



Grade Four – Science

Topic A: Waste and Our World

Identify plant and animal wastes, and describe how they are recycled in nature. For example, plant leaves serve as a source of food for soil insects, worms and other creatures. The wastes of these animals may then be further broken down by molds, fungi and bacteria.

Topic E: Plant Growth and Changes

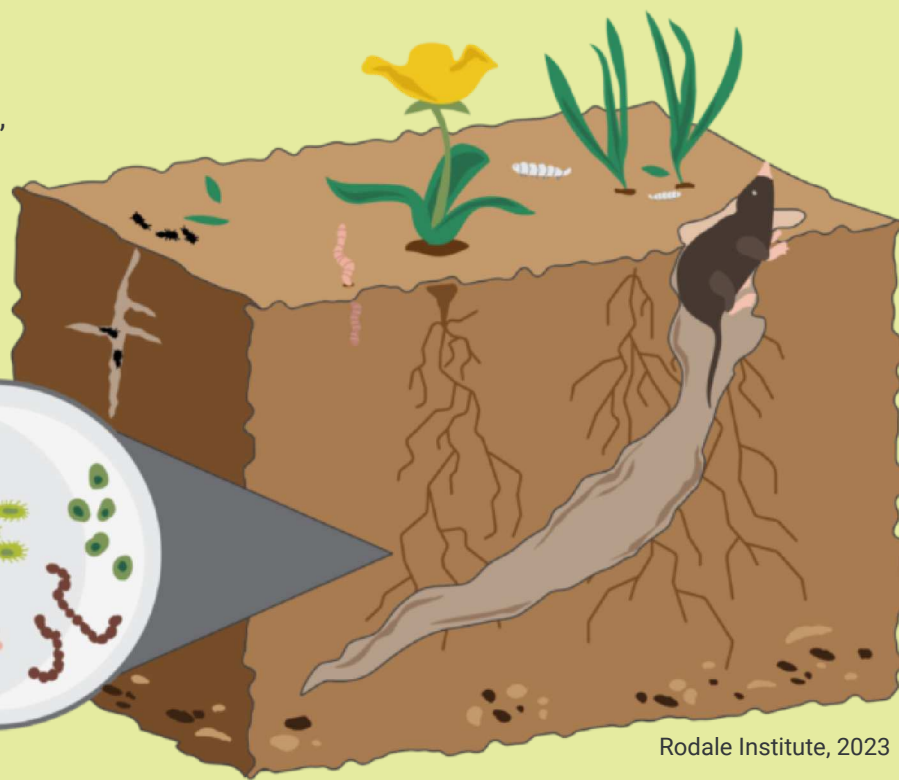
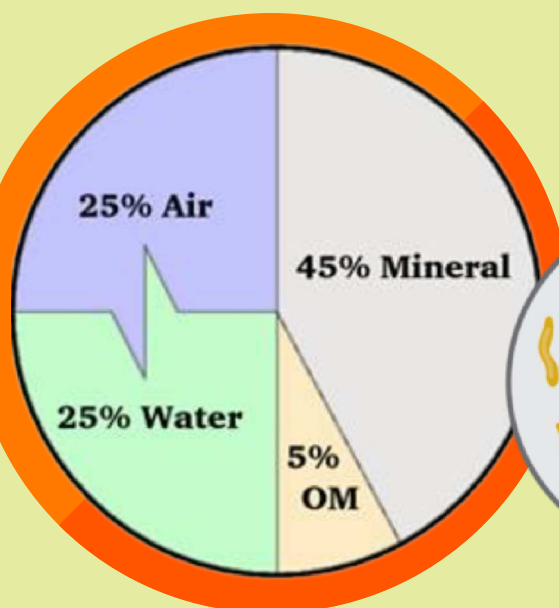
Recognize that plant requirements for growth; i.e., air, light energy, water, nutrients and space; vary from plant to plant and that other conditions; e.g., temperature and humidity; may also be important to the growth of particular plants.

Recognize that a variety of plant communities can be found within the local area and that differences in plant communities are related to variations in the amount of light, water and other conditions.

Nurture a plant through one complete life cycle—from seed to seed.

What is soil made out of?

Soil is made up of five key ingredients: minerals, air, water, organic matter, and living organisms.



Soil

Break It Down

Mineral Particles

Sand – Loose material formed by the breakdown of rocks. It will feel gritty when rubbed between your fingers and is the largest mineral particle in the soil. Each particle of sand can be seen by the naked eye. These particles can increase soil aeration, improve drainage, and help plant growth.

Clay – Clay is a very fine-grained material and the smallest mineral particle in the soil. Clay particles stick together, creating a sticky, mouldable texture, that is great at holding water. Clay expands when it is in contact with water and shrinks when dry.

Silt – Silt is a fine sediment material, with a particle size between sand and clay. It becomes this way by its transportation through water, ice, or wind. When dry, silt feels similar to flour or dust. When wet, it becomes a smooth mud.

Air

Air fills the space between the mineral particles. This allows the organisms living in the soil to breathe and gives room for water and nutrients to reach the roots of plants.

Water

Water dissolves nutrients from the soil and allows them to be carried from the soil up through the roots of plants. This is why it's important to water your plants!



Living organisms

Creatures (like worms and snails) and microorganisms (too small to see with the naked eye) that decompose organic material into humus by eating it and turning it into a fertilizer. This fertilizer is full of nutrients that are great food for plants.

Organic matter

Organic material (made of dead plants and animals) that has been decomposed into humus by living organisms. Organic matter helps the soil hold moisture and adds nutrients to the soil that plants can then use for food.



