



# **SCHOOL EXPLORERS CURRICULUM**

**GRADES 1-2**

# SCHOOL EXPLORERS

## CURRICULUM OVERVIEW

### NGSS ALIGNMENT

**1-LS-1:** Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

**2-LS4-1:** Make observations of plants and animals to compare the diversity of life in different habitats.

**2-LS-2:** Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

### OBJECTIVE

Students will observe and compare plants and animals in different habitats to explore the diversity of life. Through observation and discussion, they will recognize how different animals survive in their environments.

### MATERIALS

For chaperones:

- Self-guided tour
- Student activity instructions
- Map (optional)
- Bingo (optional)
- Glossary and Reflection

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# TEACHER GUIDE

## HOW TO USE CURRICULUM PACKET

In this curriculum, you will find a *Chaperone Guide* for a self-led tour and activities. Make copies depending on your chaperone headcount. Students do not need any copies of the materials, however, you may print individual bingo sheets for students if you prefer.

### **Self-Guided Tour**

Assign chaperone groups. Each chaperone will be able to lead the group using their *Chaperone Guides*. The headings on each page indicate the section of the zoo that correlates to where the tour is. There are talking points for certain enclosures, denoted by the subheadings named after the animal. For the talking points, there are italicized questions to spark discussions that can be led by each chaperone. Underlined words can be found in the Glossary.

### **Using the Map**

Attached is a map with marked locations of the tour. The map includes dashed lines to indicate suggested walking paths. Numbered and starred locations, also referenced in the self-guided tour, denote enclosures with provided talking points. Some enclosures are multispecies habitats meaning there may be multiple animals for each star. You may print a map for each chaperone, or just use the written tour.

### **Facilitating the Activities**

In this packet you will find two activities along with reflection questions. The chaperone-led activities are movement and observation based. Activity #1 should be done after the tour in an open space to allow for movement, while Activity #2 can be done during the tour. We recommend Village Watutu, the open space by African Aviary, Gecko Gulch, and the open space at Wild Prairies.

At the end of the of the guide, you will find reflection questions. Encourage your chaperones to engage students in discussion.

# TEACHER GUIDE

## FIELD TRIP SCHEDULE

Use the space below to plan your itinerary.

**TIME**

**ACTIVITY**

**LOCATION**

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# SCHOOL EXPLORERS

## CHAPERONE GUIDE

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### INSTRUCTIONS

Included in this booklet is a map of the path you will be taking with your group, marked with a **dashed line**. As you move through the park, refer to the Guided Tour Pages for talking points. The **stars** on the map indicate enclosures you will stop at. Some enclosures have multiple species. Refer to the numbers on the guided tour for those stops as there may be duplicate numbers. If something is in **italics**, it is a question to lead a discussion.

