

# Photosynthesis Game

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## **Standards of Learning**

Science 4.4

## **Objective**

Students will:

- Understand and model the process of photosynthesis

## **Materials**

- 10 student volunteers

## **Background Knowledge**

Photosynthesis is the process by which green plants (containing chlorophyll and other photosynthesis pigments) convert carbon dioxide, water, and certain nutrients to carbohydrates in the presence of sunlight. This is the energy driving process on earth and enables life to exist. Photosynthesis produces the food we eat and the air we breathe and recycles much of the mineral content in the soils.

A single tree will pull tons of carbon dioxide from the air and give off tons of oxygen and water vapor, as well as provide a valuable, renewable, natural resource. Therefore, forests are a giant carbon dioxide reserve and are important to carbon dioxide/oxygen cycles on earth. In addition, large forests have an important effect on local weather patterns and climate because of the amount of water they consume and water vapor they transpire.

## **Procedure**

1. Ask students to describe the photosynthesis process.
2. Ask students to name the green pigment that is important in photosynthesis (chlorophyll).
3. Explain that chlorophyll actually captures the energy in sunlight to drive the photosynthesis process.
4. Select one student to crouch on the floor. The student represents a green plant that is going to grow. It will grow by standing up. Have the rest of the students chant "chlorophyll," and allow the "plant" to grow.
5. On the first try, stop the "plant" from growing. Gently push the student back down onto the floor and ask the group, "What do plants need to grow?" The answers are sunlight, water, soil (minerals), carbon dioxide, and oxygen. Select volunteers to portray each of these in the following order, and follow the instructions below. Rehearse the actions once or twice with each participant.
  - a. Sunlight – ask one person to come up and stand beside the plant. They hold their arms above their head forming a circle to represent the sun and say "shine, shine, shine," as they walk around the "plant." The plant cannot grow with sunlight only.
    - i. Ask, "What else do plants need to grow?"
  - b. Water – ask another volunteer to stand beside the plant. They hold their hands over the plant and wiggle their fingers while saying, "sprinkle, sprinkle, sprinkle." Both sunlight and water walk around the "plant" doing the motions and saying their parts. Stop the action before the "plant" begins to grow, because a plant needs something else in order to grow.
    - i. Ask, "What else do plants need to grow?"



- c. Soil (minerals) – ask another volunteer to stand beside the “plant.” Ask the group, “How do plants get nutrients out of the soil?” The person pretends to shovel beside the “plant” while saying, “soil, soil, soil.” Have the three components begin their trip around the seed. Again stop the action before the “plant” begins to grow.
    - i. Ask, “What else do plants need to grow?”
  - d. Carbon Dioxide – Ask for three volunteers. Ask the group what the symbol for carbon dioxide is ( $\text{CO}_2$ ). Assign one volunteer to be the C (carbon) and two to be the Os (oxygen). Have these three link arms, and as they walk around the “plant” have them chant their own part of “ $\text{CO}_2$ ,  $\text{CO}_2$ ,  $\text{CO}_2$ .” Also, have the trio bob up and down as they say their parts. Stop the action before the “plant” begins to grow.
    - i. Ask, “What else to plants need to grow?”
  - e. Oxygen – Ask for two volunteers to stand beside the “plant.” Ask the group to name the symbol for oxygen ( $\text{O}_2$ ). Have the two students hook arms and skip around the other actors while saying, “I’m free! I’m free! I’m free!” Remember, oxygen is given off into the air. Allow the plant to grow to full height because all its needs are being met.
6. Have all the volunteers sit down, and ask someone not involved in the game to explain what photosynthesis is and what plants need to grow.

