



THE SERENGETI

notebook

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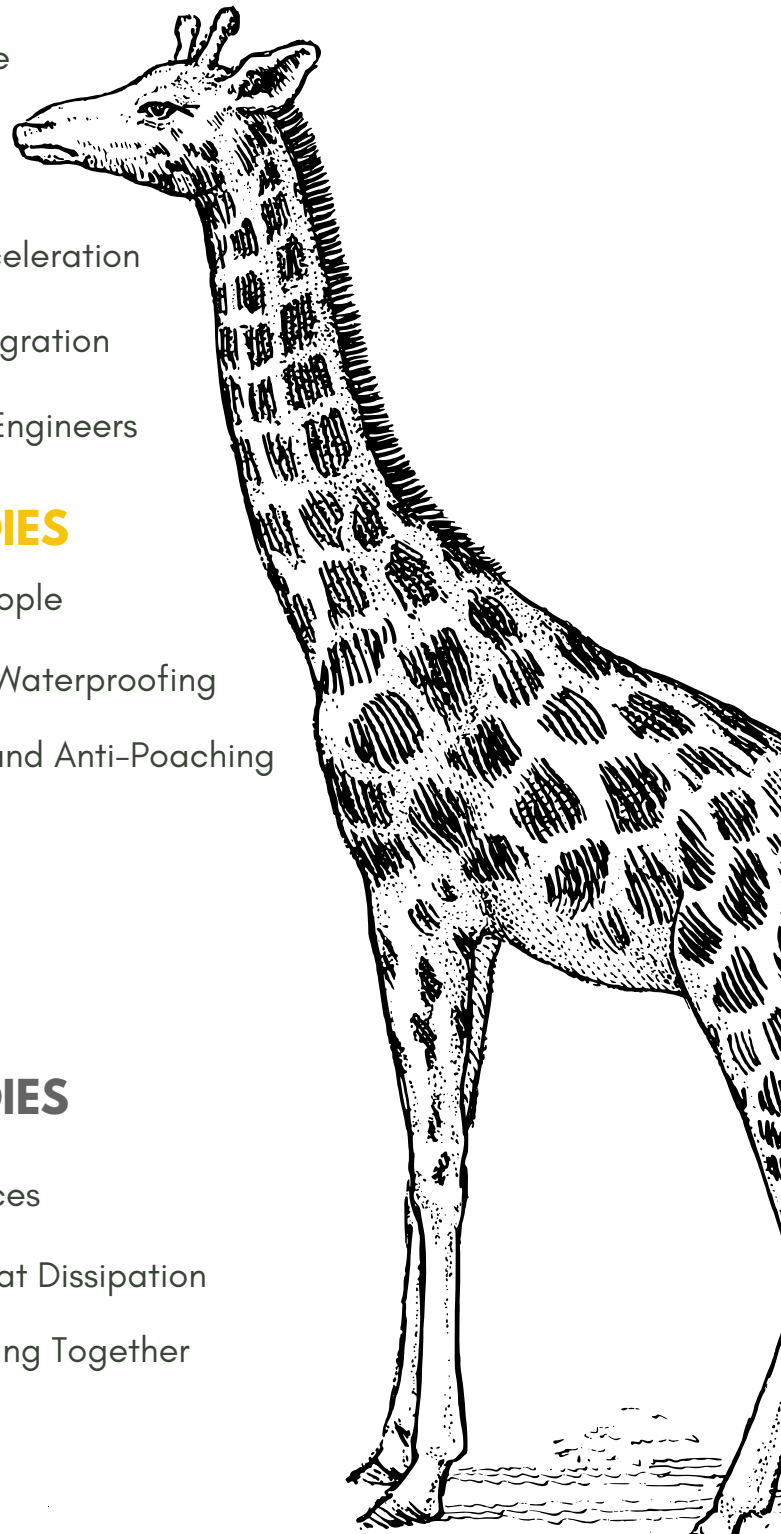
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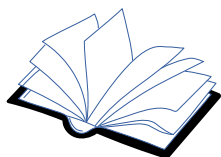
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THE SERENGETI: A LAND OF ENDLESS GRASS AND GREAT MIGRATIONS

THE VAST SERENGETI

Stretching across East Africa, the Serengeti is one of the most famous and exciting places in the world. It's mostly in Tanzania, with part of it extending into Kenya. This huge grassland covers almost 12,000 square miles—so big it would take days to drive across! The name Serengeti comes from the Maasai language and means "endless plains." When you stand in the middle of it, that's exactly what you see: tall golden grass reaching out as far as your eyes can see, under a bright African sky.

The Serengeti is one of the richest ecosystems on Earth. While it may look like endless grassland, it's actually teeming with life. Every year, millions of animals move across the plains in search of food and water. This movement, known as the Great Migration, is one of the most amazing wildlife events on the planet.

THE MAJESTIC ANIMALS OF THE SERENGETI

The Serengeti is home to some of the most incredible animals on Earth. It's estimated that over 1.5 million wildebeests, 250,000 zebras, and 500,000 gazelles live here, and each year they take part in the Great Migration. These animals travel hundreds of miles across the Serengeti, searching for fresh grass and water. The journey is long and difficult, but it's crucial for their survival.

You might also see large herds of elephants wandering through the plains. These gentle giants use their long trunks to pull up grass and flap their big ears to stay cool under the hot African sun. Lions, the "kings of the Serengeti," also roam these lands. They live in family groups called prides and work together to hunt zebras, wildebeests, and other animals. Their powerful roars can be heard from five miles away, warning the rest of the animals that the lions are near.

LIFE ON THE PLAINS: BIG AND SMALL

The Serengeti isn't just home to big animals like elephants and lions. Smaller creatures like meerkats also thrive here. Meerkats are always on the lookout for danger, standing tall on their hind legs and keeping watch for predators like hawks and jackals. These little mammals live together in underground burrows and are always looking out for one another.

Up in the sky, vultures circle high above, using their sharp eyes to spot food. These birds play a very important role in the Serengeti, cleaning up the remains of animals after predators like lions have eaten. Without vultures, the plains would be littered with bones and scraps, making the land unhealthy for all the creatures living there.

THE ROLE OF RAIN IN SURVIVAL

Rain is a key part of life in the Serengeti. During the rainy season, the grass grows tall and green, and rivers and watering holes fill up with fresh water. This is when the animals thrive, grazing and drinking to their heart's content. But when the dry season arrives, the grass turns brown and dry, and water becomes much harder to find. The animals must travel farther to find food and water, which is why the Great Migration is so important for their survival.

The Serengeti is always changing, and life here can be tough. But nature is strong and finds ways to adapt. Every animal has its own special skills to survive in this wild land, from the lightning-fast cheetah to the long-necked giraffe and the clever teamwork of hyenas. Every creature plays a part in the balance of life on the African plains.



