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## Marine Mammal Commission: Education Curriculum Lesson Plan Outline for 6<sup>th</sup>- 8<sup>th</sup> Grade

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### SLIDES

1. Cover slide
  - a. Brief introduction
2. Can anyone name some of these animals?
  - a. Allow for guesses from students
  - b. Answers (from top left, counter-clockwise)
    - i. Bottlenose dolphins
    - ii. Killer whales (which are actually dolphins!)
    - iii. Humpback whale
    - iv. Walrus
    - v. Polar bear
    - vi. Sea lions
3. What do all these animals have in common?
  - i. Allow for guesses from students.
  - ii. Answer: they are all marine mammals!
4. What is a mammal?
  - a. A mammal is warm blooded, usually has hair or fur, breathes air through lungs, has live young, and produces milk for its babies.
5. What is a marine mammal?
  - a. Allow for guesses from students.
  - b. What makes a marine mammal special is that it needs the ocean to survive. All marine mammals still breathe air like we do, but they find their food in the water and some species must live their whole lives in the water.
  - c. How are we similar to marine mammals?
    - i. We have hair and we are born alive—we aren't hatched from eggs! We also are also warm blooded, breathe through lungs, and produce milk... which makes us mammals too!
  - d. As you saw in some of the first pictures, marine mammals come in all shapes and sizes.
  - e. There are around 129 species of marine mammals!
6. Marine mammals are classified into four different groups: pinnipeds, sea otters and polar bears, sirenians, and cetaceans.
  - a. Here are some examples of different marine mammals on the next slides. Try to remember what group they are a part of!
7. Seals, Sea Lions, and Walruses
  - a. There are 33 species of pinnipeds – the name for seals, sea lions, and walruses.
  - b. They spend most of their lives diving for food, mostly fish, or relaxing in the sun.

8. How do you tell the difference between a seal and a sea lion?
  - a. Seals: small flippers, crawl on their bellies, and don't have visible ear flaps
  - b. Sea Lions: large flippers, 'walk' on land, and have visible ear flaps
9. Seal v Sea Lion
  - a. Left image: Seal – no visible ear flaps
  - b. Right image: Sea lion – visible ear flaps, 'walking', large flippers
10. Walruses
  - a. Walruses can weigh more than 4000 pounds!
  - b. Their tusks are made of ivory and can reach 1 meter long!
11. Polar Bear
  - a. There are two kinds of marine mammals that you might not expect – polar bears and sea otters.
  - b. Polar bears look different than other marine mammals, but they still need the water to survive—they eat other marine mammals like seals. They are good hunters, and walk across the ice for long distances looking for seals to hunt.
12. Polar bear
  - a. If the ice melts, it becomes harder for them to find food because they have to swim long distances between ice flows that support them and their prey.
13. Sea otters
  - a. Sea otters have very thick fur which keeps them warm in cold water.
  - b. They are the smallest marine mammals and live in coastal waters, mostly in kelp beds.
  - c. To keep from drifting apart while they sleep, sea otters sometimes sleep holding paws.
14. Sea Otters- Tool Use
  - a. Sea otters are able to use tools – rocks – to open shellfish!
15. Manatees
  - a. What kind of marine mammal is a manatee? (Sirenian)
  - b. Manatees are often called 'sea cows' because they feed on seagrasses.
  - c. You can find manatees around Florida and the eastern USA.
16. Dolphins
  - a. What kind of marine mammal is a dolphin? (Cetacean)
  - b. There are over 80 species of cetaceans and 44 species of dolphin in the world.
  - c. Maybe you've seen a dolphin before? What do you know about them?
  - d. They are very smart animals and even know who they are when they look in a mirror.
  - e. They are often very social and live in groups called pods.
  - f. While otters have fur, cetaceans and pinnipeds use blubber, which is a thick layer of fat to help keep them warm in cold water.
    - i. **Optional activity:** Show how blubber works. (NOAA activity:[https://www.afsc.noaa.gov/education/activities/PDFs/NFS\\_K-6\\_Sept2013\\_Act5.1\\_BlubberMitt.pdf](https://www.afsc.noaa.gov/education/activities/PDFs/NFS_K-6_Sept2013_Act5.1_BlubberMitt.pdf))
17. Dolphins

