

Awesome Adaptations



Theater Program Curriculum Grades 4-5



Program Description

During this 30 minute theater program, one of our education staff members will introduce students to the variety of ocean animal adaptations and how these physical and behavior characteristics may have inspired human inventions. This program will focus on the adaptations of marine birds, fish and mammals using a PowerPoint presentation and human tools as props. Participating in this program and using the enclosed activities will help your students meet ODE Science Content Standards and national Ocean Literacy Principles.

Chaperones

We ask for the chaperone's help to monitor the students' behavior during the theater program.

Before your visit:

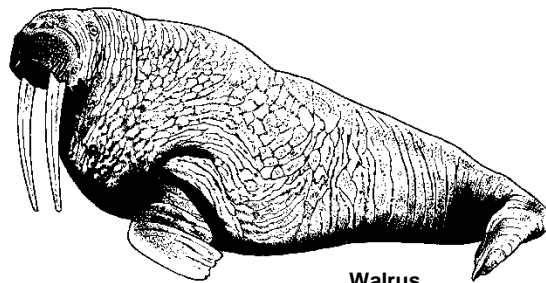
- Conduct the activity **How Big Is It?**. This will give students an idea of the diversity of life found in the ocean.
- Define the word "adaptation" for your students. Have them complete the research project described in **Something to Write Home About**.

During your visit:

- Provide your students and chaperones with copies of the **Oregon Coast Aquarium Self Guided Materials**. A master copy of the pages needed to create this booklet can be found on the Teacher Resources page at the Aquarium website, www.aquarium.org

After your visit:

- Use the **Tools of the Trade** activity with your students to review what they learned in the theater program.
- To encourage discussion on environmental impact, use the enclosed **Dilemma Cards**.



Awesome Adaptations addresses the following:

ODE Science Content Standards:

- 4.1** Structure and Function: Living and non-living things can be classified by their characteristics and properties.
 - 4.1L.1** Compare and contrast characteristics of fossils and living organisms.
- 4.2** Interaction and Change: Living and non-living things undergo changes that involve force and energy.
 - 4.2L.1** Describe the interactions of organisms and the environment where they live.
- 5.1** Structure and Function: Living and non-living things are composed of related parts that function together to form systems.
 - 5.1L.1** Explain that organisms are composed of parts that function together to form a living system.
- 5.2** Force, energy, matter and organisms interact within living and non-living systems.
 - 5.2L.1** Explain the interdependence of plants, animals and environment and how adaptations influences survival.
- 5.4** Engineering Design: Engineering design is a process of using science principles to make modifications in the world to meet human needs and aspirations.
 - 5.4D.3** Explain that inventions may lead to other inventions and once an invention exists, people may think of novel ways of using it.

Ocean Literacy Principles:

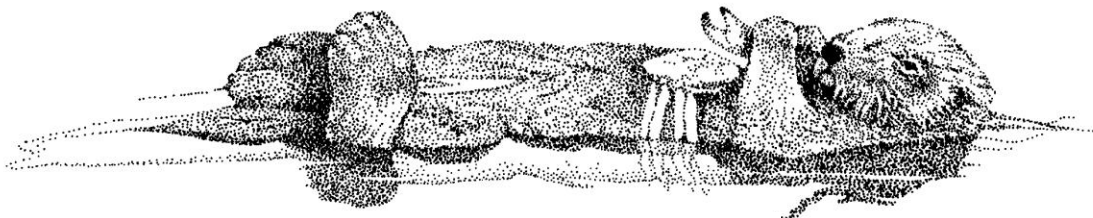
Principle 5: The ocean supports a great diversity of life and ecosystems.

A: Ocean life ranges in size from the smallest virus to the largest animal that has lived on Earth, the blue whale.

C: Some major groups are found exclusively in the ocean. The diversity of major groups of organisms is much greater in the ocean than on land.

D: Ocean biology provides many unique examples of life cycles, adaptations and important relationships among organisms (symbiosis, predator-prey dynamics and energy transfer) that do not occur on land.

Principle 6: The ocean and humans are inextricably interconnected.



Northern sea otter

Creature Classification Background Information

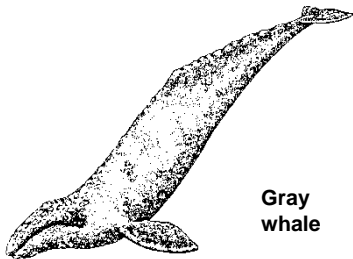
An **adaptation** is a characteristic, such as a body part, color pattern or behavior, that helps an organism survive in its environment. Just as humans are adapted to a terrestrial environment, marine animals are adapted to deal with the many challenges faced when living in the ocean. For example, marine animals are either able to breathe in water or their body design is such that coming to the surface to take a breath is relatively effortless.

