Section 2 How Soil Forms

Objectives

After this lesson, students will be able to

G.4.2.1 Describe the composition of soil and explain how it forms.

G.4.2.2 Explain how scientists classify soils.

G.4.2.3 Identify the roles of plants and animals in soil formation.

Target Reading Skill

Building Vocabulary Explain that knowing the definitions of key-concept words helps students understand what they read.

Answers

As students read each passage that contains a key term, remind them to write a sentence in their own words. Encourage students to write one or two descriptive phrases to help them remember the key term. Call on students to share their definitions.

All in One Teaching Resources

- Guided Reading Study Worksheet: *How Soil Forms, Use Target Reading Skills*

Preteach

Build Background Knowledge L1

Local Soil

Ask students: **How would you describe the color, feel, and makeup of soil in this area?** (*Answers will vary, depending on local soil type. Students may mention whether the soil is black, brown, or red; sandy or clayey; moist or very dry, and so on.*) Then let students examine and feel a commercial potting soil. Challenge students to explain why that soil is different from the local soil.

Section 2 How Soil Forms

Reading Preview

Key Concepts

- What is soil made of and how does it form?
- How do scientists classify soils?
- What is the role of plants and animals in soil formation?

Key Terms

- soil
- bedrock
- humus
- fertility
- loam
- soil horizon
- topsoil
- subsoil
- litter
- decomposer

Target Reading Skill

Building Vocabulary A definition states the meaning of a word or phrase by telling about its most important feature or function. Carefully read the definition of each Key Term and also read the neighboring sentences. Then write a definition of each Key Term in your own words.

Lab zone Discover Activity

What Is Soil?

1. Use a toothpick to separate a sample of soil into individual particles. With a hand lens, try to identify the different types of particles in the sample. Wash your hands when you are finished.
2. Write a "recipe" for the sample of soil, naming each of the "ingredients" that you think the soil contains. Include what percentage of each ingredient would be needed to make up the soil.
3. Compare your recipe with those of your classmates.

Think It Over

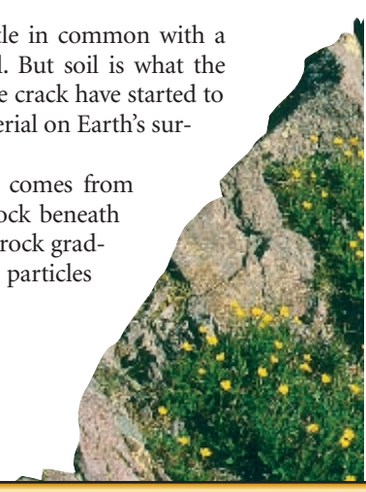
Forming Operational Definitions Based on your observations, how would you define *soil*?

A bare rock surface does not look like a spot where a plant could grow. But look more closely. In that hard surface is a small crack. Over many years, mechanical and chemical weathering will slowly enlarge the crack. Rain and wind will bring bits of weathered rock, dust, and dry leaves. The wind also may carry tiny seeds. With enough moisture, a seed will sprout and take root. Then, a few months later, the plant blossoms.

What Is Soil?

The crack in the rock seems to have little in common with a flower garden containing thick, rich soil. But soil is what the weathered rock and other materials in the crack have started to become. **Soil** is the loose, weathered material on Earth's surface in which plants can grow.

One of the main ingredients of soil comes from bedrock. **Bedrock** is the solid layer of rock beneath the soil. Once exposed at the surface, bedrock gradually weathers into smaller and smaller particles that are the basic material of soil.



Lab zone Discover Activity

Skills Focus forming operational definitions L2

Materials soil sample, paper plate, paper towel, toothpick, hand lens

Time 15 minutes

Tips Provide each student with about 50 mL of soil on a paper plate.

Expected Outcome Recipes should reflect a variety of different particles in the soil, including rock fragments and organic matter.

Think It Over Answers will vary. A typical answer might suggest that soil is a mixture of different particles, including sand, clay, rock fragments, and material derived from living things.

Soil Composition Soil is more than just particles of weathered bedrock. **Soil is a mixture of rock particles, minerals, decayed organic material, water, and air.** Together, sand, silt, and clay make up the portion of soil that comes from weathered rock.

The decayed organic material in soil is called humus. **Humus** (HYOO mus) is a dark-colored substance that forms as plant and animal remains decay. Humus helps create spaces in soil for the air and water that plants must have. Humus also contains substances called nutrients, including nitrogen, sulfur, phosphorus, and potassium. Plants need nutrients in order to grow. As plants grow, they absorb nutrients from the soil.

Fertile soil is rich in the nutrients that plants need to grow. The **fertility** of soil is a measure of how well the soil supports plant growth. Soil that is rich in humus has high fertility. Sandy soil containing little humus has low fertility.

Soil Texture Sand feels coarse and grainy, but clay feels smooth and silky. These differences are differences in texture. Soil texture depends on the size of individual soil particles.

The particles of rock in soil are classified by size. As you can see in Figure 7, the largest soil particles are gravel. The smallest soil particles are clay. Clay particles are smaller than the period at the end of this sentence.

