

Yes, P.L.E.A.S.E Trees

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Adapted from: Project Aquatic Wild. 2000. "Riparian Retreat". Page 118.

Time: 60 minutes

Overview

This activity teaches participants, grades 4-6, about riparian habitats of the Willamette River using plant and animal identification cards, a metaphor exercise, and the stream simulator. This is a useful exercise to demonstrate the functions of riparian habitats and to identify the plant and animal life that inhabit this area.

Benchmarks Addressed

SC.05.LS.05 Describe the relationship between characteristics of specific habitats and the organisms that live there. Students will be able to understand the relationships among living things and between living things and their environment. The riparian habitat will be used to demonstrate the direct and indirect relationships of the plants and animals that inhabit the area.

SC.05.LS.05.03 Recognize how all animals depend upon plants whether or not they eat the plants directly. Students will be able to understand the functions of plants in a riparian habitat and how wildlife depends on plants as a part of the food chain and for shelter.

Rationale

The use of hands-on activities will enhance your students' learning capability. The activities require participation, provoke critical thinking, and engage students through learning-by-doing.

Learning Objectives

By the end of this activity, participants will be able to:

1. describe the functions of riparian zones
2. identify plants and animals that inhabit riparian areas of the Willamette River
3. explain the value of riparian habitats for wildlife and humans

Materials Needed

- ❑ Box or bag (large enough to contain the items listed below and not transparent)
- ❑ Coffee filter
- ❑ Sponge
- ❑ Shoe
- ❑ Plastic baggie of cereal or type of dried food
- ❑ Pair of sunglasses
- ❑ Toy house or an object to represent a home
- ❑ Plant/animal identification cards
- ❑ Stream simulator (description/instructions provided on last page; plastic trees, animals, leaves, gravel and piping provided with stream simulator)

Background Material

Riparian zones are found on the edge of water bodies such as streams, rivers, lakes, creeks, and ponds. These natural areas support a variety of plant and animal communities. Riparian vegetation plays a critical role of maintaining ideal conditions for wildlife habitat. Animals depend upon riparian areas for connectivity to water for food and shelter.

The riparian zone provides protection for the stream. The vegetation acts as a buffer between the upland and the stream. Riparian plants prevent debris and pollution from entering the water. In addition, the riparian zone cleanses overland run-off as it flows downhill. The land of riparian areas helps regulate water discharge. It stores water underground during high- flow periods, such as floods and releases the water during low- flow periods. Riparian vegetation requires a high level of ground water to support their extensive root systems, which stabilize the stream banks. This prevents erosion and maintains the stream channel structure. A narrow, deep stream channel provides a critical temperature range for aquatic organisms. The streamside vegetation also shades the water surface and keeps the water temperature cool for aquatic organisms during summer months.

Riparian vegetation supplies food and nutrition for wildlife. Leaf litter and the insects it attracts are an important source of detritus, or non-living organic material. Detritus remains suspended in the water column and decomposers feed on it. Decomposers in aquatic environments are important because they are the base of the food chain. The riparian zone provides space and shelter for animal communities. The trees and stream banks provide habitat for birds and burrowing animals. Riparian zones are utilized as corridors for wildlife during daily movements and seasonal migration.

Riparian areas are also important for humans. The natural setting of forested stream banks and abundant wildlife provide an aesthetic experience for visitors. Many utilize riparian areas for recreation, such as hiking and fishing.

Activity Description

Step 1. Getting Started: Introductions (5 minutes)

Begin by defining a riparian habitat as the land that surrounds a water body and includes the water body itself (stream, river, lake, or pond). Important elements of riparian areas include the physical attributes of the land area as well as the life that inhabits it. Many plants and animals live in riparian zones and are dependent upon the availability and access to water, food, and shelter for their survival. Ask participants to close their eyes and imagine the river and the land that surrounds it. Encourage them to visualize the types of plants and animals of riparian areas, as well as scents, noises, and how things may feel to the touch. Have participants share their responses. Students may suggest organisms that do not live in the riparian habitat, such as an elephant or a rose bush. This allows an opportunity to reinforce the concept that the organisms found in these areas are dependent upon and have adapted to water availability.