Soil

Healthy Soil

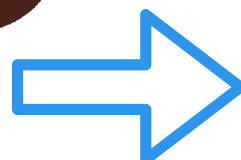
If you take a bucket of sand and pour water into it, the water will run to the bottom of the bucket very quickly. That is because sand is really porous. That means there are large spaces of air around the large particles that allow water to easily move through the sand. What do you think will happen if you do the same thing with a bucket of clay? The water will probably be very slow to move through the clay particles, because clay is not very porous. The water might even pool on top of the clay for a little bit.



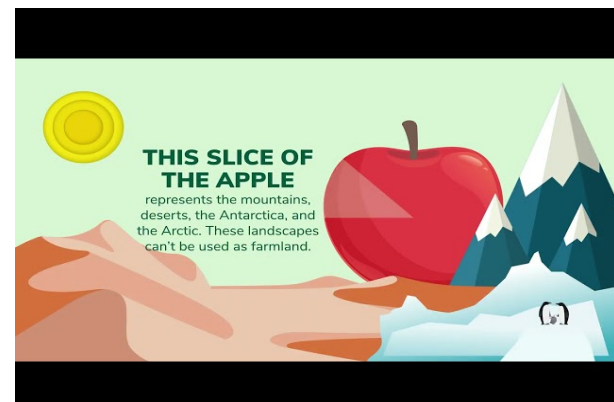
Ideally, healthy soil will have a balanced mix of sand, silt, and clay particles, as well as organic matter. We don't want water in our soil to drain too quickly, because then the water doesn't get to our plants, and valuable nutrients are washed away.

We also don't want the water to pool on top of the soil, because the roots of our plants will be too wet and possibly rot.

It is everyone's responsibility to take care of our soil! Watch our video to learn more.



Click [HERE](#) to watch.



Soil

Soil Experiment Part One

How much of each ingredient does the soil in your area have? Conduct this experiment to find out!

MATERIALS

- Mason jars (minimum 3)
- Potting soil
- Water
- Data-collecting notebook and pencil (one per student)

PROCEDURE

1. As a class, take two mason jars out into the schoolyard. Look for areas where plants grow poorly, and add some of the soil to a jar. Look for areas where plants grow well, and add some of the soil to a jar.
Optional: More jars can be used if there is a variety of soil in your area.
2. Add potting soil bought from a store to a third jar. If your classroom has a vermicompost, use soil from your worm bin instead.
3. Add some water to the jars, close the lids, and shake the water and the soil together.
4. Now, let the jars sit for a few hours or overnight.
5. In their data-collecting notebooks, have students draw the layers that have formed in the jars, labelling each layer as one of the five key ingredients of soil, then compare the three jars.

CONCLUSION QUESTIONS

- Which soil ingredient is there the most of in each jar?
- Which soil ingredient is there the least of in each jar?
- Which soil do you think is the healthiest for plant life? Why

Further Learning Question:

- What can you do to increase the health of the lower quality soil?



Soil

Soil Experiment Part Two

When it comes to growing plants in a garden, not all soil is equal. Find out why we need a healthy balance of ingredients with this experiment!

MATERIALS

- 3 small flowerpots that have drainage
- 3 tall sticks
- Water
- Bean seeds
- Ruler
- Data-collecting notebook and pencil (one per student)

PROCEDURE

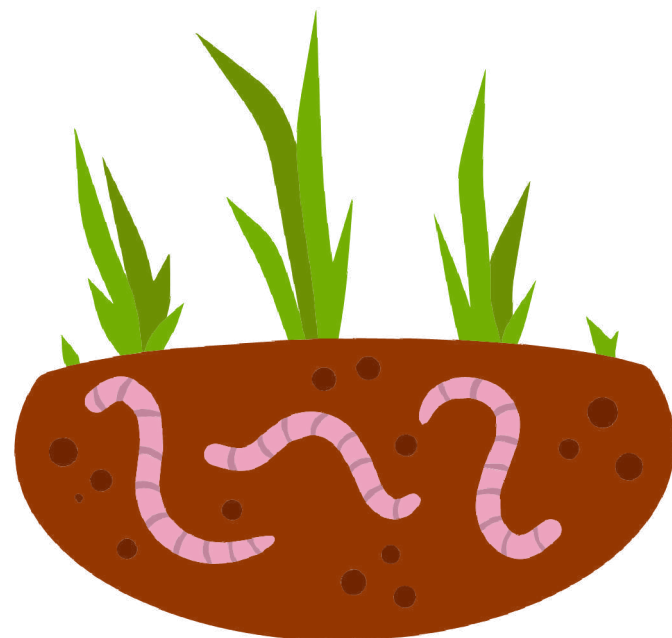
1. Fill one flowerpot with sand, one with clay, and one with the best soil from the first experiment.
2. Water each pot and then plant two or three bean seeds in each one. Put a stick in each pot for the beans to climb.
3. Water the pots every day.
4. Watch to see which beans grow! Have students draw and measure the height of the bean plants twice a week in their data-collecting notebooks until the plant produces flowers, or if you wish to pollinate, until they grow beans!

CONCLUSION QUESTIONS

- Which pot of beans sprouted and grew? Which didn't?
- Which plant grew the tallest?
- Which soil was the best? Why?

Further Learning Question:

- Do different plants grow better in different types of soil?
What plant might grow well in sand?



Soil

Experiments adapted from:

<https://lifestyle.howstuffworks.com/crafts/science-projects/science-projects-for-kids-soil-experiments.htm#pt1>

<https://lifestyle.howstuffworks.com/crafts/science-projects/science-projects-for-kids-soil-experiments.htm#pt3>

Sources:

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