

**GRADE LEVEL:** PreK, K

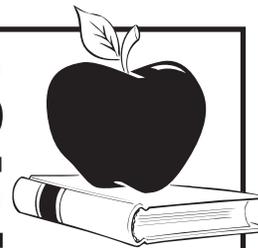
**NEXT GENERATION SCIENCE STANDARDS:** K-ESS3-1, K-LS1-1

**ILLINOIS EARLY LEARNING STANDARDS:** 11.A.ECa, 11.A.ECb, 11.A.ECd, 11.A.ECe, 11.A.ECf, 11.A.ECg, 12.B.ECa, 12.B.ECb, 13.B.ECb

**SKILLS:** observing, critical thinking, counting

**OBJECTIVE:** Students will learn how trees produce their own food and how every part of the tree contributes to the process of making and distributing food.

# TEACHER'S GUIDE



## UNIT TWO ■ LESSON TWO

# What Do Trees Do for Dinner?

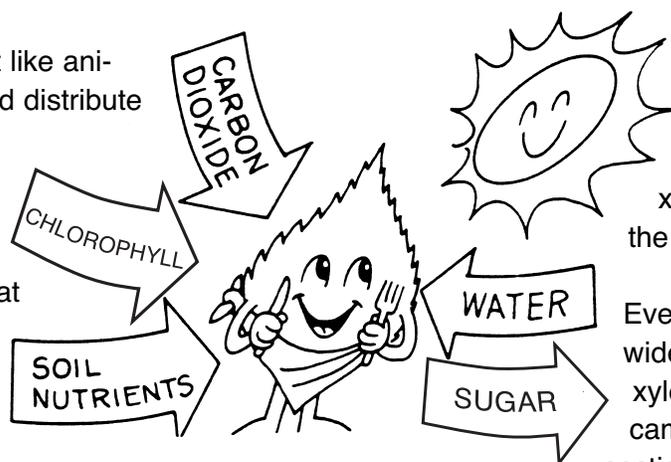
### BACKGROUND

Trees require food, just like animals. They produce and distribute their own food in a special way.

#### Little Green Food

**Factories.** The food that trees need is made in the leaves. Each leaf contains millions of cells with chlorophyll, a green pigment. Chlorophyll cells are green, which is why leaves are green in the spring and summer. These cells actually make food through a process called photosynthesis. Chlorophyll cells take in carbon dioxide from the air. Chlorophyll cells combine this carbon dioxide with water sent up from the roots of the tree. In the chlorophyll cell, sunlight passes through this mixture and turns it into sugar and oxygen. The sugar is the food that trees need to grow. Oxygen is released into the air that we breathe.

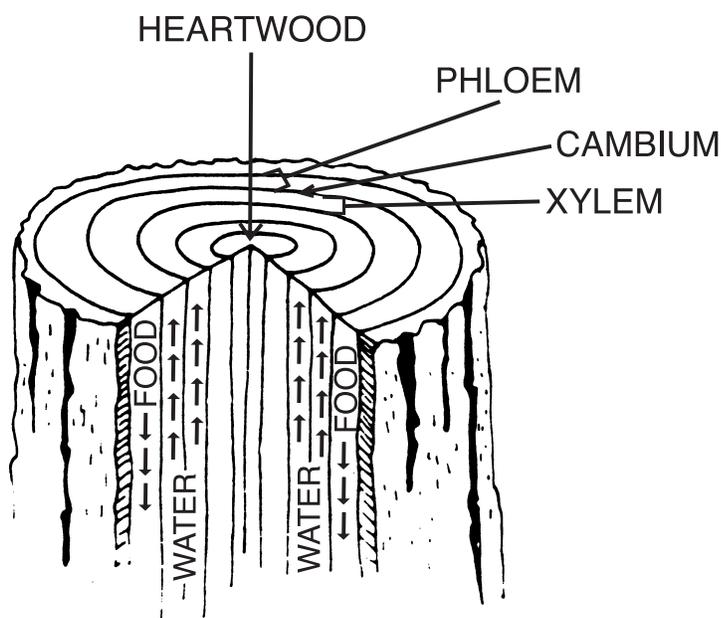
**Pipelines Inside Pipelines.** Inside the trunk of the tree is a two-way pipeline. Just inside the bark there is a pipeline that the leaves use to send food down to the roots. This pipeline is called phloem (flo-em). Next to the phloem towards the middle of the tree is another pipeline—this one is called xylem (zi-lem)—that sends water up



from the roots to the leaves. Between the phloem and the xylem there is an area of wood called the cambium. The phloem, cambium and xylem are the living portions of the trunk of a tree.

