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'EARTH'  
experiment book

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KINDERGARTEN PONGERJAS, NARVA  
ESTONIA

### DIFFICULTY LEVEL

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### OBJECTIVES

- To get acquainted with the substances of the soil
- To find out composition of the soil: water, air and various organic substances by an experimental way

# EARTH WARMING

## MATERIALS

- Test tube,
- A small amount of soil,
- A heat source

## INSTRUCTION

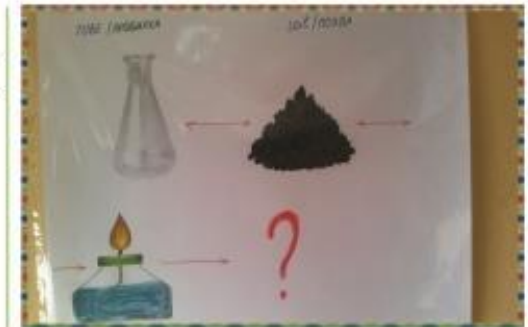
- 1- Fill about 1/3 of test tube with soil
- 2- Test tube is held above a heat source
- 3- By heating the soil, it can be seen there is water, air and organic substances.

## SCIENTIFIC EXPLANATION

When the heat source and soil interact, children observe how reaction occurs: water and air evaporate, organic substances are separated.

## CONCLUSION

When heating the soil, we find out that there are water, air and organic substance in it.





KINDERGARTEN PONGERJAS ,NARVA  
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### DIFFICULTY LEVEL

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### OBJECTIVES

- To get acquainted with the properties of acid (vinegar)
- To find out how an acid destroys a solid body (shell) by an experimental way.



# SEASHELL SHOCK

## MATERIALS

- Glass jar 250 ml,
- White vinegar,
- Seashells (2-3)

## INSTRUCTIONS

- 1- Fill a glass jar with white vinegar leaving 1/2" space at the top. (It is important to leave room at the top of the jar).
- 2- Put 2-3 shells into the jar.
- 3- Loosely cover the jar with the lid. (Again, make sure it is not too tight so that the gas can escape the jar.)
- 4- Leave the jar about two days. Observe how shells are almost completely gone.

## SCIENTIFIC EXPLANATION

Seashells and vinegar combined create a chemical reaction. Shells are a base and vinegar is an acid, so naturally there would be a reaction: dissolvability of the seashell.



## CONCLUSION

After 2 days, the shell is almost completely gone in the jar with vinegar. There is just a tiny remnant left.





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### DIFFICULTY LEVEL

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### OBJECTIVES

- To observe natural life under stones and piece of wood to find out what exist under natural materials.

# LIFE UNDERGROUND

## MATERIALS

- Rocks,
- Piece of wood (branch) from the soil in park/garden.

## SCIENTIFIC EXPLANATION

No vegetation is under things, as it can't grow without light, but soil is teeming with living organisms: a wide variety of soil fauna, including springtails, mites, earthworms, ants, insects.



## INSTRUCTIONS

- 1- To find rocks and piece of wood lying on the ground.
- 2- To put away these natural materials
- 3- Explore what exist under them: soil organisms, organic matter, grass roots, worms...
- 4- Identify and compare the life underground under stones and under piece of wood.

## CONCLUSION

Soil under natural things is full of life, there many living organisms: earthworms, ants, insects, but only roots of plants. Plants can't grow without light.



