

To Build a Tree

Grades: 3rd - 5th

Time:

50 minutes

Method:

Students will learn about the structure of a tree by acting out each of its main parts.

Objectives:

Students will be able to:

1. Name and describe at least 3 different parts of a tree and their functions. (3rd grade)
2. Name at least three animals that use trees as part of their food source or for shelter. (5th grade)
3. Give at least one example of what trees need to survive. (3rd grade)
4. Explain how volunteers (like those at Asheville GreenWorks) work to plant trees. (3rd grade)
5. Explain how planting trees contributes to the health and well-being of an individual and to the community's natural environment. (3rd grade, 4th grade)
6. Define "producer". (5th grade)
7. Name one important thing trees give to people. (4th grade)

Activity

- Start a discussion about photosynthesis and the importance of trees. Discuss what a "producer" is and its importance in the food chain.
- Explain that each participant will become a part of a tree. You may ask for volunteers or assign parts. Use the cheat sheet provided to guide you along as you instruct the group.
- Depending on the number of students you will need to figure out how many of each part you will need. If you have less than 30 students and adults you can lessen the number of Outer Bark and/or Leaves tree parts as needed. If you have more, add to the Phloem, Cambium, then Xylem in that order before adding to the Outer bark and/or Leaves.
- For 30 students you will need:
 - **1 = Heartwood**
 - **1 = Taproot**
 - **2 = Lateral roots**
 - **3 = Xylem**
 - **5 = Cambium**
 - **7 = Phloem**
 - **8 = Outer Bark**
 - **3 = Leaves**
- As you hand out the necklaces (you make from the cards at the end of the lesson) talk about the roles each of the tree parts play in the survival of a tree. Ask the students to put their necklaces on and instruct the students to listen to the following directions and take their place as you recite them. They can save the sound effects for the end. (smile)

Activity continued

Parts of Tree

- Most of the trunk in an old tree is dead wood called **heartwood**. The heartwood no longer transports water and minerals up the tree but it forms the central core of the tree and provides strength for the tree. Sometimes it rots away and the tree may topple over or split apart.
 - ACTION The **heartwood** crosses their arms and takes center stage wearing sunglasses.
- The **taproot** is the dominant root that grows straight down and absorbs nutrients and water. Some trees have long taproots that reach straight down for 15 feet or more.
 - ACTION The **taproot** sits down at the foot of the heartwood, criss-cross applesauce, and makes a deep "hummm".
- A tree's roots are long, underground branches, called **lateral roots** that spread out to help anchor the tree and to absorb water and nutrients from the soil. As a tree's lateral roots grow away from the tree and branch into finer and finer roots called rootlets. The rootlets themselves are, in turn, covered by even finer root hairs. These root hairs absorb approximately 95 percent of the water and nutrients for the tree.
 - ACTION The **lateral roots** lie down on their backs, spreading out from the taproot with their feet toward the heartwood making slurping sounds.
- The next layer close to the heartwood is called the **xylem**. Xylem, also called sapwood, carries water and nutrients up from the roots to other parts of the tree including the leaves; older xylem cells become part of the heartwood.

Activity continued

- ACTION The Xylem join hands to make a ring around the heartwood facing in. Position them so they stand between the lateral roots. The xylem pretend they are drawing water up from the roots by lowering their hands, still joined, and then raising them above their heads.
- Next to the xylem is a very thin layer called the **cambium**. The cambium is the growing layer of the tree creating new cells that become new xylem, phloem, and cambium. The cambium is also what makes the trunk, branches, and roots grow thicker.
 - ACTION The **Cambium** layers join hands and form a large circle around the xylem while chanting "we make new cells, we make new cells, we make new cells...".
- The layer between the outer bark and the cambium is called the **phloem**. Phloem, also called the inner bark, carries water and the sugar made in the leaves down to other parts of the tree such as roots, stems, buds, flowers, and fruits.
 - ACTION The **phloem** join hands and form a larger circle around the cambium. They start out holding their arms above their heads, then lowering them and raising them again.
- The **outer bark** protects the tree from injury caused by insects and other animals, disease, and fire. The outer bark's characteristics vary from species to species (for example, it may be thin, thick, spongy, rough, smooth, covered with spines, etc. depending on the type of tree).
 - ACTION The **outer bark** forms a circle around the entire tree, facing outward and standing with their arms in a goal post position, flexing their biceps, marching in place.

