

EarthWorks Orchard Curriculum

Soil

Grade(s): 2-5	Topic: Worms, Decomposition	Season: Any
Timing: 45 minutes, including 5 minute introduction, 20 minute outdoor soil sort, 15 minute outdoor soil and water activity, and 5 minute conclusion		
Objectives: <ul style="list-style-type: none">• Students can explain that soil is the scientific word for “dirt” and that it is important because plants grow in it and get their nutrients from it, and animals (including people) then eat those plants and get those nutrients• Students can describe some of the organic materials(once living plants and animals) and inorganic materials (never living rocks, sand, pebbles) that comprise soil• Students explore what soil is made of		
Materials: <ul style="list-style-type: none">• Examples of items that are living / once-alive / never alive• Soil in a dark bag students cannot see through (a brown paper bag, for example)• Trowels or another digging tool• Magnifying glasses• Labeled soil observation trays (recycled styrofoam cafeteria trays work well)• Watering cans or other water carrying containers with water inside• Pebbles in a container with a cup or scoop• Sand in a container with a cup or scoop• Clay in a container with a cup or scoop• Humus from a worm bin, if available• Decomposing leaves, if available• Other organic materials (feathers, seeds, wood chips, etc)• Sieves to demonstrate water going through different soil materials• Stopwatch• 5 – 6 jars (optional)		
Prep Needed: <ul style="list-style-type: none">• Fill containers with water• Set up containers of pebbles, sand, and silt along with cups, scoops, sieves, and jars outside, or have students help you carry these down from class• Mark observation trays with quadrants labeled “living, never-living, once living, and unsure”		
Degree of need for extra teacher or parent helper? High		
Journal Prompt: What is soil made out of? Why is it important?		
Lesson Sequence: Introduction (5 minutes) Take out your brown bag full of soil and tell the students the bag contains something that is incredibly important. Without it we would not be alive. Give them some other clues about what it is as you allow them to smell the bag and / or touch the contents of the bag (without looking), but tell them not to say their guesses out loud until the end. What’s in the bag? Soil! Today we are going to start by learning a bit more about soil. Why is soil important? What is it made of? How do we know if it will be good or bad for plants to grow in? Today we’re going to investigate.		

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Introduce the idea of living / once-alive / never alive as categories that we can sort items in to. Have students spend a few moments naming off items in each category and explain if there is any confusion.

Soil Sort (20 minutes)

Outside, split students into pairs. Give each pair a tray and a digging tool (you can also opt to divvy out the soil yourself) and tell them to dig up a small sample of soil and sort of the different parts of it. We may not be able to figure out what every last bit is, but try really hard to separate out what you can. The better job we do separating the more we will understand about what soil is made of and what *exactly* helps plants grow! Explain that students might find worms or other critters when they are digging in the soil and that if they do, they should treat them with respect and should let you know. You will save them until the end of class for the whole class to look at and talk about.

Once students have had some time to sort their soil, gather the class around and pass out magnifying glasses for them to look at the soil in more detail, reminding students not to touch soil directly with the magnifying glasses (this will scratch or smudge the lenses). Talk about what they've found. What do they notice their soil is MAINLY made of? Are they surprised? What do they think makes soil a good environment for plants to grow in? What are some of the non-living things they've found in their soil? What are some of the living things they've found in their soil? (Pass them around and talk about them.) What might those living things be doing in the soil? What does their soil smell like? Up close, is it like what they expected?

Notes:

- If you are using trays you can mark on like paper plates or styrofoam, you can section off different categories on the tray to make sorting easier for students.
- If the soil is too frozen for students to dig it up, you can dig it up before class for them.

Outdoor Water and Soil Experiments (15 minutes)

Why is soil the best for plants to grow in? What do we know plants need to survive? Try testing out these experiments to see what makes soil unique. Have half of class work on each experiment at a time, or do a demo in front of the class, allowing them to pass around the soil type before and after you have poured the water through it.

Experiment One:

Use the stopwatch to compare how quickly the same amount of water passes through pebbles, sand, clay, and soil. Which is the fastest? Which is the slowest? What is best for plants to grow in? What part of a plant takes up water? Where does that part of a plant grow? Is there a problem with water sitting in the soil for too long (clay) or leaving too quickly (pebbles)?

Experiment Two:

Collect soil from a few different locations and place into jars. Add water and shake vigorously! Watch as the materials settle and see what you can identify in each. Try using sandy soils, clay soils, rocky soil, garden soil, and potting soil to compare. (If you have clayey soils, it might take some time to separate out so you can take them back into the classroom and check on them later in the day or the next day.) Students should be able to notice that, in general, organic (living or once living) items will float, while never-living items

will sink.

Conclusion (5 minutes, inside)

Have students briefly share what they learned about soil. Is soil just one thing or is it many little things all together? What makes soil healthy for plants to grow in? Does it contain living and non-living things? What are some examples of each?

Vocabulary

Clay
Humus
Inorganic
Organic
Nutrients
Sand
Silt
Soil

Vocabulario

Arcilla
Arena
Humus
Inorgánico
Orgánico
Nutrientes
Sedimento
Tierra

Extensions / Homework Ideas:

- Have students look for plants growing in sidewalk cracks. If students look with a magnifying glass can they find signs of organic matter? Can they explain how a plant could be growing in such conditions?
- Set up seeds to try and grow in different soil materials (pebbles, sand, clay) and make predictions about what will happen.