LEARN ABOUT

Soil Properties

FIND OUT

- what properties make soil good for supporting life
- how soil can be improved

VOCABULARY

fertile

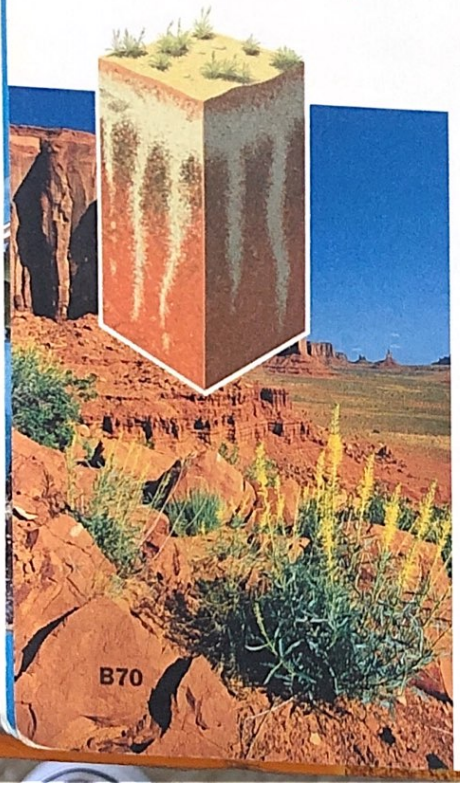
Soil as a Habitat

Before studying soil, you may have thought that all soil was much alike. Scientists have classified more than 70,000 soil types around the world. The amounts of humus, clay, silt, and sand in a soil determine the soil type. Each soil type helps meet the needs of the living things that depend on it.

Soil is an important nonliving part of ecosystems. The plants, animals, and microorganisms that live in a soil meet their needs by using the soil around them. Remember the basic needs of living things. Soil must provide most of these needs for organisms that live in it. Soil with lots of humus provides plenty of nutrients for plants. Loosely packed soil has spaces between the particles. These spaces fill with water and air. Plants and animals in the soil use the water and air to meet their needs.

✓ **How does soil help living things meet their needs?**

Plants and animals that need little water can live in dry, sandy desert soil. ▼



Good farm soil has lots of humus. Such soil helps many kinds of plants and animals meet their needs. ▼

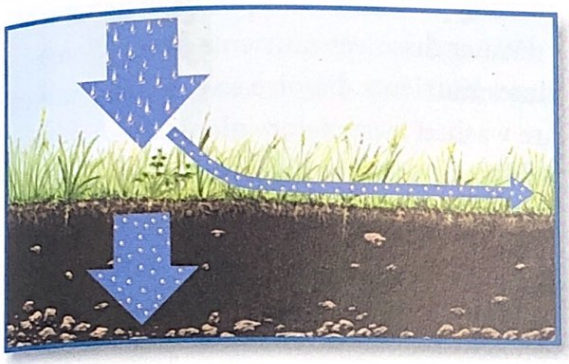
Rain-forest soil is mostly clay. It supports many kinds of life. That is because nutrients are always being recycled quickly. ▼

Water Absorption

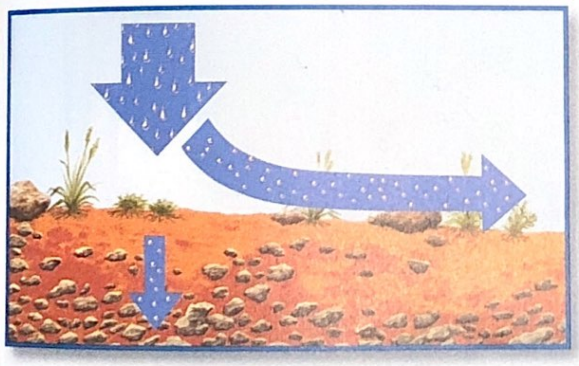
Soil types differ in how well they hold water. In the investigation, you saw that potting soil absorbs, or takes in, more water than sandy soil. Potting soil contains a lot of humus. Clay soil absorbs more water than sandy soil but the water is hard for plants to use.

The ability of soil to absorb water affects how much water plants and animals have during dry periods. It also determines how much water runs off during rainstorms or as snow melts.

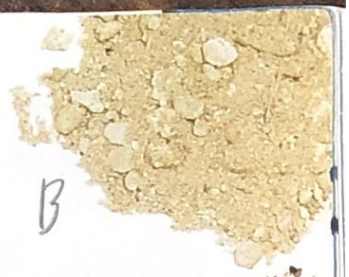
✓ **Which soil type best absorbs water?**



Soil that contains a lot of humus absorbs water like a sponge. This water is then available to the plants that live in the soil. Only a little water runs off. Also, the plant roots make spaces where water can run into soil.

