

# Lesson 1: To Be a Tree

## NUTSHELL

*In this classroom lesson, students review the three main parts of a tree. They complete a worksheet to learn the parts of a tree that are used in identification. Students play a game and act out how a tree meets its basic needs. They then label and put in order the life stages of a tree. As a conclusion, students draw their own tree, label it, and write a paragraph about how that tree is identified.*

### ENDURING UNDERSTANDINGS

- Forests are renewable resources. They can be used and regenerated at regular intervals.
- A tree is a perennial plant (lives more than one growing season) with a well-defined woody stem, crown, and roots.
- Trees compete for nutrients, sunlight, space, and water.
- Trees have life stages that includes germination, growth, maturity, reproduction, decline, and death.

### ESSENTIAL QUESTIONS

- How does the structure of a tree help it to meet its basic needs?
- What makes trees unique from each other?

### OBJECTIVES

Upon completion of this lesson, students will be able to:

- Classify trees as perennial plants (live for more than one growing season) with a trunk, crown, and roots.
- Recognize basic characteristics of trees that can be used in identification.
- Summarize the life stages of a tree.
- Explain how trees need nutrients, sunlight, space, air, and water.

### SUBJECT AREAS

Arts, Language Arts, Science

### LESSON/ACTIVITY TIME

**Total Lesson Time:** 125 minutes

- Introduction.....15 minutes
- Activity 1 .....20 minutes
- Activity 2 .....25 minutes
- Activity 3 .....35 minutes
- Conclusion.....30 minutes

### STANDARDS CONNECTIONS

Standards for this lesson can be viewed online at the LEAF website ([www.leafprogram.org](http://www.leafprogram.org)).

### FIELD ENHANCEMENT CONNECTIONS

This lesson ties closely with *Field Enhancement 1, I Can Be a Forester*.




### BACKGROUND INFORMATION

#### Trees


Trees are perennial; they live for more than one growing season. That is one of the requirements for a plant to be considered a tree. Beyond trees' perennial nature, their "well-defined, woody stem" also sets them apart from other plants. We know this feature as their **trunk**. Trees have a relatively straight, upright trunk with branches growing outward from it. The trunk provides support for the branches and leaves. It also acts as the transportation connection between the leaves and roots.

## MATERIALS LIST



### For Each Student

- Copy of Student Page  **1, Tree Identification Information**
- Copy of Student Page  **2, Tree Identification Matching**
- Copy of Student Page  **3, Tree Life Stages**
- Crayons or markers
- Scissors
- Glue
- Two sheets unlined paper (8.5" x 11")

### For Every 6 Students

- One sheet each brown, blue, red, and yellow construction paper
- Tree costume (see Teacher Page  **1, Tree Parts**)
- Carpet square

### For the Teacher


- Copy of Teacher Pages  **2-3, Is That a Tree?**
- Marker board
- Student Page  **1, Tree Identification Information** to project
- Crayons or markers
- Scissors
- Tape

**“Love the trees  
until their leaves fall off,  
then encourage them to try  
again next year.”**

★ Chad Sugg ★

## TEACHER PREPARATION

### For Needs Game

- Determine how many “trees” you will have. You can have one tree for every six students.
- Set out carpet squares (one for each tree).
- Make a crown of leaves, paper bag tree trunk vest, and roots for each tree. (Patterns and instructions on Teacher Page  **1, Tree Parts.**)
- Make needs cards (one card of each color for each tree):
  - Cut each piece of construction paper into quarters.
  - Write what each card stands for:
 

blue = water	yellow = sunlight
brown = nutrients	red = energy

The leafy **crown** of a tree is where photosynthesis takes place. Photosynthesis is the process trees use to make sugars that are the energy for tree growth. The leaves use energy from the sun and carbon dioxide from the air and combine them with water to make sugars. The food energy created by the leaves in the crown is stored in the woody branches, trunk, and roots.

A tree’s unseen **root** system may have more mass than the visible top portion of the tree. A tree’s roots usually grow farther out from the trunk than its branches. They lie just below the surface in the top nine inches of the soil. The structure of a root system is complex. Root systems consist of large, woody roots that grow out from the trunk and huge numbers of small roots growing out from the large ones. The large roots serve as anchors to keep the tree standing, provide energy storage for times when the tree isn’t making sugars, and are the path for nutrients and water to reach the rest of the tree. The small roots that grow from the large roots absorb water and nutrients from the soil.

## VOCABULARY TERMS

**Alternate:** A way branches can be arranged. One is slightly above another and on the opposite side of the stick. Leaves can also be alternate.

