

# What A Plant Wants

**Objectives:** Students will recognize that

- Different parts of a plant have different functions to help plants survive
- Plants need for sunlight, soil and water for survival and reproductions in their environment
- Plants needs differ based on their habitat

**Overview:** Students will explore what plants need to survive in different environments, how the soil, sun and water availability can affect how well a plant can or cannot survive in different habitats.

**Materials:** Felt board, felt plant and habitat parts, seeds, dirt, sandwich bags, painters' tape, markers, water & spray bottle.

**Before Class Prep:** Look through What a Plant Wants teaching kit to familiarize yourself with all the items. Pick up curriculum materials from Pick Up shelves in VN Center. Set up program materials at your station spot at appropriate field trip destination.

## **Background Information: (multiple pages)**

Animals and plants both have a a role in the habitats where they live. A good habitat will provide all the environmental conditions an organism needs to survive. These include the right combination of food, water (or oxygen in a water environment), shelter and space. Insects are sometimes be an important animal habitat of certain plants as insects are the main instruments of pollination for plants and some plants have a mutualistic relationship with an insect. (Yucca Moth/Yucca). Insects have a large roll in the lifecycle of plants that need to be pollinated as insects often move the pollination from flower to flower. Insects also have a large part in habitats in general as food, pollinators, pests or pest control and a healthy habitat is important for plants as well.

Unlike animals which eat other plants and/or animals to fuel their body (heterotroph), plants produce their own food (autotroph) through photosynthesis. Photosynthesis (meaning light & putting together) is the process of using energy from sunlight to convert water from the soil and carbon dioxide from the air into sugary food (glucose) and releasing oxygen. The food from photosynthesis is what give plants energy to grow.

Plants require certain variables to be able to grow and survive. Whether that's in nature or in a pot on our windowsill.

- Light (Sun): Leaves capture energy from the sun, then convert and store that energy for growth
  - Too much or too little sunlight will cause a plant to die
- Water (Rain): Carries the nutrients so plants can make food grow. Water may come from various sources (soil, air, rain, watering can, etc..)
- Air (Carbon Dioxide/CO<sub>2</sub>): Plants specifically need carbon dioxide from the air to make food and grow

- Nutrients (Soil): Nitrogen, phosphorus, and potassium are three main nutrients plants need for growth. Calcium, magnesium, and sulfur are also nutrients that may be important. Healthy soil should contain these nutrients, but farming practice can deplete or add to high of quantities which degrade the soil health.
- Temperature: Plants need an optimal growing temperature to thrive.
- Pollinators or Seed Dispersal:

Plant parts help in the process of Photosynthesis. The roots supply water and nutrients, including nitrogen and some minerals, to the plant, the leaves absorb Carbon Dioxide (CO<sub>2</sub>) and sunlight. This is a highly simplified summary of a very complicated process. The essential point is that the plant is making its own food, and the water and the nutrients assist in the production of that food. Roots may serve more functions than collecting water and nutrients for the rest of the plant. They may also be anchors for the plant and a site for food storage. A number of vegetables we eat are examples of when roots function as food storage (there are often called root vegetables such as carrots, parsnips and beets). Some roots accumulate sugar (sugar beets) while others accumulate starch (potatoes). One advantage of having roots store the plant's food is that the plant is more protected from the grazing of animals and from the danger of drought.

#### Plant Parts:

- Roots – Anchor plants to ground, move water and nutrients from the soil to the plant, store energy in the form of sugar or starch.
- Stems – Support the plant, transport water and nutrients from the roots to rest of plant and transport food (energy) from the leaves to the roots. Photosynthesis can occur in some stems.
- Flowers- Help the plant make seeds, attract pollinators through smell or shape.
- Fruits – Protect the seeds and attract animals to help spread seeds when animals eat them
- Leaves – The food maker for the plant through photosynthesis (absorbing carbon dioxide and using water from the roots and releasing oxygen)
- Seeds – Protect young plant and give it early energy to help grow another plant

# Photosynthesis



Description 1: The process in green plants and certain other organisms by which carbohydrates are synthesized from carbon dioxide and water using light as an energy source. Most forms of photosynthesis release oxygen as a byproduct. (The Free Dictionary)



Description 2: The process by which some cells in green plants are able to trap light energy and use it to split the Hydrogen and Oxygen in water. The Oxygen is given off, and the Hydrogen is combined with Carbon and Oxygen from CO<sub>2</sub> to make simple sugars, which are used as a food source immediately, or combined to make starch, or used in the manufacture of other substances. The light energy used is not green – green light is not absorbed by chlorophyll. Chlorophyll and other pigments trap the light, and the cell uses enzymes to split water, and to synthesize the products of photosynthesis. The energy-providing food we eat comes, directly or indirectly, from photosynthesis.

## Guiding Questions:

1. How do plants get their food?
2. How do plants reproduce?
3. Are plants dependent on the habitat conditions?
4. Are plant structures all the same? How are they different?

## State Standards:

Preschool: Life Science 2.1 - Recognize that living things have unique characteristics and basic needs that can be observed and studied.

Preschool: Life Science 2.1 - Recognize that living things develop in predictable patterns.

Kindergarten: Life Science 2.1 - To live and grow, animals obtain food they need from plants or other animals, and plants need water and light.