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# FOSSIL

## MATERIALS

- Plaster,
- Clay,
- Rock,
- Shells,
- Water

## INSTRUCTIONS

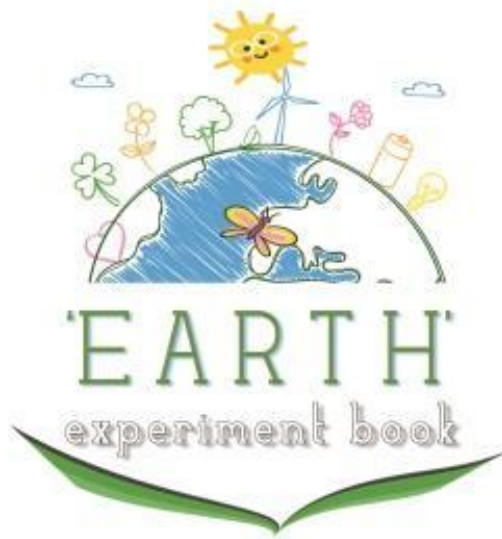
- 1- Make a thick layer of clay and imprint shells and rocks in it. We take them out.
- 2- Fill gaps with wet plaster.
- 3- Let it cure itself and then carefully take them out. What we get is copies of fossils or rocks.

## SCIENTIFIC EXPLANATION

To make artificial fossils we can use plaster which cures very fast.

## CONCLUSION

The fossils are formed after millions of years under high temperature and pressure.



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LITHUANIA

## DIFFICULTY LEVEL

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## OBJECTIVES

- Get artificial fossils



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# MAGNETISM AND GRAVITY

## MATERIALS

- Box,
- Rope,
- Nail,
- Tape,
- Magnet

## SCIENTIFIC EXPLANATION

Magnetism is a force that can attract (pull closer) or repel (push away) objects that have a magnetic material like iron inside them (magnetic objects).



## INSTRUCTIONS

- 1- Tie a bolt to a rope.
- 2- Put a magnet on top of the box.
- 3- Glue a bolt with a rope to the bottom of the box using a tape.
- 4- Lift a bolt with a rope towards the top of the box.
- 5- Inspect how the magnet holds the bolt.



## CONCLUSION

Magnetism exists between two magnetic materials or objects such as iron and magnets. Earth has gravity therefore it attracts everything including people. Gravity is a force between two objects



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KAUNO LOPŠELIS-DARŽELIS „GILIUKAS“  
LITHUANIA

## DIFFICULTY LEVEL

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## OBJECTIVES

- Prove that things are attracted to each other



# HOW EARTHQUAKES HAPPEN

## MATERIALS

- 2 strips of cloth,
- Soil,
- Small toy houses

## SCIENTIFIC EXPLANATION

When the strips are pulled, the pupils notice the "fault line" right away. The destruction is very obvious (houses are moved or tumbled).

## INSTRUCTIONS

- 1- Take the two strips of cloth (representing two different tectonic plates) and cover it with soil.
- 2- Then, place the small toy houses all along the soil (make sure to have a few houses on the actual fault line).
- 3- Have 2 pupils pull from one side one strip toward them,
- 4- While the other pupil does the same on the other side using the opposite strip.

## CONCLUSION

You can also discuss the various ways this could have occurred, such as pulling in the same direction or the speed with which we pull. The pupils notice the destructive force of an earthquake and their effect.



## 'EARTH' experiment book

KAUNO LOPŠELIS-DARŽELIS „GILIUKAS“  
LITHUANIA

## DIFFICULTY LEVEL

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## OBJECTIVES

- To observe the way that the movement of tectonic plates causes earthquakes
- To help students understand just how destructive earthquakes can be along fault lines

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### DIFFICULTY LEVEL

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### OBJECTIVES

- Alert the children about the observation, reflexion, experimentation, that help to comprehend various simple phenomenon.
- Promote the enthusiasm about science and demonstrate its importance, using real contexts from life experiences from the children's day-to-day life.
- Understand the importance of solar light as a natural source of light and heat,

# HEATING STONES

## MATERIALS

- 4 rocks
- Heat source (sun)

## INSTRUCTIONS

- 1- Leave 2 rocks in a shadow and leave 2 in the sun.
- 2- Wait for a while and observe and feel what happen.

## SCIENTIFIC EXPLICATIONS

The Sun is a source of natural light that warms and illuminates Earth.

Without the Sun, there wouldn't be light, it would always be night and always very cold.

Without light and heat, there wouldn't be any plants, neither animals or even people.



## CONCLUSION

Heating the soil, we find out that there are water, air and organic substance in it.



