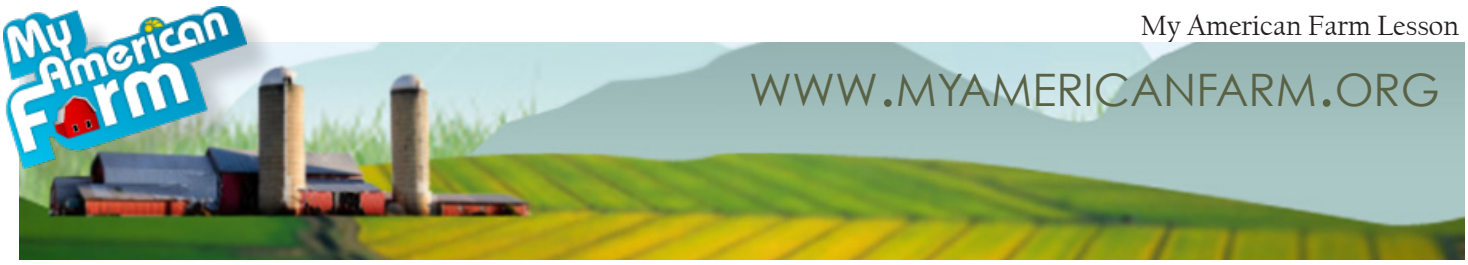


# Surprising Soil

## Take-home Activity Snapshot

### Related "My American Farm" Game

Thrive

Available at MyAmericanFarm.org

### Grade Levels

- Third - Fifth

### Content Area

- Science

### Standards

5-PS1-3 Make observations and measurements to identify materials based on their properties.

5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

*Next Generation Science Standards*

### What Will You Do?

In this activity students will learn about soil types and discover how matter moves through the ecosystem.

### Supplies You'll Need

- 3 different soil samples in disposable bags or bowls (1 set per student working group)
- Paper towels
- Worksheet (1 per student)
- Water bottles (1 per group)
- Newspaper or plastic disposable table cloth (1 per group)
- Ruler (1 per group)
- Coloring utensils
- Projector and computer
- For Enrichment: Student computers and headphones

## Getting Ready

This is an activity that is fun to do in the classroom or at home. Soil plays an important role in food and fiber production. Soil provides an environment for plants to grow, as they absorb nutrients and water. But all soils are not alike! American farmers and ranchers work hard to care for their soil, and that begins by understanding the types of soil.

Cover the work area with newspaper or plastic tablecloth for easy clean up.

Select soil samples from three different locations. Clear off debris from the top of the soil. Dig four to six inches down to collect sample. Prepare soil samples for groups by placing samples in disposable bowls or bags. Consistently label A, B and C.

Preview the game "Thrive" found at MyAmericanFarm.org.

## Introduction

Set Context for the Activity

### Step 1: Define "Agriculture"

- Set Context: *What are the most important things we need to survive?* (Listen for food, clothing and shelter.)
- *Farmers and ranchers provide our most basic needs every day, Producing the things we need to survive and thrive is part of the industry we call "agriculture". Agriculture is the production of food, fiber and fuel, and the management of our natural resources. All of these items have something in common - they are connected to the soil!*
- *Why is soil important?* Listen for students to identify that soil provides an environment where plants can absorb water and nutrients.
- Preview the activity: *Farmers and ranchers care for soil every day, and today you get the chance to as well!*


*We'll discover the types of soil and how nutrients move through the ecosystem.*

### Step 2: Introduce Soil Types

Different soil types have different qualities which impact the crops which can be grown. Clay soil, for example, is great for growing rice, because it must be able to hold water above the soil. But sandy soil is ideal for growing strawberries, because strawberries need to allow water to drain.

## Body

### Step 3: Soil Types

- Write the words "sand", "silt" and "clay" on the white board. Ask students to look at the words and consider what they know about these words. Capture descriptors below each word. *Students may not be familiar with silt, and that is ok!
- Fill in information as needed.

