

# Lesson: Amazing Adaptations

## Teacher Resource:

In the animal kingdom, the term **survival** means living long enough to reproduce and create offspring in large numbers for the continuation of the species. These offspring will inherit certain **traits** from their parents, just like we inherit certain physical characteristics from our own parents through genes. Certain traits and **behaviors** are generally what helps an organism survive in its habitat. For example, scales or fur, fins or feet, these are physical traits that will determine how well an animal will survive in its habitat. Behaviors that can determine survival include migration or hibernation to survive the changing seasons.

Over the course of time, environments go through many changes including changing climates and food availability. In turn, organisms will change over many generations as those that possess the specific **adaptations**, or traits and behaviors best suited for their environment, will survive long enough to pass their traits and behaviors to the next generations. This process is called **natural selection**. When a population cannot adapt to their changing environment, the population may become **extinct**.



## Lesson Objectives

- I can define adaptation and distinguish between a behavioral and physical adaptation
- I can describe how animals adapt to their environment through natural selection
- I can describe animal adaptations for life in the ocean
- I can discuss environmental threats to organisms living in the ocean



## NGSSS Benchmarks

**SC.5.L.14.2** Compare and contrast the function of organs and other physical structures of plants and animals, including humans, for example: some animals have skeletons for support -- some with internal skeletons others with exoskeletons -- while some plants have stems.

**SC.5.L.17.1** Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycles variations, animal behaviors and physical characteristics.

**SC.5.L.15.1** Describe how, when the environment changes, differences between individuals allow some plants and animals to survive and reproduce while others die or move to new locations.

Grade Level: Fifth Grade

Subject: Science

Duration: 30-45 minutes



### Ocean Literacy Principles:

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

### Materials:

- LMC Amazing Adaptation Cards
- Pool noodles
- Blind folds
- Caution cones
- LMC Imagination Adaptations worksheet

### Vocabulary:

- **Survival:** Living long enough to reproduce more of your own kind in large numbers
- **Trait:** A physical characteristic or condition passed by genes from parent to offspring
- **Behavior:** An activity or action that generally helps an organism
- **Adaptation:** A body part or behavior that helps a living thing survive
- **Natural selection:** A process by which organisms change over many generations and those best suited to their environment survive to pass their traits or behaviors on to next generations
- **Extinction:** When every individual member of a species is dead

## Engagement (Pre-Lesson)

Introduce the students to animal and plant adaptations through videos by Scholastic Study Jams:

Animal Adaptations Video (3:06)

<http://studyjams.scholastic.com/studyjams/jams/science/animals/animal-adaptations.htm>

Plant Adaptations Video (3:22)

<http://studyjams.scholastic.com/studyjams/jams/science/plants/plant-adaptations.htm>

**Adaptation Card Activity:** Students participate in an interactive matching card game. There are 24 cards total in the resource packet: 12 species cards and 12 corresponding adaptation cards. Give each student one card and direct them to find their match. After each student is matched, have each pair of matching cards show their species card to the rest of the class and explain what the adaptation is and why it's important.

## Exploration (Core-Lesson)

In this lesson, students will be introduced to the lateral line sensory system of fishes. The lateral line system is a sensory adaptation that allows fishes to detect water movements and pressure gradients. During this activity, the students will get to experience having a "lateral line system" by completing a short obstacle course while blindfolded with the help of their lateral line partner.

**Set-up:** Place five cones in a straight line, unevenly spaced out. Repeat this so that you have 5 separate lines of cones. Assign partners to each student in class. If an odd number of students, create one group of three students to rotate. Assign each pair of students to one of the five cone obstacles.

**Activity Procedure:** One student will be blindfolded and will act as the front end of the fish. The other student will act as the lateral line by standing behind their partner and holding a pool noodle on either side of them. The lateral line student will help the blind folded partner walk through the cone obstacle by tapping them with pool noodles on either side in order to turn them in different directions and maneuver around the obstacles. Each pair of students will complete the obstacle twice in order to switch roles.

## Explanation (Post-Lesson)

Use the provided LMC Imagination Adaptations worksheet with critical thinking questions to wrap up the lesson on animal biodiversity. Students should use their imaginations in order to design their own original animal-one that is well adapted to its habitat. Tell the students to design an animal that is living in the year 3000. Encourage the students to be creative in their animal's characteristics.

Each student/group should decide: species name, habitat/range, predators/prey, mobility and defenses, color, camouflage, size, special adaptations, etc.

Each student should consider: What the climate will be in the year 3000, what adaptations will be needed to survive, what your animal will eat, and what your animal will look like.

