

3rd-5th Grade Whale Watching Adventure Packet

Teacher Information:

This packet is designed for third grade through the fifth grade and is based on the content standards adopted by the California State Board of Education. You will gain information about whales and other marine mammals as well as some fun facts. This packet's curriculum focuses on food webs involving marine mammals, ocean ecosystems, and the basic morphology of whales and dolphins and how these structures aid them in survival.

Marine Mammal Background:

Whales, dolphins, seals and sea lions are marine mammals. Whales and dolphins spend their entire life in the ocean while seals and sea lions spend a lot of time out of the water on land or on buoys catching some sun to warm up. These animals are mammals, which means they breathe air with lungs, have hair or fur, and give live birth to their young that they nurse with milk produced by the mother. They are also warm blooded which means they can maintain their body temperature no matter what the temperature is of the environment. This is unlike a cold blooded animal like a snake, lizard or fish that's body temperature is the same as the environment they live in and need to seek a warmer area to warm their body up or a colder area to cool down.

What is an Ecosystem?

An ecosystem is a place where all living things are dependent on each other and all non living components for survival. These living things can be referred to as organisms and includes all the plants, animals, fungi, and bacteria. The organisms have adapted to their environment or in other words found a way to change over time to be more comfortable in their environment. There are many different kinds of ecosystems and they can be very big or very small. The ecosystem you will learn about is the Pacific Ocean and more specifically the Pacific Ocean on the Southern California Coast.

****Name some animals that live on our coast**

Examples:

- Whales
- Pelicans
- Sharks
- Fish

The Southern California coastal ecosystem is extremely complex and very unique. This is one reason why we are able to see so many whales right off our coast without having to travel very far. A condition that makes California's coastal ecosystem so productive is the currents that run up and down our coast and a phenomenon called upwelling.

Currents and Oceanography:

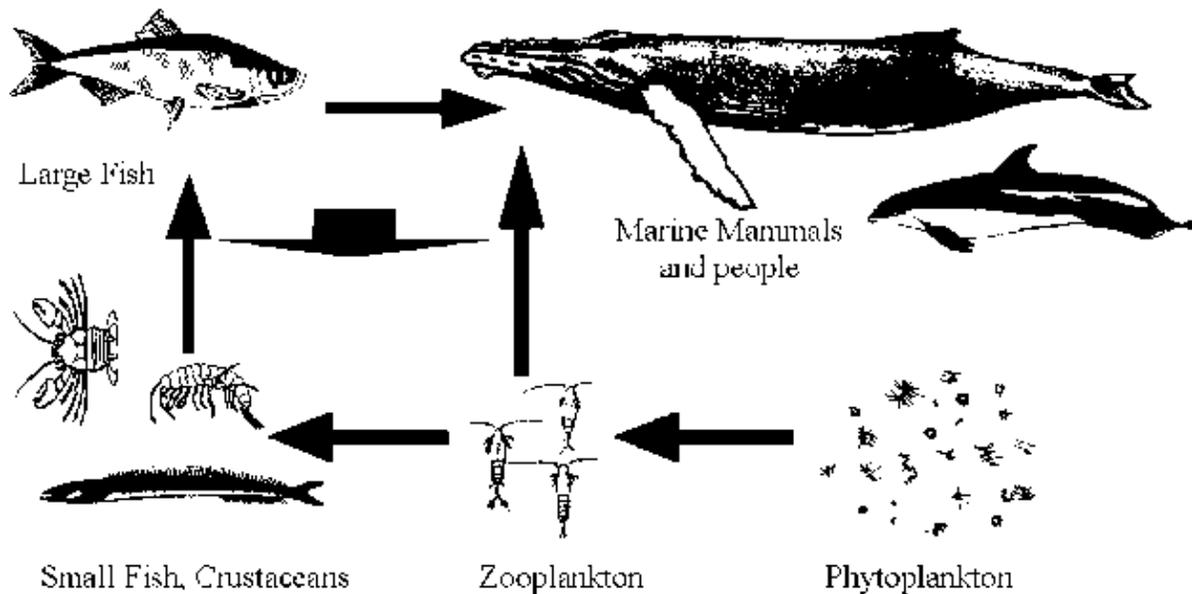
The California Current runs south along the coast of California and brings colder nutrient rich water from Alaska towards Mexico. During the summer and fall this current starts to swirl inland toward Southern California and creates the Southern California Countercurrent. This current will cause a swirling current with warmer water and brings different fish and organisms to the Southern California coast. Upwelling is also a pattern that occurs where cold water from deep in the ocean will swirl upward towards the surface and replace warmer water, bringing nutrients to the surface. When these nutrients from the deep reach the surface, plankton that live there will grow rapidly. These currents and ocean patterns create a lot of opportunity for a complex food web off our coast.

