

Willie and the Beanstalk

Xylem, Xylem: What Do You Do?

Science

Materials

Per Class:

Poster/marker or data projector/smartboard to display KWL chart/video
CD (anything upbeat)
CD player

Per Pair of Students:

One fresh celery stalk with leaves
One clear glass or cup
Red food coloring
Water
Ruler
Knife or scalpel

Per Student:

One cup or carton of milk
One straw
Science Journal
Pencil or colored pencils
Copy of Student Handout A: KWL Chart

Grade Level: 4-7

Time: Two 50-min. class periods

Standards:
Science

For Kansas standards, visit www.ksde.org

Overview

This lesson engages students in discovering the route plants take to obtain water in order to make food. This lesson also ties into students' prior experiences of their own methods of obtaining food and the steps that the food goes through before it ends up on their plates.

Objectives

1. Students will discover how animals and plants obtain nutrients to grow.
2. Students will demonstrate how water moves to the leaves and is used in photosynthesis.
3. Students will understand the many steps and individuals are involved in human nutrient consumption.

Background Information

Many animals use their mouths to ingest the necessary nutrients into their bodies. An animals'



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digestive system is able to take the nutrients from the food to give the animals its nutritional energy. However, plants obtain their nutrients in a different fashion. Plants drink water through their roots in the soil. As the water evaporates from the leaves, a vacuum is created in the stem that pulls the water upward to the leaves. Water moves in the plant's vessels (xylem) distributing nutrients. In the leaf this is part of the photosynthesis process. Soybeans use a xylem, just like every other plant, in order to transport water and grow.

Preparation

1. Obtain all materials
2. Cut the bottom off celery for pair of students
3. Make copies of Student Handout A: KWL Chart

Instructional Format

1. Ask students these introductory questions.
2. Share background information with students.
3. Students complete the 'K' and 'W' part of the KWL chart (Student Handout A) with what they know about plant parts and what they want to know.
4. Students participate in 'Where Does Milk Come From?' activity
5. Students participate in 'Xylem' activity
6. Students answer conclusion questions and complete the 'L' on the KWL chart.

Procedures

Have students answer the following questions.

Introductory Questions

1. What would happen if you stood in a pool of milk?
2. Do you think your thirst would be quenched or your stomach filled?
3. How do you obtain the nutrients your body needs?

K-W Questions

1. Which plant part gets water for the plant?
2. Do other parts of the plant get water?
3. Leaves need water to make food. How do the leaves get water?
4. How does a plant obtain the nutrients it needs to grow?
5. How are animals and plants different when obtaining nutrients?

Where Does Milk Come From? Activity

1. Ask, "Where does milk come from?"
2. Instruct students to individually list the plants, animals, people or things that are involved in getting the milk from the source to their table.
3. Have students stand in two circles, one inside the other (with same number of students on inside and outside circles). Each student should have his or her list that was created.
4. Start the music, and when music begins playing, instruct students to start walk around the circle



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to the music.

5. When the music stops, each student pairs up with student across from him or her.
6. Have the pair find a new location to discuss both lists, and they must create a new list, which highlights both individual lists (removing duplicate answers). Make sure they focus on plants, animal, people or things involved before the milk was produced, during the gathering of the milk, and after the milk was gathered.
7. Give each student a cup of milk and a straw, and have students drink the milk.
8. Ask students these questions:
 - What do you think will happen to the milk in your bodies?
 - How is this like a plant?
 - How does a plant obtain its nutrients?
Humans obtain their nutrients through their mouth and plants use the roots to gather water up to the leaves so food can be made.

Xylem Activity

1. Pairs add ½ inch water to a clear cup.
2. Add a couple drops of red food coloring.
3. Place the bottom of the celery stalk with the bottom cut off in the colored water.
4. Label the container and put it in a location that they can easily see.
5. Students make a drawing or graph the celery plant in their science journal.
6. Observe the celery stalk every few hours and record the height of the colored water in the celery stalk.
7. After the food coloring has reached the leaves of the celery stalk, cut the stem and look at the method of transportation the water traveled through the stalk to the leaves. The xylem will be easy to view.

Conclusion Questions (Assessments)

1. What did you observe?
Answers will vary depending on the student.
2. Why is it important for the water to travel through the plant in order to reach the leaves?
The leaves are where photosynthesis (food making) happens.
3. How did the water get pulled to the leaves?
The xylem transports water up the plant.
4. How did you move nutrients in a similar manner the way a plant did?
Through the straw.
5. What is involved when plants gain their necessary nutrients?
Roots, stem, leaves, soil, weather

Have students complete the L section of the KWL chart.

Another great resource from



Kansas Foundation
for **Agriculture**
in the **Classroom**

www.ksagclassroom.org

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Resources

Exploring Kansas Crops Educator's Guide (2004). Unit 2 – Growing Kansas Crops (27-52).
Kansas Foundation for Agriculture in the Classroom. To order, visit www.ksagclassroom.org.

Adapted from lesson plan created by Carol Budde, Newton, KS.

Want More? Extensions

Have students demonstrate this process using a variety of colors of food coloring and different plants or flowers. This could make colorful bouquets!