Soil texture is important for plant growth. Soil that is mostly clay has a dense, heavy texture. Some clay soils hold a lot of water, so plants grown in them may "drown" for lack of air. In contrast, sandy soil has a coarse texture. Water quickly drains through it, so plants may die for lack of water.

Soil that is made up of about equal parts of clay, sand, and silt is called **loam.** It has a crumbly texture that holds both air and water. Loam is best for growing most types of plants.

Composition of Loam

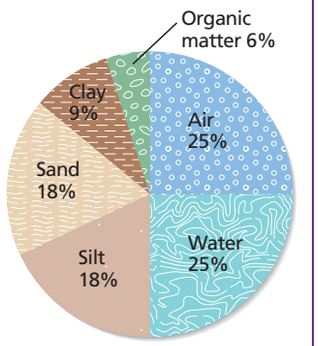
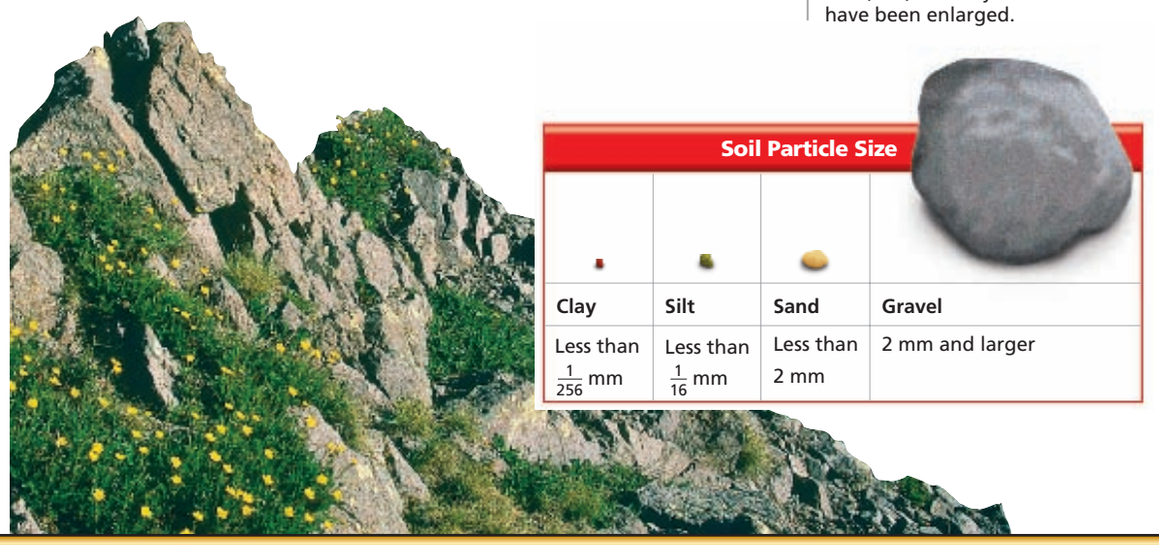


FIGURE 6
Loam, a type of soil, is made up of air, water, and organic matter as well as materials from weathered rock. **Interpreting Graphs** *What two materials make up the major portion of this soil?*

FIGURE 7
Soil particles range in size from gravel to clay particles too small to be seen by the unaided eye. The sand, silt, and clay shown here have been enlarged.



Soil Particle Size

Clay	Silt	Sand	Gravel
Less than $\frac{1}{256}$ mm	Less than $\frac{1}{16}$ mm	Less than 2 mm	2 mm and larger

Differentiated Instruction

Special Needs L1

Comparing Types of Soils Obtain three soil samples: one that is mostly clay, one that is mostly silt, and one that is mostly sand. Have students take a pinch of each sample and compare how the different soils feel between their fingers. Using a squirt bottle of water, students might want to moisten the samples. Ask students to describe each soil type by the way it feels. *(Sandy soil will feel gritty. Silty soil will feel smoother but not sticky. Clay soil will feel smooth and sticky.)* Instruct students to wash their hands after handling soil samples. **learning modality: kinesthetic**

Instruct

What Is Soil?

Teach Key Concepts L1

Soil Composition and Texture

Focus Point out that bedrock can weather to become soil.

Teach Ask students to describe the particles in soil. Ask: **Which particles come from decayed plants and other organisms?** (*Humus*) **Which particles come from weathered bedrock?** *(Clay, silt, sand, gravel)*

Apply Ask: **In what ways are all living things dependent on soil?** *(Plants depend on the nutrients in soil. Consumers eat plants as food.)* **learning modality: logical/mathematical**

Use Visuals: Figure 6 L1

Composition of Loam

Focus Explain that this circle graph shows the percentage of each component that makes up loam.

Teach Ask: **How is the high percentage of air and water related to the amount of organic matter in the loam?** (*Organic matter helps create space for air and water.*) **If the percentage of clay were 35 percent, how would that change the percentages of the other materials?** (*The percentages of sand, silt, and air would probably decrease. The percentage of water would probably increase because clay soils hold water.*)

Apply Ask: **How would more clay affect the soil's quality for growth of plants?** (*More water and less air would reduce the soil's quality for plant growth.*) **learning modality: visual**

Independent Practice L2

All in One Teaching Resources

- Guided Reading and Study Worksheet: *How Soil Forms*

Student Edition on Audio CD

Monitor Progress L2

Oral Presentation Ask students to describe the sizes of soil particles.

