Lesson 4: Marine Mammals

General Framework for Marine Mammal Lesson

Section 1: For the Teacher

This is designed as a 2-hour lesson and is broken into 2 parts. In part one, the focus is on the location of the Salish Sea and the types of marine mammals found there, including a lab activity to demonstrate how baleen and toothed whales feed. The second part is about hazards to marine mammals, with a focus on marine plastic, including a lab on density of plastics. The presentation is done using power point for delivery of information, as well as small group and large group discussion, with use of white boards. There are slides included in the power point with notes and information for the presenter that do not show up in the slideshow.

In the lab on whale feeding the students will learn about how baleen and toothed whales feed and will use a simulation to demonstrate the feeding.

In the plastics lab the students will test different types of plastics based on their recycling number to see it they float or sink in seawater. This information will then be used to see how different marine mammals may be affected by the location of the plastics in the water column.

Quick Look Lesson Chart

<table>
<tr><td>LESSON NAME</td><td colspan="3">Part One: Marine Mammals in the Salish Sea</td></tr>
<tr><td>ESSENTIAL QUESTIONS</td><td colspan="3">What are the common marine mammals found in the Salish Sea?
How do different whales feed?</td></tr>
<tr><td>KEY CONCEPTS</td><td>STUDENTS WILL ALSO LEARN</td><td>SCIENCE INQUIRY</td><td>SCIENCE VOCABULARY</td></tr>
<tr><td rowspan="4">There are a variety of marine mammals living in the Salish Sea</td><td>They will learn basic life history information on the local marine mammals.</td><td rowspan="4">Lab 1: How do Baleen and Toothed whales feed?</td><td>Baleen
Toothed
Echolocation
Salish Sea</td></tr>
<tr><td>STANDARDS</td><td></td></tr>
<tr><td rowspan="2"></td><td>ASSESSMENTS</td></tr>
<tr><td>Students will pick a local marine mammal to research in more detail and develop a poster board presentation of their information.</td></tr>
</table>

Setting: Inside

Time: About 45 minutes

Materials:

- Power point on "Marine Mammals of the Salish Sea"
- Copy of "Marine Mammals of the Salish Sea Note sheet" (for each student)
- Copy of "Whale Feeding: Baleen vs. Toothed Whales" data collection sheet.
- Samples of marine mammal bones, etc., if available
- One white board and pen per lab group or pair
- Whale Feeding Lab Materials: (one set per lab group)
- Plastic tub
- Hair comb
- 2 pairs spring hair clips
- Basil or parsley flakes
- 15 Cheerios
- 3 Rubber fishing squid

Procedure:

A. Use the power point to introduce the topic, and to present information about each marine mammal, while students record information on the note sheet.

B. How Whales Feed Lab

a. Fill plastic tub with about 2 to 3" of water.

b. Add a cup of basil or parsley flakes across the surface. These represent "krill."

c. Run the comb through the water to collect the "krill."

d. After each run, tap the comb on a paper towel to collect the krill before the next run. Do this for 15 seconds.

e. Have 2 people use the spring hair clips for 15 seconds to collect krill and collect it in a different place than from the comb.

f. Count and record the "krill" collections from each method of feeding on "Whale Feeding: Baleen vs. Toothed Whales"

g. Discuss the results before going on using the questions on the power point slide.

h. Add 15 Cheerios and 3 rubber squid to the plastic tub. These represent larger fish/squid.

i. Run the comb through the water 15 seconds and try to collect the larger fish

j. Using the 2 pairs of hair clips, try to pick out as much food as you can in 15 seconds.

k. Count and record on the lab sheet.

l. Discuss the results before going on using the questions on the power point slide.

<table>
<tr><td>LESSON NAME</td><td colspan="3">Part Two: Hazards to Marine Mammals</td></tr>
<tr><td>ESSENTIAL QUESTIONS</td><td colspan="3">What are the main hazards that impact the health of marine mammals?

