All About Trees

An Environmental Study Unit for Kindergarten – 2nd Graders

MUHLENBERG
COLLEGE

Table of Contents

What Makes a Tree

Table of Contents continued . . .

What Makes A Tree

Author: Laurie Rosenberg, Muhlenberg College
Grade Level: K-2nd
Lesson Time: One 30 minute time block and 2 hour-long time blocks. (Optional craft and snack ideas included as extensions.)
Suggested Class Structure: Guided discussion, short field study outside on school grounds, group role play, hands on activities
Subject Areas: Science and Language Arts

GOALS

Students will gain an understanding of how and why a tree is classified as a *living thing* and a *plant*. They will explore the ways in which the parts of a tree contribute to the life and survival of the tree, and discover that all plants have similar needs and structures that meet those needs. At the end of the lesson they will review the contribution of the parts of a tree to the way a tree lives and grows.

As they begin to be able to identify the parts of a tree, students will observe and notice characteristics these parts have, such as rough and smooth bark, lobed leaves, different kinds of seeds, etc.

Through literature, discussion and observation of trees in their natural surroundings and products that come from trees, students will gain an appreciation for the value of trees to humans and their role in the environment.

MATERIALS

- ☐ The book *Red Leaf, Yellow Leaf* by Lois Ehlert, and other optional books listed in the *Resources* section on page 7.
- ☐ A "Life Box" consisting of a shoebox covered with pictures of living things, and holding inside a small clear container of dirt and another small clear container of water.
- ☐ Tree parts: leaves, a large branch section or small log, bark, seeds, needles, etc.
- ☐ Plant parts: lettuce, carrot, celery, broccoli, apple, cinnamon stick.
- ☐ Plant parts chart, (see copy master in the Lesson Appendix).
- ☐ Venn diagram, (optional, for students who can read and write--copy master in the Lesson Appendix).
- ☐ Leaves traced on construction paper and cut out. Select leaves from your neighborhood and school grounds. (Optional—you can use real leaves collected just before the activity.)
- ☐ Grab bag of items, some of which come from plants and trees: pencil, magazine, wooden spoon, aluminum foil, cork, plastic comb, walnuts, Kleenex, glass bottle, etc.
- ☐ Potted plant
- ☐ Rock
- ☐ Egg cartons—one for every 4 students
- ☐ Log books for each student
- ☐ Crayons and pencils
- ☐ Bug boxes and/or small jars with holes in the lids, or special plastic collection boxes
- ☐ Clip boards

ADVANCE PREPARATION

- ✓ Gather materials for tree parts, plant parts and grab bag. Most you can find around the house and yard, but you will have to buy the vegetables and fruits.
- ✓ Create a grab bag of things that come from trees and things that don't. A canvas tote bag will work, or an old drawstring bag or small duffle bag.

- ✓ Make a "Life Box" (A shoebox decorated on the outside and containing two small clear containers—one for water and one for soil. You can use a ziplock bag for the soil and a small soda bottle with the label removed for the water.)
- ✓ Buy the book *Red Leaf, Yellow Leaf*, or get it from the library.
- ✓ Run off "Plant Parts" chart and Venn diagram, if needed.
- ✓ Collect leaves from trees on the school grounds. Optional: trace them on construction paper and cut them out. Laminate or cover with contact paper.
- ✓ Make copies of the tree book/journal for each student.

PROCEDURES – Outline and Narrative

Introduction – Trees Are Living Things - 15 min.

Use the potted plant to initiate a discussion about what makes a plant a living thing. Review with the students what it is about the plant that makes it a living thing—*it grows, it reproduces, it moves, and it has needs—food, water, air*. Contrast this with the rock.

Note: *It is difficult for students to realize that plants move, but this can easily be demonstrated by leaving the potted plant facing a light coming from one direction, (such as a classroom window), for a week or so, and then noting how the plant orients itself towards the light. Turn the plant around and wait a few days to see it move again!*

Show the class the "Life Box". See if they can guess what is in the box—the things that plants need to survive. After they have guessed, show them what is in the box. Have every child take a look. Then review what was in the box—soil, water, air and the surprise—light when they opened the box. See if the children can list all of these things. They might have trouble realizing there is air in the box, and they will definitely need to be made aware that light entered the box when they opened it. You can blow up a balloon to show that air takes up space even though you can't see it.

How Do Trees Meet Their Life Needs – 15 min.

The next activity explores how plants get what they need to survive. Pose the question, "How do plants get what they need to survive?" Show them the cover of the storybook *Red Leaf, Yellow Leaf,* and ask them to make predictions of the answer to the question. Then read the book. Afterwards, discuss how the tree in the story got air, water, sun and minerals from the soil. Go over the reasons the tree was a living thing—it grew, it reproduced, it made food in its leaves.

Show the students the leaves and the log section you have collected beforehand. Ask them to look at the leaves closely—point out the veins that carry the sap.

Look at the layers on the log cross section. Note the contrast between the protective bark layer and the inside of the tree. If you look closely between the layers of inner bark, you may even be able to see the holes where the xylem and phloem tubes were.

Discuss the parts of a tree and how they help it to survive. The **roots** take in water and dissolved minerals; the **trunk** is full of tubes

taking the water and minerals up to the **leaves**, which are the food factory for the tree. These tubes are called **xylem**. The leaves have pores for taking in and releasing air. They have a special green pigment that can take energy from the sun, water, minerals and carbon dioxide from the air and turn it into sugar

molecules—the food for the tree. There are tubes in the **trunk** that take the food down to other parts of the tree, in the form of sap. These tubes are called **phloem**.