**Broadleaf:** A tree that has broad leaves rather than needles.

**Compound Leaf:** A type of leaf that has one stem and many smaller leaflets that grow from it.

**Coniferous:** A tree that bears cones and has needles.

**Crown:** The part of a tree with live branches and leaves.

**Deciduous:** A tree that sheds all of its leaves annually.

**Decline:** The part of a tree's life when it becomes less healthy and does not recover.

**Decompose:** When dead plants and animals are broken down into nutrients by other organisms.

**Entire:** A type of leaf edge that is smooth and has no wavy or rough edges.

**Fruit:** The part of the tree that has seeds in it. It can be fruit like an apple, or fruit like an acorn.

**Germination:** The beginning of the growth of a seed when roots and a stem sprout.

**Lobed:** A type of leaf edge that has large rounded parts.

**Margin:** The outer edge of a leaf.

**Maturity:** A part of a tree's life when noticeable growth slows and it can begin reproduction.

**Nutrients:** The minerals in the soil that a tree needs to live and grow.

**Opposite:** The way branches are arranged, one directly across from the other. Leaves can also be opposite.

**Reproduction:** A part of a tree's life when it produces seeds that can grow into new trees.

**Roots:** The part of a tree that works underground to get water and nutrients for a tree to use.

**Space:** The area that a living thing needs to grow.

**Toothed:** A type of leaf edge that has small points or bumps along it.

**Trunk:** The part of a tree that connects the crown to the roots.

**Winged:** A type of fruit that has flat edges so that it can be carried by the wind.

## Identification

All trees have a crown, trunk, and roots, but they are different in other ways. Each type of tree has characteristics that make it unique. Tree identification keys use a series of questions about things that you can observe. These observations narrow the possibilities about the tree you are identifying. Keys can cover North America, the Midwest, or even just Wisconsin.

Keys generally begin by separating broadleaf from coniferous trees. They continue by identifying branch arrangement, leaf type, leaf arrangement, and fruit or cones. Bark is occasionally used to help in identifying trees, but it can vary in color and pattern, so it isn't preferred.

**NOTE:** It is common practice to refer to "deciduous" and "coniferous;" however, for the purposes of keys, these terms aren't a good choice. For an identification key, you need two opposite choices. Deciduous refers to when a tree loses its leaves, and coniferous refers to it reproducing by cones. These aren't opposite.

## Life Stages

The life of a tree can be divided into six stages. They are: **germination**, **growth**, **maturity**, **reproduction**, **decline**, and **death**.

The first stage of a tree's life begins with a seed. When a seed has the right temperature, moisture, and soil, it will *germinate* (sprout). Out of the seed comes a young tree called a seedling.

The seedling that emerges during germination continues its life through *growth* and then on to *maturity*. A mature tree is capable of *reproduction*. Many tree species live for several generations of human life. A tree can be mature and reproductive for many years.

Eventually, a tree moves on to a part of its life called *decline*. Decline can be a result of old age, competition, or some other factor such as disease, insect damage, or storm damage. The decline in the health of a tree leads, someday, to the *death* of that tree. A dead tree is still a part of the nutrient cycle. A dead tree contributes to other plant, animal, and insect life, as the tree's remains are recycled into the soil. Dead trees also serve as homes for birds, squirrels, and other wildlife.

Not all trees go through all of these steps. The life of a tree can be impacted by many things. Many trees germinate but don't survive to maturity and reproduction. A tree can go into decline at any time in its life.

## Basic Needs

Trees and other plants have five things that they need in order to live. They are: **nutrients**, **sunlight**, **water**, **air**, and **space**.

Trees use *nutrients* (minerals) from the soil to build the materials that make up the tree. These nutrients allow the tree to survive, grow, and reproduce.

*Sunlight* is the form of energy that trees use to complete the process of photosynthesis. In order for trees to convert carbon dioxide and water into sugars (and other carbohydrates), they need energy from the sun.

*Water* is another part of photosynthesis. Water is also important to a tree for transportation of nutrients. It is water that makes up most of the tree's sap. Sap carries nutrients up the trunk and sugars back down to the roots.

All plants need *air* to survive. It is from the air that they get carbon dioxide for photosynthesis. Without air in the soil, the roots of a plant would "drown."

*Space* seems to be the least tangible of the basic needs. It is important for students to know that trees can't grow when they are crowded. Root systems need room to grow, as do branches, leaves, and stems.

## PROCEDURE

### Introduction - Is That a Tree?

1. Choose a student or ask for a volunteer to act as a tree. Tell the class that together you are going to dress their classmate as a tree. They all should think about what trees look like. Bring out the crown of leaves you made ahead of time. Explain to students that the top of the tree with the leaves on it is called the crown, and place the crown headband on the volunteer's head.
2. Next, bring out the paper bag trunk vest that you made earlier. Tell students this is the tree's trunk, and it helps hold up the branches and leaves. Put the trunk on the volunteer.
3. Finally, get out the belt of string or yarn roots. Explain that these are the tree's roots. They grow underground where we can't see them, but they're very important. Put the roots on the volunteer.





