

River Raiders

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Adapted from: King's County Salmon and Trout Info:
<http://dnr.metrokc.gov/topics/salmon/SALtopic.htm#salmonviewing>

Time: 45 minutes

Overview

This lesson plan introduces elementary school participants to stream ecology, salmon and their habitat, and human's impact on rivers using hands-on, role-play, and art activities that draw upon the intelligences of various types of students.

Benchmarks Addressed

- SC.03.LS.01 Recognize characteristics that are similar and different between organisms.
- SC.03.LS.02 Describe the basic needs of living things.
- SC.05.LS.03 Describe basic plant and animal structures and their functions.
- SC.05.LS.05 Describe the relationship between characteristics of specific habitats and the organisms that live there.
- SS.05.GE.06 Identify and give examples of issues related to population increases and decreases.
- SS.05.HS.06 Understand how individuals changed or significantly influenced the course of Oregon state history.
- SS.03.GE.05 Understand how peoples' lives are affected by the physical environment.
- SS.03.HS.02 Understand events from local history.

This lesson plan will engage the students in a fun and interactive learning experience that will relate animals, their habitats, and humans, with a focus on the Willamette Valley. Along with captivating their interest, this plan will allow students to relate science, history, and geography, in an interdisciplinary approach to learning.

Learning Objectives

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

1. Identify 3 traits of salmon's habitat.
2. Identify differences between how rivers in the Pacific Northwest used to function and how they do now.
3. Name 2 things they can do to help protect our rivers and the salmon that live there.
4. Pinpoint 2 pros and cons of dam construction.

Materials Needed

- Stream Simulator!!! (Necessary for role-play activity but the others can be done without it)
- Role play cards
- Salmon Trivia Quiz questions and answer sheet
- Salmon pictures to color (include various types of salmon: Chinook, Coho, Sockeye, etc.)

- ❑ Coloring materials i.e. Crayons (do not use markers because they are too dark and may conceal the traits on the salmon's body)
- ❑ "Salmon eggs" such as skittles, jelly beans, or any other oval-shaped candy to reward correct answers
- ❑ 4 sets of bins with miniature houses, animals, and trees (for the stream simulator)

Activity Description

Step 1. Getting Started: Introductions (1-5 minutes)

Before the day of the lesson (optional activity): Hand out salmon worksheets and allow the kids time to color them. This may be used as more of a "free-time" activity or could be used to incorporate art into the classroom. They will be coloring adult male salmon returning to the river to spawn. Make sure they do not color too hard so that the different features around the mouth and tail are still visible. Mention that salmon change appearances multiple times throughout their lifetime (especially as they move from freshwater to saltwater and then back to freshwater). Hang up pictures on the wall to create a visual reminder of the things they will learn with the Stream Simulator.

On the day of the lesson:

- Have kids move their desks into a circle, or horseshoe shape so that they can all see the teacher/facilitator but can also all see one another.
- Introduce the Lesson Plan:

Today you will be teaching about rivers and more specifically the various individuals that reside in and around the rivers of the Pacific Northwest (salmon, Native Americans, explorers). The lesson will start with a quick activity to get the children thinking about water. Then, we will focus on salmon and have the students get out the salmon pictures they have colored. During this time we will label specific parts of the salmon, compare various species of salmon and discuss briefly the needs of salmon and their habitat. Then, we will move on to using the Stream Simulator and the role playing game described below to let the children have a hands-on experience to manipulate the river while critically thinking about what the ideal river would look like for various people. After this dynamic activity we will bring the class together as a whole again to do the trivia quiz game and at the end of that, incorporate a wrap-up to assure that the students have met the learning objectives of the lesson.

- Review Learning Objectives:

The learning objectives for this lesson are to identify 3 traits of salmon and their habitat, to identify differences between how rivers in the Willamette Valley used to look and how they look now, and finally, to name 2 things that they can personally do to protect rivers and the salmon that live in them. The most important goal of the day though is that the kids have fun while interacting with a stream!

