May 2020

Extended Learning May is a time when many things happen in the garden. More plants are in bloom, vegetables are harvested while others are planted, and more insects are seen. As we garden, it is important to know what a plant needs to grow. The Junior Master Gardener® program has an easy way to remember – you just need to know how to spell plants! How does that help us? Well, we say "Plants need P.L.A.N.T.S."

Source: 4-H Junior Master Gardener® Level 1 Teacher/Leader Guide, Texas A&M University

P	Place	In a container or garden
L	Light	From sun or artificial source
A	Air	Oxygen and carbon dioxide
N	Nutrients	16 different nutrients - the main ones are nitrogen (N), phosphorus (P), and potassium (K)
T	Thirst	Need water to transport nutrients form the soil to other plant parts. Water also helps transport food made by the leaves to other plant parts
S	Soil	Or other material (sand, gravel, water) to grow roots in

Plant Parts

Roots – anchors the plant in the soil and absorbs water and nutrients from the soil. Some roots store food.

Stems – supports the upper parts of plants. Water and dissolved nutrients from the soil travel up the stem in a system of tubes. Food from the leaves travel down stem to the roots. Stems also store food for the plant.

Leaves – attached to the stem; main function is to produce food in a process called photosynthesis. They also exchange gases (releases water and oxygen and absorbs carbon dioxide.

Flower – the showiest part of the plant. Petals (color and shape) attract pollinators to the flower. Produces seed.

Fruit – any seed-bearing structure. Develop after flowers are fertilized.

Seed – develops into a plant. Contains a small embryo, a food source until the plant grows its first leaves above the ground and can produce its own food, and seed coat.

Time To

Check for changes in plants. Changes can be caused insects, disease, incorrect watering, or nutrient deficiency. For example, chewed leaves usually mean insect damage. Yellowing could be cause by several factors. If your plant has a problem and you need help identifying what the issue could be and corrective measures that you could take, contact our office.

Remember, all insects are not bad guys! If your plant has leaves that look like they were chewed or curled and you see an insect, identify it before you take any action – that may not be the insect that caused the damage. It could be beneficial, so it is important to identify the insect before doing any control method.

Plant

Vegetables

Beans
Cantaloupe
Corn
Cucumbers
Okra
Peppers
Southern peas
Sweet peppers
Tomatoes

Herbs

Basil
Oregano
Mexican tarragon
Rosemary

Annual Ornamentals

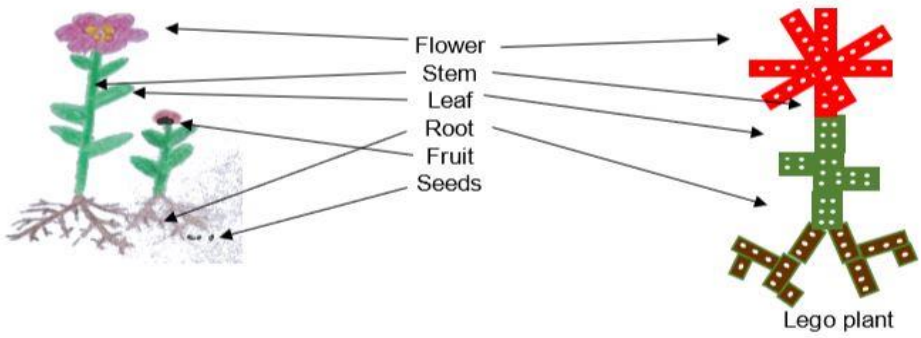
That take summer heat like salvia, wax begonia

Did You Know?

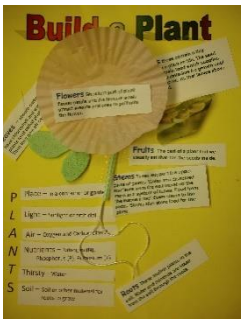
- Potatoes are underground stems. They store food. You can tell they are stems because they have nodes – the eyes of the potato. Nodes are where the buds, leaves, and branching twigs originate
- A fruit develops from a flower and contains seeds. A vegetable is any edible part of the plant other than the flower. So, by definition, tomatoes, squash, eggplant and peppers are fruits although we recognize them as vegetables on our plates.
- Most insects are good – less than 1% of all insects are pests!

