



# Plant a Plant

## Lesson Description

Students conduct experiments with growing conditions and raise their own plants. Students learn what plants need in order to grow, and learn what plants provide for humans.

## Subjects

Art, Language Arts,  
Mathematics, Science

## Teacher Background

Sun, soil, water, and air—and *nutrients* provided by these elements—are essential for the healthy growth of plants. Plants use light from the Sun to conduct *photosynthesis* to survive. From air and water plants absorb hydrogen, oxygen, and carbon. From soil, lime, and fertilizers they obtain other essential nutrients, including nitrogen, phosphorous, and potassium. Students will perform classroom experiments to demonstrate the importance of soil and water in providing nutrients to growing plants.

Draw a parallel between plants and people: point out to your students that just as humans need certain nutrients for healthy growth, so do plants. (Here, you may wish to distinguish between *food* and nutrients.) Each nutrient helps plants in special ways. Some nutrients increase seed production and leaf, stem, flower, and root growth. Other nutrients hasten plant maturity and protect plants against extreme temperatures and disease.

## Time

**Prep:** 30 minutes

**Activities:** 2–3 hours  
(not including Extensions)



Topic: plant growth  
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Code: DIG06



## Student Objectives

### Students will be able to:

- describe how most plants grow in soil; and
- explain that plants also need sunlight, water, and nutrients for growth.

## Materials

### For the Class

- Four potted and sprouting bean plants
- Four dishes or small trays
- Large tray
- Table or shelf that receives sunlight, or a grow light
- Watering can
- Water

### For Each Student Group

- Cup of silty soil used in Lesson 1 (or see page x)
- Clear plastic cup or small plastic jar
- Permanent marker
- Two lima beans, mung beans, or peanuts
- Small plastic sandwich bag
- Rubber band
- Spray bottle
- Water
- Ruler
- Drawing paper
- Graph paper
- Pencil
- Two copies of Student Handout 6A

Soil gives plants the nutrients they need to grow. Plants in turn are food for animals, they produce oxygen for animals to breathe, and they provide materials for humans' food, shelter, clothing, medicines, fuel, and chemicals.

## Learning Cycle

### Perception: 30 minutes–1 hour

**Prep** About one week before you plan to teach the lesson, start growing four plants from lima beans, mung beans, or peanuts. For local sources of rapidly germinating seeds, contact your local Natural Resources Conservation Service office (see Appendix B). Use silty soil or soil with an equal percentage of silt, sand, and clay to grow the plants—do not plant the seeds in straight sand or clay.

Number the pots 1, 2, 3, and 4. Make sure there are holes in the pots for water drainage, and water the plants when needed. Place each pot in a dish or tray to catch water that may drain out of the pots. Set the pots in sunlight or under a grow light.

- 1 Introduce this lesson by showing students four potted bean plants.
- 2 Ask students to name the things plants need to grow. (Answer: air, water, and light.) Emphasize that green plants make their own food using the energy from light, and that soil provides the other necessary ingredients for growth. Nutrients and minerals dissolved in water enter plants through the roots in the soil.



- 3 Discuss how to conduct an experiment to prove that light and water are essential for plant growth. Ask students to predict what will happen to the four plants if one plant is put in a dark closet without light and water, one in a dark closet without light but with water, one in light without water, and one in light with water.
- 4 Distribute copies of Student Handout 6A and ask students to circle the correct words for each test environment. Then have students draw their predictions for each plant. You might ask older students to label their drawings and write one or two sentences about the test environments. (Students will need clean copies of this handout for the post-activity test in the Evaluation section.)
- 5 After discussing predictions, place the four plants accordingly and explain that the class will observe these plants daily for a week.
- 6 Water the “wet” plants as necessary over the course of the week.

## Exploration: 30 minutes

**Prep** Before you conduct this activity, soak the beans in water overnight to speed germination. Poke small holes in the bottom of the plastic jars or cups for drainage.

Each student work area should have a clear jar or cup three-quarters full of soil, two beans, a permanent marker, a spray bottle with water, a sandwich bag, and a rubber band.

- 1 Demonstrate how to correctly plant a bean in a clear plastic jar or cup: plant the bean near the





**Figure 6.1.**  
**Planting a bean.**



side of the jar so the growing roots will be visible. The bean should be covered with at least two centimeters of soil, and there should be space between the soil and the top of the cup (see Figure 6.1). Soil should be moist but not wet.

