

Talk About Trees Intermediate Activity Packet

Dear Educator:

Thank you for requesting a Talk About Trees program. Enclosed you will find two activities to help you prepare your students for the on-site program. These two activities are designed to introduce your students to some basic scientific processes.

On the day of your classroom visit, your Talk About Trees facilitator will provide you with two follow-up activities that will reinforce the concepts of the Talk About Trees program.

These activities and the on-site program have been designed to correlate with the grade five benchmarks established by the State of Oregon. The Science Benchmarks are delineated below. In addition to the Science Benchmarks, these activities also address some English and Math State Benchmarks.

Please adapt these activities to provide your students with the optimal learning experience. Your Talk About Trees facilitator is available to answer any questions.

Science Benchmarks

- Describe and explain different rates of change. (On-site program (OS), Activities #3, 4)
- Diagram and explain a cycle. (OS, Activity #1)
- Organize evidence of a change over time. (OS, Activities #1, 3, 4)
- Describe actions that can cause or prevent changes. (OS, Activities #1, 3, 4)
- Describe basic plant structures and their functions. (OS, Activities #1, 3, 4)
- Describe the relationship between characteristics of specific habitats and the organisms that live there. (OS, Activity #3)
- Identify different ways and places in which scientists work. (OS, Activity #1)
- Ask questions and make predictions that are based on observations and can be explored through simple investigations. (OS, Activity #3, 4)
- Design an investigation to answer questions or check predictions. (OS, Activity #1)
- Collect, organize and summarize data from investigations. (OS, Activities #1, 3, 4)

Common Curriculum Goals**

- Understand the relationship that exists between science and technology. (OS)
- Understand the processes of technological design to solve problems and meet needs. (OS, Activities #1, 2)
- Describe the role of science and technology in local, national and global issues. (OS, Activities #2)
- Describe how daily choices of individuals, taken together, affect global resource cycles, ecosystems and natural resource supplies. (OS, Activity #2)
- Explain risk and benefits in personal and community health from a science perspective. (OS, Activity #2)

** Specific Benchmarks have not yet been developed for these Common Curriculum Goals.



Teacher's Guide

Activity 1 - Intermediate

GOAL:

To build knowledge of tree types and functions.

VOCABULARY:

broadleaved deciduous, broadleaved evergreen, coniferous, photosynthesis

OBJECTIVES:

1. To understand and identify various categories of trees.
2. To understand photosynthesis.
3. To gain appreciation of trees/forest products.

BACKGROUND:

Sugar, or sap, is food or nutrition for a tree. Certain elements taken from the environment are chemically reconstructed into sap within the leaves in a process known as photosynthesis.

Water and nutrients from the soil are taken in by root "hairs," and travel up to the leaves. Leaves (or needles) have stomata (tiny holes) to take in air. Leaves also contain the green chemical known as chlorophyll. Chlorophyll absorbs solar energy, and acts as a natural catalyst during a process in which CO_2 , H_2O , and nutrients from the soil are made into sap. Sap runs back down the tree to nourish the annual growth.

SUGGESTED PROCEDURE:

Part #1: Review with students the definition of the following:

Broadleaved Deciduous: Those trees whose leaves change color and come off the tree every Fall.

Broadleaved Evergreen: Those trees whose leaves stay green all year round.

Coniferous or Conifer: Those trees that have needles and cones.

Photosynthesis: Leaves and needles have tiny holes to breathe in air (carbon dioxide). The green part, known as chlorophyll, uses the carbon dioxide (CO_2) in the process of making food for the tree. Oxygen (O_2) is a by-product of the process and is "exhaled" back out of the leaves. Coincidentally, people and animals breathe in oxygen and breathe out carbon dioxide.

Sunlight is the energy source for the food making process. Needles and leaves soak up sunlight and activate the chlorophyll. Sunlight, water, nutrients and air are all necessary for the tree to make food. Oxygen and clean water vapor are the by-products of the food making process. The tree's roots pull in water and nutrients from the soil. The nutrient rich mixture is pulled up the trunk of the tree.