Step 2. Riparian Plant and Animal Identification Cards (5-8 minutes)

Pass out riparian plant and animal identification cards to selected participants. Ask each card holder to show the picture on the front side to the other participants and to read the description on the reverse side. Pictures should be 8x10 or larger for easy viewing. Be sure to include a diverse selection of organisms (ie microorganisms, reptiles, mammals, deciduous trees, and conifers). Descriptions should include the type of organism, where they are found within the riparian habitat, their diet, and other fun facts. Explain to participants that many other plant and animal organisms inhabit the riparian zone and that only a few have been displayed. Discuss the value of riparian habitats for human use of fishing, hiking, camping, swimming, and beautiful scenery. A few examples have been provided below.

Examples of Identification Cards:

Card 1: Coho Salmon (fish)

Coho salmon adults migrate from a marine environment into freshwater streams and rivers of their birth in order to mate (called anadromy). They spawn only once and then die (called semelparity). They feed on plankton and insects, and switch to a diet of small fishes as adults in the ocean.

Card 2: Great Blue Heron (bird)

The Great Blue Heron is a wading bird of the heron family. It spears fish and frogs with its long, sharp bill. It stands four feet tall.

Card 3: Dragonfly (insect)

The dragonfly lives near water because their larvae are aquatic. They eat mosquitoes, bees, and butterflies. Dragonflies have excellent eyesight.

Card 4: Beaver (mammal)

The beaver is the second largest rodent in the world. It lives in and out of the water of riparian habitats. Beavers are known for building dams with trees they have chewed down.

Card 5: Bacteria (microorganism)

Bacteria is the most abundant decomposer. Bacteria is found in and out of the water of riparian habitats. Bacteria feeds on detritus. Without bacteria, dead plants and animals would pile up.

Card 6: American Bullfrog (reptile)

The American Bullfrog lives in the water of riparian habitats. They eat anything that will fit in their mouths, such as snakes, other frogs, and insects. Fun Fact: Two Bullfrogs were launched into orbit in 1970 on the Orbiting Frog Otolith spacecraft.

Card 7: Bigleaf Maple (tree)

The bigleaf maple is a deciduous tree, which means that it loses its leaves in the winter. It has the largest leaves of any maple tree. Maple syrup has been made from the sap.

Card 8: The Willamette River

The Willamette River is the 13th largest river in the United States. It drains a basin of 11, 478 square miles. Many amazing plants and animals live here. Many people visit here and enjoy its beauty.

Step 3. Metaphor Exercise (10-15 minutes)

Present a box or bag containing the six metaphor objects to selected participants. Instruct each participant to pull one object from the container without allowing them to see the objects. Divide all participants into small groups for a few minutes, there should be one object for each group. Ask them to formulate ideas of how each object relates to the riparian habitat. After the group discussions, have the participants gather around the stream simulator. Begin with the group that has the filter and allow them to share their ideas. The acronym P.L.E.A.S.E. will be used to guide the discussion, as described below. After the group has responded and the answer from P.L.E.A.S.E. is given, demonstrate how riparian zones protect the stream by filtering pollution using the stream simulator (as described below). Repeat this process for each of the remaining groups.

Object**Metaphoric Function****Filter**

Protection from pollution (riparian zones protect the stream by acting as buffer, preventing debris and pollution from entering the stream and filters impurities from upland runoff as it flows downhill to the water). Wildlife benefits from a healthy stream. **Stream simulator:** point out the abundant vegetation placed along the streams that block harmful material from entering the water.

Sponge

Land stores and releases water (riparian zones store water during periods of high water flow and release water during low-flow periods). Regulating water discharge is vital for plant and animal survival. **Stream simulator:** place the piece of piping on the side of stream simulator to demonstrate the water table.

Shoe

Erosion (riparian vegetation holds stream banks together with their feet or roots). This is important for channel structure and water clarity. **Stream simulator:** use fingers to push down on the gravel beside the stream to demonstrate how easily the land comes apart and enters the stream without vegetation.

