SAMPLING THE SOIL

BENCHMARKS and TASKS

SC.B.2.2.1 The student knows that some source of energy is needed for organisms to stay alive and grow.

SC.G.2.2.3 The student understands that changes in the habitat of an organism may be beneficial or harmful.

- The student compares plants grown under various environmental conditions such as different temperatures, amounts of light, types of soil, etc.
- The student classifies and justifies changes in the habitat of an organism as beneficial or harmful.

KEY QUESTION

How does the type of soil affect seed growth?

BACKGROUND INFORMATION

Plants are affected by many **environmental** factors. Plant seeds remain dormant until conditions are right for them to sprout. Plants need soil to grow. Water and minerals are taken from the soil through the roots. Soil also provides support for the plant and an anchor for the roots. Decaying plants and animals leave behind minerals in the soil that are essential for plant growth.

Plants **adapt** to different soils along with other environmental factors. For example, a Venus Fly Trap is able to grow in boggy areas where the soil is nitrogen-poor. The Venus Fly Trap adapts to the poor soil by trapping and digesting insects to supply itself with the nitrogen it needs.

MATERIALS

Per group

12 bean seeds
paper towels
newspaper
4 clear 8-10 oz. plastic cups
1 spray bottle or mister for water
1 permanent marker
1 graduated cylinder
1 metric ruler
1 pencil

Per student

Sampling Soil Bean Seed Chart

Per class

4 large containers, each containing a different soil type (about 5 oz. of each per group): clay soil, sandy soil, potting soil, sand
1 scoop for each soil container

TEACHING TIPS

1. This activity takes about two weeks to complete.

2. The large containers should be labeled with the name of each soil type.

ENGAGE

1. Ask students if they have ever been to the beach. *Did you ever notice any plants growing in the sand? Describe them.*
2. Ask the students if they have ever seen plants growing in a marsh or in wetlands. Discuss what kinds of plants grow in that environment.
3. Ask: *Do the types of soil appear to be the same in each environment?* Explain to the students that different plants have adapted to different types of soil that are found in different environments.

EXPLORE

1. Have students spread newspaper to cover their work area.
2. Distribute cups and bean seeds to each group.
3. Explain to the students that they are going to investigate to discover which type of soil will be the best type for germinating bean seeds.
4. Have students fill each of the 4 plastic cups half full of soil. Each cup should contain a different type of soil - clay soil, sandy soil, potting soil, and sand.
5. Have students label each cup.
6. Next, students should add 30 mL of water to each of the 4 cups of soil.
7. Have students place three bean seeds in each cup by pushing the seed into the moist soil sample with a pencil. (The depth of each bean seed should be the same for all 12 of the bean seeds.)
8. One student volunteer from each group should use the spray bottle on a regular basis to keep the soil samples moist. (All four of the soil samples should receive identical amounts of water.)
9. Have students place all four of the soil samples where they will receive equal amounts of heat and light.
10. Direct students to the *Sampling Soil Bean Seed Chart* and have them circle the soil type in which they think the seeds will germinate the fastest.
11. Students will measure and record the growth of each seedling daily on the *Sampling Soil Bean Seed Chart* for a two-week period.
12. Have students illustrate the four cups on the back of the activity sheet before and again after the two-week period.

EXPLAIN

In which type of soil did the bean seeds sprout (germinate) the fastest?
What environmental factors in this experiment were kept the same?
(Water, light, temperature, and the amount of soil were controlled, or kept the same.)
What was the only environmental factor that was different?
(The type of soil was the only variable; each cup contained a different type of soil.)
Which soil had the poorest growth? Why?

EXTEND/APPLY

Have students create a graph of the data gathered on the *Sampling Soil Bean Seed Chart.*

NAME_____ DATE_____

SAMPLING SOIL BEAN SEED CHART

Directions:

- Circle the soil type in which you think the seeds will germinate the fastest.
- Measure the height of the seedling to the nearest centimeter and note any other changes.
- On the back of the sheet, draw a picture of each cup at the beginning of the investigation and again at the end.

	SANDY SOIL	CLAY SOIL	POTTING SOIL	SAND
Day 1				
Day 2				
Day 3				
Day 4				
Day 5				
Day 6				
Day 7				
Day 8				
Day 9				
Day 10				