- Address Safety Issues

When using the Stream Simulator, you need to make sure that the students will be safe. Check the outlet and extension cord for proper storage. It needs to be in a DRY place so that there is no risk of children tripping or getting electrocuted. Never let young children play with the electrical parts of the simulator. Also check for any sharp edges on the simulator to assure that no one will cut himself or herself during the lesson.

Step 2. Circular Whip Activity (2 minutes):

1. Have the kids be seated and quiet. Ideally you would want their desks in a circle around the room so that they can see each other, however, especially with younger kids that could be a 5 minute task to accomplish so if they are in rows that is fine as well. Just make sure they understand what direction the "whip" will be traveling.
2. Instruct the students to say the first thing that comes to their mind about the word that you will begin with. Give them 10 seconds to digest that and then very clearly begin the "whip" with the word "WATER."
3. You will receive a variety of answers, which is great. The topic of this lesson is rivers and salmon so if anyone has mentioned those key words identify them and relate that to the topic of the lesson. If no one has mentioned any such words begin the lesson by saying another very important thing about water, such as it provides a home for all types of creatures, one of which is salmon, and continue on from there to introduce the lesson.

Step 3. Stream Simulator Role Play (30-40 minutes):

1. Move from the circular whip activity to the Stream Simulator by mentioning the special thing we have in class today. Note: Showing your enthusiasm will peak their curiosity and get them even more excited for the activity!
2. Briefly explain the game to the children using the directions below (2 minutes):
Today we have what is called a Stream Simulator here in class with us. It will allow you to create your own stream and surrounding area. We will be playing a game that involves each group, which you will be broken into after I am done explaining the activity, you will receive a card with a name and description of the person or animal on it. You will have 5 minutes to meet with your team to discuss what your person or animal would have the stream look like. Then we will all gather around the Stream Simulator and each team will get a chance to change the river to look like their group discussed. It will be a competition between teams to most accurately create a river that meets the needs of the creature on your card. Each team will receive 3 minutes with the simulator and when I say "HANDS OUT" all hands will be removed from the Simulator and we will have a chance to look at and discuss the river environment each team created. We will repeat this with all 4 teams. There are objects available in the bins for you to use and include in your ideal stream such as houses, trees, animals, etc. Before we start are there any questions? [Answer any questions that arise. Then break the class up into 4 equal teams.]

Now we will all go over and gather around the Stream Simulator and see how it works.

Remember at this time there are absolutely NO hands touching the Simulator except for mine. You will have your chance later. If you are unable to keep your hands out of the Simulator while I am talking, you will miss out on the activity because you will no longer be welcome to participate. [Take them over to the Simulator and turn on the water and allow them to just watch how it works for a minute.]

Now I want each team to go to their corner of the room [Have the bins of animals, plants, and buildings at each corner for them to look through.] When you are quietly gathered in your corner I will bring over your situation card.

3. Hand out one card to each team and allow them about 3 to 5 minutes to talk about what they want to do. Then gather them all together again around the Simulator and choose which team will go first (base this on who seemed most productive in their group meetings or who has been paying attention and being quiet). Move that selected group to the front and bring the bins with the props over for them to use. Have everyone else take a step away from the Simulator to give the team going first a chance to create their stream. Say "go" and give that team 2 minutes to put whatever they want in the Stream Simulator to create the river described on each card.
4. Call "stop" after 2 minutes and have everyone step back from the Simulator a little so that everyone can see what has been made. Have the group read their card aloud to the rest of the class. Ask for suggestions from the entire class about things that they see and how they relate to the goal described on the card. See below for certain specific attributes that should be included for each scenario as well as discussion topics about good and bad things that may come about in the scenario.
5. After a brief discussion (3- 7 minutes) remove all the props from the Simulator and allow the next team to go and complete the same process. Go through all four groups, cleaning out the Simulator each time so that no houses, animals, or vegetation remain for the next group.

