



**Accompanying Lesson:
Stewardship and
Sustainability**

**GRADES
3-5**

I. OVERVIEW

A. Title

Caring for our Trees- Today and for the Future. In this class, students will identify ways that people use forests; and, how professionals sustainably manage forests resources.

B. Learner Objectives

1. Identify forest benefits and list human activities within each benefit.
2. Record data from a tree on school grounds and observe plants and animals that are dependent on that tree.
3. Categorize everyday objects that are made from trees and journal how humans are impacted by forest products.
4. Search for sounds found in nature to increase environmental awareness and compose a poem based on observations.
5. Develop a school stewardship plan to care for resources on school grounds.

NEXT GENERATION SCIENCE STANDARDS

[3-LS4-4 Biological Evolution](#). Unity and Diversity. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

[4-ESS3-1 Earth and Human Activity](#). Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

[4-ESS3-2 Earth and Human Activity](#). Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

[5-ESS3 Earth and Human Activity](#). Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

C. Materials (for each group)

- Activity 1: A Trees Dream Video, pencils, paper;
- Activity 2: My Terrific Tree- paper, pencil, measurement tools (yard stick, measuring tape, string or yarn), binoculars, magnifying glass, soil thermometer, tree ID guides;
- Activity3: A Day without Forest Products- forest products that you may have around your home or classroom such as: glue, cellophane tape, toothpaste, pencil, newspaper, chewing gum, dishwashing detergent, artificial vanilla flavoring, hair spray, crayons, lotion, paint, cinnamon, cough syrup, wooden handled hammer, aspirin, photographic film, citrus-flavored soft drink, baby food, instant hot chocolate, maple syrup, cork, RIT dye, muffin mix, nail polish, product information cards;
- Activity 4: Listening Walk- copy of The Listening Walk by Paul Showers, pencil, paper, sounds in nature tape;
- Activity 5: Stewardship Plan- Worksheets, clipboards, pencils

D. Time Considerations

Timing of activities can be altered to fit your classrooms needs.

- Activity 1: A Trees Dream- one 20-minute class session;

- Activity 2: My Terrific Tree- one 50-minute class session. Additional time needed if extending activity to observe over longer periods;
- Activity 3: A Day without Forest Products- one 50-minute class session;
- Activity 4: Listening Walk: one 50-minute class session;
- Activity 5: School Stewardship Plan- two 50-minute class sessions. Additional time needed for ongoing project work throughout the year.

E. Getting Ready

- Activity 1: A Trees Dream- prepare audio and visual technology to show A Trees Dream to students;
- Activity 2: My Terrific Tree- locate a tree on school grounds that can be safely accessed from all sides. Be aware of poison ivy, ant mounds, bees or wasps, or other potential dangers. Avoid trees next to fences, as students will not be able to measure tree crowns accurately. Pre-determine what science experiments to conduct based on state standards for science and math. Gather tools and instruments based on those experiments;
- Activity 3: A Day without Forest Products -Prepare pictures, props, materials. See appendix for ideas of forest products;
- Activity 4: Listening Walk- Acquire the book “The Listening Walk” by Paul Showers or prepare audio and visual technology to show the provided YouTube video link. Map out a location to conduct a listening walk on campus, or have sounds in nature tape;
- Activity 5: Stewardship Plan- Map out a walking tour of school grounds. Teachers can pre-select stewardship ideas to help focus students.

F. Key Vocabulary

Nonrenewable Resource - substances such as oil, gas, coal, copper, and gold, which, once used, cannot be replaced in this geological age.

Renewable Resource - a naturally occurring raw material or form of energy, which has the capacity to replenish itself through ecological cycles and sound management, practices. The sun, wind, falling water, and trees are examples of renewable resources.

Silviculture - is the art and science of producing and tending a forest; the application of forest ecology and economics in the treatment of a forest; and the theory and practice of controlling forest establishment, composition and growth.

Sustainable - using natural and human resources in a way that does not compromise the needs of future generations.