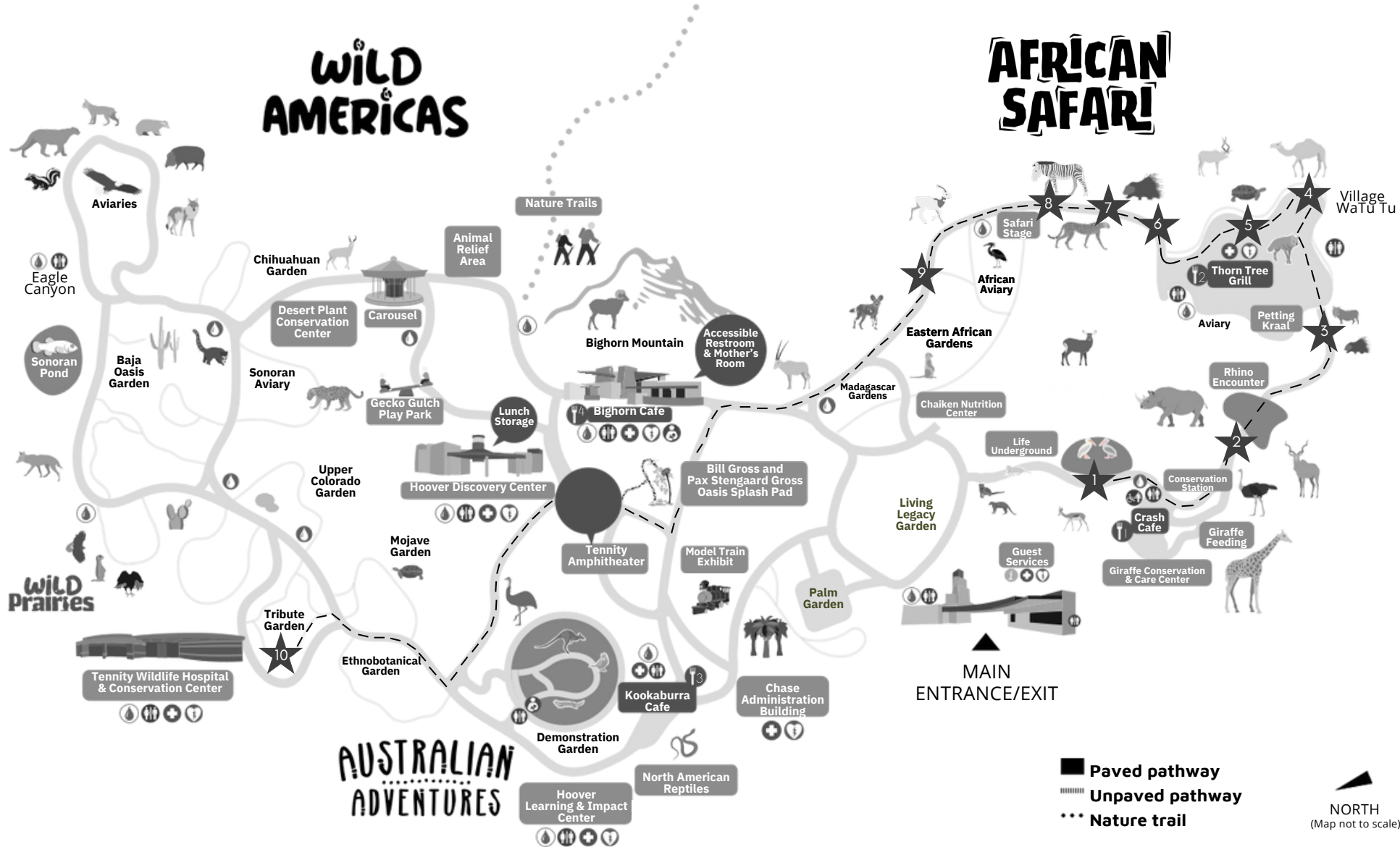
**Underlined** words can be found in the glossary.

To complete **Activity 1**, find an open space to complete and allow 15 minutes at the end of the guided tour. **Activity 2** can be done as you move through the park on the self-guided tour.

### MY GROUP

List your student group below.

|       |       |
|-------|-------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |



## FOOD & DRINK:

- Crash Cafe\*** - Specialty coffees, snacks, soft-serve, beverages, and draft beer.
- Thorn Tree Grill\*** - Freshly-made burgers, hot sandwiches, salads, soft drinks, beer, and wine.
- Kookaburra Cafe\*** - Made to order pizza, pasta, salads, snacks, soft drinks, beer, and wine.
- Bighorn Cafe** - Asian and Southwest inspired rice and noodle bowls, sandwiches, pizzas, smoothies, snacks, beer, wine, and more!

\*Closed for Summer

## GUEST SERVICES:

- Information | Lost and Found
- Mother's Room
- Stroller/Wheelchair/ECV Rentals
- Drinking Fountain Water
- Restrooms Adult Changing Table
- Bottle Refill Station
- First Aid Station
- Automated External Defibrillator (AED)

# 📍 THE SAVANNAS

## AFRICA

**BIG IDEA:** There are many different plants and animals in Africa that have traits that help them survive in their habitats.

**Ask:** What do you see when you look at the habitats in this part of the zoo?

- There are many different types of plants and animals in Africa that have traits, or special parts, that help them survive in their habitats.
- Africa has a lot of dry desert areas where there's a lot of grass and not so many trees. This is called a savanna.
- There are some places in Africa that might be more sandy, or have more thorn bushes, or are slightly more wet.

## RHINO

1

**BIG IDEA:** Some animals have thicker skin that acts like armor to protect them from things like thorny plants, insect bites, and other animals.

