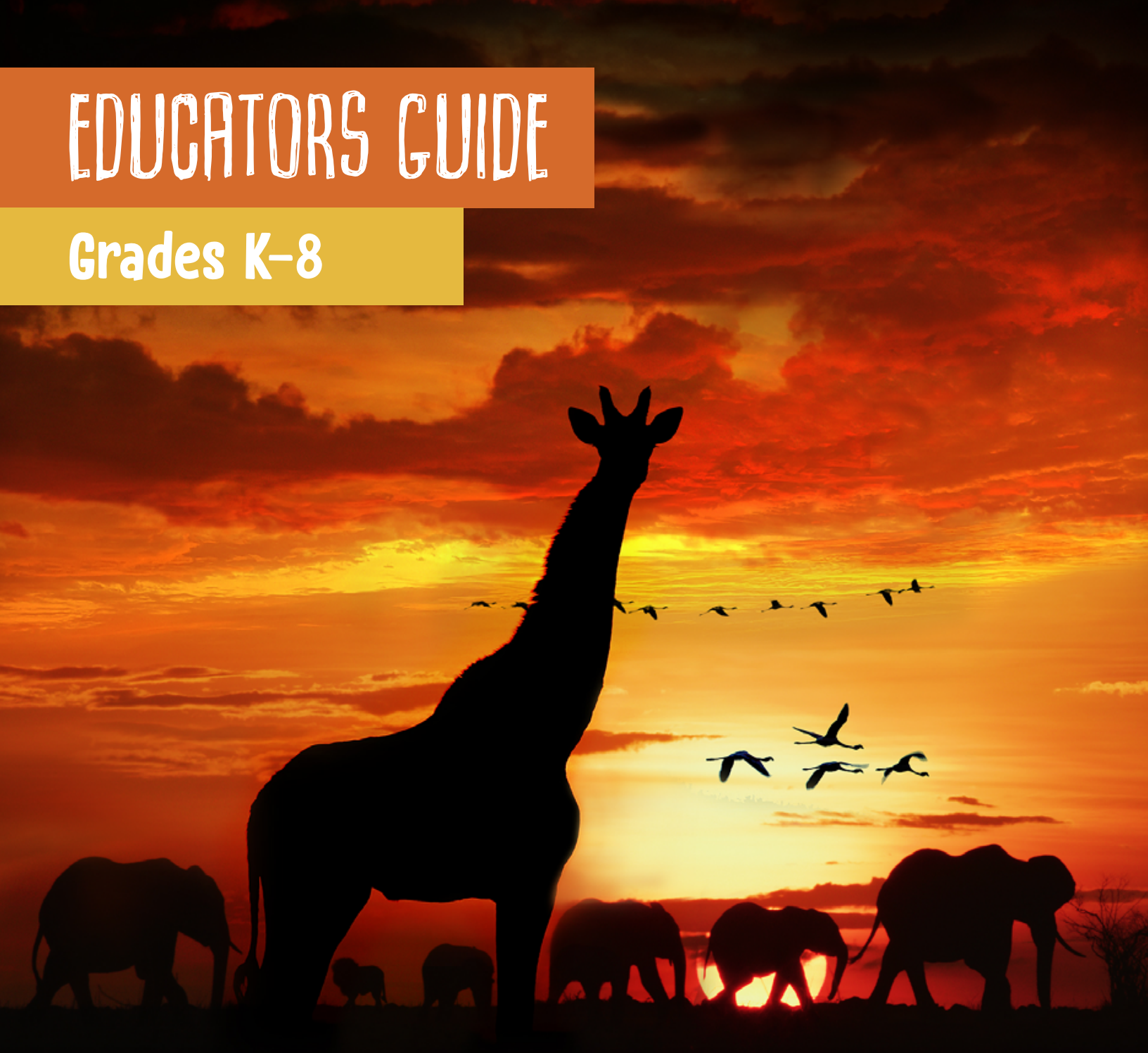
EDUCATORS GUIDE

Grades K–8



SERENGETI

DEFINITION FILMS K2 STUDIOS

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Welcome to the Serengeti Guide for Educators

This K-8 curriculum guide offers experiential learning opportunities that support students before and after watching the IMAX film *SERENGETI*. Students will explore the dynamic nature of the Serengeti ecosystem, through outdoor activities, scientific experiments, large group simulations, and creative practices in art or drama. Each lesson connects to the Next Generation Science Standards (NGSS), with themes of wildlife families (Grade K-1), habitats and seasons (Grade 2-3), interconnection of body and Earth (Grade 4-5), and resource use in the Serengeti (Grade 6-8). From the tiniest dung beetles to the largest lions, students will learn that all beings play a critical role in the survival of the Serengeti and that nothing is random in this extraordinary place.

WELCOME TO THE SERENGETI!

The Serengeti is an iconic ecosystem and National Park nestled in northern Tanzania and spanning into the southern edge of Kenya. This region is home to several Indigenous communities, including the Maasai who have grazed cattle in the Serengeti long before it became a park and later a UNESCO World Heritage site. The name Serengeti comes from the Maa (Maasai language) word siringet which roughly translates to "endless plains." These vast plains host one of the largest migrations of mammals on the planet, where 2 million wildebeest travel around the Serengeti every year, interacting with lions, zebra, cheetahs, elephants, crocodiles, and many more remarkable beings. The IMAX film *Serengeti* illuminates this vibrant ecosystem and answers the question, *what happened here that made all of this possible?*



GLOSSARY

Atmosphere
Layer of gases surrounding the Earth

Biodiversity
The variety of living beings in a particular area

Biosphere
All parts of the Earth where life is present

Carnivore
An animal who receives energy from eating other animals

Ecosystem
Group of living beings interacting with each other and with the physical environment

Habitat
A place where living beings can meet their needs to survive

Herbivore
An animal who receives energy from eating plants

Hydrosphere
All parts of the Earth containing water

Geosphere
All parts of the Earth that contain rocks, minerals, and other solid features

Omnivore
An animal who receives energy from eating plants and animals.

Plains
Flat and broad grassland habitat.

Resource
Materials from the Earth that living beings need to survive.

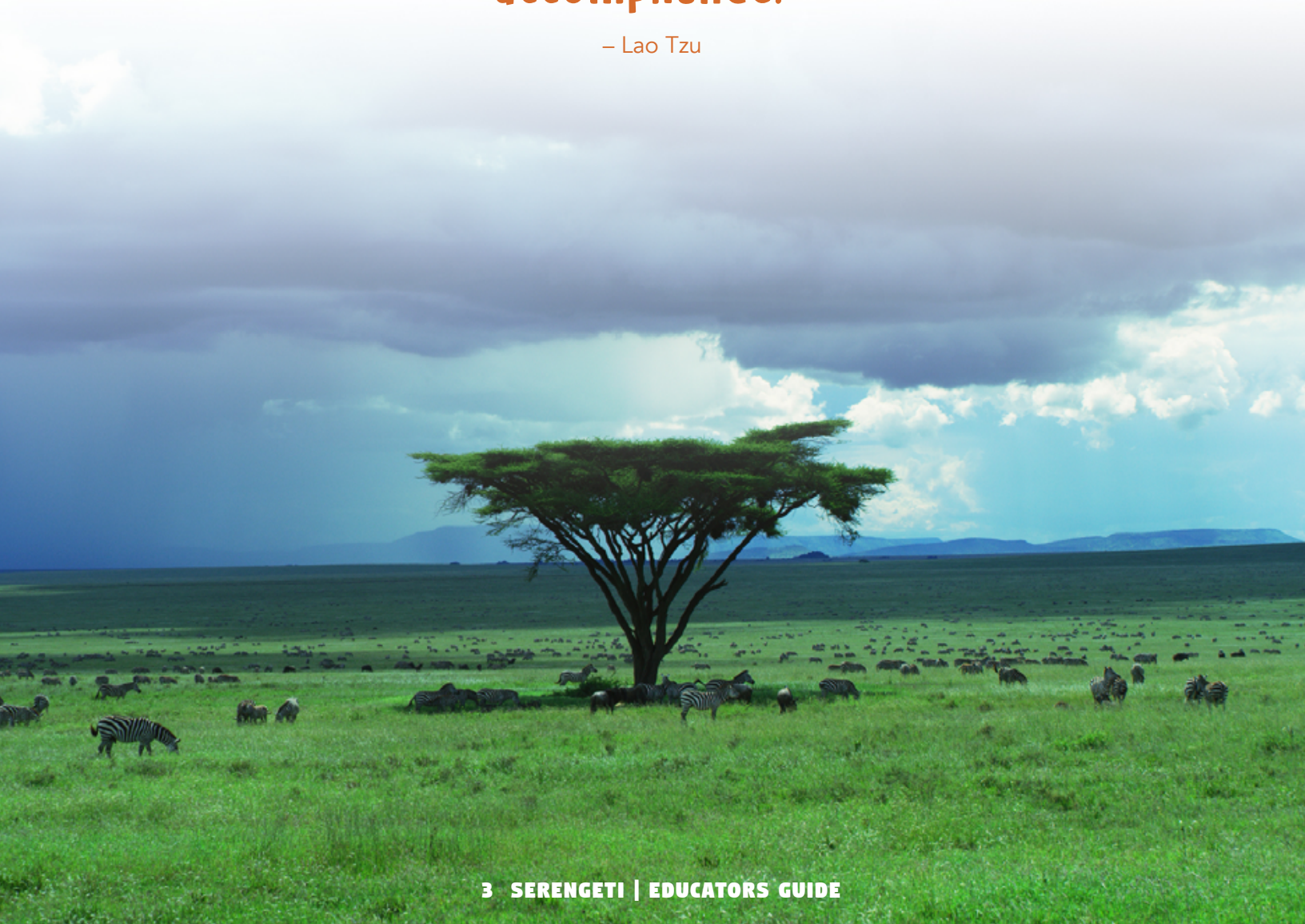
Scavenger
An animal who receives energy from eating deceased plants and animals.

TIPS FOR TAKING STUDENTS OUTSIDE

- Create a code of conduct with students on safety and respect for the natural world.
- Set clear boundaries on where students can go.
- Ensure students work in pairs or small groups.
- Create a "call" or bring a whistle to indicate when it is time to rejoin the group.
- Keep extra clothing in the classroom to help students dress for the weather.

"Nature does not hurry, yet everything is accomplished."

– Lao Tzu





Kindergarten–Grade 1:

WILDLIFE NEEDS

This lesson is recommended before ***or*** after watching *Serengeti*.

NGSS Disciplinary Core Ideas

- K-ESS2-2 Earth's Systems
- K-LS1-1 From Molecules to Organisms: Structures and Processes
- 1-LS3-1 Heredity: Inheritance and Variation of Traits

Lesson Length

- 2 hours, 30 minutes

Lesson Summary

Regardless of whether you are a lion, a wildebeest, a vulture, or a human, almost every animal has the same basic needs to survive. In this lesson, students will learn what a wild animal needs and the role of families in helping young ones survive in the Serengeti.

WARM UP – RECEIVING OUR NEEDS FROM THE EARTH

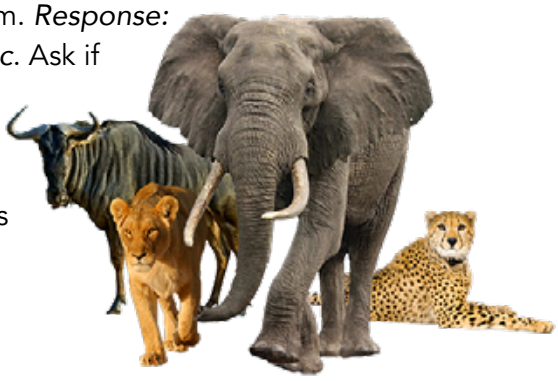
[30 MINUTES]

On a board, draw a large outline of a human body and the body of an animal that lives in the Serengeti. Share with students that every animal – including people – has basic things they need to stay alive. All the things we need come from the Earth.

