

**TEACHING KATE  
TEACHING KIDS ABOUT THE ENVIRONMENT**

**UP A TREE**

**Grade Level: 4-6**

**Time Required: 16-18 class periods of 50 minutes each**

**SC Science Standards**

This lesson plan was correlated with only the grade level specified unless otherwise noted.

**Grade 4:**

- I. A. 1. a
- I. A. 4. a
- I. A. 5. a
- I. B. 1. c, e
- II. A. 3. c
- II. B. 2. a-b

**Grade 5:**

- I. A. 1. a
- I. A. 4. a
- I. A. 5. a
- I. B. 1. c, f
- II. A. 3.
- II. B. 1. b
- II. B. 4. g

**Grade 6:**

- I. A. 1. c. 1
- I. A. 1. d. 1
- I. A. 2. f
- I. A. 3. a
- I. B. 2. b
- II. A. 1. e
- II. A. 2. a
- II. B. 2. b
- II. C. 1. f

**Purpose**

Students will describe a chosen tree using personal observation. They will map the location of their tree. Students will learn the function of tree bark, trunk and roots. They will learn about core sampling. They will also learn about leaf characteristics, as well as, the life cycle of a tree.

**Skills**

Analyzing, comparing and contrasting, comprehending, discussing, estimating, identifying attributes, identifying patterns, inferring, investigating, measurement, observing, ordering and arranging, scale drawings, summarizing, writing.

## Concepts

Identification and characteristics of plants and animals, awareness of populations and ecosystems, understanding species and their habitats.

## Materials Needed

Construction Paper	Crayons
Glue	Scissors
Camera and Film	Paper
Pencil	Crayola Markers
Metric Ruler	Graph Paper
Chart Paper	Tape
String	Paper Sack
Tree Cookies	Hand Lenses
Pins	Screen
Old Toothbrushes	<u>The Giving Tree</u> , by Shel Silverstein

## Definition of Terms

<u>Bark</u>	Protects a tree from injury caused by insects and other animals, by other plants, by disease and by fire. Bark characteristics vary from species to species (for example, it may be thick, thin, spongy, rough, smooth, covered with spines, etc.).
<u>Cambium</u>	A very thin layer of growing tissue, makes cells that become new xylem, phloem or cambium.
<u>Chlorophyll</u>	A pigment found in leaves that uses energy from the sun.
<u>Forester</u>	A specialist in the study of forests.
<u>Germination</u>	If a seed has favorable conditions (soil, climate and nutrient requirements) it will sprout.
<u>Heartwood</u>	The central core of the tree made up of dense dead wood and providing strength for the tree.
<u>Lateral Roots</u>	Roots that spread out to the sides of a tree and cover a broad area.

<u>Phloem</u>	A layer of cells conducting food from the leaves to the roots.
<u>Photosynthesis</u>	The process in which leaves convert carbon dioxide and water into oxygen and sugar.
<u>Rootlets</u>	Lateral roots and taproots branch into these finer roots.
<u>Root Hairs</u>	The finer hair like roots covering the rootlets. The root hairs absorb approximately 95% of the water and nutrients absorbed by the tree.
<u>Roots</u>	Function to help anchor the tree to the ground and absorb water and nutrients from the soil.
<u>Sapwood</u>	Also called <u>Xylem</u> , sapwood brings water and nutrients up from the roots to the leaves. Older xylem cells become heartwood.
<u>Taproot</u>	Grows straight into the ground.
<u>Tree</u>	A woody plant 20 or more feet in height with a single main stem and a crown of leaves.
<u>Tree Life Cycle</u>	Most trees begin as seeds, sprout, become a sapling, then a mature tree, which eventually becomes a dead tree, and then a rotting log supporting plants and insects.
<u>Tree Rings</u>	Also called annual rings, they show patterns of change in a tree's life as well as changes in the area where it grows. It is a cross section of a tree trunk.

### **Before the Session**

Contact a local forester, discuss your needs to meet the objective, and schedule his/her class visit. Gather all materials needed. Get needed resources from the library. Walk the school grounds and take notes on trees. Be certain all lesson objectives can be met on the school site. Become familiar with background information. Set up a "Tree Source" center for student access for researching. Schedule field trip to an orchard.

