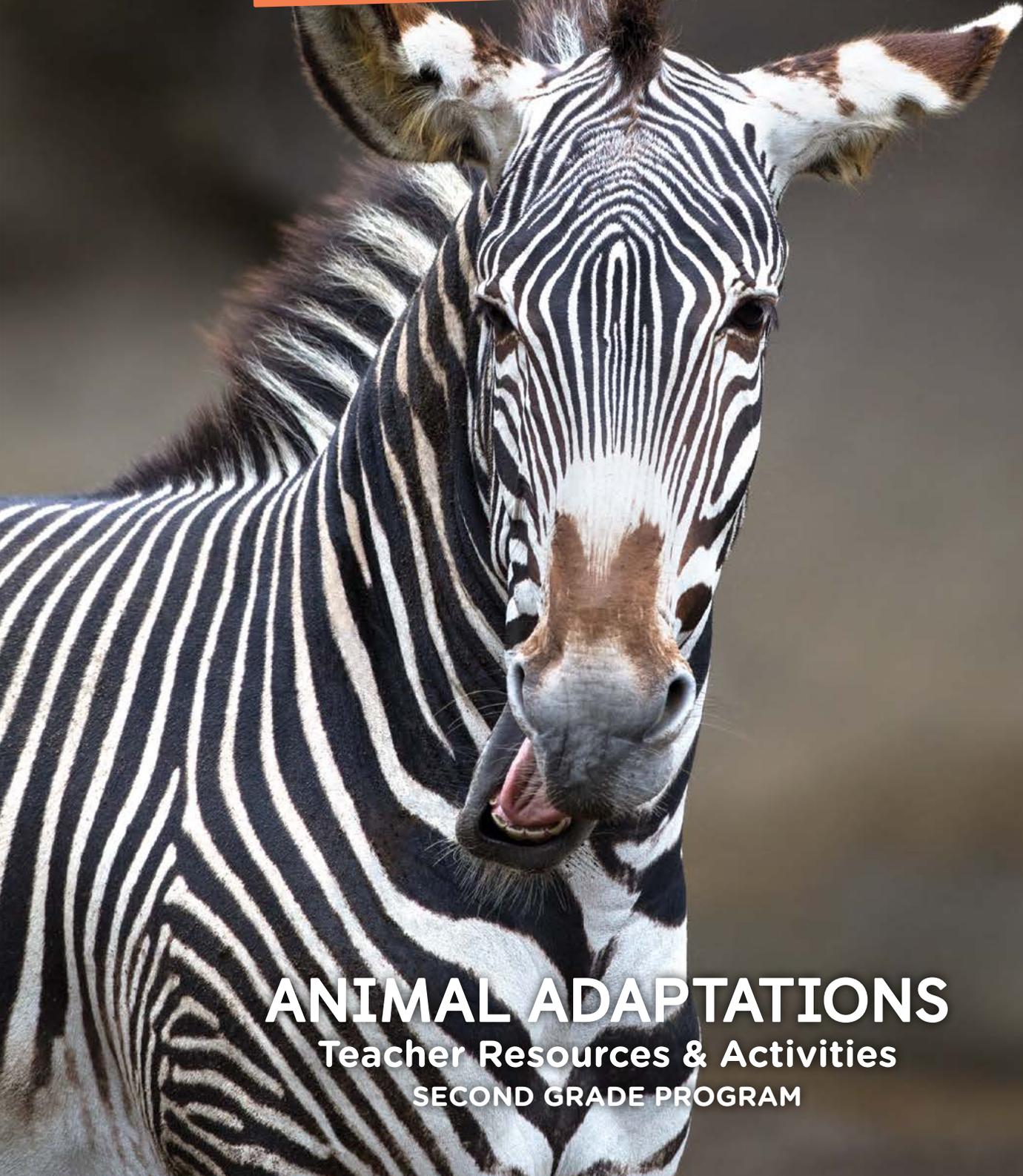


WILDLIFE EXPLORERS

· B A S E C A M P ·



ANIMAL ADAPTATIONS
Teacher Resources & Activities
SECOND GRADE PROGRAM

Standards Overview



WHAT IS THE CONNECTION BETWEEN ADAPTATIONS AND HABITATS?

Everything living on land and in water has physical or behavioral adaptations that help it survive in its habitat. In order to survive, a living thing must gather enough food or energy for growth, protect itself from harm, and reproduce. Special adaptations designed for a specific habitat help each animal or plant meet these goals. Adaptations vary; wildlife might hide using camouflage, display warning signals, use well-developed senses or body parts, or show defensive weapons and behaviors. Some plant adaptations can even help establish new habitats through seed dispersal. Throughout the activities in Adaptation Connections, you and your students will look at a variety of wildlife adaptations and how they are connected to different habitats around the world.

The materials contained in this packet have been specifically designed to prepare your students for their visit to the Zoo, and to reinforce key concepts when you return to the classroom. These materials align with the second-grade standards referenced here.



NEXT GENERATION SCIENCE STANDARDS FOR CALIFORNIA PUBLIC SCHOOLS

Students are expected to demonstrate grade-appropriate proficiency in developing and using models: analyzing and interpreting data; constructing explanations and designing solutions; and obtaining, evaluating, and communicating information. Activities in Adaptation Connections correlate with the following performance expectations:

- Develop a simple model that mimics the function of wildlife in dispersing seeds or pollinating plants. (2-LS2-2)
- Make observations of wildlife to compare the diversity of life in different habitats. (2-LS4-1)
- Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)
- Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. (K-2-ETS1-2)



COMMON CORE STATE STANDARDS FOR CALIFORNIA PUBLIC SCHOOLS

To build a foundation for college and career readiness, students must read widely and deeply from a broad range of high-quality, increasingly challenging literary and informational texts. By reading texts in history/social studies, science, and other disciplines, students build a foundation of knowledge in those fields that will also give them the background to be better readers in all content areas. Activities in Adaptation Connections correlate with the following standards:

- Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (RI.2.3)
- Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section. (W.2.1)
- Participate in shared research and writing projects. (W.2.7)
- Recall information from experiences or gather information from provided sources to answer a question. (W.2.8)
- Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. (SL.2.2)
- Draw a picture graph or bar graph to represent a data set. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (2.MD.D.10)

Everyone Needs a Place to Grow



OBJECTIVE

Students learn that living things need food, water, shelter, and space to survive.

