# What's in the soil? Investigating the soil components

## 1 Overall aims:

- Defining the concepts: soil, fertile soil, poor soil
- Getting to know the components of the soil
- Shaping pro-ecological behavior through play what would happen if there was no soil
- Developing creative thinking
- Developing teamwork skills
- Developing fine motor skills

## 2 Vocabulary - keywords

soil, soil layers, the earth's crust, minerals, organic components, air and water

## 3 Sustainable abilities developed

- Anticipatory competency
- Critical thinking
- Collaboration competency

## 4 Pillars of sustainability included

- Socio-cultural
- Economical

## 5 STEAM domains

S, A

## 6 Teaching methodologies/activity outline

**Introduction**. What soil is and why is it important for nature
The teacher presents the children with a cross-section of the Earth (a model of the Earth's interior can be prepared from a cut polystyrene ball). Outwardly, the thin layer of the Earth is called the Earth's crust. Soil is part of the outer layer of the earth's crust, which, together with the adjacent part of the atmosphere, forms a natural habitat for plants, animals and man.Today we will examine what does soil consist of.

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**Experiment: Testing what the soil consists of?**
Children work in small teams. Each team receives a large jar with a screw cap, a small spatula or spoon, a container of water, a magnifying glass, a paper coffee filter, a glass cup, a funnel.
Each group uses a spatula to collect a soil sample from a place of their choice (it is worth taking samples from different places and it is best to choose the places where the plants grow). The collected soil should reach up to 1/4 of the height of the jar (you can mark it with a line on the jar). Then the children pour water into the jar up to 3/4 of the jar height and carefully close the vessel with the screw cap. They then shake the jar vigorously a few times and set it aside to let the ground settle down. They try to answer the following questions:

- Did all the particles settle to the bottom of the jar?
- What molecules are floating on the surface of the water?
- What particles fell to the bottom?

Children describe their observations. Mineral particles sink to the bottom. Organic matter particles and living organisms float on the surface of the water
Then each group pours the water with soil particles into a glass cup through a filter placed in the funnel. Children observe with a magnifying glass whether there are any living organisms or their remains among the particles retained by the filter? They also check whether the collected sample contains other objects, e.g. garbage.
**Explanation**: soil consists of solid mineral and organic components as well as air and water. It is a mixture where are, e.g: crushed rocks, fragments of plants and animals. The soil is constantly changing under the influence of atmospheric factors (e.g. temperature, rainfall), living organisms and human activities, e.g. irrigation, treatments with agricultural machines. The fertility of the soil, depends on the amount of humus/ decay contained in it, i.e., organic matter formed mainly from the remains of plants and animals decomposed by soil microorganisms. The humus layer is close to the surface, but it can have a different thickness. The deeper you go, the less organic matter and more rock fragments. There are living organisms in every soil, including bacteria and fungi invisible to us, small nematodes and mites, as well as wingless insects and earthworms visible to the naked eye.

**Summary**

1. **What would happen if… Creative play:** The teacher invites the children to imagine if there was no soil in the world. What would happen then?
2. **Painting with soil:** Preparation: the soil must be dried (either in a low-temperature oven or in the air. Then it must be crushed. Then: mix a little soil amount in paper cups with white glue or acrylic paint. You can mix different soils to get shades. With painter's tape, you need to stick the watercolor paper to a piece of cardboard. This allows the work to dry flat without curling. Invite the children to paint on paper with a brush dipped in the soil mixture. Natural elements can be added to the painting by using glue, e.g. seeds, grass, leaves, pine cones and dried flowers.

https://pl.gardenjornal.com/10378037-soil-art-ideas-learning-activities-using-soil-in-art

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## 7 Expected learning outcomes

**The child will be able to:**

- explain the concepts of soil,
- name soil components
- describe the difference between fertile and poor soil
- anticipate what would happen if there was no soil?
- create a picture using soil

## 8 Assessment

Conversation - unfinished sentences:
Soil is needed for ...
The soil consists of ...
What needs to be done to keep the soil fertile?

## 9 Equipment and materials to be used in learning unit (tools, ingredients etc)

- for experiment: jars with lids, small spatula or spoons, containers of water, magnifiers, paper coffee filters, glass cups, funnels
- for painting: dried soil, mortars, white or other glue, cardboard, brushes, sheets, dried flowers, leaves, twigs

## 10 Kind of setting - lab, kitchen, outdoor etc.

preschool garden, classroom

## 11 References - source:

1. https://www.wwf.pl/sites/default/files/inline-files/EKSPERYMENTY%20PRZYRODNICZE%20czlowiek%20i%20srodowisko%20(1)_0.pdf
2. https://pl.gardenjornal.com/10378037-soil-art-ideas-learning-activities-using-soil-in-art

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