Food Webs and Whales:

A food web is a way of seeing how animals are connected through the things they eat. There are three kinds of organisms in a food web.

- Producer- Usually a plant or organism that gets its food from the sun by a process called photosynthesis. In the ocean the producer is going to be either kelp (seaweed) or phytoplankton.
 - Phytoplankton- Microscopic plants that live in the ocean.
- Consumer- There are three kinds of consumers.
 - Herbivore- An animal that only eats plants (or producers). In the ocean this is an animal that eats only seaweed or phytoplankton. This would be a Zooplankton and some fish.

- **Zooplankton-** an animal that floats through the ocean. Usually microscopic but not always. Could be baby (larval) fish, crabs, or other animals or even jellyfish.
 - **Carnivore-** An animal that only eats other animals. In the ocean this is a whale, dolphin, shark, pelican etc.
 - **Omnivore-** An animal that eats both plants and animals. Some fish are omnivores and eat whatever is available.
 - **Decomposer-** An animal that eats dead plants and animals. Sea cucumbers, crabs, and sea stars are great decomposers in the ocean.



<http://www.yankeefleet.com/boston-gloucestercity/information-on-whales.php>

Whale Adaptations for Survival

Whales are specially adapted for their environment. To adapt means to change to be more comfortable in your environment. If you moved from California to Germany you would probably need to adapt to that environment by maybe eating different foods, wearing different clothes or speaking another language. Whales and dolphins have many physical characteristics that help them adapt to living their lives in the ocean.

Fins- Whales and dolphins have strong fins that help them swim. They have flippers at their sides that help them balance in the water when they are swimming forward and an extremely strong tail to push them forward. A whale's tail moves up and down in the water not side to side like a fish. The fins are also shaped in a way to diminish drag and allow water to flow easily so they can get the most speed they can while swimming.

Blowhole/breathing- The blowhole is how whales and dolphins breathe. It is basically their nostrils but they have moved to the top of the head over evolutionary time to allow them to breathe at the surface without sticking their face out of the water. Because whales and dolphins are mammals and breathe air they must come to the surface to breathe but have to do it consciously (think about doing it) unlike us that do it naturally without thinking about it.

***FUN FACT:** In order to sleep whales and dolphins must keep half their brain awake to remember to breathe so they “shut off” half their brain at a time to sleep and literally sleep with one eye open!

Blubber- This is a layer of fat under the skin of most marine mammals that helps to keep them warm without having a heavy fur coat like most other mammals. Whales and dolphins do have hairs but very few so as to decrease drag. Blubber also smoothes out their skin so there are not huge bumps and grooves making them more streamlined. This is similar to how surfers or swimmers wear a wetsuit to stay warm and decrease drag when swimming.

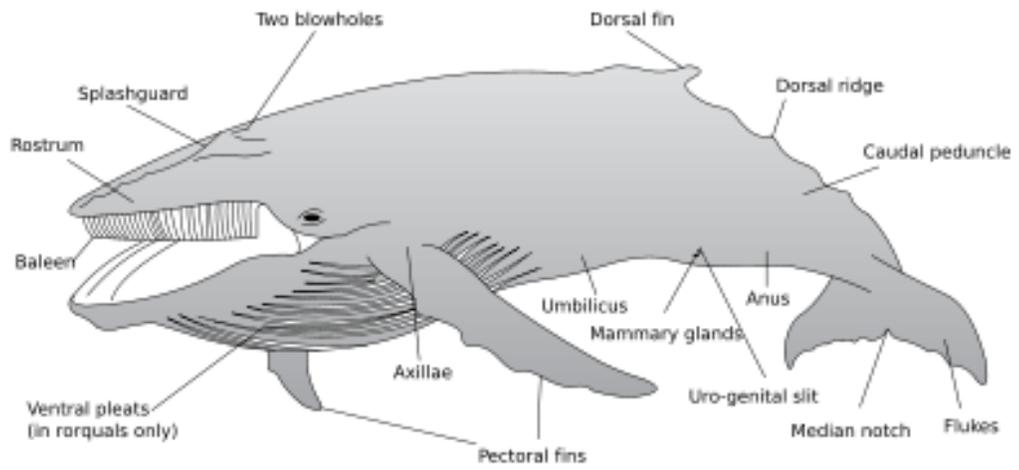
Teeth/Baleen-

- **Toothed Whales**- These are whales like orcas (killer whales), dolphins, porpoises, and sperm whales. Toothed whales tend to be smaller and hunt other animals and eat meat. They have sharp pointed teeth for grabbing fish, octopus, squid, or even other marine mammals. Toothed

