



SAN DIEGO ZOO
KIDS

RHINOCEROS

Teacher Resources & Activities
GRADES K TO 5



Greater One-Horned Rhino Calf

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The activities in this booklet follow the 5E Instructional Model developed through the Biological Sciences Curriculum Study (BSCS). The phases of the BSCS 5E teaching sequence are Engage, Explore, Explain, Elaborate, and Evaluate. Generally, activity steps 1 through 5 align with these phases.

Like this activity guide? Go to sandiegozoo.org/teachersurvey for a quick, online feedback form. We appreciate your comments.

Welcome From Zookeeper

Rick Schwartz



Nola the Rhinoceros

In my career as a zookeeper, I have had the pleasure of working with many different species of mammals, reptiles, and birds. However, I have never worked with a rhinoceros. But, not too long ago, I had the opportunity to spend time with a rhino keeper at the San Diego Zoo Safari Park, and I was introduced to a female rhino named Nola.

Spending time with Nola allowed me to gain a new appreciation for these giant mammals—listening to her breathe in deep slow breaths as large mammals do, seeing how she collected grass in her mouth, bite after bite, and hearing her grind it up as she chewed her food. I saw how she moved through her surroundings, and I even had the chance to touch her rough, but sensitive rhino skin.

Even as someone who has spent most of my life around amazing animals from all over the world, getting to know Nola was a special moment for me. It reminded me that, though they are big and powerful animals—animals that we consider “lumbering” in their ways—they can be gentle and deliberate in demeanor and movements. Sadly, Nola passed away in November 2015. Now there are only three northern white rhinos living in the world.

There are five species of rhinoceros and, unfortunately, all are endangered. The population of each species of rhino is declining for several different reasons. However, the biggest issue for all of them is poaching, or illegal hunting. Some people believe the horn of the rhinoceros has special powers, so they will pay a lot of money for one. But the truth is, the rhino’s horn is just a big clump of fibrous proteins. In fact, the horn is made of the exact same proteins as your hair and fingernails!

As we learn more about animals from around the world, we tend to appreciate them more, as well. And we are all hopeful that as more people learn about the rhinoceros, more people will join together to save them.



The Frozen Zoo®

How do you save an animal that has already disappeared? Genetic researchers at the Institute for Conservation Research, located next to the San Diego Zoo Safari Park, hope they have the answer—The Frozen Zoo. As the name implies, this “zoo” contains frozen animal material, from tissue and blood to semen and ova (eggs). The Frozen Zoo holds the genetic material from 12 individuals of the critically endangered northern white rhinoceros. From these samples, geneticists hope to culture pluripotent stem cells, which can be triggered to create any tissue in the body. It is possible that technical advances in the future might be able to use these types of cells to induce surrogate pregnancies in southern white rhinoceroses.

You can be a hero for wildlife, too. Go to endextinction.org to find out how.





Northern White Rhinoceros

Ceratotherium simum cottoni

HABITAT

In the wild, the last remaining northern white rhinos live on grassland plains in Kenya, Africa. Historically, populations ranged from Kenya and Ethiopia in the east to Nigeria and Ghana in the west.

BEHAVIOR

Because of its large size, a rhino must spend many hours eating to get enough energy to survive. It may spend up to 10 hours a day grazing on grass. When not eating, it lies down to rest or wallows in muddy pools to stay cool. An adult male rhino stays by itself, defending his territory and looking for females. Female white rhinos may group together with other younger rhinos. Mothers and calves stay together for a year or longer.

CONSERVATION

There are only three northern white rhinos, as of November 2015. Two females and a male live on a conservancy in Kenya. Like all rhinos, northern white rhinos are hunted for their horns. Horns may be ground into a powder and added to folk medicines or displayed as a status symbol.

The International Union for Conservation of Nature (IUCN) lists this rhinoceros as **Critically Endangered**.



Southern White Rhinoceros

Ceratotherium simum simum

HABITAT

This white rhino lives in the grasslands of southern Africa, where the weather is warm and rainfall is about 27 inches (700 millimeters) per year.

BEHAVIOR

Female white rhinos are more social than black rhinos. Sometimes females, their calves, and older juveniles gather in groups of up to 14. A group of rhinos is called a crash. They eat grass most of the day, resting during the midday heat. Southern white rhinos can go a couple of days without drinking water.

CONSERVATION

The southern white rhino was once in danger of disappearing, too. In the late 1890s, there were fewer than 100 individuals; but today, a more healthy population of over 20,000 survive in South Africa, Namibia, Zimbabwe, and Kenya. People concerned with this rhino helped save it by creating sanctuaries and patrolling the areas where rhinos live. Since the 1970s, the San Diego Zoo Safari Park has welcomed more than 90 southern white rhinos and leads the world in successfully breeding white rhinos.

The International Union for Conservation of Nature (IUCN) lists this rhinoceros as **Near Threatened**.



Black Rhinoceros

Diceros bicornis

HABITAT

The black rhino lives in southern and eastern Africa, including countries such as Kenya, South Africa, Zimbabwe, and Namibia. It ranges through many areas, including wooded savannas, wet forests, and semi-arid deserts.

BEHAVIOR

These big rhinos need to eat, and they spend most of their day doing it. They are browsers, searching for and eating leaves and twigs from bushes and small trees. Both males and females spend their time alone. However, if they do meet, they usually tolerate each other without chasing and fighting. Black rhinos can go five days without a drink of water.

CONSERVATION

Like the white rhino, the black rhino doesn't survive when poachers cut off its horns. The black rhino population fell to a few thousand individuals in 1995, but now the population is growing. Conservation efforts at the San Diego Zoo Safari Park have resulted in the birth of more than 10 black rhinos.

The International Union for Conservation of Nature (IUCN) lists this rhinoceros as **Critically Endangered**.



Greater One-Horned Rhinoceros

Rhinoceros unicornis

HABITAT

The greater one-horned rhino lives among the tall grasslands and marshes in Nepal and northern India. During monsoon season when rivers rise, it often moves upland to higher and drier ground.

BEHAVIOR

This is the second biggest rhino (after the white rhino) and it must eat a lot, munching on grasses day and night. When not eating, it is resting or rolling around in mud holes. Males and females usually live alone. Males defend their territories, and fights between males can be fatal. They use their large lower teeth, called tusks, to jab at each other. Moms and calves stay together for about a year and a half.

CONSERVATION

Because of dedicated people and strong conservation programs, the populations of greater one-horned rhinos in India are steadily increasing. But the major threat is still poaching, the illegal hunting and killing of rhinos for their horns. More than 65 greater one-horned rhinos have been born at the San Diego Zoo Safari Park.

The International Union for Conservation of Nature (IUCN) lists this rhinoceros as **Vulnerable**.



Javan Rhinoceros

Rhinoceros sondaicus

HABITAT

The majority of the Javan rhino population lives in Ujung Kulon National Park in western Java, an island in Indonesia. It roams through tropical rain forests, staying close to rivers and streams.

BEHAVIOR

Like most other rhinos, the Javan rhino lives by itself. Males and females only meet to mate. Females give birth to one calf and stay together for about a year. Its daily activities include walking through the forest, and eating leaves, shoots, and twigs. To cool off, it rolls in the mud along the stream banks.

CONSERVATION

Scientists believe there are fewer than 60 Javan rhinos alive today. They live in a part of Java that is difficult to reach, so scientists know very little about these rare rhinos. Even though they are protected from poachers, these rhinos are at risk from disease and from loss of habitat.

The International Union for Conservation of Nature (IUCN) lists this rhinoceros as **Critically Endangered**.



Sumatran Rhinoceros

Dicerorhinus sumatrensis

HABITAT

This rhinoceros lives on the island of Sumatra in Indonesia. It roams the lowland tropical rain forests and the mountainous mossy forests. It swims in swamps, shallow rivers, and even the ocean. It is the smallest rhino, weighing up to 2,100 pounds (950 kilograms).

BEHAVIOR

This rhino is a browser; that is, it eats leaves and twigs from young trees and shrubs. It spends most of its day moving through the forest, looking for plants to eat. During the hottest part of the day, it rests in shady spots or in shallow, muddy puddles. Males and females live by themselves. Mothers and calves stay together for two to three years.

CONSERVATION

Scientists are still learning about the rare Sumatran rhino. Recent studies using camera traps have revealed more information about its eating habits and daily movements. Unfortunately, poaching and habitat loss has decreased the total rhino population by half, to about 275 individuals today. Scientists consider this rhino to be the most endangered large land mammal on Earth.

The International Union for Conservation of Nature (IUCN) lists this rhinoceros as **Critically Endangered**.

GRADE K

Super Survivors

TEACHER RESOURCES
Visit sandiegozoo.org/teacherresources
to find this curriculum in a PDF format.

LEARNING OUTCOME

Students recognize a repeating pattern, as both animals and people need food, water, and space in order to live. *NGSS performance expectation: K-LS1-1*

INTRODUCTION

All living things need water, food, and space for shelter and raising young. People and rhinoceroses need these things too, but we find them and use them in different ways. For example, both people and rhinos drink water—people usually from a bottle or cup and rhinos from a lake or river.

For food, people eat a variety of items, both plant and animal. Rhinos are herbivores, eating only plants. For shelter, people build houses, while rhinos sleep outside in tall grasslands or open bush land.

MATERIALS

- Picture of a rhinoceros. You can find rhinoceros pictures starting on page 48.
- Copy of *Super Survivors* activity sheet, one per student
- Scissors
- Glue sticks
- The book *Rita's Rhino* by Tony Ross

ACTIVITY

Step 1: Begin activity with a class discussion to assess prior knowledge. Focus on what living things need to survive by asking leading questions such as, “What do you need to survive? What do animals need to survive? Do we need the same things as animals?” Repeat and emphasize common answers such as food, water, and space for shelter and raising young.

Next show a picture of a rhino. Ask students, “Can you name this animal? What do you think it needs to survive? Where do you think it lives? What do you think it eats?”

Step 2: Distribute activity sheet *Super Survivors*, scissors, and glue sticks. Tell students that the handout shows two places to live, a house, and an African plain. Ask students to cut out the person and the rhinoceros, and paste each into its home.

Step 3: When ready, ask students to show their work and explain their choices. Tell students that people and rhinoceroses need a few more things in order to survive.

Step 4: Ask students to complete the activity sheet by cutting out the other pictures, and placing them next to either the rhinoceros or the person. Students may draw any additional items they think a person or a rhino needs to survive.