**Ask:** What do you notice about the rhino? How would you describe the rhino to someone who has never seen one before?

- Rhinos have thick, tough skin. In fact, rhino skin can be up to 5 centimeters (2 inches) thick in some areas!
- You might see that the rhino has dry or wet mud on it. Rhinos can't sweat to keep themselves cool, so instead they keep cool by covering their bodies in mud.
- Notice the rhino's big ears. Rhinos have a great sense of hearing and smell! They use these senses more than their eyesight because they can only see about 50 feet in front of them.
- Look at the rhino's mouth. The black rhino has something called a prehensile lip. This means it can grab food with its lip like our hands! This pointed lip has thick skin so it can safely grasp thorny plants.

# THE SAVANNAS

## WATERBUCK

1

**BIG IDEA:** Some animals need to live near water sources to stay safe and healthy.

**Ask:** Some animals stay closer to water than other animals like the waterbuck. Why might living closer to water help waterbuck?

- We saw that the rhino has thick, armor-like skin that protects them from other predators. The waterbuck doesn't have thick skin like the rhino. Instead, waterbuck have oily, waterproofed fur and use their strong swimming skills to go into water often, especially when they need to get away from a predator.
- Unlike some animals that can go long periods of time without drinking water, waterbuck have to drink water everyday to keep from getting dehydrated.

## GIRAFFE

2

**BIG IDEA:** Some animals have special body parts that help them get food.

**Ask:** Giraffes eat a lot of thorny plants like the acacia trees. What do you see that giraffes have that might help them eat and reach these trees?

- Giraffes have great vision and long necks which can help them see very far. Their long necks also help them reach up high into the trees for food.
- Like the rhino, giraffes have a prehensile (pri·hen·sil) body part-- their tongues! Giraffes use their tongue to grasp onto leaves and pull them off the branches. Their tongues are about 1 inch long for every foot they are tall. So a 14 foot giraffe has about a 14 inch long tongue. This means that giraffes can reach really high up into the trees for a snack!

# 📍 THE SAVANNAS

## OSTRICH

2

**BIG IDEA:** Animals can use their strong legs to run fast or protect themselves from predators.

**Ask:** *Ostriches are very fast runners. Why do you think they can run so fast?*

- Ostriches are very heavy birds and cannot fly, even though they have feathers. Some of their predators like hyenas surprise attack them (called ambushing) and others can run very fast like cheetahs. Their long and powerful legs help ostriches take big strides or steps to get away. They can run about 43 mph!
- Ostriches have very elastic body parts in their legs that act like a spring to make them run very fast.
- Ostriches have powerful kicks that can injure or sometimes even kill predators like lions.
- Ostrich legs are so fast and powerful that they have been used as inspiration for prosthetic legs!

**BIG IDEA:** Some animals eat fruit and can spread seeds when they poop.

- Ostriches are omnivores meaning they eat both plants and animals. When they eat things like fruit, the seeds pass through their bodies. So when they poop, they leave behind seeds, allowing plants to grow in new places!

## GREATER KUDU

2

**BIG IDEA:** Some animals use their big ears and communicate with quiet movements to stay safe in tall grass.

**Ask:** *Greater kudu are a prey species, meaning other animals hunt them for food. How might they stay safe in their habitat/in tall grasses?*

- Greater Kudus have grey-brown fur with white stripes. When they get scared, they freeze in place, and their coloring helps them camouflage, or blend, into the tall grasses of the savannas.
- Look at their ears. Just like the rhino, greater kudus also have big ears they can move one at a time to listen for predators.
- They also have long legs like the ostrich which help them run and jump over things to get away from predators.

## 📍 THE SAVANNAS

### WARTHOG

3

**BIG IDEA:** Some animals use the ground for resources like keeping cool or to find food.

**Ask:** *How do you think warthogs use their tusks?*

- Warthogs use their tusks and nose like a shovel to dig to find food like roots. By doing so, they also accidentally move seeds around, which helps plants grow in new places.
- Look at the warthog's face. Their sharp tusks and wart-like bumps on their faces help protect them from other animals.
- Warthogs don't have fur and aren't able to sweat, so they wallow in mud just like the rhino to keep cool.

