



Project funded by  
EUROPEAN UNION



# SOIL

## *Participant's Booklet*







BIOLEARN-BSB142  
ECO-CONSCIOUS MINDS TO STOP POLLUTION  
IN THE VALUABLE WETLANDS OF BLACK SEA BASIN

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# SOIL

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## *Participant's Booklet*

Target Audience: 8-14 years old

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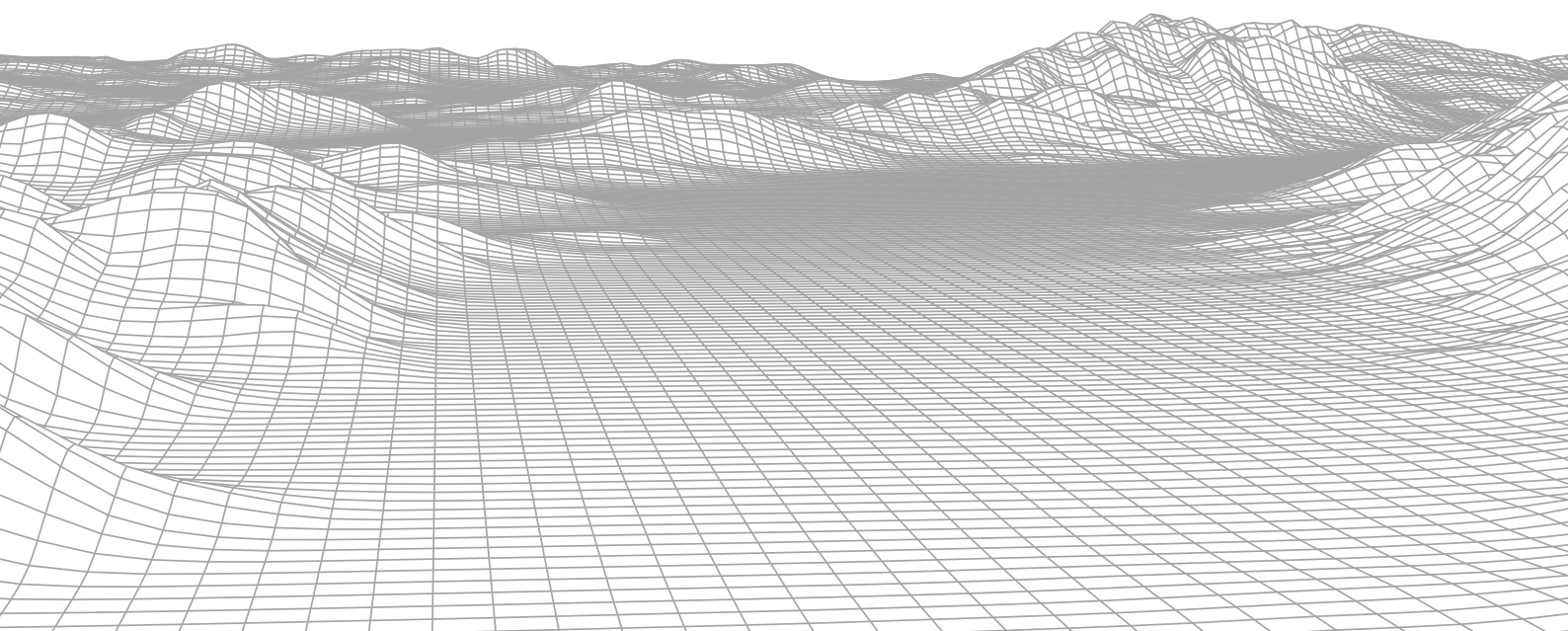
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# About The Project

BIOLEARN (Eco-Conscious Minds to Stop Pollution in the Valuable Wetlands of Black Sea Basin - BSB142), which was initiated on 01.01.2020 within the scope of the first call for proposals of “Joint Operational Programme Black Sea Basin 2014-2020” where the Directorate for EU Affairs is the national authority, is led by District Government of Enez.

