente dalla quale estrare la torcia.

Dario: indicando il quadrante della bilancia *"Facciamo così, poi vediamo pesare."*

Elena aggiunge una bottiglia con l'acqua e sottolinea ciò che fa dicendolo a voce: *"Una bottiglia di acqua."*

Dario interviene contrariato dalla decisione di Elena: *"Noooo! Non una bottiglia di acqua."*

Elena si siede per terra vicino a dove si trovano le assi di legno, si guarda attorno e vede sotto il tavolo una bobina di plastica. Prende la bobina e appoggia un'estremità di un'asse di legno sopra la bobina. Alice la osserva mentre Elena prende un'altra asse e la posiziona di seguito all'altra.

Il gruppo composto da Dario, Fabrizio, Giovanni e Arianna si concentrano attorno alla bilancia. Dario versa alcuni legumi nella bilancia e mentre lo fa guarda il quadrante della bilancia dove si trova l'ago. Arianna prende la bottiglia con l'acqua e la appoggia sopra la bilancia, Dario guarda l'ago e segue il suo movimento con un dito. Fabrizio accende la sua torcia e la punta dentro il piatto della bilancia. Giovanni si avvicina ad Alice ed Elena e prende la ciotola con i legumi accompagnando l'azione con la verbalizzazione: *"Ci servono i semi per pesare."* Elena interviene contrariata facendo notare che li hanno presi tutti loro. Si alza e va al tavolino dove i compagni stanno continuando a pesare e comincia a prendere dal piatto della bilancia alcuni legumi e metterli dentro ad una ciotola. Giovanni si lamenta e con tono laconico afferma: "*Nooooo. Tutti no, però!"* Alice interviene facendo notare che lei ed Elena non ne hanno e a questo punto Elena interviene in modo più deciso.

Elena: mi guarda e con tono piuttosto contrariato: "*Li hanno presi tutti loro i semi."*

Dario solleva il piatto della bilancia per poi appoggiarlo nuovamente e osservare il quadrante per vedere il movimento dell'ago. Al contempo, Giovanni mette dentro al piatto bottigliette vuote e poi osservano, insieme (Arianna, Dario e Giovanni) il quadrante.

Dario: guarda attentamente il quadrante e mette il dito sull'ago, vede che non si muove nulla ed esclama: *"Nooooo!"*

Giovanni: toglie le bottiglie vuote e propone: "*Allora bisogna che cerchiamo delle bottiglie più pesanti."* Guarda sul tavolo e prende quella riempita per metà con acqua e la pone dentro la bilancia. Guardano nuovamente il quadrante.

Arianna: sta cercando di girare la rotella posizionata dietro il bilanciere e che serve per regolare l'ago della bilancia, mi guarda e chiede: "*Maestra, come si fa a girare questa?"*

A questo punto, interviene Elena che in modo piuttosto esuberante (nei modi e nel tono della voce) va dai compagni che stanno lavorando con la bilancia e esclama "*Venite a giocare con le biglie. Mi servono le biglie.*"

Giovanni: *"Cosa sono le biglie?"*

Elena: mostrandogliene una: "*Questa, è una biglia.*"

Il suo intervento attira la curiosità dei compagni tanto che tutti, fatta eccezione per Dario, si siedono per terra vicino alla pista appena costruita. Dario continua ad interessarsi alla bilancia, guarda il quadrante e si accorge che quando la bilancia è vuota l'ago non è posizionato sullo zero. Prova, allora, a girare la rotella posizionata nella parte posteriore della bilancia per rimettere l'ago nella posizione corretta.

Giovanni lascia rotolare una biglia che esce, però, dalla pista.

Elena, con tono di rimprovero, interviene: "*No! Devono rimanere dentro la pista.*" Prende una biglia e, tenendola in mano, le fa compiere il percorso che ha strutturato con le assi di legno dicendo: *"Deve andare qui, poi qui e poi qui."*

A questo punto, si avvicina anche Dario. Fabrizio, da qualche tempo, è seduto per terra e disegna sul suo quaderno ciò che aveva messo nella bilancia con i compagni.

Alice si sposta dalla bilancia e si appoggia con le mani sopra il piatto, osserva l'ago che si muove e poi chiama Elena e afferma con tono enfatico: "*Guarda! Elena, guarda quanto ho pesato?!*"

Elena guarda Alice e, senza considerare quanto la compagna le sta facendo vedere le si rivolge con fare disinteressato: "*Sì. Tieni la biglia blu e vieni a giocare che tanto anche gli altri giocano a quello che giochiamo noi, vero Dario?*" Dario non dà alcuna risposta e sta riposizionando alcune assi che si erano spostate. Elena interviene con tono di rimprovero verso i compagni: "*Però, ragazzi, la pista deve rimanere a zig zag. La biglia dovete farla scivolare qui, poi qui e poi qui. Prima la fate scivolare qui, poi la fermate e poi la fate scivolare qui, la fermate e poi la fate scivolare qui…*" Elena accompagna ciò che dice con l'azione e mentre spiega il percorso che deve fare la biglia, accompagna la biglia con la mano lungo il primo tratto di pista, la ferma e la accompagna nuovamente per farle compiere il resto del percorso. Alice, intanto, rimane per qualche attimo vicino al tavolino (con un'espressione un po' delusa) e con la biglia che Elena le ha fatto prendere, poi cede e si unisce al gruppetto condotto da Elena. Alice, però, non si unisce al gioco, posa la biglia e prende uno dei legumi per terra e chiama nuovamente l'attenzione di Elena: *"Elena, guarda!"* il tono sembra un po' di sfida. Mentre la compagna si volta a guardarla, Alice prende il legume e lo porta vicino alla bocca, poi lo tocca con la punta della lingua. Elena si alza, va verso di lei e dice con aria stizzosa: "*No, che schifo.*"

Io sono seduta vicino al gruppo e prendo appunti sul quaderno, Alice mi guarda e io le dico con tono tranquillo: "*Alice, ricorda che sono legumi che tu hai preso per terra e che tu e i tuoi compagni potreste averli calpestati quindi penso sia meglio tu non li metta in bocca.*"

Il gruppetto continua a giocare e Alice prova a proporre di fare qualche altro gioco ma Elena interviene e, senza guardare Alice, continuando a far scivolare le biglie lungo la pista dice:

"*Possiamo continuare a far rotolare le biglie, perché non possiamo giocare con la pista?!"* Dario e Giovanni, intanto, hanno messo alcuni tappi di metallo lungo un tratto di pista e vi hanno messo dentro delle biglie verificando che, così, rimangono ferme e non rotolano lungo il percorso. Elena interviene e dice: "*Facciamo scivolare le biglie così…però bisogna trovare altri tappi."* Elena mette ciascuna biglia dentro un tappo e forma una fila di biglie lungo il primo tratto di pista. Arianna, Dario e Giovanni la aiutano. Alice prende un imbuto, lo porta alla bocca e dice a voce alta e simulando la voce che si sente al megafono: "*Ha inizio la gara di biglie!"* Elena la contraddice affermando che non è una gara di biglie e Alice cerca di rimediare: *"Allora, inizia la gara di pista delle biglie."* All'ennesimo non è così di Elena, Alice chiede: "*E allora, cosa state facendo?"* Elena inizia a rispondere ma, in difficoltà, cambia discorso e continua a mettere in fila tappi e biglie. Alice guarda sul tavolo, prende un pezzo rettangolare di plastica (tipo carta da rifascio libri trasparente), si dirige verso la pista e la posiziona nel punto di congiungimento tra un tratto di pista e l'altro dicendo: "*Qui le biglie scivoleranno più veloci e non cadranno nel buco."* Mentre Alice dice questa cosa rivolgendosi ai compagni, passa la mano sul pezzo di plastica come a far vedere che è liscio e che congiungendo due tratti di pista impedirà alla biglia di cadere nello spazio tra un'asse e l'altra. Fabrizio guarda la modifica fatta da Alice e le dice: *"É un po' scivolosa…".*

Ad un tratto si accorgono di aver usato tutti i tappi a disposizione, me ne chiedono altri ma rispondo che non ne ho più con me. Dario, Fabrizio, Giovanni smontano la pista per ricostruirne un tratto poco più lontano da dove avevano costruito quella precedente. Appoggiano un'asse sulla bobina per creare il piano inclinato e recuperano le biglie che, nello smontare la pista sono cadute per terra. Elena, contrariata dalla decisione dei compagni dice: "*No! Non è così il gioco."* ma rendendosi conto che ormai avevano ricostruito un tratto di pista, continua dicendo: "*Ah, ho capito bisogna fare così."* Elena si unisce ai compagni ma con il ruolo di chi regola la partenza delle biglie. Giovanni lascia rotolare le biglie lungo la pista osservandone il percorso. Arianna e Dario si mettono alla ricerca delle biglie che si sono sparse per la stanza e le raccolgono dentro ad un contenitore. Fabrizio prende un pezzo di plastica simile a quello che Alice aveva posizionato nella parte di congiunzione di due assi poco prima e ne fa lo stesso uso. Giovanni prende una biglia, la lascia scivolare e osservando che arriva fino alla fine della pista, alza le braccia in alto e dice con tono di entusiasmo: "*Evvaiiii!"*

Fabrizio si avvicina alla bilancia e pone sul piatto due biglie, osserva l'ago che non si muove e allora si appoggia con le mani e preme finchè non vede l'ago muoversi. Alice lo osserva e fa la stessa cosa. Arianna continua a recuperare biglie mettendole dentro al contenitore e poi si avvicina al tavolo dove Alice sta continuando a fare prove di peso con la bilancia. Elena, appoggiata al tavolino e con un imbuto davanti alla bocca, osserva i compagni che giocano con la pista e produce suoni e rumori con la voce che risultano alterati.

Arianna prende le biglie dal contenitore e le mette in un contenitore a parte dividendole dai legumi che pone in un altro contenitore. Giovanni continua a giocare con la pista e Fabrizio prova diversi tipi di carta dove far scivolare le biglie. Elena si avvicina a me e chiede: "*Perché non ci hai portato l'acqua?"*

Io: la guardo e le rispondo: "*Ho pensato, per questi ultimi incontri, di portarvi materiale che avevate già conosciuto e altre cose nuove perché sono curiosa di capire cosa ci si può fare,*

secondo voi e cosa si può scoprire su queste cose." Elena si alza, prende un po' di legumi, alza la mano verso l'alto e li lascia cadere guardandoli…

Arianna prende i contenitori dove ha messo tutte le biglie e le porta ai compagni che continuano a provare a far compiere l'intero percorso alle palline sulla pista. Un contenitore viene posto alla fine della pista e Elena propone: "*Facciamo che la biglia, alla fine deve entrare dentro la ciotola."*

Dario rovescia uno dei contenitori con le biglie sulla pista e Elena interviene rimproverandolo per quanto fatto. Nel contempo propone: "*Ho un'idea! Facciamo la pista più lunga. Anzi, facciamo una casa."* Dispone le assi di legno accorgendosi che non riescono a stare come lei li posiziona e afferma: "*Ci vorrebbe della colla qui."* Alice prende dei cartoni e li porge a Elena la quale dice no, mettiamoli così e facciamo il tetto.

Arianna continua a recuperare le biglie che sono rotolate per terra e le mette in un contenitore trasparente. Fabrizio trova una biglia per terra fa finta di darla ad Arianna e, invece, la mette in tasca per riporla, poi, nel contenitore di Arianna. Quest'ultima porta le biglie ai compagni senza aver capito che avevano cambiato gioco. Elena, infatti, quando Arianna porta le biglie esclama: "*No. Questa non è una pista."* Fabrizio arriva correndo e mostra ai compagni un fagiolo rosso dicendo entusiasta: *"Guardate! Alla luce è più rosso."* Arianna lo osserva, si alza e si dirige nel posto in vede il pavimento illuminato dal sole e dove ci sono alcuni legumi caduti in terra. Si siede per terra e guarda per terra, tocca alcuni legumi nella zona illuminata. Fabrizio chiama: "*Giovanni vieni a vedere! Giovanni!* Si alza e va verso Giovanni che è impegnato con il gruppetto che sta costruendo la casa. Giovanni segue Fabrizio e fanno lo stesso anche Elena e Alice. Si siedono per terra e osservano i semi.