## 📍 VILLAGE WATUTU

### CAMEL

4

**BIG IDEA:** Animals have body parts that help them live in hot, dry deserts. These body parts have also inspired humans to build factories that turn saltwater into freshwater.

**Ask:** *Camels live in hot, often sandy places. How do you think camels are able to survive in the desert?*

- Check out the camel's knees! Camels have thick skin called callouses on their knees that help protect them from the hot sand when they lay down.
- Camels carry fat in their hump which allows them to go a long time without drinking water or eating food.
- Camels have thick lips that help protect them from thorny plants just like the giraffe and black rhino.
- Look at the camel's hooves. Camel hooves are wide, making it easier for them to walk on sand.
- Camels can close their nostrils to keep sand out and when they breathe out, they can pull water out of their breaths and back into their bodies! Camel nostrils have inspired scientists and engineers to build factories that turn saltwater into freshwater, the water we can drink!

# VILLAGE WATUTU

## ADDAX

5

**BIG IDEA: Animals in hot places have light colors and ways to keep cool.**

*Like camels, addax live in hot, sandy and rocky habitats. How do you think they survive in that environment?*

- The addax is the most desert-adapted antelope, meaning addax have lots of body parts or behaviors that help them survive and thrive in the desert.
- In the winter, their fur is a grayish brown color and in the summer it turns into a sandy white color. Because darker colors absorb more light, the winter coat keeps the addax warmer in the winter. When it's hotter in the summer, the light colored fur reflects more light, keeping them cooler.
- Look at the addax hooves! Addax have wide hooves that make it easier for the addax to walk on sand, just like camels.
- Addax are also able to remove water from any plants they eat so they don't have to drink water as much as other antelopes.

## AFRICAN SPURRED TORTOISE

5

**BIG IDEA: Animals may have hard shells or armor to protect themselves from predators. Their shells could've inspired some helmet designs.**

*How do you think tortoises use their bodies to protect themselves?*

- African spurred tortoises, also known as sulcata tortoises, have thick, strong shells that protect them from predators. Their shells are made of a mix of things like bone and keratin (what our nails and hair are made of) and can be anywhere from 1/8 inch to a 1/4 inch thick. Tortoise shells likely inspired some helmet designs!
- Do you see anything special about this tortoise? African spurred tortoises have spikes on the back of their hind legs called spurs. When predators see the spikes it discourages them from trying to hunt the tortoise.

# AFRICAN SAFARI

## CAPE PORCUPINE

6

**BIG IDEA:** Some animals have sharp parts, like quills, they use to defend themselves from danger. These parts have also inspired people to design tools used by doctors and hospitals.

**Ask:** How do porcupine quills protect them from predators?

- When porcupines are threatened, they first try to warn predators. They will stomp their feet, make their quills stand up, and hiss or snort.
- If their warning doesn't work, they will run at the predator backwards or sideways. Their quills come off easily when they touch others and the sharp ends get stuck inside the predators skin.
- The shape of the tips of the quills has led to scientists studying quills to design things like needles and other tools doctors use.

**BIG IDEA:** Seeds can stick to an animal's fur or quills and fall off later. This actually inspired Velcro!

- Some seeds have spiky parts that can attach to an animals' fur or quills. When this happens, they can accidentally move seeds around.
- Because the tips of the porcupine quills are shaped like little hooks, the seeds can get stuck to them. If the porcupine moves around, the seeds can accidentally fall off somewhere else. This is called seed dispersal.
- The way these spiky bits, called plant burrs, attach to animals actually inspired the invention of Velcro.

## CHEETAH

7

**BIG IDEA:** Animals have body shapes that help them catch their food

**Ask:** Cheetahs are very fast animals. Why do you think cheetahs are so fast?

- Cheetahs hunt other very fast animals. In order for them to successfully catch their food, they also have to be very fast.
- Cheetahs have long legs that help them take big strides or steps.
- Their slender or thin bodies also allow them to run faster because it allows them to be move more easily through air.

# 📍 AFRICAN SAFARI

## KLIPSPRINGER

8

**BIG IDEA:** Some animals have feet made for climbing rocky habitats.

**Ask:** *Klipspringers are small antelope that live in rocky places. How do you think their legs make it easier for them to move on the rocks?*

- Try to spot the klipspringers tiny hooves! They have tiny feet, about as wide as a dime and they actually walk on their tiptoes.
- Klipspringers have soft pads on the bottom of their feet that let them grip onto rocks better, kind of like shoes.
- They are also very good jumpers and can jump vertically 10-15 feet which helps them quickly escape predators.