4. Review the names of the parts of the tree; crown, trunk, and roots. Tell the students that all trees have these parts.
5. Have the volunteer remove the tree parts.
6. Gather students together in a group where they can all see you and what you will hold up. Have Teacher Pages 🍌**2-3, Is That a Tree?** ready to show to the students. Cover the pictures with another sheet of paper until you are ready to talk about each one.
7. Uncover the picture of the squirrel. Ask students if it is a tree. *(No!)* Ask how they know that it is not a tree. *(It is an animal, not a **plant**.)*
8. Show the picture of the violet. Tell students it is a plant. Ask if it is a tree. *(No!)* Ask how they know it is not a tree. *(It's not tall. It doesn't have a **trunk**.)*
9. Show the picture of the vine. Tell students this plant has a woody stem. Ask if it is a tree. *(No!)* Ask why it is not a tree. *(It can't stand on its own. It doesn't have a **crown**.)*
10. Show the picture of the shrub. Tell students this plant has woody stems that grow upward and it has a crown. Ask if it is a tree. *(No!)* Ask why it is not a tree. *(It has lots of stems, not one main **trunk**.)*
11. Show the picture of the broadleaf tree. Ask if this plant is a tree. *(Yes!)* Ask how they know it is a tree. *(It is a **plant with roots**. It has a **woody stem** called a **trunk** that grows **upward**, and it only has one. It has a **crown** made of leaves and branches.)*
12. Show the picture of the coniferous tree. Ask if this plant is a tree. It doesn't look quite the same. *(Yes!)* Ask how they know that it is a tree. *(It has **roots**, a **trunk**, and a **crown**.)*

**EXTENSION:** Create the leafy crown headband, paper bag trunk vest, and yarn root belt as a class art project for each student. They can all be trees for part of the day!

## Activity 1 - Tree Identification

1. Point to something in the room that is square and ask the students what shape it is. Point to something that is a circle and again ask what shape it is. Use a few more shapes as examples. Tell the students that they have just identified those shapes. They used the shapes' differences to decide what kind they were. Tell students that they are going to learn how to look for differences in trees so they can identify them.
2. Remind students that trees all have the same parts. They all have roots, a crown, and a trunk. Tell them that trees also have differences that help us tell them apart. Trees have different leaves, branches, seeds, and bark. Tell the class that they are going to learn about those differences.
3. Pass out Student Page 🍌**1, Tree Identification Information**. Hold up or project Student Page 🍌**1, Tree Identification Information**. As you go through the following steps, be sure to point out and discuss important features.
4. Tell the class that the first step to decide what kind of tree you have is to decide if it's broadleaf or coniferous. Broadleaf trees have wide, flat leaves. A maple tree is a broadleaf tree. Coniferous trees have cones and needles. Pine trees are coniferous.
5. Branches grow differently. Some grow opposite each other, and some grow in an alternate pattern. The leaves on a tree will grow either opposite or alternate too. They will always grow the same way (opposite or alternate) that the branches do.

6. Another way to tell trees apart is by the kind of leaves they have. Needles (as on pine trees) are actually a kind of leaf that has its own special name. Needles can be single or in groups. Leaves can also be simple or compound.
7. The kind of edge that leaves have is another way to tell trees apart. Leaf edges can be needle-like, toothed, entire (smooth), or lobed.
8. The seeds of a tree are inside something we call either a fruit or a cone. Fruit is the part of the tree that holds and protects the seeds. The fruit of a tree can be a nut or berry. It can also be winged. Cones from pines and spruces hold seeds too.
9. Hand out Student Page , **2, Tree Identification Matching**. Tell students that they need to draw a line from the tree part on the left to the name that describes it on the right. They can use their Student Page , **1, Tree Identification Information**, for reference. Collect these worksheets and review them to assess the level of understanding the class has.