Invite students to place a hand on their chest and take a deep breath. Ask what they are breathing in. Which living being makes oxygen? Give clues such as "has a stem or trunk," "has leaves," etc. *Response: plants*. Ask if wild animals breathe too. Draw a tree in the outline of both bodies where the lungs are.

Next, invite students to place a hand on their belly. What do they put in their belly to keep their body alive? Ask what food – like fruits and vegetables – grow in? *Response: soil.* Ask if wild animals eat fruits and vegetables too. Draw soil with vegetables growing in the belly of both body outlines.

Next, invite students to turn a palm up to the sky and gently squeeze their wrist, just below the palm with the other hand. Can they feel something moving? What is flowing through their body? What can they drink to keep blood flowing? Ask where water comes from. *Response: clouds, rivers, etc.* Ask if wild animals need water too. Draw water in the arms and legs of both body outlines.





Kindergarten-Grade 1:

WILDLIFE NEEDS

(continued...)

Lastly, ask students how they keep their body safe from rain, lightning, wind, or snow. Where do they go in a storm? Ask students what their homes or other buildings are made of. *Response: stone, wood, etc.* Ask if wild animals have shelters too.

Draw a shelter around both body outlines.

Tell students that these are the 4 basic things almost all animals need to stay alive: food, water, shelter, and air (or space) and each of these things come from the Earth.

PART 1 - RAISING BABIES

[45 MINUTES]

Materials

- Playdough
- 3-5 tweezers
- 3-5 tongs
- Paper rolled into tiny balls (or any other items that can be easily picked up with tweezers)
- Large blue piece of paper
- A bowl
- Images of a Kori Bustard feeding babies, a Whip-scorpion with babies on their back, and a crocodile with babies in their mouth (retrieved from an internet search).

Procedure

The Earth may give us everything we – and wild animals – need to stay alive, but how do *we* get those things as a tiny young human? Ask students who makes food for them, gives them a shelter, and showed them where to get water? Students have so many people who help them get what they need! Wonder out loud if it is the same for wild animals.

Set up the following three stations:

1. **Crocodile Station:** Place an image of a crocodile with babies in their mouth on a table, along with playdough and 3-5 tongs. On the opposite side of the room, place a large sheet of blue paper to represent water. Students will make baby crocodiles out of playdough. When they first hatch, crocodiles carry their babies to water in their mouths. Students will gently pick up their playdough crocodile with the tongs, walk them to the blue piece of paper and place them in the "water."
2. **Kori Bustard:** Place an image of a Kori Bustard feeding chicks on a table, along with playdough and 3-5 tweezers. On the opposite side of the room, put a bowl of paper rolled up into tiny balls. Students will make Kori Bustard chicks out of playdough, with a wide-open mouth. Kori Bustard parents feed their babies by dropping food in their mouth. Using the tweezers like a beak, students will go to the bowl, pick up a piece of paper, bring it back to their chick and drop it off in their mouth.
3. **Tailless Whip-Scorpion Station:** Place an image of a Whip-scorpion with babies on their back on a table along with playdough. Students will make baby scorpions out of playdough. Scorpion parents carry their babies on their back, giving them a safe shelter. Students will balance the playdough scorpions on their back and do one lap around the classroom.

Have students switch stations after several minutes. To conclude, gather students and recap how each adult helped the baby get what they need. Ask students how the baby animals are like their parents – what do they *both* need to stay alive?



Kindergarten-Grade 1:

WILDLIFE NEEDS

(continued...)

PART 2 (OUTDOOR) - WILDLIFE FAMILIES

[1 HOUR]

Materials

- Image of a Lappet-faced Vulture adult and baby (retrieved from an internet search)
- Sticks
- Roughly 100 popsicle sticks (or natural items like leaves and pinecones)

Take students outside and share that wildlife families come in all shapes and sizes – just like human families. Show students an image of an adult Lappet-faced Vulture and tell students they are about to *become* a Lappet-faced Vulture family.

Make a Nest

When Lappet-faced Vultures want to start a family, they need to build a shelter for their eggs. Ask students what that shelter is called. *Response: nest.* Ask students who makes the nest and what nests are made of. Share with students that each kind of bird makes a different nest. Lappet-faced Vultures make a nest out of sticks and dried grass.

Students will gather sticks and dried grass (if available), only picking up sticks on the ground and taking only the grass they need. Have students build nests in a long row at one end of a large open area. Students may collect a single stone or other natural item and put it in the nest to represent an egg. Ask students how a vulture changes the environment to make a shelter for their egg.

Vulture Parenting

Place up to 100 popsicle sticks (or similar items) in a row at one end of the play area opposite to the row of nests. Tell students that the egg has now hatched and arrange students into partners. One partner is an adult vulture and the other is a baby. The goal of the game is for the adult to feed the baby and for the baby to grow into a healthy adult.

Game Instructions:
Share with students that vultures are scavengers, meaning they eat the bodies of animals who are no longer living. Before vulture babies can fly, adults bring them food. In this game, popsicle sticks are food.

Pairs will choose a nest and crouch down in front of it. When the game starts, adult vultures will stand and run with their wings outstretched to the popsicle sticks. They will pick up one popsicle stick and bring it back to their baby. When the baby receives a popsicle stick, they can take one step forward, still crouching.

The adult will continue bringing popsicle sticks to the baby until the baby has reached the other side of the play area and are now an adult. Adults can practice soaring with their wings outstretched until all babies have become adults.



For the next round, return all popsicle sticks to the original row and have partners switch roles. This time, a teacher or



Kindergarten-Grade 1:

WILDLIFE NEEDS

(continued...)

volunteer will be a lion who enters the play area looking for food. Like vultures, lions will eat animals who are no longer living. Throughout the game, the lion will occasionally walk into the play area. When adult vultures see the lion, they must run to their baby and crouch down beside them. Vultures cannot move until the lion leaves the play area. Continue playing the game until all babies have become adults.

At the end of the game, take students to the spot where popsicle sticks were originally placed. Ask them where all the sticks went. What would have happened to the popsicle sticks if there were no Lappet-faced Vultures? Share with students that vultures are an important animal who cleans up the environment. Invite students to say thank you out loud to all the vultures around the world who are helping keep the planet clean. Invite students to share if they do anything to help the planet. Share with students that when they do something nice for the planet, it helps themselves, their family and friends, and also the wild animals who live near and far away.

CLOSING

[15 MINUTES]

Materials

- Blank paper
- Drawing utensils

Procedure

Have students draw themselves as a baby vulture, getting what they need from an adult. Students may wish to offer this drawing to someone in their life who helps them get what they need to stay alive.

IN YOUR NEIGHBORHOOD

Take students outside and search for wild animals. When they see an animal, have students demonstrate how they think the animals eats, drinks, and breathes. Remind students that animals in their neighborhood, animals in the Serengeti AND the students themselves have the same basic needs.

KINDNESS TO ALL BEINGS

If you find a wild animal baby without their parents, call the nearest wildlife hospital for advice. The baby might not be able to get food, water, and shelter on their own!

SWAHILI

Young Ones: *Kijana*

MAA

Child: *Enkerai*



Kindergarten–Grade 1:

HOW TO SURVIVE IN THE SERENGETI

This lesson is recommended ***after*** watching *Serengeti*.

NGSS Disciplinary Core Ideas

- K-ESS2-2 Earth's Systems
- K-LS1-1 From Molecules to Organisms: Structures and Processes
- 1-LS3-1 Heredity: Inheritance and Variation of Traits

Lesson Length

- 2 hours, 10 minutes

Lesson Summary

From their very first breath, wildlife babies are already learning important skills to help them survive in the Serengeti. In this lesson, students will practice these skills and experience a year-in-the-life of a White-bearded Wildebeest.



WARM UP – SKILLS IN THE SERENGETI

[15 MINUTES]

Materials

Images of a lion, elephant, wildebeest, and hippopotamus (see Appendix A).

Procedure

Share with students that they have been learning different skills since the day they were born. They learn new skills from their family, classmates, and they can even learn skills from watching wild animals. Just like us, wild animals learn skills too!

Show students images of animals featured in *Serengeti*. As students are shown each image, ask what the animal is good at or what skill they have. Invite students to stand if they are able and demonstrate this skill on the spot. Ask, how does this skill help the animal stay alive? Does it help them get food, water, or shelter? *Examples: lions pounce to get food, elephants use their trunk to get water, wildebeest walk long distances to find food, hippos swim to take shelter from heat.*

Ask students how they think the animals learned these skills? Who taught them and when did they learn? Invite students to name a skill *they* have.



Kindergarten-Grade 1:

HOW TO SURVIVE IN THE SERENGETI

(continued...)

Who taught them, how did they learn, and how does this compare to a wild animal?

PART 1 (OUTDOOR) - CHEETAHS LEARN TO HUNT

[45 MINUTES]

Materials

Images of a cheetah cub and adult cheetah (see Appendix B) and 5-10 frisbees.

Take students outside and share that cheetah cubs learn hunting skills of hiding and running in two ways: copying adults (imitation) and playing.

HIDING: Schoolyard Camouflage

Show students an image of a cheetah adult and cub. Ask students how the cub and adult look the same or different. Share that cubs have a light stripe down their back called a "mantle," which makes them harder to see in the grass. The spots on cheetahs help with camouflage too!

Tell students they are about to play a hiding game. Ask students who they think has the best camouflage in the class today (whose clothing best matches the environment). Do they think this student will be found close to first or close to last in the hiding game? Play a round of the following game to see if their predictions come true:



One student will be a Spotted Hyena looking for cheetah cubs to eat. The hyena will stand in the middle of the play area, while cubs hide in a designated area. The hyena cannot move, other than turning in a circle to look around them. When they spot a cub, they will call out their name or what they are wearing. The found cub will sit out of the play area until the remaining cubs are found. End the round after 5-8 minutes.

Once the round is complete, ask students to reveal their hiding spots if they were not found. Check in with their original predictions. Was the student whose clothing matched the outdoor space found close to first or last? Why? Play another round, having a new student as the hyena. At the end of the game, ask students how the skills of hiding might help a cheetah hunt.

RUNNING: Chasing Frisbees

In a large open area, arrange students in a row at one end. An adult will begin by making up a running or movement pattern (i.e., zig zag, large steps, etc.) and move to the other side of the play area. Once the adult reaches the other side, students will imitate the pattern. Repeat 2-3 times with students making the new patterns.



Now that students are warmed up, they will practice chasing. Arrange students in a line. An adult will stand next to the student at the front of the line with a pile of frisbees. The adult will throw a frisbee and the student at the front of the line



Kindergarten-Grade 1:

HOW TO SURVIVE IN THE SERENGETI

(continued...)

will chase it. Once they have caught it – or picked it up – they will bring it back to the pile. Continue throwing frisbees until all students have had a chance to chase at least twice. When complete, ask students how the skill of running might help a cheetah hunt.

PART 2 (OUTDOOR) – A YEAR-IN-THE-LIFE OF A WHITE-BEARDED WILDEBEEST

[1 HOUR]

Materials

Wildebeest Story Cards (Appendix C).

