

# 3-5 Adaptations Activity

## Overview

### Focus Questions

How do adaptations help animals and plants to survive in their habitats?

### Activity Synopsis

Students will compare household objects to the adaptations of animals to determine how animals and plants survive in their habitats.

### Time Frame

Two 45 minute sessions

### Objectives

The learner will be able to:

- Define the term adaptation and explain how adaptations help plants and animals to survive
- Identify adaptations of animals and plants from pictures and explain how the adaptations help each plant and animal to survive

### Student Key Terms

- adaptation
- community
- simile

### Teacher Key Terms

- niche

## Standards

### *South Carolina College- and Career-Ready Science Standards 2021*

**3<sup>rd</sup> Grade:** 3-LS3-1, 3-LS3-2, 3-LS4-2, **3-LS4-3**

**4<sup>th</sup> Grade:** **4-LS1-1**

**5<sup>th</sup> Grade:** 5-LS1-1

\* **Bold standards are the main standards addressed in this activity**

### Third Grade Performance Expectations

3-LS3-1 Analyze and interpret data to provide evidence that plants and animals have inherited traits that vary within a group of similar organisms.

3-LS3-2 Use evidence to support the explanation that traits can be influenced by the environment.

3-LS4-2 Use evidence to construct an explanation for how the variations in traits among individuals of the same species may provide advantages in surviving and producing offspring.

**3-LS4-3** Construct an argument with evidence that in a particular habitat some organisms can thrive, struggle to survive, or fail to survive.

### Fourth Grade Performance Expectations

**4-LS1-1** Construct an argument that plants and animals have internal and external structures that function together in a system to support survival, growth, behavior, and reproduction.

### Fifth Grade Performance Expectations

5-LS1-1 Support an argument with evidence that plants obtain materials they need for growth mainly from air and water.

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## Cross Curricular Standards

### **South Carolina College and Career Standards for ELA**

Inquiry (I) – 3-1.1, 3-2.1, 3-3.1, 3-3.2, 3-4.1, 3-4.2, 3-4.3, 3-5.1, 3-5.2, 3-5.3, 4-1.1, 4-2.1, 4-3.1, 4-3.2, 4-4.1, 4-4.2, 4-4.3, 4-5.1, 4-5.2, 4-5.3, 5-1.1, 5-2.1, 5-3.1, 5-3.2, 5-4.1, 5-4.2, 5-4.3, 5-5.1, 5-5.2, 5-5.3

Writing (W) – 3-3.1, 4-3.1, 5-3.1

Communication (C) – 3-1.1, 3-1.2, 3-1.4, 3-1.5, 4-1.1, 4-1.2, 4-1.4, 4-1.5, 5-1.1, 5-1.2, 5-1.4, 5-1.5

### **Common Core ELA Standards**

Reading Informational – 3.1, 3.3

Writing – 3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 4.9, 5.1, 5.2, 5.3, 5.9

Speaking/Listening – 3.1, 4.1, 5.1

### **Common Core Math Standards**

3.MD.3, 4.MD.4, 5.MD.2

## Background

### **Key Points**

*Key Points will give you the main information you should know to teach the activity.*

- **Adaptations** are body parts or behaviors that help a plant or animal to survive in its environment.
- An organism's adaptations determine the organism's role in the **community**; whether it is a carnivore, herbivore or producer; whether it walks, swims or flies; what it can eat and what can eat it and other interactions in the community.
- An animal or plant's adaptations are often designed for a specific environment, and because of this, the animal or plant could not survive outside this environment.

### **Detailed Information**

*Detailed Information gives more in-depth background to increase your own knowledge, in case you want to expand upon the activity or you are asked detailed questions by students.*

The role an animal or plant plays in its **community**, the **niche** it fills, is often determined by the adaptations the organism has.

**Adaptations** are an organism's body parts or behaviors that help it to survive in its environment. By looking at an organism's adaptations, one can determine what an animal eats, where it lives and how it moves around in its environment.

