

Learning Journey: The Sounds around us

Age: 6-7 years old

Learning Activities: Making connections; Explaining evidence; Communicating evidence

Creative dispositions: Motivation; Ability to make connections; Imagination

Synergies: Play and exploration; Assessment for Learning

Contextual factors: Grouping

Background Information

School setting: Urban Public Primary School

This project took place with the first grade pupils of the 101st Primary School of Athens, a classic “all-day” school near the centre of the town. Sciences are taught within the 4 hours per week course ‘Environmental Study’. For this, there is a pre-defined content to be covered within the school year. The topic in my CEYS project covers only a small part of this content - about 3 pages of the school textbook. Moreover, this topic is not often taught by many teachers, using the excuse either that pupils will study it in Physics later on in the 5th grade, or that it consists of a very small part of the prescribed material, and thus not very important for this age of pupils. It is exactly these set beliefs that pupils in the first grades of primary school are still too young to approach and understand topics in Physics, that were the springboard for me to choose this topic on which to do my project through action research in CEYS.

Curriculum links:

According to the curriculum, the pupils should:

- listen and recognize sounds;
- differentiate and imitate sounds;
- acknowledge that a sound is described by its volume and its pitch;
- inquire the sound’s diffusion through gas, liquid and solid bodies.

Setting the Scene

Focus

The focus of this project is on the teaching strategies that promote **inquiry** and **creativity** through game-based and playful activities related to Science.

My intention was that through games and “creative openings” that these offer, children would inquire topics that concern them and relate to Science.

Rationale

Play and exploration offer opportunities for learning. It promotes creativity, teamwork, children’s socialization in an appropriately designed educational context, a

context based on educational aims, learning design and teaching, assessment of processes. Through playful activities the young children **face problems, form hypotheses, make predictions, inquire, and explore solutions**, while working in a no penalty zone. So the pupils construct basic knowledge, they cultivate skills and mainly form positive attitudes towards Science.

Implications for my planning and teaching

Play and exploration offer the opportunities for children:

- to be actively involved; to listen; to describe and report; to reproduce sounds;
- to compare sounds; to discriminate characteristics of sounds;
- to inquire and make assumptions combining new to old learning in Science;
- to express themselves about the sounds using various media and to represent their ideas and knowledge in different ways.

Outline of learning activities and resources (over 4 weeks)

Starting points

Three games with sounds: the first using musical instruments from the closet in the classroom, a variation of a known game and a game imitating sounds become the starting points of our exploratory trip.

- **What does it sound like?** The pupils try to recognize sounds and name them. Last comes the drum and it becomes the reason for a discussion to begin about the way the pupils think the sound is produced...
- A small device coming from “a game with cards”. Separated in four groups students try to recognize the sounds they hear and write them down on a piece of paper. The winner is the team that will recognize and write down the most sounds correctly!
- **Produce the sound I produce!** A pupil produces sounds and the child sitting next to him/her tries to imitate him/her!

The cognitive trip

The pupils work in groups, individually and all together in order to inquire issues related to sounds. Playful activities offer creative opportunities of expression, while inquiry offers scientific dimensions in procedures.

- **Volume!** The students record their voices. They hear what they recorded, they find similarities and differences, they discuss about the sounds’ volume.
- **Pitch!** The children listen to a song, bring up songs, discuss about the sounds’ pitch.
- **The sound travels through solids too.** The children put their ears on the desk to hear an alarm clock knocking.
- **The sound travels through liquids.** Two spoons inside the water in a bowl knock and the sound is heard!

- **Listen to what they say...** Using a glass on the wall the children listen to next door's class!
- **Hello!** The children create a telephone using two plastic glasses and a piece of rope!
- **We draw the experiments.**
- **If I were a sound...** If I were a sound I would have a certain color, a shape, a smell.
- **Creating mind maps using drawings and words!** Mind maps are created in order to show whatever the pupils negotiated, understood and learned about the sounds.

Follow up activities

- **Maracas!** We create our own musical instruments.
- **Little Einsteins...**

Reviewing learning across the project

The project lasted almost four weeks. There was a feeling that it was better when we spent two consecutive hours working on Science. The lesson used to start with an informal recap of what had happened during the previous science lesson. At the end of the day through informal short discussions pupils reviewed and reflected on things that impressed them, that they should remember, and that they would like to explore next.

