EXPLORING SOIL

A **FRESHFARM** FOODPRINTS LESSON PLAN

Theme: Soil Health

KINDERGARTEN / LESSON 2 / FALL / OCTOBER

LESSON SUMMARY

The purpose of this lesson is to introduce students to soil and to explore its different components. Students will examine soil from different areas around the school and dissect soil samples from the garden. They will also work to prepare the garden for winter by protecting the soil.

Objective: At the end of the lesson, students will be able to explain some of the ingredients in soil and compare different types of soil.

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BIG IDEA

Soil is made of many different ingredients.

GUIDING QUESTIONS

What are the different ingredients that create soil?

How can we tell if soil is healthy?

TIME

This lesson can be taught in a 90-120 minute block or divided into multiple shorter lessons using small group activities from the Explore section.

NATIONAL STANDARDS

Next Generation Science Standards (NGSS)

K-ESS3-1 Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

Disciplinary Core Idea: ESS3.A: Natural Resources

Science and Engineering Practices: Developing and Using Models

Crosscutting Concepts: Systems and System Models

Common Core ELA

SL.K.1 Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.

National Food Education Standards (FES)

Standard 2: Foods have sources and origins.

Standard 3: Food and the environment are interconnected.

Standard 6: We can make positive and informed food choices.

MATERIALS LIST

1. Apple and peeler for Engage
2. Bucket or pan of soil for students to examine
3. Soil and jars with lids for soil separation experiment
4. *Soil Separation Experiment* and *Soil Separation Sample Diagram* (attached)
5. Trowels and small containers to collect soil samples
6. *Soil Dissection* worksheet (attached)
7. Seeds for cover crop, if planting
8. Egg cartons for sorting soil
9. Recipe materials and cooking equipment

RECIPES

Apple Beet Carrot (ABC) Salad

French Carrot Salad

Moroccan Carrot Salad

Roasted Beet Salad

All FoodPrints recipes available here: freshfarm.org/recipes

VOCABULARY

soil: the upper layer of Earth's surface containing organic matter, rocks, and minerals

ingredient: one part of a mixture

dissect: to separate something into its different parts

CONNECTED TEXTS

The Dirt Book: Poems about Animals that Live Beneath Our Feet
by David L. Harrison

We Need Soil
by Ji-Hyeon Lee

Dirt: The Scoop on Soil
by Natalie Rosinsky

CONNECTED VIDEOS

FoodPrints TV has a series of high energy videos for students and educators. They are available here: freshfarm.org/foodprints-tv

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FRESHFARM FOODPRINTS

To learn more about the FoodPrints program and access the full curriculum, visit freshfarm.org/foodprints

WASHINGTON, DC STANDARDS AND UNITS

DC Environmental Literacy Framework
Living Things: What do plants and animals need to survive?

DC Health Standards
K-2.5.7.14 Recognize a nutritious meal or snack.

ENGAGE

The goal of this portion of the lesson is to engage students in learning by activating prior knowledge and experiences, piquing their interest, and building curiosity. Use this time to guide students through thinking about the Big Idea and Guiding Questions.

- Welcome students to the FoodPrints classroom. Share that today's lesson is about **soil**. To help students visualize soil, hold up an apple and ask students to imagine that it is the Earth. Then use a peeler to slowly cut away the peel of the apple and explain that the peel is like the soil of the earth. Since it is a thin covering, it is important to take good care of it.

- Pass around a sample of soil for students to feel. As they touch the soil, ask them to describe how it looks, smells, and feels and what they think is in the soil. Explain that soil is the top layer of the earth where plants grow.

- Tell students, "As we investigate soil today, we will find that soil is full of many different things. We are going to call them **ingredients.** Soil needs these different ingredients to be healthy and help grow our food, just like our food needs different ingredients to be tasty."

- With your students, set up a soil separation experiment. Fill a jar halfway with soil and then add water and seal tightly. (There are instructions with photographs in the *Soil Separation* attachment.) Ask students to make a prediction about what they think will happen if we let it sit for an hour or more. In your closing, you will be able to look at the jar and see how the soil has separated.

EXPLORE

In this section, students work as a class or in small groups to explore the Guiding Questions through hands-on and minds-on investigations, along with experiences in the garden and kitchen. The adult leading each small group acts as a facilitator to assist students in coming to their own understanding. Please choose from the activities below that fit best with your students, class time, and learning goals.

