Week 7: Simple Plants

2-Days-a-Week Schedule

	Day 1	Day 2
Do	☐ Do the "Does light help with photosynthesis?" experiment	☐ {*Choose one of the Want More Activities*}
Read	☐ Define algae, hydrophyte, and photosynthesis ☐ {*Read one or all of the additional reading assignments*}	☐ Read the reading assignment and discuss what was read
Write	☐ Fill out the experiment sheet ☐ Enter the dates onto the date sheets	☐ Color and label the "Divisions of Plants" sketch ☐ Prepare an outline or narrative summary

5-Days-a-Week Schedule

	Day 1	Day 2	Day 3	Day 4	Day 5
Do	☐ Do the "Does light help with photosynthesis?" experiment		☐ {*Choose one of the Want More Activities*}		☐ {*Choose one of the Want More Activities*}
Read	☐ {*Read one or all of the additional reading assignments*}	☐ Read the reading assignment and discuss what was read	☐ Define algae, hydrophyte, and photosynthesis	☐ {*Read one or all of the additional reading assignments*}	
Write	☐ Fill out the experiment sheet	☐ Write an outline or list of facts	☐ Color and label the "Divisions of Plants" sketch	☐ {*Prepare a report*}	☐ Enter the dates onto the date sheets

Supplies I Need for the Week

- ✓ 2 Fresh spinach leaves, Baking soda, Liquid dish soap, 2 Clear plastic cups, Water
- ✓ {*Optional*} Pond or aquarium water, Small glass jar, Eye dropper, Microscope, 2 Slides and cover slips

Teacher Notes

Student Assignment Sheet Week 7 (SG p. 58)

Do—Hands-on Science Activities

❒ **Experiment:** Does light help with photosynthesis? (SG pp. 60-61)

Materials

✓ 2 Fresh spinach leaves, Baking soda, Liquid dish soap, 2 Clear plastic cups, Water

❒ **Want More Activities:** See your teacher for additional directions on growing algae and learning about photosynthesis.

Experiment Information

- **Introduction** – (*in the student materials*) Plants get the food and energy the need to survive from the sun through a process known as photosynthesis. For photosynthesis, the plant absorbs water from the soil through the roots and carbon dioxide from the air through transpiration, then light which is absorbed through the leaves, is used to convert the water and carbon dioxide into glucose and oxygen. The plant release the oxygen as a waste product and use the glucose as food for the plant. They can also use the glucose to form other substances they need, such as the cellulose that is used to form the cell wall, and starch, which acts as a food store in the seed. In this experiment, you are going to see how important light is to photosynthesis.
- **Procedure** – (*in the student materials*)
  1. Fill cup 1 and 2 halfway with water. Add 1 tsp of baking soda and several drops of liquid dish soap to each cup and mix well.
  2. Place a spinach leaf to each one and push it to the bottom.
  3. Set one cup in a dark closet or bathroom. Set the other cup in direct sunlight or under a light source.
  4. Observe the changes in the cup at 15 minutes and at 30 minutes.
- **Results –** The students should see that more bubbles form on the leave in the cup that was left in the direct sunlight.
- **Explanation –** Photosynthesis uses sunlight to produce food for a plant. At the same time, oxygen gas is released in the reaction. The tiny bubbles on the leaf are the result of the gas being released. The lack of bubbles on the leaf in the dark is because of the lack of light. The chlorophyll can not produce glucose through photosynthesis without light.
- **Troubleshooting –** The difference between the two cups should be very noticeable. If it is not, make sure the cup is in total darkness and total sunlight. Also, try to observe the cups without moving them first.
- **Take it Further –** Have the students do several activities related to photosynthesis. You can use the following post for ideas:
  https://elementalscience.com/blogs/science-activities/photosynthesis-101

Want More Activities

- **Algae Growth –** Have the students attempt to grow some algae. You will need pond or aquarium water, a small glass jar, an eye dropper, microscope, and two slides and cover slips. Start by collecting some pond or aquarium water in a small glass jar. Have the students place a drop of water onto a slide and cover it with a cover slip, using the same method you learned in week one. Then, have them look at it under the microscope using the 10x objective lens. Move the slide around slowly to see if you can find any green algal cells. After that, set the jar out on a sunny window sill and observe what happens in the jar over five days. After five days, look at the water under the microscope again using the same procedure you used in steps three and four.

Read—Gathering Information

❒ **Main Reading Assignment:** *Usborne Science Encyclopedia* p. 264 Plant Food (Photosynthesis section), pp. 281-282 Water Plants

Optional Research Readings

📖 Photosynthesis: *UIDS* pp. 254-255, *DKEN* pp. 24-25
📖 Plant Anatomy: *KSE* pp. 56-57

❒ **Vocabulary:** algae, hydrophyte, photosynthesis (SG p. 50)

❒ **Memory Work:** This week, work on memorizing the photosynthesis equation. (SG p. 249)

Carbon Dioxide + Water + Energy from the Sun ⟶ Carbohydrates + Oxygen

Discussion Questions for Reading Assignments

Plant Food (Photosynthesis section), p. 264

1. What is an autotrophic plant? (*An autotrophic plant is a plant than makes its own food, usually through a process called photosynthesis*.)
2. Where does photosynthesis take place? (*Photosynthesis takes place in the plant's leaves in the palisade cells*.)
3. What is chlorophyll, where is it, and what does it do? (*Chlorophyll is a green pigment found in the chloroplasts. The job of this chemical is to absorb the light from the sun for the energy of photosynthesis.*)

Water Plants, pp. 281-282

1. What are the two categories of water plants? Explain a little about each category. (*The two categories of water plants are emergent and submergent. Emergent water plants grow well in very wet soil and most of their stems and leaves can be seen above the water surface. Submergent water plants grow mostly underwater, but they may have a few large leaves or flowers floating above water*.)
2. Where are algae typically found? (*Algae are typically found in water, but they can also grow where conditions are damp*.)
3. How are algae different from other plants? (*Algae differ from other plants because they have no roots, leaves, or flowers*.) How are they similar? (*Algae are similar to other plants because*

they can make their own food using the Sun's energy.)

4. What is seaweed? (*Seaweed is a multi-cellular type of algae.*)
5. What is eutrophication? (*Eutrophication is when an abundance of nitrogen in the water causes algae to rapidly reproduce. The algae become so numerous that they use up the oxygen in the water, causing other animals and plants in the water to die.*)

Vocabulary

- **Algae –** A simple, plant-like organism that makes its food by photosynthesis.
- **Hydrophyte –** A plant that is specifically adapted to live in water.
- **Photosynthesis –** A process that uses light energy to make food from simple chemicals.

Write—Notebooking Assignments

- **Writing Assignments:** Write a list of facts, an outline, or a report. (SG pp. 62-63)
- **Sketch:** Divisions of Plants (SG p. 59)
  - Read *Usborne Science Encyclopedia* p. 295 The Plant Kingdom.
  - Label the following: nonvascular plants, vascular plants, plants without seeds, plants with seeds, gymnosperms, angiosperms, monocots, dicots
- **Dates to Enter** (SG pp. 11-14)
  - 2600 BC- 2000 BC – Ancient Egyptians used different colors of algae as eye makeup.
  - 1811-1866 – William Harvey was the first to divide algae into four divisions based on their pigmentation.

Sketch Assignment Answers