



Science Unit: *Water Around Us*

Lesson 5 *Fish Feeding Model*

School Year: 2015/2016

Developed for: Aboriginal Focus Elementary School (MacDonald Elementary School in the process of renaming), Vancouver School District

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Grade level: Presented to grades K and 2-5; appropriate for K-7 with age appropriate modifications

Duration of lesson: 30 minutes

Objectives

1. Manipulate different tools to model different fish feeding mechanisms.
2. Appreciate how fish use different feeding mechanisms to catch prey.

Background Information

Fish catch prey by a variety of mechanisms, many of them quite foreign to us humans. Fish feed by biting, sucking food into their mouth (suction feeding), or trapping food from water that flows through their mouth (ram or lunge feeding, including filter feeding). Refs. 1 and 2. Many fish use more than one method of feeding, and some fish change their feeding method as they mature.

Vocabulary

<u>Biting</u>	A method of feeding where the food is grabbed with teeth. The food can be larger than the mouth for this kind of feeding. Also called manipulation.
<u>Suction Feeding</u>	A method of feeding where the mouth is opened and the pressure difference between the water inside and outside the mouth sucks the prey into the mouth. The most common method of prey capture by fish.
<u>Ram or Lunge Feeding</u>	A method of feeding where the animal moves forward with its mouth open as they approach prey, so that the prey flows into their mouth. The prey becomes stuck in their gill raker while the water passes through the gills.
<u>Filter Feeding</u>	A variety of ram feeding where the food is not selected visually. As water flows over baleen or gill rakers, plankton or other small food particles are trapped in it.



Materials for activity (per small group of students)

- tray of water
- tools for straining e.g. tea strainer, spatula with holes in
- tools for sucking e.g. baster, small pipette
- pieces of foam, cut into large, medium and tiny pieces (tiny should be small enough to pass through the holes in a spatula, but be caught by a tea strainer)
- tools for grabbing e.g. tongs, clothespins

In the Classroom

Introductory Discussion

Fish feed in a variety of ways. This activity will model different methods of feeding. After finding out what tool works to catch what food, we will discuss how fish feed.

Processes of science that the students will focus on: exploration, mechanical manipulation, collecting data, classifying and comparing data, recording results, inferring, hypothesis testing, concluding, predicting.

Activity Title: Fish Feeding Model

Purpose of Activity: To model the different methods by which fish feed

Methods and Instructions:

Set-up prior to experiment: Lay out trays of water and other materials on desks
Students will work in small groups.

1. Tell students that the pieces of sponge represent different kinds of food. The utensils represent different kinds of ways that fish catch food.
2. Ask students to try and catch the food with the different tools and find out what is the easiest "food" to catch with each kind of mouth?
3. Ask students to fill out the worksheet. Younger students will need to be given the names of the different tools.
4. Gather to discuss what students found, and how each tool models different feeding methods of fish.
5. Some fish feed by biting pieces off their prey, e.g., sharks, piranha, adult salmon. The tongs and clothes pins grabbing onto large pieces of foam model this kind of feeding behaviour.
6. Some fish suction feed. Food that is smaller than the mouth is sucked into it by a pressure difference when the mouth is opened. Most bony fish feed in this way. The baster sucking up medium/small foam pieces or the pipette sucking up small foam pieces models this kind of feeding behaviour.
7. Some fish feed by moving forward with their mouth open as they approach prey, so that the prey becomes stuck in their gill raker while the water moves through the gills - called ram or lunge feeding. This is modelled by the slotted spoon catching medium pieces of foam (and large pieces if they fit in the spoon "mouth"). Fish that feed in this manner include herring, mackerel, tuna and young salmon.
8. Filter feeding is a kind of ram feeding where the food is tiny and is not selected visually. As water flows over baleen or gill rakers, plankton or other small food particles are trapped in it. The tea strainer and tiny foam pieces model this kind of feeding. The grey and blue whales, the megamouth and basking sharks feed have baleen. Barnacles and mussels also filter feed.
9. Remind students that many fish use more than one kind of feeding method.



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References

1. <<http://www.biomechanics.ucr.edu/Higham%202011%20Fish%20Physiology.pdf>> Feeding Mechanics by Higham, T.E., 2011. Reproduced for educational use from The Encyclopedia of Fish Physiology, Elsevier Inc.
2. <https://en.wikipedia.org/wiki/Aquatic_predation> Wikipedia entry on Aquatic Predation, includes feeding methods of fish. Accessed May 26, 2016.