Stewardship - the concept of responsible caretaking; based on the premise that humans do not own resources but are managers of resources and are responsible to future generations for their condition.

II. BACKGROUND

Forests provide many benefits to the environment, economy and community. They provide food and habitat for wildlife, produce clean air and water, and provide areas for recreation and aesthetic beauty. They also provide the

raw materials needed to produce over five thousand wood products that we use every day, and support nearly one million jobs in the United States.

Forests must be managed to maximize these benefits. *Silviculture* is the art and practice of managing and regenerating a forest to best meet the objectives of the owner. Family forest owners apply silvicultural techniques to maintain and enhance their forestland. By altering, the *abiotic* (nonliving/never was) and *biotic* (living/once was living) factors, a forester can influence the tree species growing in a forest, and improve its overall health. Examples of Silviculture techniques that alter abiotic and biotic factors include harvesting (cutting and thinning), planting, and vegetation control (herbicide use and prescribed burning). The management techniques a forest owner applies to his or her land not only affect the present forest but also influence its future characteristics.

Since the late 1800s, humans have learned a great deal about forest ecosystems. In order to be good stewards of our forest resources, we must be responsible caretakers. Professionals understand that we need to actively manage our lands to keep them healthy and productive to in order for them to be sustainable.

III. DOING THE ACTIVITY

A. Engage - captures interest, makes connections, and provides an opportunity for students to express what they know

Ask students “*What do you like to do in a forest?*” Allow students to brainstorm ideas. Ideas will focus on recreational activities such as hunting, fishing, hiking, etc. Follow up with “*what are some ways that we can make sure that we have forests for a long time?*” Allow students to brainstorm and share ideas in various think-pair share strategies. See link for Think-Pair-Share explained. <https://youtu.be/vxMOI2Vnw54>

Explain to students that in the United States, private landowners own over 60% of the forests. These landowners can be businesses big or small, or by people like your mom, dad, grandparents or teachers! In order to keep our forests healthy, it is important that these individuals make smart choices to manage the trees. Forest Management according to the FAO (Food and Agriculture of the United Nations) is “the process of planning and implementing practices for the stewardship and use of forests to meet specific environmental, economic, social and cultural objectives.” To better understand forest management, let us watch a short video. Show Forest Fast Break: Forest Management Video: <https://youtu.be/Bxt950wIUZ8>

After watching, ask the students to recap main point: “what are the three main benefits we get from managing our woods?” Answer-Economic, Environmental, and Social.

B. Explore - activities to explore the concept or skill

ACTIVITY 1: INTRODUCTION: A TREES DREAM

Forest come in all shapes and sizes. It is important we manage our forest for different benefits; like wood products, wildlife habitat, recreation or all three! Explain to the students that they will watch a video about a tree from a forest who had a dream. Ask the students to try to figure out what was the dream of the tree. Show the video, “A Tree’s Dream.” Ask the students to pay attention to different activities that were taking place in the forest, and how people were managing the woods.

a. Questions to ask post video:

- i. Who takes care of the management of the forest? (foresters or forest managers);
- ii. What is the job of a forester? (Foresters are professionals that balance the needs of the forest with the needs

of people. They care, plant, and manage trees or forests. They are involved in various activities like planting, monitoring the growth of trees and timber harvest.);

- iii. For each tree that was harvested, how many trees are planted? (5 trees are planted for every one tree harvested);
- iv. Define renewable and non-renewable resources. Have students provide examples.

The following activities focus on the three major benefits forests can provide: environmental, economic, and social. At the end of the lesson, students will create a stewardship plan to help actively manage their school grounds.

ACTIVITY 2: MY TERRIFIC TREE- ENVIRONMENTAL BENEFITS OF A FOREST

Activity adapted from Project Learning Tree: Adopt a Tree

Forest ecology is the study of the components and functions of a forest ecosystem — community of organisms interacting with each other and with their physical environment. Forest ecosystems, which consist of bacteria, plants, birds, mammals, reptiles, amphibians, soil, water and air, differ from other ecosystems in that trees and other woody vegetation dominate them. Each of these components plays an important role in the function and health of the forest.