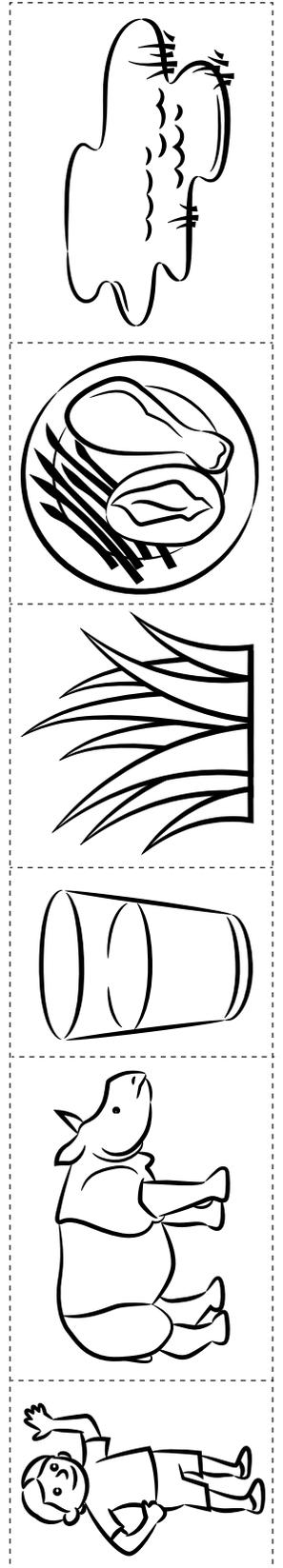
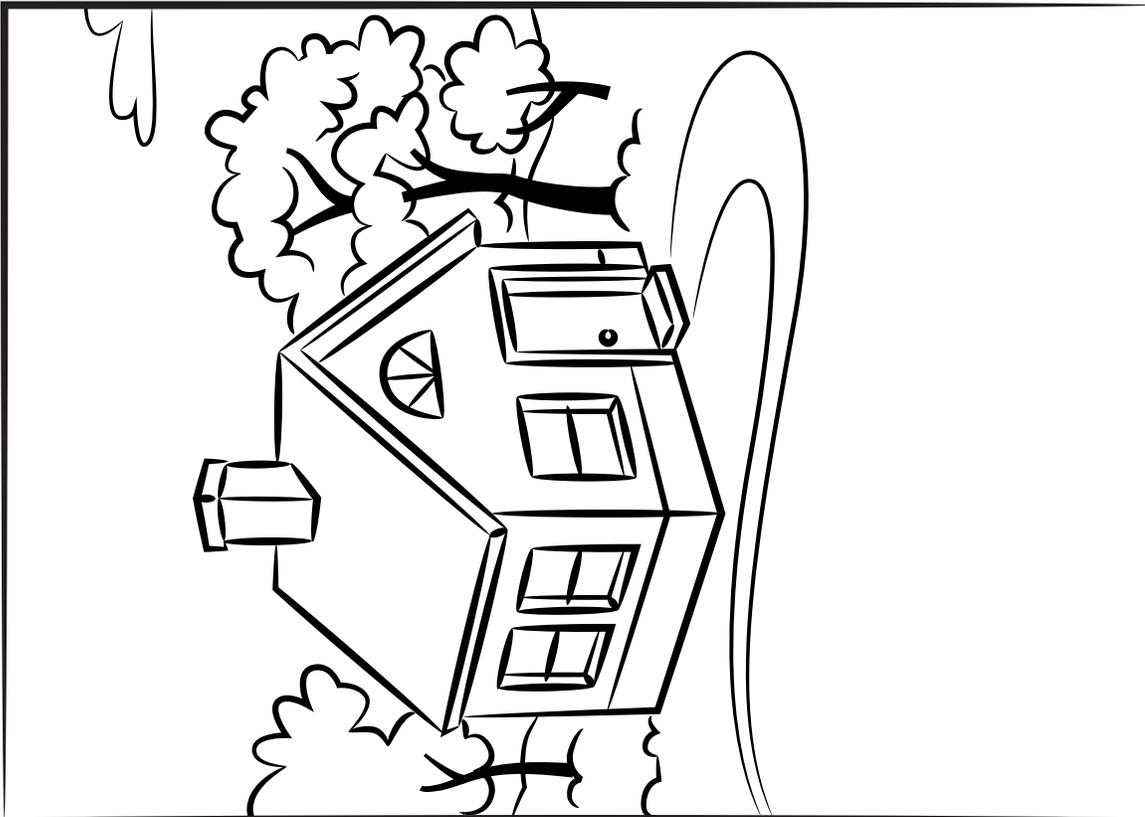
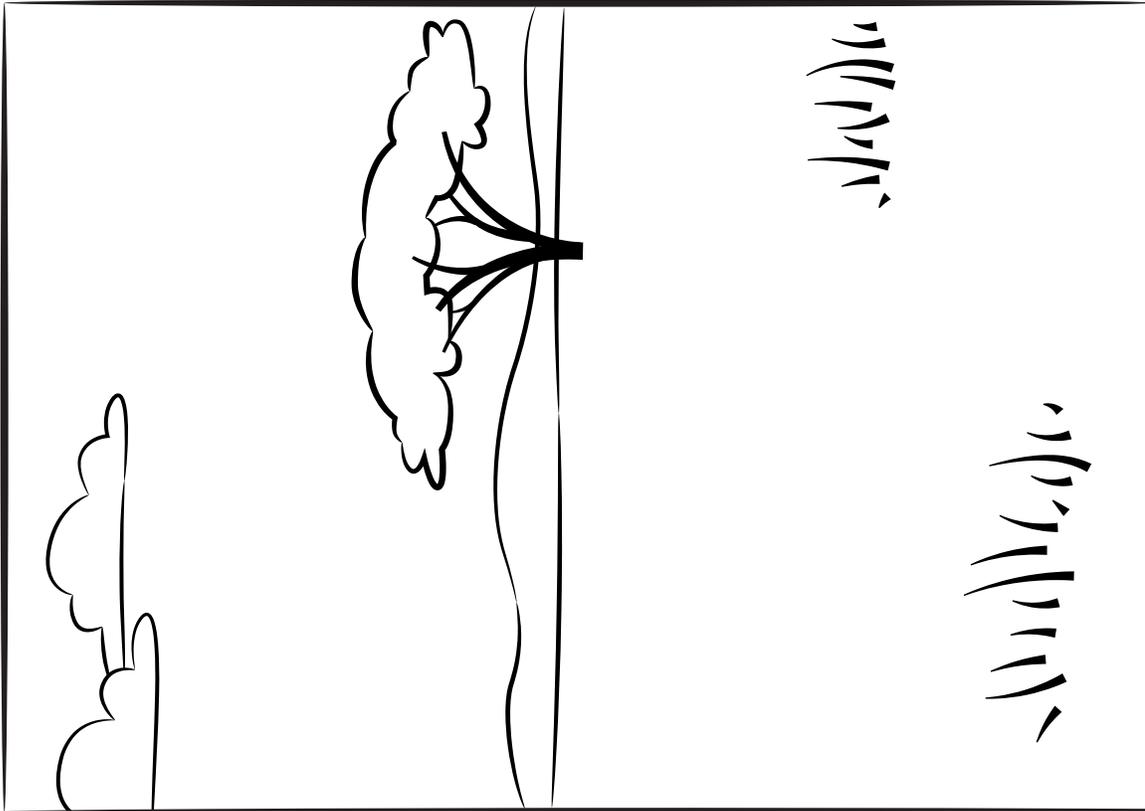
Step 5: Read the story *Rita's Rhino*. Discuss as a class what the rhino needed (*African grass, a bigger place to live*) and what Rita needed (*toast with marmalade and her bedroom*). Why didn't the rhino stay with Rita?

At the Safari Park

When at the San Diego Zoo or San Diego Zoo Safari Park, look for a rhinoceros and the enclosure where it lives. Can you see where it drinks water? Can you see what it eats?



GRADE K
Super Survivors ► activity



GRADE K

Rhino STOMP

TEACHER RESOURCES
Visit sandiegozoo.org/teacherresources
to find this curriculum in a PDF format.

LEARNING OUTCOME

Students recognize two threats to a rhino's survival.

INTRODUCTION

Hunting and habitat loss threaten the lives of rhinoceroses in Africa and Asia. The greatest threat is illegal hunting, called poaching, for rhinoceros horns. Poachers kill rhinoceroses by cutting off their horns. The horns are then illegally sold to many buyers. The horns are ground into a powder that is used in Asian folk medicines, or they may be sold whole; owning one is considered a status symbol. In South Africa, more than 1,200 rhinoceroses died from poaching in 2014. This is 5 percent of the total population of only 24,000 rhinoceroses.

MATERIALS

- Map of world showing Africa and Asia.
- Pictures of each of the five rhinoceroses species, either digital or print. You can find rhinoceros pictures starting on page 48.
- Copy of *Rhino STOMP*
- Open area or school yard, so students can sing and move

ACTIVITY

Step 1: Begin activity with a class discussion to assess prior knowledge about rhinoceroses. Ask leading questions such as, "Who can tell me where rhinos live? What do they eat? How do they move?" Tell students there are five kinds of rhinoceroses, and two species live in Africa and three species live in Asia. Present to the students the world map, and ask for student volunteers to identify these places. Show pictures of the five species and tell a little about each, including the horns—one or two—on their heads.

Ask students to look at their fingernails and hair. Tell them that a rhino's horn is somewhat like our fingernails and hair. Some people believe a rhino's horn can cure diseases, and so they hunt rhinoceroses and cut off their horns.

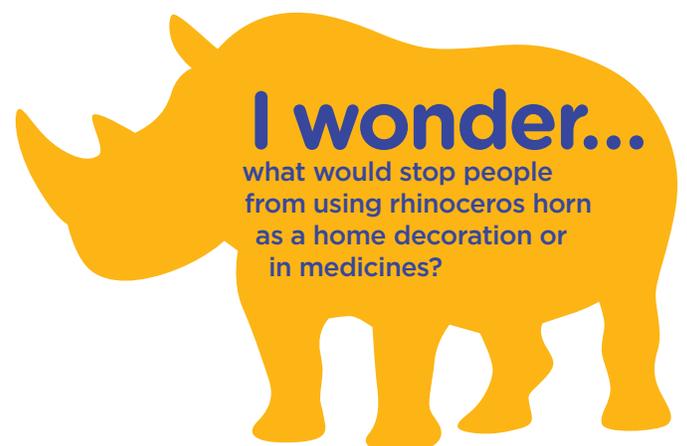
Step 2: Tell students that many people are trying to save rhinoceroses from poachers. One way to save rhinoceroses is to talk with other people about them. This is a chant about saving rhinoceroses.

Lead students to an open area or school yard, and introduce the Rhino STOMP, a call-and-repeat chant. The rhythm follows the marching cadence used in the Army and Navy marching songs.

Step 3: After chanting, ask students to group together and sit. Ask open-ended questions such as, "How did you feel about the chant? What questions do you have about rhinos? How do you think we might protect them?"

Be a Hero for Wildlife.

Small actions can make a big impact. You can help rhinos by singing the chant and telling other people about rhinos.



GRADE K Rhino STOMP ► activity



RHINO STOMP

This is a call-and-repeat chant using the rhythm of the Army and Navy marching songs.



Stomp stomp stomp stomp
Stomp stomp stomp stomp
(students stamp feet to rhythm)

Rhinoceroses big and small *STUDENTS REPEAT*
(students use arms and hands to show big and small)

The Safari Park wants to save them all. *REPEAT*
(students cross arms over chest)

Sumatran, Javan, white, and black *REPEAT*
(students use fingers to count five rhino species)

Greater one-horned rhino bring ‘em all back *REPEAT*

Rhino RALLY...rhino RALLY...rhino RALLY...rhinos—SAVE THEM

Rhino horn is made of hair *REPEAT*
(students touch or lift hair on their heads)

It’s not medicine—so beware *REPEAT*
(students make rhino horn with hands on head and shake back and forth)

Rhinos are endangered—yes it’s true *REPEAT*
(students shake rhino horn up and down)

I want to save them—how about you? *REPEAT*
(students point finger to self and classmates)

Rhino RALLY...rhino RALLY...rhino RALLY...rhinos—SAVE THEM



GRADE 1

Who's My Rhino?

LEARNING OUTCOME

Students observe, identify, and match characteristics to identify three species of rhinoceros—black, southern white, and the greater one-horned. *NGSS performance expectation: 1-LS3-1*

INTRODUCTION

There are five rhinoceros species living today; two (white and black) live in Africa and three (Sumatran, Javan, and greater one-horned) live in Asia. The largest and heaviest rhinoceros is the white rhinoceros, with males weighing as much as 5,070 pounds (2,300 kilograms). The black rhinoceros is smaller at 3,970 pounds (1,800 kilograms). White and black rhinoceroses may look similar—both have two horns—but the white rhinoceros has a square lip and grazes on grass while the black rhinoceros has a pointy lip and pulls leaves and twigs from small trees.

The greater one-horned rhinoceros lives in Nepal and northern India and is almost as large as the white rhinoceros. It has only one horn. It eats grasses that grow alongside rivers.

The two remaining rhinoceros species live in Indonesia: the Javan and Sumatran rhinoceroses. The smallest rhinoceros is the Sumatran, weighing 2,100 pounds (950 kilograms). It lives on the small island of Sumatra, and is considered to be the rarest of rhinoceroses. The Javan rhinoceros lives on the island of Java.

MATERIALS

- Full-body pictures of adult and juvenile black, southern white, and greater one-horned rhinoceroses, either digital or print. One set for each student group. You can find rhinoceros pictures starting on page 48.
- Pencils

At the Zoo or Safari Park

When at San Diego Zoo or Safari Park, ask a Zoo or Park volunteer wearing a red shirt if there are any rhino calves. If so, go to the enclosure to see the rhino calf. How is it the same and how is it different from its mother?

ACTIVITY

Step 1: Begin this activity by showing a picture of a black rhinoceros. Ask students if they can name this animal (*acceptable answers are rhino, or black rhino*). Ask students if they can identify some of the physical characteristics—body parts—of the rhinoceros (*focus on the head, horns, ears, tail, feet, and mouth/lip*).

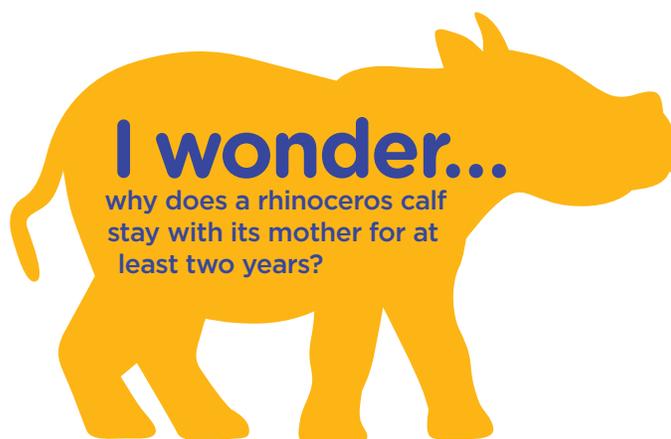
Tell students this is a picture of a black rhinoceros, and there are four other kinds of rhinoceroses alive today. Ask students leading questions such as, “Do you think all rhinos look the same? What do you think might be different?” After students have stated their answers, show pictures of white and greater one-horned rhinoceroses. Guide students to look at horns, ears, head shape, and skin to distinguish these species.

Step 2: Ask students to work in pairs. Distribute pictures of the three rhino species, both juvenile and adults, to each student pair. Ask students to work together to match juveniles to adults.

Step 3: When ready, review student results. Ask students to explain what characteristics they used to pair young and parent together. Did all students use the same characteristics? What was the same? What was different?

Step 4: Ask students to circle on each picture the body part(s) that distinguished that rhinoceros. For the white rhinoceros, it could be the square lip and two horns; for the black rhinoceros, it could be the pointy lip and two horns; for the greater one-horned rhinoceros, it could be having only one horn.

Step 5: Assess students' knowledge by showing a picture of an adult rhinoceros to the class, and asking students to identify it by name. After the picture is correctly identified, ask students to hold up the picture of that rhino's calf.



GRADE 1

Puzzle Play

▶ **TEACHER RESOURCES**
Visit sandiegozoo.org/teacherresources
to find this curriculum in a PDF format.

LEARNING OUTCOME

Students use puzzle pieces to build pictures of a southern white rhinoceros and a greater one-horned rhinoceros to compare physical characteristics.

INTRODUCTION

White and greater one-horned rhinos live in completely different places. The white rhinoceros roams African grasslands—places with relatively dry, wide-open space and scattered trees. The white rhinoceros eats grass, can go a few days without drinking water, and can't swim. In comparison, the greater one-horned rhinoceros lives in the tall grasslands and marshes in Nepal and India. This rhino can swim, and eats plants that grow beside waterways.

MATERIALS

- Full-body pictures of southern white and greater one-horned rhinoceroses along with their calves, either digital or in print. You can find rhinoceros pictures starting on page 48.
- Copies of the *Puzzle Play* activity sheet, one per student
- Copies of blank *Puzzle Play* sheet, one per student
- Markers or colored pencils
- Scissors

ACTIVITY

Step 1: Begin activity by showing pictures of a white rhinoceros and a greater one-horned rhino side by side at the same time. Ask students to identify the animal (rhino) and the names (white and greater one-horned). Ask students leading questions such as, "Here are two rhinos. Are they the same? What is different? Can anyone name them? Where do they live?"

