

Project BudBurst



Classroom Activity
www.budburst.org

Classroom Activity: Breathing Plants

Time: One 30-minute class period (followed by 20 minutes for observation every 3 days for three weeks)

Level: Grades K-4

Overview: In this activity students will discover how plants breathe through their leaves.

Materials:

- Geranium or other potted plant
- Adhesive labels
- Vaseline
- Cotton swabs

Education Standards: Available in the *Teacher Implementation Guide (Grades K-4)*

Activity

1. Explain to students that plants breathe through their leaves. They breathe in carbon dioxide and breathe out oxygen (which is just the opposite of animals).
2. Ask students to consider how plants and animals/people need each other to breathe. What happens when big forests are cut down, such as tropical forests in Southeast Asia and South America?
3. Tell students they will learn more about how plants breathe in this activity.
4. Use Vaseline to coat three plant leaves like this:
 - Top of one leaf
 - Bottom of one leaf
 - Both top and bottom of one leaf
5. Label the leaves with “top,” “bottom,” and “top and bottom”
6. Put the plant in a sunny location and water regularly. Have students observe the plant for three weeks and record their observations.
7. After three weeks, have the students explain what has happened. Did all of the coated leaves change? What does this tell us about how plants breathe?

Suggested Extension Activities

- Prevent a plant from photosynthesizing. Place tape on approximately half of a leaf's surface. Leave the plant in the sun for several days. Return and move the tape. The leaf has changed colors because it can no longer photosynthesize and does not need the chlorophyll to give it its green color.
- View transpiration in action. Affix a sandwich baggie to a leaf. Leave it in the sun for a couple of hours. Return to view moisture which was transpired through the leaves and condensed on the inside of the bag.
- Make crayon rubbings of various leaves collected from outside. Compare the location of the veins in the leaves. Monocots will have parallel veins, whereas dicots will have net-like veins.

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Background Information

Leaves are the parts of the plant where food is made by photosynthesis. Leaves take in carbon dioxide from the air, water from the soil, and energy from the sun. During photosynthesis, the leaves use light energy to change carbon dioxide and water into sugars (food). The leaf is also where transpiration, or breathing, takes place.

A leaf contains long strips of vascular tissue called veins. These supply the leaf with water and minerals, and move the food made inside the leaf to other parts of the plant. Some leaves, such as grasses, have long, parallel veins, but most leaves contain one central vein called the midrib. This is an extension of the leaf stalk, which joins the body of the leaf to the stem. The midrib branches into a number of smaller veins, called side veins. A leaf's whole vein system is called its venation.

Water is taken into a plant by its roots, and travels up through the stem to the leaves. There, some of it escapes as vapor through tiny holes called stomata on the underside of the leaves. This type of water loss is called transpiration.

Source: Adapted from *Exploring the Native Plant World*, developed by the Lady Bird Johnson Wildflower Center in Austin, Texas and *Teaching Plants from Root to Seed*, developed by the Denver Botanic Gardens in Denver, Colorado

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