The **bark** on the tree, which is dead, protects the living part of the tree from drying out and getting eaten by insects. Below the dead outer bark is the **inner bark**, which is where new trunk cells grow. In the center of the tree is the **heartwood**, which is also dead. It supports the tree.

Next, pass out the vegetable plant parts—celery, lettuce, carrots, etc. Pass out the "Plant Parts" chart. See if the students can identify what part of the plant corresponds with the picture of the plant parts. For example: apple=seed, lettuce=leaves, celery=stem=tree trunk, etc. It may be hard for students to think of how to draw a tree flower when it comes to filling in that part of the chart, but you can refer to the *Red Leaf, Yellow Leaf* book for example pictures of tree flowers, as well as other books listed in the "Resources" section. Common tree flowers students may have seen include apple, cherry, dogwood and magnolia trees.

Older students can make a Venn Diagram comparing the similarities and differences between vegetables and trees. The key characteristic that is unique to trees is that they are *woody*.

Tree Role Play - 10 min. (On school grounds or at Graver Arboretum)

Go outside and follow the Naturescope *Trees Are Terrific* "Build a Tree" lesson and role-play how the parts of the tree work together to help the tree survive. (Information on how to obtain a copy of the Naturescope *Trees Are Terrific* curriculum can be found under "Books for the teacher" on page 7.)

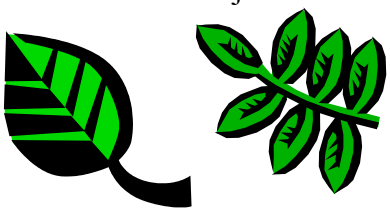
Tree Observation Hike – 50 minutes

Note: *Students use the "Notes from the Forest" journal to organize their observations for the following part of the lesson. Copy masters for the journals are in the Lesson Appendix.*

While you are outside, observe the trees in the schoolyard—compare their bark, shape, size and other features. Have the students pick out a tree to draw in their journals. Encourage them to observe and draw as many details as possible—branching patterns, animals around the tree, moss or lichens growing on the trunk, leaf shape, flowers or seeds, etc.

Gather a collection of different leaves from the school grounds. Do not take leaves off of the trees. You can trace the leaves and make bark rubbings from the trunks of the trees.

See if you can find any tree seeds. Collect and sort these using an egg carton—some seed types are nuts, berries, cones, winged seeds, pods, and fuzzy or flying seeds. Students should draw example in their journals and match the seeds with the journal examples.



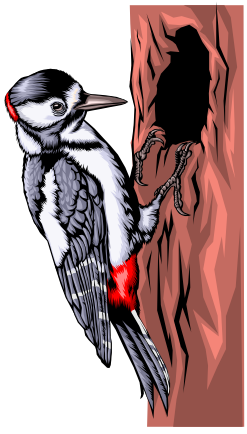
Look for signs of wildlife around and on the trees. You might see birds, insects, spiders, snails or slugs, centipedes, millipedes, squirrels or chipmunks and perhaps a toad or snake if you are lucky! If you don't see the animals first hand, you can observe signs they left behind such as half eaten seeds, droppings, tracks, homes and tunnels, etc. A small jar with holes or a mini aquarium can be used for housing small critters while everyone looks at them. Bug boxes are good for looking at even smaller things. When finished, return the creatures to the place where you found them.

Back in the Classroom - Looking At Leaves – 15 min.

Gather students together to look at the leaves they brought in. If you have a shortage of different kinds of leaves on the school grounds, you can make cutouts of leaves traced on construction paper. Encourage students to observe the characteristics of leaves by asking the following questions:

1. Do all trees have the same kind of leaves?
2. How are the leaves alike and how are they different?
3. Are there any characteristics that all leaves have in common?
4. Do any of the leaves have lobes?
5. Do any of the leaves have one stem and several leaflets?
6. What are the edges of the leaves like?
7. Do some trees have needles?
8. Do all trees loose their leaves?

A book to read before or after this experience is *Have You Seen Trees*, by Joanne Oppenheim. If the leaves came from the schoolyard, or their own yard, students can press their leaves between newspapers and stack heavy books on them for a few days to preserve them. The pressed leaves can then be glued onto paper and/or covered with contact paper.



Trees as Habitats – 30 min.

An excellent book to read following this activity is *The Apartment House Tree* by Bette Killion.

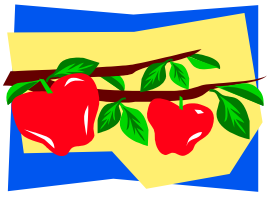
On white newsprint or poster board, draw a large outline of one of the trees in the school-yard. This will be used as the background for creating a mural depicting all the animals that depend on the trees.

Ask the students to list the animals or animal signs they observed while outside looking at trees. Decide where these animals spend most of their time—under the ground in the "basement," on the surface of the ground around the tree, on the trunk, up in the branches, or in the "penthouse" suite where the leaves are.

Students then can draw and cut out small pictures of the animals they observed and place them in the appropriate spot on the tree mural.

The Importance of Trees – 15 min.

Begin this lesson by reading the book, *A Tree Is Nice* by Janice May Udry. Afterwards, talk about all the ways people and wildlife use trees.

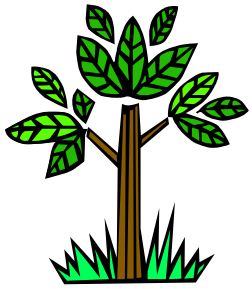


Show the students the tree items grab bag. Have the students take turns pulling an item out of the bag. Older students can work in teams to decide if the item comes from a tree or not, and if it comes from a tree, what part of the tree? After they have decided, they can create a list of the items and where they came from. For pre-reading students this can be done as a group discussion.