Step 2: Distribute puzzle sheets, scissors, and colored markers or pencils to students. Ask students to color the pictures, and cut apart the puzzles on the dotted lines. Create student pairs; then ask students to exchange puzzles. Can students match pieces?

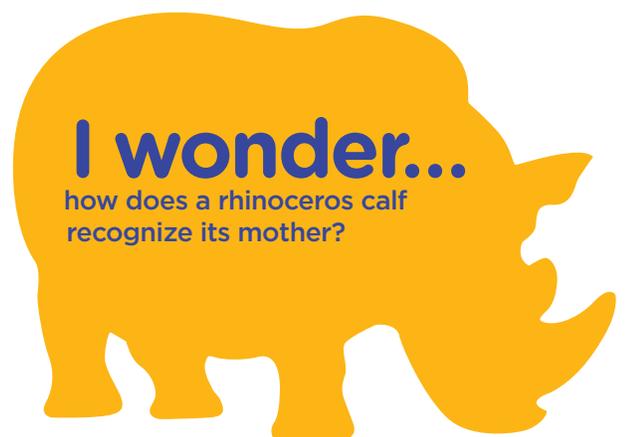
Step 3: After finishing the puzzle, ask students to pair/share their differences in the methods they used to put their puzzles together. Was there a characteristic that helped match pieces? Tell students that the white rhinoceros has two horns while the greater one-horned rhino has only one. Did the calves also have the same number of horns?

Step 4: Distribute blank puzzle sheets. Ask students to draw and color a rhinoceros (real or imaginary), cut apart their puzzle, and share again.

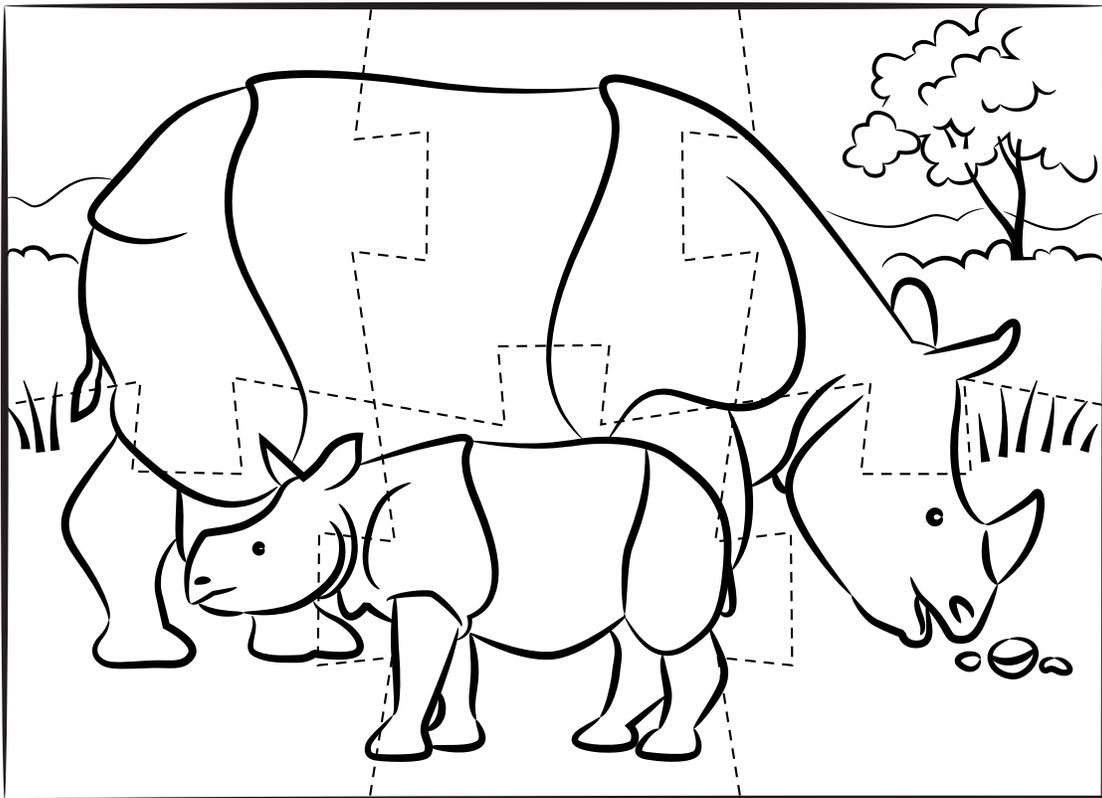
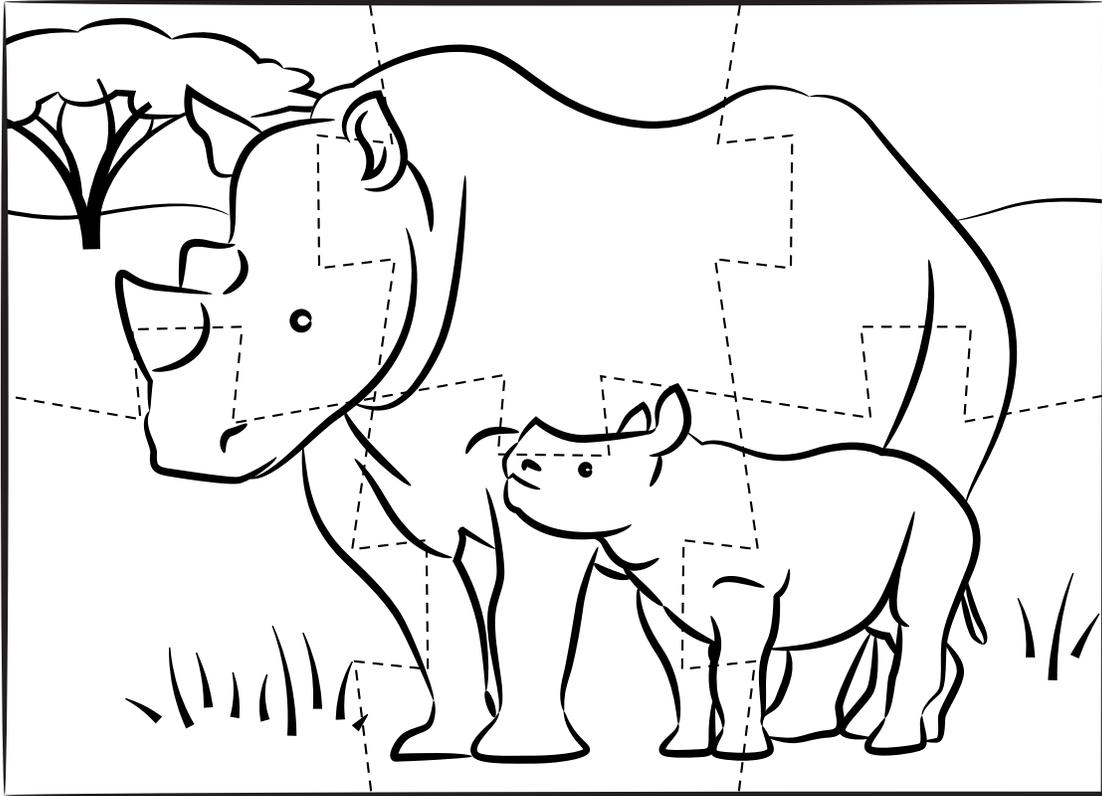
Step 5: As a class, have student pairs share their unique puzzles and relate their experiences.

At the Safari Park

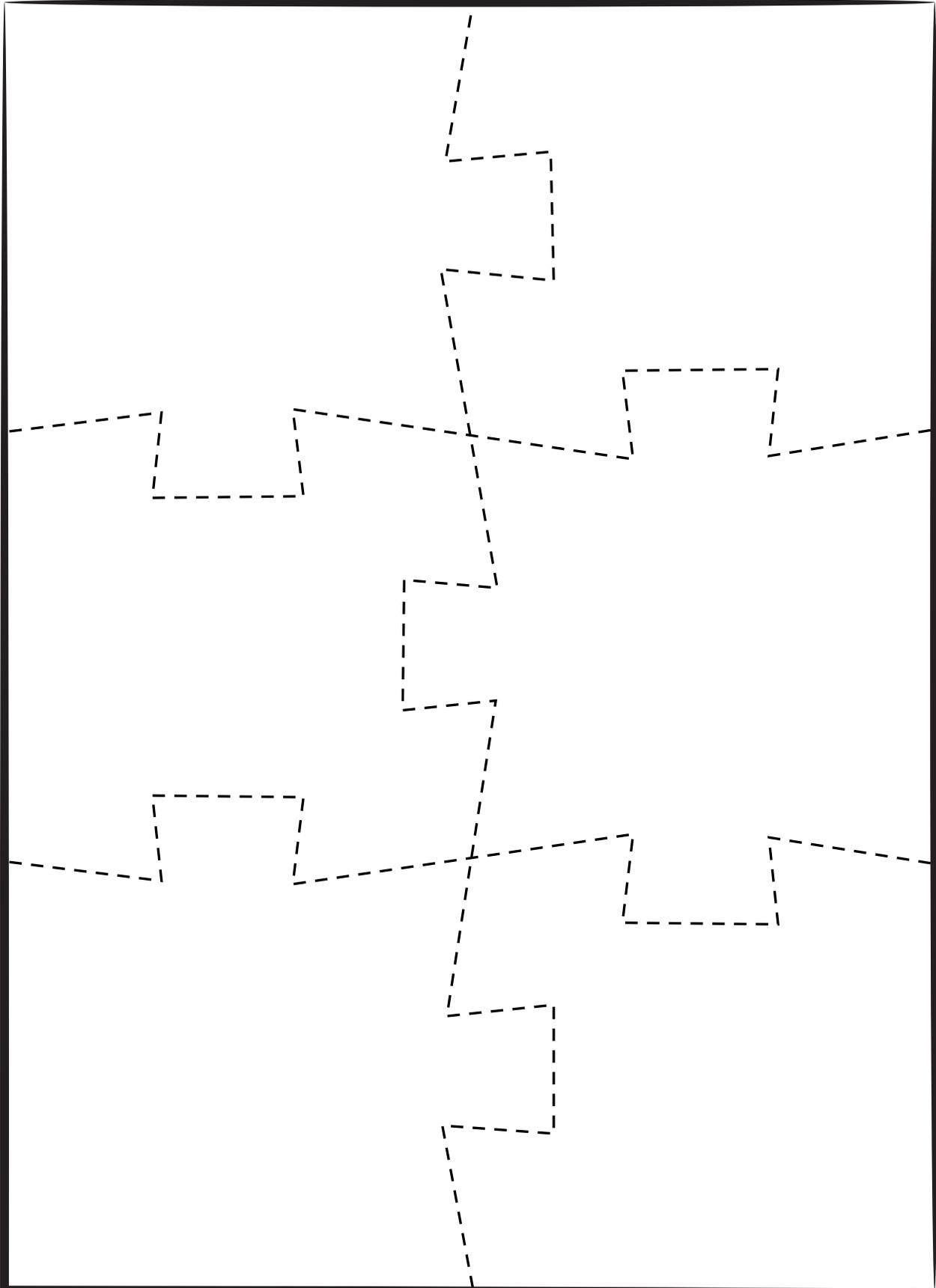
When at the San Diego Zoo Safari Park, look for rhinoceros calves and their moms. Since the mid-1970s, the Safari Park has welcomed more than 10 black rhinos, 90 southern white rhinos, and 65 greater one-horned rhinoceros calves. Congratulations!



GRADE 1
Puzzle Play ► activity



GRADE 1
Puzzle Play ▶ activity



GRADE 2

Hitchin' a Ride

TEACHER RESOURCES
Visit sandiegozoo.org/teacherresources
to find this curriculum in a PDF format.

LEARNING OUTCOME

Students create an action strip (sequence model) and build a balanced mobile to show how a rhino's eating habits influences seed dispersal.
NGSS performance expectation: 2-LS2-2

INTRODUCTION

Rhinoceroses are herbivores; they eat plants. Some rhinoceroses, like the white rhinoceros, graze on grasses. Other rhinoceroses, like the black and the greater one-horned rhinoceroses, eat leaves, twigs, and fruits. Most fruits contain hard seeds that can't be digested. These seeds often pass through the digestive tracts of rhinoceroses to be deposited on the ground in a different area of the forest or grassland than where the original plant grew. For example, scientists studying the feeding habitats of the greater one-horned rhinoceros found that the seeds of the tropical tree *Trewia nudiflora* sprouted and grew best in open grassland areas where the rhinoceros had deposited them. Rhinoceros dung fertilizes the seeds.

MATERIALS

- Picture of a black rhinoceros, either digital or print. You can find a black rhinoceros picture on page 48.
- Copies of *Hitchin' a Ride* activity sheet, one set for each student group
- Scissors
- Construction paper
- Color markers or pencils
- String
- Tape
- Paper clips
- Straight (not flexible) straws, three to four per student group

ACTIVITY

Before beginning activity, build a mobile as an example for students to model. See page 18.

Step 1: Begin activity with a class discussion to assess prior knowledge. Ask students, "What is a seed? What sprouts from seeds? How do seeds get to different places? Do we help seeds get to

different places?" Ask students if they ate a piece of fruit for lunch. Apples, oranges, grapes, plums, and other fruits have seeds.

Show a picture of a black rhinoceros. Ask students if they know this animal, and if they know what it eats. What happens when rhinos eat fruits with seeds?

Step 2: Divide students into groups; give each group a set of eight *Hitchin' a Ride* cards, along with scissors and colored markers or pencils. Ask students to work together to cut cards apart and arrange in chronological order. What happens first? Second?

