

THE NEEDS OF PLANTS

(5th Grade)

ALABAMA COURSE OF STUDY STANDARD (Science)

- ⇒ 8) Defend the position that plants obtain materials needed for growth primarily from air and water.
- ⇒ 9) Construct an illustration to explain how plants use light energy to convert carbon dioxide and water into a storable fuel, carbohydrates, and a waste product, oxygen, during the process of photosynthesis

DESCRIPTION

- ⇒ Farmer Joi will conduct an experiment to investigate the essential items a plant needs (air, water, sunlight, soil, and space) in order to complete the process of photosynthesis.

OBJECTIVES

Students will be able to:

- ⇒ identify the five needs of plants: air, water, sunlight, soil, space.
- ⇒ participate in a multivariable investigation to determine what happens to a plant when one of its needs is removed.

MATERIALS NEEDED

- ⇒ Paper and Writing Utensil (Students should have these ready before watching the video)
- ⇒ [THE NEEDS OF PLANTS \(YouTube Link\)](#)

NOTES FOR INSTRUCTION

At 6:05, pause the video to allow students to create hypotheses about what they think will happen to the plants by the end of the experiment. Take a few minutes to discuss the following questions to gauge students understanding up to this point:

- ⇒ What does sunlight do for a plant?
- ⇒ Why does a plant need air to survive? Does it breathe like you and I?
- ⇒ What's in the soil that a plant needs to survive?
- ⇒ Why does a plant need water? Does it drink it? How?



Once students have completed their hypotheses and answered the above questions, restart the video. Pause the video once more at 6:20 to explore this final question:

- ⇒ “Knowing what we know now about what plants need, what do you think happened to our zinnia on the farm?”

FOLLOW-UP DISCUSSION

After viewing the video, compare and contrast students’ hypotheses to the actual outcomes of the experiment. Ask students the following questions:

- ⇒ What do plants need to survive and thrive? (*WATER, SOIL, AIR, SUN*)
- ⇒ How is the process of photosynthesis similar to the process of baking a cake? (*YOU BEGIN WITH SPECIFIC “INGREDIENTS” THAT REACT WITH EACH OTHER AND CREATE NEW PRODUCTS*)
- ⇒ What part of the plant absorbs energy from the sun to begin the process of photosynthesis? (*CHLOROPHYLL*)
- ⇒ How is water and carbon dioxide changed into oxygen and sugars for the plant? (*LIGHT ENERGY FROM SUN*)
- ⇒ What organisms create oxygen for us to breathe? (*PLANTS*)

FOLLOW-UP ACTIVITIES

1. **How Plants Breathe:** Follow these instructions to further explore how plants “breathe” and produce oxygen.
 - Gather the following materials: glass bowl filled with lukewarm water, a fresh leaf, and a large rock.
 - The leaf should be freshly removed from a plant rather than a dead one picked up off the ground.
 - Place the leaf in the bowl of water and put the rock on top of it so it is FULLY submerged under the water. Then place the bowl in a sunny spot, inside or outside.
 - Let the bowl sit in the sun for a few hours. While waiting, create a hypothesis for what you predict will happen after a few hours have passed.
 - Once enough time has passed, take a peek at your leaf in the bowl. Write down any observations you see.
 - Come back together to discuss students’ observations and the following questions:
 - What happened to the leaf underwater? Did you see anything new on the leaf? Have you ever held your breath under water and then let it out? What happened? (*Bubbles would rise to the surface of the water*)
 - Explain that the leaf is still using the sunlight as part of the process of photosynthesis. As a leaf uses the sunlight’s energy, it still needs to expel the products it normally expels during photosynthesis – like oxygen and water. This is what allows us to see the bubbles. As the leaf releases extra oxygen while underwater, the oxygen can be seen as bubbles along the leaf and in the water. Since oxygen is lighter than water, the bubbles will eventually rise to the surface.
2. **Conduct Your Own Experiment:** Using the video as a guide, set up your own experiment at home to see if you have the same outcomes and to document the progress of your plants over a few weeks.