Alice prende un legume e si sposta in una zona d'ombra e con tono sorpreso dice: "*E' vero! Cambia colore. Qui è più scuro."* I bambini fanno alcune prove mettendo i legumi alla luce e poi all'ombra e ne osservano il cambiamento. Alice, Elena e Arianna si spostano dalla pista di biglie. Dario, Giovanni e Fabrizio si sdraiano sul pavimento e continuano ad osservare i legumi e come cambiano se spostati alla luce o al buio. Li osservano per un po' di tempo per poi tornare dalla pista. Giovanni prende un pezzo di plastica e appoggiandoci le mani sopra la usa per raccogliere tutti i legumi che trova sul percorso che compie. Fabrizio rimane a osservare i legumi, ne raccoglie di diverso tipo (fagioli rossi, bianchi, ceci, lenticchie verdi e arancioni) e li mette nella zona illuminata dalla luce del sole. Dopo un po' chiama Giovanni: "*Guarda Giovanni, ne ho preso diversi e me ne manca ancora uno da trovare."* Giovanni si alza e Fabrizio va alla ricerca del legume che gli manca tra quelli che ha trovato e che erano dentro al sacchetto che avevo portato loro.

Dario, Alice, Elena e Arianna stanno lavorando alla pista e hanno aggiunto alcune assi di legno per allungarla. Giovanni prende pezzi di plastica rettangolari che utilizza per unire le assi di legno eliminando lo spazio tra un tratto di pista e l'altro. In questo lavoro lo aiutano, ora, anche Fabrizio e Dario. Ad un certo punto, Fabrizio si rivolge a Elena e dice: "*Adesso puoi tirare la pallina."*

Elena, dopo un po', decide di prendere il quaderno dalla sua busta e si mette in terra a disegnare mentre gli altri bambini smontano la pista. Arianna raccoglie nella scatola trasparente le biglie. Giovanni e Dario lasciano cadere alcune biglie e si lanciano per terra

per recuperarle. Alice si mette vicino a Elena e prende il quaderno per disegnare. Arianna, Dario, Fabrizio e Giovanni prendono le biglie e le fanno rotolare sul pavimento. Arianna prende il cilindro che contiene tutte le biglie e le versa per terra mentre Dario e Giovanni corrono per prenderle prima che si sperdano ovunque per la stanza. Fabrizio prende la bilancia e mette dentro al piatto alcune ciotole una dentro l'altra e alla fine mette una bottiglia vuota, quindi si abbassa per guardare l'ago ma non vede alcun movimento (le cose messe sulla bilancia sono troppo leggere), toglie la bottiglia e la rimette sul piatto sbattendola in modo da provocare un movimento dell'ago. Mi alzo per spostare la telecamera in modo che riprenda l'area in cui si sono spostati i bambini. Elena e Alice vengono verso di me e mostrando una lente di ingrandimento alla quale si è rotto il manico dicono: "*Maestra Alice ha rotto, non si sa come, la lente."* Alice, prima che io risponda, prende la lente dicendo che la userà così.

Mi appoggio al muretto davanti alla finestra e il sole che colpisce qualche oggetto e si attiva un gioco di luci, tanti puntini che si muovono per la stanza e che i bambini non sembrano notare.

Giovanni, Dario e Fabrizio iniziano a correre intorno alla stanza e calpestano del materiale sul pavimento. Intervengo: "*Ascoltatemi un attimo. Non vi siete accorti che correndo rischiate di salire sul materiale che è in terra e di romperlo. Così non lo avrete più a disposizione né voi, né i vostri compagni perciò vi chiedo di non correre con il materiale sul pavimento."* A questo punto, Fabrizio prende una bobina e la fa rotolare sul pavimento. Giovanni la prende e la tira verso il compagno. I due giocano, per qualche minuto, in questo modo.

Elena viene verso di me e, con tono un po' annoiato dice: *"Io non ho quasi più voglia."*

Io le chiedo di cosa non ha più voglia e mi risponde: *"Non ho più voglia di stare qui."* Le chiedo cosa vorrebbe fare e lei mi dice che vuole disegnare e le rispondo che può farlo, se vuole, sul quaderno. Elena, alla mia risposta, prende il quaderno e propone ad Alice e Dario di giocare alla scuola.

Dario: *"Io sono la maestra."*

Elena: *"No voglio essere io la maestra."*

Alice prende il suo quaderno e si siede con i compagni. Elena dopo qualche attimo riprende e mentre continua a disegnare dice: "*Però io sono proprio stufa."* A questa nuova esplicitazione sto pensando di chiedere a Elena se vuole tornare in classe ma aspetto perché mi sembra impegnata a disegnare.

Fabrizio e Giovanni continuano a tirarsi la bobina e Arianna e Dario a tirarsi le biglie. Alice si è spostata e disegna sul suo quaderno. Io sono vicina ad Elena che, dopo un momento, mi chiama: "*Claudia, guarda! E' un ragno che mangia i semi."* Io guardo il suo disegno e ripeto con un tono incuriosito: *"Un ragno che mangia i semi?"* ed Elena, allora, alza lo sguardo verso di me e dice sorridendo: "*Sì. Guarda."* In questo modo, anche Fabrizio e Giovanni sono incuriositi e si avvicinano per vedere il disegno della compagna. Mi sembra che Elena sia un po' più serena, ora mentre prima avevo percepito un certo disagio che la bambina ha manifestato dicendo che si stava annoiando. Probabilmente, i compagni che, fino a quel

momento, l'avevano seguita nei giochi ora si stavano organizzando per piccoli gruppetti isolandola un poco. Rimango, però, seduta un po' più vicina a lei. Dopo un po' Elena si alza e va verso Alice ma torna indietro attirata da uno scambio tra me e Dario che ha trovato un fagiolo bianco, me lo mostra e con tono interrogativo chiede: "*Guarda! Cos'è questo?"* Io lo guardo e con tono neutro gli dico: "*Non sai cos'è."*. Dario risponde: "*No."*

A questo punto, Elena si volta verso me e Dario e avvicinandosi a Dario chiede: "*Cosa? Fammi vedere."* Dario mostra ciò che ha in mano ed Elena dice: "*Aspetta, è un seme."* Mentre parla con Dario, Elena guarda per terra, cerca e alla fine prende un legume uguale a quello che aveva trovato il compagno. Poi viene da me e mi dice: "*Guarda cosa ho scoperto, questi due semi li ho trovati insieme ma poi ho tirato (fa il gesto con le mani che da vicine si allontanano) e si sono staccati:"*

Arianna va a prendere la bilancia e la porta sul pavimento con alcune biglie. La raggiunge Elena che si appoggia con il peso sulla bilancia dicendo alla compagna: *"Pesiamo."* Arianna guarda il quadrante con l'ago e dopo un po' dice ad Elena: "*Ora tocca a me."* E così dicendo si appoggia sulla bilancia ed Elena esclama: "Ma quanto pesi!" Poi, Arianna ed Elena prendono delle biglie e le mettono dentro al piatto della bilancia, guardano il quadrante ma non vedono movimenti rilevanti. Riprendono le biglie e le ripongono dentro la ciotola poi si alzano e si spostano da un'altra parte della stanza.

Avviso i bambini che manca ancora qualche minuto prima di rientrare in classe. Arianna continua a cercare le biglie che ci sono sparse e le ripone dentro al loro contenitore (cilindro trasparente).

Dopo qualche minuto richiamo l'attenzione del gruppo: "*Ascoltate! Abbiamo finito il nostro incontro. Ora ci vedremo ancora una volta per salutarci perché il nostro lavoro insieme è finito."*

Dario e Giovanni, mentre parlo, sono attirati da alcune biglie per terra e si gettano sul pavimento per prenderle. Li richiamo, con tono pacato, chiedendo loro di raggiungere i compagni perché rientriamo in sezione.

TRASCRIZIONE INCONTRO PRELIMINARE

GRUPPO C

Introduco l'incontro: "Ciao a tutti… Per chi la scorsa volta non era presente, provo a raccontare cosa facciamo in questa stanza insieme per un po' di tempo. Ho portato del materiale, come la volta scorsa, trascorreremo insieme un po' di tempo, un'oretta e io starò qui con voi ma vi osserverò perché sono curiosa di capire cosa voi potreste scoprire su ciò che vi ho portato, sulle cose che trovate in queste scatole."

Sui tavolini ci sono le buste del kit con alcuni strumenti quali quaderno a quadretti, matita, righello, coltellino di plastica, lente di ingrandimento e torcia.

I bambini cominciano a guardare il materiale dentro le scatole. Eros e Luca trovano le palline rimbalzine di gomma e le fanno rimbalzare, Eros le fa rimbalzare su uno dei tavolini e tenta più volte di far centro dentro ad una scatolina davanti a lui. Quando riesce a calibrare la forza da imprimere alla pallina e questa rimbalza andando a finire dentro la scatola Eros guarda dentro e dice con soddisfazione:" Sìییì". Riprova ancora sempre con la stessa pallina a fare centro nella scatola. Andrea, Jahel e Martina guardano dentro i contenitori del materiale e trovano delle lattine di birra vuote all'interno delle quali c'è una pallina (probabilmente utile, a suo tempo, per mantenere il contenuto integro) e ne notano la presenza prima per il rumore e, in un secondo momento guardando meglio dentro la lattina. Andrea e Jahel osservano: "Qui dentro c'è una pallina". Eros viene attirato dalle osservazioni delle compagne e prende una lattina per guardarci dentro. La scuote più volte e la capovolge, guarda ancora dentro tenendo la lattina capovolta. Quando appoggia la lattina sul tavolo, Eros si guarda un po' intorno, prende la pallina rimbalzina con la quale cercava di fare centro nella scatolina e cerca di inserirla nell'apertura della lattina ma la pallina non entra. Luca è andato vicino ad Eros incuriosito…Eros lo guarda, si guarda attorno e dice: "Aspetta, aspetta…", prende la sua busta con gli strumenti forniti da me e estrae la lente di ingrandimento. Appoggia la lente sull'apertura e guarda dentro, poi, su suggerimento di Andrea ("Prendi la luce, con la luce") e di Jahel che dà l'esempio, Eros prende la torcia e la accende facendo luce all'interno della lattina. Osserva per un po', poi capovolge la lattina osservando dalla fessura la pallina che spunta poi si dirige con la torcia verso la porta che divide la sezione dallo spazio nel quale siamo noi.

Jahel ha preso delle assi di legno dicendo: "Faccio una pista per le palline" e rivolgendosi a Martina: "Lo facciamo insieme?" poi prende le assi e le appoggia per terra a formare una pista. Andrea collabora fino a quando, suggerendo ad Eros di usare la torcia, prende la sua, la accende, la punta sul pavimento e attraverso la fessura della porta dall'altra parte della quale c'è un compagno che osserva ciò che facciamo.

Jahel prende una pallina da ping pong, la lascia cadere per terra, la osserva rimbalzare poi la riprende, la tocca un po' e poi, rivolgendosi a me: "Questa è un po' dura."

Eros punta la torcia accesa negli occhi di Luca (è un invito a giocare?), Luca si protegge gli occhi e il compagno sposta la torcia per poi puntarla nuovamente in faccia.

IO: "Eros, puoi puntare la luce dove vuoi ma non negli occhi".

Eros toglie la torcia dagli occhi di Luca e gli chiede: "Dov'è la tua?"

Luca sembra voler prendere la sua torcia, poi cambia idea. Andrea prende la lente di ingrandimento e la avvicina ad un occhio e punta la luce accesa sulla lente ma stringe gli occhi per il fastidio provocato dalla luce. Prende la busta e punta la luce sulla busta trasparente.