Extensions

Use a follow-up activity from Naturescope *Trees Are Terrific,* "From Paper to Plastic." This lesson has a copy master of an illustration of the inside of a house. Students look at the picture of the house and circle all the items that come from trees. A similar copy master with pictures of tree and non-tree items, is on the back page of the *Notes from the Forest* journal copy masters. An alternative to this activity is to set up a table in the classroom and ask students to bring in items from home that come from trees. This is a good way to involve parents in their child's learning.

Your class can make recycled paper from ground up newspapers mixed with some plant pulp and water. If you intend to do this on a regular basis, an old heavy-duty blender makes it much easier to get the paper ground up very fine. *Note: this blender can never again be used for food!* You will need to cut out pieces of window screening to scoop up the paper pulp. Then roll it out (tin coffee cans work well for this), and let it dry for several days.



Students can make models of trees using string for the roots, half of a cardboard tube, (such as used for paper towels or toilet paper), for the trunk, small twigs for the branches, and leaves cut out of construction paper. Glue the string roots onto the bottom of a flat piece of white paper. Next add the trunk by gluing the tube section to the paper above the roots, cut side down. Use small twigs glued under the top of the tube for branches and then glue cut pieces of green construction paper around the branches for leaves. Rub a little glue around the roots and sprinkle on some sand or dirt, and then make sure to draw in the sun!

Celebrate the end of the unit by having a feast of foods that come from trees—apples, maple syrup, walnuts, cinnamon, etc. Research where the trees grow, what part of the tree is used for food, and how the food is gathered and taken to market. You could also visit a grocery store or farm market and see how many products come from trees.

Assessment

Note: Copy masters for assessments are in the back of the Lesson Appendix.

Show students a picture of a tree. Ask them to label the parts—leaves, trunk, roots, etc.

Show students pictures of items and ask them to identify if they come from trees.

Ask students the question, "What do all plants have in common?" They should know they grow, they reproduce, they make their own food, and they need soil, water, sunlight and air. Also, most plants have leaves, stems or trunks, and roots.

For more advanced students, show them pictures of leaves and see if they can identify needles, broadleaves, compound leaves, leaves with lobes, leaves with smooth and toothed edges.

PA Academic Standards for Environment and Ecology Covered by the Unit:

4.2.4 Renewable and Nonrenewable Resources

A. Identify needs of people.
- Identify plants, animals, water, air, and minerals as natural resources. *(Trees are living things with needs similar to people. People need trees.)*
- Explain air, water and nutrient cycles. *(Trees take in carbon dioxide and give off oxygen as part of their food-making process. Dead trees decompose and add "nutrients" to the soil. Then new plants take in these nutrients in order to grow. Trees need water and take it in through their roots. Trees absorb water from the soil through their roots, and return water to the air through pores in their leaves.)*
- Identify how the environment provides for the needs of people. *(People use trees to get products they need such as food, raw materials, etc.)*

B. Identify products derived from natural resources.
- Identify products made from trees.
- Identify by-products of plants and animals.
- Identify the sources of manmade products (e.g., plastics, metal, aluminum, fabrics, paper, cardboard).

4.3.4 Environmental Health

A. Know that plants, animals and humans are dependent on air and water.
- Know that all living things need air and water to survive**.**

C. Understand that the elements of natural systems are interdependent.
- Identify some of the organisms that live together in an ecosystem.

4.4.4 Agriculture and Society (If the extension is done)

A. Know that food and fiber originate from plants and animals.
- Define and identify food and fiber.
- Identify what plants and animals need to grow.
- Identify agricultural products that are local and regional.
- Identify an agricultural product based on its origin.
- Describe several products and tell their origins.

4.6.4 Ecosystems and Their Interactions

A. Understand that living things are dependent on nonliving things in the environment for survival.
- Identify and categorize living and nonliving things.
- Describe the basic needs of an organism.
- Identify basic needs of a plant and an animal and explain how their needs are met.
- Identify plants and animals with their habitat and food sources.
- Describe how animals interact with plants to meet their needs for shelter.
- Identify animals that live underground.

B. Understand the concept of cycles.
- Explain the carbon dioxide/oxygen cycle.

4.8.4 Humans and the Environment

A. Identify the biological requirements of humans.
- Identify several ways that people use natural resources.

D. Know the importance of natural resources in daily life.
- Identify items used in daily life that come from natural resources.

PA Academic Standards for Science and Technology Covered by the Unit

3.1.4 Unifying Themes

A. Know that natural and human-made objects are made up of parts.
- Identify and describe what parts make up a system. *(The parts of a tree contribute to the systems of the tree--a living organism. These systems include water transport, food making and distribution, protection, growth and support, reproduction, etc.)*

C. Illustrate patterns that regularly occur and reoccur in nature.
- Identify observable patterns (e.g., growth patterns in plants).
- Use knowledge of natural patterns to predict next occurrences (e.g., seasons, leaf patterns).

3.2.4 Inquiry and Design

A. Identify and use the nature of scientific and technological knowledge.
- Provide clear explanations that account for observations and results. *(Make observations of trees size and shape, leaf shapes and branching patterns, bark textures, animals living near trees, animal signs, etc.)*
- Relate how new information can change existing perceptions. *(Discuss how student's ideas about trees changed after they closely observed the trees and organized and recorded their observations.)*

B. Describe objects in the world using the five senses.
- Recognize observational descriptors from each of the five senses (e.g., see-blue, feel-rough).
- Use observations to develop a descriptive vocabulary.