Developing the learning journey

Starting points 1

Activity: A game with sounds coming from musical instruments

Children close their eyes and try to recognize what instrument produces the sound they hear.

Rationale

This activity aimed to trigger a conversation about the sounds.



Photo 1: Set of musical instruments used. A child's expectation.

Reflections

Games easily earn children's engagement and interest.

All the pupils participated and had fun.

Implications

The sounds heard in the game came only from the instruments found in the closet, so the next thought was to open sounds up to the world...!!!

Starting points 2

Activity: A little something from "a game with cards"

There are sounds coming from a small electronic device. The pupils divided in four groups try to recognize the sounds that they hear and work together in order to write down on a piece of paper where these sounds come from. The children have to work together very fast because there are just a few seconds before the next sound will be heard. They also have to collaborate very quietly so as to "protect" their ideas not allowing others to steal them! The winner is the team that will recognize and write down the most sounds correctly!

Rationale:

A small device allowed children to experience a recap of sounds all around.

Children's responses



"Sounds are everywhere!"

**Photo 2: An electronic device producing various sounds.
Children's recording of them.**

Reflections

School knowledge should be connected to children's everyday life. The pupils were alert and in close collaboration because of their motivation to win the game.

Implications

Sounds technically reproduced are exciting but how can children produce and imitate sounds?

Starting points 3

Activity: Produce the sound I produce!

Every pupil produces sounds in any way he/she can think. The child sitting next to him/her has to imitate the sound. A little bit later they change roles.

Rationale:

Embodying knowledge helps children achieve a better understanding.

Children's responses





Photo 3: Examples of children using their bodies to produce (or not) sounds

Developing the learning sequence

4 Volume - Pitch

Activity 1: Volume!

The children record their voices using a voice recorder. They hear what they recorded and discuss how their voices sound different, how they recognize their own and the others' voices, common or different features like volume.

Rationale

Recording their voices sometimes in grace and coquetry, other times in shyness the pupils explore and comment on the sounds' volume.

Children's responses



Photo 4: The voice recorder children used to record their voices

“My voice sounds strange!”

“Big volume means speaking loud?”

Reflections and Implications

The children’s dedication to explore their voices and their characteristics indicates their disposition to keep on inquiring more about the sound...

Activity 2: Pitch!

The pupils hear a song called “The seagull” included in a well known, old, Greek movie, “Alice in the navy”. This is a song and a short video deliberately selected as it posed the issue of the pitch of a sound in a pleasant way. The children then sang of other songs in a similar way.

Rationale

With a sense of humor and a stimulus coming from a well known song the children experiment with their voices and the sounds’ pitch.



Photo 5: Scene from the Greek film ‘Alice in the navy’

Reflections

Even the young pupils develop an understanding of what a sound’s volume and pitch mean.

Implications

Is the sound connected somehow to the gas, liquid and solid bodies?

5 The sound spreads both through solids and liquids 1

Rationale

These activities were designed in order to make some connections with previous explorations about gas, liquid and solid bodies.

Activity 1:

Children put their ears on their desks to see if they can hear the alarm clock.

Children's responses



Photo 6: Example of a child listening to the tick-tock of an alarm clock through her desk

Reflections

Before the experiment the pupils made some predictions about what would happen and then they tested their beliefs.

Activity 2:

Children are asked to knock two spoons to each other inside the water in a bowl and...

Teacher asks: "What do you think will happen? Discuss in your groups and tell us what you think."

Children's responses



Photo 7: Example of a child tapping two spoons to each other

Reflections

The teacher's role is crucial in order to support pupils' thoughts and sometimes to lead them ahead posing the right questions.

An experimental procedure is very close to playful activities.

Implications

The pupils asked for more experiments...

5 The sound spreads both through solids and liquids 2

Rationale

Two classic, easy, though impressive for the pupils, experiments expand their exploration.

Activity 1: Listen to what they say...

Using a glass on a wall we hear what the students next door discuss!

Activity 2: Hello!

We make our own telephone using two plastic cups and some string!

