

# 4th Grade Activity: Backyard Soil Discovery Bottles

*Soil is the skin of the earth, capable of supporting plant life and vital to all life on earth. A mixture of minerals, organic matter, liquid, gases, and micro and macro-organisms that can be easily investigated at home.*  
(NGSS Disciplinary Core Ideas 4.ESS2.1 Materials and Earth's Systems)

## Pre-Activity Questions

- What is Soil?
- What is soil made of?
- Where does it come from?

## Activity

- Many people confuse the terms soil and dirt. **DIRT** is what gets on our clothes, under our fingernails, or tracked inside by shoes from outdoor play. Consider dirt as soil that is out of place –. You can also think of dirt as soil that has lost the ability to support life – it is “dead” because it is out of place.
- **SOIL** is made up of different layers characterized as humus, topsoil, subsoil, and parent material. Soil is made from the weathering of parent material by wind and water and the biological breakdown of lichens, mosses, and the additions of organic material. As rocks break down into smaller rocks and gravel and other sediments are deposited by runoff from rain or other bodies of water, organisms begin to group around the accumulated mineral particles and organic matter forms. Over time the organic matter breaks down and becomes part of the underlying material and soil develops.
  - There are many animals that depend on soil for survival. **EARTHWORMS** benefit the garden by mixing the soil as they move and bringing down organic matter from the topsoil. They also increase the amount of air and water in the soil and break down organic matter, such as grass and leaves, so plants can use them. While the worms feed and work through the soil, they leave behind casting as waste.
- Find a place where you can dig up soil and not disturb nearby plants and animals.

## Let's investigate!

### Materials

- Clear bottle
- Soil
- Water
- Spoon or shovel
- Funnel
- Pencil/pen & paper to record observations

### Steps

1. Dig up a couple handfuls of **soil** with a **spoon** or **shovel**. Make sure to dig deep enough to get both the soil from the surface as well as from deeper levels below.
2. Use a **funnel** to help get the soil into an empty **clear bottle**.
  - a. If you don't have a funnel, you can make one using a piece of paper and rolling two sides together. Make sure one opening is smaller than the other.
3. Fill the rest of the bottle with **water**, cap it off, and shake the bottle quickly for at least one minute.
4. Allow the bottle to rest for the next few days while you observe what happens. Make sure to check back daily and record what you see.

## Post-Activity Questions and Activities

- How many layers of soil can you count or identify?
- How long did it take for the different levels to clearly be observed?
- How do animals use soil?
- How do people use soil?
- How does pollution affect soil?
- Make your own edible soil! Use chocolate pudding, chocolate cake crumbs, oreo cookie crumbs, & gummy worms. A healthier alternative would be to use yogurt and dried fruit. Mix up your own edible soil!