# TEACHING KATE
# TEACHING KIDS ABOUT THE ENVIRONMENT

## WHO, WHAT, WHERE OF A FOREST

**Grade Level: 2** **Time Required: 2-3 weeks or longer**

### SC Science Standards

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

I. A. 1. a
I. A. 3. a
I. A. 4. a
I. B. 1. c
II. A. 1. a
II. A. 2. a
II. C. 1. a
III. A. 1. d

### Purpose

The student will define what a forest needs to grow and the different types of forests. The student will compare Tropical Rain forests to the forests in South Carolina.

### Skills

Classification, comparing and contrasting, drawing conclusions, identification, observation.

### Concepts

All forests have the same basic needs, all forests function the same way, there are similarities and differences between specific types of forests.

**Materials Needed**

| | | |
|---|---|---|
| red, blue, white poker chips | petroleum jelly | black paper |
| tape measure | jar | organic leaf material |
| funnel | mesh bag or screen wire | electric light or lamp |
| drawing paper | poster board | pencils, crayons, markers |
| magazines | assortment of pictures | products items made from wood |
| tall clear plastic cups | soil | bird seed |
| small plants | water | plastic wrap |
| dilemma cards | fish bowl | dead tree branch |
| 3 pound coffee can | world maps | picture cards of products from trees |

*The Tree* by Tim Vyner
*The Great Kapok Tree* by Lynne Cherry
*Life in the Forest* by Eileen Curran
*Project Learning Tree Environmental Education Activity Guide*
*Panther Dream* by Bob and Wendy Weir
*The Cat and the Hat Come Back* by Dr. Seuss (book or video)
*The Lorax* by Dr. Seuss (book or video)
Poem - "I Think That I Shall Never See..." by Joyce Kilmer
Video - "Rain Forest Rap"
Video - "I Need the Earth, the Earth Needs Me"

**Definition of Terms**

| | |
|---|---|
| Biome | Large region that has a certain kind of climate and supports certain kinds of organisms. |
| Canopy | The layer of covering in a forest made up of tree crowns. |
| Conifer | A tree that bears cones and has needle-like leaves. |
| Deciduous | A forest of trees which lose all their leaves at some time during the year. Refers also to an individual tree type. |
| Deforestation | The clearing of forest areas. |
| Forest | A plant community in which the dominant vegetation is trees and woody plants. |
| Forest Floor | The ground level of a forest. |

| | |
|---|---|
| Habitat | The natural environment of a specific plant or animal containing all necessary resources for the plant or animal. The locality where a plant or animal normally lives and grows. |
| Hardwood | A term describing broadleaf, usually deciduous trees such as oaks, maples and elms. |
| Rain Forest | A dense jungle of plant and animal life, usually found in tropical areas. |
| Regeneration | Replacing the harvested forest with plant seeds or seedlings. |
| Softwood | A tree which is usually evergreen, cone bearing and having needles. |
| Succession | A term used to describe the steps an ever changing plant community goes through from the first plants in an area to the final plants (climax) of an area. |
| Tree | A woody plant 20 or more feet in height with a single main stem and a crown of leaves. |
| Understory | The layer of the forest between the canopy and forest floor. |

**Before the Session**

It is very important to create a learning environment which enhances the topic being taught. When the children walk into the room, they should be stepping into a "forest". The easiest forest to stimulate learning is the rain forest because it is a place of beauty and awe. Play a tape of forest sounds as the children enter the room.

These lessons were planned in such a way, that they can be adjusted for time periods, expanded upon, or adapted to student interest and ability levels.

**Background Information**

Forests are important to humans for a variety of reasons. The plants and animals that grow and live in a forest provide for our basic needs. In most forests, there are only a few kinds of trees. There are about 225 different kinds of trees in South Carolina. The United States has 731 million acres of forest land that make up about one-third of the total land base. To be classified as forest land, the area must have at least 10 trees per acre. In the United States, commercial timberlands are owned by three sectors of society: private individuals (57 percent), public agencies (28 percent), and forest industries (15 percent). Those forests are managed to provide several resources at the same time, such as timber, wildlife habitat and recreational areas.

A forest is everything within a forest setting. Within the forest a tree must be able to obtain everything it needs to grow. These requirements include sunlight, water, soil, nutrients and space. Each tree species has its own level of needs. Some have lower nutrient requirements; require certain pH levels; prefer certain water levels; or are shade tolerant or intolerant. Pines prefer a site with acidic soils and are shade intolerant, tupelo and cypress prefer standing water such as swamps and oaks are shade tolerant.

