

Animal Adaptations

EDUCATION STANDARDS

1.5

3.4

4.2

5.1

LS.7

BIO.6

OVERVIEW & PURPOSE

Driving Question: What physical and behavioral adaptations do animals have and how do those adaptations serve as survival strategies?

Students will explore different animal adaptations and how they help animals survive by:

- Part 1: Look at physical characteristics of different animals and how they help that specific animal to survive.
- Part 2: Look at animal behavior (instinct and learned) that help animals survive and thrive.
- Part 3: Students develop projects that help dive deeper into animal adaptations.

OBJECTIVES

- Provide students with inquiry-based learning opportunities.
- Use 21st Century scientific skills and processes to safely investigate the natural world.
- Help students become familiar with primary and secondary research sources, conduct experiments and collect data.
- Engage students through project-based learning and STEM where applicable.

ESTIMATED TIME

PART ONE

Approximately 45 minutes as written, but additional time can be spent with large or small group discussions. This lesson plan is compatible with a virtual learning model.

PART TWO

Approximately 45 minutes as written, but additional time can be spent with large or small group discussions. This lesson plan is compatible with a virtual learning model.

PART THREE

This project should take place over several class periods or virtual learning days. Virtual project options are available in the project choice boards.

MATERIALS NEEDED

PART ONE

- Create a Google folder for your class to use.
- Student Page 1 — Each student should have access to this page in order to complete the activities and links to supplemental resources. Younger students may need assistance with reading the directions or completing the activities.
- Curiosity Cultivation — Copy the PowerPoint slides into your folder and duplicate the 2nd slide (one for each student). **This will keep your students' work private.**
- You can watch the Part 1 video with your students or instruct them to view separately. The video will introduce students to different physical adaptations and how those adaptations help animals survive.
 - Creature Features (Grade 1)
 - Physical/Structural Adaptations (Grades 3-5)
- Animal videos — Students can watch all of the animal videos below to understand specific physical adaptations for a specific animal.
 - Barn owl (bird of prey); Bison (primary consumer); American Alligator (predator); Amphibians (predator); Atlantic Sturgeon; Insects – videos of mealworm, bess beetle, and Madagascar hissing cockroach (decomposers); Channel Whelk
- Mimicry game — this game will help students see how butterfly species have developed similar appearance to a poisonous butterfly to help it survive. The player is a bird and will come to learn which butterflies they can eat and which ones they cannot. This also helps them to understand learned behavior as a predator.
- Camouflage Hide and Seek — this activity will help students to create camouflaged shapes. Once they complete the activity, they can share a picture or video within your class' google folder to see if their classmates can find the hidden shape(s).
- Animal Classification based on physical characteristics
 - Vertebrate Artifacts 360 — In a museum style set up, students can explore the 5 vertebrate animal groups.
 - Invertebrates — This Happy Learning educational video for kids is 5:25 in length on YouTube and explores the classification of the 6 invertebrate groups.

Animal Adaptations

MATERIALS NEEDED CONTINUED

PART TWO

- [Student Page 2](#) — Each student should have access to this page in order to complete the activities and links to supplemental resources.
- [Behavior Adaptation Video](#)
- [Animal Behavior Study](#) — The Animal Behavior Study allows students to write down observations of an animal they see and identify what the behavior is and how it helps the animal. The behavior study focuses on movement, social interactions, resting, eating/drinking and communication. This could be a fun family activity. Younger students may need assistance in recording the animal's behavior. Remember to follow the [Leave NO Trace](#) principles for outdoor ethics.
- Migration — [Canada Goose Choose Your Own Adventure](#)
- [Bird Cast](#) — migratory forecasts
- Instinct vs. Learned behavior — [box turtle training video](#) and [mimicry game](#)
- [Hibernation](#) — This link takes you to the online Discover Wildlife page, “What is hibernation?”. This resource looks at different types of energy conservation strategies including hibernation, aestivation, torpor and denning.