Each animal has its own unique requirements for food, water, shelter and space so there is no perfect habitat for all wildlife species. Some animals prefer the dense undergrowth of young forests while others live on the edge of older forests and feed in the open fields. Still others need to be in areas where there is plenty of water or tall trees to build their nests. Foresters have a unique opportunity to help meet the needs of animals and people. With knowledge about the basic concepts of wildlife habitat and its relation to different wildlife species, foresters can implement management techniques to protect and enhance specific wildlife objectives. These techniques include, replanting, prescribed burns, thinning, creating cover, and mapping endangered or threatened species on properties.

In this activity, students will observe a tree on school grounds and then record and analyze observations. Students will increase their environmental awareness and appreciation for nature as well as identify relationships between their tree, other organisms, and the surrounding community.

PROCEDURE

1. Locate a tree on school grounds that can be safely accessed by students. Then collect, record, analyze, and interpret observations in a science journal;
2. Ask the students the following questions or to collect the following data:
 - a. Description of tree. Use Senses- sight, touch, sound, smell;
 - b. Identify the tree using tree guides;
 - c. What animals live on this tree vs. what animals visit this tree? Remember to look in the tree crown and on/in the soil. Use binoculars and magnifying glass for additional science tools;
 - d. What is the circumference of this tree? Students can use tape measurers or string and yarn. What are some other ways we can measure/estimate?;
 - e. What is the estimated height of this tree? Measure height using a yardstick: <https://www.youtube.com/watch?v=cDy5OjfMfZ8>;

- f. What is the width of the tree crown? <https://youtu.be/332DklgHBnw>;
- g. Is your tree alive? Is your tree in decline? What signs tell us that a tree is in poor health?;
- h. Using a soil thermometer: What is the temperature of the soil under the tree? What is the temperature of the soil outside the crown of the tree? What does the temperature difference that tell us?;
- i. What evidence of human activity is on or near our tree?;
- j. Is this tree getting enough resources? (Sunlight, water, nutrients) if not how can you tell? (Overcrowding, yellowing or wilted leaves, etc.)

2. If you had to guess the age of your tree, what would you guess? For many schools, trees were planted when the school was built. Since the opening of the school, what has your tree observed or experienced? Have students research the history and timeline of your tree. Make note of major changes and events. Ideas could include drought, hurricanes, fires, or even school closures like the recent coronavirus pandemic. How would the tree and the surrounding environment respond?

3. Extension: Students can observe the tree over a longer period and observe environmental, seasonal, or physical changes.

ACTIVITY 3: A DAY WITHOUT FOREST PRODUCTS- ECONOMIC BENEFITS OF A FOREST

What do lumber, cardboard boxes, paper, sports equipment, medicines, and even cosmetics all have in common? They are all made out of wood! These products are sent not only to your home, but also to homes across the world. Did you know that the average American uses more than 700 pounds of paper products each year? We manage our forests for not only paper but for 5000 wood products that we use every day.

Trees are a renewable resource, meaning we can replant trees to replace those that died or harvested. Even though trees are renewable, we must be conservation minded. Landowners make management decisions that are not only in the best interest for our forests but also impact our economy and the goods we depend on. Do you know what different products come from trees?

In this activity, students will increase awareness of the importance of trees to their lives and connect that everyday objects people depend on are harvested from wood.

PROCEDURE

1. Hold up one product at a time and have your students vote as to whether or not they think it comes from a tree. Be sure they understand that you are not talking about the packaging of the product but the product itself or some component of the product. Put the ones that they think come from a tree in one pile and the ones that they do not think come from a tree in another.
2. Review objects. See Goods from the Woods handout in appendix for a breakdown of wood components of common items.
3. Have the student's think of products similar to the ones you have shown them that also might come from trees. For example, adhesives other than glue, cellophane tape and hair spray that come from trees include adhesive bandages and masking tape. Examples of solid wood products other than a hammer and pencils include furniture, picture frames, and hardwood floors, lumber to build houses, firewood and toothpicks.