Each type of plant or animal has different structural adaptations that serve different functions. Blue crabs have claws that aid in defense and in the acquisition of food. Octopuses have pigment-filled cells that can contract and expand, allowing the animal to be a master of camouflage. Male seahorses have pockets on their bodies in which to brood young. Plants have stems that transport water up from the roots. Such structural adaptations aid in survival and allow plants and animals, like those mentioned above, to respond to life needs. Likewise, plants and animals have behavioral adaptations that help them to survive in their environment. Plants bend towards sunlight to efficiently capture the energy from the sun. Hermit crabs quickly retreat to the confines of their shell if a shadow passes overhead.

The adaptations of individual plants and animals are suited to the environments in which they live. Fish have fins that propel them through water. Birds have feathered wings that enable flight in air. Clues to the environments in which plants and animals live are often provided through close observation of an organism's body parts and body design. Take, for example, the beachside plant, the sea rocket. This plant has succulent, thick, fleshy leaves that help the plant to conserve water. The leaves of the plant are silvery to reflect harsh sunlight and have a waxy covering that protects the plant from salt spray. On the other hand, the leaves of deciduous trees located in less harsh environments (than the beach dune environment of the sea rocket) are thin and broad and lack the succulent, waxy nature of those of the coastal sea rocket; deciduous trees are not found in the harsh, beach dune environment and, therefore, do not need added protection from excessive sunlight or salt spray. Consider the delicate body of a jellyfish. Would you expect to find this animal in rushing currents, amongst a rocky reef or moving around on land? The delicate, watery body of the jelly

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is designed for life in the open ocean, where buoyancy is crucial and boundaries do not exist. Jellies, as members of the plankton community, are at the mercy of the currents. Those that are pushed close to inshore beaches often meet their death where waves and sandy beaches meet; they are not adapted to survive in the immediate near shore environment.

Animals that live both in water and on land have adaptations that help them to survive in both environments. The life cycle of amphibians clearly demonstrates the link between adaptations and their function(s). Baby frogs, or tadpoles, are strictly aquatic and quick observation easily reveals adaptations for life in an aquatic world: a "fish-like" tail fin and lack of limbs. However, as tadpoles morph into their adult form, their adaptations become suited to terrestrial life: four limbs and lack of a "fish-like" tail fin. Some animals, like the green sea turtle, have lives tied to land only for reproduction and the adaptations of the animal reflect a primarily aquatic life. Female green sea turtles lumber their huge bodies across a stretch of sandy beach to lay their eggs. The huge size makes movement on land quite laborious. However, in water the huge size is an advantage to not becoming a meal. The presence of four limbs enables movement on land. However, the flipper-like appendages are far more efficient in a watery world.

Individuals in a population of any species vary in many traits that are inherited from their parents. Since members of a species have the potential to produce far more offspring, or young, than the environment can possibly support with space, food, water and other resources, a constant struggle for existence among the varied members of a population is inevitable. Charles Darwin calculated that in just 750 years a single pair of elephants would have 19 million living descendants, provided that every descendent along the way lived to be 100 years old and had just six surviving offspring. But elephants and most other populations remain stable because most of the young animals generated by a species die without reproducing. The "winners" of this constant struggle for existence are those individuals with adaptations best suited to the local environment. Adaptations are body part or behaviors that help an organism to survive in its environment. Because of their special, inherited traits, some individuals are likely to be better able to avoid predators, to find food or mates or to deal with climatic pressures. These individuals will tend to survive longer and leave more offspring than others in their species that have different and less successful adaptations.

So, take time to look closely at the plants and animals in the world around you. Encourage your students to do the same. Your observations will reveal an entire world full of adaptations in action!