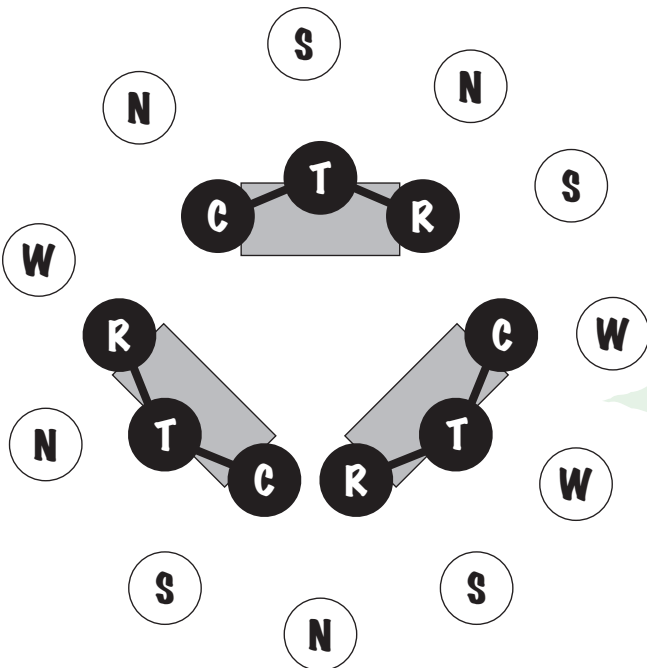
**NOTE:** The characteristics listed in this activity are only a few of the many that may be found in tree identification books. This activity is intended to help students become familiar with the terms and increase their awareness of the details of Wisconsin trees.

## Activity 2 - Tree Needs

1. Discuss with the class what the five needs of a tree are (*space, water, nutrients, sunlight, air*). Discuss why the needs are important and what part of the tree collects each of the needs. **Space** is important to a tree so that it has room to grow and can get enough of the other needs from that space. (Trees can't move to go find more water if they run out.)

**Water** is important because a tree needs it to move its food energy and nutrients from one place to another in the tree. It is also important to a tree to help it make food. Water is collected by a tree's roots. **Nutrients** are important to a tree because they are used to build the parts of the tree. Nutrients are dissolved in the water that roots collect. **Sunlight** is important because a tree's leaves use sunlight to make food energy. Food gives a tree energy to grow. The crown of a tree collects sunlight. **Air** is important so a tree can get carbon dioxide used in making food energy. Trees take in the carbon dioxide that animals (including humans) breathe out and give off the oxygen we breathe in. The leaves of a tree collect air.

2. Divide the class into groups of six. They will become trees and the things trees need. Three students make up each tree; one student is the crown, one is the trunk, and one is the roots. The other three students in the group are the tree's needs; one student is water, one is nutrients, and one is sunlight. You may have as many trees as your class size will allow. Extra students may be assigned to hand out the energy cards later in the game or be extra needs. Assign students their roles now, but wait until after you have explained the way the game is played to pass out the appropriate props.
3. Describe to students how one round of the game is played. Show students where the carpet square, or space, is. The three parts of the tree will put themselves together in the correct order and hold hands. (Trunk between the crown and roots.) At least one part of the tree must remain on their space (carpet square) at all times. All the needs should form a circle outside the carpet squares and walk slowly around the trees. Each of the needs will be holding a card and should be within reach of the trees at all times. See the diagram on page 22 for the set up.



### Diagram for Tree Needs Game Set Up

C = Crown  
T = Trunk  
R = Roots  
W = Water  
N = Nutrients  
S = Sunlight

4. Tell the class that it is the job of the tree to collect the things it needs and make those things into food energy so it can survive. Each part of the tree does its job to help the tree survive. Just as in real trees, the crown and the roots collect things. What does the crown collect? (*Sunlight cards.*) What do the roots collect? (*Water and nutrients cards.*) The tree may collect its needs cards from any of the needs in the circle, as long as the tree doesn't leave its space (carpet square). To collect a card, the crown or roots must reach out and "tag" the appropriate need. When a need is tagged, it must hand its card to the tree and leave the circle.

5. Ask what the tree is going to do with the things it collects. (*The crown uses sunlight and water to make food energy for the tree. The crown also uses nutrients to grow more branches and leaves.*) So, the roots pass water and nutrients to the trunk. The trunk passes them to the crown. Tell students it is okay for them to let go of hands for this step.
6. After the trees have collected their needs, and the crown has all of them (*sunlight, water, nutrients*), the crown may trade the needs cards for one energy card. (Another student or the teacher can have the red energy cards to hand out when he or she is asked for them.) A tree with an energy card at the end of the round has survived. (Each tree only needs to collect one energy card.) It has the energy and building blocks to grow.
7. Ask students which tree need they have not discussed yet. (*Air.*) Tell students that air is not one of the needs trees have to work for in this game because air is everywhere.
8. Now pass out the props for the game. The students chosen to be the trees should be assigned to be the crown, trunk, or roots and given the appropriate tree part to wear. (Crown of leaves, paper bag trunk vest, a belt of yarn as roots.) The students who are needs should be given a card of the appropriate color for their need. Water = blue, sunlight = yellow, nutrients = brown. (Be sure to have enough needs for the first round so that all of the trees can meet their needs.)
9. Play the first round. The results of the first round should be that all of the trees survive.
10. Play additional rounds with a few changes. Reduce the number of needs cards. Ask students what happens when there isn't enough of one of the needs to go around. (*Trees don't all survive. Trees compete with each other for the needs.*)