Answers

Figure 6 Water and air

The Process of Soil Formation

Go Online active art

For: Soil Horizons activity
Visit: PHSchool.com
Web Code: cfp-2022

Students can interact with the soil horizons art online.

Teach Key Concepts L2

Soil Horizons and Their Formation

Focus Remind students that a soil horizon is a layer of soil that has unique properties.

Teach Ask: **Which soil horizon is most similar to bedrock?** *(The C horizon; it consists mostly of pieces of bedrock.)* Refer students to Figure 8. Ask: **Which soil horizon forms last?** *(The B horizon forms last as particles wash down from the A horizon.)*

Apply Ask: **Which soil horizon is most important for growing food?** *(The A horizon)* **learning modality: logical/mathematical**

All in One Teaching Resources

- Transparency G14

Lab zone Build Inquiry L3

Examining Soil Horizons

Materials soil samples from different levels of a roadcut, white paper, toothpick or probe, hand lens

Time 15 minutes

Focus Review with students the characteristics of each soil horizon.

Teach Have students compare and contrast the samples from each horizon and identify them as coming from the A, B, or C horizon.

Apply Ask: **How are the samples different and similar?** (*The A horizon will be darker, the B horizon will be lighter and might be clayey, the C horizon will have larger rock particles.*) **learning modality: kinesthetic**

The Process of Soil Formation

Soil forms as rock is broken down by weathering and mixes with other materials on the surface. Soil is constantly being formed wherever bedrock is exposed. Soil formation continues over a long period of time.

Gradually, soil develops layers called horizons. A **soil horizon** is a layer of soil that differs in color and texture from the layers above or below it.

If you dug a hole in the ground about half a meter deep, you would see the different soil horizons. Figure 8 shows how soil scientists classify the soil into three horizons. The A horizon is made up of **topsoil,** a crumbly, dark brown soil that is a mixture of humus, clay, and other minerals. The B horizon, often called **subsoil,** usually consists of clay and other particles washed down from the A horizon, but little humus. The C horizon contains only partly weathered rock.

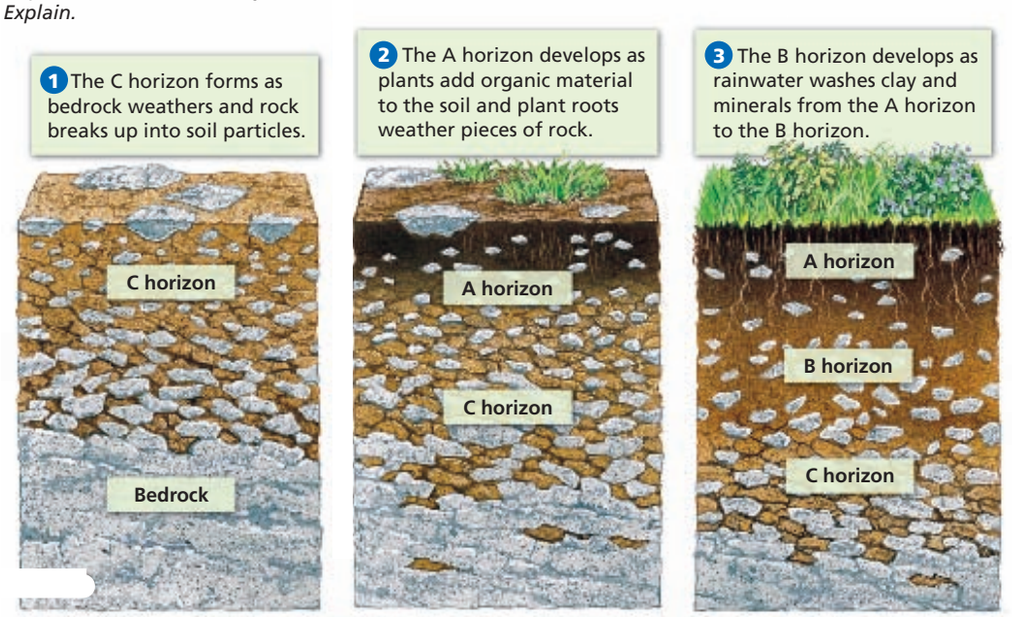
The rate at which soil forms depends on the climate and type of rock. Remember that weathering occurs most rapidly in areas with a warm, rainy climate. As a result, soil develops more quickly in these areas. In contrast, weathering and soil formation take place slowly in areas where the climate is cold and dry.

Some types of rock weather and form soil faster than others. For example, limestone, a type of rock formed from the shells and skeletons of once-living things, weathers faster than granite. Thus, soil forms more quickly from limestone than from granite.