3.3.4 Biological Sciences

A. Know the similarities and differences of living things.
- Identify life processes of living things (e.g., growth, digestion, react to environment).
- Know that some organisms have similar external characteristics (e.g., anatomical characteristics; appendages, type of covering, body segments)

and that similarities and differences are related to environmental habitat.
- Describe basic needs of plants and animals.

B. Know that living things are made up of parts that have specific functions.
- Identify examples of unicellular and multicellular organisms. *(Trees are multicellular organisms)*
- Determine how different parts of a living thing work together to make the organism function.

RESOURCES

Books for the teacher:

Bowden, Marcia. *Nature for the Very Young*. New York: John Wiley & Sons, Inc. 1989.

Braus, Judy, ed. *Ranger Rick's NatureScope: Trees Are Terrific!.* Washington, DC: The National Wildlife Federation. 1992.

Rockewell, Robert E., et. al. *Hug a Tree And Other Things To Do Outdoors With Young Children.* Beltsville, MD*:* Gryphon House, Inc. 1990.

Russo, Monica. *The Tree Almanac.* New York: Sterling Publishing Co., Inc. 1993.

Skelsey, Alice and Gloria Huckaby. *Growing Up Green*. New York: Workman Publishing Company. 1973.

Books for the students:

Bulla, Clyde Robert. *A Tree is a Plant*. New York: Harper Collins Publishers, Inc. 2001.

Ehlert, Lois. *Red Leaf, Yellow Leaf.* New York: Harcourt Brace Jovanovich, Publishers. 1991.

Fowler, Allan. *It Could Still Be A Tree.* Chicago: Childrens Press. 1990.

Gibbons, Gail. *Tell Me, Tree: All About Trees for Kids.* New York: Little Brown and Company. 2002.

Halpern, Shari. *The Apple Pie Tree.* New York: Blue Sky Press. 1996.

Killion, Bette. *The Apartment House Tree*. United States: Harper & Row, Publishers. 1989.

Lauber, Patricia. *Be a Friend to Trees, Stage 2*. New York: Harper Collins Publishers. 1994.

Manson, Christopher. *The Tree in the Wood*. New York: North/South Books. 1993.

Oppenheim, Joanne. *Have You Seen Trees?* New York: Scholastic Inc. 1995.

Udry, Janice May. *A Tree is Nice*. United States: Harper & Row, Publishers. 1956.

Web sites: Since the Web is constantly changing, check Muhlenberg's Outreach Web site for updated listings. [**http://www.muhlenberg.edu/cultural/graver/index.html**]

Web sites for the teacher

DCNR Bureau of Forestry, *Common Trees of Pennsylvania.* [**http://www.dcnr.state.pa.us/forestry/commontr/common.htm**] You can see online ordering information for a hardcopy of the booklet at [**http://www.dcnr.state.pa.us/forestry/publications.htm**]

Ohio Public Library Information Network, *What tree is it?* [**http://www.oplin.lib.oh.us/products/tree/index.html**]

Forest Biology and Dendrology at Virginia Tech. [**http://www.cnr.vt.edu/dendro/wwwmain.html**]

Lesson Appendix

Copy Masters for:

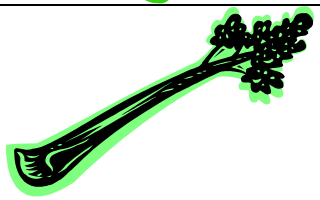
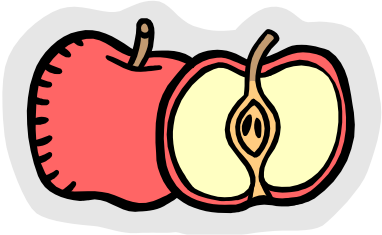
Plant Parts Chart
Plant Parts Answer Key
Venn Diagram
Notes from the Forest Journal/Log Book Copy Masters

- Cover page
- This is my tree
- Here are some leaves from my tree
- Parts of a twig
- This is the bark on my tree
- Here are some different kinds of flowers and seeds
- These are the animals around my tree
- My tree is nice because
- Things that come from trees
- The end

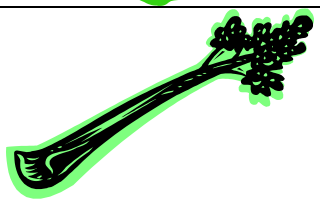
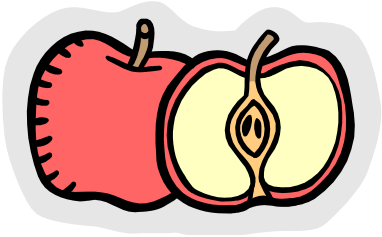
Assessment Worksheets:

- Color the parts of a tree
- What do plants and people have in common
- Trees as habitats
- Leaf shapes word match
- Leaf shapes word match Answer Key
- Tree word search
- Tree word search Answer Key