GRASSLANDS AND SAVANNAS

SAVANNA VS. SERENGETI: WHAT'S THE DIFFERENCE?

The **savanna** is a type of grassland ecosystem found in many parts of the world, including Africa, South America, and Australia. Savannas have warm temperatures year-round, with two main seasons—wet and dry. Most of the plants in the savanna are grasses, with scattered trees and shrubs. Many animals live in savannas, such as lions, elephants, zebras, and giraffes. These grasslands depend on seasonal rains and fire to stay healthy and provide food for the animals that live there.

The **Serengeti** is a specific savanna located in Tanzania and Kenya. It's one of the most famous ecosystems in the world, covering thousands of square miles. What makes the Serengeti unique is its Great Migration, where millions of animals—like wildebeests, zebras, and gazelles—move across the plains in search of food and water. The Serengeti is also home to predators like lions and cheetahs, which rely on the migrating herds for food.

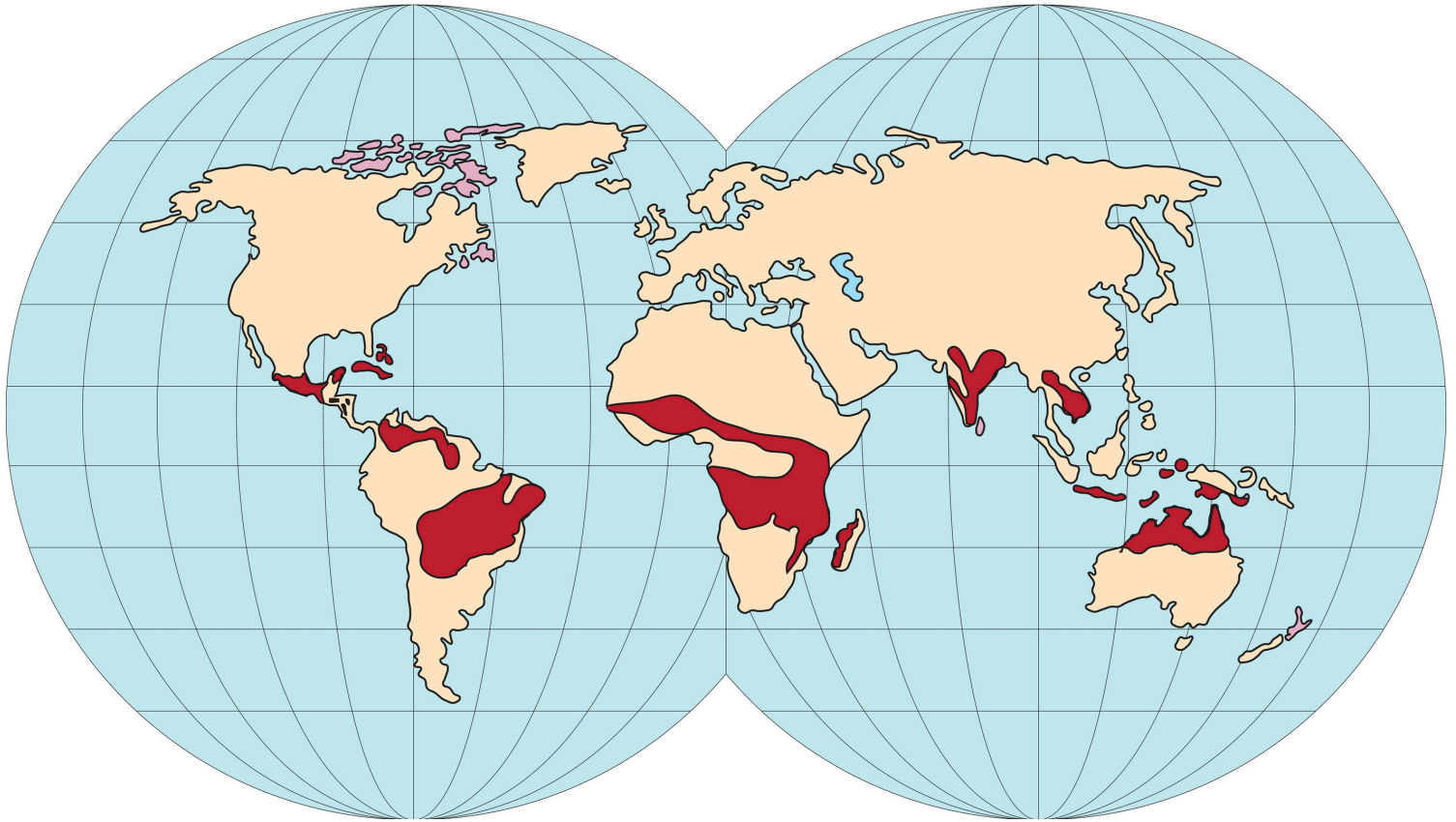
Fact Check:

- Where is the Serengeti located?
- What is one thing that makes the Serengeti unique?

Question for Thought:

Why do you think the Serengeti is such a special place compared to other savannas?

SAVANNAS OF THE WORLD



Where is the Serengeti?

The Serengeti is primarily found in Tanzania, though a small part of it crosses into Kenya along the border.

Find Tanzania and Kenya on the Map!

1. Use a map or globe to locate the country of Tanzania.
2. Color in Tanzania to mark where most of the Serengeti is located.
3. Next, color a small section of Kenya along the border with Tanzania, where the Serengeti extends into Kenya.
4. Label both countries clearly on your map.



THE SERENGETI K-W-L CHART

In the first column, write what you already know about the Serengeti. In the second column, write what you want to know about the Serengeti. After you have completed your study this month, come back and write what you’ve learned in the third column.

What I K now	What I W ant to Know	What I’ve L earned



HOW FERTILIZER HELPS PLANTS GROW

PART 1: FERTILIZER BASICS

What is fertilizer and how does it work?

Fertilizer is any substance that enriches soil with essential nutrients, helping plants grow healthy and strong. The key nutrients include nitrogen, phosphorus, and potassium—each playing an important role. Nitrogen promotes lush, green growth, phosphorus helps plants develop deep, strong roots, and potassium boosts their ability to resist diseases.

Dive Deeper: The Science Behind Fertilizers

- Nitrogen (N): Found in compounds like ammonium nitrate, nitrogen is essential for photosynthesis, allowing plants to produce food.
- Phosphorus (P): Often derived from phosphate rocks, it aids energy transfer in plants, helping them bloom and fruit.
- Potassium (K): Present in potash, potassium strengthens plant cells and regulates water flow, improving drought resistance.

In natural ecosystems like the Serengeti, animals such as zebras and wildebeests provide these nutrients through their droppings. As droppings decompose, they release nitrogen and other elements, fertilizing the soil naturally. This cycle ensures continuous grass growth, essential for the herbivores that depend on it.