Go Online active art

For: Soil Layers activity
Visit: PHSchool.com
Web Code: cfp-2022

FIGURE 8
Soil Layers
Soil horizons form in three steps. **Inferring** *Which soil horizon is responsible for soil's fertility? Explain.*



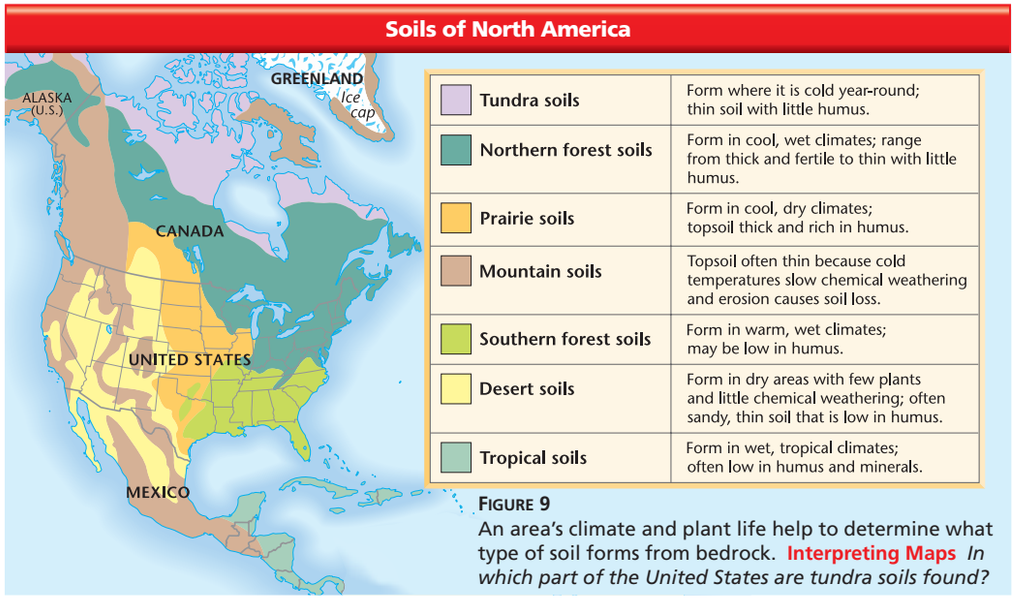


FIGURE 9
An area's climate and plant life help to determine what type of soil forms from bedrock. **Interpreting Maps** *In which part of the United States are tundra soils found?*

Soil Types

If you were traveling across the hills of north-central Georgia, you would see soils that seem to be made of red clay. In other parts of the country, soils can be black, brown, yellow, or gray. In the United States alone, there are thousands of different types of soil.

Scientists classify the different types of soil into major groups based on climate, plants, and soil composition. Fertile soil can form in regions with hot, wet climates, but rain may wash humus and minerals out of the A horizon. In mountains and polar regions with cold, dry climates, the soil is often very thin. The thickest, most fertile soil forms in climate regions with moderate temperatures and rainfall.

The most common plants found in a region are also used to help classify the soil. For example, grassland soils are very different from forest soils. In addition, scientists classify soil by its composition—whether it is rocky, sandy, or rich in clay. Other factors in the classification of soil include the type of bedrock and the amount of time the soil has been developing.

Major soil types found in North America include forest, prairie, desert, mountain, tundra, and tropical soils. Look at Figure 9 to see where each of the major soil types is found.

Reading Checkpoint **What major soil types are found in North America?**

Lab zone Try This Activity

A Square Meter of Soil

1. Outdoors, measure an area of one square meter. Mark your square with string.
2. Observe the color and texture of the soil at the surface and a few centimeters below the surface. Is it dry or moist? Does it contain sand, clay, or gravel? Are there plants, animals, or humus?
3. When you finish, leave the soil as you found it. Wash your hands.

Drawing Conclusions What can you conclude about the soil's fertility? Explain.

Lab zone Try This Activity

Skills Focus drawing conclusions L2

Materials metric ruler, string, stakes, trowel, white poster board, hand lens

Time 30 minutes

Tips Provide white poster board on which students can spread out their diggings.

Expected Outcome Students may find rocks, sand, clay, silt, insects, worms, and plants. The soil's fertility is based on its composition, particularly the amount of humus.

Extend Encourage students to examine a second plot of soil in a different location. Have students compare and contrast the soils in the two locations. **learning modality: visual**

Soil Types

Teach Key Concepts L2

Classifying Soil

Focus Remind students that when classifying soils, people group soils that have similar properties.

Teach Ask: **What affects the type of soil that forms from bedrock in a region?** *(The region's climate and plant life)* **Why might different soils in Arctic regions have similar characteristics?** *(Because the climate and plant life are similar)*

Apply Ask: **Which soil would be similar to that in the prairie region of the U.S.—a soil in the Brazilian rain forest or a soil in the grasslands of Argentina?** *(The grassland soil in Argentina)* **learning modality: verbal**

Use Visuals: Figure 9 L2

Soils of North America

Focus Ask volunteers to explain how to read the figure. Check that students can correlate the groups described in the key with those shown on the map.

Teach Have students locate your state on the map. Then ask: **Which soil type exists where we live? What climate and vegetation types occur in our region?** Remind students that climate and vegetation type affect soil.

Apply Ask: **Why does soil type vary across the country?** *(Because vegetation and climate vary)* **learning modality: visual**

All in One Teaching Resources

- Transparency G15

Monitor Progress L2

Skills Check Have each student create a flowchart that shows the process of soil formation. Have students place their flowcharts in their portfolios.