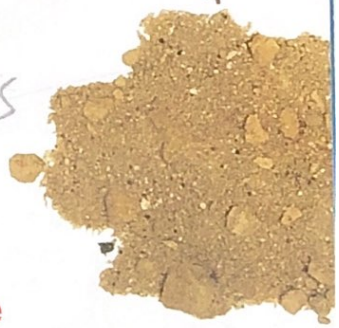


Packed, dry clay soil with few plants causes a lot of runoff. It blocks water almost as well as brick or tile. Wet clay soil holds water so well that it is difficult for plants to get the water they need.



Sandy soil is usually light in color but can be any color. It is the coarsest form of soil. Sandy soil does not stick together well when wet. ►

Soil rich in humus is dark in color because it has a lot of decaying plant and animal matter. It feels spongy and crumbles easily. ►



Various minerals in clay give it color. For example, iron makes it red. Particles of clay are very fine. When wet, clay becomes sticky. ►

Color and Texture

Two other properties of soil are color and texture. *Color* refers to the way a soil looks. *Texture* refers to the way the soil feels.

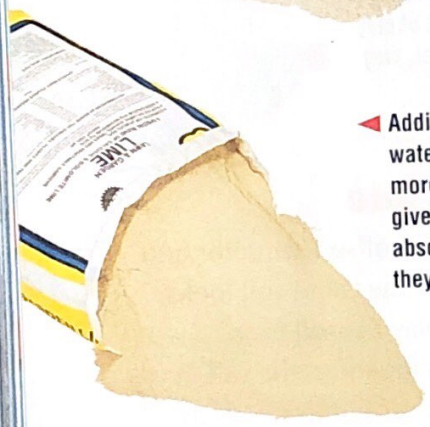
A soil's color tells a lot about the soil. It shows the presence of certain minerals or other substances. For example, red soil contains a lot of iron. Black soil contains a lot of humus. Color can also tell you how warm a soil will get. Dark soil is warmed a lot by the sun. Light-colored soil reflects more sunlight and is warmed less.

Texture describes the size of the particles that make up soil. Soil textures range from coarse to fine. A coarse soil is made up of large grains, like sand, which feel rough. A fine soil is made of dust or other powdery substances and feels smooth. Fine soil may feel sticky when wet.

✓ **Which property of soil can you discover by feeling the soil?**

Fertilizers can add nutrients to soil.

Adding sand to soil makes water flow through it more easily.



Adding lime makes water dissolve nutrients more slowly. This can give plants time to absorb nutrients before they are washed away.

Soil Richness

A soil that can grow a lot of plants is said to be **fertile** (FERT•uhl). Fertile soil is rich in nutrients and provides the right conditions for plants to grow.

A soil can be made more fertile by changing it or adding to it. Fertilizers (FUHRT•uhl•eye•zerz) are products that make soil richer. Most fertilizers add decaying plant matter or minerals.

Farmers and soil scientists have found that soil containing an even mixture of sand, clay, and humus is best for growing most plants. Soil with this mixture absorbs just the right amount of water. It also provides enough nutrients. People can add a missing part to make a poor soil better.

Water dissolves nutrients in soil. Sometimes nutrients dissolve so quickly that they are washed away before plants can use them. Adding lime to the soil slows down the rate at which minerals dissolve. Less often, water dissolves nutrients too slowly. Adding sulfur to the soil increases the rate at which water dissolves nutrients.

✓ **What products make soil richer?**

This farmer is spraying the soil with ammonia. The ammonia adds nitrogen to the soil, helping the soil grow more plants.

▲ You can help recycle soil nutrients by making a compost pile. Beneficial bacteria will rot raked leaves and grass clippings to form a rich humus. You can add the humus back to the soil.

Summary

Soil is important because it is a habitat for plants and animals. Soil properties such as color and texture, fertility, and ability to hold water make some soil types better than others for growing plants. Most soil can be improved by adding fertilizers, missing soil parts, or other minerals.

Review

1. Where are air and water found in soil?
2. Why is a soil's texture important in determining how the soil absorbs water?
3. What combination of soil parts is best for growing most plants?
4. **Critical Thinking** You start a vegetable garden and find that most of the soil is clay. What can you add to make the garden's soil better?
5. **Test Prep** Which of these soil parts has the largest particles?

   A silt
   B clay
   C humus
   D sand

LINKS

MATH LINK

Soil Temperature The temperature of soil affects how plants sprout and grow. Measure the temperature of soil outside that has been in direct sunlight for an hour. Then measure the temperature of soil that has been in shade for an hour. Find the difference between the two. Why do you think seeds are more likely to sprout in a warm place?

WRITING LINK

Informative Writing — How-To Find out which plants grow best in the soil types in your area. Make a gardening guide for students your age. Include in your guide a description of each soil type and pictures of the plants that grow in it.

HEALTH LINK

Good Nutrition Fresh fruits and vegetables are often rich in nutrients that they take from the soil. Find out which foods are rich in minerals and what the minerals are. Make a chart of your findings.

TECHNOLOGY LINK

Visit the Harcourt Learning Site for related links, activities, and resources.

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