

# Anatomy of a Tree



## Submitted By:

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## Overview

Students will learn about the tree life cycle and be able to name and label tree anatomy and function.

## Grade Levels

Kindergarten, 1<sup>st</sup> and 3<sup>rd</sup> grades

## Curriculum Correlation

K.L.1.2

1.L.2.1

3.L.1.1, 3.L.2.1, 3.L.2.3

5.L.1.2

## Duration

1 to 2 class periods

## Location

Indoor and outdoor

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## Materials

### Dress Like a Tree Activity:

1. Straws strung on yarn for roots, tie the yarn around the model's feet
2. Large brown shirt for wood, or write "wood" on a white shirt
3. Paper bag vest for bark
4. Green headband with paper or felt leaves attached
5. String necklace with paper cut-outs of apple flowers and fruits, one cut in half to show seeds.

### Body of a Tree Activity:

1. 2 large sheets of paper or poster board
2. A variety of different colored markers

### Plant Life Cycle Buffet Activity:

1. Plant seeds – enough for each student to try some
  - a. Examples: peanuts (watch for allergies), sunflower seeds, pumpkin seeds, corn nuts, any nuts, sesame seeds.
2. Roots – enough for each student to try some
  - a. Examples: carrots, ginger.
3. Sprouts – enough for each student to try some
  - a. Examples: bean sprouts, alfalfa sprouts
4. Stems – enough for each student to try some
  - a. Examples: broccoli stems, chives, rhubarb, celery.
5. Leaves – enough for each student to try some
  - a. Examples: red or green leaf lettuce, cabbage, spinach, collard greens, basil.
6. Flowers – enough for each student to eat
  - a. Examples: marigolds, dandelions, broccoli, cauliflower.
7. Fruits – enough for each student to try some
  - a. Examples: raspberries, strawberries, blueberries, apples, peaches, tomatoes

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## Learning Targets

Students will be able to name the life cycle stages of a tree.

Students will be able to name the parts and functions of a tree.



## Educators Information

Parts of a Tree from the NC Forestry Association, <https://www.ncforestry.org/teachers/parts-of-a-tree/>

Crown: The crown, which consists of the leaves and branches at the top of a tree, plays an important role in filtering dust and other particles from the air. It also helps cool the air by providing shade and reduces the impact of raindrops on the soil below.

Leaves: The leaves are the food factories of a tree. They contain chlorophyll, which facilitates photosynthesis and gives leaves their green color. Through a process called photosynthesis, leaves use the sun's energy to convert carbon dioxide from the atmosphere and water from the soil into sugar and oxygen. The sugar, which is the tree's food, is either used or stored in the branches, trunk and roots. The oxygen is released into the atmosphere.

Roots: A tree's roots absorb water and nutrients from the soil, store sugar and anchor the tree upright in the ground. All trees have lateral roots that branch into smaller and smaller roots and usually extend horizontally beyond the branch tips. Some trees have a tap root that reaches down as far as 15 feet. Each root is covered with thousands of root hairs that make it easier to soak up water and dissolved minerals from the soil. The majority of the root system is located in the upper 12 to 18 inches of soil because the oxygen that roots require to function properly is most abundant there.

Trunk/Stem: The trunk, or stem, of a tree supports the crown and gives the tree its shape and strength. The trunk consists of four layers of tissue. These layers contain a network of tubes that runs between the roots and the leaves and acts as the central plumbing system for the tree. These tubes carry water and minerals up from the roots to the leaves, and they carry sugar down from the leaves to the branches, trunk and roots.

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Heartwood: As a tree grows, older xylem cells in the center of the tree become inactive and die, forming heartwood. Because it is filled with stored sugar, dyes and oils, the heartwood is usually darker than the sapwood. The main function of the heartwood is to support the tree.