PART THREE

- [Student Page 3](#) — Using the resources or observation data from activities and resources in Part 1 and 2, students will create a product showcasing their understanding of physical and behavioral adaptations for an animal of their choice in this project based learning opportunity.
- [Guiding Questions](#) for students to use in the project type of their choice.
- [Project Choice Board](#) (Grade 1) or [Project Choice Board](#) (Grades 3-5, LS and BIO)

Animal Adaptations

GUIDING QUESTIONS

These questions will help guide you in creating your project. You can use a variety of resources to research an animal of your choice. Make sure to cite your sources for information, photographs/illustrations and videos.

- What is the animal that I have observed (in-person or video)?
- Where does this animal live?
- What are three physical adaptations for the animal you chose?
- In what ways do these physical adaptations help the animal survive and/or thrive?
- What behavioral adaptations does this animal do to help it survive and/or thrive?
- What other animals have similar adaptations?
- What adaptations are different but might help an animal in a similar way?
- Are there any adaptations that the animal has, but doesn't use for the intended purpose? (example, flightless birds)
- What are three fun facts about your animal?

DEEPER DIVE

Predator/Prey — What adaptations do each of them have that counter the other's? For example: American kestrel and voles; voles hide in burrows, but run from one entrance to another eliminating urine; kestrels can see ultraviolet light which the urine trails reflect.

- Think about herbivores and plants too and the counter adaptations.

Are there color, size or pattern differences within a species?

- Males and females
- Juveniles and adults
- Individuals living in different regions

Reproduction strategies:

- Mammals: Marsupials, Placental and Monotremes — Compare the advantages and disadvantages of these strategies.
- r species vs. k species — Compare how much time do parents invest in their offspring. What are the advantages or disadvantages to each strategy?

Animal Adaptations

PROJECT CHOICE BOARD: GRADES 3, 4, LS AND BIO

WILDLIFE EXPERT OUTREACH

Natural history museums, zoos, aquariums and nature centers often provide outreach programs to classes. Pretend you are a wildlife educator and create a PowerPoint presentation about an animal. Use graphics and cite pictures and videos to enhance your presentation.

CREATE A "DAY IN THE LIFE OF..."

As a junior wildlife education specialist, you could create a written story about the animal you observed. This story can be a poem, short story, a journal entry, a digital story or whatever you want to create to share what you learned about the animal you observed and their physical and behavioral adaptations.

INTERVIEW OR FILM CLIP

Museums often use videos to enhance their collections or displays. Create a film about an animal answering the assigned questions. This can be in "interview" format. You can be the expert or you can reach out to a professional wildlife expert.

National Geographic or other wildlife films showcase animals and are a great way to show physical and behavioral adaptations in action. You can create your own wildlife mini-film (5-7 minutes long).

VIRTUAL WILDLIFE OR ARTIFACTS EXHIBIT

Wildlife exhibits for live animals often have written information relating important information about an animal to the public. Nature centers often use hands-on objects like skulls, skins, antlers, etc. to help explain adaptations. These can be replicas or actual artifacts. Curate an exhibit using 2-3 animals or objects. Each animal or object should have a label that explains what it is and fun facts about the animal's adaptations. Objects can be collected or made.

Animal Adaptations

PROJECT CHOICE BOARD: GRADE 1

NATURE JOURNALING

Take a notepad and pencil outdoors. Find an insect, snail, pet, bird or other animal to observe. Try to draw whatever animal(s) you find. Make sure to take note of any significant markings and other physical characteristics. You can also take pictures of the animals you find to make a virtual journal.

CRAFTS

Make an animal of your own or follow the instructions for one of these: alligator; Flying squirrel; Spotted snake

WRITE A STORY

Research an animal in Virginia that has an interesting set of defenses. Write a story about an animal using its natural defenses to protect itself in the wild. What challenges does your animal face? What defenses does the animal have? How do the defenses work?

MAKE UP A SONG

Write a song or a rap about animal defenses. Why do animals need them? What kinds of defenses are there? How are they used?