Children's responses

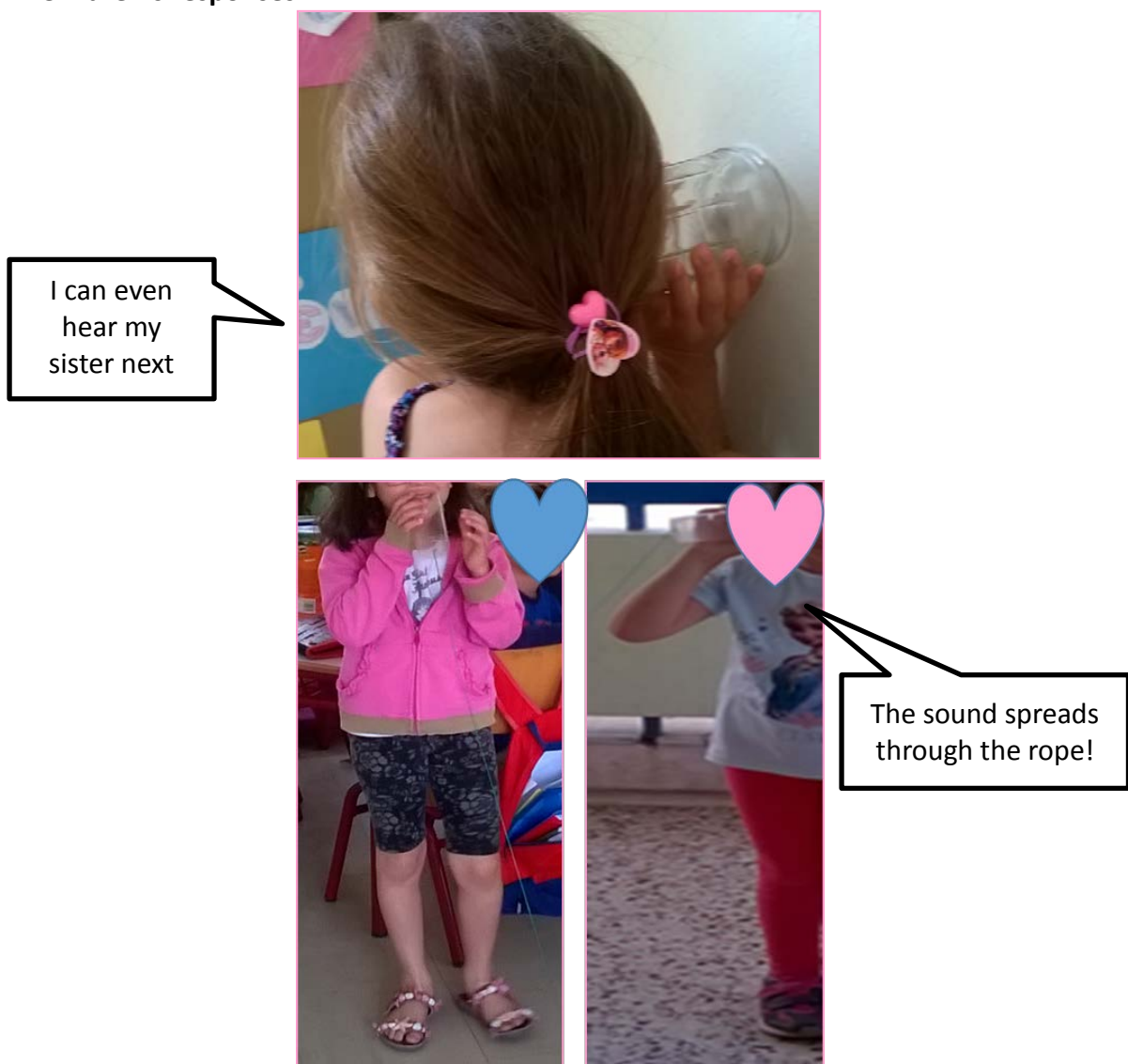


Photo 8: Examples of children exploring sound propagation through solids

Reflections and Implications

Could the children represent all these experiences somehow?