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# PERMEABILITY OF SOIL

## MATERIALS

- 2 soup spoons of; substrate, land, gravel, Clay,
- halves one as a funnel,
- the other as a cup;
- identification tags;
- coffee filters and cotton, - water

## INSTRUCTIONS

- 1- Put the filters in the funnels
- 2- Afterwards, they are put in the cups (the other part of the bottle).
- 3- Place 2 spoons of substrate, land, sand, gravel and clay in each funnel respectively.
- 4- Before we put a cup of water in each bottle, we asked what would happen.
- 5- "The water will pass through gravel and sand faster than in the other because they have more holes..."
- 6- After the addition of water, it was verified that the water went through sand faster, followed by gravel, and it took a lot of time to pass through clay.

## SCIENTIFIC EXPLANATION

Permeability is the property that represents a higher or smaller difficulty that the percolation of water occurs through the pores of the soil. In non-cohesive granular materials, such as the sand, there is a high porosity, which eases the flow of water through the soil, whereas in thin and cohesive materials, such as the clay, the opposite occurs, which makes this type of material the ideal for the construction of dams (low permeability).

## CONCLUSION

There are more permeable soils than others.



## 'EARTH' experiment book

AGRUPAMENTO DE ESCOLAS  
RAINHA SANTA ISABEL, COIMBRA  
PORTUGAL

## DIFFICULTY LEVEL

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## OBJECTIVES

- To observe the soil's permeability.



# WHERE TO SLIDE TO GET THE FURTHEST?



## 'EARTH' experiment book

AGRUPAMENTO DE ESCOLAS  
RAINHA SANTA ISABEL, COIMBRA  
PORTUGAL

### DIFFICULTY LEVEL

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### OBJECTIVES

- Predict, experiment and observe what happens when identical cars are placed in launch ramps made from the same material, with different declinations.

### MATERIALS

- 3 ramps made out of slightly polished wood (1 meter of length);
- 3 identical cars;
- 3 markers;
- 3 objects to lean the ramps on.

### INSTRUCTIONS

- 1- Place all 3 ramps in different objects (10cm, 20cm, 35cm) for different inclinations.
- 2- The ramps must be paraleled and aligned.
- 3- Therefore, a mark must be made to align the ramps
- 4- The cars are placed on the highest point of the ramp and released at the same time.
- 5- Prediction, ask the children what will happen to each of the cars when placed on top of the ramps.
- 6- Each child marked the car's trajectory and place where the movement stopped.

### SCIENTIFIC EXPLANATION

When a rolling object is released on top of a ramp, it moves along the ramp and horizontally until it stops.

In order for the car to move a larger distance, we must increase the declination of the ramp (without going over 45°).



### CONCLUSION

The cars, when released on a ramp, move along the ramp and horizontally until they stop.



# MORE LAND, MORE WATER

## MATERIALS

- Inflatable beach ball globe
- Paper
- Pens

## SCIENTIFIC EXPLANATION

There is more water than land on Earth.

## INSTRUCTIONS

1- Explain to the pupils that this activity is going to answer the question: "Does our planet Earth contain more land or more water?" Toss the inflatable globe to a pupil, encouraging him/her to catch it with both hands, all fingers spread wide. After he/she catches it, ask the pupil to look where each of his thumbs landed: on land or on water?

Have the pupil throw the globe back to another pupil. Note where their thumbs have landed.

2- Start a chart for you and your pupils. After each toss, note where each thumb landed, marking "W" for water and "L" for land depending on what happens (or color "blue" for water and "brown" for land).

3- Keep tossing the globe back and forth to one another for about 6-10 tosses. Don't forget to write down your results!

4- When you are done tossing the globe and recording your results, look at your chart together and describe what you see. Which one is more: land or water? How do you know?

## CONCLUSION

There is more water than land on Earth; water makes up about 71% of our planet.