Every year the tree trunk becomes wider as new layers of phloem and xylem grow from the sides of the cambium. When you look at a cut section of a log you can see the

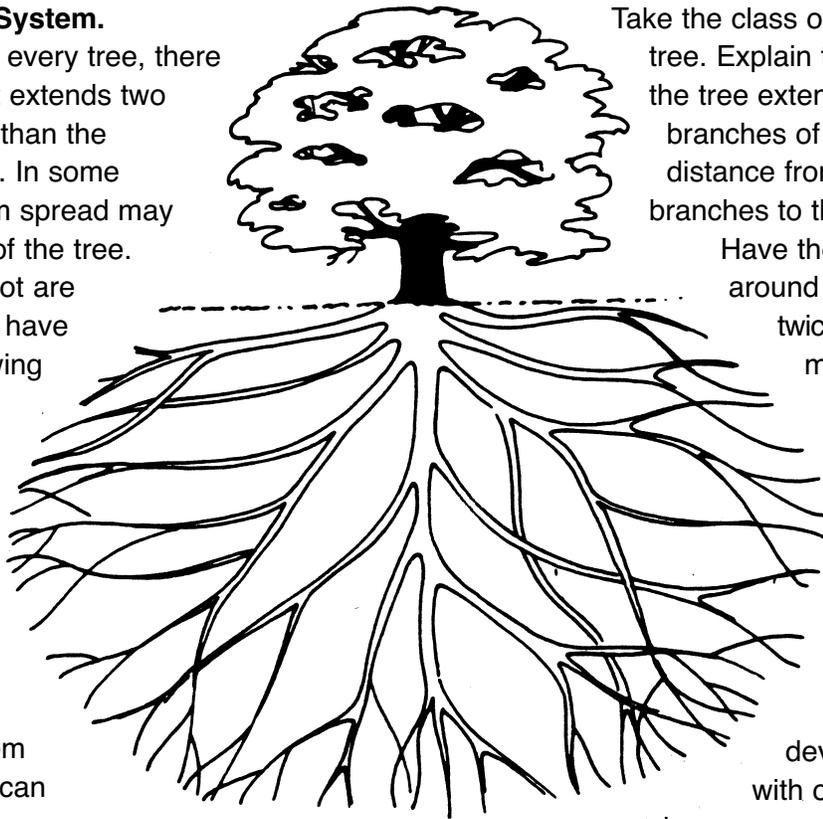
rings of new wood that are added each year the tree lives. In the center of the trunk of a tree is the heartwood. This portion of the tree is old phloem, cambium and xylem layers that are nonliving. The heartwood is very hard and gives a tree the strength to stand straight and tall.



### At the Root of the System.

Underground, under every tree, there is a root system that extends two to four times further than the branches of the tree. In some trees the root system spread may be twice the height of the tree.

Attached to every root are tiny root hairs which have beneficial fungi growing on and in them (mycorrhizae). They act like miniature straws to draw up water and nutrients. That mixture is sent up the pipeline to the leaves. Roots also receive food from the pipeline so they can grow.



Every part of the tree is involved in this system. The roots gather water and nutrients from the soil. Water flows up the trunk to the leaves where it is combined with carbon dioxide and sunlight to make food. This food flows back down through the trunk to help all parts of the tree grow.

### PROJECTS AND ACTIVITIES

If there is a microscope or magnifying glass available, show students a prepared slide from a leaf so that they can actually see chlorophyll cells.

Take the class to a nearby tree stump, take a cross section of a log to class or purchase slices of tree branches at a craft store. Show them the layers that make a tree's food transportation system.

Explain that there is a layer of new wood for every year that the tree lived and discuss why they think this happens. Have them count the rings to see how old the tree was when it was cut. Have them try to count rings to see how big around the tree was the year they were born.