6 Representations

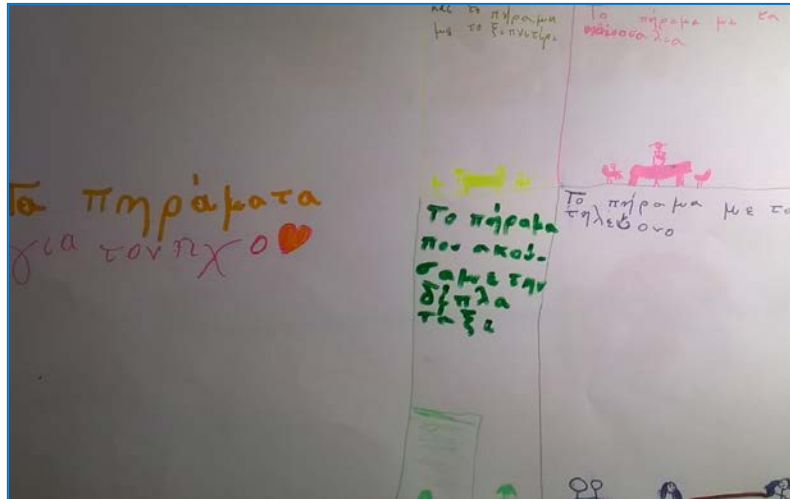
Activity:

Whatever the children did was represented on a piece of paper...

Rationale:

This is some kind of assessment and reflection through drawings and words.

Children's responses



List of the different kinds of experiments carried out.



We've heard the sound, so the sound spreads through the liquids.

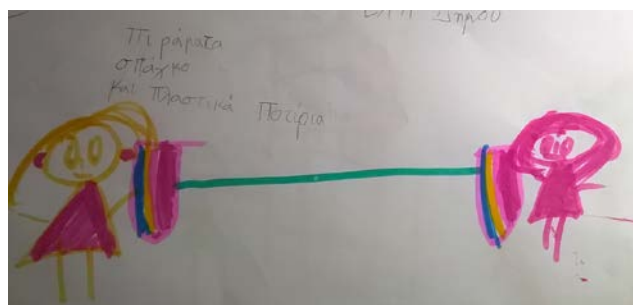
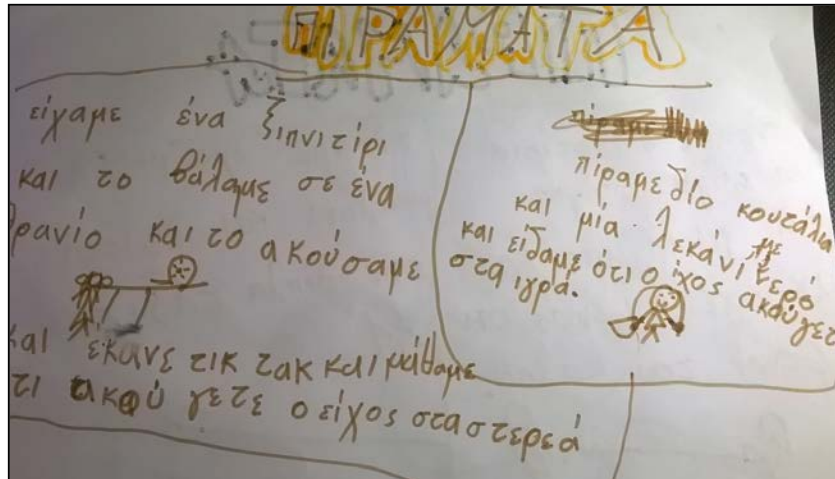


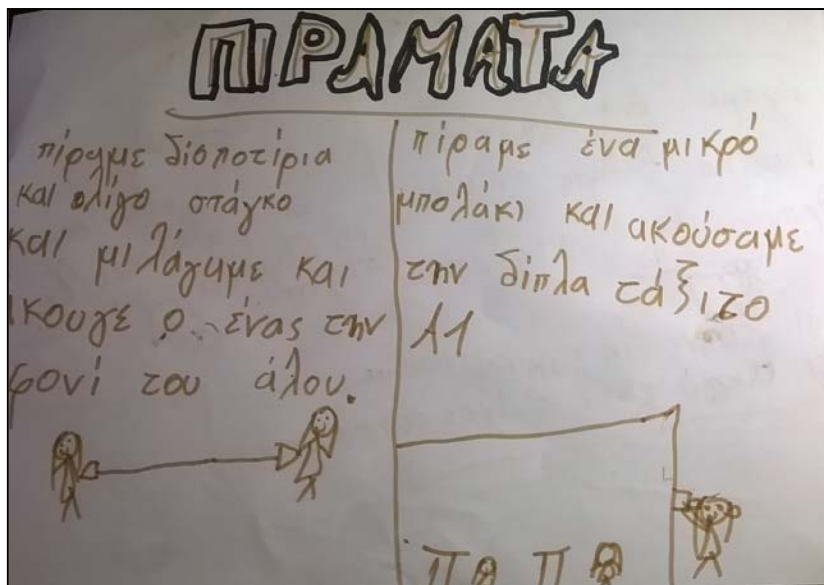
Photo 9: Examples of children's drawings of their experiments

"We had an alarm clock and we put it on the desk and we heard it and it made 'tick-tack' and we learned that the sound can be heard through solids."