- A. Have students collect and bring in their own leaves, seeds, nuts, fruit and cones. Match up specimens to their correct category (Broadleaved Deciduous, Broadleaved Evergreen, Coniferous) using tree identification books. Next, place the categories into species (for example, put all the maples together, all the oak, all the pine, etc.). Create separate Broadleaved Deciduous, Broadleaved Evergreen and Coniferous collages for your classroom.
- B. Create a landscape map. Have your students map the school's campus. Be sure to include the different species of trees around the campus and carefully chart their location. Color all the Broadleaved Deciduous red, Coniferous trees green and Broadleaved Evergreen blue.

Part #2. Brainstorm with your class a list of benefits that we get from trees. Save the list for your Talk About Trees facilitator program.

DISCUSSION QUESTIONS:

1. Why do plants and animals depend on photosynthesis? (Plants begin the food chain.)
2. What are the benefits and drawbacks of being "rooted" to the ground? (To draw up water and to support the tree trunk.)
3. If people made food the way trees do, how might their skin appear? (Green, with little tiny holes for air to be taken in and for air and water to escape)

EXTENDED ACTIVITIES:

- Experiment with photosynthesis: Tightly secure a plastic bag around a few leaves on a tree (or plant). In a few hours the bag will contain water droplets. The droplets demonstrate that water is being released by the leaves due to photosynthesis.
- Observe a tree's growth as a weekly journal project.
- Experiment with lack of space for plant growth: Place 12 radish seeds in each of five paper cups. Place 3 radish seeds in each of five other cups. Tend them all. Compare and chart their growth and condition.
- Observe and record plants/trees: Compare and contrast a tree with a plant such as a tomato plant.



Teacher's Guide

Activity 2 - Intermediate

GOAL:

To gain awareness of limited natural resources.

OBJECTIVES:

1. Match products with the resources needed to make them.
2. Compare living and non-living resources.
3. Describe ways to be resourceful consumers.

VOCABULARY:

natural resources, petroleum, manufactured products, renewable, recycle, non-renewable, consume, aluminum ore

BACKGROUND:

This activity explores what natural resources are and how we depend upon them for the products we want and need. Scientists, known as foresters, continually investigate trees. A forester's job is to grow healthy trees as a natural resource for us to enjoy and, in some cases, use. By law, foresters also must protect and maintain other natural resources such as air, water, soil and wildlife.

The answers to limited resources versus unlimited wants will be found with informed consumers who work together to balance the environmental concerns and the economic stability to all of Oregon's citizens.

SUGGESTED PROCEDURE:

Introduce Activity #2 by explaining and listing natural resources used by Oregon's early Native Americans for food, clothing, shelter, tools and fuel.

Pass out Activity #2 worksheet. Check and review.

DISCUSSION/EXTENSION QUESTIONS:

- Are there products that are combinations of living and non-living resources? (i.e. pencil, paper, plastics)
- Are there alternatives to using living resources like trees for building materials?
- What problems can using the alternatives present? (environmental damage, energy costs and resource depletion)
- What problems occur from using living resources? (environmental damage)

EXTENDED ACTIVITIES:

- Ask your Talk About Trees facilitator about papermaking activities and resources.
- Make a collage of products from trees (your Talk About Trees facilitator may have suggestions for items) or make a collage of old assignment papers, scraps and discards. Hang the resulting collage(s) in your school hallway with an appropriate heading (i.e., Recycling is Beautiful or Wood is Good)
- Create a wordsearch with a tree, wood products or people-who-work-in-the-woods theme.
- Have each student collect, measure and record the amount of paper used in one day. Devise ways to use less paper. Share ideas.
- Invite forest professionals to your class.



Activity 2: Are You 'Resource' Ful?

1. We depend on natural resources to make the Products we need.

Every day we use products. Most products are made from natural resources. Natural resources are anything that lives on, or is part of, the Earth and its atmosphere. Items like trees, water, rocks and air are natural resources.

Draw a line from each natural resource to a manufactured product.

