Lesson title: Landlocked Atlantic Salmon Spawning Habitat Demonstration

Target audience: 3rd grade

Target location: Aquarium or natural history museum

Subject: Habitat requirements

Lesson focus and goals: This lesson will focus on the habitat requirements for salmon spawning to occur with the goal of students understanding the importance of habitat conservation and how they can contribute.

Selected science standard to address: **NGSS 3-LS4-3:** "Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]"

Learning objectives: By the end of the lesson students will be able to identify three reasons why specific gravel size in a streambed is a key habitat feature that is important to the survival of salmon species.

Materials needed for activity:

- Three clear plastic tubs filled with water and different sizes of sediment
    - One container with larger rocks (6 inch diameter or larger)
    - One container with medium sized rocks/gravel (approximately 2-4" diameter)
    - One container with sand
- Large spoon
- Beads to represent salmon eggs (optional)
- Tarps/drop cloths (if doing the activity indoors and needing to prevent damage from spills

Safety considerations: If doing this activity indoors, the floor may become slippery from splashing water.

Activity:

- Add a few larger rocks to one plastic tub and fill with water
- Add medium rocks/gravel to a second plastic tub and fill with water
- Add sand to the third plastic tub and fill with water
- Provide background information on salmon (why they are important in the ecosystem and/or culturally, how they interact with other species, what they eat, etc.). This can be a stand-alone activity only focused on habitat, or combined with other activities or demonstrations to meet science standards using salmon as examples that relate to various science topics.

- Use a spoon to stir the water/rocks in each tub to represent a fish moving its tail.
- Alternately, if you have enough tubs and an easy to clean space, students can take turns with their own “fish tail” at each station and make observations for each “habitat.” **Prompt questions:** 1) How does the water look to you once it is stirred up? Is it clear or cloudy? 2) Do the rocks move when your stir the water? 3) Is there anything else that you notice?
- Learners will see that the large rocks do not move at all, the gravel can be moved without muddying the water significantly, and the sand will make the water cloudy when disturbed.
- Optional: Add beads (to represent salmon eggs) to each tub and repeat the activity. Ask students to make observations about the “eggs.” Prompt questions: 1) Can you see the eggs once the water is stirred? 2) Do the eggs stay in the redd?
- Throughout the activity, focus on three reasons that the gravel size needs to be specific: 1) The salmon’s ability to move the gravel to build a nest, or redd, 2) Oxygenation (this also depends on water temperature), 3) Clear water.

Assessment:

- Throughout the lesson, ask students the more open-ended prompt questions (above) to encourage critical thinking about what they are noticing.
- At the end of the lesson, ask students to re-state the three reasons why specific gravel sizes are needed for salmon spawning. They can say this out loud, write it, draw it, or work together as a group or individually to state the reasons. Provide multiple ways for students to share what they have learned to answer this data recall question.
- Ask students to compare their observations about the different habitats.
- Additional open-ended questions:
    - What might happen if salmon lay their eggs in each of these habitats?
    - Where would the eggs be most likely to hatch? Least likely?
    - How might flooding change the stream habitats?

Conclusion:

- Share updates on local conservation success stories (for example, naturally reproducing salmon fry being found in 2016 and 2017 in the Winooski River for the first time in 150 years).
- Share local places students can visit (especially if a field trip is planned) to learn more about salmon and Vermont’s ecosystems such as the ECHO Center in Burlington, the Lake Champlain Maritime Museum in Vergennes, and fish hatcheries throughout the state that offer tours.
- If there are students interested in fishing, include information from Vermont’s Fishing Guide & Regulations.
- Encourage students to make observations and notice places that may be salmon spawning habitat if they spend time at rivers and streams.

- Emphasize that learning about salmon and sharing this information with others can help in conservation efforts.