## Procedures

### **Materials**

We have included several examples of household items that can be used to represent adaptations of living things. After each listed item we have included ideas for specific adaptations that each item may represent. We are sure that you can think of many other ways these household items, and others, can be used to represent specific adaptations.

- Tongs (to represent a body part that pinches, i.e. crab claws or pincers)
- Tweezers (to represent a body part that grasps tiny objects, i.e. birds with finely pointed beaks)
- Scuba fins (to represent a body part that assists in movement in water, i.e. the webbed feet of river otters, turtles, alligators and many aquatic birds)
- Large-toothed hair clip (to represent a body part that snaps shut or is filled with teeth, i.e. the jaws of an alligator or gar)
- Clothes pin (to represent a body part that grasps objects, i.e. birds with beaks)
- Hard hat (to represent a body part that provides a protective covering, i.e. the shells of turtles, the exoskeletons of crabs and insects, the shells of snails)
- Bicycle helmet (to represent a body part that provides a protective covering, i.e. the shells of turtles, the exoskeletons of crabs and insects, the shells of snails)
- Piece of leather (to represent a body part that provides a protective covering, i.e. thick shark skin)
- Bathroom plunger (to represent a body part that attaches to something by suction, i.e. the suction cups on an octopus' arm and the tube feet on sea urchins, sea stars and sea cucumbers)
- Piece of shower mat (to represent a body part that attaches to something by suction, i.e. the suction cups on an octopus' arm and the tube feet on sea urchins, sea stars and sea cucumbers)

### **Other Materials**

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- Plastic bags or storage containers (1 per 5 students)
- Species sheets (if needed)
  - [American Alligator](#)
  - [Green Sea Turtle](#)
  - [Striped Hermit Crab](#)
  - [Southern Flounder](#)
  - [Great Blue Heron](#)
  - [Purple Sea Urchin](#)
  - [Longnose Gar](#)
  - [Spider-Lily](#)
- [Adaptation Observation Record](#)

## Procedure

### Part 1

1. Ask students how they prepare for a day at the beach, cold weather, or eating pizza. Do they wear winter coats to the beach, shorts during cold weather or eat with their toes? Discuss responses and explain that students adapt to their environment.
2. Ask a student to wear a coat that you have in the classroom. Discuss how it is used for protection/survival. Introduce the term adaptation and explain how organisms have adaptations that aid in survival.
3. Show the class one household item and ask the students, "What does this item do?" and "How is this item useful to the people living in your home?". Record their responses on the board.
4. Ask students if they can think of an animal or plant body part (an adaptation) that is used to do something similar to that of the household item. Encourage students to use similes during this activity. They often help students to link a new concept to something that they already know or to something familiar. A few examples are provided below:
  - The suction cups on the tube feet of sea urchins are like a bathroom plunger. Both things use suction to grab hold of other things.
  - The fur on a river otter is like a winter coat. Both things are used for warmth.
  - The shell of a turtle is like a hard hat. Both things are used to protect something soft underneath.
5. Divide the class into groups of five. Give each group a plastic bag/storage container containing five different household items.
6. Explain that students should decide how the items are useful to humans and record their ideas. They should discuss their ideas as a group.
7. Next, students should discuss how the household items can be compared to adaptations used by animals or plants. Students should use similes to relate each household item to a plant or animal adaptation. Students should record their similes. Discuss the responses.

### Part 2

1. Review the term adaptation. Show the students an item that hasn't yet been discussed. Ask them to explain how the object depicts an adaptation in an animal or plant.
2. Divide students into teams of five. Give each group of students an Adaptations Observation Record. Have the students look at the pictures and decide what adaptation(s) each animal or plant has. They should record their observations on their worksheets.
3. Next, discuss the habitat of several of the organisms. Ask students to explain how the adaptations allow it to live in its habitat.
4. Species sheets of each animal on the Adaptations Observation Record are available if needed.

