**Photosynthesis and Plant Nutrients**

**Grade Level(s)**

4th grade

**Estimated Time**

30 minutes

**Purpose**

Students will discover the art and importance of food making in plants.

**Materials**

* Flowers or celery
* Food coloring
* Water
* Cups
* Paper towels

**Vocabulary**

* Chlorophyll- the result of light striking a plant
* Photosynthesis- Process of light energy being converted into food for the plant.

**Background**

When light strikes a plant, a substance called chlorophyll forms. It usually develops in the leaves, but in many plants the small stems are also green because of chlorophyll. Without light, food can’t be formed. The plants become yellow and die. Water is brought into the plant by the roots. From the air, a gas called Carbon Dioxide enters the leaf. The gas enters the leaf through an opening on the bottom. The developed chlorophyll causes the water and CO2 to go through a change. New products: sugar and oxygen are created. The plants use the sugar as food and the oxygen is a “waste” product that is released. This process is called photosynthesis.

**Activity 1:** Photosynthesis worksheet

1. When light strikes a plant, a substance called chlorophyll forms. It usually develops in the leaves, but in many plants the small stems are also green because of chlorophyll. Without light, food can’t be formed. The plants become yellow and die. Water is brought into the plant by the roots. From the air, a gas called Carbon Dioxide enters the leaf. The gas enters the leaf through an opening on the bottom. The developed chlorophyll causes the water and CO2 to go through a change. New products: sugar and oxygen are created. The plants use the sugar as food and the oxygen is a “waste” product that is released. This process is called photosynthesis.
2. Review the worksheet. The energy made from photosynthesis moves to different parts of the plant through tiny holes called phloem. That is how food moves down to the roots but how does water move upwards?

**Activity 2:** We will observe the plants plumbing system. How does water get from the roots to the leaves and flowers?

1. To help us answer that, we will place a white flower (carnation, daisy or rose) in a vase with water and food coloring. Observe how the flower takes up the colored water.
2. What do you notice?
3. Did the water move in the flower?
4. How do we know?
5. Take the flower from the water and look at the bottom. What do you see? The tiny holes are called xylem. The water moved up through these holes. Water moves up through the xylem.

**Activity 3:** What do plants give us?

1. Read an Ag mag and brainstorm the many products we get from plants.

**Organization Affiliation**

National Ag in the Classroom

**Agriculture Literacy Outcomes**

**T1.3-5.b** Explain how the interaction of the sun, soil, water, and weather in plant and animal growth impacts agricultural production.

**T2.3-5.c** Explain how the availability of soil nutrients affects plant growth and development.

**Iowa/ Common Core** **Standards**

**3-LS1-1.** Develop models to describe that organisms have unique and diverse life cycles, but all have in common birth, growth, reproduction, and death.

**4-LS1-1.** Construct an argument that plants, and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.