

K-12 IYS Activity



Summary

There are more organisms living in a teaspoon of soil than people on the earth! In this activity, participants will dig up a sample of soil and examine it for life forms within the soil.

Learning Objective

1. Students will be able to describe how soil is a living resource.
2. Students will be able to contrast the size and habitat location of various soil organisms.

Materials Needed

Soil for digging (preferably with plants growing in it), shovels, containers to hold soil samples, hand lenses, tweezers

Soils are Living, from Pedon to Pore: Examine roots and soil for living creatures

Ages

K-12, adults

Where could you offer this?

University, local school, library, arboretum, or garden

What type of room do you need?

Lab/work benches

Recommended Group Size

Less than 20

Type of Lesson

Hands-on (participants touch the stuff), outdoor

Time Needed

Scientist prep time + clean up time: Minimal time, aside from identifying a site to dig and gathering equipment.

Participant/class time: 30-60 minutes.

Method

1. Explain that a soil pedon is a basic 3-dimensional volume of soil that is representative of the soil horizons in the local landscape. This size of soil volume is home to plant roots that we can see, thousands of soil animals (some of which we can see), and millions of soil microorganisms.
2. With a shovel, dig under several plants to at least 6-12 inches in depth.
3. Discuss the most obvious and largest living organisms (roots, and earthworms if present).
4. Have students measure the diameter and length of large and small roots, and lengths of earthworms if present. Identify macropores created by roots and earthworms and explain their importance for gas exchange and water flow.
5. Discuss specific areas of soil that are "hot spots" for biological activity, such as the rhizosphere (soil attached to roots) and drilosphere (lining of earthworm burrows). If you dig deeper, you can discuss how root density changes with soil depth, and how in general, most of soil life is concentrated closer to the surface because that is where most of the organic matter is found.
6. Have everyone take a sample of soil and examine it with hand lenses and tweezers and look for smaller life forms (mites, springtails, other large soil fauna, and perhaps even fungal hyphae). Explain that bacteria and fauna such as protozoa, and nematodes are microscopic and can't be seen with the naked eye. Explain that bacteria are so tiny, that one teaspoon of soil can contain a million or more bacterial cells, and that these cells are attached to the surfaces of soil particles, inside aggregate pores, and on surfaces of organic matter. Some even live on surfaces of other living organisms, such as roots and fungal hyphae!

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Discussion Questions

1. Did the color of soil change with soil depth? If so why?
2. Where were most of the roots found? Did root size change with soil depth?
3. Where were the greatest number and types of fauna observed, in relation to soil depth and roots?

Additional Resources

www.soils4teachers.org



Soil Science Society of America
www.soils.org