Procedure

In advance, laminate the Wildebeest Story Cards from Appendix C and place each card outside. Take students outside and walk to each card in the order they appear in the Appendix. As each card is reached, show students the images, read the story out loud, and follow the prompts indicated.



CLOSING

[10 MINUTES]

Ask students if they learned any new skills while playing "Cheetahs Learn to Hunt" or in "A Year-in-the-Life of a White-bearded Wildebeest."

Ask students how animals like termites and elephants change the Serengeti to get what they need? What special skills do they have to make this possible?

Ask students how moving around the Serengeti helps the wildebeest survive. What need are they trying to meet?

IN YOUR NEIGHBORHOOD

Invite students to practice their skill of hiding to observe wildlife outside. If they see an animal, ask if that animal moves like a White-bearded Wildebeest or uses the same skills as a cheetah for finding food? What other skills are they using to stay alive?

LIVING IN THE SERENGETI

Humans also learn through imitation! For example, young Maasai – an Indigenous community in Kenya and Tanzania – learn the skills of pastoral living by accompanying elders, then watching, listening, and practicing what the elders do (Goldman, 2020).

MAA

Wildebeest: *Oingat*

SWAHILI

Cheetah: *Duma*



Grade 2-3:

HABITATS AND THE POWER OF PLANTS

This lesson is recommended before ***or*** after watching *Serengeti*.

NGSS Disciplinary Core Ideas

- 2-LS4-1, 3-LS4-3 Biological Evolution: Unity and Diversity

Lesson Length

- 2 hours, 20 minutes

Lesson Summary

Habitats are a place where plants and animals live and receive everything they need to survive. In this lesson, students will compare habitats and their inhabitants in the Serengeti to those living near their home.

WARM UP - LOOKING IN THE BACKGROUND

[25 MINUTES]

Materials

- Photos of students or family outside in their neighborhood
- Images of people living and working in and around the Serengeti (retrieved from books or an internet search)

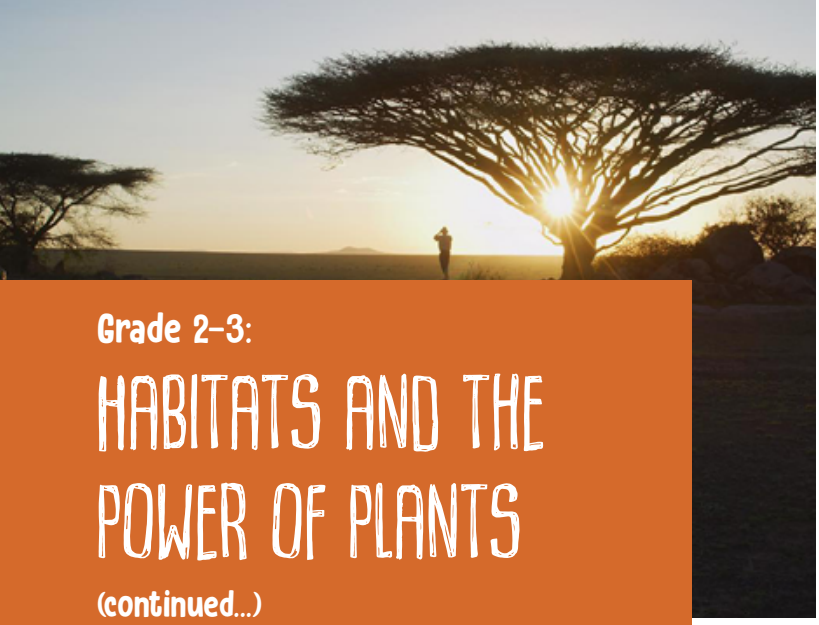
Procedure

Ask students to bring in a photo of themselves or their family outside in their neighborhood where the landscape is visible behind them. Share with students that everywhere they go, they are in a habitat. Ask what animals – including humans – need in their habitat to survive. *Responses: four basic needs are food, water, shelter, and air (or space).*

Gather students in a circle on the floor with their photos. Ask them to look for water, plants, and any buildings in their photo. Then read out the following prompts:

- *If your photo has water in it (a lake, pond, etc.), place the photos in the middle of the circle.*
- *If your photo shows mostly tall trees, place the photos together in a new spot in the circle.*
- *If your photo shows mostly grass or flowers, place the photos together in a new spot in the circle.*
- *If your photo shows mostly buildings, place the photos together in a new spot in the circle.*
- *If your photo does not fit any of the descriptions, place them together in a new spot in the circle.*

Next, show several images of people working and living in and around the Serengeti, with the landscape visible in the background. Ask if any



Grade 2-3:

HABITATS AND THE POWER OF PLANTS

(continued...)

Serengeti habitats look like habitats near their home. Place the Serengeti images beside the closest fitting group of photos on the floor.

Divide students into groups, assigning one group per photo pile. Share with students that the main habitats in the Serengeti are plains (grassland), savannah woodland, rainforest, river, and volcano. Are any of these habitats present where students are living? Each group will compare the habitat in the Serengeti to the habitat near their home, sharing with the class any similarities and differences they notice. Remind students that although there may be differences in how the habitats look, each of these habitats provides food, water, shelter, and space to a variety of plants and animals, including people.

PART 1 (OUTDOOR) - THE POWER OF PLANTS

[1 HOUR]

Materials

- Paper
- Clipboards
- Drawing utensils
- Glue
- Scissors
- Images of herbivores, omnivores and plants in the Serengeti (retrieved from books or an internet search)

Procedure

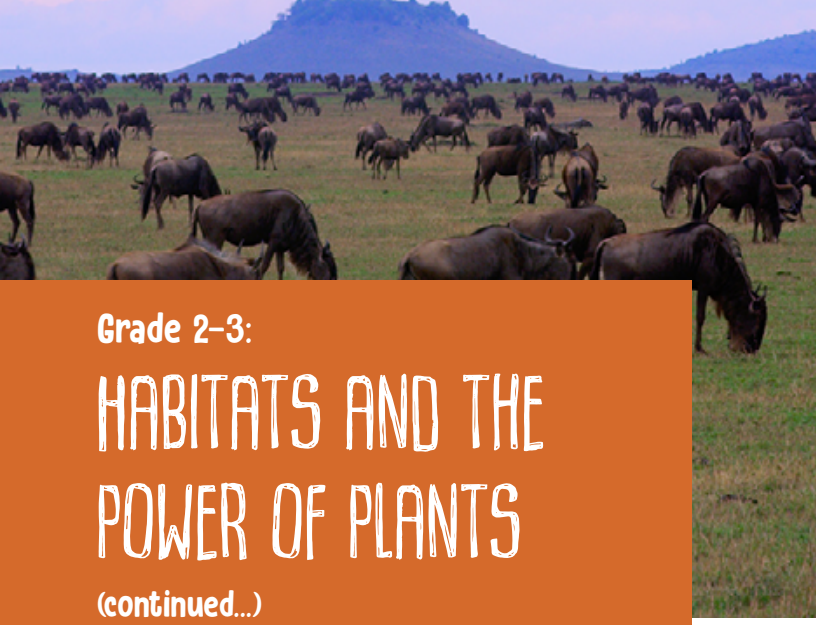
Take students outside with paper, clipboards, and drawing utensils. Share that plants are found in all habitats of the Serengeti and in their neighborhood too. Plants provide a source of food, shelter, air, and water for wildlife.

Have students look around for plants. As they meet a plant, invite them to look closely at the shape, size, color, vein pattern, and stem. Encourage students to use eyes-only if toxic plants may be in the area. Students will then sketch several leaves.

In the classroom, show students images of different plants in the Serengeti such as Pan Dropseed and Whistling Thorn. Students will look closely at the shape, size, color, vein pattern, and stem and compare them with the plants they found outside. Students will then sketch several of these leaves.

Share with students that for animals who eat plants, all the nutrients – like vitamins and minerals – found in the plants transfer to the body of the animal. Show images of several animals who eat plants in the Serengeti, called herbivores or omnivores. On a blank piece of paper, students will draw the outline of a Serengeti animal of their choice. They will cut out the Serengeti leaves they sketched and glue them to the body of the animal, making the leaves look like fur, feathers, scales, etc. They may wish to draw more leaves to fill in the body. To conclude, invite students to think of one reason why an herbivore or omnivore is thankful for plants and write a message of gratitude from that being on a leaf in their art.





Grade 2–3:

HABITATS AND THE POWER OF PLANTS

(continued...)

PART 2 (OUTDOOR) – WHO CAN THRIVE IN THE PLAINS HABITAT?

[45 MINUTES]

Materials

- 100 green popsicle sticks
- 100 red popsicle sticks
- 50 yellow popsicle sticks*
- A bag or bucket

**Note: Natural items like sticks and pinecones can be used instead of popsicle sticks.*

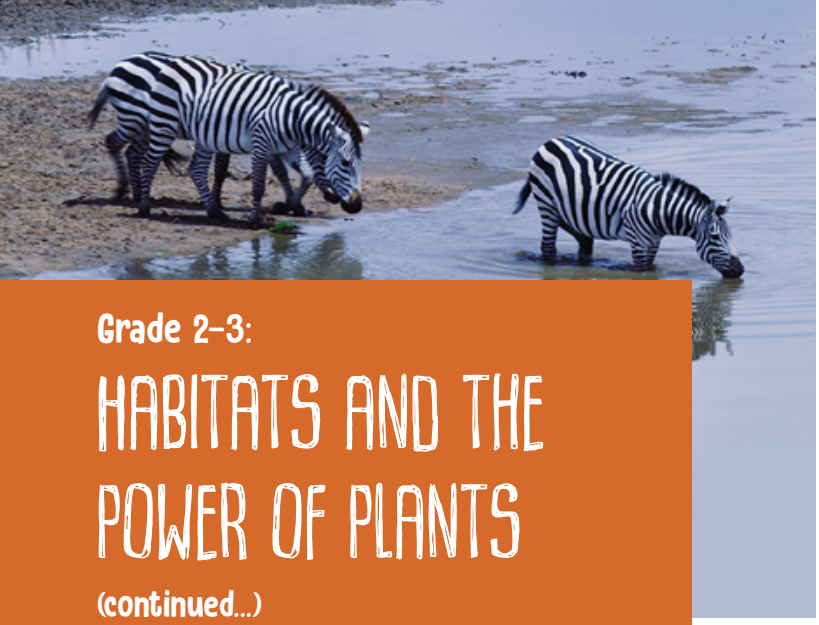
Procedure

Share with students that each species has different habitat requirements, which means certain animals can only survive in certain habitats. Take students outside. At one end of an open area, spread out 100 green and 100 red popsicle sticks, and place 50 yellow popsicle sticks in a bucket or bag and hang it on a tree branch high enough that students have to stand on their tippy toes to reach it (or have a volunteer hold it up high). Divide students into three groups: wildebeest, giraffe and crocodiles. Have students line up at the other end of the play area, opposite to the popsicle sticks and read the following instructions:

In this game, you are in the plains habitat in the Serengeti. When the game begins, wildebeest will *run* to collect one *green* stick, then bring it back to the starting side and drop it off. Repeat until the round ends. Crocodiles will move *on their belly* to collect one *red* stick, then bring it back to the starting side and drop it off. Repeat until the round ends. Giraffe will run to the bucket/bag and collect one *yellow* stick, then bring it back to the starting side and drop it off. Repeat until the round ends.