Activity

1. Draw or make a plant showing all the plant parts. There are many ways to do this – use your imagination.
   Supplies:
   Any arts and craft supplies like paper and crayons, pencil, markers, or paint
   Make a collage using items found in the house or yard
   Make a plant using Legos



Lego plant



2. Color my Flower! An experiment in water movement. There are many ways you can modify this experiment. Just ask questions like the following, then design an experiment to answer the questions.
   - What happens if I use a different type of flower or a different food color?
   - How does the food color concentration effect the experiment?
   - What happens if I use a different method to color the liquid like a colored drink?

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Photos: UF/IFAS Extension Bay County

Resources

- 4-H curriculum: Junior Master Gardener® Level 1 and JMG® Health and Nutrition, Acres of Adventure
- https://www.usgs.gov/special-topic/water-science-school

Build a Plant

Objectives:

1. To learn what plants need to grow
2. To learn the functions of the parts of a plant

Materials:

String (~8 inches long)
Straw (cut in half)
Paper cupcake liner (large & small)
Sponge, felt, paper (cut for leaves)
Seeds or pictures of seeds (bean, sunflower)
Scissors
Tape or glue
Build a Plant sheet

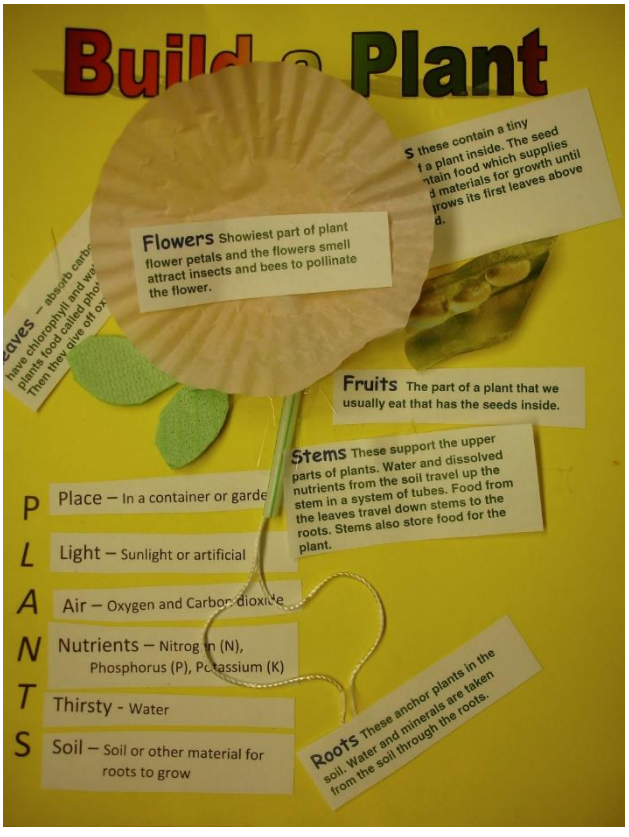
Discussion:

1. Plant needs
2. Plant parts
3. Explain why use the following
   a. Straw – the plant stem acts like a straw, contains xylem and phloem which transports water and nutrients from the roots to the leaves (xylem) and manufactured food from the leaves to other plant parts (phloem)
   b. String – spreads out like roots, acts like xylem and phloem in the plant stem
   c. Sponge – leaves absorb sunlight needed for photosynthesis

Directions:

1. Cut apart definitions for plant needs and plant parts
2. Place definitions for plants needs on bottom left section where the acronym PLANTS is located on the Build a Plant sheet
3. Fold string in half and thread string through the straw. The straw represents the stem and the thread represents the plants vascular system (what transports water, nutrients and food made by the plant). Attach straw and string to Build a Plant sheet.
4. Attach flower to top of stem. Small cupcake liner can be put in larger to make a decorative flower.
5. Attach leaves
6. Attach fruit and seeds
7. Label plant parts

KEY



Definitions for Build a Plant sheet

Plant Needs

Place – In a container or garden

Light – Sunlight or artificial

Air – Oxygen and Carbon dioxide

Nutrients – Nitrogen (N), Phosphorus (P), Potassium (K)

Thirsty - Water

Soil – Soil or other material for roots to grow

Fruits/Seeds – example of what can be used

Plant Parts

Roots - anchors plant in the soil. Water and minerals are absorbed from the soil through the roots.