Representatives of the following partners are as follows:

1. District Government of Enez-Turkey
2. Division Directorate of Edirne under First Regional Directorate under General Directorate of Nature Protection and Nature Parks of Ministry of Agriculture and Forestry - Turkey
3. Foundation Caucasus Environment - Georgia
4. Agricola NGO - Ukraine
5. Green Balkans / Stara Zagora NGO - Bulgaria
6. Management Body of Evros Delta and Samothraki Protected Areas - Greece

The overall objective of the project is to provide information, experience transfer and capacity building training between partners and develop a common environmental protection and education approach, methodology and organizing campaigns that will raise awareness in the society to reduce pollution in important wetlands in the Black Sea Basin.

**The main activities to be carried out within the scope of the 26-month project are as follows:**

1. Establishment of a total of 4 environmental protection and training centres, one of which is on the shores of Gala Lake, and providing environmental protection training to visitors and especially to students. By providing equipment for the other 6 existing centres, there will be a network of 10 activity and training centres.
2. Workshops to be held in Bulgaria and Greece, focusing on discussions about examples of



successful training and awareness-raising campaigns for the protection of wetlands, sharing experiences and preparing the materials to be used in training which will be applied in all centres. Capacity building training for trainers.

3. Organizing massive and synchronized cleaning campaigns to reduce pollution in wetlands.
4. Award-winning photo contest and exhibition focused on wetland protection.
5. Organizing a wetland pollution-based painting contest and exhibition in primary and secondary schools.

### **Outputs of the Project:**

1. “Stop Pollution” and “Save Nature” environmental education and activity centres, one of which is mobile, will be established in 5 countries and will sustainably carry out training and awareness-raising activities.
2. A report will be prepared on the nature and rate of pollutants in 5 wetlands in the Black Sea Basin.
3. A guide with examples of good practices consisting of training and campaigns focused on protecting wetlands will be prepared.
4. A wetland protection training set consisting of 12 sections will be prepared especially for students. Training sets will also be shared on the internet.
5. After 10 people from 2 each partner country received trainer’s training, they will train 25 people in each region (totally 125 people) and the sustainability of training activities will be ensured in the established centres.
6. A painting competition on environmental protection will be held in at least 15 primary and secondary schools and paintings selected by the jury will be exhibited.
7. Pictures taken in 5 regions with the participation of professional photographers will be exhibited. With the mobile ‘Stop Pollution’ vehicle, the exhibition will travel to 5 countries.
8. An environmental cleaning campaign will be held simultaneously with the participation of 1500 people in 5 regions.
9. With the international conference to be held in Georgia, the outputs of the project and future action plans will be shared with the public.

**For more information, you can visit the project website: [www.bio-learn.org](http://www.bio-learn.org)**



# Soil



## What Is Soil?

The soil on which we walk, the plants take root, we grow vegetables, fruits and we build houses... The soil which contains numerous organisms is a great mixture of mineral, water, air and organic material. It is a giant cover coating the surface of our planet.

Due to its structure, soil can hold large amounts of water. It has a rich structure in terms of minerals, it contains air and nutritious organic materials. With these properties, it creates the ideal habitat for plants. The plants stretch their roots deep down the soil and they can strongly hold on to it. They can reach the minerals and water they need to survive from the soil. In addition to plants, mushrooms, bacteria and some animals live in the rich structure of the soil. Some living beings that feed on dead plants and animal residues find sufficient food for themselves. On the other hand, they also help soil formation by decomposing the food waste and they enrich the soil.

### Did you know?

One spoon of soil contains millions of bacteria, mushrooms and other microorganisms.



The soil which contains numerous organisms is a great mixture of mineral, water, air and organic material. It is a giant cover coating the surface of our planet.

Soil is also important for animals. Various large animals like foxes, wolves and badgers dig holes in the soil and build houses for themselves. At the same time, these holes act as a cover to sleep safely and raise their babies. In addition to that, numerous small animals like mole, voles and ground squirrels spend most of their lives under the soil.