Begin the game and give students 5-7 minutes to gather popsicle sticks. When the time is up, ask a representative from each animal group to count how many sticks were collected. To thrive in the plains, groups need more than 50 popsicle sticks. Ask students which animal had the *most* popsicle sticks, the *least* popsicle sticks and which animal was in the middle. Ask students why they think some animals did better in the plains than others. *Possible responses: crocodiles are slower on land but fast in water, so they did not get a lot to eat. Giraffe did not have enough trees in the plains to eat. Wildebeest were able to get their food with ease in the plains.*



Grade 2-3:

HABITATS AND THE POWER OF PLANTS

(continued...)

CLOSING

[10 MINUTES]

Invite students to consider what makes their neighborhood a good habitat for them and their family. Where do they get their food, water, shelter, and space? Do any wild animals get their food, water, shelter and space in the same places? Remind students that they are not separate from wild animals and that they both share the same needs and, in some cases, the same habitat.

IN YOUR NEIGHBORHOOD

What could be added to your neighborhood to help wild animals meet their needs? For example, add more shelter by piling up logs, building a bird house, or making a bug hotel. For water, students can offer a shallow dish of water or a bird bath. For food, students can plant native wildflowers or trees.

KINDNESS TO ALL BEINGS

Not everyone can get food, water, and shelter in your neighborhood. Students can help by giving extra food to food banks, donating their allowance to help communities get clean water, and offering extra clothing and blankets to organizations that provide shelter to those in need.

SWAHILI

Crocodile: *Mamba*

MAA

Giraffe: *Olmeut*



Grade 2–3:

SEASONS IN THE SERENGETI

This lesson is recommended ***after*** watching *Serengeti*.

NGSS Disciplinary Core Ideas

- 2-LS4-1, 3-LS4-3, 3-LS4-4 Biological Evolution: Unity and Diversity
- 3-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

Lesson Length

- 3 hours, 40 minutes

Lesson Summary

As seasons change in the Serengeti, plants and animals change too. In this lesson, students will assess the effects of rain on the plains habitat and its impact on the lives of White-bearded Wildebeest.



WARM UP – PAINTING THE SERENGETI SEASONS

[1 HOUR]

Materials

- Paint brushes
- Art paper
- Paint
- Images of seasons in the Serengeti (Appendix D)

Procedure

Share with students that the environment is constantly changing. Some changes happen minute-by-minute like the number of raindrops falling from the sky in a storm. Other changes happen over several months like the warming of temperatures in spring on Turtle Island (North America). Invite students to share what other daily or seasonal changes they notice in their environment.

Share with them that there are three general seasons in the Serengeti: May-August (cool and dry), September-October (dry and warmer), and November-April (wet and hot). Show students images of different seasons in the Serengeti. Have students paint the scene as it appears in the image and note the season at the bottom of the painting.



Grade 2–3:

SEASONS IN THE SERENGETI

(continued...)

Have students paint the same scene again in a *different* season. They will show changes in plants and animals, and indicate the new season at the bottom of their art. Hang the two pieces of artwork side-by-side for students to compare how the landscape changes as the seasons change.

PART 1 (OUTDOOR) – GROWING A GRASSLAND

[2 HOURS, SPREAD OVER SEVERAL DAYS]

Materials

- Trowels
- Grass seed
- Soil
- Water
- Planting pots (or toilet paper rolls) x 3 per pair
- Scissors
- Markers
- Blank paper
- Writing utensils

Procedure

Take students into the schoolyard and find a grassy area. Complete the following 5 exercises:

1. Begin by crouching down and closely examining the grass. Are all the stems the same shape and color? Does the grass all smell the same? Do they notice any beings eating the grass or using it in some way (i.e., as shelter)?
2. Ask students what the grass receives from space – outside the Earth – to stay alive. *Response: sunlight.*
3. Ask students what the grass receives from the sky to stay alive. *Response: rain/water.*
4. Ask students what the grass receives from below the Earth's surface to stay alive? *Response: soil.* In pairs, students will dig up a small patch of grass – no bigger than the size of their palm. What grows from the bottom of the grass into the soil? What could be the purpose of roots?

Share that the plains are an important habitat in the Serengeti, where the grasses are eaten by many animals including wildebeest, zebras, and also cattle who are raised by the Maasai; an Indigenous community living in Tanzania and Kenya. The growth of grass changes throughout the year as it becomes warmer or cooler, and wetter or drier.

Divide students into pairs and distribute planting pots, soil and grass seeds*. Students will conduct an experiment to see the effects of rain on the growth of grass, using the following procedure:

1. Fill three pots with soil leaving a 1-2 cm of space at the top. Sprinkle seeds into the pot and cover with a thin layer of soil. Label the pots #1, #2, #3.





Grade 2-3:

SEASONS IN THE SERENGETI

(continued...)

2. Pairs will create a chart with three columns and two rows. On the top row, write #1, #2, #3 in each column. Pairs will create a second chart with three columns and five rows. On the top row, write #1, #2, #3 in each column.

Predictions

#1	#2	#3

Observations

#1	#2	#3

3. Pairs will make predictions in the first chart on how the grass will grow under the following conditions:
    a. #1 - no water (representing the Serengeti's dry season from May-August)
    b. #2 - water every day (representing the Serengeti's wet season from November-April)
    c. #3 - water every day. After the grass is 3 inches tall, cut it down to 1 inch and continue watering daily (representing the Serengeti's wet season, with grass being grazed)
4. Place the pots in a sunny location inside and water #2 and #3. Every few days, students will record any visible changes to the grass in the second chart, by adding the date and either drawings or words to describe the changes.
5. After a couple of weeks, revisit their original predictions and compare to their observations. Which conditions allowed the grass to grow the tallest? Which conditions allowed the grass to grow the greenest and fullest? If they did the experiment again, what other conditions could they have tested?

Share with students that when animals like wildebeest or cattle graze (eat the grass), it often grows back fuller and lusher than if it was not grazed. For this reason, grazers in the Serengeti help maintain the plains for themselves and many other beings to benefit from. Ask students what problem an animal like a wildebeest faces in the dry season? Based on what they saw in Serengeti, how do wildebeest solve this problem?

*If possible, select a local species of grass seed that can be planted in the neighborhood after the experiments are complete. If this is not possible, compost the grass at the end of the experiment.



Grade 2–3:

SEASONS IN THE SERENGETI

(continued...)

PART 2 (OUTDOOR) – MIGRATION SIMULATION

[30 MINUTES]

Materials

- Large plastic hoops x 21
- Migration Simulation Script (Appendix E)

Procedure

As students saw in *Serengeti*, wildebeest – also called gnus – embark on an incredible migration journey every year to the short grass plains.

Take students outside to a large open area and set up 4 rows of plastic hoops. Place 6 hoops in the first row, 6 hoops in the second row, 5 hoops in the third row, and 4 hoops in the fourth row. Rows should be about 20 large steps apart.

Students will place one foot inside the hoops in Row 1 (maximum of 5 students per hoop). Whenever students hear the words "migrate," they must run to the next row of hoops. To begin the game, read the Migration Simulation Script in Appendix E.

Based on what they saw in *Serengeti* and what they experienced in the simulation, ask students if migrating was a good solution to the problem of finding fresh grass in the dry season. Why or why not? Ask students why the wildebeest could not live in a different habitat like the rainforest or the river. Lastly, ask students why it was safer to travel in a large group rather than only one or two wildebeest (or zebras) at a time.

CLOSING

[10 MINUTES]

Ask students what seasonal changes they experience in their life. Do they change what they eat? Change what they wear? Do they travel in certain seasons? Reiterate that the environment is constantly changing and animals – including humans – respond to these changes in different ways to survive.







Grade 2-3:

SEASONS IN THE SERENGETI

(continued...)

IN YOUR NEIGHBORHOOD

Take students outside and make a list of all the animals they see in the season they are in. Ask students if any of these animals migrate. Have any animals already left for migration? Do they migrate to find food like the wildebeest or migrate for a different reason? Take a moment to send a kind wish to each migrating animal to have a safe journey.

LIVING IN THE SERENGETI

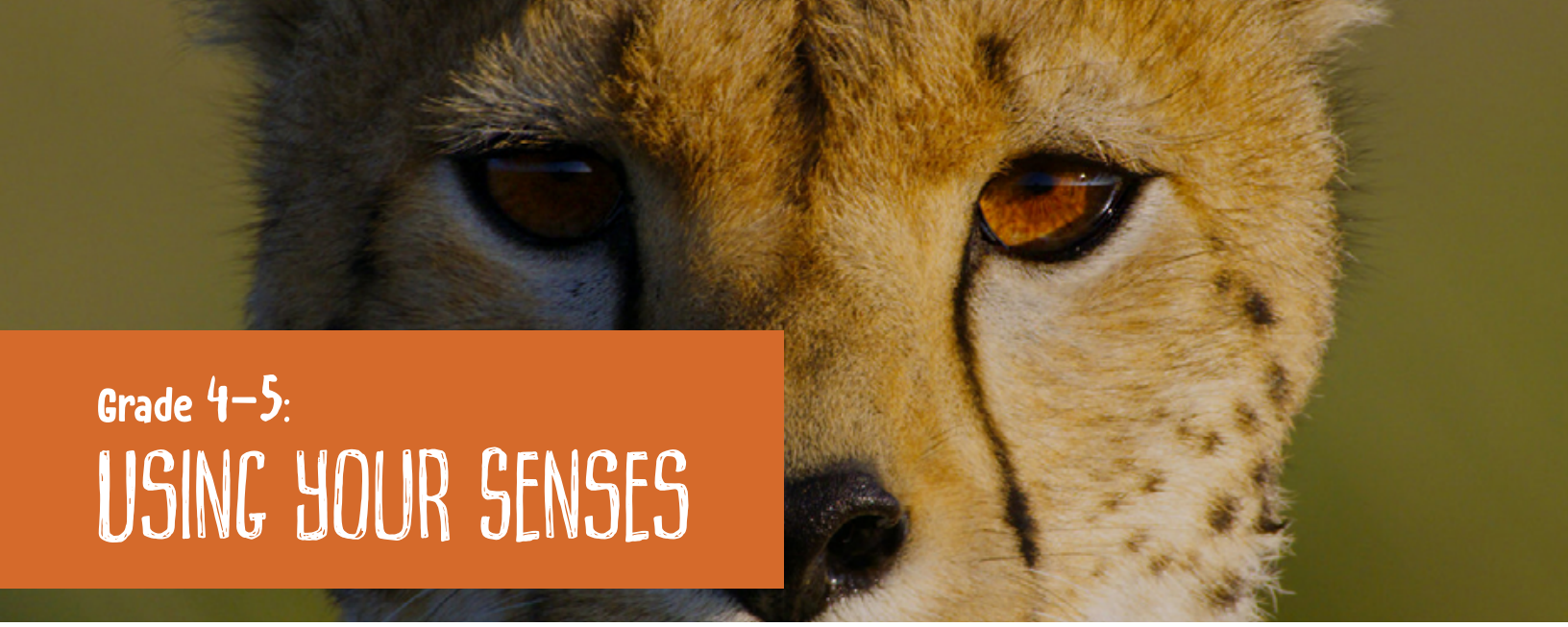
According to Goldman (2020, p. 34), Maasai describe many seasons in the Serengeti, including:

- "Orkisirata-Oltumerin – Oct./Nov.-Dec. – short rains scattered, then everywhere…
- Oladalo – mid Jan.– mid-/late Feb. – short hot dry month with a break in the rains
- Engakwai – mid-May – June/July – long heavy rains
- Koromare – mid-May – June/July – end of rainy season, beginning of dry season, with grass and rain puddles still available
- Alamei – July – Sept. – dry season"

SWAHILI

Dry Season: *Kiangazi*

Rainy Season: *Majira ya muva*



Grade 4–5: USING YOUR SENSES

This lesson is recommended before ***or*** after watching *Serengeti*.