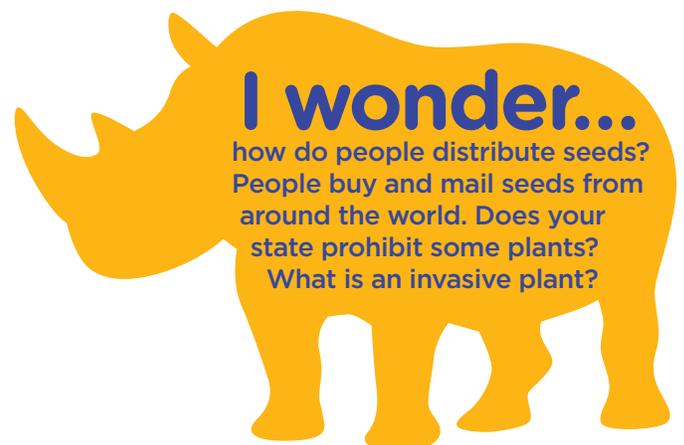
Step 3: Show copies of the eight cards and discuss the sequence as a class. When students reach consensus, tell them to write the correct number (1 to 8) the back of their cards. Discuss some of the strategies for placing the cards in this order.

Step 4: Students may color the cards while you distribute construction paper, tape, straws, paper clips, and string. Ask students to use these materials to build a balanced mobile. (*Show your model as an example.*) Students can build their mobile in any shape; however, they should keep the cards in order. Paper clips can be used as weights for balancing.

Step 5: Hang card sequences around room. Have students examine other groups' projects, and evaluate one strong point and an area for improvement for five of their favorites.

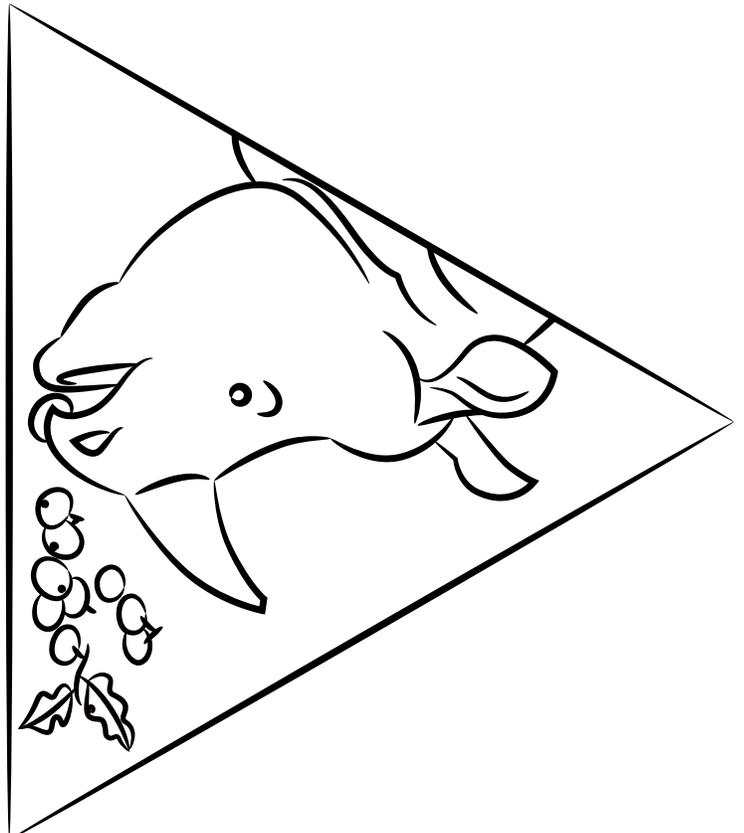
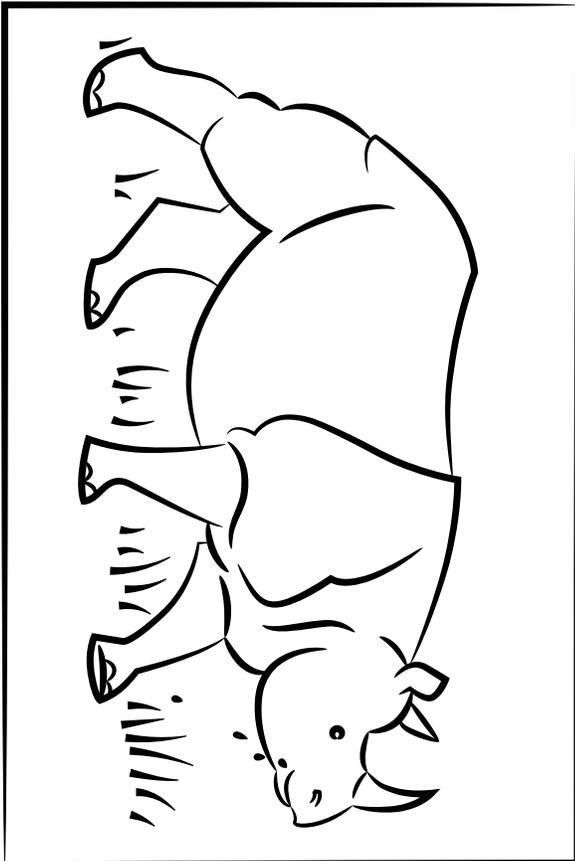
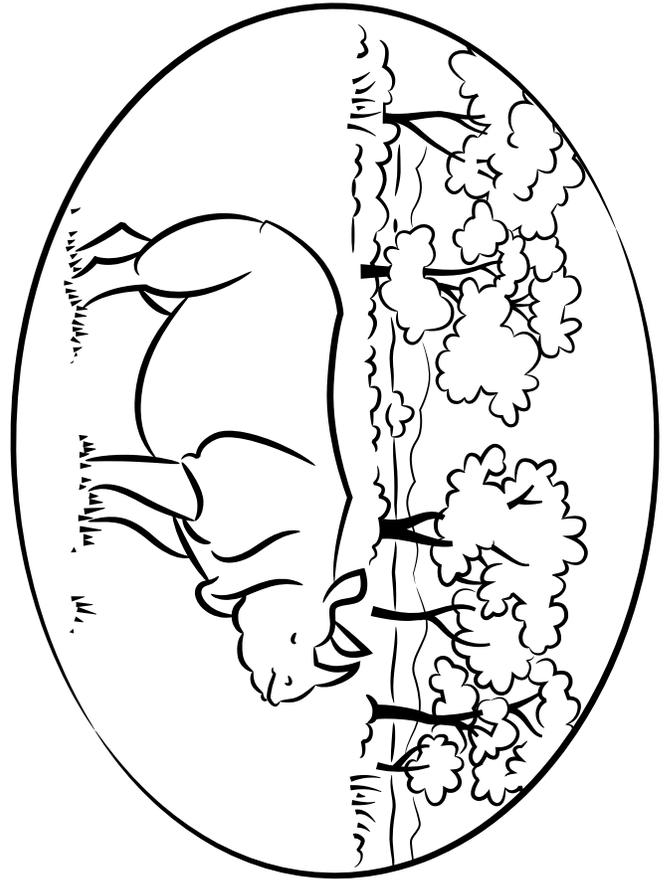
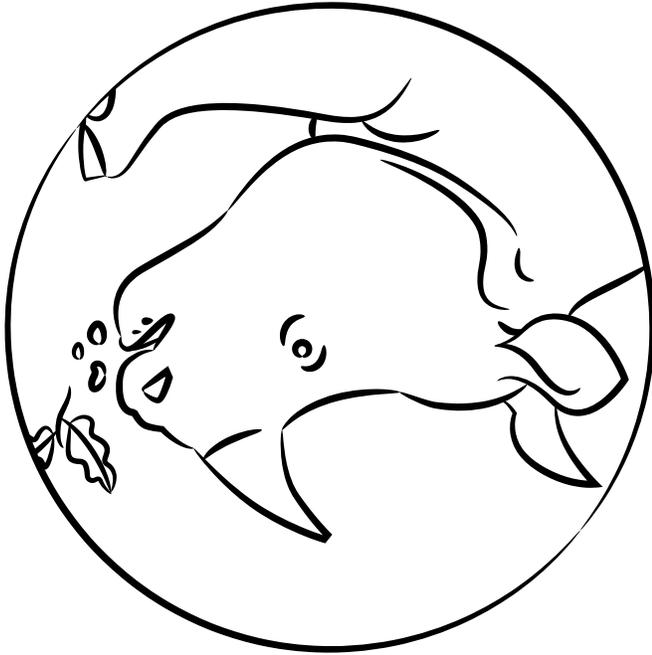
As a concluding discussion focusing on cause and effect, ask students, "What would happen if rhinos disappeared from the land? What would happen to the plants?" (*Seeds would not be dispersed; plants wouldn't grow in new places.*)

At the Zoo or Safari Park
Look for rhinos and what they eat.
Can you see any rhino dung? Why does it help seeds grow?

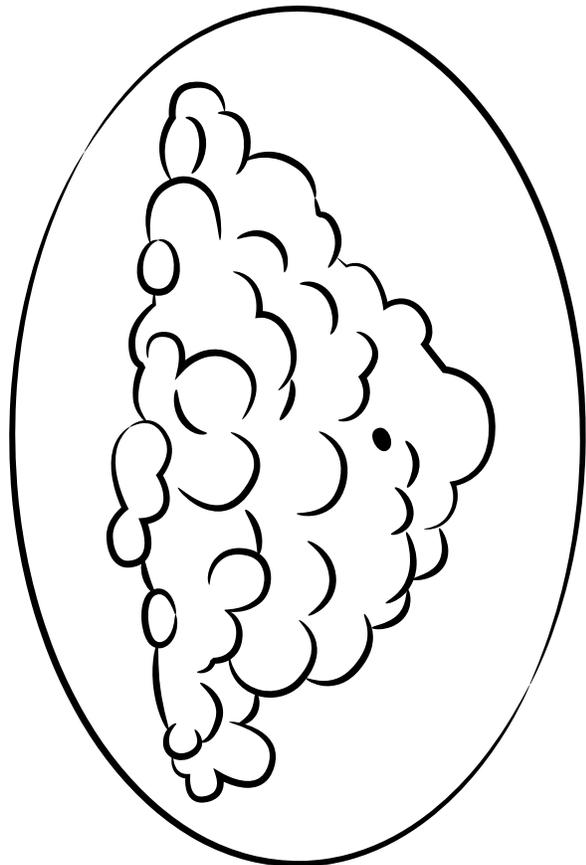
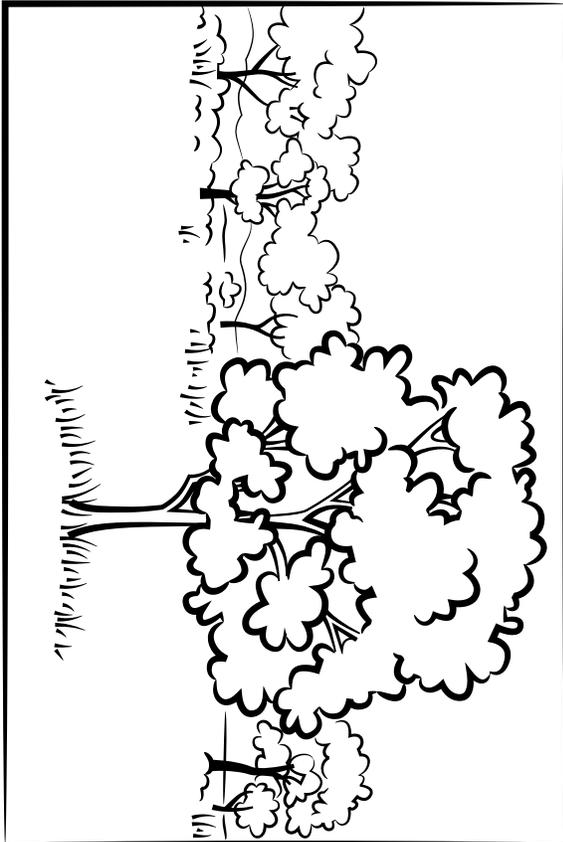
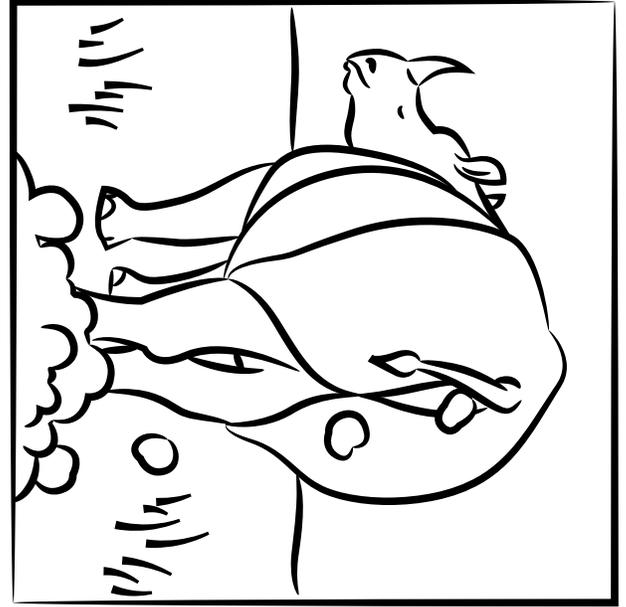
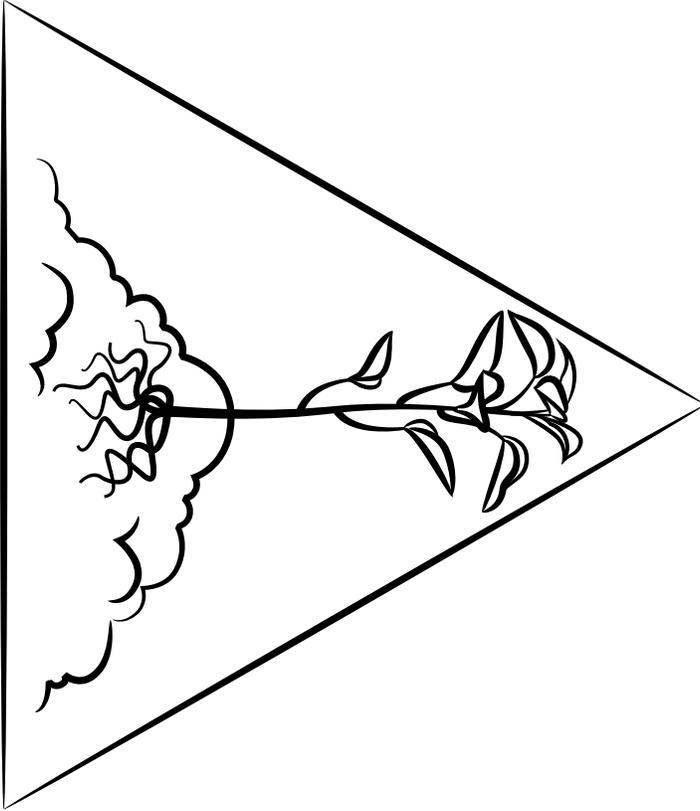