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## Extension

Challenge a family member! The students will be able to explain what they have just learned about animal biodiversity to a family member and challenge them to design an animal living in the year 4,000! The students should explain the animal that they created, keeping in mind to review their new vocabulary words: survival, trait, and adaptation. The family member will fill out the same information as the students filled out in class and the picture will be presented by the students during class.

## Evaluate

Answer the questions on the Exit Ticket (shown below).

### Amazing Adaptations Exit Ticket

1. Fill in the circles to show if these facts about animal adaptations are true, false or neither.

	True	False	Neither
Animals will adapt to protect themselves.	Ⓐ	Ⓑ	Ⓒ
Animals do not have unique adaptations.	Ⓓ	Ⓔ	Ⓕ
Animals can always adapt.	Ⓖ	Ⓗ	Ⓘ





## Helpful Photos: Core Lesson Activity





Fish Adaptations – Lateral Line Activity

Photos: Limestone Creek Elementary, 5<sup>th</sup> Grade Spring 2019



## Adaptation Cards (Engagement)

Follow the directions outlined in the Engagement section of lesson for Adaptation Cards Activity.

 <p>Loggerhead Sea Turtle</p>	<p><b>Adaptation:</b></p> <p>This species of marine reptile has a very large head, giving it its name. Females of this species lay more than 100 eggs in each nest so that there is a greater chance that more hatchlings will live to become adults.</p>
 <p>Hawksbill Sea Turtle</p>	<p><b>Adaptation:</b></p> <p>This species of marine reptile has a mouth shaped like a bird beak, giving it its name. This shape allows them to reach into crevices in order to find their preferred food item, sea sponges.</p>
 <p>Bull Shark</p>	<p><b>Adaptation:</b></p> <p>This fish species has a way of regulating its salt tolerance in order to survive in both fresh and salt water. This allows them to feed and reproduce in ecosystems that other species of its kind cannot inhabit.</p>
 <p>North Atlantic Right Whale</p>	<p><b>Adaptation:</b></p> <p>This species of large marine mammal can lower its heart rate while diving. This allows it to conserve oxygen levels while diving to great depths.</p>





Common Bottlenose Dolphin



**Adaptation:**

This species of marine mammal can be seen “porpoising” or breaching the surface of the water. This style of swimming allows them to use less energy while traveling great distances.



Scalloped Hammerhead



**Adaptation:**

This fish species is a top predator of the sea. They have a wide, flattened head called a cephalofoil, which is covered in electroreceptors that help them detect prey.



Giant Manta Ray



**Adaptation:**

This species is a filter feeder, meaning that it feeds by straining tiny particles from the water. They have two appendages, called cephalic lobes, which help guide the water into their mouth as they swim.















Atlantic Common Thresher Shark



**Adaptation:**

This fish species has a very long extended tail fin. In order to feed, this species will whip their tail through schools of fish, stunning the prey and allowing for a quick meal.



 <p>Smalltooth Sawfish</p> 	<p><b>Adaptation:</b></p> <p>This fish species has a long, toothy nose which is called a rostrum. They use this rostrum to stun prey by swiping it through schools of fish.</p> 
 <p>Kemp's Ridley Sea Turtle</p> 	<p><b>Adaptation:</b></p> <p>This species of marine reptile has a unique mass nesting behavior, called an arribada. During an arribada, thousands of individuals will nest at once, resulting in depositing more eggs in the sand than a predator can eat.</p> 
 <p>Leatherback Sea Turtle</p> 	<p><b>Adaptation:</b></p> <p>This species is the largest marine reptile that nests on Florida's beaches. It has a black, leathery shell that can expand and contract as it swims to great depths to find its preferred food, the jellyfish.</p> 
 <p>Mahimahi</p> 	<p><b>Adaptation:</b></p> <p>This species of fish reproduces 3 times per year by spawning, or releasing their eggs into the water. Each time they spawn, they release 800,000-1,000,000 eggs in order to have a better chance that more will survive to adulthood.</p> 



## Imagination Adaptations

**Directions:** Imagine we are living in the year 3000. Due to climate change, the Antarctic ice sheets have melted, the oceans have increased in temperature, and sea level has risen about 13 feet. The underwater habitats are different and the animals have adapted to live in their new environments. Design your own NEW marine species that would be adapted to live in the year 3000.

Species Name:

Habitat:

Predators:

Prey:

Adaptations (including color, size, and specialized features and how these are adaptations for the year 3000 climate):

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Draw your species below! Include labels in your drawing.

Each individual can make a difference in the future of our planet. Something as simple as reducing your waste, can have a big impact on the health of our planet. What changes can you make in your daily life that will lead to a healthier planet by the Year 3000?

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If every person in the world made one life change to lower their impact on the environment. What might the environment look like in the Year 3000?

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