Intanto Andrea prende il contenitore delle biglie, lo apre e ne mette alcune dentro una bottiglietta. La stessa cosa fa anche Jahel, Martina prende una bottiglia vuota e osserva ciò che fanno i compagni. Chi ha preparato la bottiglia/sonaglio la scuote per fare rumore, Luca scuote la lattina facendo un rumore diverso. Eros si avvicina alle assi di legno inizialmente posizionate per terra da Jahel per fare una pista, ne prende una e la appoggia sul pavimento in verticale. Mi guarda e dice: "Sai a cosa serve?" Prende la bottiglietta che ha in mano e, utilizzandola come una mazza, colpisce l'asse di legno facendola cadere. A questo punto, con la bottiglietta in mano si dirige verso i compagni e inserisce anche lui alcune biglie iniziando a muovere su e giù il contenitore per fare rumore. I bambini svuotano il contenuto delle bottiglie dentro ad una scatolina di cartone e ricominciano a riempire le bottiglie, agitano i loro "strumenti" per fare rumore. Luca partecipa in modo marginale. Quando cade una biglia si precipita a prenderla per porgerla ad un compagno…Le bottiglie vengono svuotate e riempite più volte e ogni volta che ci sono le biglie dentro vengono agitate per fare rumore. Jahel, ad un certo punto, si stacca dal gruppo dei compagni perché attirata dalla caduta di una pallina di gomma. Jahel la prende e la tira per terra esclamando con tono di stupore: "Salta!" e imita il movimento della pallina con il corpo facendo un salto. Ora prova ancora a tirare la pallina per terra ma in modi diversi e a diverse altezze da terra.

I bambini, utilizzando alcuni materiali a disposizione allestiscono strumenti a percussione e cominciano a suonare battendo le bottigliette vuote sulle assi di legno per terra. Eros, Jahel e Luca hanno in mano le bottigliette che usano come fossero bacchette di una batteria. Andrea e in piedi e si muove a ritmo agitando la bottiglietta piena di biglie. Eros dirige "l'orchestra". Quando si accorge che le assi si spostano rispetto alla posizione che lui ha dato, le rimette a posto. Quando urla "Stop" tutti si fermano ed è il primo che comincia a suonare e a dare il ritmo. Luca, ad un certo punto, prova a battere sull'asse di legno il rotolo di nastro adesivo. Ad un tratto Eros aggiunge al rumore fatto con gli oggetti anche la sua voce iniziando a cantare. Martina per un po' partecipa con i compagni, dopo qualche secondo si dirige verso i tavoli e inserisce alcune biglie dentro la bottiglia che ha in mano. Per un attimo i bambini si fermano e svuotano il contenuto delle bottiglie, poi con le bottiglie vuote tornano a suonare ma, Jahel e Martina rimangono ferme ad osservare. Eros, per un attimo, rimane da solo a continuare la sua attività suonando. Andrea si alza e va a prendere i porta torte rotondi, li porta vicino alle assi di legno e li dispone per terra per poi prendere le bottiglie e cominciare a fare rumore battendo le bottigliette sul supporto di cartone. Questo gioco continua per qualche minuto coinvolgendo, principalmente Andrea ed Eros. Jahel è tornata a riempire e svuotare bottiglie con biglie e palline mentre Luca e Martina rimangono in osservazione. Andrea, ad un tratto, afferma: "Basta! Per me faccio una pausa". Eros si alza e prova a percuotere le bottiglie su altri materiali e sui tavolini presenti nell'aula e poi, ancora, le sbatte una contro l'altra. Anche jahel prova.

Andrea: "Eros, dove sono le due lattine?"

Jahel le prende e, in un primo momento le scuote facendo sentire il rumore della pallina al loro interno, poi le batte contro un'asse di legno per terra e avvertono tutti che il rumore che

si produce è particolare rispetto a quello che avevano sentito fino ad ora. Si combinano il rumore delle lattine sull'asse e quello delle palline contenute al loro interno. I bambini percepiscono la differenza poiché l'espressione di Jahel è interessata e "divertita", e i compagni si voltano verso di lei…per un attimo quel rumore riesce a emergere sugli altri. Andrea, infatti, ad un certo punto dice: "Stooop! Ora solo le bottiglie". Jahel si ferma e si sente soltanto il rumore delle bottiglie vuote sul legno delle assi e il cartone, poi Andrea esclama: "Adesso le lattine" e Jahel riproduce il rumore che le lattine con la pallina dentro fanno quando battute contro le assi di legno. Eros prosegue facendo rumore sbattendo le bottiglie vuote sopra i tavolini della stanza. Andrea, si alza, va verso Eros e lo imita affermando: "Vado dall'altra parte", quindi si dirige dalla parte opposta del tavolino con le sue bottiglie. Jahel scuote ancora un paio di volte le lattine guardando dentro l'imboccatura perché interessata alla pallina che c'è dentro ma non sembra voler uscire. Posa le lattine, prende due bottiglie vuote e si siede per terra dove c'è la scatola delle biglie con l'intenzione di metterne alcune dentro le bottigliette. Andrea la raggiunge, prende una manciata di biglie e torna vicino ai tavolini per riempire le sue, scuote le bottigliette per fare rumore. Martina, che fino a quel momento ha osservato ciò che i compagni facevano prende una bottiglia e la riempie con alcune biglie. Jahel, una volta inserite le biglie di vetro nelle bottiglie, usa queste ultime come bacchette della batteria sopra i porta torte di cartone finchè non si alza e raggiunge i compagni al tavolino. Insieme cominciano a utilizzare le bottiglie vuote o con le biglie di vetro per fare rumore. Sbattono le bottiglie sui tavolini oppure le scuotono e partecipano tutti.

Il rumore è sicuramente l'aspetto che emerge nel modo in cui questo gruppo utilizza il materiale a disposizione anche se non ci sono riferimenti espliciti o osservazioni rispetto ai diversi suoni prodotti dai diversi materiali. Via via provano con materiali diversi…all'inizio utilizzano solo bottigliette, biglie e legno per poi aggiungere altri oggetti quali tappi, cartone, tavolini. Provano anche diverse combinazioni con i materiali. Jahel, ad un certo punto, mette quattro porta torte di cartone uno sopra l'altro e vi appoggia assi di legno posizionandole una accanto all'altra. Andrea prende due bottiglie con dentro le biglie e le percuote una con l'altra.

Riguardando il video mi rendo conto che questo interesse impegna il gruppo per 20 minuti circa durante i quali i rumori vengono ricercati solo con bottiglie battute su assi di legno, poi vengono provati anche altri materiali.

Eros è in ginocchio per terra e con una bottiglietta, utilizzata come una mazza, colpisce una pallina di plastica ed esclama: "Sì, l'ho colpita!" Si alza e la recupera. Andrea prende una bottiglietta vuota, va verso Eros e lo chiama: "Eros, vieni! Se tiro la pallina poi la devi prendere." Andrea recupera una pallina sotto il tavolo e chiama Eros per iniziare a giocare in due. Andrea lancia la pallina verso Eros, la pallina rimbalza per terra senza che il compagno riesca a colpirla a sua volta. A questo punto, Andrea dice: "Ho un'idea per provare a fare buca", si dirige verso il tavolino dove ci sono le scatole, di diversa dimensione, che contengono il materiale a disposizione dei bambini e ne prende una, la posiziona per terra – un po' distante dal posto in cui tireranno la pallina lei ed Eros e precisa: "La facciamo andare in buca là (indicando il punto nl quale si trova la scatola/canestro)." Martina e Jahel stanno riempiendo le bottiglie vuote con biglie di vetro che prendono dai contenitori sui tavolini poi e le svuotano. Martina riempie una bottiglia e poi prova a travasare il contenuto (biglie)

dentro ad un'altra bottiglietta mentre Jahel fa la stessa cosa ma travasando le biglie all'interno del contenitore dalle quali le aveva prelevate per inserirle nella bottiglia di plastica. Martina, ad un certo punto, mette alcune biglie dentro una bottiglietta di plastica, la chiude con il tappo e prova a scuoterla. Andrea ed Eros provano a fare qualche tiro colpendo una pallina leggera di plastica con la bottiglietta di plastica vuota per fare centro nella scatola che hanno posizionato per terra ma senza successo. Andrea dice: "Dobbiamo prendere le palline rimbalzine" e si dirige verso il contenitore sul tavolo prendendone una. Eros fa la stessa cosa e tornano a provare a lanciare la pallina per fare centro. Dopo aver tentato senza riuscire nell'intento, Eros e Andrea decidono di cambiare il "cesto", ripongono la scatola di cartone e decidono di indicare il punto dove immaginano la buca con una bottiglia vuota. Eros ne prende una dalle mani di Jahel ma Andrea interviene per riportare la bottiglia alla compagna e, nel frattempo, ne prende una dal tavolino e la porta a Eros che la appoggia per terra. Martina, intanto, prende la bottiglia cui ha messo il tappo dopo aver inserito alcune biglie di vetro e la porta alla bocca inclinandola come per far finta di bere. Ripeterà l'azione un paio di volte poi toglie il tappo e travasa il contenuto all'interno del cilindro dove sono contenute le altre biglie.

Luca osserva ciò che fanno i compagni ma non interviene in ciò che stanno facendo.

Andrea ed Eros continuano a colpire le palline con le bottiglie vuote finchè Andrea propone: "Facciamo così con le mani" e tira una pallina di gomma contro la parete della stanza. Jahel ha in mano due bottiglie, ne posa una e prende una pallina da ping pong e la lancia, come aveva fatto Andrea, contro la parete. Ora Andrea e Jahel provano a lanciare le palline per terra e osservano come rimbalzano. Martina ha ripreso l'esperienza di travasare le biglie da un contenitore all'altro mentre il gioco di Andrea, Eros e Jahel comincia a farsi più movimentato, lanciano una pallina per terra, la colpiscono con una bottiglietta facendola rotolare e corrono per intercettarla e colpirla ancora. In questa fase, partecipa anche Luca correndo verso la pallina, lanciandosi per terra. Eros prende una pallina, la mette per terra e con la bottiglia la colpisce facendola rotolare dritto davanti a sé per abbattere la bottiglia che rappresenta la buca. Andrea lo raggiunge, si mette per terra e dice "Ora lo faccio io", colpisce la pallina ma non riesce a far cadere il bersaglio. Ogni volta che il gioco si fa più movimentato, Luca partecipa, corre, fa scivolate come fanno i compagni quando devono recuperare la pallina che hanno, precedentemente, colpito. L'obiettivo del gioco che fanno è quello di colpire il bersaglio e farlo cadere colpendo la pallina con la bottiglia. A turno si mettono per terra, posizionano la pallina prendono la mira avvicinando il viso alla pallina e guardando in direzione del bersaglio per dare la traiettoria giusta. Quando colpiscono il bersaglio esultano: "Sì, l'ho colpito." Mentre fanno un'espressione delusa quando lo mancano. Andrea, in genere, conduce il gioco ricordando di chi è il turno per lanciare. Martina è sempre impegnata a passare le biglie di vetro da un contenitore all'altro (in particolare dal cilindro che le conteneva in origine alla bottiglietta di plastica). Quando deve svuotare la bottiglietta e travasa le biglie dentro al cilindro si rende conto che fanno difficoltà e che si crea il classico blocco a "collo di bottiglia". Dopo qualche tentativo, prova a far uscire le biglie dalla bottiglietta scuotendo la stessa ripetutamente verso il basso.

Quando mancano 5 minuti alla fine dell'incontro intervengo per avvisare i bambini: "Tra poco si concluderà il nostro incontro di oggi."

Andrea: “Ok.” E continua con i compagni a tirare la pallina facendola rotolare in terra fino a colpire il bersaglio. Martina prende la bottiglia che aveva riempito di biglie fino a metà, la capovolge sul palmo della mano e mette le biglie che cadono nel palmo dentro un altro contenitore. Ripete l’operazione più volte. Andrea si avvicina a Martina prende la sua bottiglia e versa le ultime biglie nel contenitore dove la compagna aveva messo le altre ma, durante l’operazione il cilindro pieno di biglie si rovescia. Martina si mette alla ricerca delle biglie che sono rotolate sul tavolo e cadute in terra, Andrea recupera quelle che trova mentre gioca a colpire le palline per far cadere il bersaglio. Jahel, ad un tratto dice: “Ma io non ho ancora fatto centro.” A quel punto, intervengo nuovamente per comunicare ai bambini che abbiamo finito l’incontro.