1. Describe what each fertilizer does to plants.

- Nitrogen: _____
- Phosphorus: _____
- Potassium: _____



HOW FERTILIZER HELPS PLANTS GROW

You will be testing how grass grows by comparing two patches: one with a variable—like fertilizer, water, or sunlight—and one without. Each day, you'll measure the height of the grass in both patches and track their progress. This experiment helps you understand how things like fertilizer affect plant growth. Which patch will grow faster? Let's find out!

PART 2: PLAN YOUR EXPERIMENT

2. Which variable will you test? (choose 1, 2 or all 3)

- ☐ Watering frequency
- ☐ Adding fertilizer
- ☐ Sunlight exposure
- ☐ Other: _____

3. Write down your hypothesis:

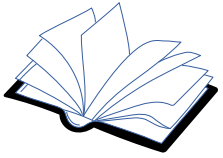
PART 3: TRACK YOUR RESULTS

4. Every other day, measure the height of the grass in both plots (e.g., one with fertilizer and one without). Record the height in the table. After the experiment, compare your results to see how the variable (like fertilizer) influenced growth."

Day	Plot with Variable (e.g., fertilizer added)	Plot without Variable (e.g., no fertilizer)
1		
3		
5		
7		

5. Reflection:

Did the grass with fertilizer grow faster? Why do you think that happened?



THE EQUATOR'S ROLE IN THE SERENGETI

WHAT IS THE EQUATOR?

The equator is an imaginary line that circles the Earth, dividing it into two halves—the Northern Hemisphere and the Southern Hemisphere. It's located right in the middle of our planet. Places near the equator, like the Serengeti, get the most sunlight all year round. That's because the sun is almost always directly overhead or very close to it. The result? Warm temperatures and lots of sunshine, no matter the time of year!

HOT, HOT, HOT: WHY IS THE SERENGETI SO WARM?

The Serengeti lies just south of the equator, which means it's warm all year long. Unlike places far from the equator that have four distinct seasons (spring, summer, fall, and winter), the Serengeti doesn't get cold winters or mild springs. Instead, it has two main seasons: the wet season and the dry season. During the wet season, heavy rains fall, and the grass grows tall and green. In the dry season, the rain disappears, and the grass turns brown, leaving the landscape hot and dry.

The wet season usually lasts from March to May and again in November. This is when the Serengeti gets most of its rainfall. The rains are a welcome relief for plants and animals, allowing grass to grow and waterholes to fill. Herbivores like zebras and wildebeests can find plenty of food, and the predators, like lions, have more energy to hunt.

The dry season, which lasts from June to October, is when rain becomes scarce. The sun bakes the land, turning the grass brown and shrinking water sources. The animals must move around more to find food and water, leading to the famous Great Migration of wildebeests and zebras.

LIFE IN THE SERENGETI'S HEAT

Animals in the Serengeti have adapted to deal with the intense heat caused by its location near the equator. Elephants, for example, use their large ears to fan themselves and cool off. Lions spend most of their day resting in the shade, hunting only in the early morning or late evening when it's cooler. Even the grasses and trees in the Serengeti have special ways of surviving the heat. Some plants grow deep roots to reach water far underground, while others have small leaves to prevent too much water from evaporating in the sun.

RAINFALL: THE KEY TO SURVIVAL

While the sun makes the Serengeti hot, the rainfall (or lack of it) shapes the landscape and life there. Rainfall determines what kind of plants grow and, in turn, what kind of animals can live in the Serengeti. When there's a lot of rain, grasses thrive, and the herbivores, like gazelles and antelopes, have plenty to eat. But during the dry season, these animals must move to find water and food, and many of them travel hundreds of miles as part of the Great Migration. Predators follow the herbivores, relying on them for survival.

Rain and heat work together to create the Serengeti's unique environment. While the heat from the equator provides warmth and energy, it's the rain that determines when animals can thrive and when they must struggle to survive.



RAINFALL AND ECOSYSTEMS AROUND THE EQUATOR

Activity 1: Ecosystem Comparison Chart

Use books or the internet to research the Amazon Rainforest, Sahara Desert, and Serengeti Grasslands. Fill in the chart below with information about each ecosystem's rainfall, temperature, plants, and animals.

Ecosystem	Amazon Rainforest	Sahara Desert	Serengeti Grasslands
Rainfall			
Temperature			
Plants			
Animals			



RAINFALL AND ECOSYSTEMS AROUND THE EQUATOR

Activity 2: Draw Your Ecosystem

Pick one ecosystem from the comparison chart. Draw what it looks like in the box below. Be sure to include the kinds of plants and animals that live there, as well as anything unique about the environment.

Draw Your Ecosystem Here:

Reflection Question:

How does the amount of rainfall affect the plants and animals living in the Amazon, Sahara, and Serengeti? Write a short response explaining how each ecosystem depends on or adapts to the amount of water it receives.



THE VITAL ROLE OF FIRE IN THE SERENGETI

THE ROLE OF FIRE IN THE SERENGETI

Fire might sound dangerous, but in the Serengeti, it's actually very important for keeping the land healthy. Every few years, fires race across the grasslands, burning away old, dry plants to make room for fresh, green grass. It might seem scary, but without these fires, the Serengeti wouldn't be as alive as it is today! Fires make the soil rich and ready for new grass to grow. And when the rains come, the grass grows fast, turning the plains green again. This new grass is food for animals like zebras, wildebeests, and gazelles. So, fire is like nature's clean-up crew, helping the grasslands stay full of life.

But fires can be dangerous, too! They can hurt communities and their animals, which is why people sometimes set small, controlled fires on purpose. These "controlled burns" help keep bigger, more dangerous fires from happening while still giving the land what it needs.

THE FIRE TRIANGLE: WHAT DOES FIRE NEED?

Fire needs three things to start: heat, fuel, and oxygen. This is called the fire triangle! In the Serengeti, the hot sun provides the heat, dry grass is the fuel, and oxygen is all around in the air. When these three things come together—whoosh!—a fire can start. Often, these fires are sparked by lightning during the dry season. Controlled burns also use the fire triangle to help manage the land. But, what if one part of the triangle is missing? For example, if there's no dry grass, fires can't start. That's where overgrazing by animals becomes a problem.

OVERGRAZING AND ITS IMPACT ON FIRE

When too many animals, like cows and goats, eat up most of the grass, there isn't enough left for fires to burn. Without enough fires, the Serengeti starts to change. Shrubs and small trees begin to take over where grass should grow. Animals like zebras and wildebeests struggle to find food because there's less grass to eat. When there are fewer herbivores, predators like lions have less food, too! The whole Serengeti food chain gets out of balance when there aren't enough fires to keep the grasslands healthy.

FIRE, OVERGRAZING, AND THE SERENGETI'S FUTURE

Fire, grazing, and plants all work together in the Serengeti, kind of like how sunshine, water, and soil help a garden grow. Too many fires can be harmful, but without enough fires, shrubs and trees will take over the grasslands. Overgrazing by livestock means there isn't enough grass to fuel the fires, which affects the whole ecosystem. Without fires, the grass can't grow back, leaving less food for the animals who depend on it to survive.