## Background Information

Most coniferous trees begin as seeds, while hardwoods may either develop from seeds or sprout from roots or stumps. Generally trees are put into flowering and non-flowering categories. The angiosperms are flowering plants and include wildflowers, shrubs and many trees. Angiosperms are pollinated by insects, bats, birds and the wind. Plants that have flowers also protect their seeds inside a fruit, pome or nut.

Most gymnosperms produce their seeds in cones and are pollinated by the wind. The most common types are conifers, like redwoods, firs and pines. Trees have many different roles in the forest depending on their age and size. Their leaves, bark, seeds, flowers, fruit and roots provide food for many kinds of animals. Insects and animals can live and feed in holes and openings.

When they die, trees return their nutrients and other elements back into the soil to be recycled through the forest ecosystem.

Trees, like all living things, have a life cycle that includes birth, growth, injury and disease, aging, and death. As trees progress from birth to death, their physical form changes, as well as their role in the forest ecosystem.

## Suggested Lesson Plan

### Lesson 1: 2-3 Class Periods

1. The teacher will lead a brainstorming session on trees. The information given will be written on chart paper in the web format.
2. The teacher will read The Giving Tree, by Shel Silverstein.
3. The class will discuss the usefulness of the tree in the poem and add information, given by the students, to the web. Keep chart on-going.
4. The class will go outside. Each student will choose a tree to “adopt” for the school.
5. The students will write observations about their tree.
6. The students’ pictures will be taken with their trees.
7. Back in the classroom the student will design a front cover out of 11" X 14" construction paper. On this the photograph and the student’s created title will be mounted.

8. The rest of the booklet pages will follow the format:
  - a. Page 1 — will include a student poem about tree on cover page. This will be completed by using descriptive notes taken during walk. It can take the form of already studied poems such as an acrostic, diamante or free verse.
  - b. Page 2 — will contain the Table of Contents. A review will be given using reference books.
  - c. Page 3 — will include observations about the adopted tree in a table form.
  - d. Page 4 — will be a map to the location of the tree.
  - e. Page 5 — will incorporate notes and drawings on functions of tree bark and roots.
  - f. Page 6 — will include notes and drawing on functions of tree trunk.
  - g. Page 7 — will have a drawing of a “tree cookie.”
  - h. Page 8 — will be a “Spatter Print.”
  - i. Page 9 — will contain notes and drawings on structural characteristics leaves.
  - j. Page 10 — will describe the life cycle of a tree. Additional activities can be added.
  - k. Back Cover — will contain a spring photograph of student with his/her tree. The students will compare the two photos and changes between them will be noted.

### Lesson 2: 2 Class Periods

1. Class will share poems composed about their trees to review.
2. Teacher will review scale drawings and legends with the class.
3. Students will draw a rough map with a scale (1 cm = 1 m) and a legend from a centralized location to their adopted tree on cm graph paper.
4. In cooperative groups, students will discuss each others’ maps, check for accuracy and suggest revisions.
5. Students will complete a final copy of the map in their booklet.

6. Students will exchange maps with different cooperative groups and practice locating trees.
7. Class will discuss legends they used and problem solving strategies.

### Lesson 3: 2-3 Class Periods

1. Students will complete a bark rubbing of their tree using crayons and drawing paper.
2. Class will compare/contrast bark rubbings. Each group will decide on a way to categorize the class's rubbings. Categorization strategies will be discussed. (Rubbings will be placed on the bulletin board after the completion of the lesson.)
3. As a class, students will brainstorm their inferences on functions of bark.
4. Teacher will initiate discussion of any function not derived by the students. Students will record notes in their booklets.
5. The class will go outside to look for injuries on tree bark caused by insects and other animals, by other plants, by disease and fire. Observations will be added to booklet page on bark. These observations can be validated by a forester.
6. Class will note differences in bark appearance (thin, thick, rough, smooth, spongy, covered with spines, etc.).
7. The students will write one complete sentence below the rubbing they made describing their tree bark.

### Lesson 4: 1 Class Period

1. The class will review the function of bark by brainstorming the definition within their group. Teacher will write each group's definition on a chart tablet to display.
2. The teacher will discuss the functions of a tree trunk, branches and leaves. The students will record this information and drawings of these parts in their booklets.
3. The students will act out the different parts of a trunk and roots. Cooperative group members can help each other.
4. Each cooperative group will have an opportunity to share their ideas. If students are having difficulty getting started, Project Learning Tree activity "Tree Factories" has suggestions.