Portfolio

Answers

Figure 8 The A horizon

Figure 9 Alaska

Reading Checkpoint Forest, prairie, desert, mountain, tundra, and tropical

Living Organisms in Soil

Teach Key Concepts L2

Formation of Humus

Focus Ask: **Have you ever walked through a forest and noticed the thick layer of leaves on the forest floor?** *(Many students have experienced this.)* Tell students that this material is litter and that litter is one source of organic matter for soils.

Teach Ask: **How does organic matter, like litter, become humus?** *(Bacteria and fungi feed on the organic matter. Humus forms during this process.)* **Where does most of the organic matter go?** *(Some is given off as carbon dioxide gas, and some goes into the bodies of the decomposing organisms.)* **Why does humus remain?** *(It is more resistant to being used for food than other types of organic matter.)*

Apply Ask: **Why is humus essential for plant growth?** *(Humus contains important nutrients and gives the soil an airy, open structure.)* **learning modality: logical/mathematical**

Use Visuals: Figure 10 L2

Life in Soil

Focus Have students list the different organisms shown in Figure 10.

Teach Ask: **How are the organisms in the illustration adapted to living in soil?** *(Animals such as mice and chipmunks have claws for digging. Earthworms are segmented, enabling them to burrow through the soil. Insects have mouth parts and appendages for eating and burrowing.)*

Apply Ask: **In which part of the soil would you expect to find the fewest examples of plant and animal life? Explain.** *(The C horizon—it lacks the nutrients and organic matter that occur in the upper layers. The C horizon is difficult for animals to burrow through and for plant roots to grow through.)* **learning modality: visual**

All in One Teaching Resources

- Transparency G16

Living Organisms in Soil

If you look closely at soil, you can see that it is teeming with living things. **Some soil organisms make humus, the material that makes soil fertile. Other soil organisms mix the soil and make spaces in it for air and water.**

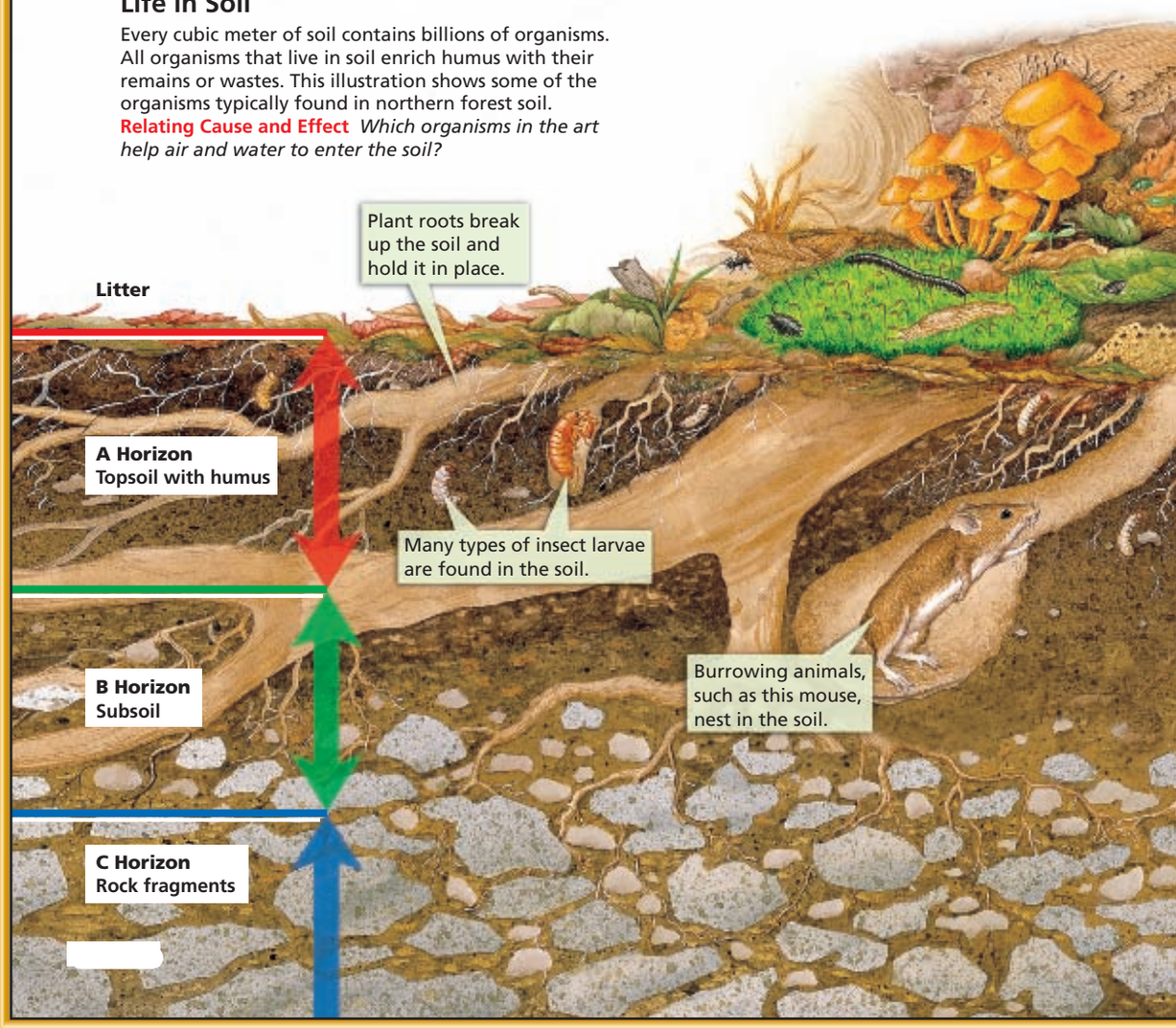
Forming Humus Plants contribute most of the organic remains that form humus. As plants shed leaves, they form a loose layer called **litter.** When plants die, their remains fall to the ground and become part of the litter. Plant roots also die and begin to decay underground. Although plant remains are full of stored nutrients, they are not yet humus.