Although humans are not adapted to living in the ocean, our natural curiosity inspires some to venture into this otherworldly environment. Humans have developed special equipment to assist them in exploring the ocean and its inhabitants: protective suits keep us warm, fins increase a diver's mobility, a face mask helps a diver to see, and we've even managed to find a way to breathe underwater using oxygen tanks that we can carry on our backs! Humans appear to be the ultimate imitators of other animals. Is it possible that the idea for a dive suit came from examining a sea otter's fur and its ability to maintain an insulating air layer to keep it warm? It also seems likely that a human diver's swim fins were designed with fish, whales and sea lions in mind!

Classification is the science of grouping organisms according to their form, structure and behavior. To do this, scientists identify characteristics, or adaptations. To classify an organism, we start with the most general characteristics and narrow down the categories to the most specific characteristics.

Magnificent Mammals

Mammals come in all shapes and sizes, from the biggest whale to the tiniest vole. They all have certain characteristics in common, no matter what their size or shape. All mammals nurse their young with milk that the mother's body produces. Also, mammals all have hair, although some mammals, like some kinds of whales, lose their hair after they are born. Mammals are also warm-blooded, which means they must eat enough food to produce energy to keep their body temperature constant. Most mammals have teeth that come in different shapes and sizes and do different jobs. Finally, mammals are vertebrates (they have a backbone), and breathe air.



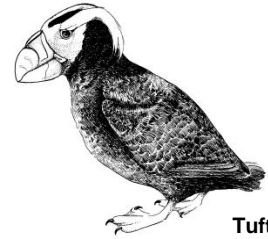
Gray
whale

Cetaceans (whales and dolphins) are marine mammals with streamlined bodies, which they propel forward with their strong flukes, or tails. These flukes are supported by cartilage rather than bone. Cetaceans breathe at the water's surface through blowholes—modified nostrils—located on top of their heads. Two kinds of whales seen off our coast are killer whales and gray whales.

Pinnipeds are another group of mammals that includes seals, sea lions and walruses. Pinniped means “feather-footed”; their broad, paddlelike flippers are shaped like feathers. Two pinnipeds off our coast are California sea lions and harbor seals.

Beautiful Birds

From the largest bird, the ostrich, to the smallest bird, the bee hummingbird, birds share common characteristics that separate them from all other groups of animals. Like mammals, birds are warm-blooded and care for their young, although they don’t produce milk to feed them. Birds are vertebrates and the only animals that have feathers. Birds lay eggs and breathe air. All birds have wings, although some, like penguins, cannot fly.

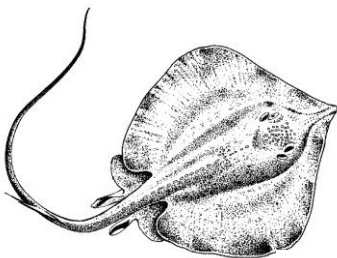


Tufted Puffin

Seabirds found off our coast include tufted puffins, rhinoceros auklets, common murre and pigeon guillemots. These birds are generally plain colored. During breeding season, however, seabirds often grow brightly colored feathers and the skin on their feet and faces may become brilliant orange or red. Because they spend most of their life at sea, only coming ashore to find a mate and build a nest, their bodies are compact and look short or stubby when compared to other birds. Though awkward on land, under water they are more streamlined, and as they swim with their wings they appear to fly, steering with their feet.

Shorebirds, or waders, like the black oystercatcher, have long slender legs for wading, and long slender necks and bills for feeding. Shorebirds often have wings that are long and narrow for fast flight. An oystercatcher has a heavy build and a long bill with a blunt, laterally flattened tip that opens shellfish and chips limpets off the rocks.

Fabulous Fishes



Sting ray

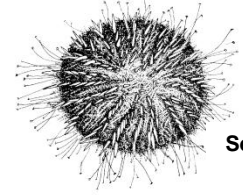
Fishes share the characteristics of having a backbone and fins. Some fish are jawless, like hagfishes and lampreys; some are bony fishes, like flounders, salmon and rockfishes; and some are cartilaginous fishes, like sharks, skates and rays. All fishes take oxygen from the water with gills and most are protected by scales. They have a backbone to support their body, and they move and balance themselves with fins.

Bony fishes, such as sculpins, have an operculum that covers their gills, a skeleton made of bones, flexible fins, and most have scales that get bigger as the fish grows.