## 'EARTH' experiment book

GRĂDINIȚA CU PROGRAM PRELUNGIT NR. 3  
BISTRIȚA  
ROMANIA

## DIFFICULTY LEVEL

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## OBJECTIVES

- To identify, through the colours, the surface of water and earth on the earth globe;
- To compare the results in order to determine which is the most widespread area in the world (earth or water)



# SOIL FERTILITY

## MATERIALS

- 3 pots,
- Black soil, - Clay soil, - Sandy soil,
- Water,
- Flower seeds

## SCIENTIFIC EXPLANATION

Plants grow only in fertile soil.

## INSTRUCTIONS

- 1- Place a different type of soil in each pot;
- 2- Plant the same kind of seeds in each pot;
- 3- Sprinkle with water;
- 4- Place the pots in the same place with light and heat;
- 5- Notice the way the plants grow in each type of soil.

## CONCLUSION

The flowers in the pot with black soil rose quickly and very beautiful, and those in the pots with clay soil and sand rose very hard and didn't develop as the others. In order to grow plants, need optimal conditions.



## 'EARTH' experiment book

GRĂDINIȚA CU PROGRAM PRELUNGIT NR. 3  
BISTRIȚA  
ROMANIA

## DIFFICULTY LEVEL

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## OBJECTIVES

- To follow the instructions in order to conduct the experiment correctly;
- To observe the different types of soil presented (black soil, clay and sand);
- To specify the conditions required for plants to grow.

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# PLANTS PREVENT EROSION

## MATERIALS

- 4 empty plastic bottles,
- 1 stand,
- String (rope),
- Soil,
- Plants, - Water

## INSTRUCTIONS

- 1-Prepare 2 of the bottles by cutting a rectangular hole along the side of the bottle. (You can use a permanent marker to mark out the piece you want to cut out.)
- 2-Stick / Attach the bottles to the stand making sure that the necks of the bottles protrude a little over the edge of the board.
- 3-Fill the bottles with plain garden soil and press down firmly to compact it.
- 4-Leave the first bottle as is and plant your plants in the second bottle.  
(Make sure you plant them tightly together and press down firmly to compact the soil.)
- 5-Cut the other two bottles in half, horizontally and keep the bottom halves.
- 6-Make two small holes opposite each other, nearest the cut side of the bottle.
- 7-Cut two pieces of string, roughly 25cm long and insert each end into the holes. Tie a knot on the ends to secure them. This will form a "bucket" to collect the water.
- 8-Hang them over the necks of each of the two bottles on the board.
- 9-Slowly pour equal amounts of water into each of the bottles.
- 10- Pour the water in at the end furthest from the neck of the bottle.
- 11- Take note of the color of the water collecting in the "buckets"!

## SCIENTIFIC EXPLANATION

The water from the first bottle is really dirty, but the water from the second is much cleaner which shows that the root structure of plants assists in preventing soil erosion. You can also add a third bottle which will contain soil covered with mulch (bark chips, dead leaves and sticks etc). Encourage the children do this daily for a week or two so they will see how the soil erodes away in the first container while the plants hold the soil in the last ones.



## CONCLUSION

Vegetation is nature's glue, so let's protect our plants and while we're about it ... Plant some more.



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ROMANIA

## DIFFICULTY LEVEL

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## OBJECTIVES

- To specify the importance of having vegetation covering the soil

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# FORMATION OF THE MOUNTAINS BY INCREMENT

## MATERIALS

- A box (the aquarium type with 2 side plates)
- Cotton, - Sand,
- Gravel, - Soil,
- Water.

## SCIENTIFIC EXPLANATION

By adding pressure, water remains at the base of the box, while earth rises and takes the form of wrinkling mountains.



## INSTRUCTIONS

- 1- Place two metal plates on sides of the box,
- 2- Add several layers of cotton to the bottom of the box.
- 3- Add sand, gravel, and earth to form multiple layers of soil. Once the layers of soil have settled, they should then be sprinkled with water.
- 4- Press on the ground from its sides, pushing towards the center, using the two metal plates mentioned earlier, and the crests should then form in the middle.

## CONCLUSION

The formation of wrinkling mountains takes place through complex processes.