Take the class outside under a large tree. Explain that the root system of the tree extends well beyond the branches of the tree. Measure the distance from the end of the branches to the trunk of the tree.

Have the class form a circle around the tree at a distance twice as long as the branch measurement. The area encompassed contains the roots that support and feed the tree.

### EVALUATION

Divide the class into three sections. The students should develop a three-act play with one group being the leaves, one group being the trunk and one group being the root system. Each group should create its own description of the function of its part of the tree. An elected spokesperson should present the description while the others act it out.

### EXTENSION

Take a class trip to an area where maple syrup is produced. Explain that sometimes people eat the very same food that trees do—in this case maple syrup from sugar maple trees. If a sugar maple tree is available near the school, it is easy for the class to make real maple syrup.

### VOCABULARY

carbon dioxide  
chlorophyll  
phloem  
photosynthesis  
xylem

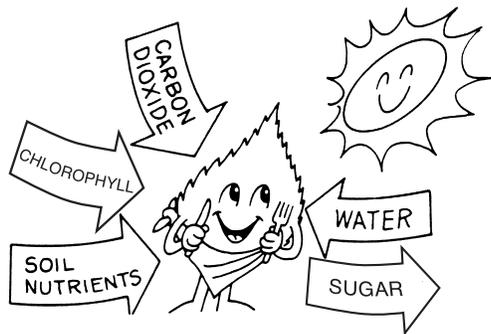
# What Do Trees Do For Dinner

# STUDENT'S GUIDE

Trees need food just like you. They make their own food. The leaves do the cooking. All they need is water, air and sunshine.

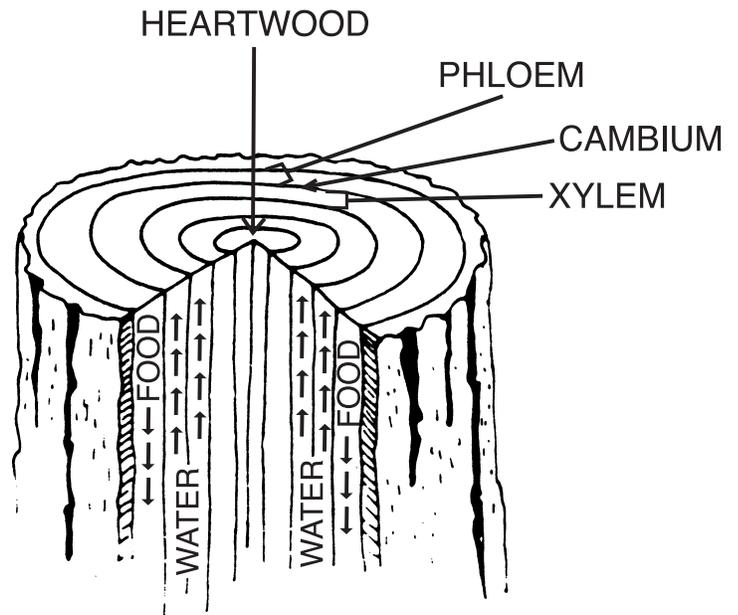
## Little Green Food Factories

When leaves are green, they are making food. They take in air. They mix in water and nutrients sent up from the roots. They use the heat from the sun to cook their dinner.



## Pipelines Inside Pipelines

Inside every tree there are hollow pipes. The roots use some of these pipes to send water to the leaves. The leaves use some of these pipes to send food to the rest of the tree. Every year a tree grows more pipes. To us they look like rings in the wood.