Cartilaginous fishes, such as sharks, have five to seven visible gill slits, a skeleton made of cartilage, rigid fins, and scales that increase in number as the fish grows.

The Invertebrates: Spineless Wonders

Invertebrates are animals without backbones. Some common invertebrates along our coast are sea stars, sea urchins, sea cucumbers and sand dollars. These particular invertebrates are classified as echinoderms. Echinoderm means ‘spiny skinned.’ Most echinoderms have body plans with their mouth on the bottom and parts that come in fives—most sea stars have five arms, urchins have five rows of spines and sand dollars have a five-point pattern on their back. Echinoderms have a simple nervous system and no clear head. They also have a water-vascular system with tube feet for locomotion. Echinoderms have an internal skeleton composed of calcium.



Sea urchin

Other types of invertebrates include arthropods, such as shrimp and crabs, which all shed their exoskeleton to grow larger; cnidarians, such as jellyfish and anemones, which all have a ring of tentacles with stinging cells called nematocysts; and mollusks, like snails and chitons, which have a soft body, a foot for movement and a shell for protection.



King Crab

Vocabulary

adaptation (*A-dap-TAY-shun*): a characteristic, such as a body part, color pattern or behavior, that helps an organism survive in its environment.

bird: a member of the class Aves (*AY-veez*), a group of vertebrates that are warm-blooded, have feathers and lay eggs. Puffins, ducks and eagles are all birds.

cetacean (*she-TAY-shun*): a member of the order Cetacea (*she-TAY0shuh*), a group of marine mammals that includes whales, dolphins and porpoises.

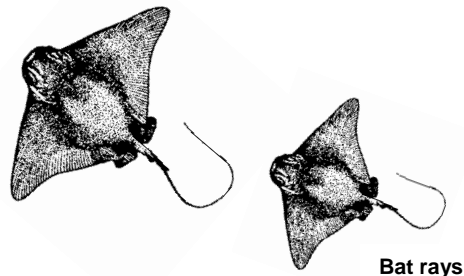
echinoderm (*ee-KIE-nuh-derm*): a member of the phylum Echinodermata (*ee-KIE-nuh-dur-MAH-tah*), a group of invertebrates with hard, spiny skeletons, radially symmetrical bodies and a water vascular system. Sea stars, sea urchins, sand dollars and sea cucumbers are echinoderms.

fish: a common name for an aquatic animal belonging to any of the four classes of fishes: Mixini (hagfishes), Cephalaspidomorphi (lampreys), Chondrichthyes (sharks, rays and relatives), and Osteichthyes (bony fishes). Fishes are vertebrates that are cold-blooded and have scales and gills. Leopard sharks, canary rockfish, wolf-eels and starry flounders are all fishes.

mammal: a member of the class Mammalia (*ma-MAY-lee-ah*), a group of vertebrates that are warm-blooded, have hair and nurse their young. Sea otters, whales and humans are mammals.

marine mammal: a mammal adapted to survive in a marine environment and dependent on it for food

pinniped (*PIH-nih-ped*): a member of the suborder Pinnipedia (*pih-nih-PEH-dee-ah*), a group of marine mammals with streamlined, torpedo-shaped bodies and long, paddlelike feet. Seals, sea lions and walruses are pinnipeds.



How Big Am I?

Lesson at a glance: Students will measure out the maximum lengths of a variety of ocean animals.

Oregon Content Standards:

SCIENCE

- **Fourth Grade:** 4.1 Structure and Function: Living and non-living things can be classified by their characteristics and properties.
- **Fifth Grade:** 5.2L.1 Explain the interdependence of plants, animals, and environment, and how adaptation influences survival.

OTHER ADAPTABLE CONTENT AREAS

- Mathematics

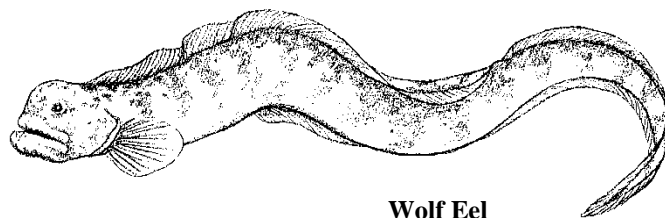
Ocean Literacy: Essential Principles and Fundamental Concepts

5. THE OCEAN SUPPORTS A GREAT DIVERSITY OF LIFE AND ECOSYSTEMS.

- 5.a. Ocean life ranges in size from the smallest virus to the largest animal that has lived on Earth, the blue whale.