4. Next, instruct your students to write a story about what it would be like to go through a day without forest products. Remind them that they would not have a house to live in or a bed to sleep in. Their car would not have a steering wheel, so they could not drive anywhere. They would not have toothpaste, a toothbrush, shampoo, soap or toilet paper. They would not have a chair to sit in, aspirin for a headache, orange juice for breakfast. Encourage your students to be creative. Some of them might like to think about how sports would be different without wooden baseball bats or football helmets. Students who are interested in music may want to write about all the musical instruments that would not exist -- pianos, violins, guitars, woodwinds. The artists in the group may want to think about what life would be like without paint or paper on which to draw.

ACTIVITY 4: LISTENING WALK- RECREATIONAL BENEFITS OF A FOREST

People go to the forest for a variety of recreational reasons. Activities like hiking, biking, camping, fishing, and hunting need to be managed to meet the needs of the public and to ensure that the resources will not be negatively impacted. For example, managers may establish hiking trails, clear up an area for picnicking, clear understory brush for wildlife habitats, or plant trees.

One popular recreational activity is wildlife watching. Bird watching, nature sightseeing, and photography all rely on your observational skills. In the following activity, students will further develop their observational skills by listening to the sounds in nature.

PROCEDURE

1. If available in your library, read *The Listening Walk* by Paul Showers. If not available, you can find a read aloud here version here: <https://youtu.be/BLs4r8lHUSg>. While listening to the story, have students take notes on the different sounds described.

a. Ask students to create a science concept map for the book. A concept map is a visual organization and representation of knowledge. See appendix for an example.

b. Questions to ask:

i. Why was it important for the character in the book to keep still or quiet?

ii. What senses did she use on the Listening Walk?

iii. Where did she hear the loudest sounds, where did she hear the softest sounds?

iv. If the main character walked in the woods, what sounds would she hear?

v. If the main character went on a night hike in the woods, what sounds would she hear?

2. Go on a “listening walk” at school, outside, or assign for homework. If outdoor activity is not an option, play a recording of nature sounds. Have students observe and record sounds they hear.

a. Follow Up - Would you observe different sounds if you did not have trees. How would your observations change if you were in a more rural environment? Urban environment?

3. Using observations, students should create a poem focusing on one sound or using as many sound words as possible.

C. Explain - students develop explanations for the concept or skill they have experienced

Students have participated in several activities that highlight the economic, environmental, and recreational benefits

that a forest provides to the community. Break class into pairs or small groups. Assign each pair/group a forest benefit that we manage the forest for (wildlife habitat, forest products, and recreational activities.) Have each group write a summary about that benefit, and management decisions to consider promoting that benefit.

EXAMPLES OF ACTIVITIES

- Wildlife Habitat: Planting specific trees, limited pesticide use, installing nest boxes, prescribed burn, restricting access;
- Forest Products: Thinning, clear cutting, logging, prescribed burn;
- Recreation: Installing hiking trails, camp sites, birding, mountain biking, fishing.

Have groups present to class.

D. Elaborate & Evaluate - activities to apply learning to new situations and discuss/compare ideas with others & students review/reflect on their own learning and provide evidence for changes to their learning

ACTIVITY 5: STEWARDSHIP MANAGEMENT PLAN

Adapted from Every Kid in a Park “Environmental Stewardship”

Ask students to define the word steward. Explain that stewards are people who manage or take care of resources. When we think about forest stewardship, professionals manage the resources and responsibly care for them for present and future use.

What are some ways that you are good stewards of your community/home/school/classroom? Allow students to brainstorm and share ideas in various think-pair share strategies. Examples include caring for a pet, completing chores at home, taking out the trash, keep classrooms clean, and help with litter pickup.