- a. Some dolphins even live in rivers, like this one that lives in the Amazon!
18. Toothed Whales
- a. There are two different types of whales: Those with teeth and those with baleen.
  - b. This whale has teeth- the sperm whale. It feeds primarily on squid in the deep-sea!
19. Sperm Whale Teeth
- a. Does anyone know how to figure out the age of a tree?
  - b. Just like trees, whale teeth lay down layers of growth that we can count to figure out the age of a whale!
  - c. Sperm whales have teeth that can weigh over 2 pounds each! They are useful, but not required to eat squid; some sperm whales have been found without teeth and yet were well fed.
20. Baleen Whales
- a. This is a humpback whale, a baleen whale.
  - b. Does anyone know what baleen is?
21. Baleen
- a. Baleen whales take BIG mouthfuls of water and then they shoot the water back out of their mouth through the baleen, which has tiny cracks for water to go through. Only the tiny fish and krill stay inside and get eaten. They are some of the biggest animals, but they eat the smallest food.
  - b. Baleen is made out of keratin, the same material that your fingernails and hair are made out of.
22. Does anyone know what type of whale this is? Hint: it is the largest whale on earth, and the largest animal to ever exist on earth.
- a. Blue Whale- an endangered whale that can be up to 30 meters long and weigh 300,000 lbs!
23. Whales like humpbacks and blue whales sing underwater. Listen to them here- [http://hawaiihumpbackwhale.noaa.gov/explore/sounds/whale\\_song.mp3](http://hawaiihumpbackwhale.noaa.gov/explore/sounds/whale_song.mp3)
- a. Whale song is used to communicate across vast distances.
24. Some whales also produce sound to locate prey, much like bats, through echolocation. Killer whales are an example of a species that uses echolocation to locate fish and other marine mammals.
- a. As you can see, there are many kinds of marine mammals that live all over the world.
  - b. Unfortunately, they face lots of challenges.
25. Why do we need to protect marine mammals?
- a. One reason is due to fishing.
  - b. Who here likes to eat fish?
  - c. Do you know how we get fish? Let's see how many types of fishing we can think of.
  - d. Pause for student responses.
  - e. Sometimes fishermen use traps and other gear to catch fish and shellfish, like crabs. Other times, they use enormous net called purse seines that scoop up entire schools of fish!

- f. But sometimes whales and other animals can swim into the ropes attached to those traps, or even into fishing nets themselves, and get tangled.
- g. This makes it hard for them to swim, and in US waters alone up to 80% of all whales show some evidence of being entangled in fishing gear or other marine debris at some point in their lives.

26. What is bycatch?

- a. Does anyone know what the term bycatch means?
  - i. Any animal that gets accidentally caught when fishermen are trying to catch something else is called bycatch.
  - ii. Bycatch is the biggest threat to marine mammals. Over 600,000 marine mammals are caught as bycatch every year!
  - iii. Check out this video from NOAA, the National Oceanic and Atmospheric Administration, to learn more. NOAA is a government agency that is responsible for taking care of our fisheries:  
<https://www.youtube.com/watch?v=xz8q6uHSdmg&feature=youtu.be>

27. The vaquita is one example of a marine mammal affected by bycatch.

- a. It is the smallest known porpoise on earth

28. It is endemic to the northern Gulf of California – endemic means that you can only find them there, nowhere else.

29. There are currently less than thirty individuals that are still alive. Vaquita have experienced a 95% decline in just two decades, making them the most critically endangered marine mammal in the world.

30. Their decline is directly attributed to bycatch interactions. Vaquita get entangled and die in the illegal gill nets that fishermen use to catch the highly valuable totoaba.

31. The totoaba is a bony fish, which is also critically endangered, that is targeted for its swim bladder, the organ that regulates its buoyancy. The swim bladders are transported to Asia where they are sold under the guise of being medicinally valuable. There is no scientific evidence to support these claims.

32. Ocean Noise

- a. So we just learned about animals getting caught in fishing gear, but why else do they need our help?
- b. Ocean noise is an issue of growing concern. It can alter behavior, cause stress, and even cause physical injury in some cases.
- c. Why would ocean noise be an issue for marine mammals like whales in particular?
  - i. Because whales communicate over long distances with each other, ocean noise can make it harder for them to find one another for important behaviors like mating.
  - ii. Thankfully, our country has put laws in place to help protect marine mammals from these, and other, threats.

33. The Marine Mammal Protection Act:

- a. The Marine Mammal Protection Act went into effect in October 1972 in partial response to growing concerns among scientists and the general

public that certain species and populations of marine mammals were in danger of extinction or depletion as a result of human activities.

34. MMPA (continued)

- a. The MMPA was the first act in the USA to use an *ecosystem-based approach* to management.
- b. The MMPA prohibits the ‘taking’ of marine mammals, defined as the hunting, killing, capturing, and/or harassing of any marine mammal.
- c. The MMPA does provide for exceptions (e.g. wildlife photography, Naval operations, construction).

35. MMPA (continued)

- a. The mandate of the MMPA is carried out by three primary agencies – NOAA, which is responsible for pinnipeds and cetaceans, USFWS, which is responsible for sea otters, walruses, polar bears, and manatees, and the Marine Mammal Commission, which is responsible for oversight of all federal activities impacting marine mammals. The Marine Mammal Commission was actually created by the MMPA!

36. Thanks for listening! Feel free to visit our website or follow us on Twitter for the latest scientific information on marine mammals.