Sand- Sand is the biggest particle in soil. It feels rough when you touch the soil. It doesn't hold many nutrients, but it drains water well. You can make sandy soil better by adding compost to hold water!

Silt- Silt particles are bigger than clay, but smaller than sand. If you touch this soil you can shape it, but it feels smooth – not sticky.

Clay- Clay is the smallest particle in soil. You can shape this soil, and it feels sticky. Clay holds a lot of nutrients for plants, but sometimes it is hard for air and water to get through.

### Step 4: Evaluating Soil

- Distribute student worksheets and divide students into small working groups. Instruct each group to get one set (3 samples) of soil, paper towels, table covering and a water bottle.
- Have students feel the soil samples and capture notes about particle size and general texture on the worksheet provided.
- Provide directions for soil ribboning:
    - » Place about 2 tablespoons of soil in the palm of your hand.
    - » Using the water bottle, wet the soil sample until it forms a ball.
    - » If the soil sample won't form a ball, it is most likely sand. Have students note if the soil sample will not form a ball.
    - » For the samples that formed a ball, have students place the ball of soil between their thumb and forefinger and gently push the soil forward with their thumb, squeezing it upward into a ribbon.
    - » Measure and note the length of the soil "ribbon".
    - » If the ribbon is less than 2 inches, you have silt.
    - » If the ribbon is longer than 2 inches, you have clay.
    - » Have students label each soil type on their worksheets.
- Clean workstations and share findings.

### Step 5: Cycle of Matter

- Draw a plant in soil on the white board. Ask students to consider how the plant gets nutrients. Listen for students to identify soil. Water moves nutrients from the soil into the plant.
    - » Draw an arrow showing nutrients moving into the plant.
- Next, ask students to identify living organisms that get nutrients from plants. Listen for students to identify animals, including humans. Draw an arrow from the plant to the animals.
- Finally, ask students to identify what happens to waste from humans and animals, including food waste. Listen for students to identify that waste decomposes back into the soil. Draw an arrow from the animal back to the soil. *You may wish to keep this discussion high-level, or take as in-depth as you need based on student ability and past knowledge. This would be an appropriate place to address decomposers if it fits into your course objectives.


- Remind students that soil is a key component in the nutrient cycling process.
- Application: Have students draw their own nutrient cycle at the bottom of the worksheet. *If time is limited, you may wish to have students complete this as a take-home activity.

## Conclusion

### Step 6: Preview Game

- Using a projector and computer, display the game "Thrive" found at www.MyAmericanFarm.org.
- Inform students that this game gives them an opportunity to dig deeper into the science of soil as they discover how farmers care for the environment.
- Encourage students to play the game at home, with permission from an adult.

### Step 7: Challenge and Recall

- Challenge students to recall at least three interesting discoveries they made during the lesson.
- Encourage students to repeat the soil-sampling procedure using soil from their school, home, or a local public area.
- Remind students that managing soil is a responsibility farmers take seriously. We can take responsibility for managing our soil as well!

## Fun Enrichment Activities

- Play the game "Thrive", found at www.MyAmericanFarm.org in class as a follow up enrichment activity.
  - » Have teams work on class computers and document decisions they make along the way, such as the choices they made to manage their soil and water.
  - » Have teams report on their decisions, and the impact these decisions had on their soil and water quality.
- Bring in a local farmer or soil specialist to speak to the class about their career area.
- Visit www.thescienceofsoil.com for more great resources, including virtual field trips!

## Foundation Contact Information

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## Student Worksheet

Name: Date:

# Surprising Soil

| Soil Sample | What does it feel like? | What do you notice about particle size? | Can you make a soil ball? Can you make a ribbon? How long? | What does this information tell you about your soil? |
|---|---|---|---|---|
| A | | | | |
| B | | | | |
| C | | | | |

## The Cycle of Matter

*Draw the general cycle of matter, including soil, below.*