- 2 Have groups plant two beans in plastic jars and water the soil.
- 3 Ask each student group to write the group members' names on the cup, then carefully cover the cup with the plastic bag and secure the bag with the rubber band.
- 4 Place all the cups on a tray, and place the tray in a window or under a grow light
- 5 Clean up work areas. Save unused soil for Lesson 10.
- 6 Students should check their plants daily and add water if necessary. For the first few days of plant growth, students should only mist the soil if it is dry. Remove the sandwich bag as soon as the first shoot appears (approximately three to four days after planting).

### **Application: 30 minutes–1 hour**

- 1 Throughout the week, students should observe their own plants. Students can measure and record daily plant growth on a data table that you create for the class beforehand, or on drawing or graph paper.
- 2 At the end of the week, help students create a simple graph of plant growth. (Younger students may be able to only compare two stages of growth and may need help to recognize the parts of a plant.)



- 3** If weather permits, take students outside to discuss other things that affect plant growth besides soil, water, and light (e.g., pollution, human interference, and air). If you conducted Lesson 1, review what happened when water was added to soil in a jar. (Answer: air bubbles rose, indicating that soil contains air. Plants need the carbon dioxide in air to conduct photosynthesis.)
- 4** Guide students to consider:
- how do the seasons affect plant growth?
  - what happens to plants during storms and high winds?
  - what happens to plants when there is too much or too little moisture?
  - what happens to plants when there are too many insects and weeds?
  - what happens to plants in soil that is nutrient-poor, rocky, sandy, or made of heavy clay?
- 5** Discuss farmers' and gardeners' work with plants and soil. What elements do farmers and gardeners try to control? (Answer: insects, nutrients, and weeds.) What elements can't be controlled? (Answer: rainfall, wind, and temperature.) How are nutrients added to the soil? (Answer: the farmer or gardener works fertilizer—along with air—into the soil. How does a farmer or gardener control weeds and insects? (Answer: cultivating plants, and using chemical and biological controls.) This discussion will help students understand what plants need to grow and how humans control the landscape.



### **Evaluation: 30 minutes**

Students should be able to list several things that plants need in order to grow. Distribute new copies of Student Handout 6A and have students draw and label the four test plants after one week in the test environment. Students can look at plant growth over time by comparing the old and new handouts. Students can also write a sentence or a paragraph about the effects of the test environment on each plant.

### **Extensions: 30 minutes each**

- Read the story “The Trees Speak” that follows this lesson, and color in Student Handout 6B.
- Read *The Giving Tree* by Shel Silverstein (see Appendix B). This short book tells the story of a tree that gives all that it can to a boy.
- Show the film or read the Dr. Seuss classic *The Lorax* (see Appendix B). This tale depicts economic greed and the abuse of trees, and describes how to help conserve natural resources.
- Students can take their bean plants or the potted plants home to plant in their yards and gardens, or keep in a pot inside the house.
- Plant flowers in a cup or container and take them home, or to patients in a nursing home or hospital.
- Write a play about growing plants.
- Have students pull old socks over their shoes and go for a “sock walk” in a nearby field or park to collect seeds that stick to their socks. Plant the seeds in containers to see what kinds of plants caught a ride.

**Name:** \_\_\_\_\_



Test Conditions: Dark / Light  
Wet / Dry



Test Conditions: Dark / Light  
Wet / Dry



Test Conditions: Dark / Light  
Wet / Dry



Test Conditions: Dark / Light  
Wet / Dry







# The Trees Speak

## Teacher Tips

Trees do much more than provide products for human consumption. Thanks to their intricate root systems and leafy branches that catch rain drops and buffer the wind, trees are Earth's great protectors. They help hold the soil in place, thereby conserving soil that otherwise would be washed or blown away. There must be soil to produce most plants, and there must be plants to prevent soil erosion.

"The Trees Speak" teaches students to care for these valuable resources. This story will take your class on a magical trip to the woods where Peter, the hero, learns about all the ways that trees help humans. Peter and your students will discover that each tree is different, that trees help humans, and that replanting and recycling trees protects a natural resource.

You can conduct many activities to reinforce concepts in "The Trees Speak." After reading this story direct student conversation to the many ways people use trees. Ask your students to identify classroom products made from

trees, such as paper, pencils, desks, and chairs.

Students can brainstorm how trees help humans. You can also discuss how trees play an important role in the environment by providing habitat for animals, cleaning the air, holding soil in place, and playing a part in the hydrologic cycle. Remember to emphasize that most plants (except air plants, aquatic plants, and marine plants) depend on soil as the home for their roots—roots hold soil in place, reduce erosion, and absorb dissolved minerals and nutrients that feed the plant. If weather permits, take your class outside and sit under a tree for a discussion.

Have your students act out what it is like to be a tree—e.g., bending in the breeze, losing leaves in the fall, and growing from a seed to maturity. A narrator can explain how trees obtain nutrients while students act out roots, water, soil, and sunlight.