Materials:

- Two 60-foot lengths of clothesline
- Cable ties
- Laminating materials
- Permanent markers
- A measuring tape for each small group of students
- Two copies of the attached animal pictures with their lengths.



Wolf Eel

Animal	Length
Lined hermit crab	¾ inch
Ochre star	12 inches
Tufted puffin (wingspan)	36 inches
Sunflower star	52 inches
Wolf-eel	5 feet
Leopard shark	6 feet
Brown pelican (wingspan)	7 ½ feet
California sea lion (adult male)	8 feet
Killer whale (adult male)	26 feet
Whale shark	46 feet
Gray whale (adult female)	49 feet
Sperm whale (adult male)	65 feet

Activity:

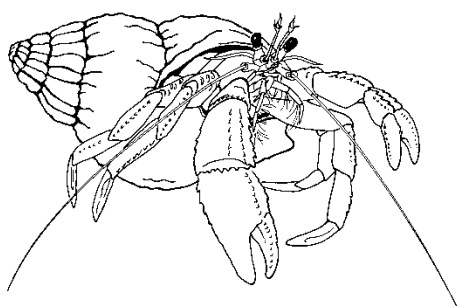
1. Before class, cut apart the pictures, laminate them (this should prevent them from tearing when they are attached to the rope), and punch a hole near the top for attachment to the rope.
2. Divide your class in half (each half will be working with a separate rope).
3. Divide the students from each half into groups of two or three.
4. Give each small group a laminated, punched picture and a marking pen.
5. Ask each small group of students to measure out the length of their animal, all using the same end of the clothesline as a starting point.
6. When they reach their point on the clothesline, have them mark it with a permanent marker and then attach their picture with a cable tie.
7. Ask each small group of students to stand at the length of their animal.

Summary:

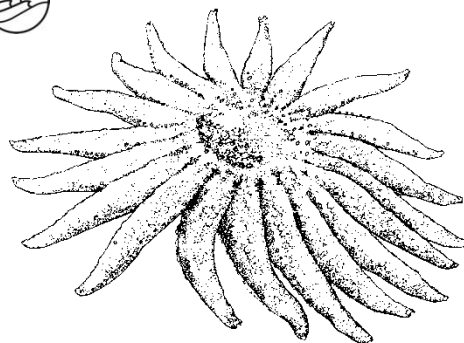
- Have the students share with their classmates the name of their animal and how long it is.
- Did the two sets of measurements match? Why or why not? Relate this question to why scientists do the same experiment many times before they are satisfied that the results are accurate.
- Have the students record how many of their footsteps equal the various lengths.
- Have your students design a bar graph with all of the animals.

Extensions:

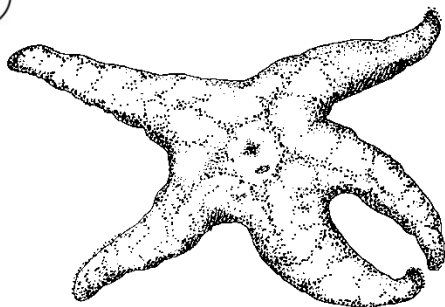
- Have the students write a research report on their animal. Have them include where their animal lives, what and how it eats, and other interesting information. Have them share it with the class.
- Once the animals are researched, have the students create a mural showing where their animals live. Use the pictures again and create a food chain based on the research your students completed on food choices.
- Have your students measure their height. How many of them does it take to equal the length of a wolf-eel, a killer whale, a gray whale or a leopard shark? How many hermit crabs would it take to equal their height?



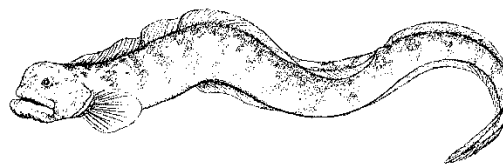
Lined hermit crab (3/4 inch)



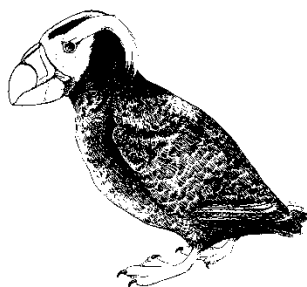
Sunflower star (52 inches)



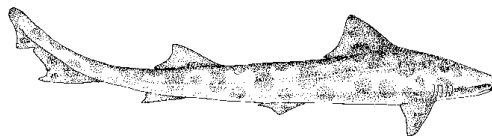
Ochre star (12 inches)