GRADE 2

Hitchin' a Ride ▶ activity



Hitchin' a Ride activity



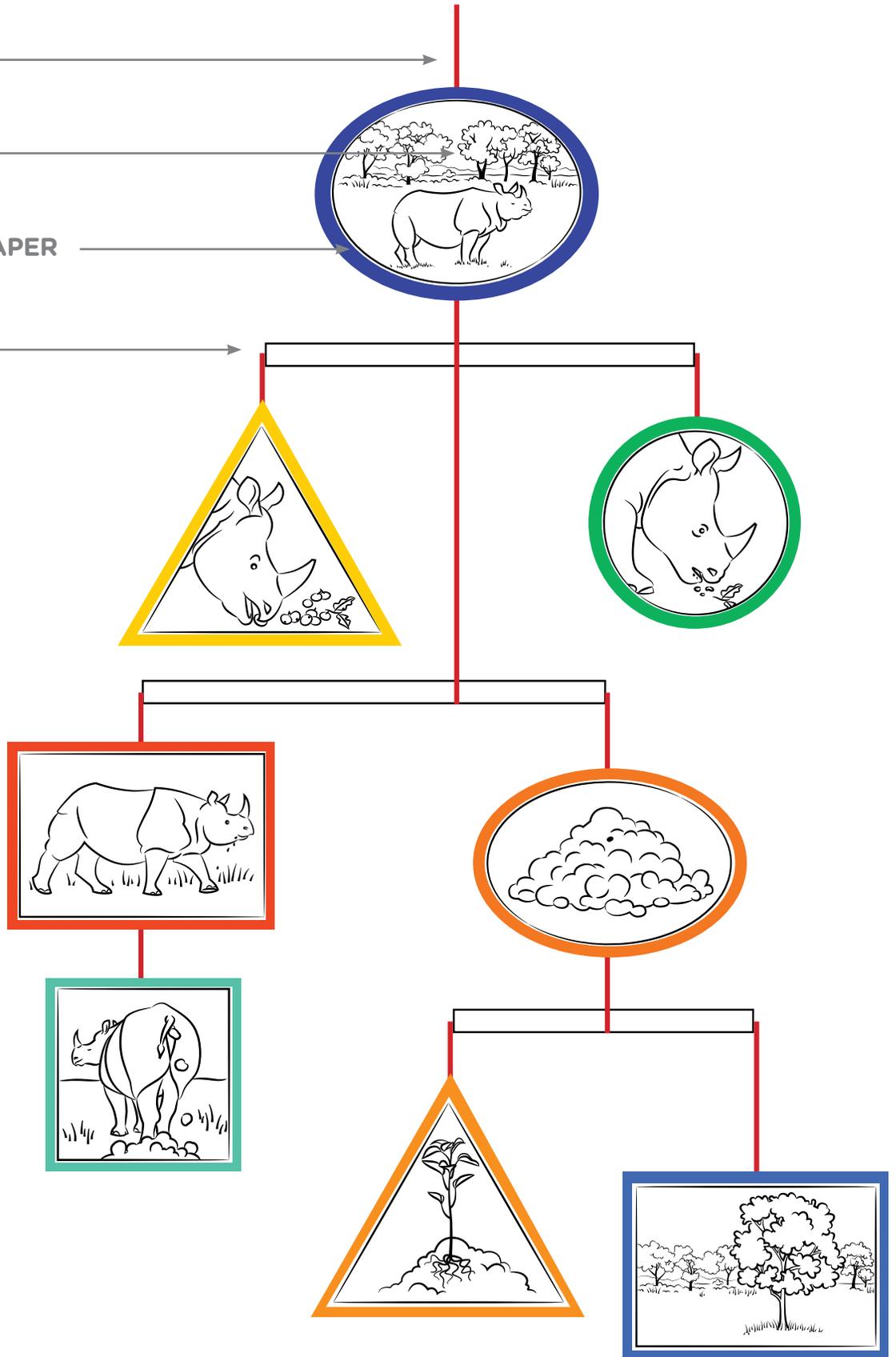
GRADE 2 Hitchin' a Ride ► activity

STRING

CARD

CONSTRUCTION PAPER

STRAW



GRADE 2

Poo Paper Fun

TEACHER RESOURCES
Visit sandiegozoo.org/teacherresources
to find this curriculum in a PDF format.

LEARNING OUTCOME

Students create plant paper that models how the feeding behavior of rhinos disperses seeds.

INTRODUCTION

We use paper every day, but do you know where it comes from, and how it is made? Paper is mostly made from wood scraps and pulp, but also from rice and hemp fibers, and even from the dung of large herbivores like rhinos, giraffes, or elephants. Why dung? Large herbivores eat large amounts of plant matter they can't digest. For example, an adult elephant eats up to 300 pounds (136 kilograms) of roots, grasses, and bark each day. Most of it passes undigested into 100 pounds (45 kilograms) of elephant dung per day. In the wild, undigested seeds sprout in the dung. The dung provides important nutrients, which help the plants grow. Papermaking with flower seeds models how this process of seed dispersal occurs.

MATERIALS

Per paper station

- 1 cup finely shredded newspaper
- 10 to 15 sheets of newspaper
- 4 cups water (works best with warm to hot water)
- Mixing bowl
- Eggbeater (or one electric blender for all stations)
- Wide pan or washing tub
- Stiff metal screen that fits inside wide pan or washing tub
- 2 teaspoons liquid starch
- Flower seeds
- 2 sheets blotting paper (available at most art supply stores)

Per student

- Science journal or notebook for observations
- Pencils

At the Zoo and Safari Park

When at the San Diego Zoo and the Safari Park, look for "poo paper" in the gift stores.

ACTIVITY

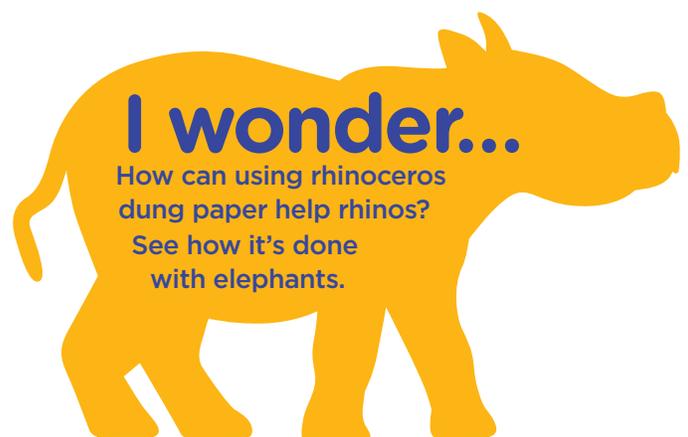
Set up papermaking stations around the classroom before beginning this activity. Each station should include shredded newspaper, water, water bucket or pan, screen, liquid starch, flower seeds, and directions. You can use one electric blender (operated by you) for the classroom, or each station can have an eggbeater.

Step 1: Begin activity by assessing students' prior knowledge. Ask students leading questions such as, "How do we make paper? What materials can we use? Did you know that some companies make paper from animal dung?" Tell students that companies have made paper from elephant, panda, and donkey dung. Today students will learn a simple method for making their own paper—not from dung, but from newspaper.

Step 2: Divide students into groups, and assign one group to each station. Have students follow the directions given at the stations, and create their paper on the drying screen. Set screens aside to dry.

Step 3: Once paper is dry (about 24 hours), cut paper into squares so each student has a square of plant paper. Tell students that companies make special paper out of dung. On a computer or overhead projector, show a few like <http://blogs.sandiegozoo.org/2014/08/12/upcycling-recycling-at-its-finest> or <http://mrelliepooh.com>

Step 4: Ask students to take home their paper to plant outside, or plant in a container in the classroom. In a week or two, ask students follow-up questions to assess how plants are growing.



GRADE 2

Poo Paper Fun ▶ activity

MAKING PAPER

GROWING SEEDS

GRADE 2

Poo Paper Fun activity

Directions

To make your paper, follow these steps:

1. Put shredded newspaper and water in bowl. Mix with eggbeater or blender until it's like a thick soup.
2. Add liquid starch to mixture
3. Add flower seeds to mixture
4. Put screen in shallow pan
5. Pour mixture over screen in shallow pan
6. Slowly lift screen from pan, letting water drip from paper. This may take a couple of minutes.
7. Place blotting paper on top of five extra full sheets of newspaper, then place screen on top of this.
8. Place another sheet of blotting paper on top of screen, then other sheets of newspaper on top of this, and press.
9. Carefully lift newspaper and blotting sheets from screen, and let paper dry for a day. When dry, peel the paper off the screen and cut into squares.

Directions

To make your paper, follow these steps:

1. Put shredded newspaper and water in bowl. Mix with eggbeater or blender until it's like a thick soup.
2. Add liquid starch to mixture
3. Add flower seeds to mixture
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8. Place another sheet of blotting paper on top of screen, then other sheets of newspaper on top of this, and press.
9. Carefully lift newspaper and blotting sheets from screen, and let paper dry for a day. When dry, peel the paper off the screen and cut into squares.

GRADE 3

Family Fest

TEACHER RESOURCES
Visit sandiegozoo.org/teacherresources
to find this curriculum in a PDF format.

LEARNING OUTCOME

Students describe and analyze the grouping behavior of female southern white rhinoceroses. *NGSS performance expectation: 3-LS2-1*

INTRODUCTION

Female southern white rhinoceroses are the most social of the five rhinoceros species. Field researchers have seen females, their young, and also juveniles gather in groups with as many as 14 individuals. A group of rhinoceroses is called a crash. Southern white rhinoceroses live in South Africa, also home to lions that prey upon rhinoceros calves. Grouping together may help females guard their calves from predatory lions.

MATERIALS

- Picture of a female southern white rhinoceros, either digital or print. You can find a white rhinoceros picture on page 50.
- Whiteboard or other large writing surface
- Board marker
- Journal activity sheet, one per student
- Access to internet for ARKive videos arkive.org

ACTIVITY

Step 1: To begin activity, lead a class discussion and brainstorm session about rhinoceros behavior. First, show a picture of a female southern white rhinoceros. Ask students if they can name this animal and where it lives. Ask students to brainstorm a rhino's daily behavior, and write their answers on the whiteboard.

Next, show students female and calf behavior. This suggested video is from the ARKive website arkive.org/white-rhinoceros/ceratotherium-simum/video-si09c.html. Ask for student comments after viewing. Focus on calf and mother interactions, and add any new behaviors to the list.

Finally, show students how young rhinoceroses may become prey for lions or other predators. This suggested video is from the ARKive website is arkive.org/white-rhinoceros/ceratotherium-simum/video-11c.html. Tell students that mother rhinoceroses often protect their calves from predators like lions.

Step 2: Distribute journal activity sheets. Ask students to be field researchers observing white rhinoceroses in Africa. Tell them they have just witnessed a group of female rhinoceroses protecting their young from a lion. What did they see?

Step 3: Ask students to share their stories with one or more of their classmates. Did everyone write the same observation? What was different? What was the same?

At the Zoo or Safari Park

When at the San Diego Zoo or Safari Park, look for other animals with young. Do these other animals show protective behavior?



GRADE 3

Black and White

TEACHER RESOURCES
Visit sandiegozoo.org/teacherresources
to find this curriculum in a PDF format.

LEARNING OUTCOME

Students compare and analyze the social behavior of white rhinoceroses and black rhinoceroses.
NGSS performance expectation: 3-LS2-1

INTRODUCTION

White rhinoceroses and black rhinoceroses live in Africa, mostly in the nations of South Africa, Namibia, Zimbabwe, and Kenya. Although they may occupy the same countries, they live in different habitats; white rhinoceroses favor grasslands, while black rhinoceroses prefer wooded areas with small trees. Their social behavior is also different. Black rhinoceroses are solitary, with adult males living alone and females staying by themselves unless raising young. White rhinoceros males are also usually by themselves, but females are more social. They often gather in small groups with their calves and other juveniles.

MATERIALS

- Map of Africa showing country names and borders. You can find an image on page 45
- Copies of *Rhino Cards*, one set for each student pair
- Access to internet, library, or other resources for information
- *Black and White* activity sheet
- Blank paper

ACTIVITY

Step 1: Begin activity with a class discussion to assess prior knowledge about African rhinoceroses, both white and black. Ask leading questions such as, “Who can name the two kinds of rhinoceroses that live in Africa? Can anyone show me on the map where they live? What do you think they eat? What do you think they do during a typical day?”

Step 2: Create student pairs and distribute rhinoceros cards. Ask students to work together to read the cards and discuss differences they might find between them.

Distribute activity sheets and review sections. Do students understand what information they should find? If needed, allow access to the internet and time to research questions.