Fires help new grass grow, keep life balanced on the plains, and make sure that the great herds of wildebeests, zebras, and gazelles can continue their migrations across the wide Serengeti grasslands, just like they have for centuries!



HOW FIRE HELPS KEEP THE SERENGETI BALANCED

Instructions:

1. Fire sets off a chain reaction in the Serengeti! Fill in the flowcharts below to show what happens when fire burns, and also what happens if overgrazing becomes an issue. Use the phrases in your Phrase Bank to complete it.

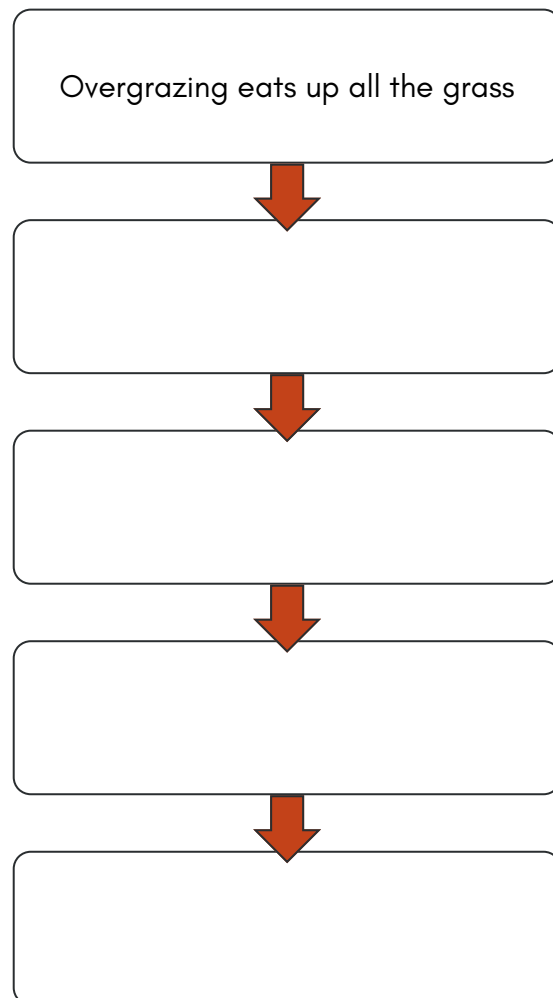
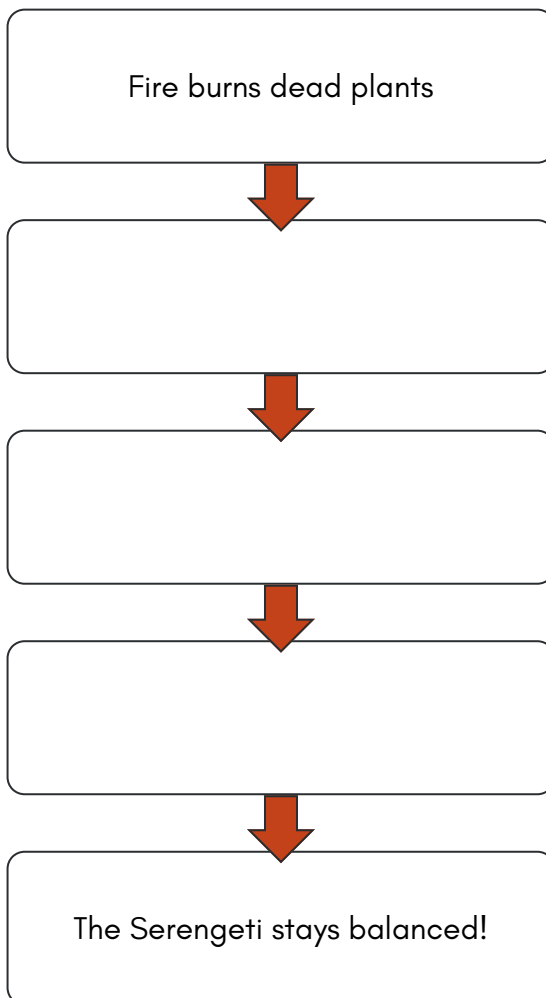
Phrase Banks

WITH FIRE

Zebras and wildebeests eat
~~Fire burns dead plants~~
 Lions hunt herbivores
 Fresh grass grows
~~The Serengeti stays balanced!~~

WITHOUT FIRE

Animals struggle to find food
 Shrubs take over
~~Overgrazing eats up all the grass~~
 The Serengeti becomes unbalanced.
 No grass for fire





THE IMPACT OF FIRE

Fire in the Serengeti is a powerful natural force that plays both helpful and challenging roles in the ecosystem. While it clears away old plants and makes room for new growth, it can also pose risks to animals and humans if it becomes too frequent. Let's explore the benefits and drawbacks of fire, as well as the impact of grazing on these grasslands.

Role of Fire Reflection Questions

1. Why do some plants in the Serengeti depend on fire to grow?

(Consider how fire clears old plants and allows sunlight to reach the soil.)

2. What could happen to animals if there are too many fires?

3. What challenges do animals face when they need to escape fire?

(Reflect on how animals might respond to sudden fires—where do they go?)

5. Why do Maasai people graze their cattle on the Serengeti grasslands?

(Hint: Think about food and economic value.)

6. What are some benefits of grazing cattle on the land, as long as it's done carefully?

(Think about how grazing can reduce the need for fire and help keep shrubs from taking over.)



SCIENCE OF FIRE: BURN TIME PREDICTION

What You'll Be Doing:

In this activity, you're going to explore how fire needs 3 things to burn; oxygen, fuel and heat. Remove any one of them, and your fire will go out. To do this, you will test how long a candle burns inside jars of different sizes.

What You'll Need to Do:

1. Measure the Jars – Measure the volume of each jar by filling it with water and counting how many cups it holds, or use an equation to calculate the volume of a cylinder.
2. Test the Small Jar– Light a tea light candle and place your smallest jar over top. Record how long it takes for the fire to go out.
3. Make a Prediction – After testing a small jar, write down how long you think the candles will burn in the medium and large jars.
4. Light the Candles – With adult supervision, light the candle inside each jar and time how long it takes to go out. Record your results.

BURN TIME EXPERIMENT

Measure:

- Small Jar Volume: _____
- Medium Jar Volume: _____
- Large Jar Volume: _____

Prediction:

- How long will the medium and large jars burn based on the small jar's time?
 - Medium Jar Prediction: _____
 - Large Jar Prediction: _____

Results:

- Medium Jar: _____
- Large Jar: _____

Was your prediction correct? Why or why not?