INTRODUCTION

All wildlife require someplace to live. This place is called a habitat. Like people, wildlife have requirements for their home. A habitat must provide:

- shelter from weather and predators
- food and water for nourishment
- space to obtain food and water, and to attract a mate.

What does it mean to thrive? It means not only surviving and living to see the next day, but also growing to adulthood and reproducing. It's important for one individual to thrive, but it's critical that a species thrives. That requires the right habitat so wildlife can reproduce and raise babies.

MATERIALS

- Post-it notes
- Blank paper
- Pencils
- Everyone Needs a Place to Grow activity sheet, one for each student
- Whiteboard

ACTIVITY

A. Kids and Pets — Wants and Needs

1. Distribute a sheet of blank paper to each student. Invite them to write four things they **NEED**.
2. Call on students to share their needs with the class. You may record these responses on a whiteboard.

Discuss the differences between needs and wants.

Need—something you have to have to survive

Want—something you would like to have, but can survive without

3. Distribute the activity sheet and ask students to answer the same question after discussing the difference between a need and a want.
4. Next, have students choose a pet from the choices on the activity sheet, and have them complete the wants and needs for their pet.
5. While students complete their activity sheets, create a T-chart on the whiteboard.

6. Open the activity to the class. Ask students to call out their answers and write them on the T-chart. Use the following discussion points to facilitate communication.

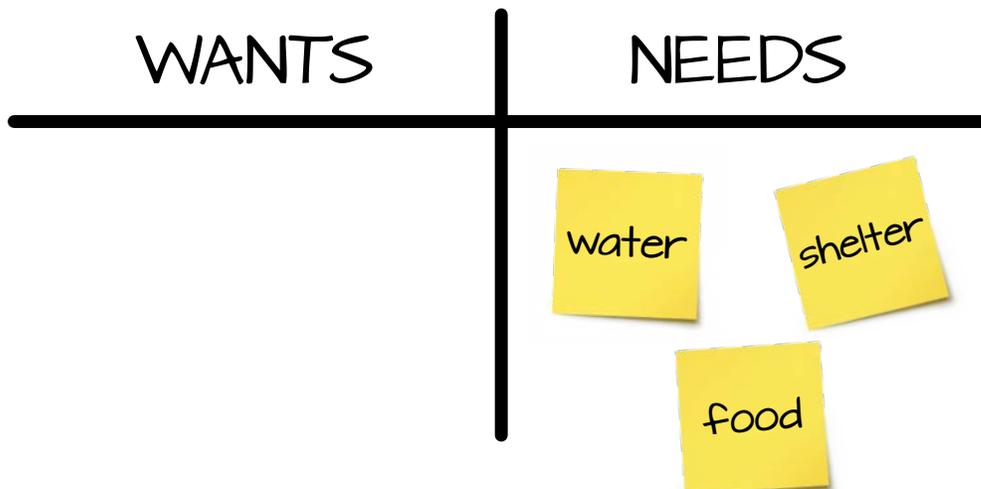
Discussion Points

- Are the needs of life easy to get?
- Do people in other parts of the world get their needs met in the same way as people in the United States?
- What happens to people who can't get what they need?
- Do you think animal needs are easy for wildlife to get?
- What would happen to a pet if people did not provide what it needed to survive?

B. Wildlife—Wants and Needs

1. Distribute post-it notes and ask students to write a want or a need for a wild animal on the paper.
2. While students are writing, create another T-chart on the whiteboard.
3. Invite students to come forward one at a time and place their post-it note in the correct area of the T-chart, either under Wants or Needs. Use the following discussion points to guide conversation.

WHAT WILDLIFE WANT OR NEED



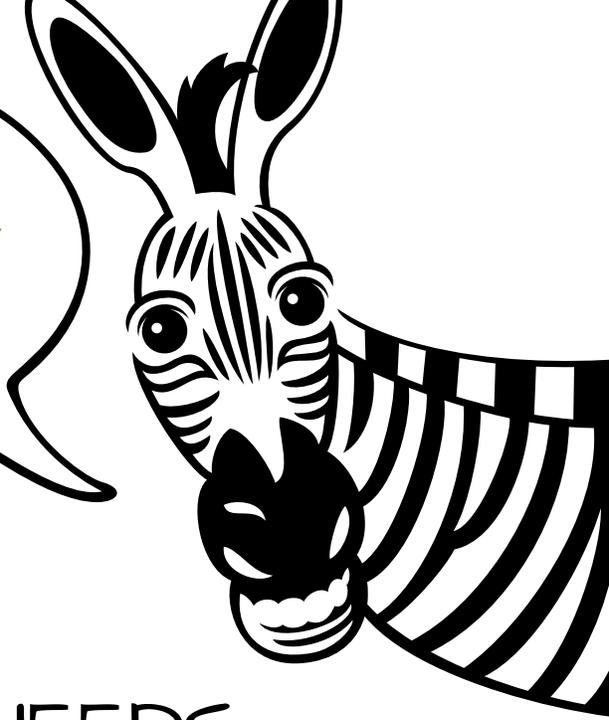
Discussion Points

- Do wildlife always get what they need?
- What kinds of things prevent wildlife from getting what they need?

EXTENSIONS

- Ask students to write a story about a superhero whose job it is to make sure wildlife always get what they need to survive.
- Ask students to find an article in the newspaper that describes a situation where food, water, or space for wildlife is or has been affected.
- Visit the Zoo and look for signs that describe how wildlife have become endangered, and what you can do to help.

Everyone Needs
a Place to Grow
ACTIVITY SHEET



My wants and needs ...