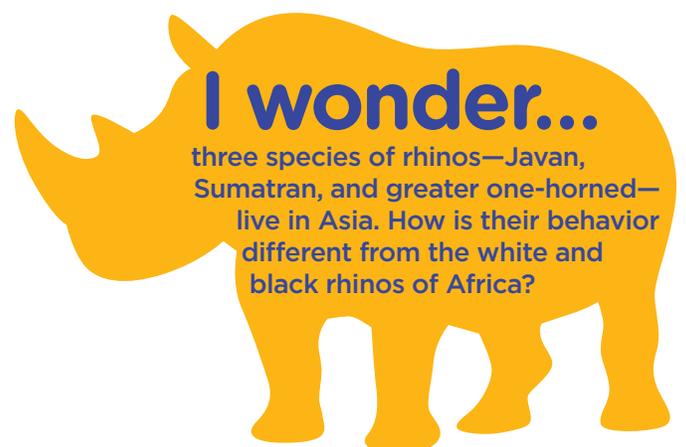
Step 3: When students have completed the activity sheets, review the characteristics as a class. Have student pairs report their research data. What are some of the differences?

Step 4: Ask students to create two new characteristics that they would like to compare. Tell them to work in pairs to find the answers, then write their characteristics and the answers on the activity sheet.

Step 5: Collect papers from students. As a class, read the category and ask other students if they can answer with the correct black or white rhinoceros.

At the Safari Park

When visiting the San Diego Zoo Safari Park, look for white, black, and greater one-horned rhinos.



GRADE 3

Black and White

Instructions:

Read the cards below to help answer the questions on the *Black and White* activity sheet.



Black Rhinoceros

Home

The black rhino lives in southern and eastern Africa, including countries such as Kenya, South Africa, Zimbabwe, and Namibia. They roam many places, from dry desert lands, to wet forests, to savannas.

Diet

Black rhinos eat leaves, twigs, and fruits. They have a pointy upper lip that helps them grab leaves and fruits. Black rhinos are browsers.

Social

Adult male black rhinos stay by themselves and defend their territory from other males. Adult female black rhinos also stay by themselves unless they are with their calf. Young black rhinos usually stay by themselves too.

Predators

Lions and hyenas may attack rhino calves.



Southern White Rhinoceros

Home

White rhinos live in Africa, mostly in South Africa, Namibia, Zimbabwe, Swaziland, and Botswana, with a small population in Mozambique. They roam short grasslands.

Diet

White rhinos eat grass. They have a wide mouth, with square lips, that helps them bite grass. White rhinos are grazers.

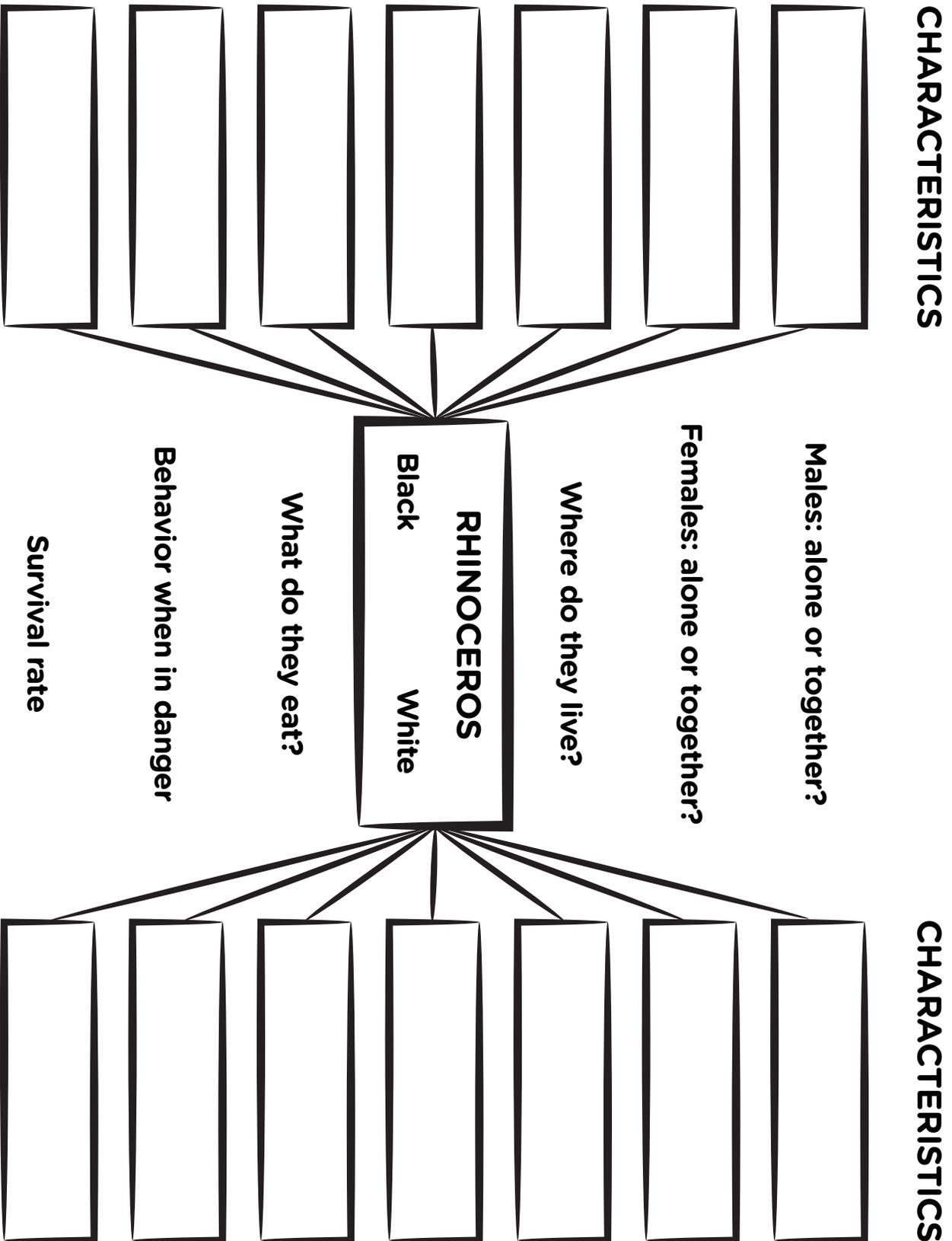
Social

Adult male southern white rhinos stay by themselves and defend their territory from other males. Adult female white rhinos may be by themselves, with their calves, or gather in small groups with other young rhinos. Young rhinos may also stay together for a while. A group of rhinos is called a crash.

Predators

Lions may attack rhino calves.

Black and White ► activity



GRADE 3

Black and White ► activity

MY NEW CHARACTERISTIC



MY NEW CHARACTERISTIC



GRADE 4

What's That I Hear?

LEARNING OUTCOME

Students identify unknown sounds and record their process for recognition. *NGSS performance expectation: 4-LS1-2*

INTRODUCTION

Rhinoceroses rely on their sense of hearing to gather information about their surroundings. They have large, curved ears, and can move each ear independently. This helps them catch noises coming at them from different directions at the same time. In addition, scientists believe rhinoceroses can make and hear sounds that are below the frequency range of human hearing; that is, below 20 hertz. Other animals have infrasonic voices too, such as blue whales and elephants. Field researchers have heard rhinoceroses snort, sneeze, grunt, scream, and “wonk.” Some rhinoceroses, like the black rhinoceros, are more vocal than others.

MATERIALS

Per student group

- Paper bag
- Four to six small noisemakers such as a kazoo, clicker, whistle, pair of drumsticks, party blower, open bottle, or bell
- Copy of *What's That I Hear?* data collection sheet
- Pencil
- Blindfold (optional)

For class

- Whiteboard or large writing surface
- Board markers
- Open area or school yard to accommodate student groups with noisemakers

ACTIVITY

To prepare for lesson, create activity sets that have one paper bag containing four to six noisemakers, a data sheet, and a pencil. Create enough sets for student groups of three.

At the Zoo or Safari Park

When visiting the San Diego Zoo or Safari Park, quietly sit on a bench and close your eyes. Focus on your sense of hearing. Can you identify some of the sounds you hear? Go to another place, and quietly sit again. Did you hear different noises?

Step 1: Begin activity with open questions such as, “Can anyone name our five senses? How do we use our senses? Can someone describe hearing and sound? Do some sounds remind us of past events, or cause us to do something?” (*For example, a school bell, a doorbell, the phone, or a kitchen timer.*) After the open-question prompts, ask students to brainstorm a list of sounds, and what each sound means to them. Continue the discussion with a focus on animals. “Do animals hear the same way as we do? How would an animal use sound?”

Step 2: Divide students into groups, and distribute activity sets along with the *What's That I Hear?* data collection sheet. Ask students to choose a data recorder and a “listener” within their group. Tell the “listener” to close his or her eyes or put on a blindfold. Tell students that the data recorder will pull a noisemaker from the bag, one at a time, and make its sound. The data recorder will then ask the “listener” to identify the sound and what, if anything, it prompts him or her to do. The data recorder will write the responses on the data collection sheet. **NOTE: This activity works best if student groups are allowed adequate space to play sounds.**

Step 3: After all noisemakers have been played, the data recorder will tell the “listener” to open his or her eyes or take off the blindfold. How well did the “listener” identify the noisemakers?

Step 4: Ask student groups to share their results with the class. Focus on any similarities or differences that students had with what the sound meant for them. Did some sounds mean different things?

Step 5: Ask students to create a graphic representation of the results. How could they show the noisemaker versus the number of students who correctly identified it? How could they show the number of common responses to one noisemaker? Complete this lesson with an open discussion about rhinoceros vocalizations and meanings.



GRADE 4

What's That I Hear? ▶ activity

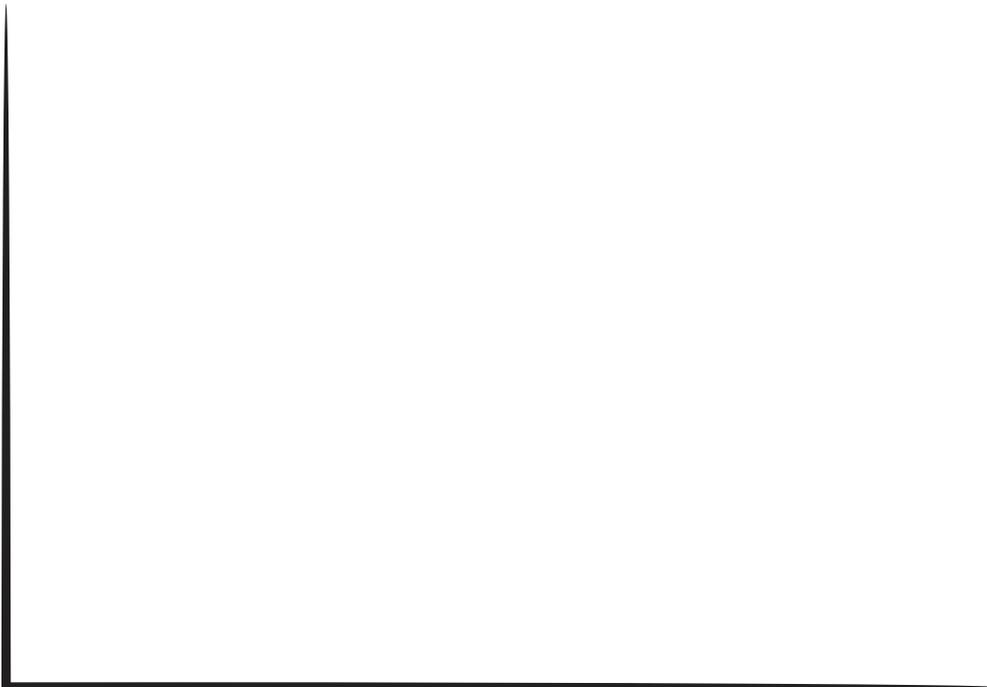
Instructions:

Record the response to each noisemaker. Can your "listener" identify each sound?
Does the sound remind him or her of anything?

	NOISEMAKER	NAME OF NOISEMAKER	REMINDS ME OF...
1			
2			
3			
4			
5			
6			

Instructions:

Use this graph to represent your results. Label the x and y axis.



GRADE 4

Eyes 4 You

TEACHER RESOURCES
Visit sandiegozoo.org/teacherresources
to find this curriculum in a PDF format.

LEARNING OUTCOME

Students model the poor vision of rhinoceroses by creating custom eyeglasses. *NGSS Performance Expectation: 4-LS1-2*

INTRODUCTION

Rhinoceroses have poor eyesight when compared with most other animals. Small eyes located on either side of their large, wide heads makes it difficult for them to see in front of them. Scientists believe a rhinoceros can see objects better when they are close by than at a far distance. And many field researchers have noticed that if an animal or person stays still, a rhinoceros pays little attention to him or her. When defending territory, male rhinoceroses stand face to face within a few feet of each other. When a rhinoceros feels threatened, it charges the animal or object, even though it can't see it very well.

MATERIALS

One eyeglass kit per student group

- Paper bag
- Seven pipe cleaners
- Scissors
- Tape
- Sheet of clear plastic wrap
- Copy of *Eyes 4 You* data collection sheet
- Pencil

ACTIVITY

To prepare for activity, create eyeglass kits by placing seven pipe cleaners, a pair of scissors, a sheet of clear plastic wrap, an *Eyes 4 You* data sheet, and a pencil in each paper bag. Create one eyeglass kit per student group.

Step 1: Begin activity with a class discussion about eyesight. Ask students leading questions such as, "How is it important to us? What do we do if our eyesight isn't sharp? What do animals do if they have poor eyesight?"

Step 2: Create student groups, and distribute eyeglass kits. Tell students to determine these roles within their group: eyeglass wearer, word-sheet holder, data recorder, and group coordinator. Ask students to fashion eyeglasses using the pipe cleaners. Add at least five layers of clear plastic wrap over each eye. The eyeglass wearer will then read the words held up by the word-sheet holder. The data recorder will make a prediction about the number of words the reader will miss, will then tally the actual missed words. Next, the group coordinator will remove ONE layer of plastic wrap from the glasses, and the eyeglass wearer will try to read the words again.

Step 3: Return student attention to you with a quick discussion of their results. Could each student see the words just as well with the clear plastic as without it? What was happening with his or her eyesight?

Step 4: Encourage students to continue with at least two more tries. Each time, have the group coordinator remove more plastic wrap from the lenses. Do the modifications make reading easier or more difficult?