Why This Matters in the Serengeti:

In the Serengeti, dry grass acts as the fire's fuel, just like wax acts as the fuel in your jars. If there's too much overgrazing and not enough grass, fires can't burn, and the ecosystem becomes unbalanced. Without fire to clear away old plants, new grass can't grow, and animals like wildebeests and zebras struggle to find food.



CHEETAHS: THE SPEED CHAMPIONS OF THE ANIMAL KINGDOM

Cheetahs are known as the fastest land animals on Earth. They can reach speeds of up to 70 miles per hour—faster than most cars drive on city streets! But what really makes cheetahs special is their ability to accelerate, which means how quickly they can go from standing still to full speed. Imagine a sprinter at the start of a race: they push off the starting block with all their might, building up speed in a few seconds. Cheetahs do the same thing, but much faster! In just three seconds, a cheetah can go from 0 to 60 miles per hour. That's almost as fast as a car speeding down the highway!

BUILT FOR SPEED AND POWER

Cheetahs are perfectly designed for speed. Their long legs are like powerful springs, pushing them off the ground with incredible force. These legs help cheetahs cover a lot of ground very quickly, allowing them to sprint after fast prey like gazelles. But it's not just their legs that help them move so quickly—their entire bodies are built for speed.

Cheetahs are lightweight, with long, flexible spines that stretch and contract like a rubber band when they run. This helps them take big strides, almost like they're flying through the air with each leap. And when they need to make a quick turn to follow their prey, their long tails act like a rudder on a boat, helping them steer and keep their balance.

ACCELERATION: CHEETAH VS. SPRINTER

Let's think about acceleration—how fast something can speed up. If you've ever watched a sprinter race, you've seen how they crouch down and get ready to explode off the starting line. They push off the ground as hard as they can, picking up speed with each step. Cheetahs do something very similar, but they do it much faster and with more power.

Their powerful back legs push off the ground with such force that a cheetah can accelerate faster than a sports car! Their acceleration is what gives them the edge when chasing down quick, nimble animals like antelopes. In the wild, a cheetah only has a few seconds to catch its prey, so being able to reach top speed quickly is super important.

ADAPTATIONS FOR THE CHASE

Cheetahs have many other adaptations that help them during the chase. Their large nasal passages allow them to take in more oxygen while they run, which helps them keep up their speed. Their large hearts pump blood quickly to their muscles, giving them the energy they need to sprint at full power. Even their claws help—they act like cleats, digging into the ground for better grip as they race after their prey.

But while cheetahs are incredible at sprinting, they can't keep up this speed for long. After just 20 to 30 seconds of sprinting, they need to stop and catch their breath. Their hunts are short and fast, and if they don't catch their prey quickly, they usually have to give up and try again later.

SPEED WITH A PURPOSE

So why do cheetahs need to be so fast? In the Serengeti, where they live, food can be hard to catch. Their prey, like gazelles and antelopes, are fast and alert. Without their speed and acceleration, cheetahs wouldn't be able to catch enough food to survive. It's their incredible design, from their powerful legs to their flexible spines and long tails, that allows them to be the kings and queens of speed in the animal world.



CHEETAH ADAPTATION POSTER

Title: Cheetah Speed and Adaptations

Instructions:

Cheetahs can run faster than any other animal! Draw a diagram of a cheetah, labeling its special adaptations that help it accelerate quickly.

Labels to include:

- **Long legs** for powerful strides
- **Flexible spine** for long, extended leaps
- **Large lungs** and heart to pump oxygen efficiently
- **Long tail** for balance and steering during fast turns
- **Lightweight skeleton** to reduce body weight
- **Claw-like paw** pads for extra grip on the ground (semi-retractable claws)
- **Enlarged nasal passages** to allow more air intake while running

1
STEP



2
STEP



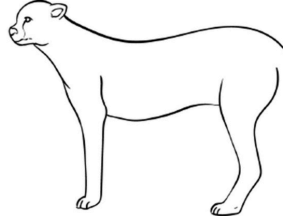
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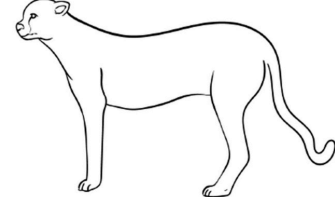
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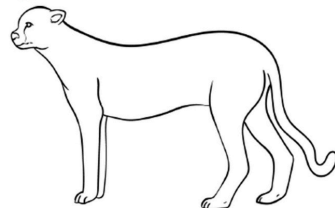
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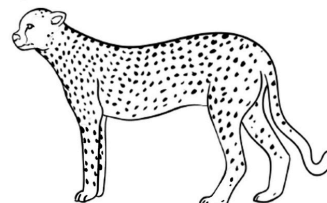
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STEP



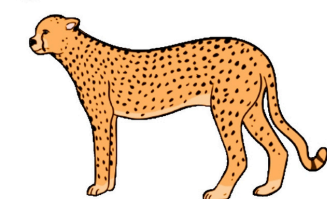
7
STEP



8
STEP



9
STEP





CHEETAH ADAPTATIONS POSTER

A large, empty rounded rectangle with a thin black border, intended for a student to draw or write their explanation.**Explain:**

Write 3-4 sentences explaining how these adaptations help the cheetah accelerate quickly.



SPRINT EXPERIMENT: HOW FAST CAN YOU ACCELERATE?

Introduction: Can You Run Like a Cheetah?

Cheetahs are the fastest animals on land, able to run 100 meters in just 6 seconds! They reach their top speed of 27 m/s (97 km/h) in only 3 seconds. But cheetahs don't keep this speed for long—they slow down after a short burst. Now, let's see how your speed compares to a cheetah's, and how fast you can run the first part of your sprint compared to the full distance.

Part 1: Record Your Run Times

Use the table below to document your times for both the 100-meter and 50-meter sprints.

Distance	Time
100m sprint:	
50 m sprint	

Part 2: Double Your 50-Meter Time

- Double your 50-meter time: _____ seconds

Is your doubled 50-meter time faster or slower than your full 100-meter run?

- ☐ Faster
☐ Slower

Part 3: Compare Your Results

1. Which part of your 100-meter run was faster?

- ☐ First 50 meters
☐ Second 50 meters

Discuss:

1. Why do you think you were faster in the first half of your run?
2. If you could try again, what strategies would you use to keep your speed throughout the full 100 meters?

Challenge: Try again. This time, run just the first 10 meters. How quickly can you accelerate?



THE GREAT MIGRATION: THE JOURNEY OF THE WILDEBEESTS

THE GREAT MIGRATION: THE JOURNEY OF THE WILDEBEESTS

Every year, millions of wildebeests take part in one of the greatest adventures in the animal kingdom—The Great Migration. Imagine this: over 1.5 million wildebeests, along with hundreds of thousands of zebras and gazelles, all moving together across the Serengeti. It's like nature's biggest road trip! These animals travel hundreds of miles, searching for fresh grass to eat and water to drink. Why do they go through such a huge journey? It's because the Serengeti is a land of extremes. During the dry season, the grass dries up, and the rivers shrink. So, the wildebeests follow the rain, moving toward greener pastures that will help them survive.

