

The Soil

Grades 2-3

Overview

The students will observe air bubbles forming on soil when water is poured on it. In groups, the students will investigate different soils to see if a plant's root hairs would survive there. Each group will plant bean seeds to see if their soil has enough air for the seeds to grow.

Objectives

- To help students understand that soil has air.
- To help students understand that air is important in soil.
- To help students understand how soil affects plants and animal life.

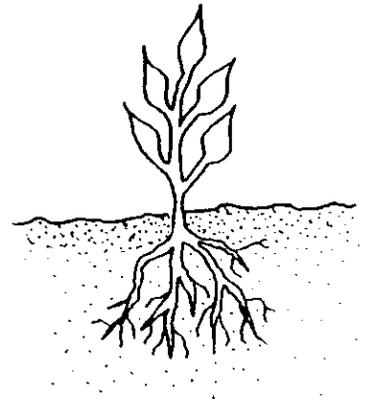
Materials

For the presenter:

- large, wide-mouthed jar
- 3 types of potting soil - enough to cover the bottom of the jar with about 4 inches
- a cup
- water
- a small potted plant - needs to have roots large enough for the class to see

For each group of 4 students:

- magnifying glass
- brown lunch bag
- spoon
- pint jar with lid
- container of water
- cup for pouring water- about 2 cup capacity
- newspaper
- 8 oz plastic cup
- 2 bean seeds
- 3 cups of one kind of soil - (soil: sandy, clay or loam)
- 1 tub to hold all materials for each group



Getting Ready

Activity 1

Put 4 inches of potting soil loosely in the large, wide mouth jar. Place it and a cup of water on a table where all the students will be able to see.

Activity 2

The class should be divided into groups of 4. Fill the brown lunch bags with about 3 cups of soil. Give 2 or 3 groups sandy soil, 2 or 3 groups clay soil and 2 or 3 groups loam soil depending on the number of students you have in your class. They will be investigating which soil is better for growing plants. Place all the items for each group in a tub for ease in handing out and collecting materials.

Procedures

Activity 1

1. Begin by asking the students to stand around the table with the jar and soil. The purpose of this activity is to show the students that soil has air in it and to start them thinking about soil and why it is important to all living things. Tell the students that in this jar you have placed soil.
2. Ask: "What is soil? "What can be found in soil?" Many of them may not realize that soil has air in it. If no one offers air as an answer, wait until you do the experiment to talk about it.
3. Slowly pour some water on top of the soil. Ask: "What is happening? (*Bubbles start to form.*) Where are the bubbles coming from?" (*The air that was trapped in the soil comes up to the top and forms bubbles in the water.*)
4. Have students return to their desks.
5. Ask: "Why air is important to soil? (*It helps plants and animals breathe.*) Can you think of any animals that live in the ground that need air to breathe? What would happen to plants if there was no air in the soil?"
6. Show the students the plant. Carefully take it out of the soil so the students can see the roots. Shake loose the extra soil. Ask: "What does this plant need to live? How does the plant take in water, food and air? (*roots*) Where does it get water, air and food?" (*soil*) As you discuss, walk around the room so all the students can get a close look at the roots. Explain that roots have little hairs called "*root hairs.*" The food, water and air go in through these hairs into the plant. Emphasize that soil is important to us. Plants will not live unless they get the things they need from the soil. What would happen to other living things if plants did not grow?

Activity 2

1. Explain to the groups that they are going to investigate soils to see if root hairs would be able to get what they need. Remind them that they need to take turns and listen carefully to your directions before starting. Give directions 1 at a time, let the students complete step 1 before going on to step 2, etc.
2. Hand out the tubs of materials.
3. Each group should cover 1 desk with newspaper; this will be their work space.
4. Take one cup of soil and pour it on the newspaper.
5. Taking turns feeling the soil. With the magnifying glass examine the soil to see what is in it. As the students are working, have the groups share what they discover. Explain to the students that some groups will have different soil than theirs.
6. Fill the jar 1/3 full of soil.
7. Using the paper cup, slowly pour water into the jar until it is 2/3 full. Ask: "What is happening? Does your soil have air? How can you tell?"
8. Screw the lid on your jar. Pass the jar around your group and let everyone shake it. Put it down on the table and observe what happens.
9. Hold up different jars so the class has an opportunity to see the different soils. Ask: "What did you observe?" There is more air in soil that has more than one layer. Large amounts of decayed leaves, twigs, etc. are a good source of food for the plants. Ask: "Did you observe anything floating on the water?"
10. Ask each team to predict if their soil would be good for growing plants. Tell them they are going to plant bean seeds to see if their prediction is true or not.
11. Take a plastic glass and fill it 1/2 full of soil. Place bean seeds on the soil and cover them up with additional soil. Pour a small amount of water on the soil and place in a well lit area. Each day, have the students water their plants and record observations. As the seeds grow into plants, have the students decide which soil the seeds liked best.

Closure

Have each group review the three things plants need to grow. Ask one team to share what they came up with. Have each team discuss why other living things depend on plants. Ask another team to share their answer.

Clean Up

Set jar with water and soil in a place for further observation. Each group is responsible for cleaning up their area and putting materials in tubs.