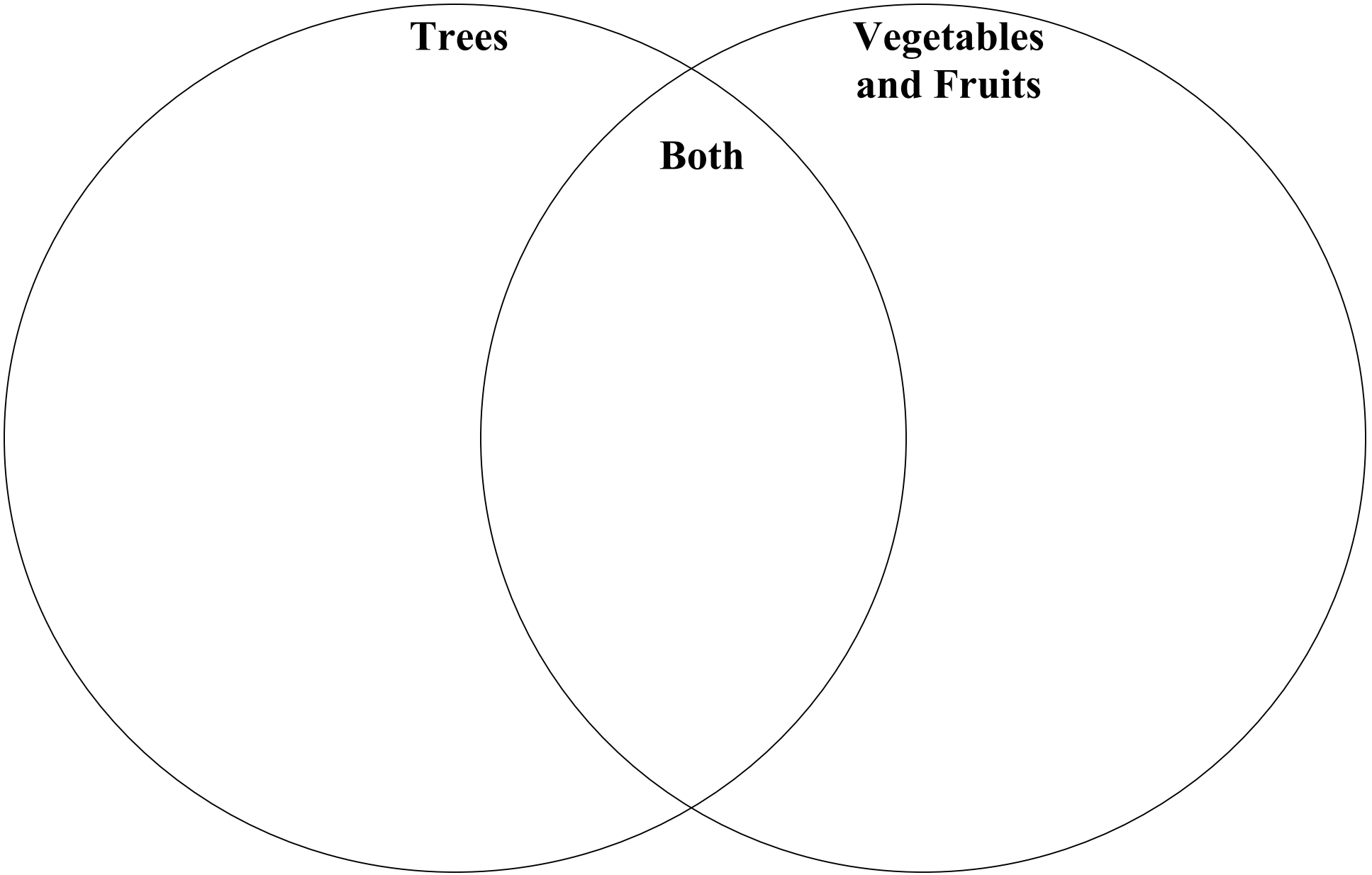
Plant Parts Chart

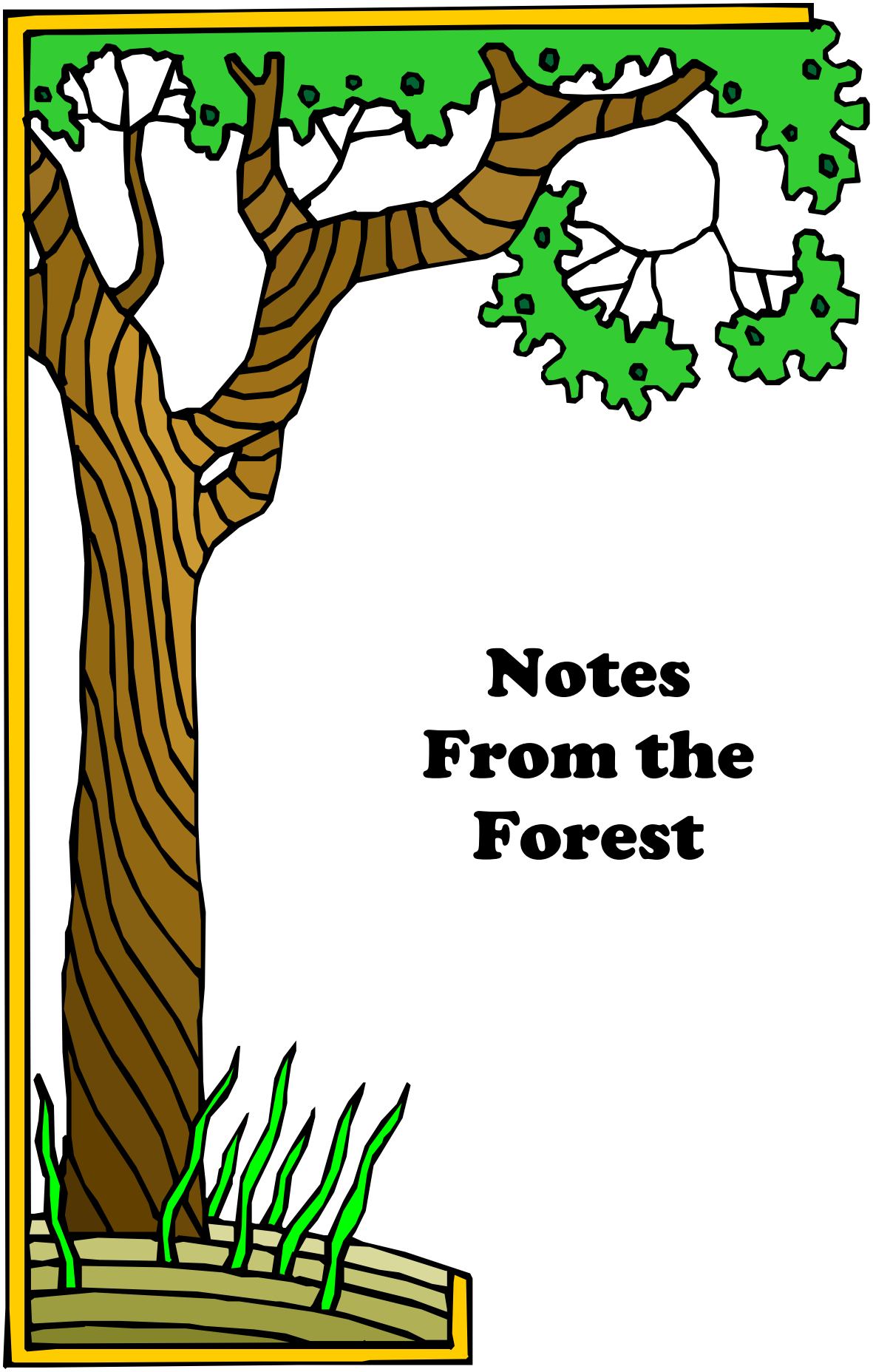
Plant Part	What Part Do We Eat	What Does This Part Look Like on a Tree?
		