Xylem/Sapwood: The xylem, or sapwood, comprises the youngest layers of wood. Its network of thick-walled cells brings water and nutrients up from the roots through tubes inside of the trunk to the leaves and other parts of the tree. As the tree grows, xylem cells in the central portion of the tree become inactive and die. These dead xylem cells form the tree's heartwood.

Cambium: The cambium is a very thin layer of growing tissue that produces new cells that become either xylem, phloem or more cambium. Every growing season, a tree's cambium adds a new layer of xylem to its trunk, producing a visible growth ring in most trees. The cambium is what makes the trunk, branches and roots grow larger in diameter.

Phloem/Inner Bark: The phloem or inner bark, which is found between the cambium and the outer bark, acts as a food supply line by carrying sap (sugar and nutrients dissolved in water) from the leaves to the rest of the tree.

Bark: The trunk, branches and twigs of the tree are covered with bark. The outer bark, which originates from phloem cells that have worn out, died and been shed outward, acts as a suit of armor against the world by protecting the tree from insects, disease, storms and extreme temperatures. In certain species, the outer bark also protects the tree from fire.

Snag information from Washington Fish and Wildlife: <https://wdfw.wa.gov/living/snags/>

Hard to believe, but trees can actually provide more habitats for wildlife dead than when they are alive. Standing dead and dying trees, called “snags” or “wildlife trees,” are important for wildlife in both natural and landscaped settings, occurring as a result of disease, lightning, fire, animal damage, too much shade, drought, root competition, as well as old age.

Birds, small mammals, and other wildlife use snags for nests, nurseries, storage areas, foraging, roosting, and perching. Live trees with snag-like features, such as hollow trunks, excavated cavities, and dead branches can provide similar wildlife value. Snags occurring along streams and shorelines eventually may fall into the water, adding important woody

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debris to aquatic habitat. Dead branches are often used as perches; snags that lack limbs are often more decayed and, may have more and larger cavities for shelter and nesting. Snags enhance local natural areas by attracting wildlife species that may not otherwise be found there.

Nurse Log: a fallen tree which, as it decays, provides ecological assistance to seedlings by providing nutrient rich soil.



## Procedure

Tree Life Cycle Movement Exercise: Students will act out a trees' life cycle with their whole bodies. This is a great way to get students up, moving and stretching. This is also a great story telling opportunity for the teacher. You can tell the story of a tree's life as students act it out.

Begin by asking students the basic stages of the tree life cycle:

- Seed to Sprout
- Sapling to Grown Tree
- Flowering Tree to Seed
- Snag (dead standing tree) to Nurse Log (decomposing down tree)
- Rich soil to Seed to Sapling, etc.

Tell students that they are going to move through the life cycle of a tree.

First, students need to start as a seed. Students should curl up into a tight ball to represent the seed shape. Explain that they are seeds in the soil, ready to grow into new trees.

Next, students should sprout roots by shooting out their legs in front of them, in a sitting position. Their upper body can still be curled up like a seed. Explain that it is raining on them and they can now emerge a little above the ground as a new sprout. Students can now uncurl their upper body and should have their legs stretched out in a sitting position.

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Tell students that they have gotten sunlight and rain and that they are growing. Students can now be upright on their knees with their arms out. Their arms are small branches with leaves trying to catch the sun to make food.

Next, students can grow to a standing position, with their arms stretched out representing a full grown tree. I like to take time to have students twist their torso from side to side. Have students stretch their arms out starting at one side, then moving above their heads and stretching to the opposite side like they are following the path of the sun.

Explain to students that they are now full grown trees and have developed flowers, which will be represented by their hands. Have students hold their palms upright, opening and closing their fist to make a flower shape. Next, their flowers have made seeds and are ready to drop their seeds. Have students turn their palms downward to drop their seeds with a “plop, plop” sound.

Student’s trees have flowered and produced seeds, they are now growing old. A large storm blows them around. Have students sway back and forth in the storm. Explain that they are a dead tree but are still standing. This is known as a snag. Many animals rely on snags to raise their young and find food.