WANTS	NEEDS

What pets want and need ...

CIRCLE YOUR PET: FISH BIRD HAMSTER CAT DOG

WANT	NEED

Awesome Adaptations!



OBJECTIVE

Students compare the adaptations of wildlife living in one habitat to those living in another.

INTRODUCTION

An adaptation can be a body part, body covering, or behavior that helps an wildlife survive in its habitat. For Roberta the Zebra, her black and white stripes help her blend in with her habitat and hide from predators. This is called camouflage. She also has special body parts, for example her grinding teeth. These teeth help her chew her food so she can swallow it. Without teeth, Roberta would have a hard time eating enough food to survive. Zebras also have excellent hearing, and their eyesight at night is as good as an owl's eyesight. Zebras can run as fast as 35 miles per hour and have a powerful kick. Many zebras will stand together in a group—called a herd or a dazzle—to make it difficult for predators to hunt one individual zebra. All of these adaptations help zebras survive in their habitat.

What about those predators? Predators use their adaptations, such as the sharp claws and teeth of a lion, to help find and catch their prey. Like zebras, lions also have camouflaged coloring and blend in with their surroundings. But in the lion's case, it's to hide in the grass to stalk their dinner.

This activity looks at both predators and prey from around the world. Let's find out what different adaptations these animals have that make it better for them to live in their habitats.

MATERIALS

- Awesome Adaptations! activity sheet, two for each student
- Markers, pencils, crayons, or colored pencils
- Glue sticks
- Scissors
- Research resources
 - Suggested readings
 - San Diego Zoo wildlifeexplorers.org or animals.sandiegozoo.org
 - PBS Kids Creaturepedia pbskids.org/wildkratts/creaturepedia/

ACTIVITY

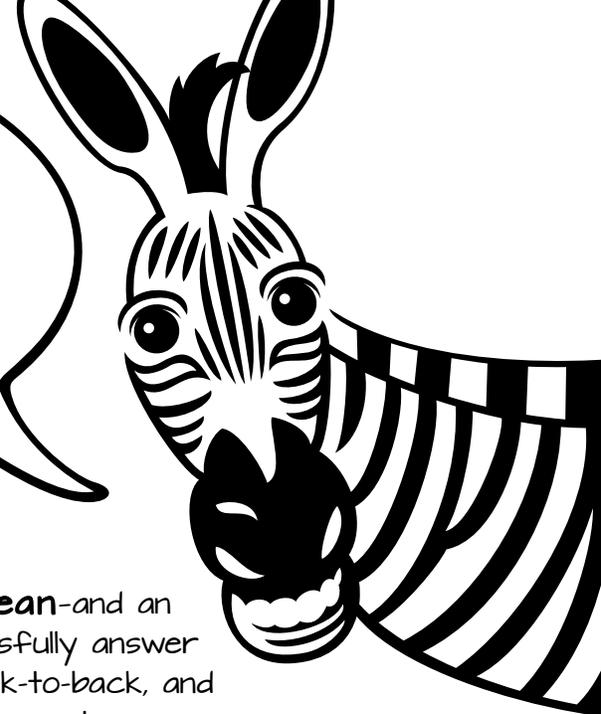
1. Give each student an Awesome Adaptations! activity sheet and access to multiple research resources. Read the directions on the Awesome Adaptations! sheet to the class, and show an example.
2. Students will create two different cards for wildlife from two different habitats. If time allows, students may create more than two cards.

EXTENSIONS

- Use student fact cards to play an adaptations game. Ask which wildlife would do best in different situations. For example, which animal runs the fastest, is best at climbing, is the strongest? Ask students to think of their own situations.
- Have students explore the Zoo on an adaptations scavenger hunt, or look for the wildlife on their fact cards.
- Have students draw an animal with new adaptations that it would need to survive in a new habitat: for example a flamingo might need fuzzy feathers covering its legs to help it in the tundra.
- Have students create and play an adaptations matching game. This could be matching a monkey to its tail, a whale to its flippers, a macaw to its wings, an owl to its talons. Ask students to describe how wildlife use their specific body part in their day-to-day behavior.
- Scientists and inventors look to nature for ideas to solve problems. This emerging field is called Bioinspiration. Ask students to think about how a wildlife adaptation might solve an everyday problem they have.

Awesome Adaptations!

ACTIVITY SHEET



Choose one habitat- **Rainforest** · **Desert** · **Grasslands** · **Tundra** · **Ocean**-and an animal that lives in each habitat. Do research to successfully answer the sections on your card. Cut out your card, fold back-to-back, and glue to make a fact card. Play a game to quiz your classmates.

ANIMAL	HABITAT
	Food it eats
	Circle one Herbivore Omnivore Carnivore
	Physical Adaptations . . .
	Behavioral Adaptations . . .
	My Name

Creative Camouflage



OBJECTIVE

Students identify camouflage as a specific adaptation for a diverse group of wildlife.

INTRODUCTION

Camouflage can be thought of as a color or shape in an animal's body covering that helps wildlife blend into the environment. Most wildlife species have developed camouflage that helps them find food and avoid predators. In contrast, predators may use their camouflage to hide when stalking prey. Camouflage varies between species, but an animal's environment often directs the color and shape of it. Camouflage patterns may match or blend into the habitat surroundings. These patterns may disguise wildlife, or mimic harmful or distasteful wildlife. A very popular camouflage expert is the butterfly.

There are close to 165,000 species of butterflies; they are found on every continent except Antarctica. With so many species, butterflies show a wide variety of colors and sizes. Butterflies might match their surroundings to hide from predators, have big spots to mimic the eyes of a large animal, or be brightly colored to warn that they are poisonous. In this activity, students learn about wing patterns and colors to camouflage their own butterflies in the classroom!

MATERIALS

- Box of multicolored pipe cleaners, toothpicks, or paper clips. One color must be green and the total number must exceed the total number of students in the class.
- Copies of the butterfly pattern activity sheet, one butterfly for each student
- Example of Camouflaged Butterflies
- Markers, crayons, or colored pencils
- Grassy area or large square of green fabric (a tablecloth works well). If your playground does not have a grassy area, you can use colored and plain wooden toothpicks on bare ground.