Earthworms and numerous microorganisms that we cannot see undertake important tasks to keep the soil healthy. For example, earthworms drill a lot of holes into the soil and help the soil to aerate and





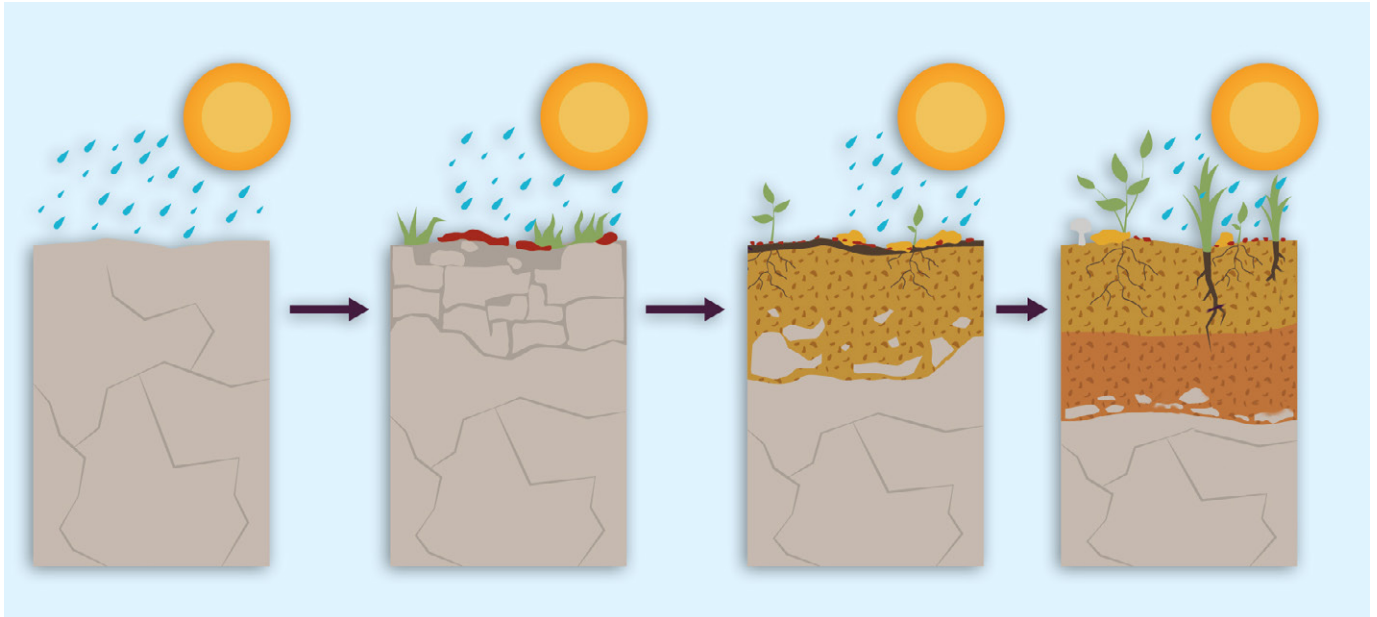


absorb more water. Additionally, they decompose organic waste and nourish the soil. Similarly, microorganisms eat and decompose the organic materials and provide various minerals and nutrients to the soil to enrich the soil.



## World Soil Day

Every year, World Soil Day is celebrated on December 5 to remember the importance and indispensability of soil for all living beings on the planet and to raise social awareness. On this special day, various conferences, training and workshop events are organised.



 Natural factors such as sun, wind and precipitation enable soil formation over the centuries.

Soil formation occurs over the centuries as a slow process and various layers are formed in this process. It takes approximately 500-1000 years for a 2.5 cm thick soil layer to form.

