

& PROJECT

Plant Explorers

Session 1 of 4

INTRODUCTION TO PLANT LIFE AND AQUATIC PHOTOSYNTHESIS DEMONSTRATION

What are the basic needs of plants? How are those similar to and different from the needs of other species? What is photosynthesis and how does it happen?

YOU WILL NEED

- Plant with portion of the leaf covered by painter's tape for 1 week
- 8-10 sprigs of e. Densa
- Large, clear container
- Stirring rod
- Large funnel
- Test tube
- Rubber band
- 20-W fluorescent light source
- Tap water
- Scissors

- Computer
- Smartboard or projector
- Plant Explorers — Slideshow
- Writing Prompt #1: Journal Entry — Handout
- Writing Prompt #2: What if you could photosynthesis? — Handout
- Crossword Puzzle — Handout
- Word Search — Handout

STEP 1 (10 MINUTES)

Do Now — What We Eat and Drink

Students will answer the following prompt: *“Write a journal entry describing your day yesterday from the time you woke up until the time you went to bed. Include what you did, ate, saw, etc.”*

STEP 2 (10 MINUTES)

Welcome and Share-Out

Review the agenda for the day

- Learn about plants and photosynthesis (how plants make food)
- Examine what happens when a plant doesn’t have access to sunlight
- Learn some new vocabulary words and play word games
- Demonstration with aquatic plants
 - Write some more!

- Share our writing and what we learned
- Students will share out their journal responses as a group

STEP 3 (15 MINUTES)

Photosynthesis Lesson

Using the presentation, introduce the basic structure of a plant:

- Flower (contains the reproductive parts of the plant and produces seeds)
- Stem (holds the plant up and carries water and nutrients from the roots to the leaves)
- Leaves (produce food for the plant and contain a substance called chlorophyll)
- Roots (hold the plant in the ground and absorb water and nutrients from the soil)

From there, facilitate an all-class discussion of how a plant's life is different from students' lives, referencing their opening journal activity.

- List the four basic necessities of a plant (light, water, air, and soil)
- Introduce the concept of photosynthesis, wherein light + carbon dioxide + water → the production of sugar and oxygen
 - The main photosynthetic part of a plant is called "chlorophyll". It's what makes leaves green!
 - The chlorophyll take in water, light, and carbon dioxide, and produce glucose (sugar) and oxygen.

STEP 4 (15 MINUTES)

Photosynthesis Demonstration

Bring a plant that has been near the window with a part of one leaf covered by painter's tape for a week to the front of the room. Ask the students to observe the color of the plant's leaves and note that the main photosynthetic pigments that give the green color to plants are called chlorophyll.

Then, remove the tape that has been covering a part of the classroom plant's leaf. Ask the students to observe the plant's leaves and note any differences between the covered and uncovered leaves.

Facilitate a conversation about why this could have happened based on what they have just learned (plants need light!). Ask the students to predict what would happen if the entire plant were deprived of light.

STEP 5 (10 MINUTES)

Vocabulary Worksheets

Students will complete word game activities to help add new words to their vocabularies by:

- Completing a word search of new vocabulary words
- Completing a crossword puzzle with their new vocabulary words as answers

STEP 6 (20 MINUTES)

Egeria densa Demonstration Phase 1

*Berkeley, Candace (2018). *"Using Aquatic Plants to Demonstrate Photosynthesis."*

Retrieved from <https://www.carolina.com/teacher-resources/Interactive/using-aquatic-plants-to-demonstrate-photosynthesis/tr28607.tr>

Gather all necessary materials in front of the entire class, and set up the following demonstration:

1. Fill the large, clear container 3/4 of the way full with the room-temperature, dechlorinated tap water.
2. Add 1 g of sodium bicarbonate to the water and stir until dissolved. This is the CO₂ source for the plant that is being used.
3. Cut 8 to 12 sprigs of the plant to a length of about 20 cm.
4. Place the cut sprigs into the mouth of the funnel.
5. Invert the funnel and place it into the container of water, trapping the aquatic plant inside the funnel.
6. Make sure the stem of the funnel is completely submerged in the water. If it's not, add more room temperature, dechlorinated water to the container until the funnel stem is covered.
7. Wrap a rubber band about 1/4 of the way down the test tube several times. This allows the test tube to sit inside the stem of the funnel without falling all the way into it.
8. Submerge the test tube into the water in the container, filling it completely.
9. Invert the test tube in the water and place it over the stem of the funnel while it is still submerged. Make sure no air bubbles are trapped in the test tube.
10. Place a fluorescent light source near the container and turn it on

Ask students to predict what will happen to the water in the test tube over the next 24-hours. They will investigate during the next class session.

STEP 7 (20 MINUTES)

If You Could Photosynthesize

Students will answer the question, *“How would your daily life be different if you could make your own food, like a plant does? Re-write your journal entry, starting from what you would do when you woke up and end with yourself going to sleep.”*

Guiding questions for struggling writers:

- Think about all the food you ate yesterday and how much of your day surrounded what you ate. What would you do with all that free time?
- How would your friends and family react? Would they photosynthesize too, or are you the only one who can?
- How is this like a superpower?
- Would you miss eating? What would you miss the most, if anything?

STEP 8 (10 MINUTES)

Share-Outs

Students will share out their writing responses as a group

STEP 9 (10 MINUTES)

Teachbacks and Close

Facilitate a full-class “teachback” of the lessons learned during the first session. Ask students to “teachback” the following:

- What do plants need to survive? (*light, water, soil, and nutrients*)
- What is that process of making their own food called? (*photosynthesis*)
- Why was the part of the leaf that we uncovered a different color than the rest of the plant? (*without light, the plant cannot photosynthesize*).
- Anything else the students learned