FIGURE 10

Life in Soil

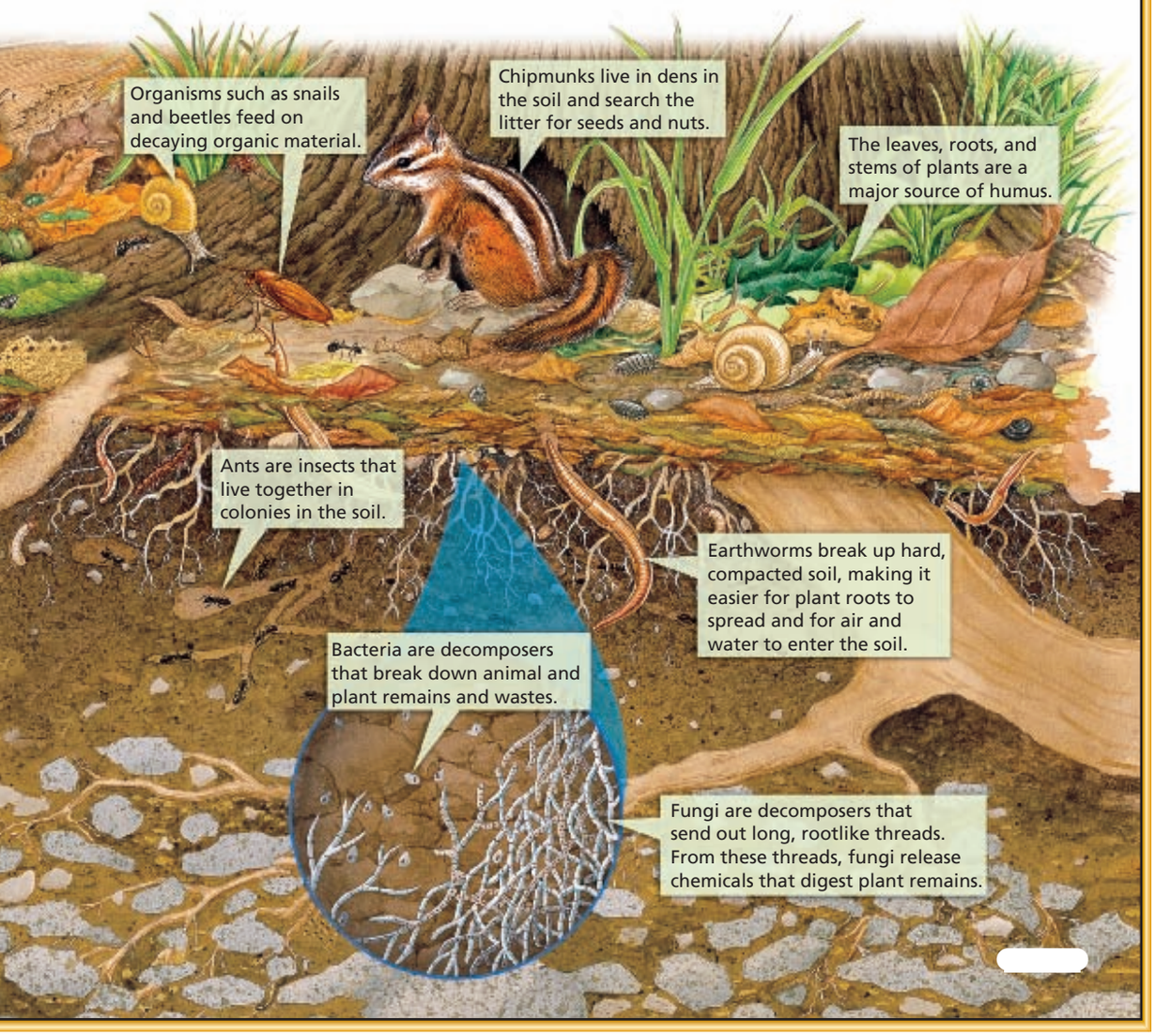
Every cubic meter of soil contains billions of organisms. All organisms that live in soil enrich humus with their remains or wastes. This illustration shows some of the organisms typically found in northern forest soil.

Relating Cause and Effect *Which organisms in the art help air and water to enter the soil?*



Humus forms in a process called decomposition. During decomposition, organisms that live in soil turn dead organic material into humus. These organisms are called decomposers. **Decomposers** are the organisms that break the remains of dead organisms into smaller pieces and digest them with chemicals.

