Science of Life Explorations

Let’s Learn About Soil:

What’s in Soil?
What does organic mean?

When talking about soil, organic means something that is alive or was once alive. Things like leaves and animals can be alive. When they are no longer alive, they can still be called organic. Organic matter is an important part of soil because it adds nutrients and improves the texture.

INORGANIC MATTER means something that was never alive. What is an example of something that is not alive and never was?

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Soil is made up of both organic and inorganic matter. Usually soil that has organic matter is very good for plants. It also contains living creatures that we can see and some we can’t see. FUNGUS AND BACTERIA are important parts of healthy soil.

Fungus and Bacteria can’t always be seen in the soil and may require magnification. Fungus and bacteria help breakdown organic matter so that plants can get the nutrients they need to be healthy. Soils that do not have any organic matter, fungus or bacteria are usually not good for plants.

What other creatures live in the soil?

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Let’s collect soil and learn more about it.

With a shovel or trowel gather soil from two or three different places, such as near a sidewalk, in a garden or field. If you can, collect from a third site that is different from the other two, such as from under a tree, or across town. Go ahead and fill the bags, as you can use them for experiments later. (Your teacher may have already done this step.)
The first soil activity will show you the different COMPONENTS of soil.

Fill a mayonnaise or similar jar about half way. Add water till the water level is about 3/4 of the bottle.

**Draw a line on this jar to show where 3/4 full would be.

Close tightly and shake the soil and water to mix. Let the jar sit for at least two days. Don’t move it.

When the water is almost clear, you will see that the soil has settled.

What things in the soil should be at the bottom of the jar?

___________________________________________________________

Do you think you will see layers? Why?

___________________________________________________________

What might float in the water?

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Can soils be different? Why?

If you can, examine some of your collected soil on a table covered with plastic. Use magnifying lenses. Soils may look, feel and smell differently.

Circle the things that describe your soil:

- wet
- dry
- sandy
- smooth
- sticky
- dark
- light
- full of stones
- no stones
- has sticks in it
- has worms in it
- crumbly
- has leaves in it
- has an odor
- does not have an odor
- or: ______________________

Look at the soil photographs on page 2. One shows reddish soil from the western U.S. It has a lot of minerals but not a lot of organic matter. Do you think it would be good for plants?

Soil is different because it is created from rocks and boulders. This is called PARENT MATERIAL. Because rocks in different parts of the country are made of different types of parent material (granite, limestone, shale, quartz) the soil is different, too.

Another reason soils are different is because of the ENVIRONMENT. N.Y. soils have a lot of organic matter and appear a darker brown. Do you think that having a lot of trees and plants around adds organic matter? Rainfall and snow helps organic matter decompose.
For Budding GEOLOGISTS:

What is a rock?

A rock can be large or small, but it is made up of two or more minerals.

Number these rock types from smallest to largest size
___sand grains are tiny pieces of rock
___mountains are huge, giant hunks of rock which are part of
    the earth’s crust
___pebbles can be held in your fingers
___dust is the smallest size
___boulders are larger than people
___stones are small enough to hold in your hands

What is a mineral?

A MINERAL is a substance that is the same all the way through. Rocks
are classified by their size and what they are made of. Minerals are classified
by their characteristics. Some minerals are very beautiful and when cut and
polished, can become gemstones.

(Everything has CHARACTERISTICS. It is the way we can describe things.
A person may be tall, or have dark skin, or like to sing. Those are their
characteristics.)

Do you think these rocks are made of the same minerals? Do they have the
same characteristics? They probably were formed in different ways.
Remember! Rocks are made of two or more minerals.

Minerals are studied and organized by their color, LUSTER (shiny or dull), weight, hardness and how it breaks apart. Some minerals are clear, and light travels through them.

Bedrock is not just the name of the town where Fred Flintstone lives. It is what we call rock below the surface soil. It can be any type of rock and can be a few inches below the surface to many feet below. The bedrock in western NY is mostly SEDIMENTARY. The bedrock in the mountain areas of NY are mostly IGNEOUS or METAMORPHIC. These are the three main ways rock is formed from minerals.

Limestone rock is very common in New York State. It is made up of calcite. Research calcite and write two sentences that describe its characteristics.

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Bacteria: one celled micro-organisms that can be helpers to plant and human health or can cause disease

Clay: the smallest of the soil particles; when wet it is sticky and when dry it is very hard

Components: an ingredient or one of many 'parts' that make up something

Erosion: the wearing down of soil by wind, water, heating and freezing

Fungus: a living organism which absorb nutrition by decomposing its food source

Horizon: in soil, horizons are another name for its layers

Inorganic Matter: things that are not alive and never were, such as rocks

Magnification: using glass lenses that magnify (make things seem larger) so that small things are easier to see

Nutrition: the energy (food source) needed by living things to be able to survive and thrive

Organic Matter: things that are living or were once living (leaves are 'dead' but were once alive)

Oxygen: an essential element that animals and most plants need to survive; it is found in the atmosphere, the soil and in water

Parent Materials: in soil, parent materials are the types of rocks and minerals that eventually become soil over time

Particles: small parts of something, especially soil

Silt: a type of soil particle between the smallest (clay) and the largest (sand)

Surface: the top of something

Textures: the varying structure of something, such as rough or smooth
When discussing soil - organic refers to something that is alive or was alive. If it was never alive - such as a rock - then it is inorganic. This is a good discussion point. Is a wooden fence organic? a book? a leather glove? Trees were alive, but what about leather? Remind students that leather is a by product of animals, and because leather is part of something that was once living, it is organic. Organic items will break down due to their nature, much faster than inorganic items. This is why soil is created so slowly. A rock will sit and seem to stay the same for hundreds of years.

(StLess_LearnSoil_Organic.pdf)

To really learn about soil, it’s always a good idea to have some ‘on hand’. You may choose to ask someone to collect it for you, or collect it yourself. If at all possible, it is always good experience to have the students involved in the collection. We suggest you gather at least 2-3 bags full of soil, each from a different place. Other lessons in our curriculum require students to work with soil. Remove earthworms and other creatures when possible before conducting the water experiment.

(StLess_LearnSoil_CollectSoil.pdf)

There are many good sources of information on rocks and geology. Perhaps you know of someone who collects rocks and minerals, or your library has a good reference book. We’ve added a page to the teacher section to further discuss geology, because many students exhibit an interest in rocks and minerals.

(StLess_LearnSoil_Different.pdf)