## AFRICAN PAINTED DOG

9

**BIG IDEA:** Animals work together to survive.

**Ask:** *African painted dogs live in groups, or packs. Why do you think this predator lives in packs?*

- Just like the greater kudu, painted dogs live in groups and have unique markings or spots. However, greater kudus are a prey species that eat plants and African painted dogs are predators that hunt other animals.
- The painted dogs do everything together like hunt and raise their young and are led by a female painted dog. This helps them be more successful and gives them a better chance to survive.

# 📍 TRIBUTE GARDEN

## POLLINATORS

10

**BIG IDEA:** Pollinators like smelly scents that come from plants, like in flowers.

**Ask:** *Why do you think pollinators, like bees or even flies, like smelly flowers?*

- Pollinators are animals that help flowers make seeds and fruits by taking pollen, the yellow dust on flowers, from one flower to another.
- Pollinators are usually looking for food when they pollinate a plant. A strong scent helps pollinators know where to go to find nectar. Once they find the nectar, they accidentally pollinate flowers.
- Compare with our zoo animals:
  - Rhinos have a really good sense of smell that helps them find food.

**BIG IDEA:** Pollinators use their sense of vision to find nectar.

**Ask:** *How do flowers use their petals to bring pollinators to them?*

- Different pollinators prefer different flower colors! Look for flowers of different colors and see which pollinators are visiting them. See below which colors pollinators prefer:
  - Bees: blue, purple, yellow
  - Butterflies: red, orange, yellow, pink, blue
  - Moths & bats: pale colors, usually white (mostly open up at night)
  - Flies: green, white, yellow
  - Hummingbirds: red, orange, purple
- Find a flower nearby. Do you see any markings on the petals? Even if you don't see anything, flower petals actually have marks that are invisible to humans that pollinators can see! Usually, these marks go toward the center of the flower where the nectar is.
- Compare with our zoo animals:
  - Giraffes use their keen sense of vision and neck height to find food or predators.

**BIG IDEA:** Pollinators, like bees, work together to find nectar.

**Ask:** *Bees work together to do many things including finding nectar. How do you think they tell each other where to find it?*

- When bees find nectar and return to the hive, they tell the other bees where to go through a waggle dance. The bees move in a figure-8 and waggle (shake their abdomen) in the direction of the food.
- How long the dance lasts tell other bees how far the nectar is.
- Compare with our zoo animals:
  - African painted dogs communicate with each other to find and hunt food.



# ACTIVITY #1: CAN YOU FIX IT?

## ACTIVITY OVERVIEW

**Goal/Objective:** Demonstrate an understanding of how animals are adapted to survive in specific environments.

**Topic Overview:** Adaptations, behavior, and climate

**Activity Time:** 15 minutes

**Location:** Find an open space for students to move like the open area by Tenny Wildlife Hospital.

**Chaperone Materials:**

- Problem Cards (Pages 15-16)

## INSTRUCTIONS

At the end of the self-guided tour, students will determine if the attached problem cards (**page 15-16**) can be “solved” using one of the animals’ traits (body parts).

**Chaperone Instructions**

Once you finish the self-guided tour, gather the students and tell the students to think about the animals they learned about. Read the problem cards aloud and then have them consider the animals they learned about to figure out which animal has a trait (body part) that can solve the problem. Use the guiding questions to help students if they get stuck.

# ACTIVITY #1: CAN YOU FIX IT?

## PROBLEM 1

**How can we see far away?**

Guiding Question:

- *What parts of the animal help it look around or see far?*

Solution:

- We can be up higher off the ground or have glasses or lenses to help us see farther away like a giraffe.

## PROBLEM 2

**How can we run really fast?**

Guiding Question:

- *What about the animal's body might help it move quickly?*

Solution:

- We can take bigger steps to move faster like a cheetah or ostrich.

## PROBLEM 3

**How can we safely walk on rocks?**

Guiding Question:

- *What is special about the animal's feet that might help it on a rocky or uneven ground?*

Solution:

- We can wear shoes that have a grip like the soft padding of the klipspringer.