"We took two spoons and a bowl with water and we saw that the sound can be heard through liquids."

"We took two cups and a bit of string and we talked and one could hear the voice of the other."



"We took a small bowl and we heard the classroom next door."

Photo 10: Examples of children's description of their experiments with words and drawings

7 Our own journal

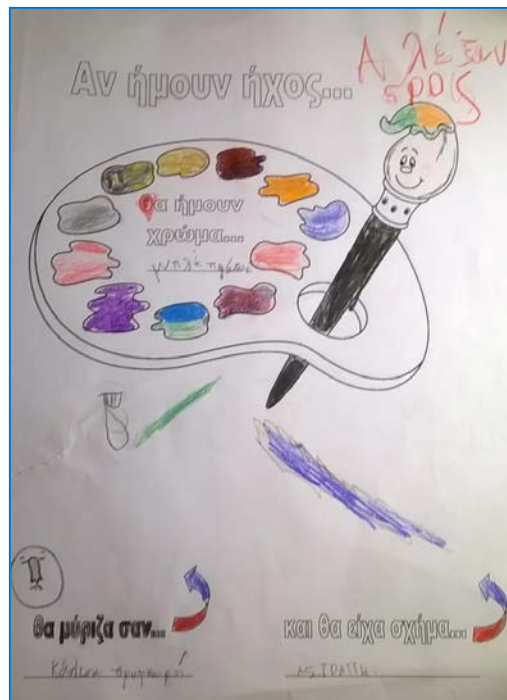
Activity: If I were a sound...

If I were a sound I would have a certain color, shape, smell...

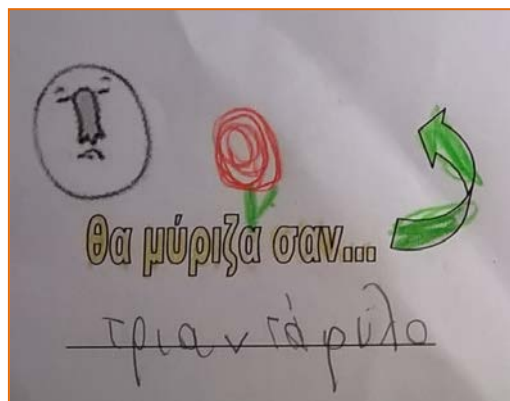
Rationale:

A kind of creative expansion and expression.

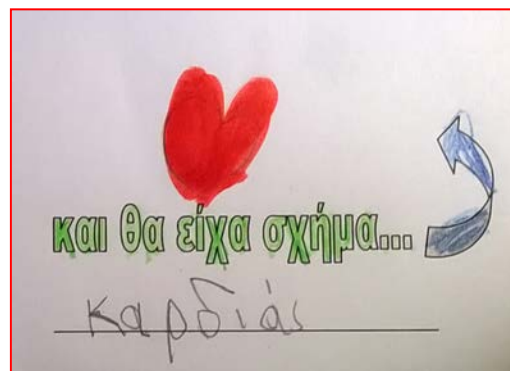
Children's responses



"If I were a sound, I would smell like a dirty sock and would have the shape of a lightning."



"...I would smell like a.... rose."



"...and would have the shape of a.... heart."