VERBALE 1° INCONTRO

GRUPPO C

Io: Oggi, come la volta scorsa, vi ho portato del materiale, degli oggetti. Voi con queste cose potete fare ciò che volete…toccarle, guardarle…Insomma, tutto ciò che volete…solo una cosa non potete fare ed è quella di usare queste cose per farvi male. Io sono qui, vi osservo perché sono curiosa di vedere cosa si può scoprire con questi materiali.

Eros: possiamo fare così? *Mette le mani dentro l'acqua*

*Io ripeto che possono fare ciò che vogliono tranne farsi male e bagnarsi troppo…*Come la volta scorsa, io sono qui e vi osservo perché sono curiosa di vedere cosa potete scoprire con queste cose…

I bambini sembrano spiazzati…sono fermi. Andrea non era presente alla fase di osservazione preintervento e Mattia neppure…

I bambini cominciano a mettere alcune cose nelle vaschette di acqua a disposizione…. Eros mette una pallina, la spinge sul fondo e quando la lascia torna su a galla…Andrea mette una lattina di coca cola nell'altra vasca, la riempie e la svuota…Altri bambini sono ancora un po' in osservazione…Mattia riempie e svuota una lattina, poi una bottiglia…

Eros: mi è venuta un'idea! *Prende una pallina e riprova, la spinge giù nell'acqua, la guarda tornare a galla…Lo fa un paio di volte poi prende una bottiglia di plastica e prova a riempirla, la svuota. Ripete l'operazione.* Che fredda quest'acqua!

Martina e Jahel stanno giocando con una pallina nella vaschetta…Martina ha le mani dentro l'acqua, mi guarda e sorride…

Mattia trova la scatolina che contiene gli anelli di metallo, li prende e li mette in acqua…

Eros: le bolle! *Mentre sta cercando di riempire una bottiglietta di acqua la immerge inclinandola per far entrare l'acqua e osserva che escono le bolle…*

Io sono vicino alla telecamera, annoto sul quaderno…talvolta mi sposto vicino a loro…

Provano a mettere diversi giochi nell'acqua…Riempiono e svuotano con l'acqua bottiglie e lattine…

Mattia riempie una lattina e travasa l'acqua dentro la bottiglia di plastica…Andrea prova a mettere dentro la bottiglia diversi oggetti, poi prova un tappo di sughero ma non entra…lo posa.

Mattia prende l'acqua da una vaschetta con una lattina e la versa in un'altra vasca…

Eros: mettiamo i tappi.

Mattia: *prende i tappi di metallo, li mette nell'acqua canticchiando* Tutti i tappi, tutti i tappi…

Jahel: *riempie una lattina e versandola si rivolge a Martina:* Guarda!

Mattia continua a fare travasi…da una lattina a una bottiglia…Andrea continua a cercare oggetti da inserire dentro ad una bottiglia…

Eros si sposta per andare verso una delle vasche più grandi che sono a terra e scivola scontrando la vasca con l'acqua. Mi avvicino: Cosa è successo? Ho un tono calmo…*sorrido perché mi rendo conto che non si è fatto male.*

Eros: sono scivolato.

Io: Sei scivolato! È stato un incidente, può capitare…facciamo così…*prendo un asciugamano e tolgo un po' di acqua caduta per terra…lo aiuto a rialzarsi e gli tolgo il grembiule che si era bagnato. Gli altri bambini, Andrea in particolare che era più vicino a lui ride divertito…*

Io: Bisogna che facciate un po' di attenzione perché il pavimento bagnato è diventato scivoloso e le ciabattine che avete possono farvi scivolare…cercate di muovervi con calma.

I bambini cominciano di nuovo a fare le loro prove…con le bottiglie, travasano. Andrea sta mettendo una delle vasche più piccole vuote dentro quella grande come volesse riempirla…poi mi guarda…dopo un po' dice…

Andrea: Io non so cosa fare…

Io: Non sai cosa fare!? Guarda un po' quello che hai a disposizione, che vi ho portato…

Andrea: ce l'hai un po' di colla?

Io: se ho un po' di colla? No, qui con me ora no!

Andrea: perché io voglio fare un po' così *mette un tappo di metallo sopra uno di sughero e mi fa vedere che vorrebbe attaccarli insieme.*

Andrea torna dalla vasca, prende qualcosa. Io sono con loro e intanto con un asciugamano raccolgo l'acqua che si è accumulata sul tavolo mentre Mattia faceva i travasi…

Ora anche altri bambini travasano…non solo acqua ma anche oggetti da una vasca all'altra…

Eros: *Prende una pallina la getta in acqua e la guarda andare giù e tornare su. Si rivolge ad Andrea vicino a lui e dice:* Guarda!

Andrea *ha in mano delle palline e prova a gettarne una nell'acqua…ne butta un'altra ma la pizzica dandole una spinta in avanti con il pollice e la pallina schizza via sul pavimento.*

Eros prova pizzicando la pallina verso l'acqua e la guarda andare prima giù e poi tornare su.

Uno dei compagni chiede Ma come fai?

Eros: Così e ripete il movimento…

Intanto Andrea si è allontanato dalla vasca dell'acqua con la pallina e la lancia per terra mettendola su indice e medio e dandole un colpetto con il pollice. Ora lo fa vedere a Eros e la lancia contro il muro…la pallina rimbalza. Eros si alza in fretta…recupera due palline e

le lascia cadere dentro l'acqua poi prende una lattina e comincia a riempirla con gli anellini di metallo. Andrea continua il suo gioco con le palline..poi la svuota. Andrea si avvicina alla vasca dove sta giocando Eros e lancia la pallina contro il muro.

Eros: Ehiii!!! Prova anche lui, ma la pallina che usa non rimbalza…

Andrea: dov'è? *Sta cercando la sua pallina che rimbalzando ha perso di vista.*

Eros: E' lì…indica dove si trova la pallina…

Jahel e Mattia sono nell'altra vasca d'acqua e continuano a fare travasi con bottiglie e lattine…

*Andrea continua a giocare con la pallina e a lanciarla contro il muro…*Mi diverte tantissimo questo gioco.

Eros: Andrea! *Prova anche lui a tirare la pallina nel modo in cui la lancia Andrea…*

I due iniziano a giocare tirando e facendo rimbalzare la pallina contro il muro… Dopo un po' Eros prova a farla rimbalzare per terra… Ad un tratto ne ha due in mano…le fa rimbalzare per terra. Una di queste rimbalza e l'altra no ma non esplicita nulla… di ciò che accade…La ributta in acqua e prende una biglia sul fondo.

Eros: *si volta verso Andrea e dice:* Sei pronto Andre? *Fa cadere la biglia per terra…Torna correndo verso la vasca…scivola e cade.*

IO: *andando da lui.* Così no, non correte perché vedete qui c'è bagnato e si scivola…cercate di non correre. *Mentre sto asciugando l'acqua che c'è per terra dove Eros e Andrea stanno giocando con le palline Jahel corre verso di noi dicendo:* Oh mamma! Mattia! *Alzo lo sguardo…. ha riempito troppo una vaschetta con l'acqua travasandola via, via da una vasca all'altra e ora, cercando di sollevare la vaschetta per rovesciarla nella vasca più grande ha fatto cadere acqua sul pavimento. Mi avvicino, asciugo un po'…intanto Mattia riesce a sollevare la vaschetta e rovesciarla nel contenitore più grande.*

Jahel: gliel'avevamo detto eh!

Io: facciamo così, dai! *Metto asciugamani per terra per assorbire perché se ne è rovesciata davvero un bel po' e dopo di noi useranno la stanza i bambini delle elementari…*

Andrea ed Eros sono tornati il primo a giocare tirando la pallina matta per farla rimbalzare e Eros è vicino alla vasca dell'acqua dove Mattia sta mettendo rovesciando l'acqua contenuta in alcune bottiglie…

Eros: Noooo…Mattia!

Mattia si sposta ma continua a fare travasi da una vasca all'altra usando le bottigliette…

Jahel, Andrea e Eros cominciano a giocare tirando palline per terra o sul muro…

Jahel: *Provando a tirarla come Andrea…* Ce l'ho fatta! Ce l'ho fatta!

Ora tutti i bambini iniziano a fare questo gioco…anche Mattia.

Le palline matte rimbalzano, le biglie no…

Mattia torna a fare travasi per un momento…. Eros si avvicina ad una delle vasche, prova a mettere una delle palline dentro ad una bottiglia, non entra… rovescia la bottiglietta. Ora passa a riempire una lattina e una bottiglietta di acqua per poi versarne il contenuto…

Jahel, Andrea continuano a giocare lanciando le palline e correndo a prenderle. Io intervengo solo per ricordare loro di non correre troppo dove il pavimento è bagnato…

Eros prova a tirare la pallina nello stesso modo con il quale la tira Andrea ma facendola cadere in acqua. Prova un paio di volte…

Ora iniziano a rincorrersi…tirano le palline in aria e le guardano cadere a terra. Sposto una delle vasche grandi che sono per terra sul tavolo perché temo che possano caderci dentro mentre corrono.

Mattia sta travasando acqua e ad un tratto rovescia in una vaschetta piccola tutto il contenuto di una più grande facendo traboccare l'acqua sul tavolo che comincia a cadere sul pavimento….Prendo un asciugamano e lo metto dove gocciola l'acqua, con un altro asciugo sul tavolo.

Andrea continua a giocare tirando le palline contro il muro…inizia a lanciarle…Lo fermo dicendo che è meglio non tirarle troppo forte perché possono rimbalzare sulla testa di qualcuno o sulla telecamera…

Mattia comincia a correre intorno al tavolo…per la stanza.

Io: Mattia fai attenzione, non correre perché hai le ciabattine bagnate, per terra c'è bagnato e rischi di prendere uno scivolone.

Mattia torna alla vasca dell'acqua e riprende i travasi…Eros nella vasca vicino a lui sta osservando palline dentro l'acqua. E riprende a fare travasi anche lui.

Ad un tratto la telecamera si ferma…possibile che qualcuno di loro abbia fermato la registrazione senza che me ne accorgessi ma vedo ora che si è fermata quando manca un quarto d'ora alla fine del nostro incontro.

I bambini nel frattempo continuano per un po' a fare travasi, poi riprendono a lanciare le palline…troppo forte contro il muro colpendo Jahel e una volta la telecamera. Continuano a correre e decido di fermare l'incontro per non riprenderli ancora….

VERBALE 2° INCONTRO

GRUPPO C

Quando arrivo le maestre mi dicono che i bambini sono di nuovo assenti…ne hanno pochi quel giorno. Verifico quanti ce ne sono del gruppo che devo incontrare quel giorno e vedo che ce ne sono 4. Decido di fare l'incontro lo stesso.

Io: Vi ricordate, l'altra volta? Vi ho portato delle cose. Oggi anche…Potete fare quello che volete con queste cose, tranne farvi male. Vediamo cosa si può scoprire con questi oggetti…

I bambini cominciano a prendere il materiale, Eros prende le bottiglie e le mette nella vasca grande dell'acqua. Jahel mette qualcosa dentro una bottiglia e la scuote.

Jahel: Wow. Forte!!! *Mentre scuote la bottiglia che fa rumore.* Possiamo buttare anche queste nell'acqua *mostra la bottiglietta che stava scuotendo...*

Io: potete fare ciò che volete…le regole però sono di non farvi male e non bagnarvi troppo.

Jahel: *rovescia il contenuto della bottiglietta nella vasca d'acqua…la biglia cade e va a fondo. Se ne accorge e me lo indica dicendo:* Guarda!

Io: Eh, già!

Tilde: dove mi metto?

Io. Scegli…Le mostro le vasche d'acqua per terra e quelle sul tavolo…Scegli tu dove vuoi metterti…

Eros: perché è andata sott'acqua *indica una pallina che ha messo nella vasca dell'acqua.*

Io: già…chissà…*mi fermo vicino a lui…*

Tilda prende alcune palline da ping pong e altri oggetti e li mette dentro la vaschetta che ha scelto.

Io sempre vicino a Eros che mi dice: Si è messa a testa in giù…*ha osservato che aveva messo dentro la bottiglia due biglie, l'ha capovolta facendo andare le biglie dalla parte del tappo e inserendo la bottiglia nell'acqua ha osservato che si metteva a testa in giù con la parte contenente le biglie sott'acqua…Lo guardo ma do un rimando di conferma…*Sì, già…si è messa a testa in giù.