NGSS Disciplinary Core Ideas

- 4-LS1-1, 1-LS1-2 From Molecules to Organisms: Structures and Processes
- 5-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

Lesson Length

- 2 hours, 35 minutes

Lesson Summary

To survive in the Serengeti, each animal has a variety of senses to help navigate the world around them. In this lesson students will practice using their own senses and learn about the connections within and outside the body of wildlife in the Serengeti.

WARM UP - SKILLS IN THE SERENGETI

[15 MINUTES]

Materials

Images of animals in the Serengeti (Appendix A & B).

Procedure

Show students images of animals in the Serengeti. Invite students to close their eyes if it feels safe and comfortable, and imagine they are one of these beings. Guide students through this silent exercise:

Begin by taking three deep breaths, just noticing the air going in through your mouth or nose and out.

Bring your attention to your feet. Do you have paws, hooves, no feet at all? What does the ground feel like beneath you? Offer thanks to the part of your body that allows you to move.

Now bring your attention to your torso, the middle part of your body. Can you feel your heartbeat? Place a hand on your chest and notice the gentle rise and fall of your lungs as you breathe in and out. Offer thanks to your heart and lungs for working hard each day to keep your body alive.

Bring your attention to your head. Do you have fur or feathers around your eyes and ears? Does your tongue feel teeth that are sharp or flat? Offer thanks to all parts of your head that give you the ability to sense the world through sight, smell, taste, and sound.

Now notice how your whole body feels from head to feet. Take two deep breaths and open your eyes.

Ask students how it felt to imagine themselves as



Grade 4-5:

USING YOUR SENSES

(continued...)

another being. Ask in what ways is their body similar to that of a wild animal.

PART 1 (OUTDOOR) - SURVIVING WITH SENSES

[45 MINUTES]

Materials

- Paper
- Writing utensils
- Clipboards

Procedure

Take students outside and hand out paper, clipboards, and writing utensils. Students will imagine themselves as the same animal they chose in the "Warm Up." As they walk around outside, they will practice using the senses they need to survive. For guidance, create a worksheet for students with the following prompts for them to answer:

EYES: What do you see? Where does that information go in your body? How would you respond to what you are currently seeing as this animal?

EARS: What do you hear? Where does that information go in your body? How would you respond to what you are currently hearing as this animal?

NOSE: What do you smell? Where does that information go in your body? How would you respond to what you are currently smelling as this animal?

Students will answer the questions on their worksheet through drawings or words as they walk around. Have students draw arrows on their worksheet to indicate the flow of information into the body of the animal and the subsequent response(s) of the body.

Remind students that external structures like the eyes and nose cannot work on their own; they are connected to internal structures like the brain which process and respond to information. In turn, an internal structure like the brain relies on the heart, lungs, and several other parts of the body to work. The bodies of animals, including humans, are completely interconnected just like an ecosystem.

PART 2 - SERENGETI FOOD WEBS

[1.5 HOURS]

Materials

- Paper
- Markers or other writing utensils
- Painting supplies
- Devices with internet
- Books on wildlife in the Serengeti with images
- String
- Tape

Procedure

Just as the body is interconnected within itself, the body of animals are also interconnected with the Earth. There is a constant flow of energy from the Earth to the body that makes it possible for internal and external structures to function. This energy is



Grade 4–5:

USING YOUR SENSES

(continued...)

typically transferred through food.

Assign students an animal living in the Serengeti and have students examine images of the animal's body and either trace or freehand draw the animal. Students will then paint the animal and once dry, label all external parts of the animal they can see accompanied by 2-3 words to describe how that part helps the animal survive (i.e., tail: to balance). Based on the animal's external structures such as teeth, claws, or talons, students will guess whether the animal is an herbivore, omnivore, or carnivore and write 1-2 sentences on the back of their painting to explain their choice. Students will also guess whether they think the animal is food for another being. Have students research the animal to see how close their guesses were to the animal's actual diet. Students will then paint one additional being who is food for their main animal.

Clear a large space on the wall and hand out string and tape to each student. Choose one student to tape their main animal and food source on the wall, along with a string that connects the two paintings. Ask if any students have an animal connected to either of the beings currently on the wall. Invite that student to tape up their paintings and string.

Continue until all students have taped their beings to the wall. If there are any duplicate beings, group them together. Once complete, invite students to add any additional string connections needed between beings.

Ask students what would happen to their main animal if any being was removed from the web. Which other beings would be impacted? Reiterate the vast connections within an ecosystem and that any change will influence *all* species and may impact their ability to get the energy they need to survive.

CLOSING

[10 MINUTES]

Ask students how using different senses help animals survive in the Serengeti. In what ways do *their* senses help them survive?

Ask students if they were included in the Serengeti food web, where would they go? Who are humans connected to? Remind students that humans are not separate from ecosystems and just like wild animals, have connections to all other beings.





Grade 4–5:

USING YOUR SENSES

(continued...)

IN YOUR NEIGHBORHOOD

Choose a local species and imagine what it might be like to see the world through their senses including eyes, ears, nose, and touch. Spend 10 minutes outside moving around like this animal. Consider writing a short poem to describe the experience using the prompts *"I see… I hear… I smell… I feel…"*

KINDNESS TO ALL BEINGS

Everybody is different, with a range of abilities and experiences of the senses. But not every school - or business - is designed for all bodies. Invite students to write a letter to school administration or a local business advocating for a change that would help someone with a specific sensory need feel more welcomed and comfortable in the space (for example, scent-free zones, braille installations, etc.).

SWAHILI

Elephant: *Tembo*

MAA

Lion: *Olng'atuny*





Grade 4–5:

EARTH'S SYSTEMS IN THE SERENGETI

This lesson is recommended ***after*** watching *Serengeti*.

NGSS Disciplinary Core Ideas

- 4-LS1-1 From Molecules to Organisms: Structure and Processes
- 5-ESS2-1 Earth's Systems
- 5-PS3-1 Energy

Lesson Length

- 2 hours, 55 minutes

Lesson Summary

The Earth is in constant motion with interactions between the geosphere, biosphere, hydrosphere, and atmosphere. In this lesson, students will identify the interconnection between these systems, with a focus on the biosphere within the Serengeti.



WARM UP (OUTDOOR) – COMPARING VEGETATION

[1 HOUR]

Materials

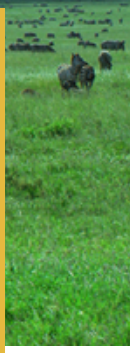
- Blank sheets of paper x4 per students
- Writing utensils
- Clipboards
- Images of different habitats in the Serengeti (Appendix F)

Procedure

Every ecosystem is impacted by the *Geosphere*, *Hydrosphere*, *Biosphere*, and the *Atmosphere*. Plants are part of the *Biosphere* and the search for fresh and nutritious plants prompts the 300-mile migration of White-bearded Wildebeest across the Serengeti each year.

Take students outside and hand out two sheets of blank paper and writing utensils to each student. Have students divide their paper into four equal sections (front and back) with the labels *Trees*, *Shrubs*, *Grasses*, and *Other*. Guide students to an area with vegetation and pause. Have students look around and decide what percentage of vegetation types are present in this area. They will shade in the

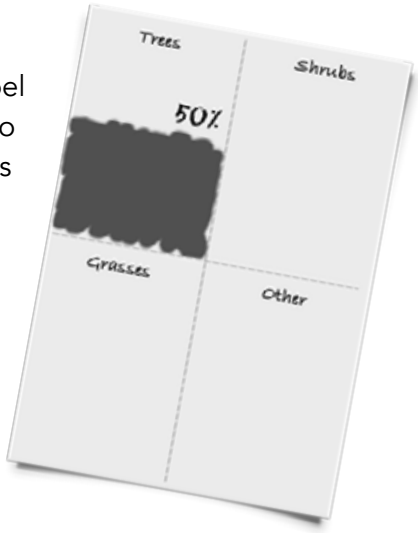




Grade 4–5:

EARTH'S SYSTEMS IN THE SERENGETI

(continued...)



sections under each label with their estimation. Go to three additional areas outside and repeat.

Back in the classroom, hand out two more blank sheets of paper and writing utensils to each student. Have students divide their paper into four equal sections again (front and back) with the labels *Trees*, *Shrubs*, *Grasses*, and *Other*.

Show students images of different habitats featured in *Serengeti* and repeat the exercise of estimating the percentage of vegetation types in each image. Ask students which type of vegetation is most common in the Serengeti. Ask students why that might be. How does this compare to the vegetation they found in their neighborhood?

PART 1 (OUTDOOR) – HOW DOES GRASS GROW?

[1 HOUR]

Materials

- Trowels x1 per pair
- Blank paper x2 per pair
- Writing utensils x2 per pair

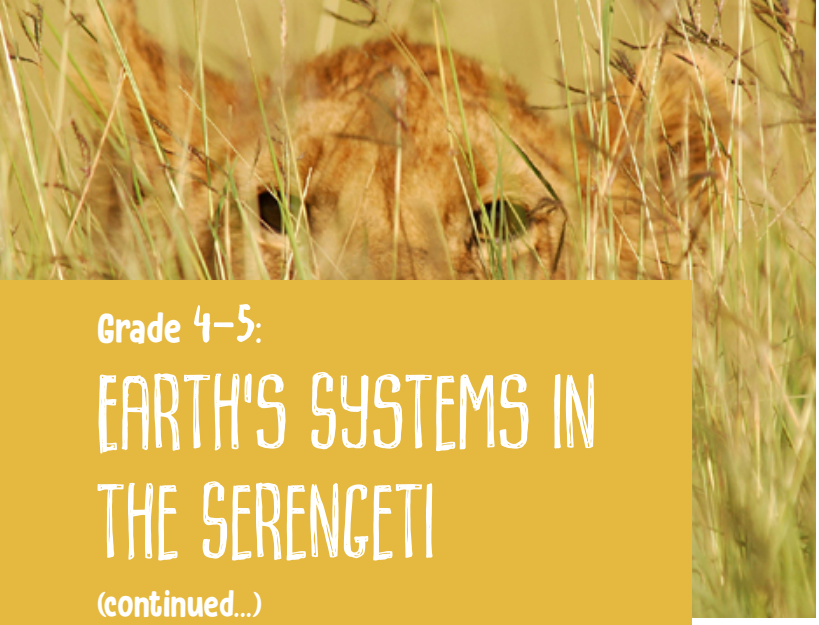
Procedure

Have students recall the needs of wildebeest – a key species in the Serengeti – and ask what type of plant is critical in keeping the wildebeest alive. *Response: grass.*

Take students outside and divide into pairs. Hand out a trowel, paper and writing utensils. Choose a location with grass and invite each group to dig up a palm-sized patch of grass. On their blank piece of paper, invite each student to sketch the grass and based on what they see, label any internal or external structures that the grass needs to survive. This may include roots, leaves, flowers, seeds, and stems.

Next, ask students to answer the following prompts alongside their sketch with drawings or words:

1. Which biological being fertilizes this grass? *Possible response: decomposing leaves, dung of animals. [Serengeti response: dung from wildebeest and other grazers]*
2. Which biological beings eat this grass and prompt better growth? *Possible response: local herbivores. [Serengeti response: grazers like wildebeest, zebra and gazelle]*
3. What hydrological feature helps grass grow here? *Possible response: rain, river. [Serengeti response: rain]*
4. Are there any atmospheric or geological features that help grass grow here? *Possible response: rocks, soil, sunlight. [Serengeti response: soil, sunlight, lightning (fires), ash from volcano]*



Grade 4–5:

EARTH'S SYSTEMS IN THE SERENGETI

(continued...)