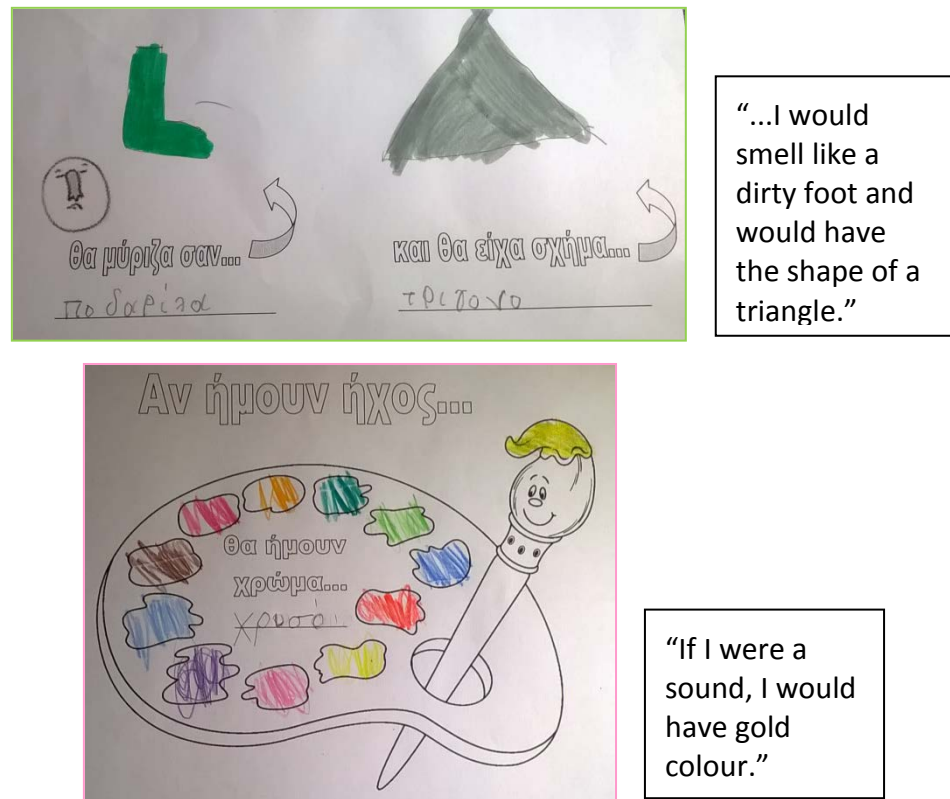


Photo 11: Examples of ‘if I were a sound’ drawings

Reflections

A small stimulus can release pupils’ creativity.

Implications

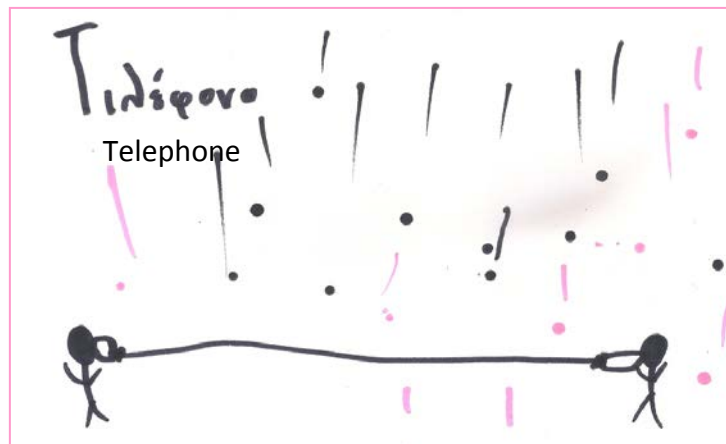
Assessment and reflection of what the pupils have experienced and possibly learnt?

8 (Mind) maps using drawings and words

Activity: A map with words!

We create mind maps to show all that we discussed, understood and learned about ‘sound’.

Children's responses



"Sound spreads through solids, liquids and gases."