Several layers of vegetation may be found in a forest. These are the canopy, the understory, the shrub layer, the herb layer and the forest floor. The canopy is the highest layer and the primary site of energy fixation. The density of the canopy determines the amount of sunlight which reaches the lower levels. The understory consists of shade tolerant smaller trees such as dogwood and redbud and younger trees of the species found in the canopy. The shrub layer consists of even smaller young trees of species found in canopy and understory, as well as, shrubby species such as blueberries, sparkleberry, hydrangea, laurel, fetter bush, wax myrtle, rhododendron, etc. The herb layer contains all the small herbaceous plants and grasses. The forest floor contains mosses, molds, fungi, etc. and is where decomposition takes place and nutrients are released to be used again.

A forest is a stage in the succession of plant growth on a particular area. Primary succession begins with barren soil such as a dune line or newly deposited alluvial soils in a flood plain. Colonial species of grasses and herbaceous plants grow and bind the soil. Moisture and fertility increase as plant remains decay and organic matter is added to the soil. Shrubby plants invade the area next. Seeds of pioneer tree species such as pine and yellow- poplar sprout and those which are in sunny areas, since these species are shade intolerant, bolt and grow fast shading out many of the colonial and earlier successional species. If the area is a site low in nutrients, oaks may come in instead of pines. Hardwoods grow up through the pines and the shade intolerant pines die. Eventually, if nothing happens to set the process back; such as a natural disaster caused by fire, flood, high winds, etc.; shade tolerant tree and shrub species such as dogwood, redbud, sourwood, sparkleberry, azalea, laurel, rhododendron, etc., will fill the understory. The mature or tolerant stage in the sequence of communities has been reached when only shade tolerant dominant species of the forest crown can replace themselves. Climax occurs when the community has reached an equilibrium or steady state with the environment. The community at this point is stable and self-replicating. Secondary succession follows, for the most part, the same steps as primary but higher up the successional ladder. Secondary succession begins with a disturbed area such as a farm field left fallow or a forest burned out by fire. These areas already contain a high level of nutrients in the soil. Grasses and weedy annuals rapidly colonize the area. These are followed by perennials, then vines and shrubs. Pines appear next and shade tolerant hardwoods begin to grow under them resulting in a pine - hardwood mix. Eventually pines are overtaken and shaded out by hardwood species. Over time if nothing happens to set back succession a climax forest will be achieved.

Deciduous forests are wooded areas that are primarily made up of deciduous hardwood trees. Coniferous forests are primarily made up of the softwood variety such as the pine trees. South

Carolina has both types of trees. Most conifers are located in the Coastal Plains. Deciduous forests are primarily located in the Upstate area. The Piedmont or Sandhills areas are a mix of both types of trees. A dominant tree species in a forest usually determines the forest's appearance and suitability as a habitat for plants and animals.

Tropical rain forests grow in areas that receive more than 80 inches of rainfall each year. These are generally areas around the equator. Rain forests cover about six percent of the Earth's land, with over half of the species of plants and animals on the planet living in these forests. Temperatures are between 70 and 95 degrees all year. As many as 60 to 100 different kinds of trees may grow on a single acre of rain forest land. The rain forest has a larger variety of living things than any other biome. For example, over one-half of the world's insects live in the rain forest. South America's tropical rain forest have over 25,000 different kinds of plant life.

The destruction of the forest and rain forest is a problem that affects everyone. These different types of forests are needed to replenish the atmosphere with fresh oxygen and provide other substances needed for life. About 50 million forested acres of rain forest are lost each year.

**Suggested Lesson Plan**

Session 1

1. Begin with a brainstorming session to observe what the students' perception is of a forest. This activity may be done as a whole group brainstorming session or in cooperative-learning groups. Combine all information the students give on a large chart for later comparisons.

2. Take the class on a walk in a wooded/forest area containing young and old trees. Ask the students to use their observation skills.

3. Upon returning to the classroom, as a group, make a comparison of the information they listed before the walk and what they observed on the walk into the forest or wooded area.

4. Draw a conclusion as to a definition, or what makes up a forest.

Extended activity: The students could draw a forest before brainstorming and then draw a picture of the forest they walked in for comparison.

Session 2

1. Read *The Tree* by Tim Vyner to the class.

2. Discuss what a tree needs to grow (space, light, water, and soil nutrients).

3. Play "Every Tree For Itself" from *Project Learning Tree Environmental Education Activity Guide*, Lesson 27, page 83. Use colored (red, blue, white) poker chips to represent light, water and food.

4. Draw conclusions from the activity about what happens when a tree does not obtain enough of what it needs to grow.

Session 3

1. Read Joyce Kilmer's poem "I think that I Shall Never See..."

2. Outline the activity "Adopt a Tree" from *Project Learning Tree*, lesson 21, page 65. The students will adopt a tree for five days of observations.

3. Take a walk in the closest wooded area to your school campus. Each child will select a tree, tag it, and do the "Adopt a Tree" activities over a five day period.