### How Is Soil Formed?

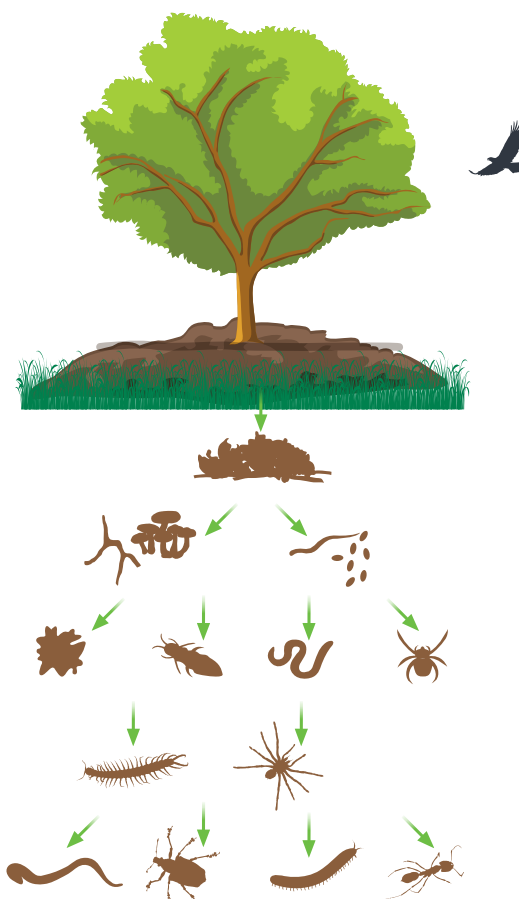
Soil is formed from the weathering of rocks. Various external factors such as climate conditions, temperature changes, wind, rain, sun break these rocks into smaller pieces over centuries. When the rocks start to crumble, the creatures called lichen and vegetation that later develops can accelerate this breaking down with their roots. In this way, various soil structures occur from the sands on the beach to the soil on our fields. The soil formation process is so slow, that it takes approximately 500-1000 years for a 2.5 cm thick soil layer to form.

The soil structure formed by breaking the rocks into the smallest pieces is called **clay**. A microscope is needed to see the clay grains. The middle-sized particles are called **silt**. Alluvium carried with the rivers is a good example



of silt soil structure. Silt grains can be seen with a magnifying glass. The rock part with the largest grain structure is called **sand**. When you consider the sand that you can see with your naked eyes near the shore, you can better understand how small grains do clay and alluvium have. The soil consists of a mixture of these three types called clay, silt and sand.

The organic section formed by dead plant and animal residues is added to this inorganic structure formed by breaking down rocks. Dead plants and animals are broken down by bacteria, fungi and worms into small pieces and create the layer called **humus**. This dark-coloured humus layer





rich in terms of organic materials is mixed with the inorganic structure consisting of clay, silt and sand. Worms play an important role to mix the humus to the mineral layer below. The humus contains beneficial nutrients for healthy soil; for example, it provides nitrogen to plants which is an essential nutrient.

The mixture of all these organic and inorganic materials only forms half of the soil. The majority of this mixture is filled with gaps. These gaps are filled with water and air. The soft, porous soil that gives life to numerous plants and has rich minerals and nutrition is formed. Plants get the nutrients and minerals and reach air and water by using their roots from this rich soil.







## Did you know?

The tree with the deepest roots on Earth is in South Africa. The roots of this tree species known as Shepherd's tree extend approximately 70 meters to the soil.

## Soil Layers

Soil formation occurs over the centuries as a slow process and various layers are formed in this process. If you try to dig the soil, you can even notice some of these layers.

The outermost layer of the soil is called the organic layer or the **O layer** consisting of **humus** that mostly has plant and living being residues. This layer exists as a thin layer and the **A layer** is below this layer with a low level of minerals but a high level of organic substances. Due to the intense nature of the organic matter, the colour of the soil looks extremely dark. O and A layers are the most fertile layers of the soil. Although these two layers are thinner compared to other layers, they enable living beings to live. O and A layers are together called **topsoil**.