Lesson 5: 1 Class Period

1. Teacher will hand out tree cookies to each cooperative group. Observations will be made about differences/similarities among the tree cookies. This will be written on chart paper and posted.
2. Using a drawing on the overhead, the teacher will review the parts of a tree trunk.
3. Have students count the rings to determine the age of the tree. Students share ages with group members who check for accuracy.
4. In their tree booklet students will draw a “tree person cookie” that represents their age. Below they are to list at least 5 significant events in their lives. Teacher will have them mark the ring that corresponds to their age at the time of each event with a symbol.
5. The “tree person cookies” and the life stories they represent will be shared voluntarily with the class.

Lesson 6: 1 Class Period

1. The class will review the functions of a tree trunk, roots and bark through a student question/answer session.
2. A forester will come to take a core sample and discuss what can be learned through core sampling. A core sample may be used to determine growth rate, age and if any diseases such as red heart disease in pine are present. A forester can also show students how to use bark gauges and how to measure height and density.

Lesson 7: 2 Class Periods

1. On a sheet of chart paper the class will review the benefits of core sampling.
2. Students will gather leaves from a variety of trees.
3. Students will use the leaves to make “spatter prints” in their booklets. (Note: Page will need to be removed from the booklet for this activity, allowed to dry, then re-entered.) Place a leaf on a sheet of paper and secure it with pins. Then place the screen over the leaf and paint across the screen using a toothbrush. Afterward lift off the screen, unpin the leaf and carefully lift the leaf away.
4. While the “spatter prints” are drying the teacher will lead the class in a discussion of the following leaf structural characteristics: needles or broad leaves, shape (heart, rounded, tapered), margins, textures, and simple or compound.

5. When the “spatter prints” have dried, students will label them with structural characteristics.

#### Lesson 8: 2 Class Periods

1. Class will discuss the life cycle of humans.
2. Class will go outside to observe trees in different stages of development.
3. In class, have groups discuss and develop their ideas concerning the life cycle of a tree.
4. The teacher will explain the life cycle of a tree to the class.
5. Students will illustrate a tree life cycle diagram in their booklet.
6. Class will mark a wooded area outside (10 m X 10 m) and make a class tally chart of the number of trees they see at different stages of the life cycle.

#### Lesson 9: 1 Class Period

1. Using the definitions learned in this unit, the class will play T-R-E-E-O Bingo. The winner of each round will get to make a leaf print t-shirt. They will bring a white t-shirt from home. The teacher will provide acrylic paints. The student will cover the leaves collected with paint and press them firmly, paint side down onto t-shirt. They will then hang the shirt to dry.

### **Application**

In order to gain an appreciation for tree orchards, students will visit an apple orchard. The following aspects of apple orchards will be emphasized: maintenance of orchards (pruning, pest control, fertilization, rotation), effects of orchard production on wildlife (raccoons, deer, insects, etc.), variety of apples produced in South Carolina, stages of fruit development.

If there is no apple orchard nearby a peach orchard would serve the same purpose.

### **Resources Available**

Project Learning Tree. 1993. American Forest Foundation, 1111 19th St. NW, Washington, D. C. 20036.

Project Wild. 1992. Western Regional Environmental Education Council, Bethesda, M. D.

Trees are Terrific, Ranger Rick. 1991. National Wildlife Federation.

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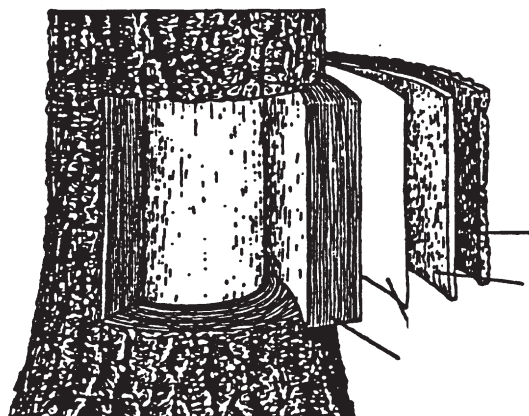
**TEST ON TREE PHYSIOLOGY**

Name:

Date:

Students will answer the following questions in complete sentences.

- A. What are three ways tree bark serves to protect a tree?
  
  
  
  
  
  
  
  
  
  
- B. What are the 2 main functions of tree roots?
  
  
  
  
  
  
  
  
  
  
- C. Given a diagram, label the parts of a tree trunk and explain the function of each part.



- D. What are four leaf characteristics?

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LAYERS OF TREE BARK