Resources

aluminum ore
grain
trees
petroleum (oil)
sand
cows

Products

paper
milk
bread
gasoline
cans
glass

2. Living resources can grow and reproduce. They are renewable.

- How many of the resources listed above are renewable?
- Non-living resources are non-renewable. How many of the resources listed above are non-renewable?

3. Some resources can be recycled.

To recycle means to use again. Products we have used, or consumed, cannot be used again. Look at the "Products" list above.

- Which three can be recycled?
- Which three cannot be recycled?
- Why should people be concerned about consuming resources that cannot be renewed and recycled?

4. People who are able to use things in new and clever ways are called resourceful.

If you are "resourceful" you should have fun filling in the correct letters below.

The ason you may be garded as a sourceful person is because you act sponsibly. You try to choose and use products made from newable sources. Like t es, newable sources can produce, be planted, placed and cycled. Now, that's ally markable!



Name _____

Teacher's Guide

Activity 3 - Intermediate

GOAL:

To investigate, measure and observe trees.

OBJECTIVES:

1. To gain understanding of trees through direct observation.
2. To record observations made about trees.
3. To measure height, circumference and crown spread of trees.

VOCABULARY:

canopy, crown spread, circumference

MATERIALS:

clipboards, colored pencils/crayons, tree(s) located within short walking distance of classroom, yardsticks.

Note: Divide students into groups of 3-4.

BACKGROUND:

Students in Oregon enjoy a unique opportunity to observe many species of trees. Some of your students may live in forested areas where trees are abundant. Others may live in more urban neighborhood settings in which "urban forests" exist. These "urban forests" may include trees within city parks, playgrounds, residential areas, schools and even empty lots. These ecosystems contain trees, plants and wildlife that provide wonderful observational opportunities for students.

SUGGESTED PROCEDURE:

1. Explain to students that they will be going on a walk. They will be observing trees in the area and writing down their observations.
2. Brainstorm with the class how trees in urban areas benefit neighborhoods. Help students develop answers such as providing homes for animals, food, holding soil in place, as well as other reasonable answers they develop on their own. Discuss how trees take in carbon dioxide and release oxygen, as well as clean dust and pollutants from the air. Also discuss how trees cool and humidify the air.
3. Give each student a copy of the Tree Observation sheet. Go over the items on the sheet that the students will be looking for while doing their tree observations.
4. Take the students on a walking tour of the school grounds or neighborhood. Be certain that they have their clipboard, colored pencil/crayon, yardstick and Tree Observation Sheet (or one sheet per group). While on the walk, have them discuss the different benefits of the urban forest.
5. Next, you should arrive with your students to the pre-selected tree(s) as discussed in the materials portion of this activity. If there is more than one tree, divide your students up so there is one tree for each group to observe. Have them examine the tree(s) and record their observations on the Tree Observation Sheet.
6. Students will return to the classroom and compare/contrast their observations. Students can then write a paragraph about the walk and the tree observations they made. Paragraphs should include a detailed description of the tree and the benefits of the urban forest that they noted on the walk.

DISCUSSION/EXTENSION QUESTIONS:

1. Why are trees important to neighborhoods and other urban areas?
2. How do trees protect against soil erosion? (tree roots hold soil in place, make the soil more able to absorb water (permeable) and prevent runoff and flooding in storm drains)
3. How is wildlife dependent upon trees? (Trees are used as homes and shelter for animals and birds. Many animals also get food from trees (sap, nuts, acorns, insects). Trees also hold water in crevices and on leaves, providing a water source for animals.)
4. What would life be like in neighborhoods or other urban areas without urban forests? (Keep in mind that we don't typically get wood or paper products from these trees, but fruits and nuts can come from them. These trees also provide recreational areas, natural beauty and shade. They cool and clean the air and absorb noise. Guide students in developing these answers during this discussion).



Talk About Trees Activity #3

Tree Observation Sheet



BRANCHES (Canopy)

The canopy of a tree is where the leaves and branches are located. *Examine the tree's canopy.*

The leaves are (mark all that apply):

broad and flat	toothed
smooth	scaly
leathery	fuzzy
shiny	rough
needlelike	other

On the back of this sheet, draw a picture of the leaf or needle that you have just observed.

What type of animals are living or could be living in the canopy?