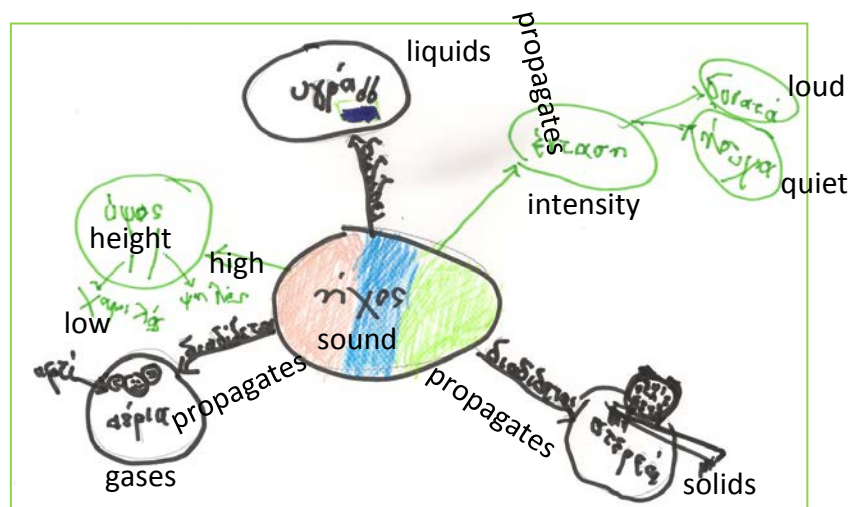
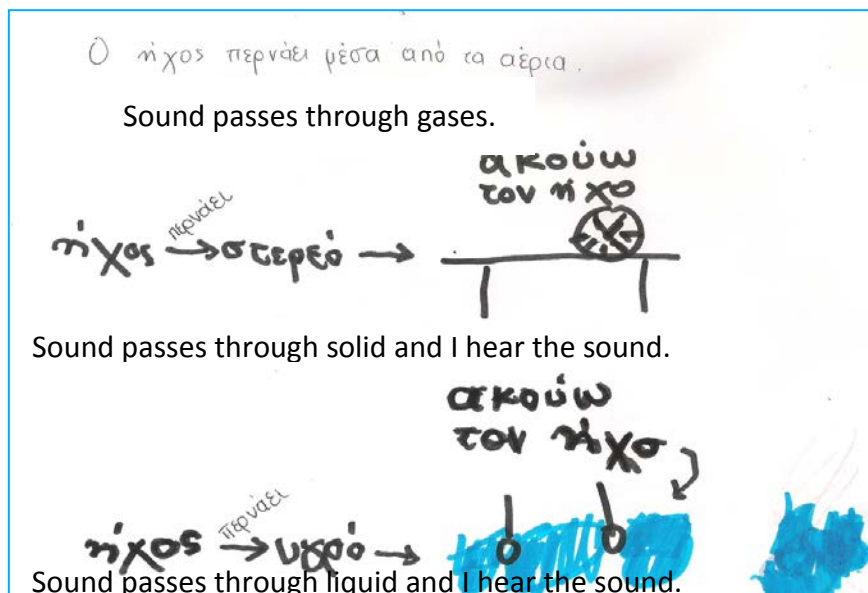


Photo 12: Examples of children's mind maps about sound

Reviewing learning across the project

The project lasted almost four weeks. There was a feeling that it was better when we spent two consecutive hours working on Science. The lesson used to start with an informal recap of what had happened during the previous science lesson. At the end of the day through informal short discussions pupils reviewed and reflected on things that impressed them, that they should remember, and that they would like to explore next.

Assessment of pupils learning but also overall evaluations of their learning experience were explored throughout the whole project, sometimes in a formal some other times in an informal way. For example:

- Through games like those played as starting points
- Informal recaps of what had happened during the previous science lesson (formative evaluation).
- Informal short discussions ⇔ The pupils reviewed and reflected on things that impressed them, things that they should remember, things that they would like to explore next (formative evaluation).
- Depictions of their experiments through drawings.
- Mind maps.

A game to assess previous learning and skills

The pupils in groups recognize the sounds that they hear and they write down on a piece of paper where these sounds come from. The winner is the team that will recognize and write down the most sounds correctly! A visual quantitative impression is given on the white board...

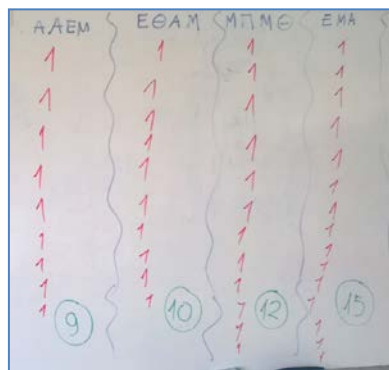


Photo 13: “How many sounds can your recognise?”

Overall Reflections

Children’s progress

Child 1 (E.):

Even though E. Had some difficulties in writing, she wrote that if she were a sound, she would smell like a star! She enjoyed working in Science and felt the need to discuss it with her dad at home asking various questions as he mentioned.