After some time snags will fall to the ground. Have students “safely” fall to the ground. Once a tree has fallen to the ground it is considered a nurse log. Nurse logs provide food and homes for many animals. A nurse log eventually decomposes into the soil. This enriches the soil for other trees and plants to grow. Have students decompose into the ground by spreading out flat on the ground.

You can then finish, with students curling up into a ball again to represent the seed and the cycle beginning again.

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Dress like a Tree Activity: Student will model a trees' anatomy to review the different parts of a tree and their functions.

**This activity is best for younger students, Kindergarten (K.L.1.2) and 1<sup>st</sup> grades (1.L.2.1) or as a review for older students.**

Have students help you transform the teacher or another student into a tree. What parts does a tree need in order to survive? Adorn the teacher or student with the related prop as you guide the process by asking the students questions.

1. How will our tree stay anchored in the soil and gather water and minerals? (Roots.)
  - a. Straws strung on yarn for roots, tie the yarn around the model's feet
2. How does our tree stand up so tall and strong in the forest? (Wood.)
  - a. Large brown shirt for wood, or write "wood" on a Tshirt
3. What protects our tree's trunk from disease, insect damage, or fire? (Bark.)
  - a. Paper bag vest for bark
4. How does our tree get energy? (Leaves.)
  - a. Green headband with paper or felt leaves attached
5. Where do new trees come from? (Tree flowers make seeds.)
  - a. String necklace with paper cut-outs of apple flowers and fruits, one cut in half to show seeds.
7. What makes a tree a tree? (All these parts put together!)

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Body of a Tree Activity: Students will establish how people and trees share things in common by discussing how different parts of trees serve different functions, as different parts of our bodies serve different functions for us.

**This activity is great for 3<sup>rd</sup> grade (3.L.1.1, 3.L.2.1) and 5<sup>th</sup> grade (5.L.1.2)**

Begin by making 2 large posters with the outline of a human body on one and the outline of a tree on the other. Place the posters side by side at the front of the room. Explain to students that they are going to be drawing the organs of both a human body and a tree and observe how they are similar. You may want to write out the names of organs and tree parts on the board for students to copy onto the posters.

Read out the following and have students draw the parts for the tree and human bodies as you go. Students can take turns drawing or you can assign several students to each poster.

1. Our human skeletons support our bodies. What supports a tree?
  - a. Its trunk (its heartwood); its roots
  - b. Have students draw the human skeleton (basic) within the body outline and for the tree, draw and label the trunk, roots, and add a heart to represent the heartwood (they can also label their function for the tree)
2. If the needles and leaves take in and get rid of carbon dioxide and oxygen, what part of the human body are they like?
  - a. The Lungs

Have students draw the lungs in the human body and leaves for the tree. Again have them label the leaves function for the tree.

3. What system handles nutrients (food) and water for a tree?
  - a. The needles and leaves produce food by photosynthesis.
  - b. The xylem transports water. (Brings water up from the roots)

Have students draw an Up Arrow with a water symbol on the trunk



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- c. The phloem transports food. (Brings food down from the leaves)

Have students draw a Down Arrow with food symbol on the trunk

- d. The roots absorb water and send it up the tree for growth.

Have students draw an Up Arrow with a water symbol on the roots

- 4. What system handles food and water supplies for humans?

- a. Our digestive system breaks down nutrients and water.

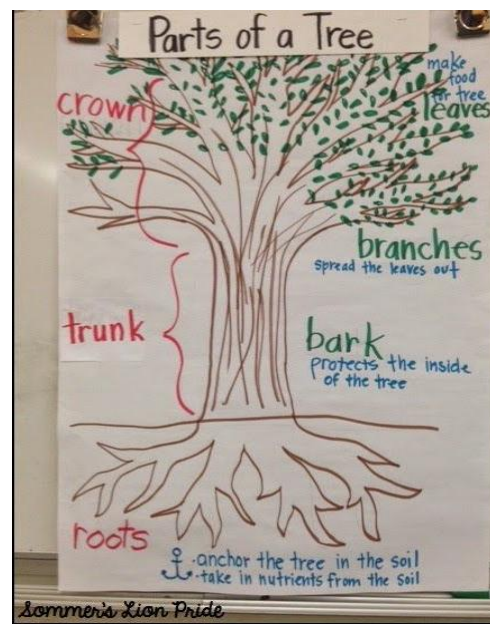
- b. Our circulatory system transports nutrients and water to all cells in our body.