ACTIVITY

A. Introduction to Camouflage

1. Separate the pipe cleaners, toothpicks, or paper clips by color, and count the number of each color. Write the overall total on the whiteboard or flipchart paper.
2. Mix the colors and spread the items over a green grassy area, a green piece of fabric, or the bare ground.
3. Tell the students they have 10 seconds to collect as many of the items as possible. Say "GO" and time the event. Say "FREEZE" when time is up.

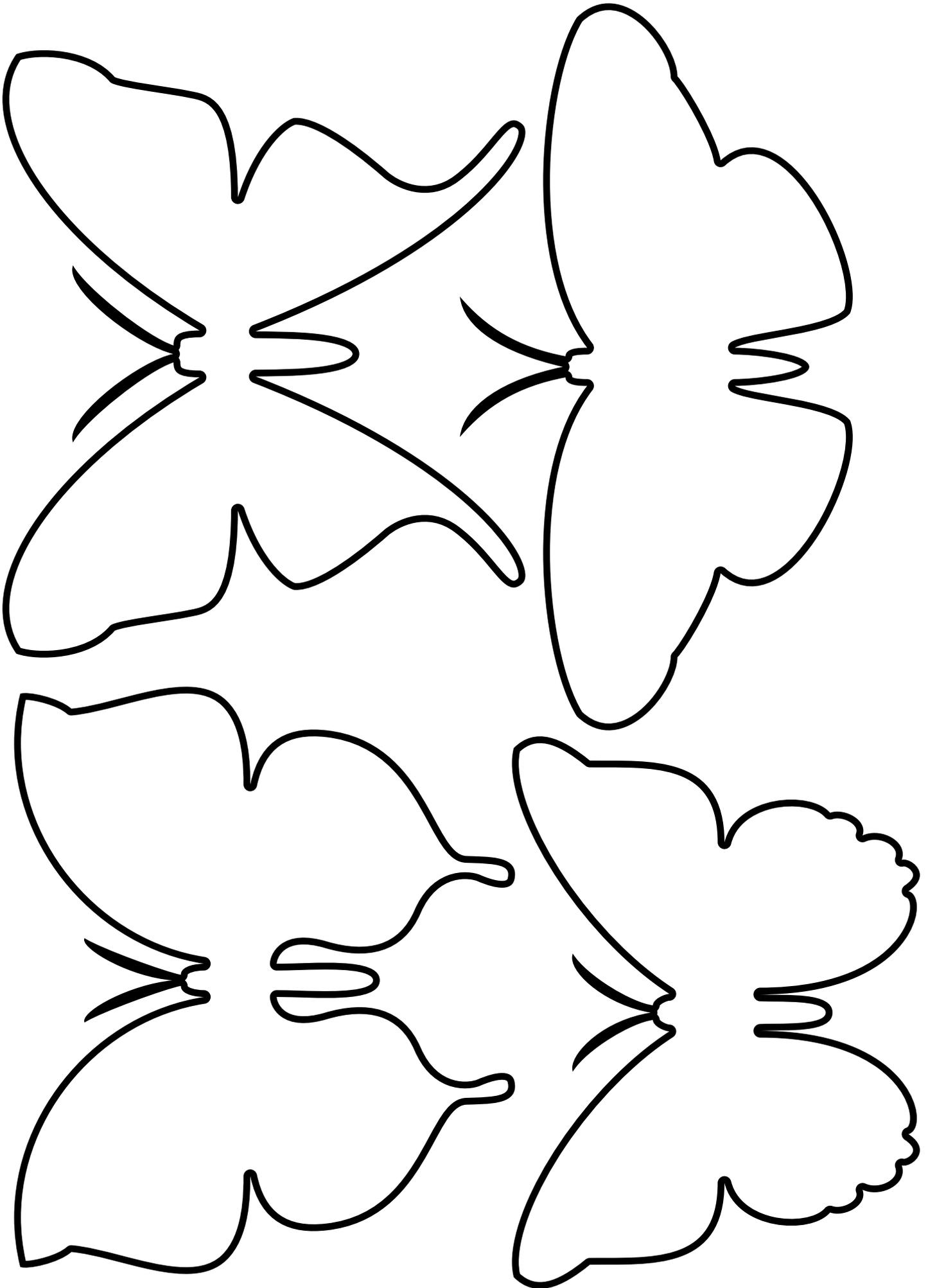
4. Ask the students to count the number of each colored item they found. Compare their totals to the original count and have students determine which were easier to find, and which were harder. Why?
5. Introduce the concept of camouflage as a wildlife adaptation. Explain that many species have colors or markings on their fur, scales, feathers, or skin that help them blend in with their habitat—the place where they live.
6. Have students give examples of camouflage they already know, and how it might help wildlife survive.

B. Creative Camouflage

1. Give each student a copy of the butterfly pattern sheet and a variety of markers, crayons, or colored pencils.
2. Ask the students to pretend that the classroom is a butterfly habitat. Have each student select one area in the classroom that is his or her butterfly's habitat. This area can be the wall, floor, desk, or door; wherever the student chooses.
3. Tell the students to color their butterfly to match the habitat, so the butterfly's pattern acts as camouflage.
4. Have students place their butterflies in their classroom habitat without covering them.
5. Pick one student to be the predator. Ask this student to find as many butterflies as possible. Which ones were harder to find? Which were easier? Why? You may also invite another class to come in to search for butterflies. Your students could act as "scientists" watching the hunting behavior of these "predators."

EXTENSIONS

- Have students create a basic picture graph or bar graph to represent the number of colored items found in the first part of the activity.
- Have students color butterflies with patterns that may warn predators or attract mates.
- Create different types of habitats in the classroom such as a tundra, forest, or desert, and have students color their butterfly according to the type of habitat.
- Go on a butterfly hunt outside! What camouflage strategies of our local butterflies do you see?
- Visit the Spineless Marvels Invertebrate House in the Wildlife Explorers Basecamp zone to observe the camouflage of some other insects.