Soil decomposers include fungi, bacteria, worms, and other organisms. Fungi are organisms such as molds and mushrooms. Fungi grow on, and digest, plant remains. Bacteria are microscopic decomposers that cause decay. Bacteria attack dead organisms and their wastes in soil. Very small animals, such as mites and worms, also decompose dead organic material and mix it with the soil.



Help Students Read L1

Relate Text and Visuals Have students refer to the visual as they read the captions and the text for Living Organisms in Soil. Ask students to check the visual for animals and plant roots that break up the soil and organisms that are decomposers.

Lab zone Build Inquiry L2

The Amount of Air in Soil

Materials soil sample, 2 measuring cups, scoop or old spoon, water

Time 15 minutes

Focus Help students understand that spaces exist between soil particles and that these spaces can be filled with either air or water.

Teach Challenge small groups of students to determine the amount of air in a soil sample by adding a measured volume of soil to a measuring cup and then pouring an equal volume of water into the cup. The water will fill the spaces in the soil, so the amount of soil and water in the cup will be less than the two volumes added together. Students can find the volume of air in the original volume of soil by subtracting the final volume in the cup from the sum of the original volumes of soil and water.

Apply Ask: **Why is the combined volume of soil and water less than the original volumes?** (*The water filled the air spaces in the soil.*) **learning modality: visual**

Differentiated Instruction

Gifted and Talented L3

Worm Composting Invite students to learn how to build a worm compost bin in which plant materials can be added to make fertile soil for gardens. A typical bin is a large container with drainage holes in the bottom. To prepare the bin for worms, fill it halfway with strips of newspaper and fallen leaves. Then add the worms and cover the container with plastic, allowing enough air for the worms to breathe. The worms will digest most food scraps except meat and dairy products. Red wiggler worms work best in composting bins and can be obtained from biological supply companies. **learning modality: kinesthetic**

Monitor Progress L2

Oral Presentation Ask students to explain how each different kind of soil organism contributes to soil formation.

Answer

Figure 10 Earthworms and burrowing animals

Monitor Progress L2

Answers

Figure 11 The soil is likely to be very fertile because earthworms carry humus down to the subsoil and pass out soil as waste, which is enriched with substances plants need to grow.

Reading Checkpoint Earthworms

Assess

Reviewing Key Concepts

1. a. Rock particles, minerals, decayed organic material, air, and water **b.** Soil horizons form as bedrock weathers, and rock breaks up into soil particles. Plants weather rock mechanically and chemically and add organic material to the soil. Rainwater washes clay and minerals from topsoil to other soil horizons. **c.** Topsoil, subsoil, C horizon, bedrock

2. a. Climate, plants, and soil composition **b.** Tundra soils and desert soils would form most slowly. Tundras are cold, and deserts are dry.

3. a. Some soil organisms make humus, a material that makes soil fertile. Other soil organisms mix the soil and make spaces for air and water. **b.** Decomposers include fungi, bacteria, and worms. They digest or decompose dead organic material and mix it with the soil. **c.** The soil would become less fertile because the decomposers make humus.

Reteach L1

Have students make a concept map about soil that includes the following connecting phrases: *form when, are classified according to,* and *contain organisms that include*.

Performance Assessment

Writing Challenge students to design and write a two-page pamphlet (such as a local park might hand out) that explains the formation and composition of the local soil. The pamphlet should include drawings of soil profiles and other relevant visual aids.

All in One Teaching Resources

- Section Summary: *How Soil Forms*
- Review and Reinforce: *How Soil Forms*
- Enrich: *How Soil Forms*

FIGURE 11
Soil Mixers
Earthworms break up the soil, allowing in air and water. An earthworm eats its own weight in soil every day. **Predicting** *How fertile is soil that contains many earthworms likely to be? Explain.*

Mixing the Soil Earthworms do most of the work of mixing humus with other materials in soil. As earthworms eat their way through the soil, they carry humus down to the subsoil and subsoil up to the surface. Earthworms also pass out the soil they eat as waste. The waste soil is enriched with substances that plants need to grow, such as nitrogen.

Many burrowing mammals such as mice, moles, prairie dogs, and gophers break up hard, compacted soil and mix humus through it. These animals also add nitrogen to the soil when they produce waste. They add organic material when they die and decay.

Earthworms and burrowing animals also help to aerate, or mix air into, the soil. Plant roots need the oxygen that this process adds to the soil.

Reading Checkpoint **Which animals are most important in mixing humus into the soil?**

Section 2 Assessment

Target Reading Skill

Building Vocabulary Use your definitions to help you answer the questions below.

Reviewing Key Concepts

1. a. **Describing** What five materials make up soil?
   b. **Explaining** How do soil horizons form?
   c. **Sequencing** Place these terms in the correct order starting from the surface: C horizon, subsoil, bedrock, topsoil.
2. a. **Reviewing** What are three main factors used to classify soils?
   b. **Interpreting Maps** Soil forms more rapidly in warm, wet areas than in cold, dry areas. Study the map in Figure 9. Which soil type on the map would you expect to form most slowly? Explain.
3. a. **Identifying** What are two main ways in which soil organisms contribute to soil formation?
   b. **Describing** Give examples of three types of decomposers and describe their effects on soil.
   c. **Predicting** What would happen to the fertility of a soil if all decomposers were removed? Explain.

