

How Do Trees Eat? Elementary Level Curriculum

Objective: Students will understand how trees, and all plants, eat and the processes that plants use to take nutrients from the soil. Students will be introduced to the concept of photosynthesis and the parts of the tree.

This lesson corresponds to:

-S.5.GS.6/5-LS1-1- Support an argument that plants get the materials they need for growth chiefly from air and water.

Materials:

- 6 stalks celery (leaves still on)
- 2 colors food coloring (red and blue work best)
- 3 clear cups
- Water

Background Information: Trees have a large system of roots that anchor them into the ground. The roots act as more than just anchors to protect the tree from getting blown away in the wind or floods, the roots act as feeding tubes and suck nutrients and water out of the soil and into the tree.

The inside of the tree is composed of a network of tubes that act like veins and arteries that flow from the roots to all the branches and leaves. These tubes are called the *xylem* and the *phloem* and they make up the *sapwood*. The xylem tubes carry nutrients, sap and water from the roots up the tree and the phloem tubes carry nutrients, water and sap from the leaves to other parts of the tree. Together these tubes are able to keep the whole tree fed and healthy. Thinking ahead to tapping trees, it is this layer of the tree, the sapwood, that is tapped and sap runs out of. If you put the tap too far into the tree the sap will not run.

Photosynthesis is a process that takes place in all plants, it is one of the main ways that plants make food. The leaves on trees and plants soak up the sun's rays and take in carbon dioxide and water and turn it into sugar. The tree stores this sugar and it is absorbed into the sap that is running through the sapwood of a tree. The sap of a tree serves many different purposes depending on the type of tree, sap can be equated to a human's blood. In maple trees the sap is used for fuel for growing lots of new leaves. It is the sugar contained in maple sap that gives it the unique ability to be turned into sweet maple syrup.

Introduction: People eat and animals eat, so trees and plants must eat too because they are living organisms too. Ask students:

- Do you have any ideas how trees are able to eat? Or what they eat?
- Why do the trees need to eat?
- What are some parts of the tree?

There are two activities for teaching these concepts.

Activity 1: Tree Tai Chi: Students will learn the parts of the tree in a fun and interactive way. This activity can be done in the classroom with students standing, or it can be done outside.

Each part of the tree will have a movement associated with it. Have students do the associated movement when the tree part is called out. After students understand all the movement/part pairings turn this into an elimination game, similar to 'Simon Says.'

-Roots: Bend down and move your hands towards your feet on the floor pretending you are collecting nutrients from the soil.

-Vascular System (tubes in the sapwood): Reach for your feet and slowly stand up bringing your arms up until they are over your head, representing water and nutrients traveling up through the vascular system.

-Phloem: Shake arms and head, fold arms and head in towards chest, representing movement of nutrients from leaves of tree inward.

-Xylem: Curl in a ball and slowly extend body upward, representing movement of nutrients from roots up to the leaves.

-Sap: Shake entire body with lots of energy, representing a sugary liquid moving through the tree.

-Leaves: Extend your arms above your head and slowly bring them down to your sides while wiggling your fingers, representing the growth of leaves and their ability to absorb sunshine.

-Photosynthesis: Spread whole body out and act as if soaking up sun and warmth, jump and wiggle around with lots of energy.

Additional movements and associations can be created.

Activity 2: Rainbow Celery Experiment: This activity demonstrates that nutrients are absorbed from the roots and transported to the rest of the tree/plant.

Procedure:

1. Fill three glasses half full with water.
2. Place 4-5 drops of red food coloring in one glass, and 4-5 drops of blue in a different glass.
3. Place two stalks of celery, freshly broken off the branch, in each glass. **DO NOT TAKE THE LEAVES OFF.**
4. Have your students write down observations and predictions of what will happen as the celery sits in colored water.
5. Let sit for 24 hours.
6. Have students make observations again and try to explain what they see. what has happened to the celery and why.
 - a. You can leave the celery in the colored water for longer to see if there are more changes, but you should see results in about a day.

Conclusions: The celery will have changed to be the same color as the water, demonstrating that plants/trees are soaking up water from the ground which is then transported to all parts of the tree/plant.

-This message can be expanded upon to include a discussion about what is in the soil and how it affects trees/plants, i.e. agricultural and urban runoff as well as pollution.

Conclusions: After these activities, the following questions can be used to test students understanding and provoke further thought of these concepts.

-How do maple trees use sap?

-Why is it important for maple producers to know about how the inside of trees work?

-Why is it important to keep the soil and earth clean? How does it affect trees?

-Do you think maple syrup from different places would taste slightly different?

Resources:

“Parts of a Tree” North Carolina Forestry Association. Retrieved 10 January 2019.

<https://www.ncforestry.org/teachers/parts-of-a-tree/>

Shiwnarain, Mohendra. “The Parts of A Tree” Retrieved 10 January

2019. <https://sciencetrends.com/parts-tree-function/>

“How do Trees Make Sap” Wonderopolis. Retrieved 23 December 2019.

<https://www.wonderopolis.org/wonder/how-do-trees-make-sap>

<http://www.teaching-tiny-tots.com/toddler-science-celery-experiment.html>