WHY DO WILDEBEESTS MIGRATE?

The wildebeests are on a mission! They need food, and they know the best way to find it is to follow the rains. When it rains, grass grows tall and green, perfect for munching on. But when the dry season hits, the grass disappears, so the wildebeests move on. Their journey takes them in a giant loop from the southern Serengeti to the northern Maasai Mara in Kenya. They've been making this trek for thousands of years, and their survival depends on it. Wildebeests don't travel alone though. In fact, over a million wildebeests, zebras and gazelles journey because there's safety in numbers. Lions and cheetahs might want to make a meal out of them, but when there are so many animals moving together, it's actually harder for predators to catch one. Zebras are like the lookout crew—they have sharp eyesight and can spot fresh grass or danger from far away, helping the herd navigate.

DANGERS ALONG THE WAY

But it's not all smooth sailing. The migration is full of challenges. One of the scariest moments comes when the herd must cross rivers like the Mara River. Here, the wildebeests face fast currents, steep banks, and lurking crocodiles. It's like the ultimate obstacle course! Some wildebeests make it, while others aren't so lucky, but the herds keep moving, driven by their need for food and water.

WILD WILDEBEEST ADAPTATIONS

Wildebeests are the marathon runners of the animal world. They're built to go the distance! Their strong, tough hooves help them travel across rocky, uneven ground without getting worn out. Their noses can even sniff out rain from miles away, helping them know where to head next. And if danger strikes? Wildebeests can run up to 50 miles per hour! They may not be as fast as a cheetah, but they're quick enough to escape predators most of the time.

THE CIRCLE OF LIFE ON THE MOVE

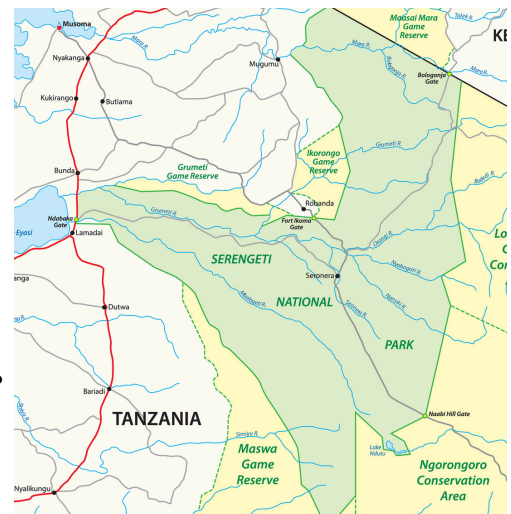
The Great Migration is not just about the wildebeests' journey—it's a whole ecosystem in action. Along the way, thousands of wildebeest calves are born, learning to walk and run within minutes so they can keep up with the herd. But the migration also means danger, with predators like lions, hyenas, and crocodiles lurking. For every wildebeest that doesn't make it, new life is born, and the cycle continues. The wildebeests' movement even helps the land itself. As they graze, they leave behind nutrient-rich soil, allowing fresh grass to grow back, not just for themselves but for all the animals in the Serengeti. The Great Migration is li

Use the reading passage to complete this worksheet. Draw a map of the Serengeti to show important water sources, and annotate (add notes) how these sources impact animal behavior and movement. Think about both the wet and dry seasons.

1. Draw the Serengeti Map:

- ## 2. Annotate Your Map:

-



1. How does the wet season impact animal migration paths?

- ## 2. What do animals do when seasonal water holes dry up?

3. Which areas become crowded when water is scarce? What challenges might arise?

MIGRATING WITH PURPOSE:

CLUES FOR MAPPING



SEASONAL WATER HOLES:

- These water sources fill up only during the wet season (November to May) when the Serengeti receives rain. During the dry season, these waterholes shrink or disappear entirely, forcing animals to move closer to permanent rivers and lakes.
 - Clues for Mapping Seasonal Water Holes: They are often located in open plains or lower-lying areas where water collects temporarily during the rainy season. Areas like the southern Serengeti and certain parts of the Ngorongoro Conservation Area have many seasonal water holes.

PERMANENT RIVERS AND LAKES:

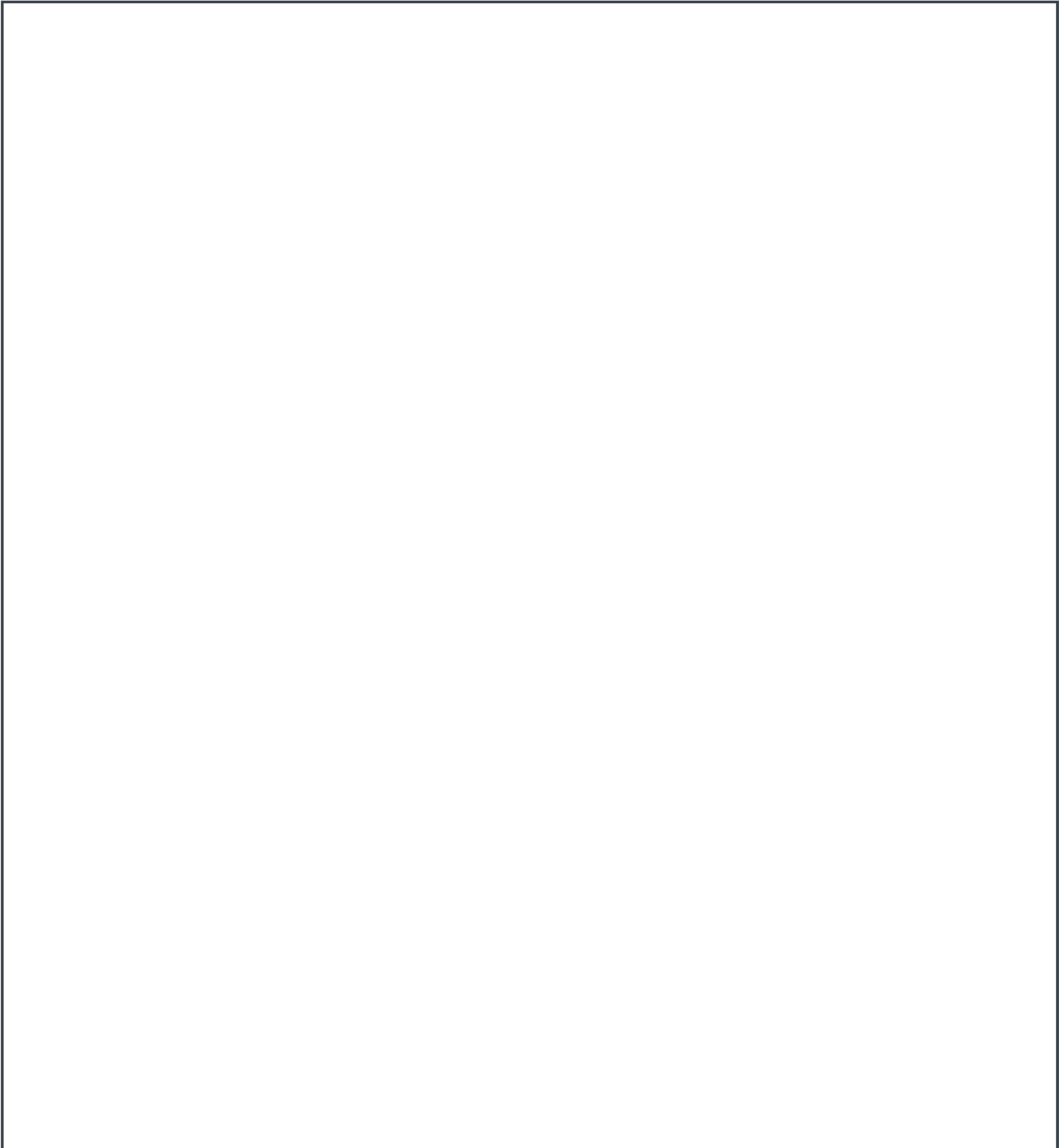
- These water bodies remain throughout the year, supporting animal life even in the dry season. Important permanent water sources in the Serengeti include Lake Victoria (northwest), Lake Eyasi, and the Mara River in the northern Serengeti.
 - Clues for Permanent Sources: These will usually be labeled as large lakes, rivers, or streams that animals depend on year-round. Look for water sources along migration paths where animals gather during the dry season.