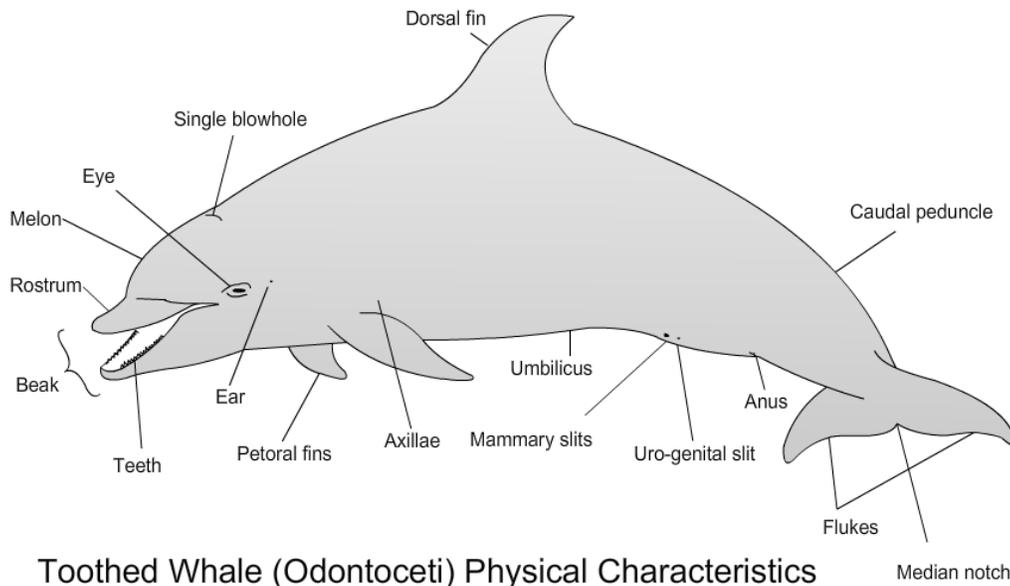
whales and dolphins will usually live in a group called a pod so they can hunt together similar to wolves on land. Dolphins will work together to herd fish into big groups and then take turns swimming into the ball of fish catching as many fish as they can eat each time. Orcas will hunt for large fish like tuna or salmon but also eat seals and sea lions. They will stalk their prey like a lion and attack them quickly using their sharp teeth to grab them and kill them. You can relate dolphins and orcas to other predatory packs like lions or wolves.

- **Baleen Whales**- These whales have very special teeth called baleen. Whales that have baleen are gray whales, blue whales, humpback whales, and fin whales amongst others. Baleen is made out of the same material as our fingernails called keratin and looks like a brush or comb growing in the front of their mouth. Instead of using their teeth to grab fish or to chew, they use their baleen to sift through the water and capture tiny shrimp like animals called krill, small fish or crustaceans. Most baleen whales are filter feeders, eating krill or fish in the water but Gray whales will use their baleen to scoop huge mouthfuls of mud and sand and sift out small worms and crustaceans on the bottom of the ocean. They also have pleated grooves along their throat to help expand their mouth for such huge gulps of food. You can think of how a baleen whale eats like if you ate a huge spoon of cereal and squished all the milk out through your teeth to collect the cereal behind them.

Ears/sound- Hearing is the most important sense for whales and dolphins and helps them locate food in some cases and communicate with others. Sound travels much farther and faster in water than it does on land however it does not necessarily mean it can be heard easier. Whales and dolphins have very specialized ears which are very small holes on the side of their head that help them to hear in the ocean. Some whales like blue whales make sounds that are very low and travel all the way across oceans to communicate with others. Other whales like humpback will sing songs to each other to communicate. Dolphins and toothed whales also use sound for echolocation which is a way to “see” with sound. They will emit sounds from an organ in the front of their head called a melon and listen to the echo as it bounces back off of objects including fish. It is thought that some dolphins will use their teeth as a sort of antennae to pick up the sound as it echoes back to them. Bats use this same technique to locate insects when hunting in the dark.



Baleen Whale (Mysticeti) Physical Characteristics



Toothed Whale (Odontoceti) Physical Characteristics

<http://commons.wikimedia.org>

Fun Whale Facts:

- **The blue whale is the largest animal to have ever lived on this planet with the longest blue whale ever recorded being 108 feet long! This is about twice the size of a school bus!**
- **Scientists think that a blue whale might be able to live for 80-90 years or even longer!**
- **A blue whale can hold its breath for almost an hour but a Sperm whale is the champion diver and can hold its breathe for over 2 hours and can dive to almost 10,000 feet!!**
- **Baby whales drink milk that can be around 52% fat which is like the consistency of mayonnaise. Whole cow milk is around 2% fat.**