Discussion topics for each scenario card:

Sheila the Salmon Situation:

River Should Include:

- ◆ Cool, clean freshwater
- ◆ Riparian vegetation (stabilize bank and provide shade)
- ◆ Clean gravel (spawning and laying eggs)
- ◆ Large woody debris in water (resting and hiding places)
- ◆ Adequate food (small organisms in the water)
- ◆ Varied channel forms
- ◆ Shallow pools (spawning)
- ◆ Oxbows or wetlands (extra habitat)

River Should NOT include:

- ◆ Large dams
- ◆ Predators (bears, beavers)
- ◆ Fishermen
- ◆ Lots of rapids

Bazillion-aire Situation:

River May Include:

- | | |
|----------------------------|-----------------------|
| ◆ Multiple large buildings | ◆ Meanders |
| ◆ Dam | ◆ Oxbows |
| ◆ Animals | ◆ Riparian Vegetation |

This option is open to interpretation. The kids will use their imagination to create what they would want in a luxury property. You can encourage their creativity in the group discussions, asking about their boats, horses, guest houses, swimming pools, fancy cars, ideal view, etc. Topics to include in the discussion could be how close they build their house to the water edge, if there is any vegetation to help stabilize the bank and keep the water clear, any meanders in the river that could slowly destroy the property because of erosion, and the presence of animals and how they might not remain near for long if you disturb them with your house. Another main topic to touch on here is if they included a dam in their river or not. If not, ask the students why they did not, or if they even considered it. If they did, ask them reasons for why they did include a dam. Below are some positives and negatives of dams to discuss with the students.

Positives:

- Recreational use (boating, fishing, swimming)
- Clean energy source
- Flood control
- Large supply of water
- Reservoir creates habitat for birds

Negatives:

- Initial flooding of surrounding area will destroy habitat
- Interferes with migration patterns of fish
- Creates temperature variations in water because of deep pool

Kalapuya Indian Situation:

River should include:

- ◆ Birds, small game, deer, bear, and elk
- ◆ Nut trees, berries, and trees for firewood
- ◆ Salmon, trout
- ◆ Streamside vegetation
- ◆ Meandering streams
- ◆ Oxbow lakes
- ◆ Small winter dwellings
- ◆ Canoes

River should NOT include:

- ◆ Large houses
- ◆ Man-made dams
- ◆ Cars or roads

With older students you could discuss how the Kalapuya managed the land by burning it every so often to create room for hazelnuts to grow and left camas seeds loose for collection. Was that wrong of them to manage it? Is it wrong for us to manage it today? In what ways do we manage the land today?

Lewis and Clark Situation:

River should include:

- ◆ HUGE river (they thought the Columbia was the Pacific Ocean so they should not be able to see across)
- ◆ Indians
- ◆ Salmon in the river
- ◆ Waterfalls (Celilo Falls)
- ◆ Oxbow lakes
- ◆ Marshy area around the river
- ◆ Canoes
- ◆ Elk, deer, and bears
- ◆ Birds: cranes, geese, ducks, gulls, crows
- ◆ Pine trees and huckleberry
- ◆ Natural debris in the river
- ◆ Multiple channels and meanders

River should NOT include:

- ◆ Buildings
- ◆ Man-made dams
- ◆ Garbage (human material waste)
- ◆ Structured streamside vegetation
- ◆ Redirected channels for things such as irrigation

NOTE- This activity can also be used with younger kids. Adjustments will have to be made. One possibility is to only work with one situation card and read it aloud to the whole class and allow them to work as one unit to create the stream. This may be difficult to do depending on class size.

Step 4. Gauging Understanding (max 5 minutes)

Wrap up the Stream Simulator activity by having the students sit at their desks again and then use question to assure that they met the learning objectives for the day:

Who can identify 3 traits of a salmon's habitat for us?

Can anyone name 2 pros and cons of having a dam in a river?