MIGRATION PATTERNS

- Wet Season (November to May): During this time, animals like wildebeests spread across the southern Serengeti, grazing in areas near seasonal water sources. They avoid over-crowding because water is plentiful across the plains.
 - Clue for Wet Season Mapping: Mark animals gathering near seasonal water holes and along the open plains in the south.
- Dry Season (June to October): As seasonal water holes dry up, animals migrate toward permanent rivers and lakes, especially the Mara River in Kenya. This is a time of great challenge, with predators like lions waiting at water sources, and wildebeests facing dangerous river crossings.
 - Clue for Dry Season Mapping: Focus on animal paths toward permanent water sources. Add arrows moving north toward the Mara River.



MAP OF THE SERENGETI





TERMITES: THE TINY ENGINEERS OF THE SAVANNA

When you think of great builders, you might imagine humans creating skyscrapers, bridges, or houses. But did you know that some of the most amazing builders on Earth are actually tiny termites? These little insects, smaller than a grain of rice, build towering mounds that can be as tall as a full-grown person! In the Serengeti, termite mounds are more than just piles of dirt—they're cleverly designed structures that keep termites safe, cool, and thriving in one of the hottest places on Earth.

THE GREAT TERMITE MOUND: A SUPER-SMART DESIGN

Termite mounds may look like giant dirt castles, but they're actually engineering masterpieces. Inside, the mounds are full of tunnels, chambers, and even ventilation shafts that help control the temperature. Think of it like a natural air conditioning system! In the hot savanna, the temperature outside can soar to over 100 degrees Fahrenheit, but inside the mound, it stays cool and comfortable, thanks to the termites' clever design. Scientists have even studied termite mounds to learn how to design buildings that stay cool without needing electricity.

How do they do it? The mounds have special vents and tunnels that allow hot air to escape while bringing fresh, cooler air in—kind of like the way our homes use fans to keep air moving. These tunnels are so well-designed that the mounds stay cool during the hottest days and even warm during cold nights!

TEAMWORK MAKES THE DREAM WORK

Termites are all about teamwork. There are thousands—sometimes even millions—of termites in a single mound, and each one has a specific job to do. Some termites go out and collect food, like bits of grass and wood, to bring back to the colony. Others take care of the queen, who spends her life laying eggs to keep the colony growing. Then there are the worker termites, who are the real builders. They're the ones who gather mud, saliva, and even poop (yep, it's true!) to create the walls of the mound. Together, they work like a construction crew, with each termite adding tiny bits to the mound until it's strong, insulated, and ready to stand up to the elements.

WHY TERMITE MOUNDS MATTER

Why do termite mounds even matter? Well, these mounds play a big role in the ecosystem. As the termites dig and build, they mix up the soil, which helps plants grow. The mounds also provide shelter for other animals, like lizards, birds, and even some mammals. Some animals might dig into the mounds to make a home, while others use them as lookout spots to keep an eye out for predators.

Termites themselves are also important in the food chain. Many animals, like armadillos, anteaters, and birds, depend on termites as a food source. So, by building their mounds and thriving in the savanna, termites are helping to keep the whole ecosystem in balance.



LEARNING FROM TERMITES

LEARN ABOUT BIOMIMICRY!

Introducing Biomimicry: Learning from Termites

Biomimicry is when humans look at nature and copy its solutions to solve problems. Termites are amazing builders, and scientists have studied their mounds to learn how they keep cool inside, even in hot climates.

Who Discovered Termite-Inspired Cooling?

In the 1990s, architect Mick Pearce used termite mounds as inspiration to design the Eastgate Centre in Harare, Zimbabwe. Pearce wanted to create a large building that stayed cool without needing expensive air conditioning. By studying how termites build their mounds to stay cool, he used the same ideas to keep the air flowing through the building.

How Do Termites Keep Their Mounds Cool?

Inside termite mounds, the termites dig tunnels that bring cool air in and push warm air out, creating natural ventilation. They build these systems to regulate the temperature inside, even when it's hot outside. This idea of using air flow without electricity helped Mick Pearce design a building that stays cool naturally.

How Is It Used Today?

The termite-inspired design in the Eastgate Centre became a famous example of eco-friendly architecture. Many architects and engineers now use similar ideas in buildings to reduce energy use. This method, called biomimicry, helps keep indoor spaces cool in hot climates, just like termite mounds do.

Watch this video to learn about engineer Mick Pearce and his incredible design:

<https://www.youtube.com/watch?v=620omdSZzBs>





EASTGATE CENTER ENGINEERING

After reading about biomimicry and the Eastgate Center, answer the following questions.

1. What problem did the architect Mick Pearce solve by studying termite mounds?
(Hint: Think about how termites control temperature inside their mounds.)

2. How do termite mounds keep cool without air conditioning?
(Hint: Pay attention to how air moves in and out of the mounds.)

3. What part of the Eastgate Centre building works like the tunnels in a termite mound?
(Think about how the air circulates through the building.)

4. Why is it important to design buildings that don't rely on air conditioning?
(Consider energy use and environmental impact.)