Writing in Science

Product Label Write a product label for a bag of topsoil. Your label should give the soil a name that will make consumers want to buy it, state how and where the soil formed, give its composition, and suggest how it can be used.

Lab zone Chapter Project

Keep Students on Track Check that students have chosen their sample soils and growing materials. Choices include sand, vermiculite, gravel, potting soil, and local topsoil. Confirm that students have planted their bean seeds. Students can begin to make notes describing each sample, predict which material will be best for plant growth, and design a method for recording data about growth.

Writing in Science

Writing Skill Persuasion

Scoring Rubric

4 Exceeds criteria in some way; for example, by reading and appearing like an actual product label

3 Meets criteria but does not go beyond requirements

2 Includes only brief description of required elements

1 Is incorrect and incomplete

Lab zone Consumer Lab

Comparing Soils

Problem

What are the characteristics of two samples of soil?

Skills Focus

observing, inferring, developing hypotheses

Materials

- 20–30 grams of local soil
- 20–30 grams of bagged topsoil
- plastic spoon • plastic dropper • toothpick
- water • stereomicroscope
- plastic petri dish or jar lid
- graph paper ruled with 1- or 2-mm spacing

Procedure

1. Obtain a sample of local soil. As you observe the sample, record your observations in your lab notebook.
2. Spread half of the sample on the graph paper. Spread the soil thinly so that you can see the lines on the paper through the soil. Using the graph paper as a background, estimate the sizes of the particles that make up the soil.
3. Place the rest of the sample in the palm of your hand, rub it between your fingers, and squeeze it. Is it soft or gritty? Does it clump together or crumble when you squeeze it?
4. Place about half the sample in a plastic petri dish. Using the dropper, add water one drop at a time. Watch how the sample changes. Does any material in the sample float? As the sample gets wet, do you notice any odor? (*Hint:* If the wet soil has an odor or contains material that floats, it is likely to contain organic material.)
5. Look at some of the soil under the stereomicroscope. (*Hint:* Use the toothpick to separate the particles in the soil.) Sketch what you see. Label the particles, such as gravel, organic matter, or strangely shaped grains.
6. Repeat Steps 1–5 with the topsoil. Be sure to record your observations.
7. Clean up and dispose of your samples as directed by your teacher. **CAUTION:** *Wash your hands when you finish handling soil.*

Analyze and Conclude

1. **Observing** Did you observe any similarities between the local soil sample and the topsoil? Any differences?
2. **Inferring** What can you infer about the composition of both types of soil from the different sizes of their particles? From your observations of texture? From how the samples changed when water was added?
3. **Inferring** Do you think that both types of soil were formed in the same way? Explain.
4. **Developing Hypotheses** Based on your observations and study of the chapter, develop a hypothesis about which soil would be better for growing flowers and vegetables.
5. **Communicating** Write a report for consumers that summarizes your analysis of the two soil samples. Be sure to describe what factors you analyzed and give a suggestion for which soil consumers should use for growing flowers and vegetables.

Design an Experiment

In Question 4 you developed a hypothesis about which soil would be better for growing flowers and vegetables. Design an experiment that would test this hypothesis. Be sure to indicate how you would control variables. *After you receive your teacher's approval, carry out your experiment.*

Analyze and Conclude

1. Answers will vary, depending on the local soil samples used. Most bagged topsoil samples will have high percentages of organic materials. Most natural soils will have less organic material.

2. Students should be able to estimate what proportions of the sample are clay, silt, and sand. Organic material will float in water.

3. Students might note that the bagged topsoil contains more organic matter and formed from more plant matter than the local soil did.

4. Hypotheses will vary, depending on the soil samples. Normally, bagged topsoil is a good mix for flowers and vegetables.

5. Reports will vary. Students' suggestions should be supported by data.

Lab zone Consumer Lab

Comparing Soils L2

Prepare for Inquiry

Key Concept

The characteristics of soil determine its usefulness.

Skills Objectives

After this lab, students will be able to

- observe and compare two soil samples
- infer the soil's composition from their observations and infer how the soil samples formed
- develop hypotheses about which soil would be better for growing flowers and vegetables

Prep Time 30 minutes
Class Time 40 minutes

All in One Teaching Resources

- Lab Worksheet: *Comparing Soils*

Advance Planning

Collect soil at least one day in advance. Make sure that it is relatively dry. Potting soil can be obtained from gardening centers. Use a balance to prepare individual samples of 20–30 grams each.

Guide Inquiry

Troubleshooting the Experiment

- Tell students to view only a small amount of soil under the microscope. Too much material will make viewing difficult.
- Caution students not to put soil in the sink, where it could clog the drain.

Expected Outcome

Specific outcomes will depend on the soil samples used. All students should be able to observe various characteristics of their samples.

Extend Inquiry

Design an Experiment Students' experiments should have the two different soil samples as the independent variable. The factors to control include the amount of sunlight, the amount of water, and the temperature. Students should develop a procedure, a list of materials, and a method of recording data.