Camouflaged Butterflies



Seeds, Scat, and Habitat



OBJECTIVE

Students learn how plants depend on other wildlife for seed dispersal.

INTRODUCTION

Many different plants grow within a habitat, but how do those plants get there? Plants come from seeds. For seeds to grow, they need water and sunlight. In addition, many seeds need to move to new ground before they can start growing. Seed dispersal plays a vital role in moving seeds. With the help of wildlife and special adaptations, seeds move to new areas and grow without overcrowding or competition from the parent plant.

There are a few ways that seeds can move. Some seeds are heavy and fall down to the ground. Some are light with wings and float with the wind. Others get moved around by wildlife, like squirrels that bury seeds in the ground to eat later and then forget! Those seeds sprout and grow new plants. Other seeds have little hooks on them. The hooks get stuck to an animal's fur and catch a lift to a new place. Many seeds are quite tasty and get eaten by wildlife. These seeds are returned to the soil in the animal's droppings, or scat; neatly encased in a packet of fertilizer to help the plant grow.

MATERIALS

- Blank paper, one per student
- Markers, crayons, colored pencils
- Assorted scrap items recycled from home, such as toilet paper rolls, popsicle sticks, pipe cleaners, tape, buttons, paper clips, or scrap paper
- Reading book about seed dispersal, such as *Flip, Float, Fly!* or *Miss Maple's Seeds*.

ACTIVITY

1. Introduce topic by reading one of the suggested books on seed dispersal, such as *Flip, Float, Fly!* or *Miss Maple's Seeds*.
2. Instruct the students to close their eyes and imagine traveling to a new habitat. Ask them to look for new plants growing in their imaginary habitat and to bring back seeds from those plants.
3. Ask the students to open their eyes. Distribute the blank paper and coloring markers, crayons, or pencils.
4. Ask the students to draw their imaginary habitat and the plant they discovered. Ask them to pair with a classmate and share their habitat, giving their plant a name. Encourage them to talk about how scientists name new plants when they are found.
5. As a class, review the different ways that wildlife help with seed dispersal (see introduction for ideas). Ask students to create a detailed drawing of their imaginary seed and describe how they think it is dispersed. They may also draw the animal that helps with dispersal.
6. Using their colored seed sketch as a guide, ask students to build a model of their seed

using assorted scrap materials. Emphasize that the model must show the adaptations needed for successful dispersal. For example, pipe cleaner hooks can get caught on fur, sticky tape can get stuck on skin, or bright colors can attract wildlife to eat it. The key is creativity!

7. Have students present their habitat drawings to the class and explain their seed's adaptations to help with dispersal and survival. Stress that students state these key points when presenting their project:
 - My habitat is...
 - My plant is called...
 - This is the species that helps my plant...
 - My seed's adaptations are...

EXTENSIONS

- Introduce the additional concepts of plant growth and survival now that the seed has been dispersed.
- Lead students on a nature walk around the school or neighborhood to identify different seed dispersal processes.
- Collect a variety of seeds and set up test stations in the classroom. For each seed type, test for stickiness, hardness, heaviness, or other factors. For example, use a sock to see if the seeds stick, or drop seeds on paper to see how they fall to the ground. Ask students to devise new test protocols.



I'm a Survivor!



OBJECTIVE

Students identify plant and wildlife adaptations used for survival.

INTRODUCTION

For prey species, avoiding predators is a key part of survival. Prey must constantly be on the lookout for predators and must escape or defend itself. Many prey species have developed a variety of adaptations to protect themselves from becoming dinner. In order to survive, wildlife rely on camouflage, warning signals, well-developed senses, defensive weapons, and behaviors.

This activity looks at a variety of wildlife, from both land and water habitats, to see how they survive. After examining these adaptations more closely, students will create their own unique species, which will surely survive in its habitat!

MATERIALS

- 8 to 10 photos of wildlife with different adaptations* (one picture per student group)
- Blank paper, one for each student
- Scrap paper or ruled paper
- Pencils
- Copies of the Wildlife Adaptations Cards, cut apart (one card per group)
- Colored pencils, markers, or crayons

ACTIVITY

A. Analyzing Adaptations

1. Divide students into small groups and distribute one wildlife photo to each group.
2. Ask the students to closely examine their photo.
3. Distribute blank paper and pencils. Direct the students to write down everything they observe in the photo. They may also add any prior knowledge, descriptions, or facts.
4. Based on their observations from the photo, ask students to identify three adaptations the wildlife has that helps it avoid being eaten.

B. Adapt Wildlife

1. Distribute a Wildlife Adaptations Card to each group. Some groups may receive the same card.
2. Ask students to read their card and design a plant or animal according to the information given on the card. Remind students that they should think about:
 - the physical adaptations of their wildlife
 - any behaviors their wildlife might display
 - the habitat their new species lives in (real or imaginary).
3. Ask students to draw and color their creations. Emphasize that students should create something new, and not copy wildlife that already exists.
4. Check that students name their plant or animal, label the adaptation(s), and write a description of what the species can do to survive.
5. If time allows, students can write a short story about their species.
6. Creations can be shared with the class, or, if behavior is involved, role played.

EXTENSIONS

- In Analyzing Adaptations: have students describe if the adaptation is offensive or defensive.
- In Adapt a Wildlife: have students create a 3D model of their creation using various craft supplies.
- Students create a predator-prey adaptations comparison chart. Have students list the different adaptations or create a collage with a variety of wildlife adaptations to visually display for reference.
- Create a predator/prey game where students role play the new adaptations they've learned.

****Some suggestions for plant and animal photos are on the following pages.***

Others include skunk (warning stomp/spray), sea urchin (spines), elephant hawk moth caterpillar (mimicry), penguin (webbed feet), and milkweed sap (poison). For additional information refer to Adaptation Profiles in the Resources section.