Tilda: *toglie una bottiglia che qualcuno ha messo dentro la sua vaschetta e dice:* No, quella non mi serve.

Andrea è in piedi con in mano una bottiglietta e comincia a sbatterla contro l'altra mano che contiene una biglia. Fa rumore. Ripete più volte.

Tilda, Jahel e Andrea continuano a giocare inserendo oggetti diversi nell'acqua. Mi avvicino a loro. Andrea mi racconta che sul percorso vitae sono venute giù due frane.

Io: lo ascolto. Due frane? Sul percorso vitae? E dove si trova il percorso?

Andrea: è un percorso nel bosco… dove si va che c'è il Santuario.

Io: aspetta, aspetta. Quale Santuario?

Andrea: quello che c'è su…nel bosco. È quello dell'eremita…

IO: ma è vicino?

Andrea: si, c'è una strada sterrata e li c'è il percorso vita. *Nel frattempo ha messo biglie nella bottiglia e mi chiede di mettere il tappo. Lo faccio e gliela restituisco. Comincia a fare rumore scuotendo la bottiglia.*

Mi allontano un momento perché Jahel dice che l'acqua è fredda e decido di andare nel bagno di fronte alla stanza per prendere acqua calda da aggiungere. Eros è dalla vasca con l'acqua e probabilmente sta lasciando cadere oggetti nell'acqua perché dice: Wow! Che tuffo!

Tilda, Andrea giocano con le bottiglie. Tilda mette acqua dentro una bottiglietta, la tappa con una pallina. Poi rovescia la bottiglia e osserva cadere la pallina e rovesciarsi l'acqua nella vaschetta. Andrea riempie l'acqua e la svuota ripetutamente… Quello che ho scritto fino a qui lo vedo dalle registrazioni della videocamera...

Intanto rientro con l'acqua e ne verso un po' nelle vaschette per riscaldare l'acqua che c'è dentro. Prendo quella di Eros, tolgo un po' di acqua dicendo che la tolgo se no se aggiungo l'altra si rovescerebbe per terra… Verso un po' dell'acqua dalla vaschetta di Eros in un'altra al momento non utilizzata.

Tilda: A cosa serve quella? *Indica la vaschetta inutilizzata dove ho aggiunto acqua…*

Le rispondo che sta lì…se a qualcuno servirà potrà utilizzarla.

Tilda: questi a cosa servono? Indica la scatoletta che contiene le brugole…

Io: mah…a cosa potrebbero servire?

Tilde: me la apri? *Vuole che le apra la scatoletta delle brugole…Mi avvicino a lei e apro il contenitore. Ne do qualcuna a Tilda. Si avvicina Jahel e porge la mano perché ne vuole un po' anche lei… Tilda mette le brugole nell'acqua…*

Jahel: va verso la vasca grande, si volta verso di me e chiede: Posso mettere queste qui? Possiamo buttarle in acqua?

Io: penso di sì…

Jahel: Si, si può…sono andate giù…

Io: eh già.

Andrea e Jahel sono vicini, dalla stessa vasca. Andrea riempie una bottiglia e si rivolge a Jahel chiedendo se gli dà un tappo. Poi Andrea viene da me e mi chiede se posso tappare la sua bottiglia. Tappo la sua bottiglia…Andrea la prende e comincia a scuoterla facendo rumore con el cose che ha messo dentro con l'acqua (biglie).

I bambini continuano a utilizzare il materiale che ho portato loro per fare travasi, osservare come si comportano gli oggetti nell'acqua senza, però, verbalizzare osservazioni o fare ipotesi su galleggiamenti, schizzi, o altro…

Trovano i tappi dentro il contenitore del materiale sul tavolo…Eros prende qualcosa, si avvicina a me…io sono accovacciata vicino a dove ci sono Tilda, Andrea e Jahel…Eros mi chiede: Posso venire a giocare li da andrea…da loro.

Lo guardo, gli sorrido proponendogli di chiedere a loro…

Andrea: Certo Eros!!! Sei mio amico. Certo Eros!!!

Eros trasporta alcuni oggetti dentro una vaschetta dell'acqua in quella grande dove stanno giocando Jahel e Andrea. Tilda chiede se anche lei può andare a giocare con loro. Poi però non ci va…continua a giocare con le cose che ha messo nella sua vaschetta.

Tilda dopo un po' si alza, va verso la vasca dei suoi compagni, prende una lattina. La riempie e la svuota. Poi prende due bottigliette più piccole. Le mette nell'acqua…travasa l'acqua dall'una all'altra…dopo un po'…dice: Perché faccio le bolle.

Io: fai le bolle?

Tilda: Sì…

Le fa versando dall'alto il contenuto delle bottiglie dentro la vasca dell'acqua e osserva le bollicine che si formano dopo l'impatto…

Mi volto verso il gruppetto che sta giocando insieme nella vasca grande…Andrea mette alcuni piccoli oggetti (biglie, anellini di metallo) dentro una bottiglia elencando una serie di cose (cacche di cerbiatto, delle vacche…) Eros fa una faccia schifata e dice Bleh! *Continuano…stanno facendo una pozione…mi guardano e allora commento:* Una pozione con cose così disgustose farà diventare bellissimi! Qualcuno dice…Che schifo. Io: Eh…un po' sì.

Andrea prende una biglia ed Eros: No, quella è mia!

Andrea: *la mostra sul palmo della mano a Eros e lo sfida*: Vieni a prenderla!!! *Scappa correndo…*

Eros lo insegue…

Io: però, non così…correndo abbiamo già visto che si scivola.

Tornano dalla vasca…si litigano delle palline…Andrea ne prende una e la getta dall'alto dentro l'acqua.

Eros: ehi! Mi hai bagnato sulla testa!

Andrea ripete divertito, la getta nell'acqua per tentare di bagnare Eros che si lamenta.

Tilda è dietro di me…sta cercando di far uscire qualcosa che aveva messo dentro alla lattina di coca cola…Andrea bagna la pallina e la lascia gocciolare sul braccio di Eros. Poi prende un po' di acqua nel palmo della mano, mi accorgo che la vuole tirare ad Eros e lo fermo dicendogli di non farlo.

Tilda è sempre dalla sua vaschetta dell'acqua ma ad un tratto si alza e dice: Boh, io non gioco nemmeno più perché mi sto bagnando troppo!

Io: Facciamo più attenzione…

Tilda: mi tiri su la manica? *Vuole che la arrotoli perché si è bagnata il polso della maglietta e le dà fastidio.*

Andrea vede una pallina rimbalzare sul pavimento, probabilmente tirata da Eros…la riprende la fa rimbalzare, Jahel prova a prenderla calciando con il piede per ritirarla. Iniziano a giocare tirando la pallina…colpisce il sostegno della telecamera che traballa un po'.

Io: Fate solo attenzione a non colpire la telecamera perché si romperebbe…

Andrea e Jahel riprendono a giocare facendo rimbalzare la pallina per terra…Eros mette dentro l'acqua delle palline da ping pong…

Tilda si è seduta e prende la lente che ha nella sua bustina, la usa mettendola davanti agli occhi…dopo un po' mi chiede: Posso lavarla è un po' sporca.

Io: dici che è un po' sporca?

Tilda: c'è un po' di graffietti in questa…(nella lente). *La mette nell'acqua, la tira fuori, la guarda…la rimette in acqua. Quando la tira fuori, la avvicina ad un occhio e dice:* Uuuh! Che bella così! L'ho bagnata ed è diventata bellissima!

Andrea ed Eros ricominciano a giocare tirando le palline che più volte arrivano vicino alla telecamera. Provo a spostarla. Non serve! allora mi rivolgo ai bambini chiedendo a loro di mettersi più lontani dalla videocamera per continuare a giocare. Dopo un po' ricominciano a lanciare le palline che rimbalzano indietro con troppa forza…mi metto davanti alla telecamera, prendo una pallina e comincio a giocare con loro tirando le palline più piano… Ora stiamo giocando tutti…anche Tilda si è unita al gioco. Per un po' giocare con loro serve per contenere lanci troppo forti…poi Andrea ed Eros iniziano a lanciarli con forza al muro…Mi rendo conto che sto iniziando a dover ripetere troppe volte "State attenti!", Più piano, non così forte!"

Decido di liberare il tavolino e propongo loro di disegnare quello che abbiamo fatto oggi…ci sediamo al tavolino, prendono il loro quaderno e la matita e iniziamo a disegnare.

Andrea dice che sta disegnando una strega…

Jahel: Come si fa a disegnare un castello?

Io: Un castello! Ah!

Jahel: allora si fa una riga qui, una riga qui…*sta facendo un rettangolo….*

Eros si alza e guarda ciò che sta disegnando Jahel.

Andrea: per fare un castello devi fare una puzzetta!!! *Dopo un po' mi guarda e chiede:* Scusa! Questa pagina la posso usare?

Io: quello è il tuo quaderno, puoi utilizzarlo come vuoi…Ma oggi abbiamo giocato con i castelli?

Andrea: No abbiamo fatto così *prende il suo coltello di plastica e lo mette sulla guancia muovendolo su e giù*

Io: No, è vero che è di plastica ma può tagliare…e vedo che hai già un paglietto sulla fronte…

Andrea: quello ero sul letto di mia nonna e Pedito è saltato su e mi ha graffiato…

Io chiedo chi sia Pedito e Andrea mi spiega che è il suo cane…Poi disegno anche io e dico cosa sto disegnando…Il muro, le palline…

Andrea: Ma quindi se la pagina del quaderno è tutta colorata posso prenderne un'altra?

Io: si puoi usarne un'altra…

Tilda: sì, anche io l'ho fatto!

Ricomincio anche io a disegnare con loro…sul mio foglio. Disegno dei bambini…mi chiedono chi sto disegnando. Rispondo che disegno dei bambini…

Jahel: cosa stai facendo tu, Tilda?

Tilda: faccio una bambina

Eros: io faccio spiderman…

Intanto finisce il tempo del nostro incontro…Ci salutiamo e li riaccompagno in classe dai compagni.

VERBALE 3° INCONTRO

GRUPPO C

La mia consegna iniziale è la stessa delle volte scorse…

I bambini riprendono alcune attività che avevano fatto durante lo scorso incontro. Tilda ed Eros mettono oggetti di diverso tipo nella vasca grande dell'acqua, li osservano per un po' e passano a prendere altri materiali da mettere in acqua. Mattia e Martina utilizzano principalmente bottiglie di plastica che riempiono e svuotano, Jahel utilizza dei legnetti per costruire…Andrea riprende a lanciare le palline facendole rimbalzare per terra o sul muro.

Jahel, ad un certo punto, prende i legnetti con i quali stava costruendo qualcosa, si avvicina alla vasca dove sta giocando Jahel e li mette dentro l'acqua dicendo: Guarda, tieni…*anche Martina che vede questo passaggio ripone nella vasca dell'acqua di Tilda i materiali che stava utilizzando nella sua vaschetta.*

Tilda: *Tiene per un po' le mani dentro l'acqua, appoggiate sul fondo e poi esclama rivolgendosi a me*: E' calda!

Io: E' calda, Sì!