Animal Adaptations

VIRGINIA STANDARDS OF LEARNING CORRELATION

1.5 The student will investigate and understand that animals, including humans, have basic life needs that allow them to survive. Key ideas include:

- a) animals need air, food, water, shelter, and space (habitat);
- b) animals have different physical characteristics that perform specific functions; and
- c) animals can be classified based on a variety of characteristics.

3.4 The student will investigate and understand that adaptations allow organisms to satisfy life needs and respond to the environment. Key ideas include:

- a) populations may adapt over time;
- b) adaptations may be behavioral or physical; and
- c) fossils provide evidence about the types of organisms that lived long ago as well as the nature of their environments.

4.2 The student will investigate and understand that plants and animals have structures that distinguish them from one another and play vital roles in their ability to survive. Key ideas include:

- a) the survival of plants and animals depends on photosynthesis;
- b) plants and animals have different structures and processes for obtaining energy; and
- c) plants and animals have different structures and processes for creating offspring.

5.1 The student will plan and conduct investigations in which

- a) planning and carrying out investigations
 - collaboratively plan and conduct investigations to produce data
 - identify independent variable, dependent variables, and constants
 - determine data that should be collected to answer a testable question
 - take metric measurements using appropriate tools
 - use tools and/or materials to design and/or build a device that solves a specific problem

LS.7 The student will investigate and understand that adaptations support an organism's survival in an ecosystem. Key ideas include:

- a) biotic and abiotic factors define land, marine, and freshwater ecosystems; and
- b) physical and behavioral characteristics enable organisms to survive within a specific ecosystem.

BIO.6 The student will investigate and understand that modern classification systems can be used as organizational tools for scientists in the study of organisms. Key ideas include:

- a) organisms have structural and biochemical similarities and differences;
- b) fossil record interpretation can be used to classify organisms;
- c) developmental stages in different organisms can be used to classify organisms;
- d) Archaea, Bacteria, and Eukarya are domains based on characteristics of organisms;
- e) the functions and processes of protists, fungi, plants, and animals allow for comparisons and differentiation within the Eukarya kingdoms; and
- f) systems of classification are adaptable to new scientific discoveries.

Animal Adaptations

NEWSPRINT CAMOUFLAGE

BACKGROUND

Camouflage, also called protective coloration, is a method of concealing coloration that allows an otherwise visible animal to remain indiscernible from the surrounding environment through deception. This enables the organism to “hide” in plain sight, thus aiding in the survival of the prey (from getting eaten) or predator (allowing sneaking upon prey).

The most common form of camouflage is called cryptic coloration, whereby the animal is similar in color to its surroundings. This is found to some extent in most species. Some examples are the earth tones of rabbits, deer and squirrels to match dirt, brush and trees or the countershading (light bellies and bluish backs) of sharks to blend in when viewed from below or above.

Other forms of camouflage include skin and fur patterns to blend in and break up the outline of the animal’s shape — such as the stripes on zebras and tigers — or disguising itself to resemble something either uninteresting or dangerous — such as the walking stick that looks like a twig or the SpiceBush butterfly that resembles the toxic tasting Pipevine butterfly.

The type of camouflage a species develops depends on the environment in which it lives—what is around it in the habitat (both plants, animals and nonliving components) and what time of year it is the physiology and behavior of the animal—whether it has fur, scales or feathers, can fly or run and whether it is solitary or lives in groups whether or not the animal is a predator or prey, such as if the prey cannot see colors, the predator does not have to blend in by color, only by pattern. An animal will not develop any camouflage that does not help it to survive. Consequently, not all animals have the same form of camouflage. As a means of survival, an animal’s camouflage may be even more effective than its other weapons of teeth, claws, beaks, etc, as being entirely overlooked by a predator is preferable to having to put up a fight.