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## At-home learning and virtual modifications

**At-home learning:** Send this nearpod link to students for an interactive lesson about adaptations. It will cover physical adaptations (body parts), behavioral adaptations (behaviors/actions) and ask them to compare everyday items to plant and animal adaptations. When you are back together in person or virtually, ask them to tell you how the lesson went and what they learned.

### [Adaptations link without student interaction](#)

If you would like to see the results of their nearpod activities, you can set it up as a Student-Paced activity following these directions.

1. Create a free nearpod account (<https://nearpod.com/>)
2. Ask Aquarium to send you the Adaptation nearpod link (email [education@scaquarium.org](mailto:education@scaquarium.org))
3. After you receive Aquarium link, add lesson to your nearpod activities by clicking "Add to My Library"
4. Send to students using Student-Paced option
5. You'll be able to see their answers and interactions

**Virtual:** Explain to students that an adaptation is a body part (physical adaptation) or behavior (behavioral adaptation) that helps an organism to survive. Survival means getting food, not becoming food and protecting themselves. Ask if they can think of a body part or behavior they have that helps them to survive. Go through 2-3 examples to make sure they understand. Now, have students find one item (non-living) in their house and bring it to the camera. Have them think about what the item is used for. Then have them think of an animal or plant with an adaptation that is similar. For example, they could bring a bottle of glue and the animal adaptation could be a tree frog's sticky feet that helps them stick to trees. Give each student the chance to share their item and adaptation.

## Assessment

### Assessment #1:

Introduce students to one of South Carolina's ocean inhabitants, the porcupinefish, by giving them each a Porcupinefish Adaptation Story Worksheet (2 versions: [solid lines](#) for older students, [writing guide](#) for younger students). Ask each student to look closely at the animal pictured. Have students write a creative paragraph about the porcupinefish that includes the following:

1. A description of three adaptations they think the porcupinefish might have based on their observation of the animal (10 point per adaptation; 30 points total); credit all rational observations.
2. A description of how they think each adaptation helps the porcupinefish to survive in the ocean (20 point per description; 60 points total); Teachers should credit all descriptions even if the explanation of the function of the adaptation is not biologically correct; the goal of this assessment is to determine if students can observe an animal, look at its body parts and come up with a possible guess as to how those body parts might help an animal to survive and not whether or not the guess is accurate.
3. Encourage creative writing for the format (10 points total).

### Scoring Rubric out of 100 points

Clearly states 3 adaptations (10 points per adaptation): 30 points

Describes how adaptation helps for survival (20 points per description): 60 points

Uses imagination and creativity while providing descriptions in complete sentences: 10 points

An example of a paragraph that would receive the full points appears below.

*This is a story about Spike, the porcupinefish. Spike has a small mouth that helps him to eat little jellyfish in the ocean. Spike loves to eat jellyfish! He has to swim around in the water to catch his food and Spike uses his fins to move. Spike is called Spike because his mother likes the name Spike and because he has pointy things all over his body. Spike uses his pointy things to scare other fish away so that they won't eat him.*

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Note that porcupinefish do have small mouths, but they use them to eat snails, crabs and shrimp, not jellyfish. However, the student who wrote the paragraph above received full credit. Use the [Porcupinefish Species Sheet](#) if you need to brush up on your porcupinefish details.

## Assessment #2:

Have students complete the [Adaptations Quiz](#)

*Scoring rubric out of 100 points*

10 points for each correctly answered question ([Adaptations Quiz Answer Key](#))

## Cross Curricular Extensions

### **STEAM Extension**

Have students design their own make-believe animal choosing adaptations to help it survive. Students can then create the animal out of recycled materials and art supplies.

### **STEAM Extension**

Have students pick a habitat in South Carolina (saltmarsh, pond, ocean, swamp) and then have each students create an animal or plant from that habitat out of different items available (pipe cleaners, masking tape, popsicle sticks, egg cartons, clay, fabric, construction paper, markers, etc.). Put all the organisms together to create a habitat community in the classroom.