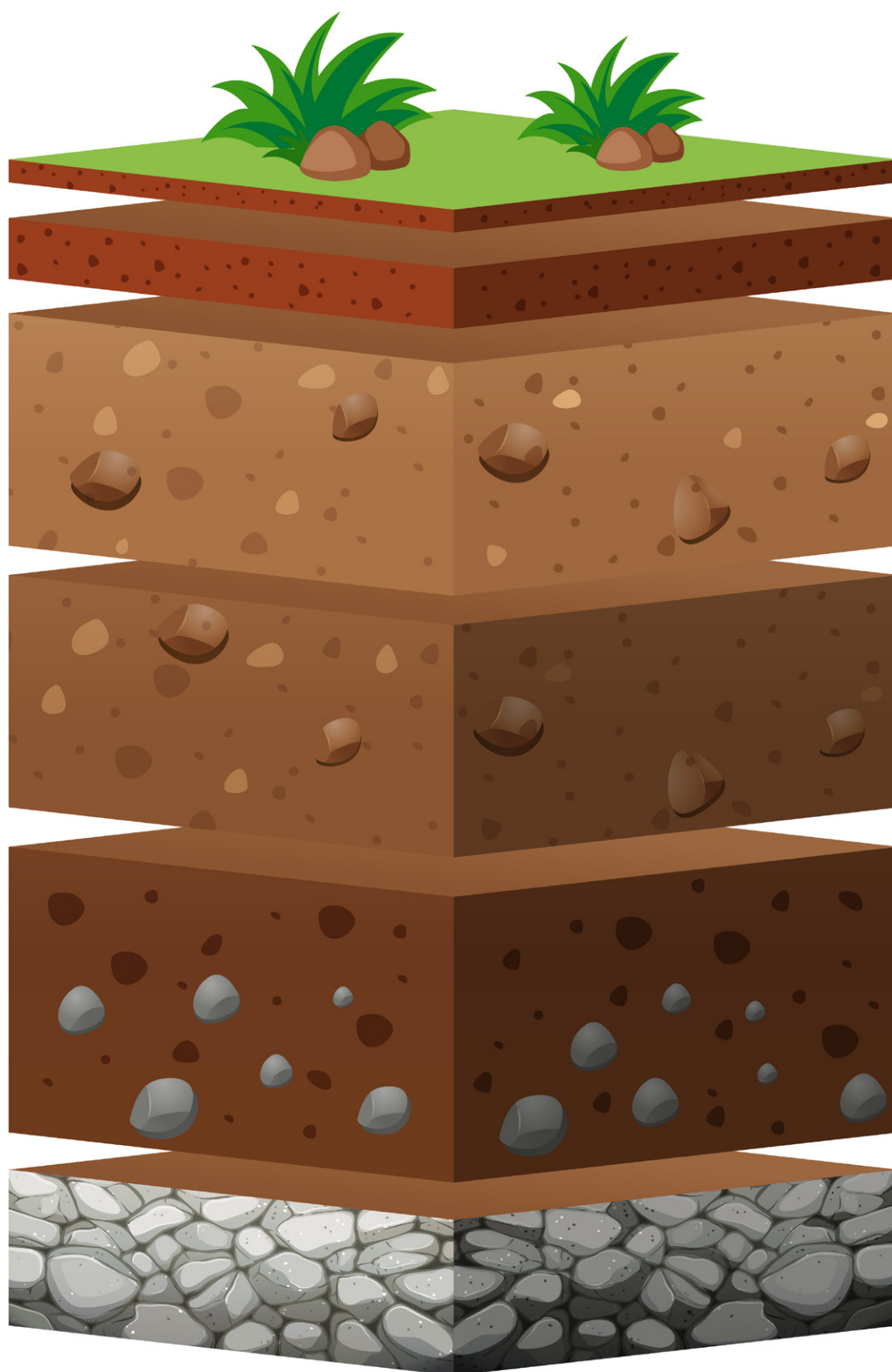


There is a **B layer** or **subsoil** just below O and A layers. This layer mostly consists of minerals and it might contain a low amount of humus. Only the roots of the deepest plants can reach this layer. Animals do not live on this layer but fossils can be found here!

Under the B layer, there is a **C layer** or also known as the **parent material**. The reason this layer is called the parent materials is that the upper layers of the soil developed from the parent material. This layer contains large rock pieces and living beings do not live here. Below that layer, the **R layer** called **bedrock** is located at the bottom which consists of unbroken, hard and giant rocks. This layer does not have any living beings and it acts as a ground for all the other top layers.