I'm a Survivor!
ACTIVITY SHEET



Wildlife Adaptations Cards

DRAW A SPECIES THAT COULD QUICKLY DIG A TUNNEL OR BURROW TO GET AWAY FROM PREDATORS.

DRAW A SPECIES THAT HAS A PROTECTIVE COVERING TO SURVIVE STRONG TEETH CHOMPING ON IT.

DRAW A PLANT OR ANIMAL THAT HAS SPINES OR STINGERS TO HELP PROTECT IT.

DRAW A SPECIES WITH A WARNING SYSTEM TO SCARE OFF PREDATORS.

DRAW WILDLIFE THAT IS MIMICKING OR COPYING A DIFFERENT DANGEROUS SPECIES.

DRAW A SPECIES WITH EXCELLENT HEARING AND EYESIGHT TO AVOID PREDATORS.

DRAW WILDLIFE THAT CAN SPIT, SPRAY, OR SQUIRT A CHEMICAL TO PROTECT ITSELF.

DRAW A SPECIES THAT CAN MOVE QUICKLY TO ESCAPE A PREDATOR.

The Better to Eat You With



OBJECTIVE

Students identify and describe predator-prey relationships.

INTRODUCTION

Some wildlife are in the business of eating other wildlife and some must try to keep from being eaten. This is the normal life cycle in nature. Whether an individual is a predator or the prey, it must have adaptations for its environment, or it will not survive.

Predators often get as bad a rap as villains, or a rabbit does when it nibbles grass. But, in fact, they are doing the same thing we do when we sit down at the dinner table. They are getting the energy (food) they need to survive.

What adaptations are best suited for predators? How successful are predators at catching prey? Can a predator be prey too? Students will explore these concepts in this activity.

MATERIALS

- Whiteboard or flip chart for recording group ideas
- Copies of the Your Superhero Predator activity sheet, one per student
- Pencils, markers, crayons, or other drawing supplies

ACTIVITY

1. Read this paragraph to the students.

There are many different kinds of adaptations that make an individual a successful predator. Some adaptations are physical, and others are behavioral. Wildlife develop these over time to match the environment where they live. Some examples of physical adaptations include deadly venom, sharp teeth, strong jaws, and razor-like talons. Some examples of behavioral adaptations include hunting in groups, or stalking (sneaking up on) prey.

2. Distribute the Superhero Predator activity sheet.
3. Tell students to think about the paragraph on predator adaptations. Remind students that wildlife have different adaptations for hunting.
4. Brainstorm with students some of the adaptations that predators use to catch prey. Write student responses on the whiteboard or flip-chart paper.
5. With these ideas in mind, tell students to complete their Superhero activity sheet by drawing a predator showing its adaptations for catching its prey.
6. To complete the bottom of the activity sheet, tell students how to write a haiku poem. Explain that it is a short poem and it includes words that create a feeling or image. See Haiku How-to on the next page for further instruction.

7. Write this poem on the whiteboard as an example for the students.

The Hungry Snake
Ready for dessert
The snake was completely still
Waiting for its prey

8. Direct students to write a haiku about their predator superhero.
9. Have students share their superheroes and read their poem to the class. You can also hang student papers throughout the room and have students participate in a gallery walk.

HAIKU HOW-TO

A haiku is an unrhymed three-line poem. It is based on a traditional Japanese poetic form. Though there are different ways to write a haiku, the traditional pattern is to write the first and last lines with five syllables, and the middle line with seven syllables. The pattern of syllables looks like this:

Line 1: 5 syllables
Line 2: 7 syllables
Line 3: 5 syllables

EXTENSIONS

- Assign students homework to read a book, watch a program on television, or use a computer to identify the types of prey a specific predator eats. For example, a snake (predator) eats rats (prey). Write the predator/prey combinations on the whiteboard as students hand in their answers. Play charades working in groups of two. Discover if the class can guess which combinations are being acted out.
- Have the students write a story describing a real, living predator and its behaviors without naming the predator's identity. Have the students share their stories.

The Better to
Eat You With
ACTIVITY SHEET



Superhero Predator

A large rectangular area enclosed by a dashed line, intended for writing a haiku.

My haiku about the hunt:

Three horizontal lines provided for writing the haiku.

Survival of the Fittest



OBJECTIVE

Students identify ways in which wildlife protect themselves.

INTRODUCTION

Wildlife can't just hide in a bush in hopes of surviving! Whether prey or predator, wildlife must have special adaptations to live another day. Being fit in the wild means having the right tools, and reproduction to avoid extinction.

Wildlife adaptations are unique in design. Some adaptations are obvious; sharp, long teeth are clearly meant to bite. Other adaptations may be subtle. For example, why does a vulture have a featherless head? A vulture is a scavenger and feeds on dead animals, often putting its head into carcasses. After feeding, the bare skin is exposed to the sun. The sun's heat kills harmful bacteria that might have rubbed off from the decaying meat. A clean head helps keep a vulture healthy, so this bird can live another day and stick its head inside another carcass. Yuck!

MATERIALS

- Predator Surprise activity sheet, one copy for each student
- Pencils
- Markers, crayons, or other drawing supplies
- Wildlife adaption information written on the whiteboard

Wildlife adaption information for the story ending:

Wildlife

Horned lizard
Opossum
Northern fulmar

Adaptation

Squirt blood from eyes
Play dead
Throw up or vomit

ACTIVITY

1. Distribute the Predator Surprise activity sheets. Read the beginning of the story to the students.
2. After you finish reading, ask students to choose one of the three species listed on the whiteboard for their end of the story.
3. Ask the students to write a complete ending to the story. The ending must include the adaptation listed for their species and describe what happens to the prey animal when the predator and prey meet.
4. Ask the students to draw a picture of their story's ending on the other side of their activity sheet.
5. Have the students read their stories to a classmate next to them, or share with the class.

EXTENSIONS

- Create a bulletin board of the pictures from the stories.
- Have students continue the story to create a multi-page book.



