



## OCEAN EXPLORATION

### Concepts

There are two major groups of cetaceans the baleen and the toothed whales. They each have unique feeding strategies.

### HCPS III Benchmarks

SC 1.1.1  
SC 1.1.2  
SC 1.2.2  
MA 6.1.1  
MA 6.3.1  
MA 6.11.1

### Duration

1 hour

### Source Material

Marine Mammal Center  
NOAA NMFS  
PRISM

### Vocabulary

Baleen  
Blubber  
Breaching  
Bubble nets  
Calf  
Cetacean  
Dorsal fin  
Flipper slap  
Fluke  
Keratin  
Krill  
Migration  
Rorqual  
Tubercles

## How do whales eat?

### Summary

Did you know the biggest animal alive survives by eating the smallest animal alive? A Humpback eats a ton of plankton (literally) to get the energy they need to grow, migrate, and reproduce. Students will learn about the two major groups of cetaceans (baleen and toothed whales) and experiment with the different feeding strategies.

### Objectives

- Students will be able to identify the different types of whales and their feeding methods
- Students will be able to test and compare different methods of feeding in the two groups of cetaceans (baleen versus toothed whales)
- Students will be able to understand the adaptations of whales (sensory system, buoyancy, communication)

### Materials (one per group of 4-5 students)

“Ocean Animals” Some small items that can represent the food plankton and larger items that can represent fish (small, medium and large) Candy/cereal/sequins/rubber fishing bait

Clear tupperware containers or bowls

Toothbrush or paintbrush

Tongs or chopsticks

Ziplock bags

Timer

### Making Connections

This lesson is part of the series of lessons in the whale research notebook, it should take place after lesson 5 “How big is a humpback whale?”

### Teacher Prep for Activity

1. Set aside all the materials that the groups will need.
2. Fill each Tupperware about  $\frac{3}{4}$  full with water
3. Place the ocean animals in the container and mix around with hand (most of the “ocean animals” should float)

### Background

Marine mammals such as humpback whales live in a world that can sometimes be hard to see, because sunlight penetrates or shines through the top 200 meters of the ocean.



Some whales can use sound to find food and find each other. Sometimes they work together to hunt for food, humpbacks have an interesting technique of group hunting where they form nets made of bubbles called, you guessed it, “bubble nets”. The whales swim together in a spiral pattern around a school of fish and as they swim they are releasing bubbles that herd/corral the fish into a tight ball. As the whales enclose the school of fish they can gulp them up!

Whales can use sound to communicate and sound travels 5 times faster in water than it does in air. You can hear a whale that is miles away but it sounds very close! Scientists can monitor and record the sounds of marine mammals with a hydrophone (or underwater microphone) and distinguish what species it is based on its acoustical patterns. For example dolphins click while whales moan. More research is needed to try to understand these complex animals and why and how exactly they use sounds.

Humpback whales are famous for singing the loudest and longest songs (hours). Only males sing and they seem to sing the same song over and over. They sing with their head down and tail up! Is it a form of navigation? Do they sing to attract mates? Maybe, we don't really know. It has been suggested that whales can use it to detect food and underwater features like seamounts from miles away.

## Vocabulary

**Baleen:** the mouth parts of baleen whale used to filter krill and plankton from the water

**Blubber:** the layer of fat that insulates whales

**Breaching:** the behavior of the whales body jumping completely out of the water

**Bubble nets:** a type of group feeding behavior that humpbacks do in Alaska. They blow bubbles and form a bubble net that traps the fish and krill in a circle and the whales feed on them.

**Calf:** a baby whale

**Dorsal fin:** the fin located on the back of the cetacean (also called dorsal fin on fish)

Flipper slap: the behavior type that involves the pectoral fin slapping on the surface of the water

**Fluke:** a whales tail

**Keratin:** the stiff material that makes up whales baleen (it is similar to your fingernails)

**Krill:** a shrimp like animal that is a major food source for the baleen whales

**Migration:** traveling great distances across the ocean to breed or feed (example: Humpback whales migrate 3000 miles from Alaska to Hawaii in the winter to breed and back to Alaska in summer to feed.



**Rorqual/Baleen whale:** one of the two major groups of cetaceans, characterized by whales having baleen instead of teeth.

## Procedure

1. Pass out the materials to each group
2. Have students get out their whale research notebooks
3. Begin a class discussion by asking students what they think eats more, a humpback whale or a dolphin and why?
4. Ask the class: If you couldn't rely on sight to find your food, what senses would you use? Write them on the board  
Examples: smell, taste, hear, touch  
How could they use each of these?  
Go into more detail on each and guide them...  
How could they use temperature?  
Temperature of ocean water may indicate areas with high productivity –  
How much do whales eat?
5. Do you think it would be different based on what type of animal you were? Like the baleen whale versus a toothed whale or dolphin? Let them guess and ask them what type of teeth or mouths do they each have?
6. What is the difference?
7. Have students recall the previous lesson when they learned about how large humpback whales are.
8. Ask the students to think about the size of a whale and the size of a dolphin
9. How can the largest animal alive survive on the smallest animal alive?
10. Then guide them into the lesson in which they will try to eat like the baleen whale and the toothed whale
11. Show them a video of humpback whales bubble netting (See recommended resources)
12. Give them each a turn to try and “eat like a whale or a dolphin” using the utensils to grab as much as they can from the Tupperware in the time designated (example: 30 seconds)
13. Have students separate what they catch and record (in their whale research notebook), how many are plankton and how many are fish?
14. The students will take turns using the different utensils to see how many food items they can catch with each method
15. After each student has had a turn ask them to share their results with the class
16. Finally have a discussion about which method of feeding, baleen (filter feeding) or teeth (biting) gets the most items of food

## Assessments

Completed whale research notebook

## Resources

Marine Mammal Center

NOAA NMFS

Videos:

Whales An unforgettable journey IMAX (available through netflix and certain libraries)

<http://www.arkive.org/humpback-whale/megaptera-novaeangliae/video-08a.html>



## Extension Activities

Go whale watching at the beach (or alternatively watch a video) – make observations with binoculars

## Math Connections

Did you know? Humpback Homework...EXTRA CREDIT (Optional)

1. When a baby humpback is born they are about 12 feet long and can weigh a ton, after just 7 months they can be 25 feet long! Growth spurts for a baby humpback are estimated to be an inch a day in length and 100 pounds a day gained!

How much will the baby weigh AND how long will it be when it leaves Hawaii to swim back to Alaska? It was born in Hawaii on **January 15<sup>th</sup>** and leaves Hawaii on **April 15<sup>th</sup>**. Hint: January has 31 days, Feb has 28, March has 31, April has 31. Lets just say they have a growth spurt everyday they are in Hawaii.

2. Whales milk contains 35-50% fat – Most humans drink 2%. Moms feed calves 40 times a day for 12 months. They can drink 2-3 gallons of milk at each feeding!!! (No wonder they grow so fast!) How many gallons of milk does a baby humpback whale drink a day? Give the range and show your work.