Have student draw the stomach and intestines with water and food symbols and arrows around the body for the circulatory system.

- 5. OUTER BARK is like your skin. It protects the tree from outside damage.

- a. Have students draw a thick outline around the human body to represent the skin and around the tree's trunk to represent the outer bark and label.

After you have read out all of the corresponding parts, bring the two posters together to compare their functions and similarities.



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## Plant Life Cycle Buffet

From Nebraska Game and Parks Commission, <http://outdoornebraska.gov/wp-content/uploads/2015/12/Plant-Life-Cycle-Buffer.pdf>

## Materials Needed:

8. Plant seeds – Edible seed, enough for each student to try some
  - a. Examples: peanuts (watch for allergies), sunflower seeds, pumpkin seeds, corn nuts, any nuts, sesame seeds.
9. Roots – Edible, enough for each student to try some
  - a. Examples: carrots, ginger.
10. Sprouts – Edible, enough for each student to try some
  - a. Examples: bean sprouts, alfalfa sprouts
11. Stems – Edible, enough for each student to try some
  - a. Examples: broccoli stems, chives, rhubarb, celery.
12. Leaves – Edible, enough for each student to try some
  - a. Examples: red or green leaf lettuce, cabbage, spinach, collard greens, basil.
13. Flowers – Edible, enough for each student to eat
  - a. Examples: marigolds, dandelions, broccoli, cauliflower.
14. Fruits – Edible, enough for each student to try some
  - a. Examples: raspberries, strawberries, blueberries, apples, peaches, tomatoes

## Procedure:

Have a special day devoted to exploring the parts of a plant and the plant life cycle through eating scrumptious foods!

Begin by talking about the life cycle of a plant. Ask students what part of the life cycle comes first (this is a hard question to answer as it is a cycle and one part does not come “before” any others).

For the sake of this activity, start with the seeds. Invite students to try some of the edible seeds you have brought in. Ask the students what happens when a seed is planted and begins to grow... it grows sprouts and roots. Invite students to try some of the sprouts

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and roots you brought in.

Once students have tried the sprouts and roots, ask what comes after the plant has grown sprouts or roots... it grows stems and leaves. Now, invite the students to try the stems and leaves.

Next, ask the students what happens after the plant collects enough energy from the sun in its leaves... it grows flowers. Invite the students to eat the flowers.

Finally, ask the students what the flowers create... fruits (with seeds). Invite the students to eat the fruits.

As you talk with students about each stage of the plant's life cycle, have them draw each step. When you are done trying all the foods, the students will have a drawing of the complete plant life cycle.



## Extensions

Parts of a Tree Sort: Take students on a nature walk and bring paper bags labeled for different parts of a tree. (leaves, seeds, bark, etc.) While on your walk gather some examples of tree parts in your paper bags. Make sure that students are only gathering materials that have already fallen from the tree. Once back in the classroom, dump bags out and take a closer look at what students have collected. Did you place anything in the wrong category? You can have magnifying glasses, microscopes, and dissection materials handy to help students take a closer look at what they have gathered.

Photosynthesis Relay Race Game (3<sup>rd</sup> Grade): <http://ellenjmchenry.com/photosynthesis-relay-race-game/>



## Resources

Simple external parts of a tree worksheet from Teachers Pay Teacher, <https://www.teacherspayteachers.com/Product/Parts-of-a-Tree-Worksheet-2750754>