How does plastic debris impact life in the ocean?</td></tr>
<tr><td>KEY CONCEPTS</td><td>STUDENTS WILL ALSO LEARN</td><td>SCIENCE INQUIRY</td><td>SCIENCE VOCABULARY</td></tr>
<tr><td rowspan="4">There are a variety of hazards that may have an effect on the health of marine mammals living in the Salish Sea.</td><td>They will learn about potential hazards to marine mammals living in the Salish Sea and potential solutions.</td><td rowspan="4">Lab 1: How can different types of plastics cause problems with the feeding of marine organisms.</td><td>Density
Pelagic
Surface
Benthic
Bioaccumulation</td></tr>
<tr><td>STANDARDS</td><td></td></tr>
<tr><td></td><td>ASSESSMENTS</td></tr>
<tr><td></td><td>Informal: Fill out an Exit ticket at the end of the class.

Formal: As part of their assessment from part one, students will pick at least one of the Salish Sea Watershed Challenges and show how their chosen marine mammal will benefit from it.</td></tr>
</table>

Setting: Inside

Time: About 55 minutes

Pt. 2 of power point, “Hazards to Marine Mammals”

One white board and pen per lab group or pair

One “Exit Ticket” for each student to use at the end if time.

Plastic Lab Materials: (for each group)

Plastic tub

Copy of “Plastics in the Water Column Lab” data collection sheet. (for each student)

One set of plastic samples of each different type per lab group

Samples of plastic that has washed up on the beach

Procedure:

Use the power point to introduce the topic and to present information.

Use the white boards to have students write down and share things made of plastic.

Lab Procedure:

1. Examine the plastic objects
2. Choose one object and find its recycling number (on the bottom of the object).
    - Predict: Do you think this item will sink or float? Why?
3. Place the object in the tank of water.
    - What happened?
    - Were you surprised? Why or why not?

- Do you think the recycling number relates to its buoyancy?

4. Record your type of plastic, your predictions, and results on the lab sheet.
5. Share and discuss the results.

Next Generation Science Standards

Performance Expectations		
MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem		
Scientific and Engineering Practices	Disciplinary Core Ideas	Cross-cutting Concepts
Developing and Using Models	LS2.B: Cycle of Matter and Energy Transfer in Ecosystems	Energy and Matter Scientific Knowledge Assumes an Order and Consistency in Natural Systems

Worksheet

MARINE MAMMALS OF THE SALISH SEA

Record the name and one fact for each marine mammal._____

SEALS AND SEA LIONS	TOOTHED WHALES	BALEEN WHALES	OTTERS

WHALE FEEDING: BALEEN VS. TOOTHED

TYPE OF WHALE	# OF KRILL CAUGHT	# OF FISH/SQUID CAUGHT
BALEEN		
TOOTHED		

Basil Flakes = Krill Cheerios = Fish

WHALE FEEDING: BALEEN VS. TOOTHED

TYPE OF WHALE	# OF KRILL CAUGHT	# OF FISH/SQUID CAUGHT
BALEEN		
TOOTHED		

Basil Flakes = Krill Cheerios = Fish

PLASTICS IN THE WATER COLUMN LAB

NAME _____

1. Experiment with a variety of plastic objects.
   a. Record the name of the item and its recycling number in the chart below.
   b. Predict whether it will sink or float and write in the chart below.
   c. Now submerge the items in the water and record your results below.

	Plastic Item	Recycling #	Prediction: Do you think this plastic sinks or floats?	Results: Did it sink or float?

2. Look at the **Density Table** to answer the following questions.

- Compare the densities of fresh and salt water. Which is the most dense? Which is the least dense? Why do you think salt water is more dense than fresh water?

- Which plastics will float in fresh water? Sea water? How do you know?

- Does that match your findings? Explain. (Think about why you may have gotten different results.)

EXIT TICKET

Two marine mammals found in the Salish Sea are

_____

_____

One thing that can harm marine mammals is_____

_____ because _____

_____

Two things I will try to do to help protect the Salish Sea are

_____

_____

EXIT TICKET

Two marine mammals found in the Salish Sea are

_____

_____

One thing that can harm marine mammals is_____

_____ because _____

_____

Two things I will try to do to help protect the Salish Sea are

_____

_____