## Activity 3 - Tree Life Stages

- Hand out Student Page  **3, Tree Life Stages**. (Discuss “life stage” if the term is unfamiliar to the students.)
- Write the word “germination” on the board. Describe germination including:
  - The first step in the life of a tree is germination.
  - During germination, a seed sprouts.
  - A root comes out of the seed and grows into the soil, and a stem comes out and grows a few leaves.
  - A seed germinates if it has the right amount of water, the right kind of soil, the right temperature, and if it does not have too many other plants around it.
  - Have the students find the picture of germination on their sheets and write the word on the line under the picture.
- Write the word “growth” on the board. Describe growth including:
  - After a tree germinates, it grows.
  - It adds more leaves and roots and gets taller.
  - Have students find the picture of growth and write the word on the line under the picture.
- Write the word “maturity” on the board. Describe what it means for a tree to be mature including:
  - After a tree grows for a while (sometimes a very long time) it becomes mature.
  - A mature tree still keeps growing, but only a very little bit each year. Trees aren’t like people and animals who stop growing when they are mature.
  - A mature tree has lots of leaves and is healthy. Have students label the picture of a mature tree on their sheets.
- Write the word “reproduction” on the board. Describe reproduction including:
  - Once a tree is mature, it is ready for reproduction.
  - Reproduction occurs when a tree produces seeds that can grow into new trees.
- If those seeds land in the right spot, lots of new trees can begin their own lives.
- Have students label the picture of reproduction.
- Write the word “decline” on the board. Describe decline including:
  - When a tree gets old (that may take anywhere from 50 to several hundred years, depending on the type of tree), it isn’t as healthy anymore and begins to decline.
  - When a tree declines, it often has fewer leaves, starts to lose branches, and gets cavities in its trunk. (Compare cavities in the tree trunk to cavities in a tooth.)
  - Have students label the picture of decline.
- Write the word “death” on the board. Describe death including:
  - All trees die sometime.
  - When a tree dies, it loses all its leaves, and eventually its branches break off. It gets lots more cavities in it too.
  - These cavities serve as homes for wildlife such as woodpeckers, squirrels, and raccoons.
  - A dead tree stays standing for a long time, but eventually falls to the ground. Once a dead tree is on the ground, it provides homes for animals and other plants and slowly breaks down and becomes part of the soil.
  - Have students label the picture of death.
- Ask students to color their pictures of the life of a tree. Have them cut out the pictures that are in random order on their sheets. Once the pictures are cut out, have the students arrange them on another sheet of paper in correct order (*germination, growth, maturity, reproduction, decline, death*). Review the steps in the life of a tree to be sure everyone has them in the correct order. Once you are confident all the students have the correct order, have them glue the pictures down. Post the completed papers on a bulletin board.





## Career Profile

### Jim Storandt, Tree Nursery Manager

Meet Jim Storandt. Jim is in charge of the Griffith State Tree Nursery. A nursery is a place where people grow trees from seeds and then sell the trees for other people to plant. Jim's job is to make sure everything happens just right in order to grow seven million young trees every year! He also is in charge of the other people who work at the nursery. Together, they make sure the tree seeds are planted, watered, fertilized, and protected from insects and diseases that might harm them. The trees that Jim and his staff grow are sold to people in Wisconsin who want to plant trees on their land. There are two other state tree nurseries like Jim's in Wisconsin.

To get this job, Jim went to college and studied water and soil. He volunteered with the Peace Corps in Paraguay, South America, where he learned about growing and planting trees. When he came back to Wisconsin, he worked as an assistant at the nursery before he got the job as the superintendent.

Jim says that one of his favorite things about his job is that he gets to do different things in different seasons of the year.

He also likes working with landowners who buy the trees. Jim knows that he is helping improve the forests of Wisconsin and making them more beautiful.

If you want to work in a tree nursery like Jim, he says you should "take an interest in how plants grow, how the seed develops, and try growing them." He also suggests that you work on your math and writing skills.