PROCEDURE

1. Take students on a walking tour around the school grounds. Ask the class to record and identify areas that need stewardship.
2. When you return to the classroom, distribute the “making a school stewardship plan” worksheet. Plans can be developed in small teams or as a class. Creatively think about which areas on the school grounds that may need care or “green” projects that students can accomplish that raise environmental stewardship.
 - i. Examples of Activities:
 1. Implement a recycling campaign.
 2. Plant a butterfly/habitat garden.
 3. Create a poster campaign with ideas to “green” your home.
 4. Build a birdhouse habitat.
 5. Develop an outdoor classroom.
3. If working in teams, have each group present ideas Class will vote to select one stewardship idea to adopt and complete throughout the school year. Some projects may need administration approval.

4. For Extension: Have each group present ideas. Complete Project Learning Tree: Green Your Home's Outdoor Space https://www.plt.org/wp-content/uploads/pdf/PLT-GreenSchools-School-Site-Investigation_Student-Page_Green-Your-Home-Improving-Outdoor-Spaces.pdf

IV. ENRICH: EXERCISES THAT EXTEND OR ENRICH THE LEARNING EXPERIENCE

A. Option 1 – Have students explore forestry careers to better understand the roles people have in managing our natural resources.

- a. Forestry Works- <https://www.forestryworks.com/>
- b. NC Forestry Association- Focus of Forestry Careers Profiles
- c. Careers in Forestry: Find your Path by Oregon Forest Resources Institute- <https://www.youtube.com/playlist?list=PL-KepgRbFKJzyLnlzLBOoflv-GLXUjghc>
- d. [Exploring Forest Careers by Project Learning Tree](https://www.plt.org/curriculum/green-jobs-forest-careers/) <https://www.plt.org/curriculum/green-jobs-forest-careers/>
- e. Texas A&M Forest Service: Forestry Career Pathway: https://www.youtube.com/watch?v=gbeClzhJmCA&list=PLeudtKjcZlzxLSrh_gfIs5l16cPPKhk4a

B. Option 2 – Invite a professional into the classroom or look into field trip opportunities into state educational forest sites to see firsthand management techniques.

C. Option 3 – Have students create their own management plan for a stand of trees. What benefits will they focus on? Who will use their forest? What management techniques would they implement?

V. ADDITIONAL RESOURCES:

1. Project Learning Tree – www.plt.org

Project Learning Tree is an award-winning environmental education program designed for _____ teachers and other educators

2. Forest Fast Breaks - <https://www.youtube.com/playlist?list=PLS8kydnMHO9ltXX5y1aPtSV2DfZkWOHQI>

APPENDIX/ADDITIONAL RESOURCES

A Day without Forest Products: Goods from the Woods Examples

CELLOPHANE TAPE

Cellophanes are made from a chemical that is a by-product of wood pulping during the papermaking process. They are used in making such products as tape and wrap.

CHEWING GUM

Chewing gum base is made from the rosin or storax of trees such as spruce. Chewing gum may also be artificially flavored with peppermint and spearmint, which come from tree chemicals.

PHOTOGRAPHIC FILM

Many photographic films contain cellulose acetate, a chemical derivative of cellulose, the main ingredient of wood. Cellulose acetate is also used to make molded plastics for eyeglass frames, combs, toothbrushes and car steering wheels.

PAINT

Many paints, varnishes and other surface coatings contain rosin, a by-product of the pine pulping process, which acts as a drying agent. Rosin is also used in printing inks, soaps, detergents and adhesives.

SOFT DRINKS

Many citrus-flavored soft drinks contain chemicals from trees called esters. The esters, which are derived from wood rosin, act as a weighting agent and assure a uniform distribution of the citrus flavors.

VANILLA FLAVORING

Artificial vanilla flavoring is made from lignin, the natural glue that holds wood together. Other products made from lignin compounds are ceramics, cleaning compounds and laundry anti-cling agents.

BABY FOOD

Torula yeast is a high-protein product made from wood sugars recovered during papermaking and used in many baby foods and baked goods.

GLUE

Many glues and adhesives are made from hard resins, a natural substance that comes from trees.

STP™ OIL TREATMENT

STP™ Oil Treatment and other synthetic lubricants are made from finished fatty acids derived from wood.