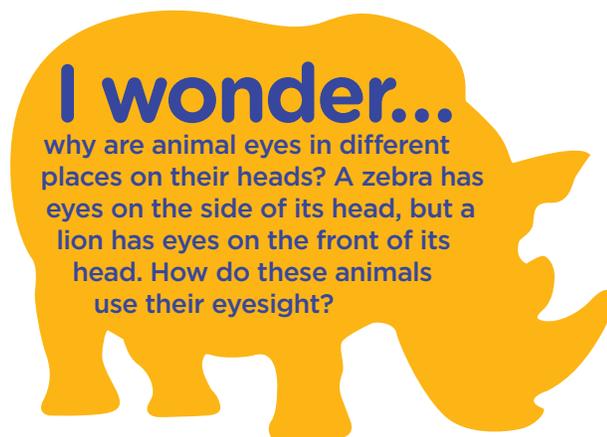
Step 5: When complete, review student results and explanations. Use the result of poor eyesight to begin a discussion about rhino vision.

At the Zoo or Safari Park

When visiting the San Diego Zoo or Safari Park, find animals with different eyes. Where are the eyes located on the animal's head? How is the animal using its eyes? Is it asleep or awake?

I wonder...

why are animal eyes in different places on their heads? A zebra has eyes on the side of its head, but a lion has eyes on the front of its head. How do these animals use their eyesight?



GRADE 4
Eyes 4 You ▶ **activity**

Rhinoceroses' vision is known to be poor, but their sense of hearing is sharp. To make up for poor eyesight, they listen for the alarm calls of other animals. For example, a bird called the oxpecker often rides on a rhino's back, squawking when danger comes near.

	PREDICTED WORDS	ACTUAL
TRIAL 1	PREDICTED _____ MISSED WORDS OUT OF 47 TOTAL WORDS	_____ MISSED WORDS OUT OF 47 TOTAL WORDS
TRIAL 2	PREDICTED _____ MISSED WORDS OUT OF 47 TOTAL WORDS	_____ MISSED WORDS OUT OF 47 TOTAL WORDS
TRIAL 3	PREDICTED _____ MISSED WORDS OUT OF 47 TOTAL WORDS	_____ MISSED WORDS OUT OF 47 TOTAL WORDS
TRIAL 4	PREDICTED _____ MISSED WORDS OUT OF 47 TOTAL WORDS	_____ MISSED WORDS OUT OF 47 TOTAL WORDS

GRADE 5

Game of Life

TEACHER RESOURCES
Visit sandiegozoo.org/teacherresources
to find this curriculum in a PDF format.

LEARNING OUTCOME

Students use game play to model the movement of matter within a greater one-horned rhino's food pyramid. *NGSS performance expectation: 5-LS2-1*

INTRODUCTION

Greater one-horned rhinoceroses, also known as Indian rhinoceroses, live in Nepal and northern India at the base of the Himalayan mountains. They roam the tall grasslands along rivers, eating primarily grasses but also fruits, leaves, and branches of shrubs, and, when close-by, ripened farm crops like rice and corn.

Humans are the main threat to the survival of greater one-horned rhinoceroses. Poachers kill rhinoceroses for their horns, and destroy the local habitat by clearing land for agriculture. Tigers also live in the area and may prey upon rhino calves.

MATERIALS

Per game

- Picture of a greater one-horned rhinoceros, either digital or print. You can find a greater one-horned rhinoceros picture on page 51.
- Pair of dice
- Copy of chance cards
- Copy of game directions
- Copy of data sheet
- Twenty of each colored bead: red, green, blue
- Copies of the books: *One Special Rhino: The Story of Andatu* and *Dowlina: A Rhino's Story* (optional)

ACTIVITY

Step 1: Begin lesson with a class discussion to assess prior knowledge about food chains, food webs, and food pyramids. Ask students leading questions such as, "What is a food chain? What is a food web? What is the difference? Why do we connect animals this way? What does a food pyramid represent? Why is this important?" Introduce students to the greater one-horned rhinoceros, its habits, where it lives, what it eats, and what eats it.

Step 2: Pair students and distribute dice, chance cards, game directions, and data sheet. Have students play game with first five rounds using six chance cards and the second five rounds using an additional five chance cards. Tell students to count beads, and record data after each round.

Step 3: After play, tell students to tally data and graph results in their groups. Ask students: "Under what conditions did the food chain continue for at least five rounds? What happened when additional threats, both at the producer level and the consumer level, were added? Did the food chain ever break? What would this mean in the real world?"

Step 4: Ask students to modify their game—by either adding or subtracting chance cards—so that the food chain endures for at least 10 rounds. Students must have at least six chance cards in play for each round.

Step 5: Ask students to explain their results and show their data. What was important to balance? Optional: read the suggested books—*One Special Rhino: The Story of Andatu* and *Dowlina: A Rhino's Story*—to learn about two successful rescues of young rhinos.

At the Safari Park

When visiting the San Diego Zoo Safari Park, look for signs that talk about our conservation programs. What does SSP mean? What is one of our success stories?



GRADE 5

Game of Life ► activity

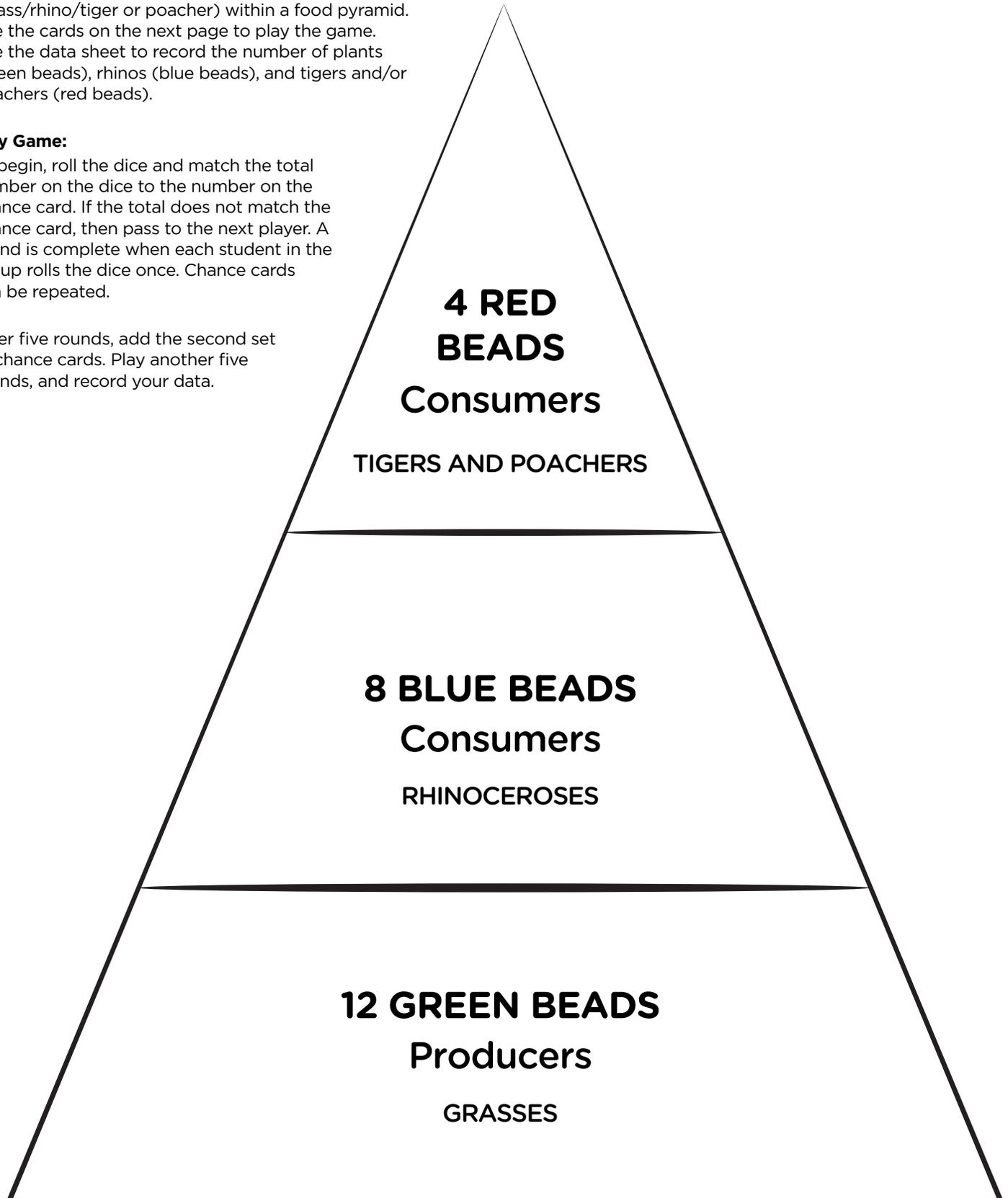
Set Up:

Use the image below to set up a simple food chain (grass/rhino/tiger or poacher) within a food pyramid. Use the cards on the next page to play the game. Use the data sheet to record the number of plants (green beads), rhinos (blue beads), and tigers and/or poachers (red beads).

Play Game:

To begin, roll the dice and match the total number on the dice to the number on the chance card. If the total does not match the chance card, then pass to the next player. A round is complete when each student in the group rolls the dice once. Chance cards can be repeated.

After five rounds, add the second set of chance cards. Play another five rounds, and record your data.



GRADE 5

Game of Life activity

Chance Cards

Cut apart and sort into two groups.

Rounds 1 through 5 chance cards: 3, 5, 6, 7, 11, and 12

Rounds 6 through 10 chance cards: 2, 4, 8, 9, and 10

		3	Natural regrowth of grasses. Add two green beads (grasses).
7	A female rhino gives birth. Add a blue bead (a rhino).	12	A tiger takes a rhino calf. Take off a blue bead (a rhino).
5	A rhino dies of natural causes. Take off a blue bead (a rhino).	11	A ranger catches a rhino poacher. Add a blue bead (a rhino).
6	A heavy monsoon rain causes flooding and plants die. Take off two green beads (grasses).	2	A zoo reintroduces a rhino to the wild. Add a blue bead (a rhino).
4	A factory pollutes the river and plants die. Take off two green beads (grasses).	8	A poacher kills a rhino for its horn. Take off one blue bead (a rhino).
10	A farmer clears land for planting crops. Take off two green beads (grasses).	9	A trophy hunter kills a rhino. Take off one blue bead (a rhino).

GRADE 5 Game of Life activity

Record the number of your green, blue, and red beads after each round.

	GREEN BEADS	BLUE BEADS	RED BEADS
START	12	8	4
ROUND 1			
ROUND 2			
ROUND 3			
ROUND 4			
ROUND 5			
<i>ADD NEW CARDS</i>			
ROUND 6			
ROUND 7			
ROUND 8			
ROUND 9			
ROUND 10			

GRADE 5

Voices for Rhinos

TEACHER RESOURCES
Visit sandiegozoo.org/teacherresources
to find this curriculum in a PDF format.

LEARNING OUTCOME

Through the process of scripting and filming a one-minute video, students learn about threats to rhino survival, and suggest conservation solutions.

INTRODUCTION

Rhinoceroses are in trouble. Of the five species, three appear as Critically Endangered on the Red List of Threatened Species maintained by the International Union for the Conservation of Nature. The two remaining are either Near Threatened or Vulnerable. Many conservation efforts are underway—both in Africa and Asia—but more help is needed.

MATERIALS

- Copies of the *Rhino Profile* cards, pages 4–6
- Copies of *Voices for Rhinos* activity sheet, one per student group
- Pictures of the five rhinoceros species, either digital or print. You can find rhinoceros pictures starting on page 48.
- Map of Africa and Asia showing country names and borders. You can find maps on pages 45–47.
- Map showing current distribution of rhinos. You can find a distribution map on page 44.
- Access to the internet or library for rhinoceros information
- Access to iPhone, iPad, and Apple app store for video production

ACTIVITY

NOTE: This activity asks students to create a one-minute video. A general guideline for video production is two class periods per one minute of video. You are welcome to modify this lesson to fit your time needs.

Step 1: Begin this lesson with a class discussion to assess prior knowledge about rhinoceros conservation. Introduce students to the five rhinoceros species using pictures and the *Rhino Profile* cards on pages 4–6. Visit websites such as the International Rhino Foundation, at rhinos.org. Also, post maps of Africa and Asia to review the location of rhinoceros populations.

Step 2: Create student groups with three to four students each. Tell students their assignment is to create a one-minute video about saving rhinoceroses. Distribute *Voices for Rhinos* activity sheet, which outlines the steps needed to create the video. Review the sheet, explaining each step and the resources available to the students. Determine a timeline to complete the project. Assist student groups as they work through their project using rubric.

Step 3: When videos are completed, plan a day to showcase student work, and evaluate the presentation. Use the sample rubric (page 39), or modify it to your classroom, to assess the effectiveness of the presentation.

At the Zoo or Safari Park

When at the San Diego Zoo or Safari Park, look for signs, posters, or videos telling about animal conservation. In addition to rhinos, what other animals are in need of help?

