# Underground inhabitants (game with decomposers)

| GLOBE | | *Related SDGs:* | *Type of activity* |
|---|---|---|---|
| **Sphere** | **Protocols** | | |
| Pedosphere | - Soil Characterization<br>-Soil pH<br>-Soil Moisture<br>-Bulk Density | 4 (Quality education)<br><br>12 (Responsible Consumption and Production) | Research |

***Overview***

The soil is perhaps an ecosystem in itself, it harbors a great biodiversity that can include organisms ranging from tiny microscopic bacteria and nematodes to springtails, mites, myriapods, earthworms, moles and worms. Each of these groups has a multitude of species. It is said that: "... in a spoonful of soil there could be more inhabitants than in the entire planet...". It is considered a complex and dynamic living organism that can be regarded as the living layer of the Earth, in a symbiotic condition with plants. This activity is proposed as a game through which we concretely get closer to the living things of the soil and sense those of microscopic condition, ideally establishing a connection that allows us to become aware that the soil is a non-renewable resource that must be treasured to give sustainability to the vital process of all living organisms.

***Time***
3 hours with a field trip.

***Prerequisites:*** (K-3 - K-8)
None.

***School level***
Primary.

***Purpose***

To learn about some forms of soil life that participate in the underground community and their contribution to ecosystem development in an exploratory way.

***Student Outcomes***

- To identify specimens of living organisms, present in soil.
- To establish differences among specimens based on their physical constitution.
- To infer about their function and participation in the biotope context.

### *Introduction*

Soil organisms act as primary agents for driving nutrient cycling, regulating the dynamics of soil organic matter, soil carbon sequestration and greenhouse gas emissions, modifying soil physical structure and water storage, increasing the amount and availability of nutrients for vegetation and increasing plant health. In addition, these organisms act as decomposers of living things residues for the continuity of the matter cycle in the ecosystem, returning the primary elements to the plants. These services are not only essential for the functioning of natural ecosystems, but also constitute an important resource for the sustainable management of agricultural systems.

### *Guiding Research Questions*

- What physical characteristics do the soil visible inhabitants have?
- How does the earthworm community contribute to the soil ecosystem configuration?

### *Scientific Concepts*

- Entomology, Insects, Microorganisms
- Biodiversity, Ecosystem
- Meteorological factors influencing soils
- Living things
- Symbiont community

### *Materials and Tools*

- Garden tools such as a small shovel and a rake
- Plastic pieces of 50x50 cm
- Measuring tape
- A log book and pencils
- Simple magnifying glasses
- Magnifying glass adaptable to a cell phone for photos

## *What to Do and How to Do It*

### *Beginning*

- In a selected study site disperse your students and ask each one to start excavating to a depth of approximately 30 cm. The excavation material should be placed on plastic, where they should scatter the material and dig for identifiable living things. Anecdotal records of the activity should be kept at all times and the area should be geo-positioned.

***Development***

- Carefully, have your students capture the living things that they find, observe them with the help of a magnifying glass, ideally take photographs, and do a small sketch of their main characteristics (number of legs, shells, eyes, etc.). Have your students record the number of specimens they have seen and the land characteristics. Afterwards, they need to release the specimens back to the soil.

***Closing***

- After making the observations and taking the measurements, your students must organize their records and data systematically using tables and/or graphs. Have them make a discussion about the experience and record measurements and inferences.
- As a complement, concurrently make your students begin bibliographic research to find names of the specimens they found as well as any supplementary information. The students need to build a small collective atlas with the references of such specimens, make a presentation of their task for their immediate community and initiate a pluralistic debate on the following question: Is soil a living organism? Why?

***Frequently Asked Questions***

-Should special sanitary precautions be taken for this activity?

Only the common ones: hand washing, voluntary use of safety gloves, and application of hand sanitizer.

***Suggested Resources***

- Soil investigation at (www.globe.gov)
- Soil biodiversity textbooks

***Bibliography***

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