### **Language Arts Extension**

Students should write a narrative story from an animal or plant's point of view. A day in the life of a \_\_\_\_\_. Your animal or plant wants to survive in their habitat. Adaptations are body parts or behaviors that help a plant or animal to survive in its environment. Describe how an organism's adaptations determine its role in its community. Create characters, dialogue, description, and a sequence of events to tell the story of your animal or plant.

Write a story that includes 3 of the 5 concepts:

- How your organism gets energy (carnivore, herbivore, or producer) and what adaptations help it get food?
- How your organism moves (walks, swims, flies) and what adaptations help it with movement?
- What behaviors help your organisms survive (hibernation, migration, climbing)?
- How your organism protects itself (spikes, shells, claws, teeth)?
- How your organism interacts with other organisms in its community?

### **Math Extension**

Have students create math problems about animals using their adaptations. Trade with a partner. Solve problems and have students orally explain how they solved the math problem to the author of the math problem. The problem creator can check the answers and explain how they solved the problem. See if students solved the problem the same way or used different strategies.

Math Problem Examples:

- Scientists are tracking a 14-foot Great White Shark along the Atlantic Coast to learn more about the migration patterns of sharks. If the shark travels 390 miles in January and traveled the same distance every day, how far did the shark travel per day?
- A male fiddler crab waves his big claw to attract a mate and to defend his territory. One fiddler crab waves his claw 15 times every minute. If he waves his claw for 30 minutes, how many times did he wave his claw?
- A black skimmer is a shorebird that migrates south for winter. If it travels 2,000 miles during its whole migration. How much of the migration has it completed, if it has traveled 500 miles?

### **Language Arts Extension**

Have students create a picture of an animal and label physical adaptations. Then have students take away an adaptation and discuss how it would impact that animal. Have students write an opinion piece on if the animal should be returned to the wild or raised in captivity. What would be to the best interest of the animal? Students should state their opinion, provide reasons, supporting facts, and a conclusion.

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## Art Extension

Have students create imaginary physical adaptations that they can add to the animal and discuss how it would help the animal.

Examples:

- A giraffe with wings. (The giraffe could fly to reach leaves higher on the tree and would be able to survive with a shorter neck).
- Fish with an elephant trunk. (The fish may use this new trunk to aid in its search for food on the bottom of a lake or ocean).

## Resources

### Teacher Reference Books

Godfrey, Michael A. Field Guide to the Piedmont, The University of North Carolina Press, Chapel Hill, NC, 1997.

*A look at the characteristics and wildlife communities of the Piedmont region that stretches from New York through South Carolina to Alabama.*

Kovacik, Charles F. and John J. Winberry. South Carolina: The Making of a Landscape, University of South Carolina Press, Columbia, 1987.

*Information on the geology, ecology and cultural history of the different landforms and regions of South Carolina.*

Martof, Bernard S. et. al. Amphibians and Reptiles of the Carolinas and Virginia. University of North Carolina Press, Chapel Hill, 1980.  
*A content-rich field guide to the reptiles and amphibians of South and North Carolina and Virginia.*

Meyer, Peter. Nature Guide to the Carolina Coast, Avian-Cetacean Press, Wilmington, NC, 1998.

*An informative look at the characteristics and wildlife of the Coast and Ocean regions of South and North Carolina.*

Rhodes, Fred C et. al. Freshwater Water Fishes of the Carolinas, Virginia, Maryland and Delaware. University of North Carolina Press, Chapel Hill, 1994.

*A content-rich field guide to the fresh water fishes of South Carolina, North Carolina, Virginia, Maryland and Delaware.*

Ruppert, Edward E. and Richard S. Fox. Seashore Animals of the Southeast. University of South Carolina Press, Columbia, 1988.

*A content-rich field guide for the identification of shallow-water invertebrate animals of the Atlantic coast of the southeastern United States.*

South Carolina Wildlife magazine, published by the South Carolina Department of Natural Resources.