4. Have the student sketch their tree as they observe it on the very first day of selection. The student will then write a short paragraph as to why they selected the tree they did.

Session 4

1. Discuss the different layers in a forest: canopy, understory, shrub layer, herbaceous layer and forest floor.

2. Each student will construct a Berlese Funnel for studying the tiny animal life in the forest floor. In a jar, place a wet paper towel. Place black paper around the jar and coat the top of the jar with petroleum jelly. Place a funnel which contains a mesh bag or screen wire lining in the jar. Gather leaf litter and place it in the funnel. Turn on a light or lamp that shines on the leaf litter. Examine the contents of the jar every hour for the entire day. Students will record in drawings what they observe in the jar after one hour, two hours, and three hours.

3. Discuss the Berlese Funnel experiment in regards to life in the forest floor that we do not usually see when we walk in the forest but are always present.

Session 5

1. Read the book *The Great Kapok Tree* by Lynne Cherry to the class for discussion of the many ways the tree was useful to man and animals.

2. Divide the class into three groups or teams for compiling a list of ideas for one of three ways forests are used. One group will brainstorm for the ways the forest is used by Wildlife. Another group will do Products from or made from the forest. The third group will do Recreational uses of the forest. Give each group five minutes to brainstorm among themselves.

3. Using each group as a team, one member from each group in turn will name a use. If they are successful, their team earns a point. Each team must name a use from their given area.

4. Using a large sheet of butcher paper, all students will then cut out pictures from magazines and paste on the areas of use (Wildlife, Forest Products, and Recreation).

| Forest Products | Wildlife | Recreational Usage |
|---|---|---|
| | | |

Session 6

1. Read "In the Forest of S.T. Shrew" pages 22-23 from *Project Learning Tree*. (Another good story is the book *Life in the Forest* by Eileen Curran.)

2. Discuss the many different kinds of habitats that can be found in a forest (such as tree, ground cover, streams, ponds, underbrush, etc).

3. Divide the class into small groups. Give each group a sheet of poster board. Each group will select and draw one kind of habitat. They may either draw or cut out pictures to show the different kinds of animals that might live in that type of environment.

4. The students will play "Oh, Deer" from *Project Wild*, pages 146-149, with some students becoming deer and others becoming the essential components of the habitat area such as food, water and shelter.

Session 7

1. Discuss the many products we either get directly from trees or that we make from trees.

2. As the students discuss products construct a "Treasure Tree" by hanging examples they might name on a large tree branch that has been anchored in a weighted 3 pound coffee can.

3. Play "Tree Detective" with the students. On the back of each child tape a picture of a product we get directly or indirectly from trees. (Students should not tell other students what is taped to their backs.) The student is to figure out the identify of their product by asking fellow

students questions that require only a "yes" or "no" answer. After a given amount of time, the students should share their guesses with the rest of the class who will inform them if they are correct.

Extended activity: Students could also decide if their product is a food product, a wood product (such as furniture) or a paper product.

Session 8

1. Discuss the many different uses of forest land for recreation. This discussion can also lead into the state and federal lands that have been established as parks or wildlife conservation (wise use of resources) or preservation (no use of resources) areas.

2. Have the students draw a picture of their favorite way to use the forest for recreation.

Session 9

1. Discuss the different types of forest biomes: Coniferous, Deciduous, Mixed and Tropical Rain Forest (the area around Highlands, N.C. is classified as a temperate rain forest due to its amount of rainfall). Since all these types will not be present in your area, I suggest using a laser disc picture selection to show each type of biome. (Windows on Science from Data Optical Primary Volumes or Data Optical laser disc entitled "Forest.")

2. Use copy of a world map for the students to color and label the primary types of forests around our world. (See Ecosystem Map.) Help them make observations about why different types of forests occur around the world.

3. Rainfall, sunlight and temperature are important factors influencing where plants can grow and where different types of animals can live. Compare world maps showing temperature ranges, land formations, and rainfall amounts.

4. Watch the Video "Rain Forest Rap." (6 minutes.)

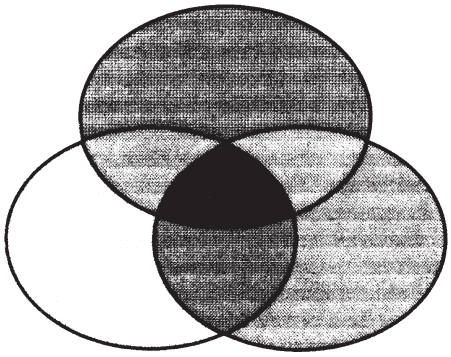
Extended Activity: At this point you could go deeper into the study of the rain forest and the different types of plant and animal life located in the rain forests around the world. There is an abundance of material available for an extended study of the tropical rain forest.