Students can color in Student Handout 6B, draw a picture of a world without trees, or write a poem about a tree.



## **The Trees Speak**

Darren leaned his head against the back of the porch and counted to 50. "Ready or not, here I come," he announced.

Peter had already run off into the woods away from his friends Sally, Julio, and Darren, and was well hidden. "Darren will never find me here," thought Peter as he sat down beneath a large oak tree.

Peter leaned his back against the tree and closed his eyes. He liked "Hide and Seek" but they had been playing for over an hour. Peter was getting tired.

"I'll just rest a minute," Peter said to himself, as his head fell forward and his chin dropped to his chest. Peter didn't know how long he stayed in this position. It must have only been a few moments because he almost immediately heard voices.

"Look at him," said the first voice, "sound asleep to all the cares of the world."

"He's rather sweet when he's asleep," said another voice with a much higher tone.

"That's the answer," laughed a third voice in a deep echoing tone. "Let's find something that will put them all to sleep for the next 200 years."

Several others must have found this very amusing because the woods were suddenly filled with the sounds of laughter.

Peter sat up and rubbed his eyes. He looked to the left, then to the right. He looked all around, but there was no one there.

"Look," said the first voice, "he's awake. You know it's against the rules to awaken humans."



Peter sat up straight and pressed his back against the tree trunk. "Darren, is that you? Julio? Sally?" he said.

"Of course not," said the deep voice, "I am speaking to you. And I wish you wouldn't lean so heavily against me. You're giving me trunk trauma."

Peter jumped to his feet. "I didn't know trees could talk."

"Listen to this kid," said a bushy cottonwood tree. "This child of asphalt probably doesn't know that fish can swim and birds can fly either."

"Ah, well," sighed the willow tree with the soft voice, "what can you expect from someone who watches television only with his eyes."

"My sister is now a television cabinet and encloses the TV with her whole body," explained the walnut tree, proudly. "She's also an end table, a dining room chair, and part of a bookcase."

"I'm afraid for my family," said the giant redwood, looking down on all the trees. "There used to be forty different types of me, now there are only three."

Peter was shocked. "What happened to the others?"

"They became your floors, bookshelves, and tables, little human. They became your toilet paper and notepads, toothpicks and newspapers. You name it," answered the redwood, gruffly.

"I don't want to brag," said the dogwood, "but think of all the things we do for you."

"Our leaves blanket the Earth and warm it from the chill winter winds," said the buckeye.



"Our greenery helps make rain," boasted the ash.

The pine shook its needles. "Our roots dig deep in the ground and keep the soil from shifting."

"We breathe in your carbon dioxide and give you oxygen in return," rasped the old hazelnut.

"Our wood becomes your homes and furniture," said the oak.

"And we feed you," cried the apple, cherry, peach, orange, and pear trees in unison.

"Our branches are the homes of small mammals and birds, and some of us give you magnificent beauty," said the lovely aspen, her golden leaves quivering in the sunlight.

"And," roared the crab apple, "you cut us down and grind us into pulp so you can have an extra magazine in your mailbox."

The large elm bent down to Peter. "Excuse my angry bothers and sisters," he said gently, "but they're right. If you overuse us and don't replant us or recycle our products, the Earth will become a very sad place."

"Try to think of the world without trees," sighed the tiny Japanese plum, her little purple leaves shaking in fear at the idea. "Why, the ground would start shifting this way and that, because our roots wouldn't be there to hold the soil in place."

The pine shook his needles. "And without us holding it in place, the rain would wash away the soil you use to grow your food," he added.

"The Sun could scorch the land dry if there were no trees to give shade," said a mighty maple.





Peter was very upset by what he heard. He sat down and tried to imagine such a world.

“Peter,” someone shouted. “Where are you, Peter?”

Darren, Sally, and Julio came running through the forest. “Oh, there you are,” said Sally. “We’ve been looking for you everywhere.”

Peter jumped up excitedly and pointed at the oak. “Trees speak,” he announced. “I heard them. I’ve been talking to them.”

His friends thought that was very funny, and they laughed and laughed.

“It’s true,” said Peter, stamping his foot in anger. “Trees do speak. Just listen and you’ll hear them too.”

The children were very quiet. They closed their eyes and listened, but except for a soft fluttering of leaves, the trees were silent.

“That’s OK,” said Peter, shrugging his shoulders. “Maybe the trees want me to speak for them.” He led his friends out of the forest. “You see,” he said, “trees do a lot of things for us. Just try to imagine what this world would look like if there weren’t any trees.”

Peter talked all the way home.

Name: \_\_\_\_\_

