

Animal Adaptations

Explore

Grade: 3	Implementation Practice: Small Group
Subject Area: Science	Supporting Content: Engineering
Objective(s): Students will design two animal models, one that can survive in the ocean and one that can survive on land.	

Standards Addressed

NGSS	Performance Expectation 3-LS4-3: Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.		
	Disciplinary Core Idea(s)	Science and Engineering Practices	Crosscutting Concept(s)
	<ul style="list-style-type: none"> • LS4.C: Adaptation 	<ul style="list-style-type: none"> • Engaging in an Argument from Evidence 	<ul style="list-style-type: none"> • Cause and Effect
	Engineering, Technology, and Application 3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.		
CCSS	ELA-Literacy SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.		

Vocabulary and Skills

Key Terms		Key Skills
ocean	thrive	Modeling
adaptation	habitat	Observing
survive		

Essential Question(s):

How do an animal's adaptations help it to survive in its habitat?

Guiding Question(s):

What are adaptations?

What characteristics or structures (adaptations) help animals to survive on land?

What characteristics or structures (adaptations) help animals to survive in the ocean?

Teacher Background Information

5E Instructional Model – Explore

The 5E instructional model organizes learning experiences so that students have the opportunity to develop their own understanding of the concept over time by building what they know. There are five phases of learning including: Engage, Explore, Explain, Elaborate, and Evaluate. The Explore phase is an opportunity to “level the playing field” by creating a common experience for all students from which they can compare results and ideas and continue to build new knowledge.

During the Explore, students are expected to “mess around” or experiment and investigate and are not expected to have all of the answers. Students should be investigating new ideas and figuring out how to solve problems based on their observations and recorded data. Students should be encouraged to carry out their ideas and to share their ideas with classmates. The teacher’s role is to encourage students to interact with the materials as well as with each other. During this phase, it is critical that the teacher ask probing questions to help students make sense of their experiences, but not provide answers to every question. It is important to listen to students’ conversations and take note of misconceptions and misunderstandings as they arise for future resolution during the Explain phase. This should be a time for open exploration by the students.

As the lesson is introduced, be sure to let the students know that this is an opportunity for exploration and that no question or observation is too small or unimportant. Encourage students to use the tools at their disposal (classroom library, notebooks, each other, etc.) to engage in the lesson.

Content Background – Adaptations

An adaptation is a feature that helps an organism survive in its habitat. Technically, it is a feature that is common among a population of organisms because it provides some improved function.

Adaptations are produced by natural selection, the process by which an organism having certain traits that better enable it to adapt to specific environmental pressures (i.e. predators, climate changes, competition for food, competition for mates) will tend to survive and reproduce in greater numbers than those without the trait. Adaptations can be physical (body parts) or behavioral.

Adaptations can be a physical attribute, such as the thick layer of blubber used by marine mammals, including sea lions, seals, whales, and polar bears, for insulation or the black and white stripes of a zebra which helps to camouflage individuals in the herd. Our five fingers, including an opposable thumb, are an adaptation that allows humans a broader range of motion and increased dexterity. Male peacock feathers and other extravagant attributes such as brightly colored scales and feathers, as well as deer antlers and the male lion’s mane are also physical adaptations. Often these type of adaptations are used to demonstrate male fitness in an effort to garner mates.

Behavioral adaptations such as animals working together to hunt, as seen in pods of killer whales, packs of wolves, and lion prides. Bears hibernating during the winter is also a behavioral adaptation. The various predatory styles observed in fish, such as the lie-in-wait ambush style of scorpionfish and lionfish to the stalking behavior of some shark species are examples of behavioral adaptations.

Animals, and other living things, demonstrate a unique set of adaptations that help them to survive and thrive in their particular habitat. Generally, when an animal is removed from its habitat it will not thrive and could possibly not survive because it is not adapted, or equipped, for the new conditions, or environmental parameters (predators, resources, climate, etc.).

Advance Preparation

- Teacher will need to preview the 360° video and be familiar with the technology used to view and manipulate the video
- Teacher will ensure student devices are preloaded or set to watch the video
- Teacher will review the background information provided
- Collect materials needed for students to create the animal models, including but not limited to:
 - Construction paper
 - Crayons/colored pencils/markers/paint
 - Glue and/or tape
 - Recycled materials (e.g. scrap paper, bottles, caps, empty tissue boxes, tissue paper tubes, newspaper, pipe cleaner, wire, empty boxes, etc.)
- Access to student notebooks

Potential Misconceptions

- Animals that live on land can also live in the water, and vice versa
- An animal's adaptations will help it to survive in any habitat

Before Viewing

Discussion Question(s):

What are adaptations?

What adaptations do you have that make it possible for you to play your favorite game?

What adaptations do birds have that are different from the adaptations a dog or cat have?

Student Activity: *(Access student prior knowledge and build background knowledge.)*

During the discussion, identify and write the class definition of adaptations on the board and request that students record it in their notebooks.

During the discussion have students record, in their notebooks, either the adaptations that make it possible for them to engage in their favorite game or the adaptations birds have that are different from a dog or a cat.

While Viewing

Discussion Question(s):

What type of animals are you observing?

What sort of adaptations do those animals have?

How are those adaptations different from a bird, or a dog?

Student Activity: *(How are students engaged? How are students recording their observations and processing what they are learning?)*

As students view the 360° video, have them record their observations in their notebooks regarding the different animals and adaptations they observed.

After Viewing

Discussion Question(s):

How are the animals you observed in the video different from animals that live on land?

Student Activity: *(How are students synthesizing and analyzing what they learned from the activity/video?)*

Students should now use the materials at their disposal to create two models, one of a creature that can survive in the ocean and one of a creature that can survive on land. Each of their models should include specific adaptations that promote survival in each unique habitat.

When students create their models, thought should also be given to how each organism would obtain the energy (food) it needs to survive in its habitat.

Students should also be able to describe the adaptations each of their creatures have to survive in the ocean or on land.

Examples:

An animal that can survive in the ocean should have appendages that aide in locomotion through water, such as fins, flippers, or webbed feet. Alternatively, the appendages would have to be very strong to make it possible for the creature to walk through the water along the ocean floor.

Organisms living in the ocean would need to have special breathing apparatus such as gills, or a protected air exchange system that prevents water from entering the lungs (similar to that of whales and seals whose blowhole and nose openings close shut to prevent water from entering.)

An animal that can survive on land would need sturdy appendages that help it get around on a solid surface, or through the air. The breathing apparatus of terrestrial organisms would not need to compensate for being submerging in water.

Extension Ideas

- Students can create a story describing the day in the life of each of their creatures, including where the animals sleep, how they find food and water, and how they escape predators in their habitat.
- Students can work together as a whole class to create a taxonomic classification system for their organisms, similar to a dichotomous key.