Jahel porta ancora qualche legnetto nella vasca di Tilda e quindi si inginocchia (la vasca è posizionata per terra) e cominciano a giocare insieme…Martina è in piedi, osserva…ad un tratto sorride….vede Andrea che lancia una pallina che finisce nella vasca dove sta giocando Eros…forse lo schizza perché Eros si lamenta…Andrea prova ancora e questa volta la sensazione è che voglia far cadere la pallina nella vasca per bagnare Eros…Ci riesce e comincia a ridere divertito. Mattia è fin dall'inizio sul tavolino dove era posizionata una vaschetta più piccola e che ha scelto per fare le sue attività con la bottiglia di plastica…non sembra interessato a ciò che fanno i compagni. Martina prova ad avvicinarsi alla vasca dell'acqua dove ci sono Tilda e Jahel…Andrea corre per prendere una delle palline che ha tirato. Martina sembra un po' a disagio tanto che ho l'impressione che non sia quello il suo gruppo e la mia difficoltà è dovuta al fatto che Martina è stata qualche volta assente e dall'essermi dimenticata il quaderno con i nominativi dei bambini nei vari gruppi a casa…Dunque riesco a ricordare i nomi dei bambini che sono stati sempre presenti e che hanno partecipato di più. Forse mi sono fatta un po' condizionare dalle maestre che all'inizio del percorso mi hanno descritto Martina come una bambina molto introversa e che non parla mai con loro e poco con i compagni…L'insieme di questi pensieri mi porta a chiederle se abbia voglia di rimanere con noi…mi fa cenno di si…Le dico che quando vorrà tornare dai suoi compagni e dalle sue maestre potrà farlo…Rimarrà con noi fino alla fine. Controllando a casa il quaderno con i gruppi mi accorgo che era proprio in questo gruppo…

Andrea continua a tirare le palline sul muro…quando cadono. Mattia è andato dalla vasca dove ci sono Tilda e Jahel…vuole prendere delle palline ma Tilda non vuole. Inizia un piccolo bisticcio tra Tilda e Mattia il quale comincia a prendere alcuni legnetti dalla vasca e tirarli a Tilda…Non intervengo perché la situazione sembra risolversi con Tilda che dice a Mattia: Ne puoi prendere solo una!

Eros ad un tratto si lamenta perché è stato colpito da una delle palline lanciate da Andrea che non si ferma e continua a lanciarle verso il muro piuttosto forte. Intervengo dicendo ad Andrea che se vuole continuare quel gioco dovrà fare attenzione a non colpire i compagni. Andrea comincia a tirare più piano, si avvicina ad Eros che è sempre nella vasca dell'acqua che ha scelto e sta mettendo ripetutamente le stesse palline dentro l'acqua. Le tira su e le ributta in acqua, le osserva andare giù e tornare su… (il movimento che fanno è un po' come se rimbalzassero in acqua). Andrea getta una delle sue palline dentro l'acqua provocando uno schizzo un po' più forte. Jahel tira vicino ai suoi compagni una pallina ma Andrea gliela riporta…

Andrea*: torna da Eros e prova a coinvolgerlo*: Eros, vieni a giocare con me con le palline? *Il tono della voce è alto…*

Mattia è tornato alla sua vaschetta e all'attività di riempimento delle bottiglie di plastica…vicino a lui c'è Martina e ha iniziato anche lei a riempire bottiglie e lattine nella sua vaschetta…

Andrea non avendo ricevuto riscontro da Eros al suo invito di giocare con le palline, decide di giocare tirando le palline dentro la vasca di acqua di Eros…ne lascia cadere una dall'alto e schizza Eros che esclama: Ehi!!! *Il gioco si ripete un paio di volte, poi Eros decide di giocare a tirare le palline con Andrea…i primi lanci sono troppo forti e intervengo e mi rivolgo a tutti perché prima lo avevo detto solo ad Andrea, proprio dopo pochi minuti che aveva ripreso a fare il gioco di tirare le palline contro il muro:* No! Allora, prima l'ho detto solo ad Andrea, lo dico per tutti adesso. Se volete fare questo gioco, va bene ma non tirate così forte contro il muro perché rimbalzando potete colpire qualche compagno o la telecamera. Giocate pure, ma la regola che vi ho dato all'inizio, di non farvi male, la dobbiamo rispettare.

Anche Jahel comincia a giocare con le palline e dopo un po' la segue Tilda…Andrea ed Eros si sono avvicinati alla vasca dell'acqua e provano a buttare le palline dall'alto dentro l'acqua. Mattia e Martina continuano la loro attività senza lasciarsi coinvolgere per il momento.

Andrea ed Eros continuano a tirare palline nell'acqua e cercano di fare gli schizzi sempre più alti…tirano forte la pallina dentro l'acqua e scappano via…forse per non bagnarsi. Tilda si è avvicinata alla telecamera, ci gioca un po'…Jahel la chiama: Tilda, Tilda! Vieni a giocare con le palline!

Tilda prova a prendere una pallina bloccandola con un piede, ma torna a giocare con la telecamera. Guarda nell'obiettivo e prova a posizionare la sua mano, le singole dita nel posto giusto per poterle vedere da dietro lo schermo.

*Intervengo con i bambini che giocano a tirare le palline dentro l'acqua e sul muro perché la situazione mi sembra di nuovo sfuggirmi di mano…(le palline rimbalzano con troppa forza sul muro e colpiscono Tilda…Andrea ed Eros tirando le palline con forza dall'alto nell'acqua hanno bagnato eccessivamente il pavimento):*Ascoltate un momento, fermatevi perché vanno bene i giochi che fate ma ci sono delle regole!

Andrea: Quali regole?

Io: va bene se volete fare gli schizzi lanciando le palline dentro l'acqua ma non bagnate troppo per terra e non bagnatevi troppo neppure voi. Va bene se volete giocare a tirare le palline e farle rimbalzare ma dovete tirarle più piano altrimenti vi potreste fare male. Queste sono le regole e se volete fare questi giochi occorre rispettarle *(il mio tono di voce è calmo, un po' più alto rispetto a quando parlo con loro e deciso)*

Eros riprende a lasciar cadere le palline dall'alto dentro l'acqua. Mattia si è unito al gioco di Jahel, Andrea e Tilda (che nel frattempo ha lasciato perdere la telecamera che si è spostata non inquadrando più la zona dove si trovano tutti i bambini…).

I bambini continuano con le stesse attività e gli stessi giochi…Eros, ad un certo punto, prende altri oggetti (fino ad ora ha utilizzato soltanto le palline dentro l'acqua) e li lascia cadere dall'alto dentro l'acqua. Prende due o tre legnetti per volta, e così via anche con le palline da ping-pong.

I bambini che giocavano a tirare le palline cominciano a correre intorno ad un tavolino, si rincorrono…giocano a prendersi. Dopo un po' gli propongo di fermarsi… Mattia si volta verso la telecamera…guarda nell'obiettivo… poi la sposta e la telecamera cade...

Io: la telecamera non spostatela…se cade rischia di rompersi. Utilizzate le cose che vi ho portato, ma la videocamera lasciatela qui.

Andrea dopo un po' prende una delle palline con cui sta giocando e la posiziona davanti all'obiettivo…lo lascio fare, sposta la pallina e contemporaneamente guarda dietro allo schermo per capire quando riesce a riprenderla…

Nel frattempo Eros sta passando (lanciandoli) i materiali che aveva messo dentro la sua vaschetta dentro a quella vicino a lui e più grande. Poi si siede per terra, prende i legnetti, li tira furi dall'acqua e inizia a costruire qualcosa per terra. Andrea si avvicina, invita Eros a giocare con lui ma quest'ultimo risponde: Vieni tu a giocare qui con l'acqua. *Andrea tira una delle sue palline dentro l'acqua provocando uno schizzo. Andrea comincia a giocare con Eros, chiacchiera raccontandogli di una cosa che gli ha detto il nonno ma non riferita a ciò che stanno facendo. Poi andrea getta la pallina nell'acqua, schizza…Eros getta nell'acqua, ad uno ad uno, i legnetti che stava utilizzando per fare la sua costruzione. Il gioco di fare gli schizzi prosegue per un po'…Andrea con la solita pallina, Eros con i legnetti….*

Gli altri bambini prendono le loro buste, quaderno e matita e disegnano…io sono vicino a loro…Tilda mi chiede di aprirgli la bustina dove c'è la lente. Mattia prende dalla sua busta la torcia e la accende, si avvicina ad eros, la punta negli occhi…Si rivolge ad Andrea e i due cominciano a rincorrersi…Dopo un po', Andrea scivola e cade…si tira su…Mattia lo cattura ed è alle sue spalle e sbatte la torcia contro la testa di Andrea…intervengo per ricordare che non si usano le cose con le quali giocano per fare male. Andrea torna a giocare con Eros.

Andrea: Zucchina vuota! Zucchina marcia! *Rivolgendosi a Mattia in tono di sfida…Mattia raggiunge la vasca dove si trova Eros e lancia dentro alcuni oggetti bagnando Eros…Io faccio alzare per asciugare il lago di acqua per terra vicino a lui… si risiede sull'asciugamano che ho messo in terra. Andrea torna a sedersi dalla vasca dove sta*

giocando Eros, Mattia ha in mano la lente e la torcia accesa…batte ripetutamente l'una contro l'altra mentre cammina per la stanza. Le bambine sono in un'altra zona della stanza e stanno disegnando sedute o sdraiate per terra.

Martina, ad un certo punto, accende la sua torcia e la punta sul suo quaderno aperto… guarda, osserva…muove la torcia lungo la pagina…La spegne.

Andrea sta costruendo qualcosa con i legnetti, Mattia distrugge la costruzione e Andrea lo riprende: Mattia! Nooooo! Dai lasciali stare!

Mattia accende nuovamente la torcia, la punta contro il muro, la allontana un po' dal muro poi si volta e se ne va…

Io mi avvicino ad Andrea che, nel frattempo sta ricostruendo quanto Mattia gli aveva fatto cadere…mi avvicino perché mi accorgo che Mattia guarda la costruzione e si sta avvicinando…Andrea lo vede e gli dice di lasciarlo stare. Mi siedo per terra e aiuto Andrea a recuperare i legnetti caduti.

Mattia torna dove ci sono le bambine che stanno utilizzando le cose dentro le loro buste (matita, coltellino, lente….) e sono sedute sotto una delle finestre. Andrea lo raggiunge e gli dice: Puoi distruggere tutto quello che vuoi (riferendosi alla sua costruzione)… *Mattia non se lo fa dire due volte, si alza e corre per buttare giù la costruzione con un calcio seguito anche da Andrea. I due mentre buttano giù la costruzione urlano:* Goal!

Tilda si avvicina alla telecamera e prova nuovamente a posizionare la mano e guardare se riesce a vederla dallo schermo…Martina si mette davanti allo schermo e dice: Noooo, non toccarla! *(io mi accorgo di quello che dice riguardando il video perché sono dove stanno giocando Mattia, andrea ed Eros…dalla finestra dove sta disegnando Jahel). Martina si allontana e va dove c'è Jahel…le dice qualcosa che però non capisco (non si sente neppure dal video). Poi Martina e Jahel prendono le loro buste per metterci dentro le cose…Martina prende un quaderno per terra e chiede a Jahel:* Questo è tuo?

Jahel: Sì.

Martina prende il quaderno e lo inserisce nella busta di Jahel…

Andrea, Mattia ed Eros giocano a tirare le palline e altri oggetti dentro l'acqua…Poi Andrea, seguendo una pallina rimbalzata verso la telecamera (posizionata dalla parte opposta a dove si trovano le vasche dell'acqua) grida: Giochiamo con le palline!!!