Have students draw arrows indicating where these features enter the plant (i.e., through the roots, stem, etc.).

Like the grass in their neighborhood, grass in the Serengeti has the same basic structure and has similar needs. On the back of their paper, have students answer the same prompts as above for grass in the Serengeti. Once complete, compare answers and invite students to share similarities and differences between the local grass and Serengeti grass. Reiterate that grass does not exist without the hydrosphere, biosphere, geosphere, and the atmosphere. Everything on Earth is interconnected.

PART 2 – DRAMATIC FLOW OF THE SERENGETI

[45 MINUTES]

Materials

Serengeti Ecosystem Script (Appendix G)

Procedure

Divide the class into the following six groups and hand out a *Serengeti Ecosystem Script* to each group: **Group 1** – Geosphere/Volcano, **Group 2** – Hydrosphere/Rain, **Group 3** – Biosphere/Grass, **Group 4** – Biosphere/Wildebeest, **Group 5** – Biosphere/Dung Beetle, **Group 6** – Atmosphere/Lightning

Each group will read through the script and note the places where their Earth system is mentioned. Groups will then come up with dramatic actions and artistic movement to represent their Earth system at each moment it appears in the script.

Once groups have practiced their actions, bring the class together in a large open space. Read the script and invite groups to enter the "stage" and perform their actions as their Earth system is mentioned. As new groups enter the stage, encourage them to move around and interact with other groups to represent interactions between Earth's systems.

After the large group simulation is complete, ask students whether they think the Serengeti could exist if any one of the Earth systems were taken away. Reiterate the interconnectedness between all Earth systems and the important role each system plays in the survival of the Serengeti in its current form.

CLOSING

[10 MINUTES]

Ask students in what ways vegetation and other features of the biosphere help them survive. Invite students to think of a connection they have with one other Earth system that is helping them stay alive. Remind students that they are part of the Earth and rely on the interconnection between the geosphere, hydrosphere, biosphere, and atmosphere to survive, just like the beings in the Serengeti.



Grade 4–5:

EARTH'S SYSTEMS IN THE SERENGETI

(continued...)

IN YOUR NEIGHBORHOOD

No matter where students are in the world, Earth's systems are working together to make a home for students, their families, and all other beings in their neighborhood. What choice could students make to support one or more of these systems? For example, cleaning up litter on a beach can support the hydrosphere and biosphere. Complete an action either as individuals or as a class.

LIVING IN THE SERENGETI

People are also part of the biosphere within the Serengeti. Indigenous communities including the Kuria, Ikoma, Sukuma, and Maasai are all part of the dynamic Serengeti ecosystem. Many of these communities are pastoralist, keeping grazing cattle on the plains which can stimulate the growth of new grass and add fertilizer through dung much like the wildebeest.

SWAHILI

Insect: *Mdudu*

MAA

Forested area: *Entim*



Grade 6–8:

RESOURCE AVAILABILITY AND BIODIVERSITY

This lesson is recommended before ***or*** after watching *Serengeti*.

NGSS Disciplinary Core Ideas

- MS-LS2-1, MS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics

Lesson Length

- 3 hours, 10 minutes

Lesson Summary

Humans and wildlife alike are dependent on resources from the Earth to survive. In this lesson, students will make connections between resource availability and its impact on species in the Serengeti.

WARM UP – MORE THAN A RESOURCE

[30 MINUTES]

Materials

- Images of wildlife in the Serengeti (Appendix A & B)
- A timer

Procedure

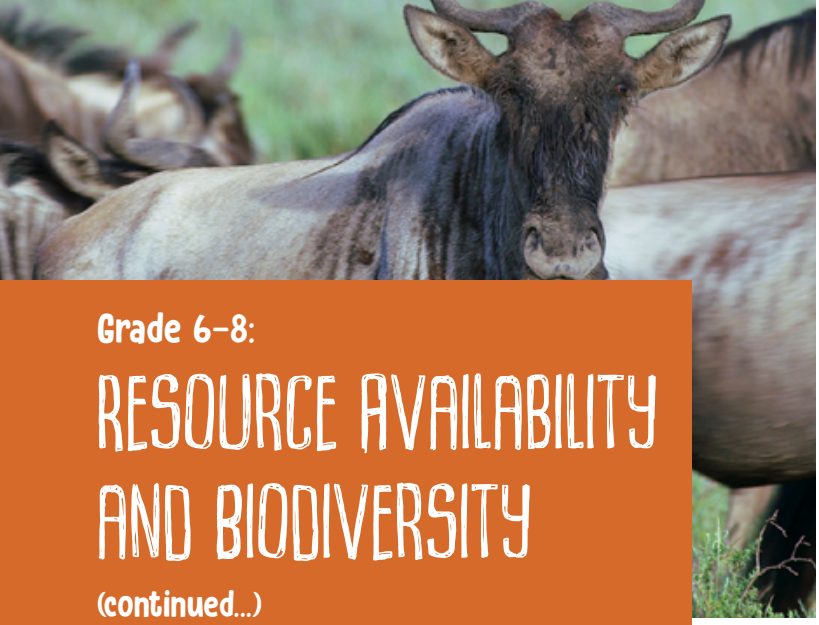
Share with students that the parts of the Earth living beings use to survive are often called resources. Resources include plants, animals, water, air, minerals, and more. If one being uses too much of a resource, there might not be enough left for other beings who also rely on that resource.

Show students various images of wildlife in the Serengeti. As a class, identify resources that are visible in each image. Note whether the animal in the image is using the resource(s) and what other resources they need to survive. If they are not using the resource in the image, what other animals in the Serengeti might need that resource to survive.

Share with students that animals themselves are often considered resources, for example as a food source. However, when humans identify non-human animals as resources, they are often perceived as objects or "things" rather than sentient beings.

Divide students into pairs and have pairs sit face-to-face. Hand out an image of a wild animal in the Serengeti to each student. Students will then take turns completing the following sentence out loud: "I am more than a resource because…" Example responses may be "I have a family" or "I can feel." Set a timer for 2 minutes and have students keep offering responses until the time is complete.

Remind students that regardless of whether a resource is living or non-living, it is our



Grade 6-8:

RESOURCE AVAILABILITY AND BIODIVERSITY

(continued...)

responsibility to treat that resource with care and respect.

PART 1 (OUTDOOR) - RESOURCE AVAILABILITY IN THE SERENGETI

[30 MINUTES]

Materials

Three different color popsicle sticks or natural items x1 set per student.

Procedure

Take students outside to a large open area. At one end of the area, randomly distribute the three colors of popsicle sticks. Have students stand in a row at the opposite end of the area facing the sticks.

In this game, some students will be grazers of the Serengeti. They may wish to be gazelles, zebras, wildebeest, or a different grazer of their choice. The goal of the game is to collect enough resources to survive. The three resources in the game are: plants, water, and minerals, each represented by a different color of popsicle stick (or natural item).

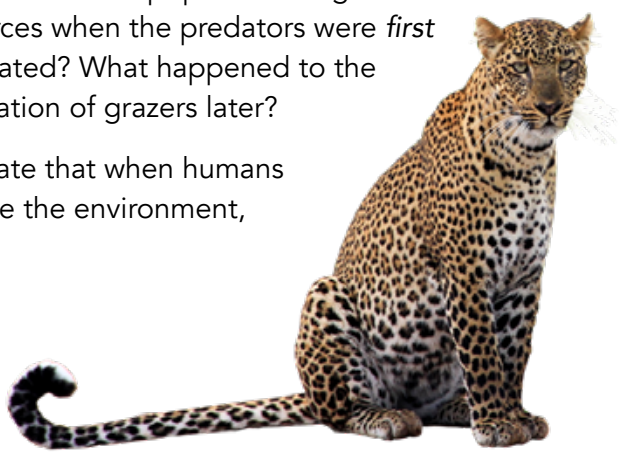
Round 1: Divide the class in half – Group A and Group B. Group A are grazers and will run to the popsicle sticks, collect one of each color and return to the group. Ask the grazers if everyone got the resources they needed. The answer should be yes.

Round 2: Tell students that a new (fictional) airport is being built in the Serengeti to fly in more tourists. Group B are construction workers. Each construction worker removes one stick from the pile and sets it aside. Grazers (Group A) will once again run to the popsicle sticks and try to collect one of each color. Give students approximately 30 seconds and then ask them to return to the group. Ask the grazers if everyone got the resources they needed. Students who did not get what they need will join Group B.

Round 3: Share with students that there is good news! Time has gone by and some of the resources have regenerated in the Serengeti. Students from Group B can each return one popsicle stick to the resource row. But now the new airport has brought in tourists who hunt wildlife. These hunters have reduced the population of predators like leopards in the Serengeti. Ask students what might happen to the population of grazers with no predators around. The population will increase! Group B are now grazers and join Group A. All grazers must now try to collect the resources they need. Give students approximately 30 seconds and then ask them to return to the group. Ask the grazers if everyone got the resources they needed.

End the game after Round 3. Debrief with students by asking the following: What happened to the resources when the airport was built? What happened to the population of grazers? What happened to the population of grazers and resources when the predators were *first* eliminated? What happened to the population of grazers later?

Reiterate that when humans change the environment,





Grade 6-8:

RESOURCE AVAILABILITY AND BIODIVERSITY

(continued...)

there can be a detrimental impact on the availability of resources which in turn impacts the species who rely on those resources to survive.

PART 2 (OUTDOOR) - CHANGING BIODIVERSITY

[2 HOURS, SPREAD OVER 2 WEEKS]

Materials

- Blank paper
- Writing utensils
- Clipboards
- Large plastic hoops x1 per pair
- Field guides on local natural history
- Scissors
- Watering can
- Ash fertilizer
- Manure-based fertilizer

Procedure

Take students outside to an area with a "built" environment, such as a sidewalk, paved area, or other human-built structures and divide into pairs. Hand out blank paper, writing utensils, a clipboard, and a large plastic hoop to each pair.

Students will place their hoop on the ground and record the number of different plants and animals found in their hoop, along with a tally of individuals observed for each species. Students will also note the presence of resources like rocks and water. Repeat the exercise at a new location away from the built environment, for example in a nearby park.

Have students compare findings from the two sites and answer the following questions:

1. Which site had a higher number of *different* species (greater diversity)?
2. Which site had higher populations of *each* species?
3. Which site had more resources?
4. How might the availability of resources affect population size in an area?
5. How might a change in the environment (i.e., building sidewalks, roads, etc.) affect population?

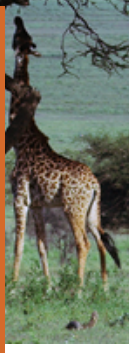
Share with students that changes to the environment are not always instigated by humans. Natural changes occur every day in ecosystems around the world. For example, in the Serengeti, grass is eaten by grazers like wildebeest and zebra, the Ol Doinyo Lengai volcano erupts to spread ash across the plains, rain brings water to rivers, and dung of wildlife fertilizes the soil.

Assign pairs to one of the following experiments: *Grazers*, *Rain*, *Ash*, or *Dung*. To start, all groups will place their plastic hoop on a new patch of grass and once again count the number of different plants and animals present, as well as the number of individuals present for each species.