		
		
		
		
		

Answer Key for *Plant Parts Chart*

Plant Part	What Part Do We Eat	What Does This Part Look Like on a Tree?
	*Flower buds*	*Examples may vary*
	*Stem and leaves*	*Tree trunk*
	*Root*	*Answers will vary, some trees have a large taproot, some have many surface roots*
	*Leaves*	*Answers will vary*
	*Seed*	*Answers will vary*
	*Bark of cinnamon tree*	*Answers will vary, some bark is smooth and some bark is rough*

Venn Diagram





Notes From the Forest

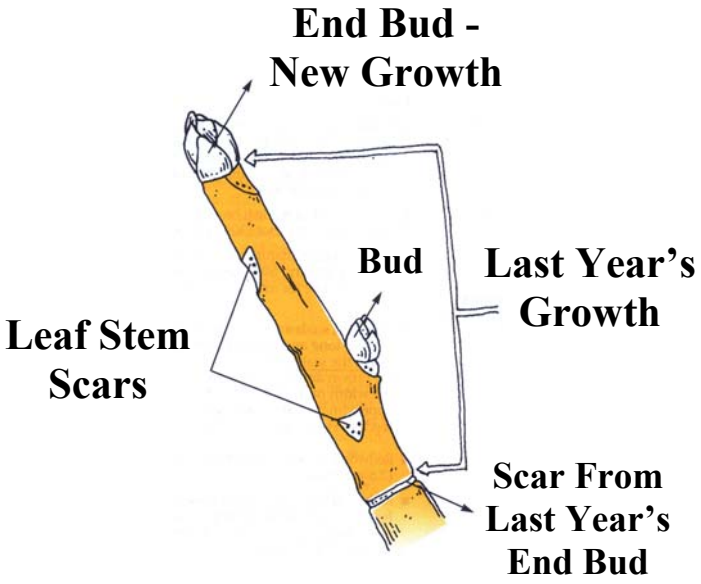
This is my tree.

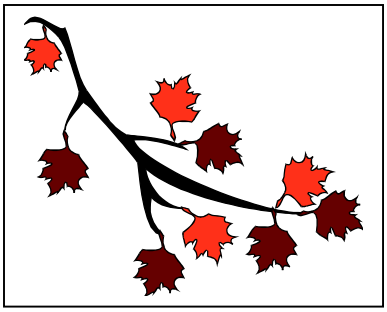
Here are some leaves from my tree . . .

How are they alike?

How are they different?

Parts of a Twig



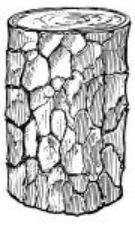


Here is a picture of a twig from my tree.

This is the bark on my tree .

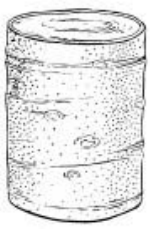
What Kind of Bark Does Your Tree Have?

Furrowed



Scaly

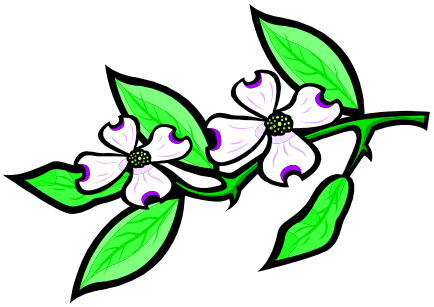
Shaggy



Smooth

Warty

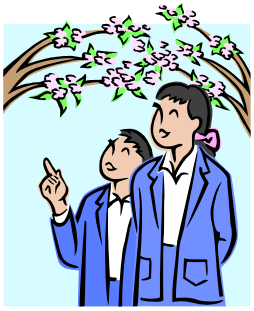
Here are some different kinds of tree flowers and seeds.



These are the flowers and seeds of my tree . . .

These are the animals
and signs of animals around my tree.

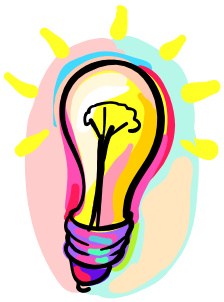
My tree is nice because . . .