**'EARTH'**  
experiment book

GRADINTA CU PROGRAM PRELUNGIT STRUCTURA  
A SCOLII GIMNAZIALE "GHE. POPESCU"  
SCORNICESTI , ROMANIA

## DIFFICULTY LEVEL

\*\*

## OBJECTIVES

- To know the materials provided by the educators;
- To follow the steps towards completion of the experiment;
- To draw conclusions from the experiment.

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# BIOREMEDIATION

## MATERIALS

- A large jar, Earth,
- Food scraps,
- Worms,
- Gauze.

## SCIENTIFIC EXPLANATION

Through the worms' eating of the food scraps, they leave behind a natural, well-ventilated fertilizer due to the holes made by the moving worms from one place to another.

## INSTRUCTIONS

- 1- Lay a layer of earth within the large jar, and then place a layer of food scraps from the children's lunch.
- 2- Add another layer of soil over the layer of food scraps and insert the worms. (The mouth of the jar should then be sealed with gauze so that the worms do not escape the jar but have breathing conditions.
- 3- Cover the jar
- 4- Place the jar in a dark closet.
- 5- After 2-3 weeks, the worms will have eaten the food scraps and therefore leave behind the best soil for growing flowers - compost.

## CONCLUSION

The food scraps should not be discarded because, with their help and the help of the worms, we can produce high quality soil for a flower garden.



## 'EARTH' experiment book

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# CASTLES MADE OF SOIL

## MATERIALS

- 1 large container,
- 5 glasses,
- Clay soil (yellow),
- 1 glass of water.

## SCIENTIFIC EXPLANATION

By placing the glasses filled with moist clay on top of a heat source, the water will evaporate, and the clay will detach off the walls of the glass.



## INSTRUCTIONS

- 1- Place the clay soil in the large container, then add water.
- 2- Mix thoroughly to obtain a yellow playdough.
- 3- Place the playdough obtained into the 5 glasses;
- 4- Place on a radiator.
- 5- After 5-6 hours the glasses are overturned, and the shapes obtained are placed in such a way as to form a castle.

## CONCLUSION

The water evaporates when in contact with a heat source.



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## DIFFICULTY LEVEL

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## OBJECTIVES

- To handle the materials provided by the educators;
- To follow the experiment's instructions;
- To draw conclusions from the experiment.

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TURKEY

### DIFFICULTY LEVEL

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### OBJECTIVES

- Observing how germination has come to fruition
- Observing the effect of the soil on flower growth

# HOW PLANTS GROW

## MATERIALS

- 2,3 beans or red beans,
- Cotton
- Plastic container (or glass cup, jar, etc.)
- Water
- Soil

## INSTRUCTIONS

- 1- Preparation and planting
- 2- Irrigation and germination
- 3- Rooting
- 4- Staging
- 5- Stage to soil
- 6- The stage of growth and development
- 7- Observation

## SCIENTIFIC EXPLANATION

In order to sustain the life of the plants and to grow, it must be found. Every growing root and root is on its tip, and there are thin, hairy roots that allow the plant to get moisture. These thin roots take the oxygen and water in the surrounding water and space. So, the plant grows.



## CONCLUSION

It can be seen that the beans germinate as it squeezes. After the germinated beans are planted on the soil, it is observed that the new beans grow more and become formed.



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# RECYCLE WISELEY

## MATERIALS

- Waste materials ;  
(Leaf, Bag, Paper, Bottle cover, Plastic, Glass)
- Soil

## SCIENTIFIC EXPLANATION

Understand how you disintegrate the waste materials.  
Observe how long plastic, paper and fruit vegetables have returned. To realize that they can dissolve the substances in the soil

## INSTRUCTIONS

- 1- Collection of waste materials.
- 2- Borrowing of waste materials in the soil.
- 3- Removal of waste materials from the soil at the end of the test period.

## CONCLUSION

Recycling in fruits and vegetables is very fast.  
(Paper and wood transform slow while in the plastic we can't see any changes)



## 'EARTH' experiment book

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## DIFFICULTY LEVEL

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## OBJECTIVES

- To get knowledge about recycling.
- To discover which materials have been recycle for a longer period of time.