Although the soil layers are in this general form, these structures might change in different places in the world. While some places like mountains peaks are rocky, there is less rock and infertile soil layer in deserts consisting of sand.

Thousands of plants scattered all around our planet extend their roots to the soil and hold on to life. They can reach rich nutrients and minerals that are necessary for them to grow.



**O**

**A**

**B**

**C**

**R**

 Soil Layers

## Why Is Soil Important?

The soil plays a vital role for all living beings. While it provides food for some, it acts as a shelter and home for others.

Plants are the main living beings that we cannot think independently of the soil. Thousands of plants scattered all around our planet extend their roots to the soil and hold on to life. They can reach rich nutrients and minerals that are necessary for them to grow. Similarly, various fungi species are dependent on soil.

Bacteria, microorganisms and worms living in the soil are indispensable living beings to make the soil healthy and fertile. They both contribute to the formation of new soil and prepare nutrition for the plants.

The soil is one of the most important natural elements that enable biodiversity on our planet. Erosion is one of the main threats destroying the soil.

### Did you know?

Approximately 1 million earthworms live in 1 acre (approximately half of a football field) undamaged and healthy agricultural fields.







The soil becomes a shelter for mammals, birds, reptiles and bugs to build their home, be protected from hunters and raise their young. In short, the soil is one of the most important natural elements that enable biodiversity on our planet.

This structure which is home to numerous living beings and has a vital role in the continuation of life in the world is formed so slowly that it is really important to protect the soil. Erosion is one of the main threats destroying the soil. The destruction of the top fertile layer of the soil by external factors



such as water and wind is called **erosion**. Destruction of this fertile layer will cause the living beings under and above the soil to go extinct. This top layer that contains nitrogen which is vital for the development of the plants is eliminated due to erosion. The soil becomes poor and infertile. Other than that, factors such as the destruction of the forests and vegetation, damaging the soil surface, increasing urbanisation, intense agricultural and animal husbandry practices, pollution and climate change greatly damage our soil.

The soil without living beings on it becomes desert and irrevocably destroyed. This is why it is important to protect the soil that gives life to all living beings on our planet including humans. Especially if we consider the fact that it takes 500-1000 years to form a 2.5 cm thick soil layer! Before everything else, we can protect this life source by protecting the forests, wetlands and nature and respecting the soil.

Factors such as the destruction of the forests and vegetation, erosion, increasing urbanisation, pollution and climate change greatly damage our soil.

## Did you know?

### Making Compost

The natural fertiliser prepared by decomposing some plant- and animal-based wastes in the wet and breathable environment is called compost. Thanks to compost, it is possible to enrich the soil to grow vegetables, fruits and flowers in terms of nutrition and minerals, to make the soil more breathable and fertile. Lots of people prepare their compost from waste such as fruit and vegetable scraps, tea, eggshells and nutshells that we consume in our daily lives by keeping them in a special box in their balcony or gardens.