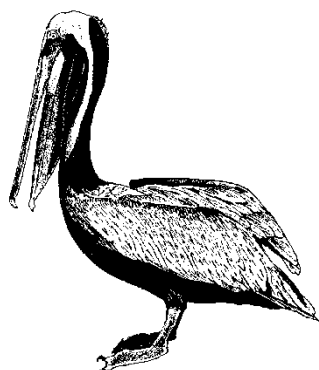
Wolf Eel (5 feet)



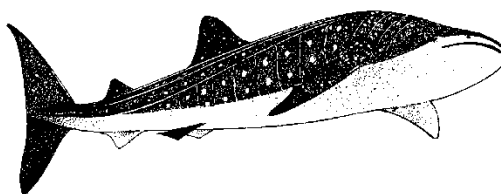
**Tufted puffin (36 inches)
(wingspan)**



Leopard shark (6 feet)



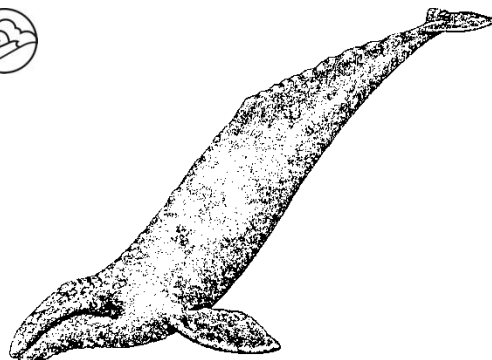
**Brown pelican (7 ½ feet)
(wingspan)**



Whale shark (46 feet)



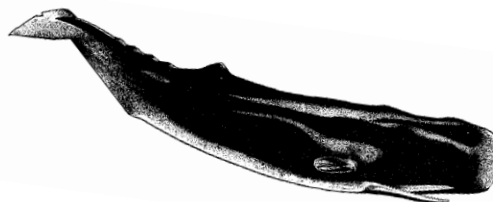
California sea lion (8 feet)



Gray whale (49 feet)



Killer whale (26 feet)



Sperm whale (65 feet)

Something to Write Home About

Lesson at a glance: Students will study a marine habitat and one of its inhabitants and then write a story that includes a description of their chosen animal's adaptations for survival in its environment.

Oregon Content Standards:

SCIENCE

- **Fourth Grade:**

- 4.1 Structure and Function: Living and non-living things can be classified by their characteristics and properties.
- 4.2L.1 Describe the interactions of organisms and the environment where they live.

- **Fifth Grade:**

- 5.1 Structure and Function: Living and non-living things are composed of related parts that function together to form systems.
- 5.2L.1 Explain the interdependence of plants, animals, and environment, and how adaptation influences survival.

OTHER ADAPTABLE CONTENT AREAS

- English

Ocean Literacy: Essential Principles and Fundamental Concepts

5. THE OCEAN SUPPORTS A GREAT DIVERSITY OF LIFE AND ECOSYSTEMS.

6. THE OCEAN AND HUMANS ARE INEXTRICABLY INTERCONNECTED.

Materials:

- Students may use their school and local library and the internet.

Background:

An **adaptation** is a characteristic, such as a body part, color pattern or behavior that helps an organism survive in its environment. Just as humans are adapted to a terrestrial environment, marine animals are adapted to deal with the many challenges faced when living in the ocean. For example, marine animals are either able to breathe in water, or their body design is such that coming to the surface to take a breath is relatively effortless.

There are several different marine habitats, and each one challenges its residents' survival. For example, animals living in a rocky shore environment must contend with crashing waves and constantly changing tides, which leave tidepool residents vulnerable to predators, inconsistent food supply, weather and curious tidepooling humans.

Activity:

1. Have your students choose one of the following marine habitats to study:
 - Rocky shore – a rocky coastline where the land meets the ocean
 - Sandy shore – a sand-covered coastline formed by waves

- Kelp forest – nearshore areas where dense forests of kelp grow: kelp forests are similar to a forest on land in many ways.
 - Open ocean (pelagic zone) – ocean water from just offshore to mid-ocean (above 300 meters)
 - Deep sea – open ocean below 300 meters
2. Assist students in choosing a fish, bird, invertebrate or mammal that lives in their chosen habitat.
 3. Once students have spent time researching their animal and its habitat, have them write a story describing their animal's habitat and how its adaptations help it to survive there.
 4. Your students should consider the following questions as they write their story:
 - What would it be like to live in this habitat?
 - What other forms of plant and animal life share this habitat with your animal?
 - What is the relationship between your animal and the other organisms living in that habitat?
 - How might humans affect the lives of the plants and animals living in this habitat?

