



Understanding Adaptations

Marine Mammal Superpowers

All mammals are warm-blooded, have hair or fur, breath air through lungs, bear live young, and produce milk through mammary glands to nurse young. The ocean environment presents extreme conditions for marine mammals that require extreme, almost superpower-like, adaptations in order to thrive. **Adaptations** are physical or behavioral traits that can be passed to offspring that help an animal survive and reproduce. Dense fur or blubber acts much like Iron man's super suit, protecting marine mammals from cold temperatures. The otter's ability to use tools, like rocks, to crack open shellfish is similar to Thor's hammer that has the power of lightning. Below are some other marine mammal adaptations for living in the ocean.



Dense fur or blubber made from a thick layer of fat to keep warm in the ocean.



Streamlined bodies and modified appendages (fins or flippers) to swim fast through water.



High levels of hemoglobin and myoglobin store extra oxygen in blood and muscles while diving.



Use sound (**echolocation**) or **vibrissae** (face whiskers) to navigate through water with limited visibility.



Exhale prior to diving to tolerate pressure changes by removing air from their body.



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The Marine Mammal Center's Facilities

The Marine Mammal Center first opened in 1975 and was remodeled in 2009. The new facilities reflect what we know about marine mammal adaptations.

The pool **depths** vary based on species, age, and condition the animals are in. In-ground pools allow easy access to water and have resting areas at different depths for elephant seal pups learning to swim and maneuver. Above-ground pools were designed for sea lions that like to climb and rest on the side of pools. Larger in-ground pools are for patients close to release to allow them deeper diving experience and for open ocean animals like fur seals.



Water **temperature** is not heated and reflects temperatures close to the ocean water off of the California coast. The patients have either fur or blubber to stay warm in the water, but heating pads are provided for younger and weaker animals. Additionally, there is a climate-controlled isolation unit with heated floors for harbor seal pups and neonate patients.





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Activity

At The Marine Mammal Center, we care for three groups of marine mammals – pinnipeds (seals and sea lions), sea otters, and cetaceans (whales, dolphins, and porpoises).

We have included some examples of species to compare that we work with (Hawaiian monk seal, southern sea otter, and bottlenose dolphin). However, feel free to explore comparing and contrasting other species of marine mammals.

Materials:

- ✓ A notebook and pencil or comparison chart to take notes
- ✓ Optional: Laptop, tablet, or smartphone

Instructions

1. Fill out the chart on the next page with an adaptation each species has for dealing with four different environmental conditions. Think of how humans deal with these factors when in the water as well (i.e. when swimming, snorkeling, scuba diving).

*For a challenge, draw the adaptations.

2. Answer the questions below.

Which adaptations were similar?

Which adaptations were different?

Can you think of another adaptation marine mammals have for living in the ocean?
What would be the human equivalent?



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	Hawaiian Monk Seal 	Southern Sea Otter 	Bottlenose Dolphin 	Humans 
Water temperature				
Swimming or Diving				
Change in Pressure				
Light levels				

[Click here](#) for more information on marine mammal adaptations to help you complete this chart.