Stems - supports the upper parts of plants. Water and dissolved nutrients from the soil travel up the stem in a system of tubes. Food from the leaves travel down stem to the roots. Stems also store food for the plant.

Leaves – absorb carbon dioxide, have chlorophyll and water to make plant food in a process called photosynthesis. During photosynthesis, leaves give off oxygen.

Flowers - showiest part of plant. Flower petals and the smell attract insects and bees to pollinate the flower.

Fruits - part of a plant that we usually eat that has the seeds inside.

Seeds - contain a tiny embryo of a plant. The seed halves contain food which supplies energy and materials for growth until the plant grows its first leaves above the ground.

Build a Plant

P

L

A

N

T

S

Activity 2

Color my Flower!

The purpose of the stem is to support the upper parts of the plant and to transport water, nutrients, and food made by the plant throughout the entire plant. So how does the water get to the top of a large tree? You can demonstrate how water moves through a plant by using a flower like a carnation or a stick of celery. If you don't have a flower or celery, you can use paper towels or toilet paper. Source: 4-H Junior Master Gardener® Level 1, Handbook, Texas A&M University; 4-H Acres of Adventures Level 1.

Objective: To learn how water moves through a plant

Using a flower or celery

Materials:

White flower or celery stalk with leaves
Water
Food coloring
Container to hold the colored water

Directions: Put water in the container and add several drops of food coloring (the more intense the color, the more intense the flower color will be). Make a fresh cut in flower stem or celery. Place in colored water. Observe over the next few hours but be aware it may take a day or two before the color reaches the flower or celery leaves. If the flower doesn't take up the water, recut the stem. Make a patriotic flower cutting the stem in thirds lengthwise and putting each stem part in one color - red, blue and plain water (white).

Using paper towels

Materials:

Paper towels or toilet paper
Water
Straw (clear to observe color)
Container to hold the colored water
Scissors
Food coloring

Directions: Put water in the container and add several drops of food coloring (the more intense the color, the more intense the flower color will be). Cut the tip of the straw in quarters and bend them down. Start twisting the paper towel and place in the straw. As you twist the paper towel it will continue to move into the straw. When it comes out the other end, you can cut the paper towel at the end where the straw has been cut to represent petals. The paper has to extend past both ends of the straw. Place in water. Observe over the next few hours but be aware it may take a day or two before the color reaches the top of the paper.

Using paper towels

					
Supplies	Twisted paper	Paper inside straw	Added to water	After 45 minutes	After 24 hours

Extended learning: Capillary action brings water and the minerals/nutrients dissolved in the water into the roots. But because of gravity, this only gets the water up so high. To get it up the rest of the way, cohesion and transpiration work together. Water molecules stick to one another, referred to as **cohesion**. Water escapes from the plant leaves, it evaporates in a process called **transpiration**. As water is pulled out from the leaves, more water enters the roots because water sticks together.

Think of drinking through a straw. What happens when you stop sucking and put your finger on the end of the straw – no more water enters the straw but as soon as you start sucking again, liquid is pulled up. The sucking action is like the evaporation/transpiration from a plant. As water exits the plants from the leaf, more water is pulled into the plant from the root. The same thing happens in a paper towel, water sticks together and moves through the paper towel. For more information on water visit https://www.usgs.gov/special-topic/water-science-

school. Temperature and wind effect how fast water moves up the stem. This explains why plants may wilt on hotter days – more water leaves the plant (transpiration) so more water has to enter the roots.