- **Photosynthesis is a process that trees use to convert light energy into chemical energy. The chemical energy stored in molecules fuels the tree's activities. Photosynthesis usually happens in the leaves (although sometimes it can happen in the bark) using a pigment called chlorophyll. "Photo" means light and "synthesis" means to put together. Light with carbon dioxide and water makes food.**

The gases needed for and generated by photosynthesis enter and exit through tiny holes called stomata, on the under surface of the leaves. Photosynthesis is largely responsible for producing and maintaining the oxygen content of the Earth's atmosphere, and supplies all of the organic compounds and most of the energy necessary for life on Earth. Water vapor also exits through the stomata in the process of transpiration.

- **ACTION The remaining students become leaves. Their part is to dance and flutter their hands resembling leaves blowing in the wind around the outside of the bark singing "We make food, We make food..."**
- **When the tree is completely assembled, have all students act out and chant their parts simultaneously.**
- **Use the cheat sheet provided to guide you along as you instruct the group.**

Caution: To prevent name tags from tangling, collect them by the card instead of the necklace.

COOL FACTS ABOUT TREES

The tallest trees in the world are found in the Pacific Northwest (in the US!) and are called coastal redwoods.

The largest tree in volume in the world is also found in the US and is a sequoia, another type of redwood. It is called General Sherman and lives in Yellowstone National Park.

TREES PROVIDE

- Clean air by removing pollutants and capturing carbon dioxide and producing oxygen.
- Shade and reduce cooling costs for a home and office.
- Control stormwater runoff by acting as a sponge, soaking up rain and other pollutants before they enter into the river.
- Provide wildlife habitat and food for people (ex: apples) and animals (ex: acorns).
- Provide wood products that we use every day!
- Make the community a beautiful and healthy place for everyone to live!

ASHEVILLE GREENWORKS

Asheville GreenWorks began cleaning and greening as Quality Forward in 1973. GreenWorks engages citizens as volunteers to plant edible and shade trees across Asheville and Buncombe County. With the help of thousands of volunteers, GreenWorks planted 394 trees in 2016 and continues to provide and plant trees in the community through events like "The Tree Giveaway". GreenWorks has also planted nine community orchards that provide free food for the community.

Cheat Sheet

1 Heartwood crosses their arms and takes center stage and is the old, dead part of the tree. Student wears sunglasses.

1 Taproot sits down at the foot of the heartwood and makes a deep "hummm...".

2 Lateral roots lie down on their backs, spreading out from the taproot with their feet toward the heartwood making slurping sounds

3 Xylem joins hands to make a ring around the heartwood facing in. Position them so they stand between the lateral roots. The xylem pretend they are drawing water up from the roots by lowering their hands, still joined, and then raising them above their heads.

5 Cambium layers join hands and form a large circle around the Xylem while chanting, "we make new cells, we make new cells, we make new cells..."

7 Phloem joins hands and forms a larger circle around the cambium. The phloem transport food down from the leaves. They start out holding their arms above their heads, then lowering them and raising them again.

8 Outer bark forms a circle around the entire tree, facing outward and standing with their arms in a T-position, flexing their bi-ceps, marching in place.

3 Leaves dance and flitter their hands on the outside of the bark singing, "we make food, we make food" like wind through the leaves. The leaves are where our energy starts so crank it up!

Heartwood



the old, dead part of the tree

Cross arms and take center stage

Taproot



dominant root that grows straight down and absorbs nutrients and water

sit down at the foot of the heartwood and make a deep "hummm..."

Lateral Root



grow outward or laterally from the tree and absorb water and nutrients

lie down on your back, spreading out from the taproot with your feet toward the heartwood and make slurping sounds

Xylem



carry water and nutrients up from the roots to other parts of the tree including the leaves

lower your hands and then raise them above your head

Cambium



growing layer of the tree creating new cells that become new xylem, phloem, and cambium

join hands around the xylem and chant "we make new cells, we make new cells..."

Phloem



also called the inner bark, carries water and the sugar made in the leaves to other parts of the tree

join hands and form a larger circle - hold your arms above your head then lower and raise them

Outer Bark



protects the tree from injury caused by insects and other animals, disease, and fire

face outward and stand with your arms in a T-position, flexing your bi-ceps, marching in place

Leaves



location of photosynthesis

dance and flutter your hands on the outside of the bark singing, "we make food, we make food" The leaves are where our energy starts so crank it up!