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# ERODING SOIL WITH WATER

## MATERIALS

- Sea sand
- Water
- Tray

## INSTRUCTIONS

- 1- Place the soil or sand at one corner of the tray and press it gently. In this experiment, it represents the sandy beach shore.
- 2- Pour water in the middle of the tray until a part of the soil or sand is covered.
- 3- Tilt the tray back and forward slowly at first, but then faster to produce small waves that reach the shore and make the soil or sand move.

## SCIENTIFIC EXPLANATION

The action of the waves in the tray slowly changes the form of the shore by moving the soil or sand down and into the water. All the seas and oceans change constantly the shores they touch. Some destroy or dig big portions of rock, while others carry out big quantities of sand and deposit it somewhere else. This persistent and gradual action of water upon earth is called erosion.

## CONCLUSION

Sea constantly erodes the coast line and builds new sand formations and this way it continues to change the form of the surface of Earth.



## 'EARTH' experiment book

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SPECIAL NEEDING PRESCHOOL, BURSA  
TURKEY

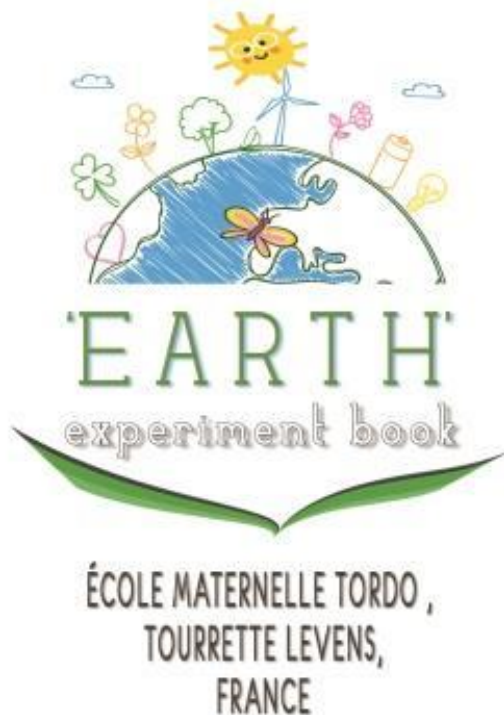
## DIFFICULTY LEVEL

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## OBJECTIVES

- To observe the way that the constant movement of water erodes the coast line





### DIFFICULTY LEVEL

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### OBJECTIVES

- Plant and observe the development of a seed
- Express ideas about seeds, both orally and through drawing.
- Suggest some answers, implement strategies
- Use correctly the terms: stem, leaf, root.



# WHAT IS A SEED?

## MATERIALS

- Some seeds (two kinds: beans and peas),
- Hand magnifier,
- Tubes, - A bag of potting soil,
- Spoons, - A watering can or bottles.

## INSTRUCTIONS

- 1-The day before experiment: rehydrate seeds in water
- 2- Observe the seeds with a magnifying glass and draw them
- 3- Choose a type of seed to plant
- 4- Put the potting soil in a tube
- 5- Add seeds (2 or 3)
- 6- Cover seeds with potting soil
- 7- Water the seedlings.
- 8- Follow the evolution of the seedlings
- 9- Do not forget to water and to observe every day

## SCIENTIFIC EXPLANATION

Seeds germinate and give plants. Each seed gives a plant. There are different types of seeds that give different types of plants. Growing plants produce stems, leaves, roots. Plant growth takes time.