Survival of
the Fittest
ACTIVITY SHEET

PREDATOR SURPRISE

There once was a large, cranky predator that enjoyed waking up each day to hunt unsuspecting prey. The entire animal kingdom lived in fear of this hungry predator. All the wildlife were chattering about what action should be taken if they should come face to face with the large, cranky predator. Some said swimming away was the only answer, but for those that didn't swim, this was an awful idea. Others suggested standing completely still to blend in with the bark of the big cork tree. For those who were brightly colored or rounder than the cork tree trunk, this was a terrible idea. Those with stripes said "run together in a herd and confuse the predator, making it hard for him to distinguish one animal from another." Not everyone had stripes and many traveled alone, not in herds. They thought this was a terrible idea. Some prey thought all the chatter was crazy, since they believed the predator could never sneak up on them, because the placement of their eyes on the sides of their head made it easy to see anything coming from any direction.

Well, the sun came up and the large, cranky predator opened his eyes for another day of chasing unsuspecting prey. His stomach was rumbling, and he was especially cranky because he hated the bright sun. He much preferred a cloudy morning. He hadn't gone far when he thought he saw some bushes moving to his right. He plunged through the waist-high plants, only to see . . .



Resources

SUGGESTED READING

- Amstutz, Lisa J, et al. *Amazing Animal Adaptations* (4 book series). Capstone Press, 2011.
- Green, Jen, et al. *Amazing Animal Hunters* (8 book series). W.B. Saunders Company, 2012.
- Jenkins, Steve. *What Do You Do When Something Wants To Eat You?* HMH Books for Young Readers, 2001.
- Kalman, Bobbie, et al. *Introducing Habitats* (12 book series). Crabtree Publishing, 2006.
- Kalman, Bobbie and Walker, Niki. *How Do Animals Adapt?* (The Science of Living Things). Crabtree Publishing, 2000.
- Kaner, Etta. *Animal Defenses: How Animals Protect Themselves*. Kids Can Press Ltd, 1999.
- Kuhn, Dwight and Schwartz, David. *Where in the Wild? Camouflaged Creatures Concealed... and Revealed*. Random House, 2011.
- Lundgren, Julie. *Animal Adaptations*. Rourke Publishing Group, 2011.
- Macken, JoAnn Early. *Flip, Float, Fly! Seeds on the Move*. Holiday House, 2008.
- O'Connor, Karen, et al. *Animal 911: Environmental Threats* (6 book series). Gareth Stevens Publishing, 2013.
- Racanelli, Marie. *Camouflaged Creatures*. The Rosen Publishing Group, 2010.
- Schimmel, Schim. *Children of the Earth* (3 book series). Cooper Square Publishing LLC 1994.
- Silver, Donald and Wynne, Patricia. *One Small Square* (12 book series). McGraw-Hill, 1997.
- Wheeler, Eliza. *Miss Maple's Seeds*. Nancy Paulsen Books, 2013.

ONLINE RESOURCES

To learn more about animals at the San Diego Zoo:

animals.sandiegozoo.org

ielc.libguides.com/sdzw/factsheets/index/

To have fun exploring wildlife, videos, crafts, stories, games, and more:

sdzwildlifeexplorers.org

To learn more about research and conservation:

science.sdzwa.org

To read inspirational stories about how San Diego Zoo Wildlife Alliance is saving wildlife around the world:

sandiegozoowildlifealliance.org/journal



ADAPTATION PROFILES

Sidewinder

Crotalus cerastes



HABITAT

Arid deserts and flatlands in southwestern United States

BEING BROWN

When you live on the ground, brown is best. Like other rattlesnakes, sidewinders blend in with the rocks, soil, and dry grasses where they live. This cryptic coloration allows them to hide in plain sight.

BEWARE

A rattlesnake has a unique adaptation: at the end of its tail it grows interlocking, hollow segments. When alarmed, the snake coils into a circle and shakes its tail. The rattle means, "Beware, stay away!"

Silk Floss Tree

Ceiba speciosa



HABITAT

Subtropical and tropical forests of Brazil and Argentina

SPINY

Trees can't move; they grow in place. So when insects or animals attack, defenses come in handy. Some trees taste terrible, while others have sticky sap. A few, like the silk floss tree, have thorns on their trunks.

SHARP

This tree's triangular thorns cover the trunk from the ground to the top branches. Sharp tips and edges keep animals from gnawing at the trunk and from climbing the tree for tender leaves.

Indian Crested Porcupine

Hystrix indica



HABITAT

Forests, scrubland, and rocky areas of Southern Asia and the Middle East

QUILLS

Porcupines are famous for their quills, and this one has hundreds of them. Quills are sturdy, hollow hair strands. Some can be as long as 12 inches (30 centimeters). When they shake, quills on the tail make a hissing rattle.

QUICK

When threatened by a lion or a leopard, a porcupine raises its quills. If the threat doesn't go away, the porcupine charges—backside first. Quills don't have venom. However, the deep wounds they cause can become infected.

Desert Tortoise

Gopherus agassizii



HABITAT

Scrubland and deserts of the southwestern United States

TOUGH

The desert tortoise lives in a hot spot—the Mojave Desert, where temperatures can reach 105 degrees Fahrenheit (41 degrees Celsius). The tortoise's domed shell, called a carapace, helps it survive.

TOTE

The carapace encloses a tortoise's lungs and internal organs. A tortoise can store up to 40 percent of its body weight in water inside its bladder.

Three-banded Armadillo

Tolypeutes matacus



HABITAT

Savannas and dry scrublands of Brazil

ARMOR

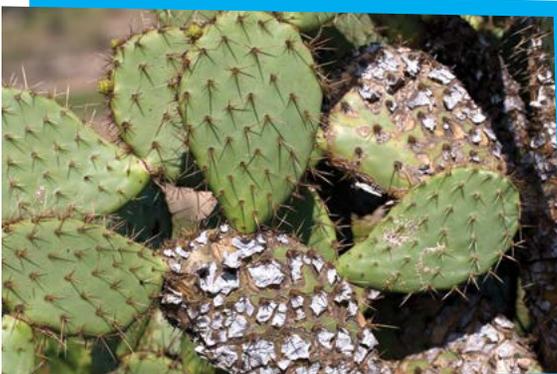
Three flexible sections of skin join together two domed shells on the body of the armadillo. Tough plates also cover the head and tail. For digging, modified second, third, and fourth toes of the hind feet have fused to make a hoof-like claw.