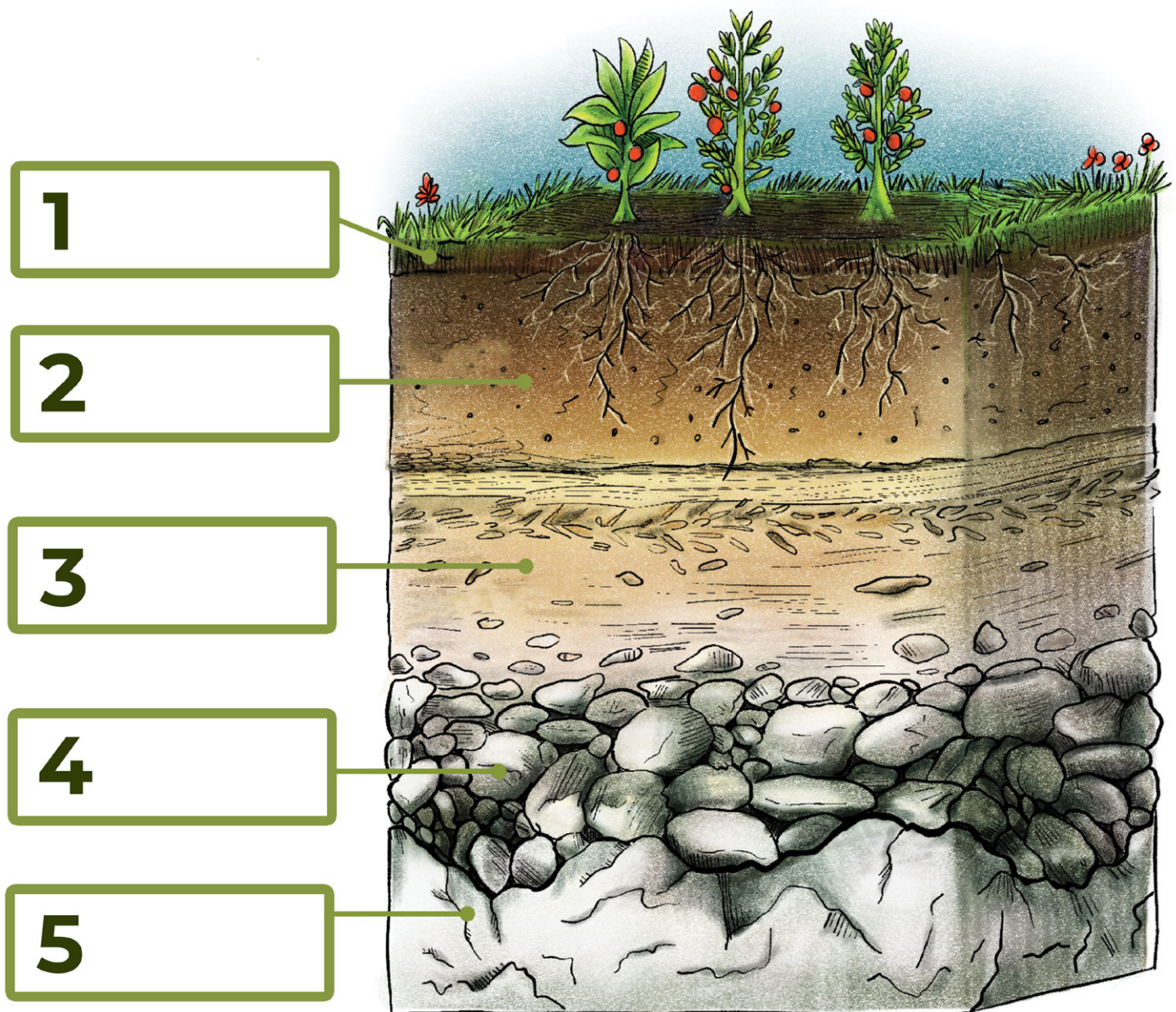
# Worksheets



## SOIL LAYERS

Find the correct words among the mixed letters below.  
Then, write the word inside the empty box.

1. mushu \_ \_ \_ \_ \_
2. tiooslp \_ \_ \_ \_ \_
3. ssuobil \_ \_ \_ \_ \_
4. aprten lmaetria \_ \_ \_ \_ \_
5. ebdrcok \_ \_ \_ \_ \_



**Answer Key:** 1. Humus 2. Topsoil 3. Subsoil 4. Parent material 5. Bedrock

# SOIL AREA OBSERVATION FORM

*Let's record what you see!*

**Date**

**Start and  
End Time:**

**Location**

**Observer**

|   |  |
|---|--|
| Weather (sunny, cloudy, partially cloudy, rainy):   |  |
| Wind (intense, light, no wind):   |  |
| What is the colour of the soil?   |  |
| What is the structure of the soil (humus, clayey, sandy or smooth, etc.)?                   |  |
| Does the soil smell? If yes, how?   |  |
| Is the soil dry or wet?   |  |
| What is the temperature of the soil?  |  |
| Are there any traces on the soil (animal droppings, animal footprint, feather, nest, etc.)? |  |
| Which living beings did you see on the soil?  |  |
| Which living beings did you see in the soil?  |  |
| Which non-living things did you see on the soil?  |  |
| Which non-living things did you see in the soil?  |  |