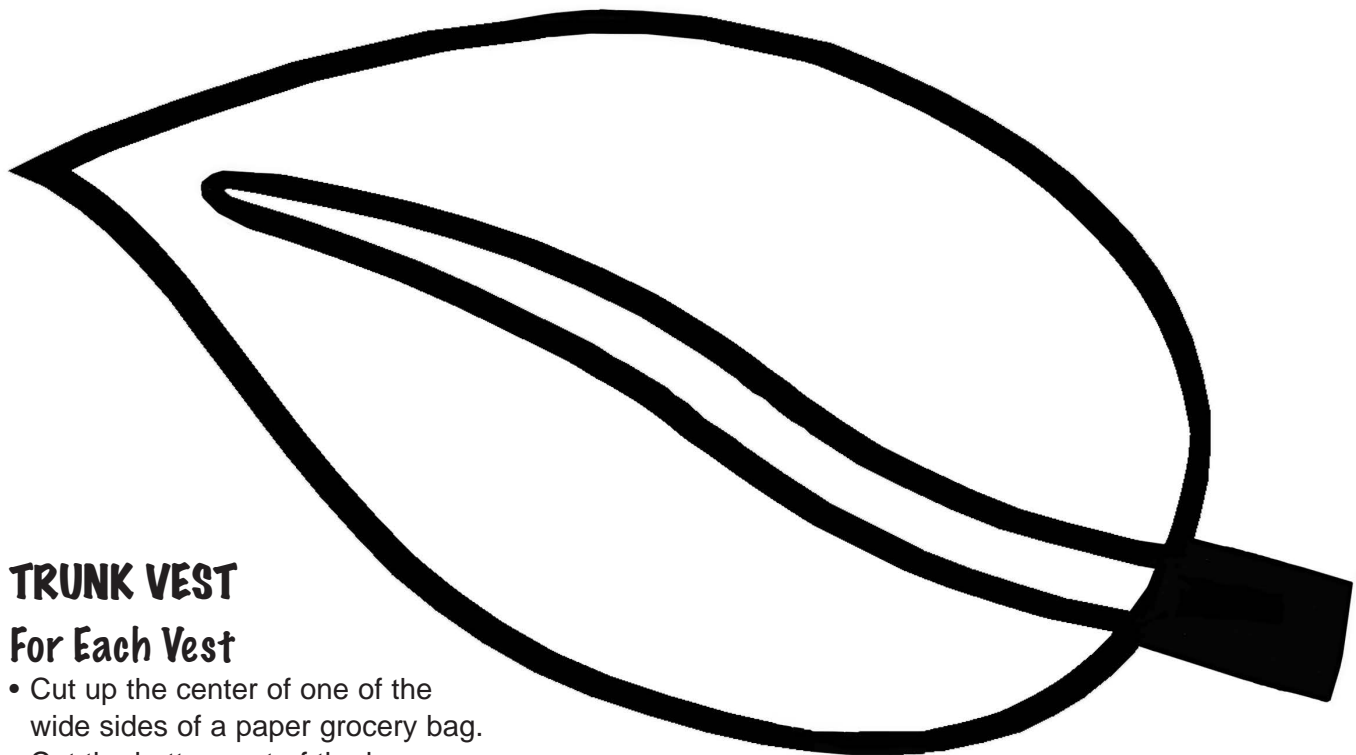
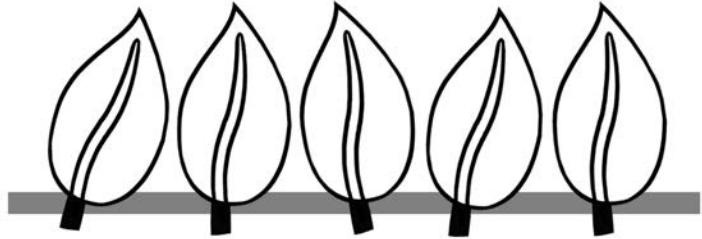
***This is Jim (in circle) planting one of the seedlings from his nursery.***

## TREE PARTS

### CROWN OF LEAVES

#### For Each Crown

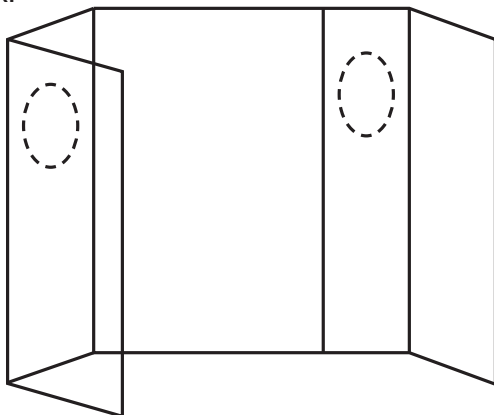
- Make 5 leaves from the pattern on this page.
- Color and cut out the leaves.
- Cut a one-inch-wide strip of paper long enough to go around a student's head.
- Attach the leaves to the strip of paper.
- Fasten the ends of the crown around the student's head with a paper clip or tape.