AGILE

When threatened, this armadillo tucks in its legs, ears, and head, curling into a ball. Although this provides excellent protection from predators, the armadillo is helpless from people who easily pick up the small ball.

Prickly Pear Cactus

Opuntia littoralis



HABITAT

Deserts in the southwestern United States and Baja California, Mexico

FLAT

Cactuses are plants, but where are the leaves? These cactuses conserve water by growing thick, flat stems called paddles. The spines on the cactus paddle are highly modified leaves!

FLOW

Spines protect this cactus from wildlife that want to munch on its water-rich paddle. They also reduce airflow across the surface, which decreases water lost through transpiration.

Cape Clawless Otter

Aonyx capensis



HABITAT

In or near rivers in much of Africa

WATER WORLD

A river otter spends more than half its time in the water. Its slender body is covered in short, dense fur and the otter's tail is thick and strong. Long whiskers called vibrissae are sensitive to the slightest touch.

WEBBED

A river otter's short legs help it crawl in and out of watery areas. Rough skin on the palms and fingers helps grip slippery fish. Webbing between the hind toes helps the otter swim.

Poison Frog

Dendrobates galactonotus



HABITAT

Near streams and ponds in Central and South America

COLORFUL

Known as the jewels of the rainforest, these small frogs show off vibrant colors. You'd think this would make them an easy target for predators, but their warning coloration signals a deadly defense.

CAUSTIC

This frog's skin oozes poison. Once a predator tastes a poisonous frog, it doesn't go back for more.

Sugar Glider

Petaurus breviceps



HABITAT

Forests in Australia, Papua New Guinea, and Indonesia

GLIDING

A possum that flies? Well, almost. This one glides up to 150 feet (45 meters) between tree branches. A thin, furred membrane between its wrist and ankle stretches wide in the air. The membrane is called a patagium.

GRABBING

Gliding between branches isn't easy, especially at night. To help, sugar gliders have large claws and an opposable toe on the hind foot. A long tail helps with steering.

Blue Morpho Butterfly

Morpho peleides



HABITAT

Tropical rainforests of Mexico, Central America, Colombia, and Venezuela

MULTIPLE

Some butterflies have the same colors on both sides of their wings, but not the blue morpho. The undersides are brown with spots and rings. The tops are shimmering blue.

MOVING

As this butterfly flies, the changing wing color confuses predators. A bird sees blue, then brown, then blue again. Against a multicolored forest, the change in color makes the butterfly hard to spot and follow.

Grevy's Zebra

Equus quagga grevyi



HABITAT

Dry grasslands of eastern and southern Africa

ZIGZAG

Too many stripes can be confusing. That's the plan when zebras get together in herds. When a predator approaches and all the zebras move at once, it's difficult to distinguish just one zebra in the crowd.

ZIPPY

Zebras are not slow; they can reach top speeds of 40 miles per hour (65 kilometers per hour). Threatened zebras may buck or kick as they run.

Indian Axis Deer

Axis axis



HABITAT

Wooded regions and grasslands of India, Sri Lanka, and Nepal

HIDING

These deer browse on plants, eat fallen fruit, and nudge through leaf litter. White spots on a brown-red background help them blend in with background colors and broken sunlight as they move through the forest.

HEAVY

Adult male deer grow antlers as long as 3 feet (1 meter). Each antler has three points, or tines. A male uses its antlers to protect itself against tigers and other predators.

GLOSSARY

Adaptation — a part, covering, or behavior that helps wildlife survive in its habitat.

Bacteria — one-celled organisms that live everywhere on Earth. Some are harmless, some are beneficial, and others are dangerous and even deadly.

Blood — a bodily fluid in animals that delivers necessary substances such as nutrients and oxygen to the cells and transports metabolic waste products away from those same cells.

Body Covering — any covering for the body or body part, e.g. hide, pelt, skin, feathers, scales, shell.

Body Part — any part or piece of an organism such as limbs, tail, feathers, horns, ears.

Camouflage — a color or structure on an individual's body that helps it blend into its environment.

Carnivore — wildlife that eats other animals.

Competition — the process of trying to get resources before others do.

Defend — protect oneself from harm.

Dispersal — moving from one geographic area to another and not returning.

Endangered — populations so low that they are moving toward becoming extinct.

Extinct — no longer living.

Food — a variety of nutrients necessary for energy and health.

Fulmar — an Arctic seabird.

Habitat — the place where an individual lives.

Herbivore — wildlife that eats plants.

Patagium - the fold of skin connecting the forelimbs and hind limbs.

Predator — an organism that hunts and eats other organisms for food.

Prey — an animal that is taken and eaten by another animal (predator) for food.

Mimic — to naturally look or act like something else.

Omnivore — wildlife that eats both plants and animals.

Plant — organism capable of making its own food by photosynthesis.

Scat — animal droppings.

Scavenger — an organism that eats dead or decaying matter.

Seed — the part of a flowering plant that contains a baby plant and a supply of food inside a protective coating, which grows into a new plant.

Senses — sight, hearing, smell, taste, and touch.

Shelter — a place to sleep, rest, or live that provides protection from predators and weather.

Space — an area encompassing land that allows for life activities like eating, sleeping, food gathering, and finding a mate (may be a few feet or many square miles depending on the species).

Species — a group of plants or animals sharing common characteristics and a common name.

Survival — using adaptations to continue to live.

Vomit — to eject the contents of the stomach through the mouth.

Water — a clear liquid that is essential for life.



Lesser Kudu



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