# Notes





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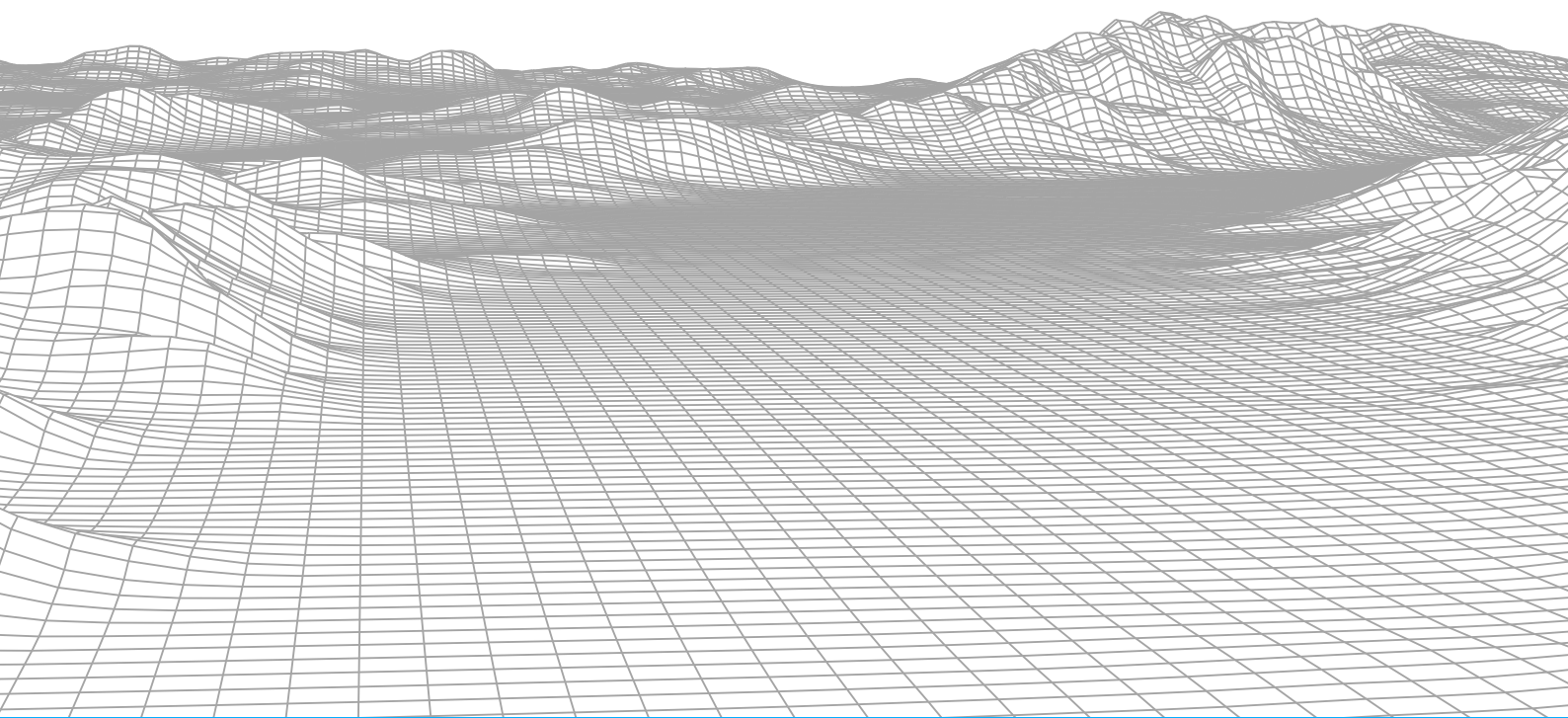
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