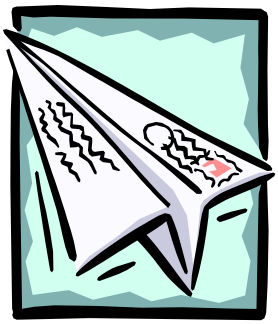


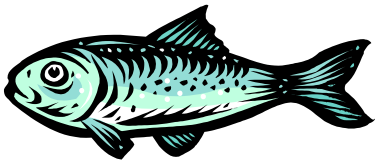
Things That Come From Trees

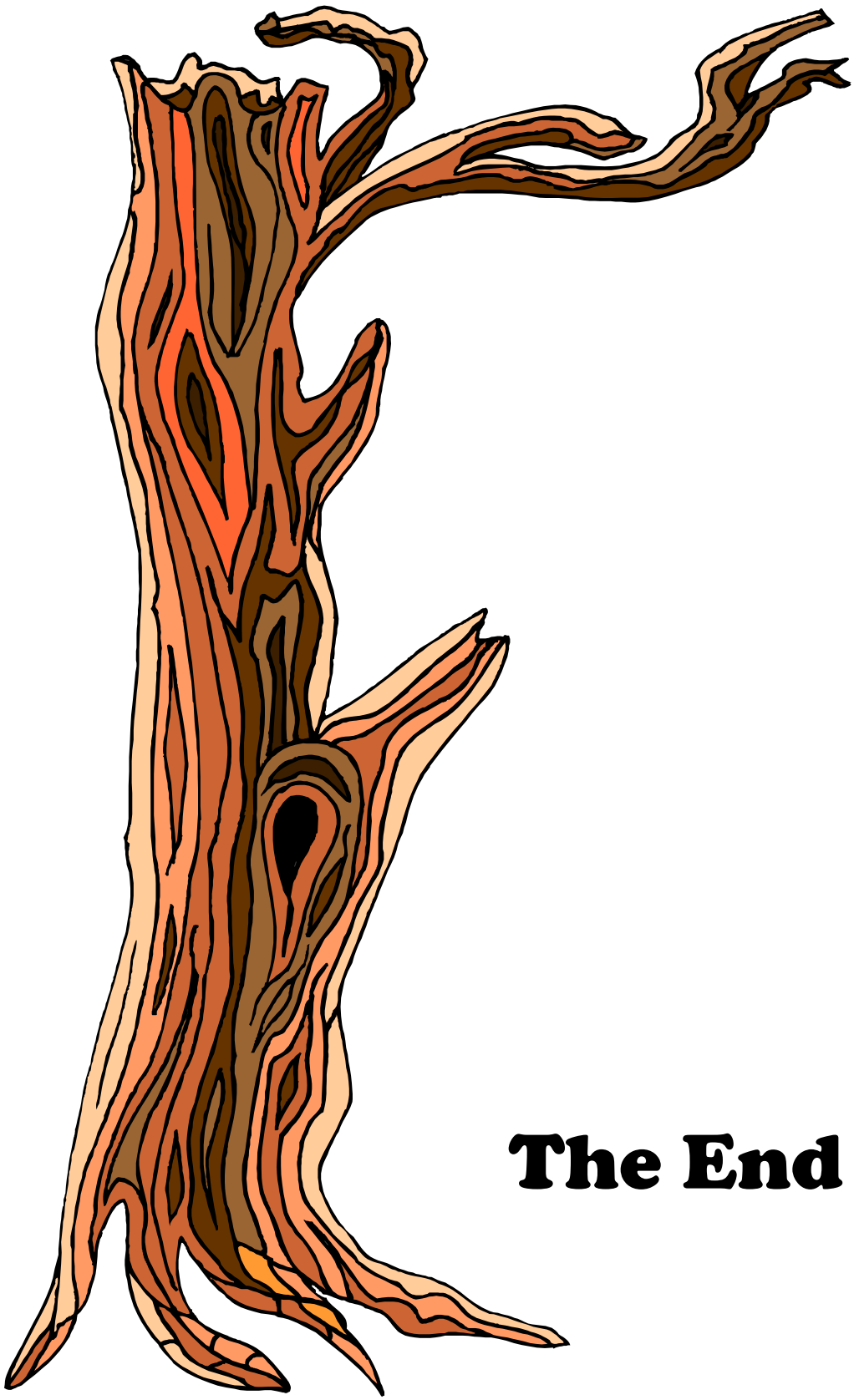
Name:_____ **Date:**_____

Directions: Circle things that come from trees and put an 'X' through things that do not come from a tree.