First Grade: Life Science 2.1 – All organisms have external parts that they use to preform daily functions

Second Grade: Life Science 2.1 - Plants depend on water and light to grow and on animals for pollination or to move their seeds around.

Second Grade: Life Science 2.2 - A range of different organisms lives in different places.

Third Grade: Life Science 2.1 – Organisms have unique and diverse life cycles

Fourth Grade: Life Science 2.1 - Organisms have both internal and external structures that serve various functions.

# Lesson Outline

<p><b>Opening/Introduction</b></p> <p>(~3 min)</p>	<p>Welcome students to station and let them know what you will be talking about today. Ask questions to gain an understanding of the group's knowledge and start point.</p> <p>Guiding questions?</p> <p>PreK-K: What do plants need to survive and grow?          1<sup>st</sup> – 2<sup>nd</sup>: How do plants reproduce (Describe a plants life cycle)?          3<sup>rd</sup> -4<sup>th</sup>: Is a plants life cycle dependent on its habitat?          How does a plants structure help it survive?</p>
<p><b>Key Talking Points</b></p> <p>(~5 min)</p>	<ul style="list-style-type: none"> <li>• Describe the plants life cycle and parts that help it survive</li> <li>• Discuss how animals impact plants (eating and distributing seeds, eating and killing plant, pollinating)</li> <li>• If students know the life cycle and animal interactions discuss the structure of a plants and the interactions that help photosynthesis.</li> </ul>
<p><b>Hands-on Activity</b></p> <p>One or more</p> <p>(~10 -15 min)</p>	<ul style="list-style-type: none"> <li>• Build a Plant (felt board plant)</li> <li>• Plant a seed to take home/school</li> <li>• <b>Photo Synthesis (game?, activity?)</b></li> <li>• <b>Cattail Dissection</b></li> <li>•</li> </ul>
<p><b>Conclusion</b></p> <p>(~5 min)</p>	<p>Discuss importance of plants in our habitat. With older students add in the importance of the process of photo synthesis.</p> <p>If you did cattail dissection discuss the parts of a cattail and how they impact the wetland.</p>
<p><b>Assessment Questions</b></p> <p>(~3 min)</p>	<ul style="list-style-type: none"> <li>▪ What do plants need to grow?</li> <li>▪ Do these needs change based on their habitat (food, water/air, shelter, space)?</li> <li>▪ Does this habitat we are in allow plants to grow well or poorly? Why?</li> </ul> <p>How do seasons affect plant growth? What variables are more available in the spring/summer?</p>

# Hands-on Activities

## Activity & Materials

## Instructions

Felt Board  
Felt Plant Pieces

- 1) Gather students in front of you and the felt board. As you discuss what a plant needs to survive, use the felt plant pieces to “build” all the parts on the board. Let the students individually put the pieces up as they raise their hand and answer the question “What does a plant need to grow”? (One piece per student depending on size of group, you may have multiple students place extra pieces such as rain drops, stems and leaves).
  - ✦ Sun
  - ✦ Soil
  - ✦ Seed
  - ✦ Rain
  - ✦ Sprout
  - ✦ Stem
  - ✦ Roots
  - ✦ Leaves (w/ veins)
  - ✦ Flower
- 2) Once you have built the plant have students find their space and become a seed in the “soil”.
  - Act out being a growing plant slowly standing up and stretching arms you repeat “sun and water” over and over (use a spray bottle over the students if it is warm).
  - Encourage the students to continue to grow by extending their arms as branches and leaves as they slowly stand (grow) and then use their hands to form a “flower” around their head.
  - Ask what does a flower produce? (Seeds!)
  - Have the students drop back to the “dirt” as their flower drops seeds and repeat the process at least once being the plant for the next year.

<ul style="list-style-type: none"> <li>• Permanent Marker</li> <li>• Sandwich Bags</li> <li>• Soil</li> <li>• Seeds</li> <li>• Water in Spray Bottle</li> <li>• Cup to scoop soil.</li> </ul>	<p>Place all the planting supplies on a table, bench or other area to create a production line of planting.</p> <p>Once you have built your flower and/or had the students become a flowering plant, move over to the production area. Have adults with the group help you in the production line.</p> <p>Ask the students to remind you what a seed needs to grow, do we have all the pieces here? (they will need to continue supplying the plant with sun once they leave).</p> <ul style="list-style-type: none"> <li>• Line up students in a row. Ask adult to write names on the sandwich bag as the students start (If marker is not working on bag use painters' tape)</li> <li>• Once the student has their bag scoop one ½ cup of soil into the bag</li> <li>• Have them pick a seed to plant in their bag</li> <li>• Have the student count as adults add 10 sprays of water to the bag. (K-2<sup>nd</sup> grade)</li> <li>• Close the bag and place the labeled bag into a box (or bag) that teachers will take back on the bus. You may have one container for each group or combine them all to take to the bus at the end of the program.</li> </ul> <p>Let teachers know that they can have the seeds germinate at the schools (suggest taping bags to the window) or that students may take them home to plant in a pot or in their yard.</p>
	<p><u>Activities coming soon</u></p> <ul style="list-style-type: none"> <li>➤ Photosynthesis Game/Activity</li> <li>➤ Cattail Dissection</li> </ul>