Baggie of cereal

Attract insects and leaf litter (source of food or detritus). Leaves from riparian vegetation fall into the water and are eaten by decomposers, which are the base of the food chain. The leaves in the water also attract insects. Living insects are a source of food and dead insects that fall into the water are a source of detritus. **Stream Simulator:** place leaves in the flowing water to demonstrate how leaves float on the water surface and are carried by the current.

Sunglasses

Shade (streamside vegetation provides shade for the water surface of the stream). Aquatic organisms require a specific temperature range to live in. **Stream simulator:** point out the abundant vegetation along the stream banks and discuss how the tree canopy provides shade from the shining sun above.

Toy house

Escape (shelter for wildlife). Riparian habitats are home to many organisms. This is where animals hide, sleep, or hang out. **Stream Simulator:** Place plastic animals in the stream simulator.

Step 4. Stream Simulator (30-40 minutes)

Allow students to play with the stream simulator. Encourage them to put their hands in the simulator and have fun. This is a good time to ask the participants questions about the lesson content. What would happen if there was no streamside vegetation? (*no shade leads to increased temperatures and wildlife is harmed*) What kind of plants and animals are found in riparian habitats? (*frogs, fish, birds, beavers, etc.*) What would happen if all the pollution went into the stream? (*effects water quality, harms wildlife, and looks unpleasant*) What would happen to the aquatic animals if the temperatures increased from no streamside vegetation? (*the wildlife would be harmed*) What would the stream banks look like if there was no vegetation? (*the banks would erode into the stream, decreasing water quality, and harm wildlife*).

Step 5. Gauge Understanding (2 minutes)

Ask participants if they can identify plants and animals found in riparian habitats of the Willamette Valley. Ask participants to use P.L.E.A.S.E. to explain riparian zone function.

Step 6. Wrap Up (1 minute)

Express to the group the importance of riparian zones for plants and animals, as well as the aesthetic and recreational value to humans.

Additional Reading/Resources

Alden, P. and D. Paulson. 1998. *National Audubon Society Field Guide to the Pacific Northwest*. New York, NY: Chanticleer Press, Inc.

Burns, J.E. 1970. *The Importance of Streamside Vegetation to Trout and Salmon in British Columbia*. Nanaimo, B.C.: Department of Recreation and Conservation.

Oregon State University. 2007. Willamette Basin Explorer. Online. Available: <http://willametteexplorer.info/issues/habitats/riparian.php>. March 17, 2007.

Saling, A. 1999. *The Great Northwest Nature Factbook: A Guide to the Region's Animals, Plants, and Natural Features*. Portland, OR: Westwinds Press.

Appendix I

River Doctors

This is another activity that can be taught in addition to or separate from Yes, P.L.E.A.S.E Trees.

The only additional materials needed, besides the simulator and its components, are some pieces of trash. The activity takes 15 minutes. The objective is to become a "River Doctor" and convert an unhealthy stream to a healthy stream for salmon.

Step 1: Before the students approach the simulator have an unhealthy stream for salmon already constructed by:

- Widening the river channel
- Placing the trees away from the streamside
- Taking rocks out of the streambed
- Removing logs from the river
- Polluting the river with trash

Step 2: Have children actively help create a healthy stream for salmon by:

- Narrowing the river channel
- Placing the trees near the streamside
- Putting rocks in the streambed
- Returning logs to the river
- Removing pollution from the river

With each improvement to the river, explain its significance to healthy salmon habitat:

- The river channel must be narrow and deep to accommodate proper water temperatures for salmon to live in.
- The trees near the streamside provide shade on the water and regulate water temperatures for salmon. Especially in the summer when the sun is out longer during the day.
- It is important to have rocks in the river for salmon to lay their eggs on. Different salmon have different preferences for the size of rock they lay their eggs on and therefore the river should have a variety of different sized rocks.
- Logs in the river provide habitat for salmon to hide from predators. Also, the logs create calm pools that the salmon can take a break in.
- Salmon can accidentally ingest pollution and cause harm.