Eros: Dai Andre, passamela! *Stanno giocando a calcio con le palline…*

Mattia insegue una pallina, corre, fa la scivolata per prenderla, scontra la telecamera che cade a terra…Ricordo le regole e sposto la telecamera più vicino alla porta…Tilda, Andrea si mettono davanti all'obiettivo e giocano…

Tilda: *si mette dietro la telecamera, osserva lo schermo…:* Andrea mettiti qui! *Indica di mettersi davanti alla videocamera…Lui esegue e comincia a saltare, ballare…la telecamera traballa…sono lì con loro, mi accorgo che il cavalletto è storto e chiedo ai bambini di aspettare un momento così posso raddrizzarlo…Li lascio giocare e rimango vicino a loro (Andrea, Tilda, Jahel, Mattia).*

Dopo qualche minuto i bambini ricominciano a giocare con le palline e a rincorrersi…Scivolano e cadono…dopo un po' intervengo nuovamente per ricordare che ci sono delle regole e che rispettarle serve per non farci male…Continuano a correre e intervengo in modo più deciso…

Io: ci possiamo sedere un attimo insieme?! Anche in piedi così, ma ci fermiamo un momento perché devo dirvi una cosa…All'inizio vi ho detto che se volevate giocare a tirare le palline al muro, dentro l'acqua andava bene ma non dovevate tirarle troppo forte perché potevate farvi male. Ora siete già scivolati tutti per terra mentre correvate, non vi siete fatti nulla ma se scivolate correndo rischiate di sbattere contro le cose che ci sono nella stanza. Giocate pure con le palline, con le altre cose che avete a disposizione ma non correte più qui…

Scelgono il gioco delle palline che tirano in aria, contro il muro…le fanno rimbalzare. Gioco anche io…Comincio a giocare tirando la pallina a Jahel che me la restituisce… Dopo un po' di minuti (5 circa durante i quali continua lanciare in aria le biglie) arriva Mattia, si mette vicino a me e dice: Siamo due portieri! *Jahel tira la pallina verso di me, la prendo e la passo a Mattia che la rilancia a Jahel…A jahel si unisce Tilda. Il gioco prosegue per un po'…*

Ad un tratto mi alzo perché Andrea mi fa cenno di andare da lui dal tavolino dove sta facendo alcune cose con l'acqua… Non vedo quanto accade ma sento Tilda che si lamenta perché Mattia l'ha picchiata…Mattia lamenta che non gli viene passata la palla (probabilmente Tilda e Jahel la tirano storta, si alzano e la riprendono per tirarla nuovamente e questo fa sì che a Mattia, posizionato dalla parte opposta a loro, non la riceva mai.) Mi avvicino e ricomincio a giocare con loro…non sono più per terra…lascio che siano i bambini a giocare…sono lì vicino e dico a Mattia di mettersi dove era prima, le sue compagne tireranno la pallina e lui la prenderà…Tilda lancia la pallina che, però, prende una traiettoria fuori dalla portata di mattia…la raccolgo io e la passo a Mattia…

Quando mi rialzo vedo Eros che tira fuori la testa dall'acqua contenuta in una vaschetta ed è bagnato…

Io: No, così no. Sei stato ammalato, forse non è stata una buona idea, *mentre dico così, prendo un asciugamano e lo asciugo…*

Tilda arriva da me dicendo che Mattia l'ha picchiata…e il gioco che facevano si è nuovamente interrotto…

Andrea, Eros, Mattia ricominciano a giocare tirando le palline per terra…Io mi accorgo che l'ora dell'incontro è finita e lo dico ai bambini…

Io: Il tempo per stare insieme oggi è finito…Andiamo?

I bambini rispondono: Noooo!!! Ora stanno giocando con le palline…si sono seduti per terra e le fanno rotolare sul pavimento…

Io: No?! Dai ci rivediamo la prossima settimana…

Vogliono rimanere ancora ma devono prepararsi per il pranzo. (l'incontro è dalle 10.15 alle 11.15)

Dico loro che anche io sono stata bene con loro ma ora devo rimettere a posto e andare a casa e loro devono prepararsi per il pranzo. Ora si alzano e torniamo in classe.

Osservazione GRUPPO C

(nessun intervento)

Introduco l'incontro esplicitando la stessa consegna della volta precedente. A differenza degli altri gruppi, il mio ruolo e il mio intervento in questo gruppo rimangono pressochè gli stessi. Mentre parlo, i bambini hanno iniziato a prendere alcuni oggetti perlopiù assi di legno.

I bambini presenti sono 6: Andrea, Tilda e Eros di 5 anni e Mattia, Martina e Jahel di 4 anni.

Mattia prende un legume e dice: "*Questi sono semini, questo qui cos'è?"*

Io: prendo quello che Mattia mi porge e dico: "*Ecco dov'era finita la gommina della matita di Elena e che lei ieri non trovava più!"*

Mattia ha preso una ciotola trasparente con un po' di legumi e la scuote, piano, muovendo il bacino e canticchiando la cucaracha. Mentre si muove guarda sempre la ciotola dalla quale escono fuori alcuni legumi. Cerca di muovere il corpo più lentamente/armoniosamente provando a fare in modo di tenere ferma la ciotola per impedire che si rovesci tutto sul pavimento. Andrea prova ad imitare Mattia utilizzando la bottiglietta nella quale ha messo alcune biglie e dei legumi ma senza riporre particolare attenzione a quanto accade ai semi dentro la bottiglia. Eros sta osservando alcuni legumi sparsi sul tavolino e viene attirato da quanto stanno facendo Andrea e Mattia. Eros vorrebbe provare a fare come loro, si avvicina ad Andrea chiedendogli di prestargli la bottiglietta e, poiché Andrea rifiuta, Eros inizia a rincorrerlo per la stanza per farsi dare la bottiglietta/sonaglio.

Jahel prende una delle ciotole con dentro i legumi e la porta sul pavimento sotto una delle finestre, poi torna a prendere altro materiale e lo porta dove ha lasciato la ciotola precedentemente. Si siede per terra e comincia a prendere i diversi legumi, li guarda poi li rimette nella ciotola.

Tilda si è costruita una bottiglietta sonaglio utilizzando alcune biglie, la scuote poi si allontana dal tavolo per tornare con la bilancia. Eros e Andrea si stanno ancora rincorrendo. Tilda versa le biglie che aveva dentro la bottiglietta sul piatto della bilancia e osserva il quadrante e l'ago poi rimette le biglie dentro la bottiglietta e va alla ricerca di legumi da aggiungere dentro la bottiglia.

Mattia ha messo alcuni legumi dentro ad un cilindro trasparente, lo scuote un poco, lo guarda poi lo apre e aggiunge altri legumi. A questo punto, scuote nuovamente il cilindro e sembra soddisfatto. Quindi chiama i due compagni che si stanno rincorrendo e, con tono di sfida, dice: "*Ehi…sentite?"* e scuote il suo sonaglio. A quel punto la rincorsa ricomincia ma ora l'obiettivo non è quello di Eros che vuole farsi dare la bottiglia/sonaglio da Andrea ma i tre corrono e, contemporaneamente, scuotono i sonagli che si sono costruiti per fare rumore. Il sonaglio di Mattia, non avendo alcun tappo, presto rimane senza legumi ma questo non ferma il gioco dei tre bambini.

Tilda rimette sulla bilancia la bottiglia ma, evidentemente, non è soddisfatta perché riparte alla ricerca di altri legumi da aggiungere. Da un po' di tempo osservo Tilda che mette e toglie oggetti dalla bilancia a un piatto. Li pone sulla bilancia, guarda l'ago, poi li toglie per passare

ad un altro oggetto oppure li lascia sul piatto e ne aggiunge altri guardando sempre il quadrante con l'ago.

Ad un certo punto, mi accorgo che Andrea si ferma improvvisamente e si appoggia al tavolino, mi guarda. Mi sembra affaticato e mi avvicino a lui chiedendo: "Andrea, tutto bene?"

Andrea: "*Sì. Solo ho ancora un po' di raffreddore."*

Io: "*Allora, forse è meglio evitare di correre così tanto come state facendo. Fermatevi un momento e vediamo se con questi sonagli che vi siete costruiti si possono fare altre cose."*

Mattia prende un imbuto e si avvicina al tavolino del materiale mentre Eros e Andrea prendono le assi di legno e iniziano a utilizzarle come mazze per colpire diversi oggetti (bottigliette vuote, tappi e palline). Tilda e Mattia prendono, a loro volta, un'asse di legno e fanno la stessa cosa. Intervengo perché la situazione mi sembra rischiosa in quanto i bambini si sono messi a coppie, uno di fronte all'altro, e provano a lanciare un oggetto in aria per poi colpirlo. I bambini, però, sono vicini tra loro e potrebbero colpirsi senza volerlo. Io: "*Ascoltate, se volete fare questo gioco occorre rispettare alcune regole per non farvi male. Dovreste stare più distanti tra voi e, soprattutto, colpire gli oggetti appoggiandoli al pavimento – come avevate fatto anche un'altra volta."* Per fare in modo che queste regole vengano mantenute, prendo un'asse di legno e faccio loro vedere come dovrebbero fare e, per un poco, gioco con loro.

Tilda ha ripreso la bottiglia, ora ha inserito non soltanto biglie ma anche i legumi che ha trovato nelle ciotole e sparsi sul pavimento, e la svuota nel piatto della bilancia, osserva il quadrante e, senza dire nulla, rimette il contenuto dentro la sua bottiglietta.

Andrea lancia una biglia in aria e la colpisce con la sua "mazza" ma Eros, con tono arrabbiato, gli fa subito notare che ha disatteso la regola che ci eravamo dati: "*No! Andrea non devi tirare in alto, non devi."*

Andrea: "*Scusa, scusa* (guarda anche verso di me)*, ho sbagliato. Ora tiro in basso."*

Il gioco ricomincia e si unisce anche Jahel. Andrea colpisce il tappo per terra e lo fa andare verso Eros e Mattia i quali lo colpiscono per rimandarlo ad Andrea. Mattia riesce a prendere più volte di Eros il tappo e a rimandarlo al compagno così, Eros, sbuffando e con tono scocciato, si rivolge a Mattia: "*Mattia, a me, ora tocca a me. Passamelo un po' anche a me!"*

Eros, quando il tappo torna dalla loro parte, lo prende sottraendolo a Mattia che reagisce colpendo il compagno con l'asse di legno. Intervengo con un tono deciso ma calmo e a voce bassa: "*Così non va bene. Queste cose non devono essere usate per farvi male."*

Mattia mi guarda, sbuffa e dice: "*Allora perché ce le hai portate queste?* (indica le assi di legno)"

Io: "*Ve le ho portate perché mi interessa sapere cosa si può fare secondo voi con queste cose, ma la regola era che non dovevate farvi male. Possono essere usate come mazze per colpire palline o tappi, ma non per far male ai vostri compagni."*

Il gioco si interrompe, le assi di legno vengono riposte, Mattia prende una ciotola trasparente con dentro qualche biglia, dei legumi secchi e usa come tappo un'altra ciotola trasparente capovolta sulla precedente formando, così, una sfera. La scuote tenendola vicino all'orecchio, sorride e inizia a correre intorno al tavolo del materiale e a scuotere la "palla" trasparente con le biglie e i legumi dentro. Andrea prende un rotolo di cartone di scottex, lo mette davanti alla bocca e produce suoni diversi per modificare la sua voce e finge di inviare comunicazioni dallo spazio. Eros riprende un'asse di legno, una biglia poi si siede in terra e comincia a colpire la biglia facendola rotolare. Martina, che fino a quel momento, era rimasta ad osservare, ferma accanto al tavolo del materiale, si avvicina al gioco proponendosi per raccogliere le biglie e riportarle ad Eros. Dopo qualche corsa per riprendere la pallina che il compagno colpisce, si ferma nuovamente e torna accanto al tavolo del materiale.

Jahel ha preso alcuni pezzi di carta e cartoncino e ha cominciato a strapparli per metterli dentro ad una ciotola trasparente all'interno della quale c'erano alcuni legumi. Strappa i pezzi di cartoncino finché sono così piccoli da non riuscire più a spezzarli (di questo, però, non fa alcun cenno). Tilda ha ripreso a inserire biglie e legumi nella sua bottiglia utilizzando, ora, un imbuto. Quando inserisce oggetti che non passano attraverso l'imbuto usa un dito per rimescolare e spingere gli oggetti per farli passare. Le biglie che risultano troppo grandi per il foro vengono tolte e messe da parte. (Tilda, ESP/travasi, imbuto, oggetti di varia dimensione, N.V., individuale). Finito questo passaggio, prende la bottiglia e distribuisce il contenuto in due ciotole trasparenti per poi andare dai compagni e offrire loro biglie: "*Chi vuole delle biglie?"* Mattia si avvicina e ne prende una, poi Tilda passa da ogni compagno che prende una biglia. Si appresta a fare un secondo giro gridando: "*Chi ne vuole un'altra?"* Eros risponde dicendo che non ne vuole un'altra mentre Mattia e Andrea corrono verso Tilda dicendo a voce alta: "*Io, io ne voglio un'altra."*

Mattia prende un imbuto e lo usa prima per produrre suoni strani con la voce modulando tono e timbro, quindi lo mette all'orecchio e comincia a girare per la stanza finchè si rivolge ad Andrea: "*Aspetta. Vieni che ti devo sentire il cuore."* e così dicendo, mette la parte stretta dell'imbuto all'orecchio appoggiando al petto del compagno la parte più ampia (tipo uno di quei vecchi stetoscopi).

