Plants Are Cool!

South Carolina Aquarium

Students will learn about the process of photosynthesis and how the different parts of a plant serve a function in the overall survival of the plant.

OBJECTIVES

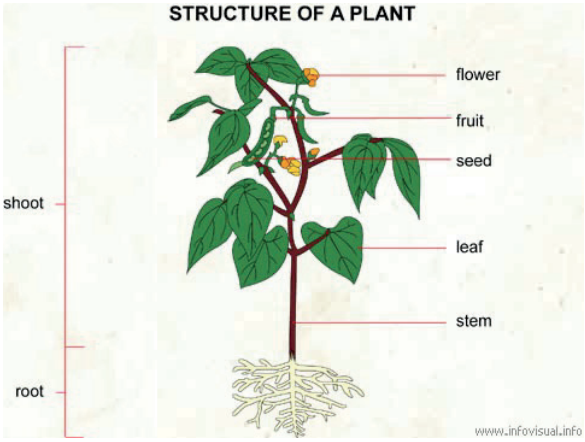
- Students will be able to identify plant structures (roots, stem, leaves, flower, fruit, seed).
- Students will be able to list the needs of plants (air, water, nutrients, space).
- Students will be able to explain the transfer of energy through photosynthesis.

SOUTH CAROLINA SCIENCE STANDARDS

K-LS1-1, K-ESS2-2, K-ESS3-1, 1-LS1-1, 2-LS2-1,
4-PS3-2, 4-PS3-4, 4-LS1-1, 5-PS3-1

MATERIALS IN BIN

- Copy of "Plants Are Cool" activity
- Aquarium map (with activity exhibits marked)
- Plant labeling activity (parts and functions)
- Plant labeling activity answer key (for teachers only)
- Plant part examples
- Flashcards of "Cool Aquarium Plants"
- "National Geographic Readers: Plants" by Kathryn Williams



VOCABULARY TERMS

Review terms with students before coming to the Aquarium to ensure that they have a basic understanding of the terms that will be used in the activity! Choose which terms are relevant/need to be reviewed based on your students' ages.

- **Producers** – An organism that creates their own food (also known as an *autotroph*)
- **Consumers** – An organism that feeds on other organisms in order to gain energy (also known as a *heterotroph*)
- **Photosynthesis** – The process through which plants use sunlight and their cells known as chloroplasts to create food from carbon dioxide and water, producing oxygen as a byproduct
- **Organism** – An individual animal, plant or single-celled living thing
- **Root** – The part of the plant found in the ground to give it support and retrieve nutrients and water from the soil
- **Stem** – The main body or stalk of a plant that provides support
- **Leaf** – The part of a plant that collects sunlight for use in photosynthesis
- **Flower** – The seed-bearing part of a plant
- **Fruit** – The fleshy or dried ovary of a plant that houses seeds
- **Seed** – A flowering plant's unit of reproduction
- **Habitat** – The natural home or environment of an organism

BACKGROUND

Plants are living organisms known as producers, meaning they are capable of producing their own energy and do not need to consume another organism in order to gain energy. The process that plants go through

to produce this energy is known as photosynthesis. Through their various structures, they acquire water, air (carbon dioxide) and nutrients. They use these components, along with energy from the sun, to produce their own food.

Photosynthesis involves a green pigment through which plants create their own food. This process involves a green pigment known as chlorophyll that allows the plant to absorb light. This energy from light is then used to turn water (H_2O) and carbon dioxide (CO_2) into food for the plant. A byproduct of photosynthesis is oxygen (O_2) which helps many living things on Earth. This oxygen that is created from photosynthesis is what is essential for both animals (i.e. humans) that breathe air and those that breathe underwater (i.e. fish). Photosynthesis is extremely important not only for plants' survival, but for the survival of nearly every other living thing on the planet.

The main structures of a flowering plant are the roots, stem, leaf, flower, fruit and seeds. The roots suck up water and nutrients from the ground and pull them into the stem. The stem transports water and nutrients throughout the plant as well as creates stability for the plant, allowing it to grow toward the sunlight. The leaves soak up the sunlight for photosynthesis. The flower contains the stamen and carpel, which together produce fruit. Seeds are formed within the fruit, and when these seeds are planted in the ground, they grow into new plants.

All living things need a place to live, and this place is called a habitat. Plants need air (carbon dioxide), nutrients (food), water and space to be able to survive in a habitat. Plants need the carbon dioxide from the air and water to photosynthesize. They need nutrients to fuel their systems and space in order to grow. Large plants, like trees, require a lot of space to grow whereas small plants, like grass, do not. Some plants can survive in a variety of conditions while some can only survive under perfect conditions.

COOL AQUARIUM PLANTS

Maidenhair Fern — Mountain Forest gallery
Maidenhair fern *(Pteridaceae adiantum*) typically live in moist, well-drained soils or on vertical rocky substrates (look for them here in the Mountain Forest exhibit!). They can stand up to 2 feet tall and have a light, delicate appearance.

Loblolly Pine — Piedmont gallery, American kestrel exhibit
Loblolly pine *(Pinus taeda)* is a large evergreen with a tall straight trunk. They prefer to grow in wet soils with lots of sunlight and are found throughout the southeast. They are the predominant tree found in the Francis Marion National Forest (located just a short drive from downtown Charleston).

Bald Cypress Tree — Coastal Plain gallery, brownwater swamp
Bald cypress trees *(Taxodium distichum)* are large trees with a thick base and knees. The thick base helps hold the tree up because it can grow in the water of a swamp. The knees can grow up to 6 feet tall and are also thought to help hold the tree up in water.

Palmetto Tree — Saltmarsh gallery
The palmetto tree *(Sabal palmetto)* is South Carolina's state tree and is found on the state flag! They have a wide range of growth and are often found along river banks, in saltmarshes, sand dunes and are frequently used as ornamentals around residential areas.

Plants Are Cool!

South Carolina Aquarium

Sargassum — Ocean gallery
Sargassum *(Sargassum bacciferum)* is a brown algae that is found in temperate and tropical waters throughout the world. They have specialized structures called air bladders that help them to float in large masses at the water's surface.

PROCEDURES
Pick up the Exhibit Activity and supplies from the Information Desk. As you walk through the Aquarium, locate the plants listed above and discuss some of their interesting features with students. Choose any spot at which to complete the activity.

1) Review the following with your students *(can be edited based on the age group).*
    a. What is a plant? What does it need to survive?
    b. What are the things needed for photosynthesis? What is produced from photosynthesis?
    c. Why is photosynthesis necessary for a plant to survive and why is it necessary for animals to survive?
    d. What are the main structures of a plant?
2) Use the magnetic matching game to review the parts of a plant with students and ensure they understand the location and function of each part of the plant.
    a. **Root** — Sucks up water
    b. **Stem** — Holds the plant up
    c. **Leaf** — Collects sunlight for photosynthesis
    d. **Flower** — Makes fruit with seeds
    e. **Fruit** — Makes seeds
    f. **Seed** — Grows into a new plant *(show them the different types of seeds)*
3) If time allows, read "National Geographic Readers: Plants" by Kathryn Williams.
4) As you continue through the Aquarium, point out other cool plants mentioned above.
5) Return the Exhibit Activity to the Information Desk when you are finished.