1. **Garden - Science: Soil Dissection.** In this investigation, students explore soil in order to identify some of its different ingredients. Using a trowel and small container, students first collect a small soil sample to **dissect**. Then have them work in small groups to separate what they find in their sample. They can use attached *Soil Dissection Worksheet* to document what they find. Empty egg cartons are a useful sorting tool for this activity.

2. **Garden - Science: Preparing the Garden Soil for Winter.** Explain to students that if we leave the garden bare over the winter, rain could wash away the nutrients in the soil or even the soil itself. Students can help by removing old plants, putting leaf mulch or straw in the garden beds to cover them, or by planting a cover crop.

Planting a Cover Crop

A cover crop is a plant or plants that you grow on purpose to do one or more of the following: add nutrients (usually nitrogen), add organic material, and/or hold the soil in place.

Some good options include winter rye, winter peas, daikon (also called "tilling") radish, hairy vetch, and crimson clover.

When planting cover crop, simply scatter seed over the soil and gently mix it into the top of the soil with your hands, a rake, or weeding tool. In the spring, cut down the cover crop and either chop it into the soil to let it decompose there or cut off the top of the plants and let the roots decompose a few weeks before planting your spring or summer crops.

3. **Classroom - ELA/Science: Book Discussion.** Choose a book from the list of Connected Texts on page 2.

   - *The Dirt Book: Poems about Animals that Live Beneath our Feet* by David Harrison has 15 poems that explore dirt and the many creatures that make their home underground.
   - *We Need Soil* by Ji-Hyeon Lee describes many of the different functions of soil: its nutrients helps plants grow, many different creatures live in soil, and both plants and creatures become part of soil when they die.
   - *Dirt: The Scoop on Soil* by Natalie M. Rosinsky and *Using Soil* by Sharon Katz Cooper are both nonfiction books that introduce basic facts about soil.

   After reading, take time to check on the soil experiment you set up in the Engage section to observe how the ingredients are separating.

4. **Classroom - Cooking: Prepare recipes** using root vegetables. Make one or more recipes using root vegetables like carrots, beets, and turnips. If possible, use some vegetables from your garden. See page 2 for suggested recipes.

EVALUATE AND CLOSE

The closing of the lesson is a time for students to reflect and synthesize what they have learned, and to share the food you have prepared together. Below are two ways to help students share and evaluate their learning at the end of each session.

BIG IDEA

Soil is made of many different ingredients.

GUIDING QUESTIONS

What are the different ingredients that create soil?

How can we tell if soil is healthy?

1. **Reflect and Share:** As a group, revisit the Big Idea and Guiding Questions introduced at the beginning of the lesson. Help students articulate how their understanding of these concepts has grown or changed, what questions they still have, and how they could continue to learn more.
   Suggested ways to **reflect and share:**
   - Ask students to share what they discovered in their soil dissection.
   - Observe the soil separation experiment and ask students to describe what they notice.

2. **Eat and Appreciate:** Eating the food you have prepared together and taking time to appreciate the food is an important part of the FoodPrints experience.
   Suggested ways to **eat and appreciate:**
   - Assure students who are hesitant to taste new foods that they are not required to eat.
   - At the same time, explain that tasting new foods is the only way to find out if your taste buds are maturing and beginning to welcome new flavors!
   - Ask that everyone takes the first bite together and remind them that it is okay if their taste buds aren't ready for these flavors yet.
   - Take time to appreciate and recognize all the different people and natural resources involved in growing, harvesting, transporting, buying, and preparing the ingredients you are eating.
   - Ask students to thank their classmates for helping to prepare the food and work as a team.
   - Encourage students who are enjoying the taste of the food to express what they like and why.

NAME _____ DATE _____

SOIL SEPARATION EXPERIMENT

Instructions: The pictures on this page outline the steps for conducting a soil separation experiment.

Step 1: Fill a jar halfway with soil.

Step 2: Add water until the jar is almost full.

Step 3: Mix it up. You can either stir with a stick or close the lid and shake.

Step 4: Let sit for an hour and observe separation.

HUMUS (decomposed plant materials such as leaves)

CLAY

SILT

SAND

ROCKS AND PEBBLES

SOIL SEPARATION SAMPLE DIAGRAM

NAME _____ DATE _____

SOIL DISSECTION

Instructions: As you carefully observe soil, record how many of each item you find.

Sand 	Roots 
Clay 	Rocks 
Insects 	Worms 
Wood 	Larva 
Leaves 	Other _____