What benefit or benefits does the tree's canopy provide for people?

Measure the crown spread: Crown spread is the distance a tree's branches spread away from its trunk. To measure, locate the branch that sticks out farthest from the trunk. One person stands directly under its tip. Another person will go to the opposite side of the tree, standing under the tip of the branch that sticks out the farthest from the trunk on that side. A third person measures the distance (to the nearest foot) between them.

Put your answer here: _____

TRUNK (Bark)

The bark is the outer part of the tree. Examine the tree's bark.

Describe the color of the tree's bark.

Is the bark's texture rough or smooth?

Name: _____

Name: _____

On the back of this sheet, make a small rubbing of the tree's bark next to your leaf/needle drawing.

Name: _____

Date of Observation: _____

Teacher's Guide

Activity 4 - Intermediate

GOAL:

To understand seeds and observe their growth into trees using varying conditions.

OBJECTIVES:

1. Compare different types of tree seeds.
2. Sprout different types of tree seeds.
3. Journal progress of seeds to saplings.
4. Experiment with seeds/tree growth, varying the growth conditions.

VOCABULARY:

embryo, ovule, seed, coat, tissue

MATERIALS:

grapefruit seeds, Douglas-fir seeds, store purchased soil, cups (for planting), razor blade (to peel the grapefruit seed covering)

BACKGROUND:

A tree seed is a fertilized tree egg. It is a mature *ovule* (egg) composed of an *embryo* (baby tree) and food for the embryo in the form of *tissue*. These are wrapped inside a protective tissue or a seed coat. Under proper conditions, the seed may develop into a tree.

SUGGESTED PROCEDURE:

1. Sprout the grapefruit seeds first. Peel grapefruit seed coverings with a razor blade. (Peel rounded end first, the pointed end contains the embryo.)
2. Place seeds in wet paper toweling and place in a sunny area of the classroom. Check paper toweling often to assure it stays wet.
3. When seeds have sprouted, decide with the class how to experiment with growth conditions. Explain that they will be journaling the various seeds to see how different conditions effect growth. Suggestions for varying conditions: Leave a sprout in its paper toweling without planting it in soil, place one of the sprouts in a shaded area of the classroom, plant several sprouts close together in one of the cups, place one of the cups in a sunny, warm area of the classroom, place 2-3 sprouts in a warm sunny spot and vary the dampness of the soil, use different types of soil when planting the seedlings.
4. Plant your Douglas fir seeds, following the directions given on the seed packet.
5. Once the seeds have sprouted, note the difference in the sprouting time between Douglas fir and grapefruit. Vary the conditions of the Douglas fir sprouts as you did with the grapefruit. Journal the similarities and the differences.
6. Draw the different seedlings as they mature. What are the similarities and differences in their appearance? What common things did they need to grow healthy? What were the differences in their needs?

Tree Observation Sheet, *continued*

What type of animals or insects could be living in or on the bark?

Measure the trunk's circumference: Using the yardstick, measure up the trunk to 4-1/2 feet from the ground. From that spot on the trunk, wrap the string/yarn around the trunk. Measure the length of yarn/string that went around the trunk using the yard stick.

Put your answer here: _____

Measure the tree's height: Hold your arm out in front of you so that your fist is at eye level (don't bend your arm). Have another person measure the distance from your fist to your eye.

Then face the tree you want to measure and hold a yardstick so that the distance from your hand to the top of the stick is the same as the distance you measured between your fist and your eye. Be sure to hold the stick straight up and down.

Next, walk backward away from the tree until you can see the base of the tree by looking over your fist, and the top of the tree by looking over the top of the yardstick. As you walk backward, do not move your head up and down; just move your eyes to see top and bottom of tree. Finally, when you can see the tree completely by sighting over the top of the yardstick and the top of your fist, have another person measure the distance between you and the tree. The distance is the height of the tree.

Put your answer here: _____

Ground Floor:

The ground floor is the layer located on the ground under and around the tree. Examine the ground floor. Describe any plants, animals, rocks or other things that you see.

This tree's common name: _____

This tree's scientific name: _____