Session 10

1. Read *Panther Dream* by Bob and Wendy Weir.

2. Make a Venn Diagram comparing the rain forest to the forest of South Carolina.

   Label each outer section in the following ways: Rain Forest, South Carolina Conifer Forest, South Carolina Deciduous Forest. The overlapping rings will be used to list how they are all alike, with the outer rings listing ways they are all different.



Venn Diagram

Session 11

1. Discuss succession with students. Succession is a term used to describe changes in an environment over time.

2. Have the students construct a "Forest in a Jar." First, place two inches of soil in a jar. Add three inches of water and leave uncovered. Next, add an aquatic plant and place the jar near light. Do not replace any water due to evaporation. After several days add one or two bird seed to the jar. Observe the changes taking place. Once the bird seed has germinated and begins to grow, you will need to add a little water (for rainfall). Every other day, observe how the "forest" has changed. The students should record what they observe in drawings. Before the students take their "forest" home, have them discuss how the environment changed.

Extended Activity: Half of the class can make a rain forest in a jar. This is done by adding two inches of soil, three tablespoons of water and some small plant life. Cover the jar with plastic wrap, securing tightly with a rubber band. Place the jar in the sunlight and begin making observations. Students could compare the two types of forest and the changes they observed in each.

Session 12:

1. Read *The Cat in the Hat Comes Back* or *The Lorax* by Dr. Seuss or view one of the videos.

2. Discuss the book from an environmental view.

3. Take a walk in the forest areas again and observe things that are harming or may harm our environment in some way. Discuss these problems as you walk.

Session 13

1. Bring in an environmental resource person who can relate well with the lower grade level students to discuss caring for our environment. The South Carolina Department of Natural Resources would be helpful in arranging this.

Session 14

1. View the video "I Need the Earth, the Earth Needs Me" (15 minutes in length).

2. To stimulate discussion on ecosystem management and help establish values and beliefs related to wildlife and other elements of the environment, prepare dilemma cards. Dilemmas could be about specific problems such as loss of rain forest, return of grey wolves to National Parks in the west, loss of wetlands, cutting of old growth forests, etc. Students could also be involved in writing dilemma cards.

3. One at a time the students would draw a dilemma card from the fish bowl (which represents our world). They would read the situation to the class, state what they feel should be done about the problem. The discussion would then be opened up for the rest of the students' input.

**Application**

Students will begin to develop an understanding and appreciation of forests and their role in the environment. Students will be able to identify a forest and state reasons why we need to manage our forests better. In the past, it was a common practice to log huge areas at one time creating a large clearcut which was left to regenerate naturally. Later on large clearcuts were still the norm but all trees not commercially valuable were killed, logging debris was piled in windrows and burned and the area replanted in a single species. Now although the clearing still goes on we know that smaller cuts with irregular shapes create more edge for wildlife. Other practices used to benefit wildlife are leaving snags (old dead trees), leaving some mast producing hardwoods (those with edible seeds or fruits) within pine stands and leaving a few well shaped mature trees to naturally reseed an area (shelter wood and seed tree plots).

**Extension**

Do creative writing about trees (see "Poet-Tree" from *Project Learning Tree*).
Plant a tree.
Start a nature walk in the forest near your school.
Expand the unit to include wildlife of the different forests.
Expand the study of the tropical rain forests of the world.
Take a field trip to a state or federal forest management area.
Study endangered species and what we are doing to protect them.

**Resources Available**

AIMS Educational Foundation. 1989.

A Unit About Rain forest. 1993. Evan-Moor Corp. Monterey, CA 93940-5746

Elements of Ecology, 3rd edition. 1992. R. L. Smith. Harper Collins Publishers Inc., New York, N.Y.

Familiar Trees of South Carolina, A Manual for Tree Study. S.C. Forestry Commission in cooperation with Clemson University Extension Center, Clemson, S.C. 29634-0310

In The Rain forest (thematic unit for young learners) Evan-Moor Corp. 1993. Monterey, CA 93940-5746

Kessler, G. 1995. Clemson University, Department of Forest Resources, Clemson, S.C. 29634

Life in the Forest. 1985. Eileen Curran. Troll Communications.

Panther Dream. 1991. Bob and Wendy Weir. Hyperion.

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.

South Carolina Department of Natural Resources, Columbia, S.C.

Teaching KATE. 1995. Coalition for Natural Resource Education.

The Cat in the Hat Comes Back. 1986. Dr. Seuss. Random House, N.Y.

The Great Kapok Tree. 1990. Lynne Cherry. A Gulliver Green Book, Harcourt Brace and Company, New York, San Diego, London.

The Lorax. 1971. Dr. Seuss. Random House, N.Y.

The Tree. 1995. Tim Vyner. Barrons Educational Series.

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**WHO, WHAT, WHERE OF A FOREST**

**ECOSYSTEM MAP**