The End

Color the Parts of a Tree

Name:_____ **Date:**_____

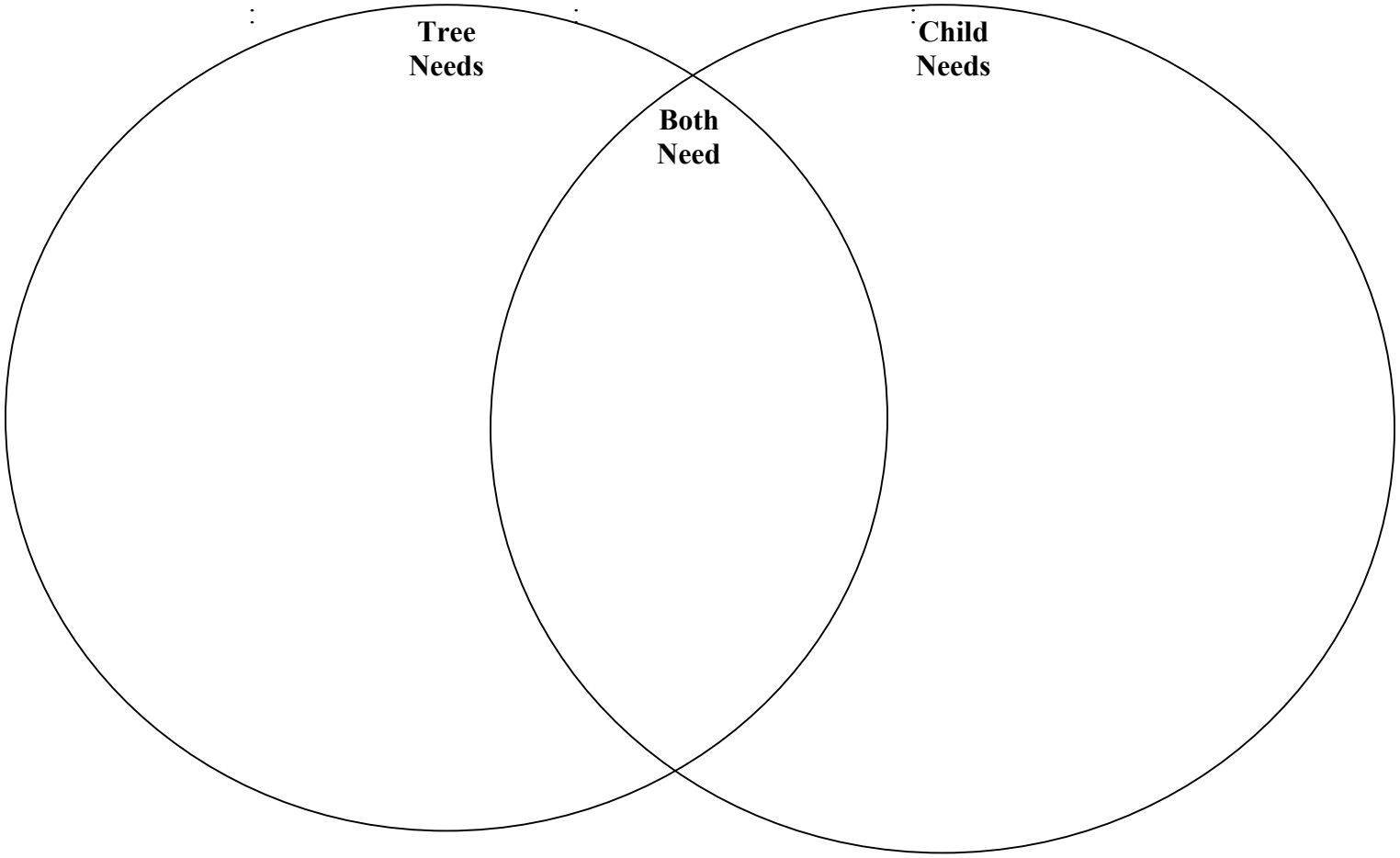
Directions: Color in the different parts of the tree.
Color the **roots black**.
Color the **bark on the trunk brown**.
Color the **branches light brown**. or **tan**
Color the **leaves** of the tree **green**.

What Do Plants And People Have In Common?

Name:_____ **Date:**_____

Directions:
Look at the picture and read the questions.
Write the answers in the circles.

What does **just the tree** need to grow?
What does **just the child** need to grow?
What do **both the child and the tree** need to grow?



Trees As Habitats

Name:_____ Date:_____

Draw an animal in the picture that would use this tree as a house or live around the tree.

Leaf Shapes Word Match

Name:_____ Date:_____

Directions: Use the word bank to describe each leaf. In some cases more than one word may be correct.

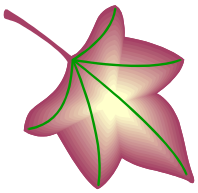
Word Bank

Simple Leaf	Needles
Compound Leaf	Lobed
Smooth edges	Toothed edges

_____

_____

_____



_____

_____

_____

Leaf Shapes Word Match Answer Key

Name:_____ Date:_____

Directions: Use the word bank to describe each leaf. In some cases more than one word may be correct.

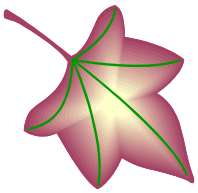
Word Bank

Simple Leaf	Needles
Compound Leaf	Lobed
Smooth edges	Toothed edges

Simple leaf
Smooth edges

Simple leaves

Toothed
Edges



Simple leaf
Lobed leaf
Smooth edges

Compound leaf

Needles

Name _____ Date _____

Tree Word Search

Find each of the following words.

SUN	SOIL	WATER	TRUNK
AIR	APPLE	BIRD	LEAF
BARK	TREE	ROOTS	

O E L W A T E R T B T R R A A A
R E I U R D T L U A P P L E I A
S T A B T I E N E R P F T O R R
R R R P T T I A O E A B T B R A
L E E R E T S O I L N T O L K O
F A B R I T A B N R N D S I S A
R W B D K R O O T S U R S N B T
B R A K R E A B D I R T B S R S
L U R B I E A A T S S A D L E B
S S K T L B W T R L U N T E T W
R P K W T I N O A L N L R R R E
L B R L O B U R L P R T R S U E
W I W I N R B R E T O A I R N E
L R E O W T D E A U A E E R K L
R D A E L R T R F L T S R B L A
K A A R L I W N K U E R R R D R

Answer Key

SUN	AIR	BARK	SOIL
APPLE	TREE	WATER	BIRD
ROOTS	TRUNK	LEAF