Summary:

By understanding the relationships between organisms in a given habitat, students should be able to gain an appreciation for the fragility of an ecosystem and how human interaction can affect a habitat and the organisms that live there.

Extension:

1. Have students illustrate their story.
2. Have students list their sources as a bibliography.

Tools of the Trade

Lesson at a glance:

Students will understand and recognize several marine invertebrate adaptations by comparing them to tools made and used by humans.

Oregon Content Standards:

Science

- **Fourth Grade:** 4.1L.1 Compare and contrast characteristics of fossils and living organisms.
- **Fifth Grade:** 5.2L.1 Explain the interdependence of plants, animals, and environment, and how adaptation influences survival.

Ocean Literacy: Essential Principles and Fundamental Concepts

5. THE OCEAN SUPPORTS A GREAT DIVERSITY OF LIFE AND ECOSYSTEMS.

- 5.d. Ocean biology provides many unique examples of life cycles, adaptations and important relationships among organisms (symbiosis, predator-prey dynamics and energy transfer) that do not occur on land.

Materials:

- ❑ Marine invertebrate pictures and/or names on cards
- ❑ Human tools and other objects that represent marine animal adaptations
- ❑ Blanket or sheet
- ❑ Table or floor space

Activity:

1. Gather a collection of tools and other objects that represent marine animal adaptations.
2. Before class, place the items under a blanket or sheet on the floor or on a table.
3. Give each student a picture or name of a marine animal.
4. Have the students sit down in a circle around the covered items. Everyone must be able to see the blanket or sheet.
5. Lift the covering off the items and give students three to five seconds to look at the items.
6. Quickly cover up the items.
7. Ask student to name some of the items that they saw.
8. Pull out the items that the students listed.
9. Ask the student(s) holding the appropriate animal picture or name to describe why they think their animal has an adaptation that works like the tool.
10. Repeat the activity until all of the items have been seen and explained.

Seabird Examples:

- Seabirds such as **cormorants**, have heavy **dowel**-like bones that make diving easier and flying difficult!

- Some seabirds, such as **arctic terns**, rely more on flight than the ability to dive to capture their food. Their bones are hollow like **straws** so that they are light enough to soar through the air above the water in search of dinner.

Marine Mammal Examples:

- Many marine mammals, such as **California sea lions**, have webbed feet or flippers, just like a human's **swim fins**, to help them swim quickly and easily through the water.
- A **gray whale's** baleen traps tiny animals in its strands as it sweeps the bottom of the muddy ocean floor like a **broom**.

Fish and Invertebrate Examples:

- A **great white shark** has teeth that work like a **knife and fork**. One jaw holds the prey while the other slices.
- Flatfish, such as **starry flounders**, can't swim very quickly, so, in order to avoid being eaten, they use **camouflage** to hide from predators.
- A **sea urchin** protects itself with its **ice pick/tooth pick** shaped spines.
- A **sea star** uses its tube feet like a **plunger** to hold onto the rocks in the crashing waves.

Summary:

1. Discuss the importance of adapting to your habitat.
2. Discuss how organisms adapt slowly and cannot keep up with the changes made to their environment by humans. For example: Sea otters have not adapted to deal with oil spills.
3. Have students brainstorm things that they can do at home to help protect the marine environment and its inhabitats.

Extension:

Have students create their own marine animal adaptation analogies.

Dilemma Cards

Lesson at a glance:

This lesson is designed to give students an opportunity to examine their own values and beliefs related to the environment and to practice discussing environmental issues without placing judgments.

Common Curriculum Goals and Benchmarks:

SOCIAL SCIENCE

- **Fourth and Fifth Grade:** SS.05.GE.07 Understand how physical environments are affected by human activities.
- **Fourth and Fifth Grade:** SS.05.GE.07.01 Understand how and why people alter the physical environment
- **Fourth and Fifth Grade:** SS.05.GE.07.02 Describe how human activity can impact the environment.
- **Fourth and Fifth Grade:** SS.05.SA.03 Identify and study two or more points of view of an event, issue, or problem.
- **Fourth and Fifth Grade:** SS.05.SA.04 Identify characteristics of an event, issue, or problem, suggesting possible causes and results.

Materials:

- Dilemma cards

Background information:

Discussing environmental ethics can be difficult. There are many sides to every issue, and often the feelings for one position or another are strong. In presenting this activity to students, stress the importance of not placing judgment, and listening to perspectives other than their own. Understanding all sides can provide a bigger picture of the issues.

It is not the intent of this activity to prescribe right and wrong answers for the students.