DISHWASHING DETERGENT

Detergents as well as many soaps and shampoos, are made from crude fatty acids derived from wood. The lemon scent of some detergents and furniture polishes is produced during pine turpentine processing.

LOTION

Many products, including lotions, contain Vitamins A and E, which come from turpentine extracts. Many skin lotions also contain stearic acids, which are derivatives of fatty acids produced during the papermaking process.

MEDICINE

Medicine in tablet form is held together with lignin, the natural glue that also holds wood together. The essential elements of aspirin come from the bark of willow trees. Other medicines used in treating diseases such as high blood pressure and Parkinson's disease contain various wood derivatives.

CINNAMON

Many spices used in cooking, such as nutmeg, bay leaves and cinnamon, come from trees. Cinnamon is made from the bark of the laurel tree, which grows in India and Sri Lanka. Cinnamon sticks are thin pieces of bark from young trees that have curled up as they were dried.

INSTANT HOT CHOCOLATE

Instant hot chocolate contains cellulose, the main building block of wood. This form of cellulose acts as a thickening and binding agent.

HAIR SPRAY

Hair spray and many other adhesives are made from tree resins, which are sticky, liquid substances found in trees. Resins usually harden when exposed to air.

MAPLE SYRUP

To make syrup, sap is collected from the sugar maple tree by pushing a hollow tube through the dead bark to the sap-conducting layer. The sap is then boiled until only the sticky syrup remains.

CORK

Cork is the bark of the cork oak. Every eight to ten years, the outer bark of the trunk is stripped away, leaving only the bark cambium. This layer then grows into new bark.

CRAYONS

Carnauba wax, which comes from the leaves of the carnauba tree, is the waxy component of crayons, lipstick and other cosmetics. It also is used in car wax and as a finish coating on furniture, fruits, vegetables and a wide variety of other products including medicine tablets.

COUGH SYRUP

Many cough syrups and mouthwashes contain pine resin, a natural component of tree sap, which has antiseptic properties.

RIT DYE

The osage orange is a shrubby North American tree whose wood produces a yellow fabric dye. The North American black oak is also a source of yellow dye.

MUFFIN MIX

Many baked goods contain some type of tree gum that acts as a thickening agent and has similar composition to carbohydrates. Gums also are used in cosmetics and as stabilizers in ice cream.

TOOTHPASTE

Toothpaste contains cellulose gum, a natural product derived from wood that acts as a binder and provides a creamy texture. Many toothpastes also contain terpenes, chemicals derived from wood and used to sweeten the spearmint or peppermint flavor of toothpastes and mouthwashes.