Who can name things they would have seen in and around Oregon rivers 200 years ago?

Can anyone think of anything they can do, or their parents and friends can do, to help protect rivers and the salmon that live there?

Step 5. Wrap Up (5 minutes)

Bring it all together, summarizing key points and integrating threads so that a synthesis occurs. If the learning objectives have not been met restate them multiple times. Open the class up to questions and comments.

Additional Reading/Resources

Follow up activity or a great wrap up activity if there is time:

Trivia Game Quiz:

Have the students seated in their desks or gathered on the floor. Explain that they will be playing a game and you will be asking them questions and giving them possible answers and they will need to choose the correct answer. Remind the students to raise their hands to answer a question rather than just shouting it out.

Ask each question to the class as a whole and call on one person to answer it. If that individual answers it correctly they receive a (1 or more, it doesn't matter) "salmon egg" (pink/orange jelly bean or other type of candy/treat). Whoever has the most "eggs" at the end of the game wins a prize. The important part is the discussion between each of the questions- just a few minutes to relay the main message. Other supplemental questions can be asked as well.

Questions (correct answers are in bold):

1. About what percentage of salmon eggs laid in a river will return as an adult?

- a) 2% b) 30% **c) one tenth of 1%** d) 13.7%

[Importance of keeping an open path to the rivers- so few return already with current barricades]

2. Which salmon type is listed as threatened with extinction in the Willamette River?

- a) Coho b) Sockeye c) Chum **d) Chinook**

3. How many species depend on the nutrients given off from salmon that spawn and die in our streams? a) 137 b) 46 c) only bears beavers **d) nobody knows**

[Talk about the circle of life, everything is connected, food web]

4. What is the greatest source of pollution for our rivers here in Lane County?

- a) factories b) animal wastes **c) runoff from homes, lawns, and roads** d) birds

[Talk about point source and non-point source pollution]

5. What is a riparian zone? a) an area declared too polluted to fish or swim in **b) the bank of a stream, lake, or river** c) an area that allows people to fish for salmon d) the line that runs along the side of a salmon's body

[Talk about the importance of vegetation next to the stream to decrease erosion and water siltation]

6. How can conserving water and electricity help to protect our salmon? a) electrical currents electrocute many salmon each year during their spawning season **b) conserving water and electricity leaves more water in the river to serve as salmon habitat** c) there is no connection between humans conserving water and electricity and saving salmon d) consuming less electricity means no dams

[Discuss awareness to action ideas- what they can do as kids to help save the salmon, every action counts]

7. Which of these actions would be best to help save salmon in the Willamette?

- a) recycling your bottles and cans b) help keep streamside areas clean of trash
c) using biodegradable soap to wash your dishes **d) checking for oil, transmission fluid, and coolant leaks in your car to prevent leaks**

[Really it is ALL OF THE ABOVE!!! Awareness to action- get them to go home and inform their parents about these issues]

To learn more about Native Americans in Oregon and the Kalapuya tribe specifically please visit Salem's Online History website at: http://www.salemhistory.net/people/native_americans.htm

To learn more about salmon and the impacts that humans have on them please visit the King's County Northwest Salmon, Northwest People website at:

<http://www.metrokc.gov/exec/esa/salmonslides.htm>

Scenario Cards:

You are a bazillion-aire who just moved to Oregon and would like to build your mansion on the river so you can enjoy the beautiful view of the Willamette. Where would you build it, what would you hope to have around it? Consider: you would like it to still be there for your grandchildren to enjoy.

Sheila the salmon is traveling back upstream to her birth site. What would make her journey easiest and what does she hope to find in order to lay her eggs?

You are a native Kalapuya tribe leader whose people depend on the river to survive. Where would you have your tribe settle and what would you hope to find there?

You are William Clark from the exploring duo Lewis and Clark. During your first travels on the great Columbia River what did you see? What types of plants and animals did you encounter?