Activity:

1. Divide students into groups of four or five.
2. Give each group a dilemma card and have one member read the dilemma and the choices of answers to the rest of their group.
3. Each student in the group should decide on their own what their response would be. Then have each group discuss their choices among themselves. Each student should be able to defend their reasoning.

Summary:

1. Discuss each dilemma as a class. Be sure to remind your students that there are several sides to any issue and usually there isn't only one right answer.
2. Stress the importance of gaining a clear understanding of all positions.
3. Ask the students whether or not it would have helped them make their dilemma choices if they had known more about the issue.
4. Ask them if they think that most people are aware of these issues.

5. What can they do to help more people become aware of human impact on the marine environment?
6. Encourage students to find out more about the issues brought up in their dilemmas. Knowing more will allow them to make more informed decisions.

Extensions:

1. Have students research other issues related to marine mammals discuss them as a class.
2. Discuss how other marine wildlife may also be affected by marine debris, water pollution, commercial fishing, eco-tourism or possible release from a captive situation such as an aquarium.

1.

You just cleaned your basement. On a dusty back shelf you discovered 10 cans of old paint and some very old pesticides and weed killers that you can't use.

What will you do with them?

2.

You are walking on the shore with a friend who is visiting you from the Midwest. Your friend sees a purple sea star she thinks is very beautiful. She tells you she wants to go into the tidepool and get it to take it home.

What do you do?

3.

You are an expert salmon angler. You always know where the BIG ones are. You're standing on the side of a stream where you know the salmon run. On the far side of the stream you see a pool you just know has the BIG one in it, but to get there you must cross the stream. You know this is probably an area with salmon redds (nests), but no one from the Department of Fish and Wildlife is around and you're expected to come home with a fish for dinner.

What do you do?

4.

You were fishing at a secluded lake and caught seven fish this morning. Now, its afternoon and the fishing as been great! You have caught five fish in one hour, all of which are on your string in the water and are bigger than this morning's fish. The law allows you to possess 10 fish per day.

What should you do?

5.

You are on a fieldtrip to the Newport bay front. Although you know it's not a good idea to feed the wildlife, some of your friends are tossing pieces of their tunafish sandwiches to the sea lions.

What should you do?

6.

You're on a charter boat with your family during your summer vacation. Your grandfather, a grumpy, stubborn man, is a heavy smoker and keeps throwing his plastic cigar butts over the side.

What should you do?

4.

- a. Continue to fish and keep all the fish.
- b. Let the smallest fish you caught this afternoon go free and keep the big ones to stay within your limit.
- c. Quit fishing and go for a hike.
- d. Continue to fish but release them.
- e. Other

1.

- a. You know it's illegal, but you simply hide them in your garbage can with your other household waste and have it taken to the county landfill.
- b. Leave them in your basement.
- c. Call the county to find out where to dispose of them safely.
- d. Other

5.

- a. Tell them that feeding the sea lions can harm the animals and ask them to stop.
- b. Report their behavior to an authority on the dock.
- c. Ask the teacher to ask them to stop.
- d. Ignore them.
- e. Other

2.

- a. You notice that there are many sea stars and you think it won't hurt anything to take just one.
- b. Offer to pull it off the rock and suggest you play Frisbee with it.
- c. Explain that this animal won't be able to survive if she takes it home and suggest that she watch it here and then leave it in its habitat.
- d. Yell at her and ask her how she would feel if someone picked her up and threw her out in the ocean.
- e. Other

6.

- a. Yell at him, call him an idiot and ask him if he hasn't heard of the MARPOL Protocol, the law prohibiting the dumping of all plastic wastes from ships at sea.
- b. Ask the captain for a can, give it to your grandfather and politely ask him to use it for his cigar butts.
- c. Do nothing.
- d. Tell your parents to tell your grandfather to quit smoking.
- e. Other

3.

- a. Go to the nearest house and ask to borrow their boat, knowing you'll be in the doghouse if you don't come home with fresh fish.
- b. Put on your best lure, cast as close to the pool as possible and hope for the best.
- c. Carefully walk through the stream.
- d. Go to the fish market for fish for dinner.
- e. Other

1.

There are getting to be too many sea lions near your town. Their pups are starving. Sea lions eat fish – but fishermen need fish too. The sea lions rest on the beach – but people want to sit on the beach too.

What should the people in your town do?

2.

You are on a fishing boat with a friend's family. When the fishing net is hauled in, some of it is torn. Your friend's father cuts the torn part out and throws it overboard. Just then you see some dolphins swimming toward the boat.

What should you do?