Andrea ed Eros hanno ricominciato a tirarsi le palline colpendole con l'asse di legno e rispettando le regole che ci eravamo dati nel precedente tentativo. Io mi siedo per terra accanto ad Andrea pensando, così, di contribuire a mantenere la situazione maggiormente tranquilla. Mattia, da qualche istante, utilizza le biglie e cerca il modo per farle rimbalzare per terra. Prova con una biglia ma osserva che non rimbalza come vorrebbe allora ne prende un'altra e, questa volta, la getta con maggior forza sul pavimento. L'effetto non è ancora quello che lui si aspetterebbe quindi ne prende una terza e la tira contro una parete. Si dirige nella scatola del materiale e riconosce le palline di gomma rimbalzine e lo esplicita: "Queste, queste lo so che rimbalzano!" *Così dicendo ne getta una in terra verificando che rimbalza, certamente più della biglia.* (Mattia, ESP./rimbalzo, biglie, palline di gomma, V., individuale).

Mattia, a questo punto, mette una pallina dentro una ciotola e si dirige verso i compagni dicendo a voce alta: "*Chi vuole una pallina?"*

Martina, fino a quel momento ha sempre osservato le compagne ed è rimasta vicino alla bilancia. Ad un tratto, prende una ciotola e mette dentro alcuni tappi di metallo per poi dirigersi verso la bilancia. Guarda la bilancia poi si allontana e torna poco dopo con il piatto che appoggia sopra la bilancia e dentro al quale versa i tappi che erano dentro la ciotola. Una volta versati i tappi, si abbassa e guarda l'ago della bilancia, poi prende un altro tappo più grande e lo inserisce, si abbassa nuovamente per guardare il quadrante e si rialza prendendo alcune bottiglie vuote. Si abbassa e, contemporaneamente, mette dentro al piatto le bottiglie vuote e la sua espressione cambia; sorride. Si alza e sembra fremere nel cercare nuovi oggetti da mettere sulla bilancia e, di seguito, inserisce una bottiglietta con un po' di acqua e un imbuto per controllare, ogni volta, il quadrante. Terminati gli oggetti da mettere sulla bilancia svuota il piatto controllando alla fine il quadrante. Durante queste operazioni non verbalizza nulla ma mi sembra che ad un certo punto capisca come funziona la bilancia ad un piatto perché quando si rende conto che inserendo oggetti l'ago si abbassa, inizia a cercare in modo entusiasta e frenetico altri oggetti da mettere sul piatto. (Martina, ESP./peso, bilancia a un piatto, oggetti vari, N.V., individuale).

Il gioco di Mattia, Eros, Andrea e Jahel sembra essere più contenuto, Tilda raccoglie tutte le biglie sparse sul pavimento dentro a due ciotole e le rimette a disposizione dei compagni.

Martina, dopo aver provato a pesare gli stessi oggetti, prende i tappi di metallo dentro al piatto della bilancia e li ripone dentro una ciotola trasparente. Prende in mano la ciotola e prova ad agitarla e alterna il rumore che producono i tappi se si scuote la ciotola a quello che si fa se li rimescola con le mani. Prova ad introdurre con i tappi altri materiali quali legumi e qualche biglia. Produce rumore alternando sempre l'azione di agitare la ciotola oppure rimescolando il suo contenuto con le mani. (Martina, rilevazione fenomeno/rumore, ciotola, oggetti vari, N.V., individuale)

Mentre gioca con i compagni, Andrea prende alcune biglie ma, invece, di colpirle come ha fatto fino ad ora, si avvicina al tavolo e le mette dentro al cilindro trasparente iniziando a scuoterlo forte per fare rumore. Passa accanto a lui Eros e Andrea scuote più velocemente e forte il cilindro con le biglie e, con tono di sfida, dice ad Eros: "*Senti cosa faccio"* (Andrea, ESP/rumore, cilindro e biglie, V., sociale [Eros]). Dopo un pò comincia a scuotere più forte e a scappare per farsi rincorrere ma Eros riprende l'asse di legno e ricomincia a colpire le palline per terra. Mattia prende l'imbuto e lo porta davanti alla bocca producendo suoni e rumori e giocando a cambiare timbro e tono di voce. Gioca a produrre suoni più acuti o gravi e lunghi. (Mattia, ESP/rumore, voce e imbuto, N.V., individuale). Dopo qualche tentativo, Andrea riesce a coinvolgere Eros che comincia rincorrerlo per la stanza insieme a Martina. Mattia, usando l'imbuto come megafono urla ai compagni che è notte e bisogna fermarsi e andare a dormire. I compagni continuano a correre, io mi avvicino al tavolino del materiale e raccolgo alcuni oggetti caduti sul pavimento, Tilda si avvicina e mi aiuta e anche Eros e Andrea smettono di correre. Eros, Andrea e Mattia si mettono sotto al tavolino ma mentre cercano di uscire Andrea scontra Mattia che si mette a piangere dicendo che il compagno lo aveva picchiato… Io sono vicina a loro e propongo di guardare dentro ad una delle scatole che non avevano quasi considerato. Mattia guarda dentro la scatola, prende alcuni pezzi di carta, li appallottola, li srotola e li ripone sul tavolo. Tilda prende due ciotole con le biglie dentro, le porge ad Eros e Andrea dicendo: "*Guardate cosa vi ho portato! Con queste potete fare ciò che volete."*

Eros e Andrea ne prendono alcune, mi siedo vicino a loro ma ricominciano a correre intorno alla stanza inseguiti da Tilda. Martina ha preso un foglio di carta velina, si è messa in un punto di passaggio e solleva il foglio in modo che i compagni lo possano toccare ad ogni loro passaggio. Mattia inizia ad inseguirli ma si ferma davanti ad una stufetta spenta, la guarda per un po', tocca le manovelle che regolano la ventilazione e la temperatura. Dopo qualche secondo si alza, si dirige verso i compagni che intanto si sono fermati in un angolo della stanza nel quale ci sono alcuni strumenti utilizzati dai bambini delle elementari per rompere la pentolaccia durante la festa di carnevale (bastoni di legno, mazze di plastica). Intervengo: "*Quelle che vedete appoggiate lì non sono cose che vi ho portato io perciò vi chiedo di lasciarle stare e di utilizzare il materiale che vi ho portato nelle scatole."* (Adulto, regola)

Jahel va nel posto in cui, all'inizio, aveva lasciato del materiale e lo sposta vicino alla parete dove ci sono i tappeti, si siede e inizia a separare i pezzi di cartoncino dai legumi. Dopo qualche secondo la raggiunge Tilda con il piatto della bilancia dove le due bambine rovesciano il contenuto delle due ciotole. Subito dopo versano nuovamente il contenuto dentro le due ciotole senza separare i materiali e Tilda riporta il piatto della bilancia sul tavolo.

Eros e Andrea si avvicinano al tavolo del materiale, Eros prende la bilancia e mette sul piatto la ciotola con dentro alcune biglie e legumi. Andrea interviene in ciò che sta facendo Eros versando nella ciotola sul piatto altri oggetti. Eros si lamenta dell'intrusione. Intanto, Tilda ha preso dalla tasca del suo grembiule un giocattolo che aveva portato con sé e Mattia lo nota e lo prende di mano a Tilda la quale inizia a lamentarsi. La bambina, a sua volta, lo tira via di mano al compagno che però riesce a trattenerne un pezzo causando il pianto di Tilda. A questo punto, chiedo a Mattia di darmi il pezzo che aggiusto ricomponendo il gioco e passandolo a Tilda: "*Ora, però, Tilda credo sia meglio che tu metta questo giocattolo nella tua busta per prenderlo quando finirà il nostro incontro."* (Adulto, regola).

Tilda preferisce riporlo in tasca dicendo che lo avrebbe lasciato li. Dopo qualche minuto, Tilda riprende il gioco e questo richiama l'attenzione di Mattia che riesce a prenderlo creando nuovamente il disappunto di Tilda. A questo punto, intervengo: *"Mattia dovresti restituire il giocattolo a Tilda che, però, lo porterà in classe perché vorrei continuaste ad utilizzare ciò che vi ho portato io."* La situazione torna tranquilla. Eros prende le biglie da una ciotola e le mette dentro ad una bottiglia di plastica e poi la scuote vicino all'orecchio, prova a inserire altri oggetti dentro la bottiglietta e scuote nuovamente finchè tappa la bottiglia e la utilizza per produrre rumore. Questa volta non scuote solo per fare più rumore ma varia anche la velocità con la quale scuote il sonaglio e cambia il ritmo tra momenti in cui scuote e momenti in cui sta fermo. (Eros, ESP/rumore, bottiglia plastica, oggetti vari, N.V., individuale).

Tilda, si avvicina ad Eros e prende le bottigliette con l'acqua dentro e le scuote avvertendo che le sue fanno un rumore diverso e meno forte. Decide, dunque di appoggiarla sul tavolino. Andrea prende una bottiglietta e la usa per far ridere i compagni sbattendola, leggermente, sulla testa e fingendo di cadere per terra all'indietro come svenuto.

Eros prende due assi di legno e ne porge una ad Andrea dando inizio ad un duello che non fermo perché contenuto e non ne percepisco rischi. Mattia e Tilda tirano le palline per terra e corrono per prenderle.

Il gioco delle due coppie continua per alcuni minuti. Martina prende un foglio di carta crespa portandolo davanti agli occhi – come per bendarsi – e togliendolo un attimo dopo. Alterna queste operazioni un po' di volte finché viene interrotta da Mattia che prende una striscia di carta crespa, spingendo Martina lontano dal tavolo. Mattia prova a strappare la striscia di carta crespa ma non riesce, riprova con maggior forza ma non riesce a strapparla. Si allontana dal tavolo con la striscia di carta dicendo: *"Questa sembra colla."* e se ne va utilizzando la striscia come un nastro che fa sventolare muovendo il braccio. (Mattia, rilevazione fenomeno/resistenza, carta crespa, V., individuale). A questo punto, Mattia prende malamente un'asse di legno ad Andrea che reagisce e i due finiscono per litigare ma sembrano trovare un accordo e non intervengo. Andrea riprende la bottiglietta con dentro alcune biglie e la usa, come in precedenza, per suscitare risate. Eros fa altrettanto e i due continuano per un po' finché Eros chiede a Andrea di scambiare le bottiglie.

Andrea: "*No, non voglio."* Comincia a scappare correndo per la stanza inseguito da Eros il quale, per cercare di convincerlo a fare cambio gli dice: "*dai, guarda che la mia ha un po' di acqua dentro e fa più male."* Il tentativo ha successo e i due fanno cambio ricominciando a simulare di colpirsi in testa e cadere a terra. Mattia, Tilda e Jahel colpiscono le biglie utilizzando bottigliette vuote. Ad un certo punto, Mattia recupera un po' di biglie e le mette in bocca sputandole subito dopo.

Intervengo, questa volta, in modo più deciso fermando il gruppo di bambini e chiedendo loro di ascoltarmi: "*Le biglie non vanno messe in bocca perché può essere pericoloso. Sapete, ormai dall'inizio dei nostri incontri, che potete fare qualunque cosa vogliate con il materiale che avete a disposizione tranne farvi male o romperlo."* Eros sottolinea: "*E' vero. Con queste (mostra una biglia) poi puoi rimanere strozzato se vanno in gola."*

Eros, Andrea, Tilda prendono le bottigliette vuote e ricominciano a colpire le palline facendole rotolare per terra. Si uniscono al gioco Mattia e Jahel. Io sono seduta accanto a loro e questo contribuisce a mantenere la situazione più contenuta. In questo modo il gioco dura alcuni minuti, tanto che ad un certo punto devo controllare quanto manca alla fine dell'incontro. Mi alzo per controllare l'ora e avviso i bambini che mancano pochi minuti e che dobbiamo cominciare a prepararci per tornare in sezione. Andrea, quando finisco di parlare, mi guarda e dice: "*Ma ci vediamo la prossima volta?"*

Io: "*Questa è l'ultima volta che ci incontriamo per lavorare così come abbiamo fatto fino ad ora. Tornerò ancora perché ci saluteremo. Lavoreremo ancora insieme, ma in modo diverso.* A questo punto, accompagno il gruppo in sezione.