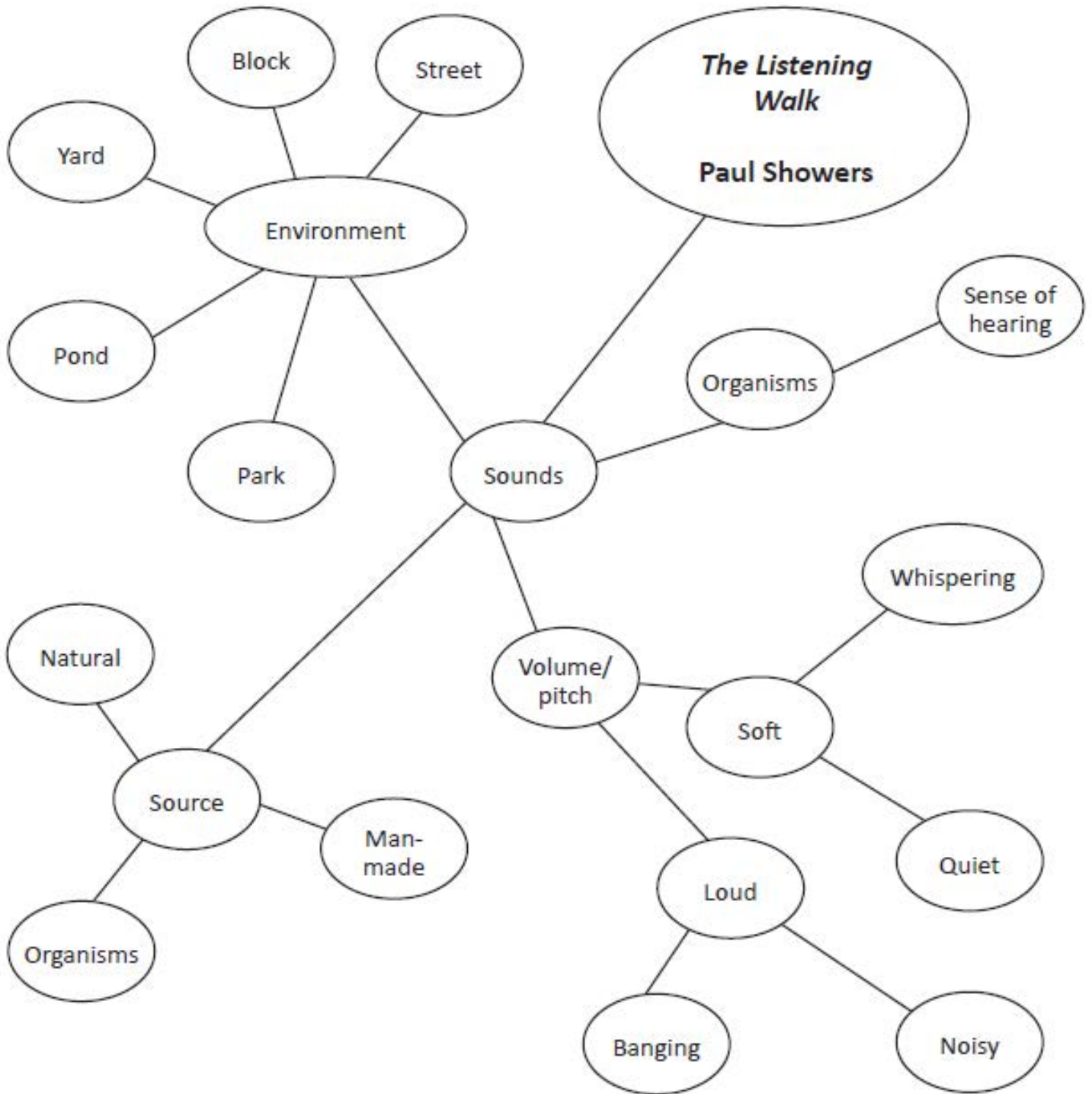
FABRIC SOFTENER

Fabric softener sheets are a paper product formed from cellulose, the main building block of wood. They also may contain beta pinene, a turpentine by-product used in many perfumes and fragrances.

NAIL POLISH

Nail polish and other paints contain nitrocellulose, a mixture of cellulose from wood pulp and several chemicals. The presence of nitrocellulose makes a liquid moisture-proof when it dries. Some nail polishes also contain resin, a natural substance secreted by plants.

Science Concept Map



Making a School Stewardship Plan

Team members' names: _____

1. Areas of school where stewardship is needed: _____

2. What actions will your team take to provide stewardship in this area and which team members will do which tasks?

(Ideas include: board eraser, bookshelf arranger, turns off lights, playground or cafeteria cleanup, waste reduction and recycling coordinator, junior water-conservation manager, student stewardship ambassador to school, landscaper, etc.)

3. Who can help us?

(teachers, staff, parents, other students—try to be specific.)

4. What tools or supplies will we need?



Photo: Courtesy of National Park Service.

5. How often will the tasks need to be done?

6. How can we tell others about our stewardship plan and get them involved?

What Do You Propose?

Use your notes above to write a stewardship proposal to your principal. Your proposal should answer these questions: **1)** What is the need? **2)** What actions do you propose that students take? **3)** What is the timeline for those actions? (When will the actions happen during the school day? How often will the actions happen?) **4)** What materials and/or support will you need for those actions?