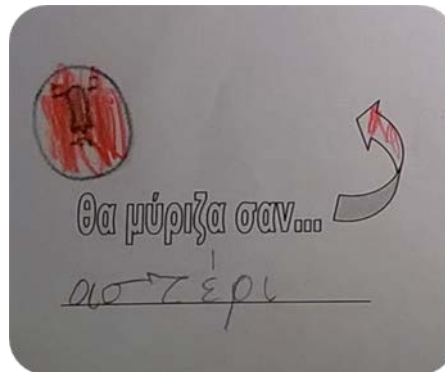


Photo 14: Child 1: "I would smell like a star"

Child 2 (M.):

M. showed in texts her understanding. At first she described the experiments she experienced and then she tried to form more general conclusions using words that match with the formal language used in Science.

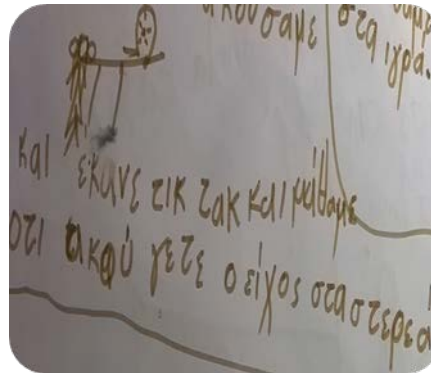


Photo 15: Child 2's drawing

Child 3 (Th.):

Th. is a low profile child, though having a strong cognitive background. He often seems to have ideas, but hesitates to express them. When the pupils were asked to make a mind map Th. suggested to his group words like "solid", "liquids", "gas", "spreads out". It seemed rather easy for him to adopt the language of Science in a way that shows his understanding.

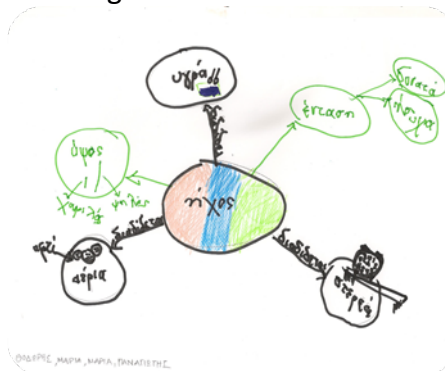


Photo 16: Child 3's mind map

Review of children's progress

Through playful activities the pupils became familiar step by step with scientific procedures, like posing questions, forming hypotheses, conducting simple experiments, arriving at explanations and conclusions. They also started to expand their vocabulary including terms and words used in Science.

Unexpected outcomes

Some pupils like E., felt the need to carry out at home what she had worked on in the Science lesson. In one way or another all the pupils were actively involved in the Science lessons and found ways to express themselves creatively. For example whereas E. faces some difficulties with writing, she did not hesitate to express herself even in this way.

Children's responses

The pupils often showed their interest asking if and when we would play games or we would try out experiments related to the sounds. They also made comments and represented their thoughts and experiences using written words or different media forms.

Teacher role

The teacher:

- organizes (continuous assessment, keeping focus children in mind, recording observations and/or discussions);
- supports and guides (questioning, developing the children's scientific thinking skills);
- intervenes in a discrete manner in order to assure quality dimensions in pupils' work.

He/she is always alert to promote quality and creativity in children's work.

Classroom environment

The pupils used everyday materials in simple experiments and games in order to explore and express their ideas and thoughts, to assess and realize their new knowledge.

Next steps for learning and teaching

Systematic and well organized gathering of data, together with continuous monitoring and assessment of procedures and outcomes.

Reflection questions for the reader

- In what ways would you support children's understanding of sound?
- How could you help children recognise and talk about the scientific inquiry processes and skills they are developing when problem solving?
- How would you help children reflect on their learning using their drawings?

Practical Information

The **materials** used were:

- cheap, easy to find materials like plastic cups, string,
- materials that pupils already have like pencils and colors,
- materials available at school like musical instruments, spoons, a bowl, some water, papers
- a mobile phone for photos, a voice recorder, DVDs or Internet connection, a device with sounds, an alarm clock

Tasks: games with sounds, recordings, experiments, mind maps, expression using various art forms.

Follow up activities:

- **Maracas!** We create our own musical instruments.
- **Little Einsteins...**
- **Visit to Herakleidon Museum**



Pupils made their own musical instruments.



Shorts episodes from "Little Einsteins"



Herakleidon Museum
"Sounds and melodies"



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