For *Grazers*, students will cut the grass using scissors. For *Rain*, students will water the grass daily for two weeks. For *Ash*, students will sprinkle ash fertilizer on the grass. For *Dung*, students will sprinkle manure-based fertilizer on the grass.

After one week, return to the hoops and re-count the biodiversity, noting any changes to resource availability. Repeat again at the end of two weeks





Grade 6-8:

RESOURCE AVAILABILITY AND BIODIVERSITY

(continued...)

(or longer if time permits).

Have students compare the biodiversity and resource availability before and after the change was made. Students will then make a 3-minute presentation to share their results, answering the question of how changing the environment impacted the populations who lived there and whether similar changes might take place in the Serengeti ecosystem. If there was no change, ask students to share why that might be.

CLOSING

[10 MINUTES]

Ask students in what ways *they* have changed the environment and affected resource availability, either in a positive or negative way. How might these decisions impact wildlife in their neighborhood? How might these decisions impact wildlife in a place that may be farther away like the Serengeti?

Ask students in what way they would *like* to change the environment to make more resources available for wildlife in their community and beyond. Encourage students to make this change.

IN YOUR NEIGHBORHOOD

While some grassy areas benefit from grazers, longer grass is also helpful to a variety of beings like insects and smaller mammals. Encourage students to advocate for no-mow zones in the schoolyard or neighborhood to promote the growth of longer grasses and wildflowers.

KINDNESS TO ALL BEINGS

Accessing resources like food and water can be challenging for both wildlife and humans. Consider volunteering for a local non-profit or supporting a non-profit in Tanzania or Kenya that distributes essential resources to a community.

SWAHILI

Leopard: *Chui*

MAA

Zebra: *Oloitiko*



Grade 6–8:

RE-IMAGINING PARKS

This lesson is recommended ***after*** watching *Serengeti*.

NGSS Disciplinary Core Ideas

- MS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics
- MS-ESS3-1, MS-ESS3-3, MS-ESS3-4 Earth and Human Activity

Lesson Length

- 4 hours, 55 minutes, over multiple days

Lesson Summary

Parks are often considered the solution for protecting biodiversity across the globe. In this lesson, students will look critically at parks and redesign Serengeti National Park to best support people and wildlife alike.



WARM UP (OUTDOOR) – HUMAN IMPACTS ON THE ENVIRONMENT

[1.5 HOURS]

Materials

- Blank paper
- Writing utensils
- Clipboards
- Devices with internet

Procedure

Ask students if they have visited any kind of park before including national parks or small local parks. What did it look like? Who was in the park? Make a list of park features they can recall. Take students outside to the nearest park-like space (for example, a schoolyard) and hand out paper, writing utensils, and clipboards to each student. Divide paper into six equal-sized boxes. Add the label *Before* in the left column boxes and *After* in the right column boxes. Add the heading *Park Builders* in the top row, *Park Users* in the middle row and *Park Inhabitants* in the bottom row.



Grade 6-8:

RE-IMAGINING PARKS

(continued...)

Park Builder Before	 After
Park Users Before	 After
Park Inhabitants Before	 After

Before refers to *before* the park was built.

After refers to *after* the park was built.

Inhabitants can be both human and more-than-human.

Give students 15-20 minutes to walk around the space, noticing the impacts on the environment from Park Builders, Park Users, and Park Inhabitants and either sketch or use words to fill in each box. Once complete, invite a few students to share their before/after findings for each category.

Back inside, share with students that human impacts on the environment are felt around the world, including in the Serengeti. Ask students to recall the *Serengeti* film, which takes place in Serengeti National Park. Students will research and answer the following four questions:

1. Why was Serengeti National Park created?
2. Who created Serengeti National Park?
3. On whose land was the park created?
4. What happened to the people who previously lived in the Serengeti Park space (where are they now)?

Hand out paper and writing utensils. Divide paper into six equal-sized boxes with the same labels and headings as before. Students will sketch or use words to indicate the various impacts on the Serengeti environment from Park Builders, Park Users, and Park Inhabitants in each box. Once complete, invite a few students to share their before/after findings for each category. Have students compare their Serengeti findings with their neighborhood findings. Ask students how both environments are impacted by people, noting any similarities or differences.

PART 1 - DISTRIBUTION OF RESOURCES IN THE SERENGETI

[45 MINUTES]

Materials

- Blank maps of the Serengeti x2 per student (Appendix G)
- Coloring utensils
- Devices with internet

Procedure

Share with students that not all resources are evenly distributed globally, nor are they evenly distributed on a smaller scale, within ecosystems like the Serengeti.

Hand out blank maps of the Serengeti and label map basics including a compass direction, scale, and title. Based on what students saw in *Serengeti* and with any additional research needed, students

Grade 6-8:

RE-IMAGINING PARKS

(continued...)

will draw and label the Mara River, woodland (trees), and plains (grass). Ask students which resource is most abundant in the Serengeti and which is the least abundant and note this on their map. Discuss why certain resources are more abundant than others in the Serengeti.

Share with students that humans can also change the distribution of resources in an ecosystem. Give them the fictional scenario that a new mega resort is going to be built by an overseas company next to the Mara River, which will include a spa, ziplining, wood cabins, and a waterpark. This new resort will increase the number of people in the park from 6,000 to 20,000 people per day.

Hand out a second blank map of the Serengeti to each student. For this map, students will consider how the resort might impact the Serengeti ecosystem by redrawing the Mara River, woodland, and plains after the resort has been built and there are now 20,000 users in the park per day. After redrawing the resources, students will answer the following questions:

- Was there a change in the distribution of resources? Why?
- Was there a change in the most and least abundant resources?
- Which wild animals featured in *Serengeti* would be impacted by the presence of the resort?
- How would people living in and near the Serengeti be impacted by the presence of the resort?
- Are there any real-world examples of how tourism has impacted the resources in an area?

Discuss the redrawn maps and responses as a class. Reiterate that resources are unevenly distributed and human activities that are not done with care can further deplete resources in an area.





Grade 6-8:

RE-IMAGINING PARKS

(continued...)

PART 2 - REDESIGNING THE SERENGETI

[2.5+ HOURS]

Materials

- Large blank poster paper
- Drawing utensils
- Sticky notes

Procedure

After reviewing the impact that a mega resort might have on the Serengeti, share that the fictional company has cancelled their project. Now, a local Indigenous community has hired you to work alongside them to help redesign the park so there can be tourists, Indigenous presence, and great care for land and species within the park boundaries. In small groups or individually, students will submit a proposal for a redesigned park.

In each proposal, students will answer the following:

- What would the park look like if both tourists and Indigenous communities were present?
    - Research at least one Indigenous community in the Serengeti to learn about their community and their needs in the park.
- How would biodiversity be maintained (or increased)?
    - What responsibility would the park users have in caring for the land and wildlife?
- How would resources like water and trees be maintained?
- How would you monitor the human impact on the environment to evaluate the park's success?
    - Research existing monitoring practices for inspiration.

Have students draw the redesigned park on large poster paper and prepare a 5-8-minute presentation answering the questions above. Students will evaluate their classmate's designs by writing one thing they liked about the proposal on a sticky note and one thing they might add or change. They will stick the notes around the poster after the presentation.

CLOSING

[10 MINUTES]

Ask students what their personal responsibility is in maintaining biodiversity and resources. In what ways do they currently demonstrate this in their lives? Ask what their personal responsibility is in listening to Indigenous voices. In what ways do they currently demonstrate this in in their lives?

Ask students how they could influence the design of parks in a real-world situation. Remind students that they can advocate for changes that benefit both biodiversity and Indigenous communities, which ultimately benefits all beings on Earth.



Grade 6-8:

RE-IMAGINING PARKS

(continued...)

LIVING IN THE SERENGETI

The Maasai hold extensive knowledge of the land and wildlife in the Serengeti, understanding migration and climate patterns, availability of resources, how to co-exist with wildlife, and much more. Honoring these Indigenous ways of knowing are vital to the survival and protection of the Serengeti ecosystem.

IN YOUR NEIGHBORHOOD

Make a list of the nearest conservation areas or other large parks in your community. Choose one from the list and write a letter to park management, asking how the park welcomes and supports BIPOC (Black, Indigenous, and People of Color) and/or LGBTQIA+ communities and what plans they have in the future to become a more inclusive space.

SWAHILI

National Park:
Mbuga ya taifa

MAA

Land: *Enkop*



CREDITS

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Based on a concept by Karen Gordon

Serengeti is a K2 Studios release of a Definition Films production
The film is written and directed by Michael Dalton-Smith

Back to Earth Science Inc. is located on the traditional territory of the Anishinaabek and Haudenosaunee. K2 Studios is situated within the traditional territory of the Gabrielino/Tongva Nation.

SOURCES

Animalia. (n.d.). LAPPET-FACED VULTURE. Retrieved from Animalia: https://animalia.bio/lappet-faced-vulture

Bradford, A. (2017). Facts About Gnus (Wildebeests). Retrieved from Live Science: https://www.livescience.com/54421-gnus-wildebeests.html

Boudreau, D., McDaniel, M., Sprout, E., & Turgeon, A. (2011). Conserving the Earth. Retrieved from National Geographic: https://www.nationalgeographic.org/article/conserving-earth/

Herbison, L & Frame, G. (2020). Hippopotamus. Retrieved from Britannica: https://www.britannica.com/animal/hippopotamus-mammal-species

Goldman, M. (2020). Narrating Nature: Wildlife Conservation and Maasai Ways of Knowing. The Arizona Board of Regents.

Malik, N. (Ed.). (2001). Swahili: A Rough Guide Dictionary Phrasebook. Penguin Books Ltd.

Serengeti National Park (2021). Weather & climate Serengeti National Park. Retrieved from Serengti.com: https://www.serengeti.com/weather-climate-serengeti.php

Serengeti National Park. (2021). Meet your hosts: the Maasai people. Retrieved from Serengeti National Park: https://www.serengeti.com/maasai-people-serengeti.php

Serengeti National Park. (n.d.). History of Serengeti National Park. Retrieved from Serengeti National Park: https://www.serengetiparktanzania.com/information/history-of-serengeti-national-park/

United Nations Educational, Scientific and Cultural Organization. (2021). Serengeti National Park. Retrieved from UNESCO: https://whc.unesco.org/en/list/156/

APPENDICES

APPENDIX A – IMAGES FOR "SKILLS IN THE SERENGETI" ACTIVITY



Lion Cubs, *Serengeti*



Wildebeest, *Serengeti*



Elephant, *Serengeti*



Hippopotamus, *Serengeti*

APPENDIX B – IMAGES FOR "CHEETAHS LEARN TO HUNT" ACTIVITY



Cheetah, *Serengeti*



Cheetah Cub, *Serengeti*

APPENDIX C –
WILDEBEEST STORY CARDS FOR "A YEAR-IN-THE-LIFE OF A WHITE-BEARDED WILDEBEEST" ACTIVITY

CARD 1:



It's **February** in the Serengeti and White-bearded Wildebeest are having babies called calves in the short grass plains. You are the first wildebeest born this season and you take your first wobbly hoof steps on the soft grass. At only a few days old, you are already running circles around the adult wildebeest and singing at the top of your lungs "neeeew neeeeeeew" *Students practice singing "neeeew neeeeeeew."*



By **April**, the short grass your family of thousands has been eating is even shorter and it is time for the herd to leave this place in search of fresh grass and water. You don't want to leave without saying goodbye to your favorite bird friend – the Flamingo – so off you run to wish them farewell. By the time you return, the herd is gone. They've left without you! Oh no! You've never been on your own before and don't know which way the herd has gone. How will you find them? You start walking alone.