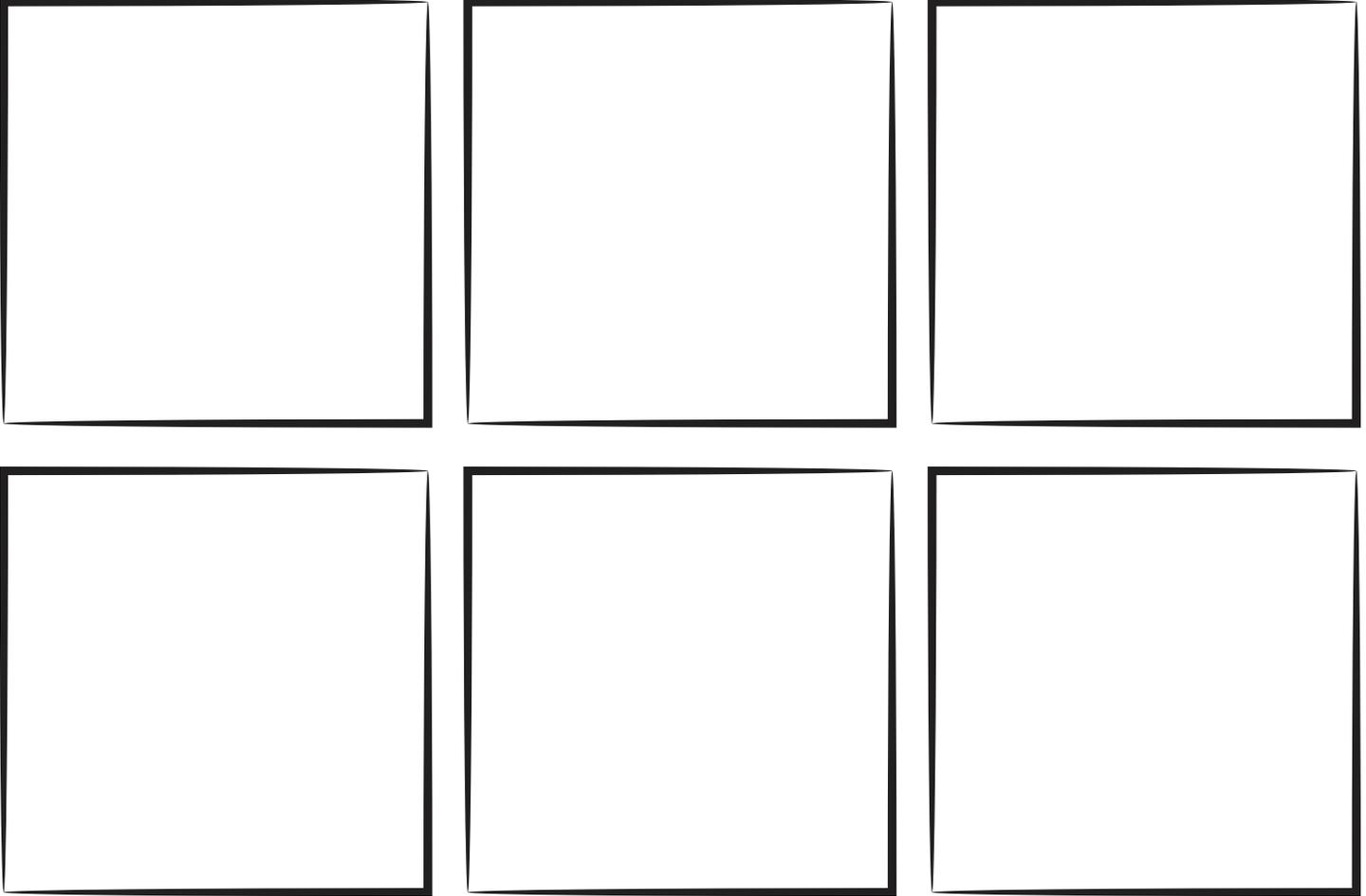


GRADE 5

Voices for Rhinos ► activity

STORYBOARD:

Draw a picture of each scene, and tell how long that scene will show in the one-minute (60-second) video.



Make a list of ALL the materials you need to produce the video.

FILMING:

Where will I film my video? Who will be there? Who will be the actors? Who will be the filming crew?

EDITING:

How will I edit my video? List all equipment needed.

PUBLISHING:

How will I show my video to others? List all equipment needed.

GRADE 5

Voices for Rhinos activity

Sample grading rubric for video production

CATEGORY	4	3	2	1
CONTENT	Stays on topic; gives accurate view; states action	Stays on topic most of the time; gives accurate view most of the time; states action	Seldom stays on topic; gives accurate view; states action	Doesn't stay on topic; gives inaccurate view; doesn't state action
ORGANIZATION	Contains titles, labels, lists, and advanced organizers where appropriate	Contains most titles, labels, lists, and advanced organizers where appropriate	Contains some titles, labels, lists, and advanced organizers where appropriate	Missing titles, labels, lists, and advanced organizers
ORIGINALITY	Creative and original	Not often seen, and with a new view or twist	Seen before, but with a new view or twist	Common and often seen, only a copy of previous video work
SOURCES	All references noted, facts without errors	Most references noted, facts without errors	Some references noted, some errors	No references, many errors
DESIGN	Professional use of image composition, font, color, camera angle	Profficient use of image composition, font, color, camera angle	Amateur use of image composition, font, color, camera angle	Poor use of image composition, font, color, camera angle
PRESENTATION	Coherent, smooth, and well-planned; held audience's attention.	Mostly coherent, smooth, and well-planned; held audience's attention most of the time	Somewhat coherent, smooth, and well-planned. Audience attention drifted from presentation	Not coherent, smooth, or well-planned. Audience distracted
MECHANICS	No misspelled words or grammatical errors	1-2 misspelled words or grammatical errors	3-4 misspelled words or grammatical errors	More than 4 misspelled words or grammatical errors
USE OF MEDIA	Picture, video, audio, and effects were used to enrich the presentation	Picture, video, audio, and effects were used, but at times distracted from the presentation	Either picture, video, audio, or effects were not used, and this distracted from the presentation	Picture, video, audio, or effects were not used. Presentation lacked coherent support of media
WORKLOAD	Workload was equally divided among group members; all group members contributed	Workload was divided but not shared equally, some members did more work than others	Workload was divided but not shared equally, some members did not contribute anything	Workload was not divided. One or two members did majority of work, some members did not contribute

Resources

ONLINE

To learn more about animals at the San Diego Zoo:

zoo.sandiegozoo.org/animals
ielc.libguides.com/sdzg/factsheets/index

To learn more about animals, including rhinos, at the San Diego Zoo Safari Park:

sdzsafaripark.org/park-animals-plants

To learn more about rhino research and conservation:

endextinction.org

To have fun exploring the San Diego Zoo

Global Kids' website:

kids.sandiegozoo.org

READING LIST

Rita the Rhino by Tony Ross

Let's Look at Rhinos on the Reading A-Z website:
readinga-z.com/book.php?id=1750

Remy the Rhino Learns Patience by Andy McGuire

My Rhinoceros by Jon Agee

One Special Rhino: The Story of Andatu by the Fifth Graders of P.S. 107

Dowlina: A Rhino's Story by Grace Borgeson

Connection to the Next Generation Science Standards

The materials and activities presented in this guide are just one step toward reaching the standards and performance expectations listed below.

STANDARDS

- LS1: From Molecules to Organisms: Structures and Processes
- LS2: Ecosystems: Interactions, Energy, and Dynamics
- LS3: Heredity: Inheritance and Variation of Traits
- LS4: Biological Evolution: Unity and Diversity

PERFORMANCE EXPECTATIONS

Kindergarten: K-LS1-1 performance expectation: Use observations to describe patterns of what plants and animals (including humans) need to survive.

Dimension	Name or NGSS citation	Student tasks in activity
Science and Engineering Practices	Analyzing and Interpreting Data	Students identify and match survival items (food, water, shelter) to humans and rhinoceroses.
Disciplinary Core Ideas	LS1.C Organization for Matter and Energy Flow in Organisms	Students draw what rhinoceroses need to survive.
Cross-cutting concepts	Patterns	Students notice similar needs (food, water, shelter) in different forms.

Grade 1: 1-LS3-1: Make observations to construct an evidence-based account that young plants and animals are alike, but not exactly like, their parents.

Dimension	Name or NGSS citation	Student tasks in activity
Science and Engineering Practices	Constructing Explanations and Designing Solutions	Students review photos to explain and match calves and parents of three rhinoceros species.
Disciplinary Core Ideas	LS3.A Inheritance of Traits	Student recognize key identifying characteristics when matching parents with calves.
Cross-cutting concepts	Patterns	Students identify similarities and differences between the appearances of three rhinoceros species.

Grade 2: 2-LS2-2 performance expectation: Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

Dimension	Name or NGSS citation	Student tasks in activity
Science and Engineering Practices	Developing and Using Models	Students create chronological sequence for seed dispersal facilitated by rhinoceros feeding behavior.
Disciplinary Core Ideas	LS2.A Interdependent Relationships in Ecosystems	Students connect seed dispersal to rhinoceros feeding habits.
Cross-cutting concepts	Cause and Effect	Students discuss consequences of seed dispersal without rhinoceroses.

Grade 3: 3-LS2-1: Construct an argument that some animals form groups that help members survive.

Dimension	Name or NGSS citation	Student tasks in activity
Science and Engineering Practices	Engaging in Argument from Evidence	Students gather evidence from real-life videos.
Disciplinary Core Ideas	LS2.D Social Interactions and Group Behavior	Students analyze by comparison the social behavior of two rhino species.
Cross-cutting concepts	Cause and Effect	Students discuss the benefits of social behavior that helps rhinos survive.

Grade 4: 4-LS1-2: Use a model to describe how animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

Dimension	Name or NGSS citation	Student tasks in activity
<i>Science and Engineering Practices</i>	<i>Engaging in Argument from Evidence</i>	<i>Students gather data by creating and experiencing a variety of sounds, and modifying visual acuity.</i>
<i>Disciplinary Core Ideas</i>	<i>LS1.D Information Processing</i>	<i>Students explore how they identify sounds, and the affective response to each sound.</i>
<i>Cross-cutting concepts</i>	<i>Systems and System Models</i>	<i>Students manipulate materials to model rhino vision.</i>

Grade 5: 5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Dimension	Name or NGSS citation	Student tasks in activity
<i>Science and Engineering Practices</i>	<i>Developing and Using Models</i>	<i>Students play a game that models dynamics within a food web.</i>
<i>Disciplinary Core Ideas</i>	<i>LS2.A Interdependent Relationships in Ecosystems</i>	<i>Students recognize and discuss interrelationships between producers, consumers, and decomposers.</i>
<i>Cross-cutting concepts</i>	<i>Systems and System Models</i>	<i>Students learn and build trophic levels within a food pyramid.</i>

Glossary

adaptation. A physical characteristic or behavior that helps a plant or animal survive in its habitat.

apex predator. An adult animal that consumes other animals (prey) but is not preyed upon.

body part. Any part or piece of an organism such as a limb, tail, feathers, horns, ears.

browser. An animal that eats leaves, twigs, and fruits.

camouflage. Protective coloring that animals use to blend into their environment in order to avoid being seen by predators or prey.

carnivore. An animal or plant that eats other animals.

competition. The process of trying to get resources before others do.

consumer. A living organism that must eat in order to survive. Some consumers eat plant matter (herbivore), some eat other animals (carnivore), and others eat a variety of foods (omnivores).

crash. Name (collective noun) given to a group of rhinos.

decomposer. An organism that recycles dead organic matter into useful nutrients within a food pyramid. Bacteria and fungi are decomposers.

defend. Protect oneself from harm.

detritivore. An animal that eats animal waste or decaying plants and animals.

ecosystem. A community of living things and nonliving things within an area.

endangered. Populations so low that they are moving toward becoming extinct.

extinct. A species of plant or animal that no longer lives.

food. Nutrients necessary for energy and health.

food pyramid. A graphic representation that illustrates the reduction of energy between the trophic levels in a food chain of a specific ecosystem. This model is also called a trophic pyramid or an energy pyramid.

grazer. An animal that eats grasses.

habitat. The place where an animal lives.

herbivore. An animal that eats plants.

predator. An animal that hunts and eats other animals for food.

prey. An animal that is taken and eaten by another animal (predator) for food.

omnivore. An animal that eats both plants and other animals.

plant. Organism capable of making its own food by photosynthesis.

producer. A living organism that is able to produce its own food (energy). Green plants and some bacteria are capable of self-nourishment.

savanna. A grassy plain with few trees; found in tropical and subtropical areas.

seed. The part of a flowering plant that contains a baby plant and a supply of food inside a protective coating, and grows into a new plant.

senses. Ways we receive information: 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, finding a mate, and raising young (may be a few feet or many square miles depending on the species).

species. A group of animals that show common characteristics and mate to produce fertile young.

survival. Using adaptations to continue to live.

trophic level. Within the context of a food pyramid, the graphic representation of the role each plant or animal plays within a food chain. Trophic levels include producers, consumers, and decomposers.



IN DANGER OF DISAPPEARING?

Rhinos once roamed across most of sub-Saharan Africa and Indonesia. Today, less than 30,000 rhinos remain, and three of the five species are critically endangered.



PROTECTION
Efforts are underway to protect rhinos from poachers. Trained guards walk parks and sanctuary lands in the hopes of catching and prosecuting the outlaw hunters.

PRESSURE
The biggest threat to rhinos is poaching; that is, the illegal hunting and killing of rhinos for their horns. On average, one rhino is poached every 8 hours.

THE HORN TELLS THE STORY



BLACK
The black rhino has two horns and a pointed, prehensile lip.



WHITE
The white rhino has two horns and a square lip.



GREATER ONE-HORNED
The greater one-horned rhino has one horn and thick skin folds with bumps on the surface.



JAVAN
The Javan rhino has one horn, a very pointed lip, and smoother skin than the greater one-horned rhinoceros.



SUMATRAN
The Sumatran rhino has two short horns and hair covering most of its skin.



AFRICA





INDIA

CHINA

NEPAL

SHUTAN

BANGLADESH

MYANMAR
(BURMA)

VIETNAM

LAOS

THAILAND

CAMBODIA

MALAYSIA

SINGAPORE

BRUNEI

MALAYSIA

INDONESIA

SRI
LANKA

UZBEKISTAN

KYRGYZSTAN

TURKMENISTAN

TAJIKISTAN

AFGHANISTAN

IRAN

PAKISTAN

QATAR

UNITED
ARAB
EMIRATES

OMAN

MONGOLIA



Southern White Rhino



Northern White Rhino



Black Rhino



Greater One-horned Rhino



Sumatran Rhino

Javan Rhino





Greater One-Horned Rhino Calf



Black Rhino Calf



Southern White Rhino Calf



Black Rhino



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