3.

You are out on the beach with your friend and you find a seal pup. No one else is around.

What should you do?

4.

You work at an oceanarium that might be able to return a whale to the wild. Here are some facts to consider:

- You have been treating the whale for a possibly contagious disease. The disease seems to be gone.
- The whale has begun to feed on its own, but you don't know if it will be able to find food in the wild.
- It has not been with others of its own species for most of its life.
- Whales swim with their own pods but you don't know if its pod can be found or if they will accept it.
- This species of whale is not endangered.

Make your decision based on what is best for this whale and for whales in the wild. What should you do?

2.

- a. Move quickly and try to pull the net out of the water.
- b. Tell your friend's father that it is against the law to throw plastics overboard. Tell him also that marine mammals die from getting tangled in nets.
- c. Try to scare the dolphins away.
- d. Don't say anything but report him to the Coast Guard when you get to the dock.
- e. Do nothing
- f. Other

1.

- a. Take some of the sea lions to live in another place. This would mean fewer sea lions near your town. (Keep in mind that the ones you move might not live or they might come back.)
- b. Let nature take its course and let the sea lions starve.
- c. Catch the pups and let your local aquarium take care of them, if they can. When the pups are older, set them free.
- d. Hire a biologist to determine the actual effect of the sea lions on the fishing industry
- e. Let licensed hunters control the sea lion population.
- f. Other

4.

- a. Go ahead and release it and hope it will socialize and feed on its own. You hope to use radio-tracking equipment to follow its progress in the wild.
- b. Since your whale seems healthy, capture other whales in an ocean pen. Introduce your whale to them. If your whale hunts and eats on its own and gets along with the other whales, then release it
- c. Keep the whale in the oceanarium for educational purposes and for study since you can not prove it is healthy.
- d. Other

3.

- a. Take it home and care for it in your bathtub.
- b. Leave the pup alone. Call the State Police and tell them the pup is on the beach. Stay to keep people away from it until they arrive.
- c. Pet the pup, although you know it's against the law. Then return it to the water.
- d. Do nothing
- e. Other

5.

You are the owner of a large factory. The water that your factory drains into the river nearby is polluted, but it is within legal limits. Fish and marine mammals in your area are getting sick from the pollution. Some are dying. The equipment to reduce the pollution is expensive. If you buy it, you can't give your employees raises this year.

What should you do?

6.

You are the owner of a small aquarium. You are going out of business because not enough people are coming to see your exhibits. Your seals are healthy but old. Other aquariums might not want to adopt them, and you might not be able to get permits to turn them loose. You are not sure if they can live in the wild after 25 years in your aquarium. These seals are not an endangered species.

What should you do?

7.

You are a researcher on a small tropical island. The people of this island hunt dolphins for food. They travel in canoes and use spears to kill the dolphins. Each year a small number of dolphins is injured but not captured. Some of these injured animals may not survive.

What should you do?

8.

You are a humpback whale photographer. You always know where you can find the whales. You are out in your boat and see a mother humpback whale and her calf. To get the photograph you want, you must be at least 20 feet from the pair. You know this is against the law, but no one from the government is around. Your magazine has to have the photo.

What should you do?

6.

- a. Ask other aquariums if they can take the seals. Keep at it until someone says yes, or until you run out of possibilities.
- b. Ask an animal rights group to try to force the government to let you release the seals.
- c. Load the seals in your truck and release them without the permits. Deal with the law later.
- d. End the seals' lives.
- e. Other

5.

- a. Since you are within legal limits, wait a while to see if the cost of the equipment will go down.
- b. Do nothing.
- c. Store the water until the laws change or until you have extra money to spend on the equipment.
- d. Add the equipment, because you know that the chemicals will work up the food chain and affect even more animals. Your employees may be unhappy, but everyone will lead healthier lives.
- e. Other

8.

- a. Stop your engine and hope that the whales will come closer so that you can get your photograph.
- b. Keep following the whales at a legal distance and hope you get your picture. (Keep in mind that you may be tiring the calf.)
- c. Chase them down and take your picture.
- d. Forget taking a picture of this pair of whales. Look for another photo opportunity, even though you feel sure you'll never get one as good as this.
- e. Other

7.

- a. Give the people motor boats to increase their speed. This might improve their aim.
- b. Give them guns to reduce the suffering on the part of the dolphins. This will also increase their hunting efficiency.
- c. Do nothing. This tradition has gone on for hundreds of years and hasn't seemed to hurt the dolphin population.
- d. Bring in another food source so the people don't have to eat dolphins.
- e. Other