*This award winning magazine regularly features articles and photography on the habitats and wildlife of all of the regions of South Carolina.*

Teal, John and Mildred. Life and Death of the Salt Marsh, Ballantine Books, New York, 1969.

*An in-depth look at the characteristics and organisms found in the salt marshes of the Coast region.*

### Teacher Reference Websites

Eisenhower National Clearinghouse

<http://www.enc.org/>

This website is sponsored by the United States Department of Education. An entire section is dedicated to lesson plans and activities for teachers.

Frank Potter's Science Gems

<http://www.sciencegems.com>

A plethora of science resources can be accessed at this terrific site. Under the Life Science 2 heading, teachers can access the "Ecology", "Biology of Plants" and the "Biology of Animals" sections. All sections contain a wide variety of information, resources, and lesson plans related to ecology, plants and animals.

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South Carolina Department of Natural Resources (SCDNR)

<http://www.dnr.sc.gov/>

Information on the wildlife and geology of all of South Carolina.

## Student Reference Books

Eyewitness Books: Pond & River. Alfred A. Knopf, Inc, New York, 1988.

*This book uses photographs, illustrations and text to teach the reader about the plants and animals that make freshwater habitats their home.*

Eyewitness Books: Ocean. Alfred A. Knopf, Inc, New York, 1995.

*This book uses photographs, illustrations and text to teach the reader about the plants and animals that make ocean habitats their home.*

Eyewitness Books: Amphibian. Clarke, Barry and George Brightling. Dorling Kindersley, Inc. New York, 2000. ISBN 0789457547.

*This book uses photographs, illustrations and text to teach the reader about amphibians.*

Eyewitness Books: Bird. Burnie, David and Kim Taylor. Dorling Kindersley, Inc. New York, 2000. ISBN 0789458004

*This book uses photographs, illustrations and text to teach the reader about birds.*

Eyewitness Books: Butterfly and Moth. Whalley, Paul and Kim Taylor. Dorling Kindersley, Inc. New York, 2000. ISBN 0789458322.

*This book uses photographs, illustrations and text to teach the reader about butterflies and moths.*

Eyewitness Books: Fish. Parker, Steve and Dave King. Dorling Kindersley, Inc. New York, 2000. ISBN 0789458101.

*This book uses photographs, illustrations and text to teach the reader about fish.*

Eyewitness Books: Reptile. McCarthy, Colin and Colin Keates. Dorling Kindersley, Inc. New York, 2000. ISBN 0789457865.

*This book uses photographs, illustrations and text to teach the reader about reptiles.*

Eyewitness Books: Sharks. MacQuitty, Miranda and Dave King. Dorling Kindersley, Inc. New York, 2000. ISBN 0789457784.

*This book uses photographs, illustrations and text to teach the reader about sharks.*

Eyewitness Books: Insects. Mound, Laurence et. al. Dorling Kindersley, Inc. New York, 2000. ISBN 0789458160.

*This book uses photographs, illustrations and text to teach the reader about insects.*

Eyewitness Books: Tree. Burnie, David and Peter Chadwick. Dorling Kindersley, Inc. New York, 2000. ISBN 0789458209.

*This book uses photographs, illustrations and text to teach the reader about trees.*

Matthews, Downs. Wetlands, Simon & Schuster Books, New York, 1994.

*This book describes different types of wetlands and the plants and animals found there.*

## Student Fiction Books

Cannon, Janell. Stellaluna. Harcourt Brace and Company, New York, 1993.

*This book describes the frustrations and discoveries of a bat raised to behave like a bird. The author provides notes on the natural history and adaptations of bats.*

## Curricula

Aquatic Project WILD

<http://www.projectwild.org/ProjectWILDK-12AquaticcurriculumandActivityGuide.htm>

Project WILD

<http://www.projectwild.org/>