ACTIVITY: NEWSPAPER SHAPES

MATERIALS

Newspaper Classified Ads

Glue Sticks

Scissors

Gather sheets of newspaper classified ads. All black and white is best. Have students cut out shapes from the newspaper and use a glue stick to place the pieces on a large sheet. Have students send in pictures of their newspaper for you to place into a google slides presentation (one slide per student). Share the google slides file with your students and have them pick one or more student’s picture to try to find the shape. They can comment on how hard or easy it was to find the shape for each of the other students’ pictures.

Animal Adaptations

ANIMAL BEHAVIOR STUDY

WHAT IS BEHAVIOR?

“Behavior is defined as action or reaction under specific circumstances.”

BUT WHAT DOES THAT MEAN?

Imagine that you are watching someone lie down on a bed, close their eyes, and start to breathe very regularly. What behavior might you be watching?

TYPES OF BEHAVIORS

An animal’s behavior can assist an animal to survive and enhance the use of their physical adaptations. In this activity, you will get to observe and record behavior that you see an animal do and think about how that behavior helps the animal.

In studying animal behavior, it is very important to carefully define what it is you are seeing. This is important because a clear definition and description will tell people exactly what you are recording (your data!!!!) in terms of the animals’ behavior.

Although there are many, many kinds of behavior that people can observe, we’re going to look at five specific kinds of behavior.

1. **Movement** (Locomotion): How does the animal move?
2. **Social Interaction**: What does the animal do with the group or a person?
3. **Resting**: What does it mean for the animal to be resting?
4. **Eating/Drinking**
5. **Communication**: Communication behaviors can help animals find mates, establish dominance, defend territory, coordinate group behavior, and care for young; examples include signals, which can include visual; auditory, or sound-based; chemical, involving pheromones; or tactile, touch-based, cues.

Animal Adaptations

ANIMAL OBSERVATION DATA SHEET

WHAT BEHAVIORS DO YOU SEE?

KIND OF ANIMAL: _____

TIME OF DAY: _____

LOCATION: _____

TYPE OF BEHAVIOR 1. MOVEMENT 2. SOCIAL 3. RESTING 4. EATING/DRINKING 5. COMMUNICATION	DESCRIPTION OF BEHAVIOR WHAT IS THE ANIMAL DOING? HOW DOES THIS BEHAVIOR HELP THE ANIMAL SURVIVE?	INSTINCT OR LEARNED DO YOU THINK THIS AN EXAMPLE OF INSTINCT OR LEARNED BEHAVIOR?	BEHAVIOR AND PHYSICAL ADAPTATIONS WHAT PHYSICAL ADAPTATION MIGHT BE ENHANCED THROUGH THE BEHAVIOR YOU ARE OBSERVING?

Animal Adaptations

STUDENT PAGE 1

DRIVING QUESTIONS

What physical and behavioral adaptations do animals have and how do those adaptations serve as survival strategies?

OBJECTIVES

I will explore different physical animal adaptations and how they help animals survive.

MATERIALS NEEDED

Note: Younger students may need assistance with reading the directions or completing the activities.

- Curiosity Cultivation — Your teacher will provide the link to PowerPoint slides.
- You can watch the Part I video with your teacher or your teacher may have you view it on your own. The video will introduce you to different physical adaptations and how those adaptations help animals survive.
 - [Creature Features \(Grade 1\)](#)
 - [Physical/Structural Adaptations \(Grades 3-5\)](#)
- Animal videos — you can watch some or all of the animal videos below to understand specific physical adaptations for a specific animal.
 - [Barn owl](#) (bird of prey)
 - [Bison](#) (primary consumer)
 - [American Alligator](#) (predator)
 - [Frog/Salamander](#) (predator)
 - [Atlantic Sturgeon](#)
 - [Insects](#) — videos of [mealworm](#), [bess beetle](#), and [Madagascar hissing cockroach](#) (decomposers)
 - [Channel Whelk](#)
- [Mimicry game](#) — this game will help you see how butterfly species have developed similar appearance to a poisonous butterfly to help it survive. You, as the player, is a bird and you will come to learn which butterflies you can eat and which ones you cannot. Too many poisonous ones and you might get sick or die. This also helps you to understand learned behavior as a predator.
- [Camouflage Hide and Seek](#) — this activity will help you to create camouflaged shapes. Once they complete the activity, they can share a picture or video within your class' Google folder to see if their classmates can find the hidden shape(s).
- [Animal Classification](#) based on physical characteristics
 - [Vertebrate Artifacts 360](#) — In a museum style set up, you can explore the 5 vertebrate animal groups.
 - [Invertebrates](#) — This Happy Learning educational video for kids is 5:25 in length on YouTube and explores the classification of the 6 invertebrate groups.