## PROBLEM 4

**How can we hear things far away?**

Guiding Question:

- *What is something that animals that have good sense of hearing have in common?*

Solution:

- We can cup our hands behind our ears to make our ears bigger like the rhino.

## PROBLEM 5

**How can we stay safe even in a place?**

Guiding Question:

- *Which animals have patterns or ways to confuse or hide from predators?*

Solution:

- We can wear things to help us camouflage into our surroundings like the zebra or greater kudu.

## PROBLEM 6

**How can we protect our skin and bodies?**

Guiding Question:

- *Is there an animal with something hard or thick on its body for protection?*

Solution:

- We can wear helmets to protect our heads or wear armor (thick clothes) like the spurred tortoise and rhinos!

# ACTIVITY #1: CAN YOU FIX IT?

## PROBLEM 7

**How can we travel far while keeping our bodies healthy?**

Guiding Question:

- *Which animals are really good at going a long time without needing to stop for water?*

Solution:

- We can bring snacks with us in a backpack like a camel with its hump or we can make sure we have lots of water like the addax has in its body.

## PROBLEM 8

**How can we keep cool when it's hot?**

Guiding Question:

- *Which animals have body parts or fur that help stay cool in hot weather?*

Solution:

- We can cool off in water or and use soft and light clothes to protect us from the sun like the rhino and waterbuck.

## PROBLEM 9

**How can we dig without tools?**

Guiding Question:

- *Which animals use their bodies to find things in the ground?*

Solution:

- We can use our hands or even feet to dig like the warthog who digs without tools.

## PROBLEM 10

**How can we scare away any danger?**

Guiding Question:

- *Which animal shows a warning and defends itself when its threatened?*

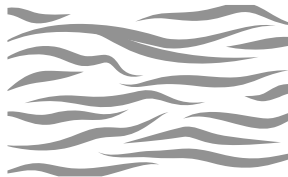
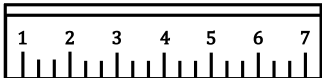
Solution:

- We can wear things that make noise or have things like spikes similar to the cape porcupine!

# ACTIVITY #2: DIVERSITY BINGO

## DIRECTIONS

While you're visiting the zoo, try to spot the following adaptations that help animals survive.

|                                                                                                                        |                                                                                                                                    |                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|  <p>Walks or runs fast</p>            |  <p>Has fur that changes with the seasons</p>     |  <p>Has patterns or stripes to hide</p>        |
|  <p>Lives in a group or pack</p>     |  <p>Has special body parts to protect itself</p> |  <p>Uses big ears to listen and stay safe</p> |
|  <p>Climbs or jumps really well</p> |  <p>Has thick skin to protect itself</p>        |  <p>Has special mouth parts to grab food</p> |

# REFLECTION

## REFLECTION QUESTIONS

**Chaperone instructions:** Ask each question to your group and discuss responses.

1. What was your favorite thing you learned about? Why?
2. Can you name one desert animal and share something special about it?
3. If you were an animal in the savannas, what trait or special feature would you want to have?

# GLOSSARY

## GLOSSARY

- **Ambushing:** A surprise attack from a hidden place.
- **Camouflage:** A way animals defend themselves, usually by blending in with their surroundings.
- **Desert-adapted:** Plants and animals that can survive in the desert because of their traits.
- **Keratin:** A tough material that makes up animal hair, nails, and the outer layer of skin.
- **Pollinators:** An animal that helps move pollen (the yellow dust) from one flower to another so plants can make seeds or fruit. Examples: butterflies, bats, or bees.
- **Predator:** An animal that hunts and kills other animals for food.
- **Prehensile:** To describe a body part that is able to grasp something.
- **Prey:** An animal that hunted and killed by another animal for food.
- **Savanna:** A grassy area with few trees, found in warm places like in Africa.
- **Seed-dispersal:** How plants spread their seeds to new places so they can grow.
- **Trait:** A special body part or feature that gets passed down from parents to offspring. Examples: eye color, fur/hair color, leg length, beak shape.
- **Waggle Dance:** How bees tell each other about the direction and distance a food source (nectar) is from the hive.