CARD 2:

It's now **June** and you've been walking on your own for a month with no sign of the herd. You look ahead and see a huge river filled with hippopotamuses. Maybe the hippos have seen the herd! "Hello hippos, have you seen my family?" you ask.



"Yes," said a hippo missing several front teeth. "I will tell you which way they went, but first I need your help. I lost my front teeth and can't eat my usual plants. If I don't eat, I can't poop, and my poop is *very* special. It feeds the fish in the river! Bring me 5 different leaves to eat and then I will show you the way."

Students collect 5 leaves each and bring them to the hippo. "Thank you!" said the hippo. "Your family went that way." *Point in the direction of Card 3.*

APPENDIX C –
WILDEBEEST STORY CARDS FOR "A YEAR-IN-THE-LIFE OF A WHITE-BEARDED WILDEBEEST" ACTIVITY (CONTINUED...)

CARD 3:



Another month has passed, and it is now August. There is still no sign of the herd. Where could they be? You try calling them "Neeeeeeew, neeeeeew," but all you hear back are soft trills. Who is that? You turn around and find 10 ostrich chicks all huddled together. Maybe they have seen the herd! "Hello ostriches, have you seen my family?" you ask.

"Yes," said all 10 ostriches at the same time. "We will tell you which way they went, but first, we need your help. Our parents sent us to find locusts - who are like grasshoppers - to eat for dinner. Locusts harm trees and plants that humans eat, so we are basically superheroes saving all the plants. Help find a locust for each of us and we will show you the way to your family."

Students will now search for 10 insects - one for each ostrich - with eyes only. When 10 insects have been found, continue reading. "Thank you!" said the ostriches in unison. "Your family went that way." *Point in the direction of Card 4.*

CARD 4:



It is now October and the weather has started to change. The short rains have begun and grass is starting to grow…but not where you are. Where are you anyway? You look around and see little mountains bursting from the soil. Does someone live here? You knock on the mound and a termite pops out of a tiny hole. Maybe *they* have seen your family! "Hello termite, have you seen my family?" you ask.

"I have!" the termite squeaked. "I will tell you which way they went, but first, I need your help. Termites are like vultures, but instead of eating *animals* who are no longer living, we eat *plants* that are no longer living, which makes room for new plants to grow. After a long day of eating, we come home to our mounds - made from soil and our spit. When the wildebeest herd passed through here, they knocked over one of our mounds! Build us a new mound and then I will show you the way to your family."

Students will now build mounds out of natural materials they find on the ground. The taller, the better! Omit the spit. "Thank you!" said the termite "Your family went that way." *Point in the direction of Card 5.* "P.S. Watch out for the cheetah that likes to sit on our mounds!" hollered the termite.

APPENDIX C –
WILDEBEEST STORY CARDS FOR "A YEAR-IN-THE-LIFE OF A WHITE-BEARDED WILDEBEEST" ACTIVITY (CONTINUED...)

CARD 5:



The month is **December** and you find yourself in a thick forest. You can smell rain in the air and know you must be close to your family. Where there is rain, there is grass! You see a small shape lumbering through the trees toward you with a long trunk. Who could that be? A baby elephant! Maybe *they* have seen my family! "Hello baby elephant, have you seen my family?" you ask.

"I have!" said the elephant in a high-pitched bellow. "I will tell you which way they went, but first, I need your help. My job is to clear a path in the forest so animals like you can make your way through. But I don't have tusks yet and it's hard to clear a path without tusks! Help me move these sticks and rocks and I will show you the way to your family."

Students will clear sticks, rocks, leaves and other items off to the side of the path they are on. "Thank you!" said the elephant. "Your family went that way." *Point in the direction of Card 6.*

CARD 6:



It is now **February** and you've been walking for a whole year trying to catch up with your wildebeest family! You step on soft grass that you've felt under your hooves before. You pause to take a bite and it's the most delicious grass you've ever tasted! You stuff some grass in your mouth and as you lift your head up, you come face to face with a Grant's Zebra, who also has grass stuffed in their mouth. With your mouth still full of grass you say, "Hello Grant's Zebra, have you seen my wildebeest family?"

"I have!", said the zebra, also with grass in their mouth. "I prefer the name *Oloitiko* that was given to me by the Maasai people. If you can call me my Maa name, I will show you the way."

Students will practice saying their Maa name. "Thank you!" said the *Oloitiko*. "Your family went that way". *Point in the direction of Card 7.*

APPENDIX C –
WILDEBEEST STORY CARDS FOR "A YEAR-IN-THE-LIFE OF A WHITE-BEARDED WILDEBEEST" ACTIVITY (CONTINUED...)

CARD 7:



You rush through the grass and spot your friend the Flamingo! If they are here, that means you have walked a full circle around the Serengeti that took a whole year! Could your family be here too? You start "neeeeew-ing," and hear a response. "Neeeeew neeewwwww." You bound ahead and then you see them; your White-bearded Wildebeest family. They gallop over and nuzzle your nose! Your family has missed you so much and cannot believe how much you've grown. They are so proud of you for finding your way back to the herd and this time, they won't leave the short-grass plains without you.

APPENDIX D –
IMAGES FOR "PAINTING THE SERENGETI SEASONS" ACTIVITY



November – April in the Serengeti, *Serengeti*



May – August in the Serengeti, *Serengeti*



September – October in the Serengeti, *Serengeti*

APPENDIX E –
MIGRATION SIMULATION SCRIPT FOR "MIGRATION SIMULATION" ACTIVITY

It's September in the northernmost part of the Serengeti. White-bearded Wildebeest – that's you – are happily eating grass, your favorite food. But the grass isn't as green as it used to be. There hasn't been rain in months! But as you take another bite, you smell something. You sniff the air [*students smell the air*] and smell rain! That means fresh green grass might be growing, but not here. You follow your nose and begin to **migrate**. [*Students run to Row 2.*]

You make it to the Mara River, but the water is rushing high up the banks. You think about turning around to go live in the rainforest instead of crossing the river. Could you survive in the rainforest? [*Ask students if they could survive in the rainforest.*] There is not enough grass in the rainforest and too many trees! So, you jump into the water and swim to the other side. This river won't stop you – you need to **migrate**! [*Students run to Row 3.*]

For the wildebeest who couldn't fit in a hoop (maximum 5 students per hoop), the river did in fact stop you. Hungry crocodiles ate you and now you are a hungry crocodile too. In the next round, you can tag wildebeest to eat them. Whoever you tag becomes another crocodile.

The remaining wildebeest rest on the riverbank, but only for a moment. It's now November and the smell of rain is close! Ahead of you could be fresh green grass. Behind you are most certainly crocodiles, so you shake the water off your body [*students shake their body*], stretch your legs [*students stretch their arms and legs*] and **migrate**! [*Students run to Row 4.*]

December is here and as you walk, you start to feel raindrops run down your hair and watch them fall softly on the greenest grass you've ever seen. Congratulations! You found the short grass plains in the southernmost part of the Serengeti! But just as you take a bite of grass, two zebras gallop past you at full speed. Uh oh. When zebras start running, lions are near. Can they outrun the lions? [*The crocodiles now become lions. Invite two volunteers to become zebras and run back to Row 3 without getting tagged by the lions.*]

Travelling in small groups is not safe! A couple of zebras or wildebeest are no match for a pride of lions. But where can the herd find more wildebeest? What could you do to make the herd bigger? [*Ask students how the herd can become bigger.*] You could have babies! February is baby season for wildebeest and each year up to 500,000 wildebeest are born. [*More than half of the lions turn into baby wildebeest and rejoin the wildebeest group at the hoops in Row 4.*]

By the time the calves are two months old, the short grass is shorter and the rain has stopped. You say goodbye to the short grass plains, run past the lions, jump over the Mara River, and by August, you are back in the northernmost part of the Serengeti where you began your journey to **migrate**. [*Students run all the way back to Row 1, tagged by lions along the way.*]

End the simulation here.

APPENDIX F –
IMAGES FOR "COMPARING VEGETATION" ACTIVITY



Plains habitat, *Serengeti*



Rainforest habitat, *Serengeti*



Savannah Woodland habitat, *Serengeti*



River habitat, *Serengeti*



Volcano habitat, *Serengeti*

APPENDIX G –
SERENGETI ECOSYSTEM SCRIPT FOR "DRAMATIC FLOW OF THE SERENGETI" ACTIVITY

Millions of years ago, volcanoes **(Group 1 – Geosphere/Volcano enters)** formed in the Serengeti as tectonic plates deep below the Earth's surface smashed together or pulled apart. With every eruption, ash billowed from the peaks and settled on the ground around the **volcano**. Fast forward to now and the Ol Doinyo Lengai - or "Mountain of God" in Maa (Maasai language) - erupts and spreads ash across the Serengeti about every 40 years.

Ash from the **volcano** fertilizes the soil, giving nutrients to plants. But plants need more than nutrients to grow. They need rain **(Group 2 – Hydrosphere/Rain enters)**. Every October, the short rains begin where water drops from the clouds landing softly on the soil and ash. The **rain** travels underground and waters the seeds of grass.

(Group 3 – Biosphere/Grass enters). As **water** hugs the seeds, tiny **grasses** start to sprout. They wiggle their way through the soil and **volcanic** ash and burst out above the ground. The **grass** packs all of their nutrients into short stems that gently sway back and forth on the Serengeti plains. They do not need to grow tall because grazers will eat them soon enough.

In the northernmost part of the Serengeti, where Kenya meets Tanzania, wildebeest smell the **rain (Group 4 – Biosphere/Wildebeest enter)**. **Rain** means fresh grass, so the **wildebeest** begin their migration journey to find the short **grass**. They walk for 300 miles dodging crocodiles in the Mara River and facing off lions in the Savannah. When they get to the plains, they eat the **grass** *and* they poop.

Nothing is wasted in the Serengeti - not even dung **(Group 5 – Biosphere/Dung Beetle enters)**. **Dung beetles** search for wildebeest poop among the swaying **grasses**. They roll the dung or mash it, using their six strong legs. When the dung is just right, they dig a hole in the **volcanic ash** and soil to lay their eggs and cover the eggs with a blanket of dung. The swaying **grasses** wave and say thanks for spreading out nutritious fertilizer to help them grow stronger across the plains.

In February, **wildebeest** babies are born on the plains. They eat all the **grass** they can until the rain stops in April and the **grass** starts to dry out. Crunchy **grass** is not tasty, so the **wildebeest** travel back to the border of Kenya and Tanzania in search of food.

The drying **grass** gets taller and drier each day. In the heat of summer, a storm rolls in with the darkest clouds and rumbling **thunder (Group 6 – Atmosphere/Lightning enters)**. Several bolts of **lightning** flash in the sky and strike the dried **grass**. A small fire starts and quickly spreads across the Serengeti plains, burning up the dried **grass** until it is only ash lying on the ground.

In October, the short **rains** begin again. Water pours from the sky onto the **volcanic** ash and ash from the fire. Small sprouts of **grass**, fed by the **rain** and **ash**, grow out of the soil more vibrant and nutritious than ever before. The **wildebeest** sniff the air, smell the fresh growth, and know it is time to migrate 300 miles south to the short grass plains again. All is connected here in a constant flow that makes the Serengeti an extraordinary ecosystem like no other.

End Dramatic Flow here.

APPENDIX G –
BLANK MAP OF THE SERENGETI FOR "DISTRIBUTION OF RESOURCES IN THE SERENGETI" ACTIVITY



Map courtesy of go2africa.com