ACTIVITY

There are hundreds of adaptations — all of them are fascinating and interesting to explore. In this first lesson, you will get to know different animals and some of the adaptations that help them survive. Have fun exploring and if you find an adaptation that you are interested in, keep exploring.

Once you have explored adaptations and the resources on this page, your teacher will give you access to a google slide in the Curiosity Cultivation activity.

Directions: Go outdoors for a short walk, and see what animals you see — bugs, birds, your pet, etc. Take a photo of one. Insert your photo from your Wonder Walk into one slide.

- **Notice:** What did you notice when you took the photo? What adaptations does the animal have?
- **Wonder:** What are you curious about? Write 1–3 questions. Be specific in your pondering(s) and avoid asking, “why?”
- **Connect:** Can you think of other animals that have any of the same adaptations?

Animal Adaptations

STUDENT PAGE 2

DRIVING QUESTIONS

What physical and behavioral adaptations do animals have and how do those adaptations serve as survival strategies?

OBJECTIVES

I will explore different behavioral animal adaptations and how they help animals survive.

MATERIALS NEEDED

Note: Younger students may need assistance with reading the directions or completing the activities.

- [Behavior Adaptation Video](#)
- [Animal Behavior Study](#) — The Animal Behavior Study allows students to write down observations of an animal they see and identify what the behavior is and how it helps the animal. The behavior study focuses on movement, social interactions, resting, eating/drinking and communication. This could be a fun family activity. Younger students may need assistance in recording the animal's behavior.
- Migration — [Canada Goose Choose Your Own Adventure](#)
- Instinct vs. Learned behavior — [box turtle training video](#) and [mimicry game](#)
- [Hibernation](#) — This link takes you to the online Discover Wildlife page, "What is hibernation?". This resource looks at different types of energy conservation strategies including hibernation, aestivation, torpor and denning.

ACTIVITY

In this lesson, you will explore animal behavior and make connections with the physical adaptations.

- Start by watching the Behavior Adaptation video.
- Print or copy the Animal Behavior Study and follow the directions to record your observations.
- There are additional resources that you can explore to learn about other behavioral adaptations.
- You can use the information you collected from the Animal Behavior Study in the final part of the lesson. Remember, this is just an introduction to all of the behaviors animals might exhibit. If one of these behaviors interests you, continue to learn more.

Animal Adaptations

STUDENT PAGE 3

DRIVING QUESTIONS

What physical and behavioral adaptations do animals have and how do those adaptations serve as survival strategies?

OBJECTIVES

I will explore different behavioral animal adaptations and how they help animals survive.

MATERIALS NEEDED

- [Guiding Questions](#) for students to use in the project type of their choice.
- [Project Choice Board](#) — Grade 1 and [Project Choice Board](#) — Grades 3-5, LS and BIO

ACTIVITY

Using the resources or observation data from activities and resources in Part 1 (and 2), you will create a product showcasing your understanding and research of physical and behavioral adaptations for an animal of your choice in this project based learning opportunity.

You can flip the above activity so you pick an adaptation and give examples of animals that all have that adaptation or exhibit a similar behavior. For example, you may want to explore night vision or other adaptation for moving around in the dark in nocturnal animals.

Let your interest in this topic guide you.