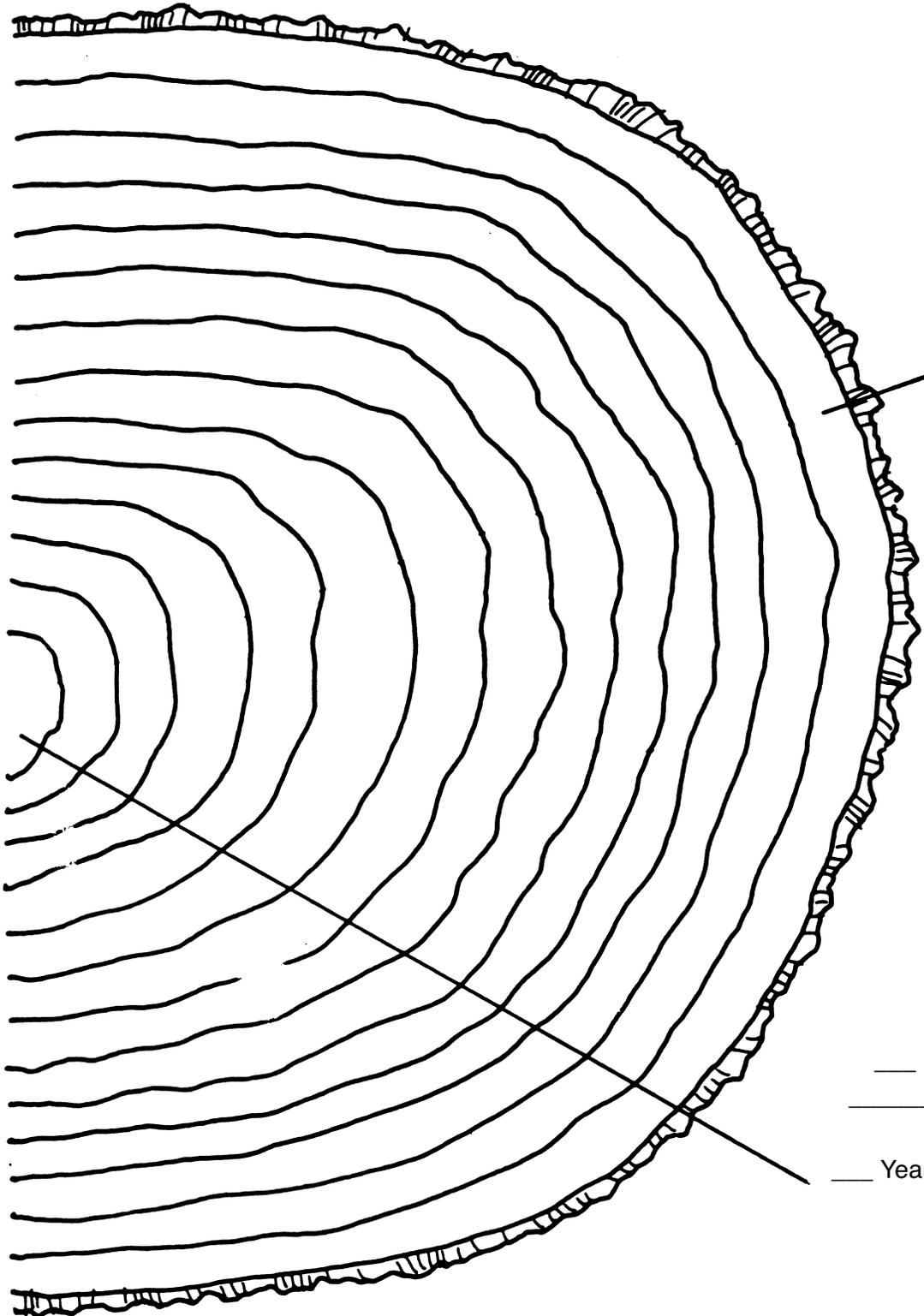


## How Trees Drink

Trees drink with their roots. They take water from the ground. Trees have more roots than they have branches. The part of the tree you can't see is bigger than the part you can! Roots have hairs like tiny straws to drink water and send it up the pipes to the leaves.

# Growing Together!

Every year that a tree grows, it forms a new ring. How many years has this tree been growing? What have you been doing while this tree was growing? Write the current year in the first blank. Fill in the years for the important events in your life. Draw a line from each year to the matching ring. Then count the rings of the tree to find out how big the tree was in each of those years. (Dates to be filled in by students.)



\_\_\_ This year's growth.

\_\_\_ I was born.

\_\_\_ I learned to walk.

\_\_\_ I learned to talk.

\_\_\_ I lost my first tooth.

\_\_\_ I started school.

\_\_\_ I met my best friend.

\_\_\_ I learned to ride a bike.

\_\_\_ I took my favorite trip to \_\_\_\_\_.

\_\_\_ Year this tree began.