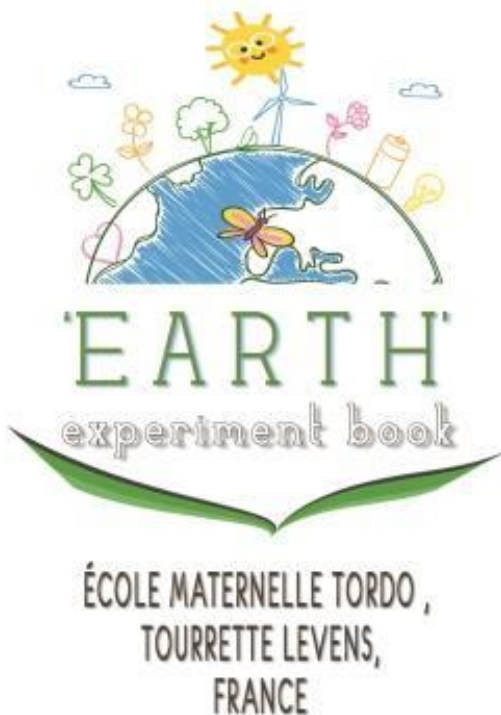
## CONCLUSION

All seeds do not germinate at the same time. The root appears first during germination



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### DIFFICULTY LEVEL

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### OBJECTIVES

- Observation of the manifestations of life for animals
- Observation of the diversity of the living world.



# HOW INSECTS GROW

## MATERIALS

- Vivarium,
- Larvae,
- Food larvae; Bran, Dry bread
- Observation magnifiers

## INSTRUCTIONS

- 1- Buy larvae in a shop.
- 2- Prepare the vivarium with flour and food.
- 3- Put the larvae.
- 4- Observe every day.

## SCIENTIFIC EXPLANATION

The development of most animals presents a succession of phases. (birth, development, growth, adult and death).

The development of some insects goes through the larvae stage. The transition to the adult state is called metamorphosis.



## CONCLUSION

The mealworm comes out of the egg in the form of larvae. Its development requires several moults before reaching the adult state.



# FORMATION OF A VOLCANIC CONE

## MATERIALS

- Yoghurt pot (with a hole in the bottom middle of it)
- Drinking straw, Wheat semolina
- A piece of Cardboard with a hole in the bottom middle of it

## SCIENTIFIC EXPLANATION

The volcanic cone was gradually formed by the accumulation and cooling of the materials ejected during the eruption.

## INSTRUCTIONS

- 1- Put drinking straw inside the hole of yoghurt cup
- 2- Put the cardboard on the yoghurt cup
- 3- Place wheat semolina in the cardboard
- 4- Blow in the drinking straw

## CONCLUSION

Heating the soil, we find out that there are water, air and organic substance in it.



## 'EARTH' experiment book

ÉCOLE MATERNELLE TORDO,  
TOURRETTE LEVENS,  
FRANCE

## DIFFICULTY LEVEL

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## OBJECTIVES

- Understand the origin of the volcanic cone (accumulation of materials emitted during eruptions)
- Manipulate and experiment, formulate a hypothesis and test it, argue
- Express and exploit the results of a research using the scientific vocabulary in writing and speaking.

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# SMALL SCIENTISTS ACROSS EUROPE

## WHY MAKE SCIENTIFIC EXPERIENCES IN MATERNAL SCHOOL?

### MULTIPLE CHALLENGES

- To familiarize children with the science
- To change the representations of children
- To develop attitudes: curious, thoughtful, selective, persevering, and skilful.

### BUT ALSO

Scientific experiments help develop skills:

- in the scientific field: living area, discover the matter,
- in the structuring of time,
- in relating to quantities and sizes,
- in communicating between children and adults, by using different language skills and by participating in collective exchanges by agreeing to listen to others, while waiting for their turn.
- in the field of creation: using art as a means of expression and representation.

Situation language:

- Say what one does or what a comrade does.

Language of evocation:

- To understand a story adapted to his age and to manifest it by rephrasing in his own words the narrative thread of history.

Written language:

- Dictate a text individually to an adult. Use a precise lexicon during exchanges: seed, root, stem, leaf, sow, plant, germinate, grow, grow ...

In the field of communication:

- Participate in a collective exchange by agreeing to listen to others, while waiting for their turn and remaining in the subject of the exchange.

In the field of creation:

- Use drawing as a means of expression and representation

## PROJECT

### COORDINATORS

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