### TRUNK VEST

#### For Each Vest

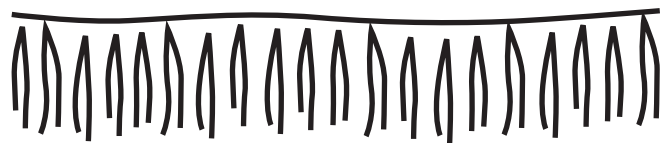
- Cut up the center of one of the wide sides of a paper grocery bag.
- Cut the bottom out of the bag.
- Cut circles for arm holes in the two narrow sides of the grocery bag two inches from the top.
- Turn the bag inside out and color it to look like tree bark.



### YARN ROOT BELT

#### For Each Root Belt

- Cut a piece of yarn long enough to go around a student's waist and tie in a bow.
- Cut 20 pieces of yarn 20 inches long.
- Tie the 20 pieces of yarn to the belt piece.



# IS THAT A TREE?


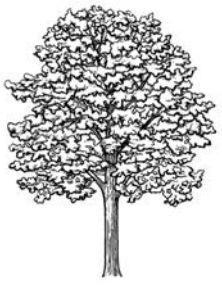
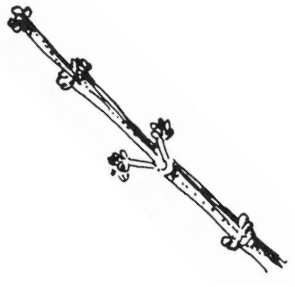





# IS THAT A TREE?




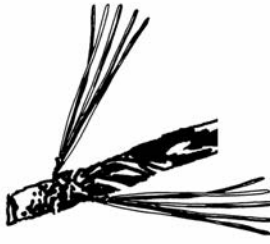


# TREE IDENTIFICATION INFORMATION

 <p>Coniferous</p>	 <p>Broadleaf</p>	 <p>Opposite</p>	 <p>Alternate</p>
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## TYPE OF TREE

## HOW BRANCHES GROW


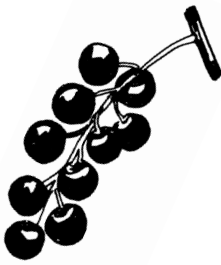


### LEAF TYPE

 <p>Single Needle</p>	 <p>Groups of Needles</p>	 <p>Simple</p>	 <p>Compound</p>
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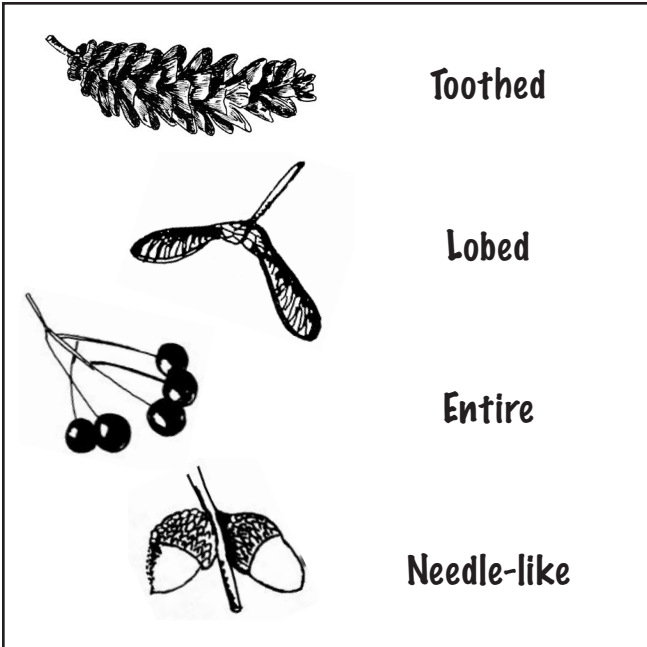
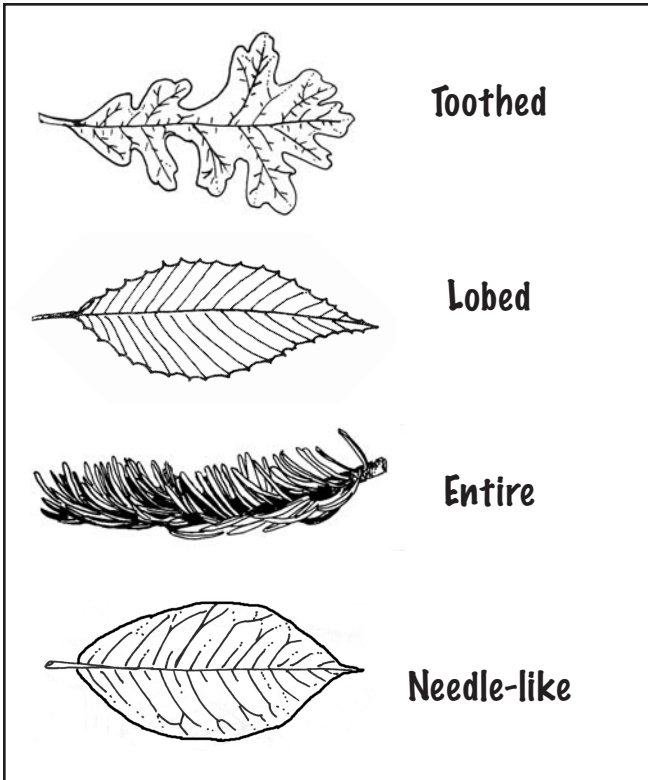
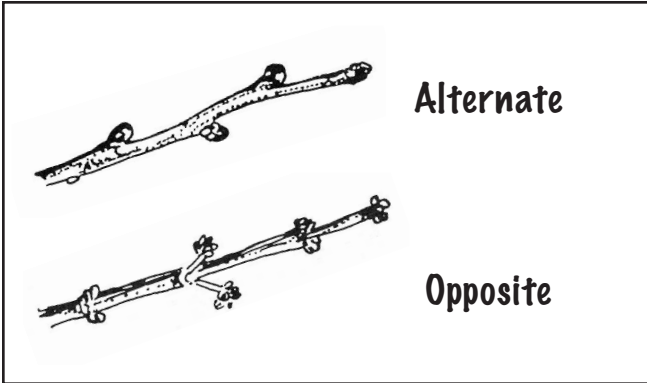
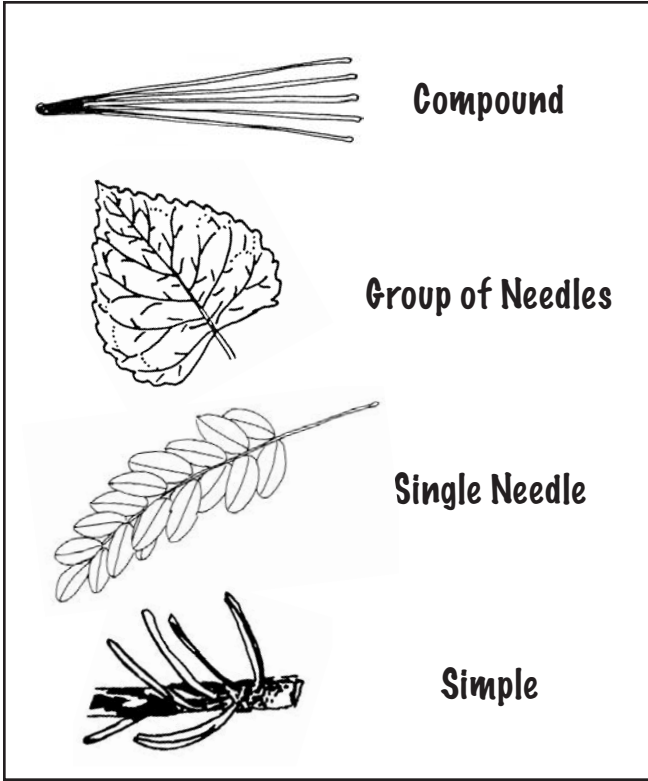
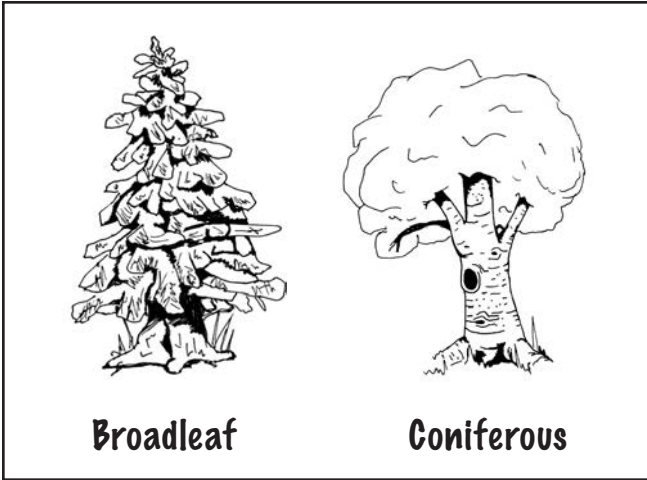
### LEAF EDGE

 <p>Needle-like</p>	 <p>Toothed</p>	 <p>Entire</p>	 <p>Lobed</p>
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### FRUIT (Seeds and Cones)

 <p>Nut</p>	 <p>Berry</p>	 <p>Winged</p>	 <p>Cone</p>
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# TREE IDENTIFICATION MATCHING





# TREE LIFE STAGES