5. What is biomimicry? Do you know of another example of biomimicry besides termite mounds.

6. Do you think more buildings should use ideas from nature like the Eastgate Centre?
Why or why not?



BUILD A TERMITE INSPIRED DESIGN

Your challenge is to create a structure inspired by termite mounds, focusing on how natural ventilation keeps air moving to regulate temperature. The goal is to use what you've learned from the Eastgate Centre's design in Zimbabwe, which mimics termite ventilation systems, to create your own model with working airflow.

Materials I will use:

Imagine: How will you design your ventilation system to move air through your structure efficiently? Think about how air enters, circulates, and exits.

Plan: Draw a sketch of your termite-inspired structure and label the materials you plan to use. Highlight the areas where air will flow in and out.

Test & Improve: After building your design, simulate airflow using a fan or by blowing air through the structure. Hold your hand near the entrance and exit points—can you feel the air moving?

Test 1: Does air flow through the structure?

☐ Yes ☐ No

Test 2: Does the air exiting your design feel cooler?

☐ Yes ☐ No

Reflect: What did you learn from the activity? What worked? What did not work?



THE MAASAI AND THEIR CONNECTION TO THE SERENGETI

WHO ARE THE MAASAI?

The Maasai are one of the most famous groups of people living in East Africa, known for their bright clothing, beadwork, and deep connection to the land. They live mostly in Kenya and Tanzania, near the vast Serengeti, and their history goes back hundreds of years. Unlike many other people in the world today, the Maasai still live a traditional way of life. They raise cattle, sheep, and goats, and much of their daily routine revolves around caring for these animals.

COLORFUL CLOTHING AND BEADWORK

One thing that makes the Maasai stand out is their amazing clothing and jewelry. If you were to visit a Maasai village, the first thing you might notice is how colorful everything is! The Maasai wear shukas, which are long pieces of fabric wrapped around their bodies, often in bright red, blue, and purple. These colors aren't just for style—they hold deep meanings for the Maasai. The Maasai are also known for their intricate beadwork, which they wear as necklaces, bracelets, and earrings. Each color of the beads tells a story:

- Red stands for bravery and strength.
- Blue represents the sky and the rain, which helps their cattle grow strong.
- Green is a symbol of the land, health, and fertility.
- White represents purity and the milk that their cattle provide.

LIVING WITH THE LAND AND ANIMALS

The Maasai don't live in big cities or towns. Instead, they live in small villages made of huts, which are built using mud, sticks, and grass. These huts are often arranged in a circle, with a special area in the middle for their animals to stay safe at night. The Maasai have a unique way of living with the animals around them. For example, even though lions roam the same lands, the Maasai use their knowledge of the animals' behaviors to avoid conflict. They also believe that cattle are a sacred gift, and they take great care in looking after their herds, which provide them with milk, meat, and a sense of pride.

WHY JEWELRY IS SO IMPORTANT

For the Maasai, wearing jewelry isn't just for decoration—each piece tells a story. When Maasai girls and boys grow up, they are given special pieces of jewelry to mark important moments in their lives. The colors and patterns of the beads represent different stages, like becoming a warrior or getting married. Even the size of the jewelry can be important, with bigger, more elaborate pieces often reserved for people with important roles in the community.

PROTECTING THE SERENGETI TOGETHER

The Maasai's traditional way of life is also key to protecting the Serengeti. Because the Maasai respect the land and the animals they share it with, they've helped preserve this incredible ecosystem. They know that if the balance of the Serengeti is upset, it could hurt the plants, animals, and even their own way of life. That's why the Maasai work with conservationists to ensure the Serengeti remains a place where both people and animals can thrive together.



COLORS OF THE MAASAI

The Maasai people use colorful beads to express important parts of their culture, history, and way of life. Each color in their jewelry carries a deeper meaning tied to the environment they live in, their traditions, and the values they uphold. Let's explore the meanings behind these colors in more depth!

COLOR AND MEANING CHART:

RED: Stands for **bravery** and **strength**, showing the courage the Maasai have when protecting their animals and community.

BLUE: Symbolizes the **sky** and **rain**, which helps the grass grow and keeps their cattle healthy.

GREEN: Represents the **land** and **health** because the land provides food and supports life for both animals and people.

WHITE: Means **peace** and **purity**, like the milk they get from cows that nourish and sustain them.

YELLOW: Reflects **energy** and **warmth**, just like the sun that gives life to the land.

ORANGE: Stands for **friendship** and **generosity**, showing how welcoming the Maasai are to guests.

BLACK: Represents the **Maasai people** and their **unity**, including the challenges they face in daily life.

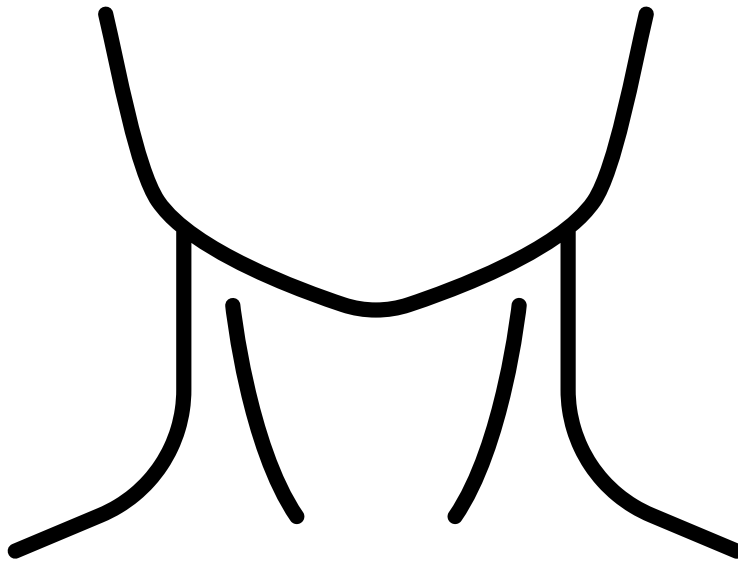




COLORS OF THE MAASAI

Instructions:

1. Draw a Maasai necklace on the neckline below.
2. Color in the necklace based on the colors and meanings found on the previous page.



3. Write down the meaning of this necklace.



DESIGN A NECKLACE WITH MEANING

Lesson
7



What Does Maasai Jewelry Tell Us About Their Culture?

Maasai jewelry is colorful and meaningful. The Maasai use their jewelry to celebrate important events like weddings, births, and becoming a warrior.

The colors are also shared during rites of passage, like ceremonies for young Maasai warriors becoming adults. Orange beads might be given as gifts to celebrate a special bond or to welcome guests. These necklaces are not just jewelry; they reflect the values of the Maasai people and tell the story of their connection to nature, family, and tradition.

Cultural Reflection Questions:

1. How do the Maasai use their jewelry to show important moments in their life? (Discuss how beadwork is connected to life stages, community events, and celebrations.)
2. What do you think the colors of Maasai jewelry tell us about their connection to the land and animals?

Create Your Own Jewelry Design:

Design your own piece of jewelry, using colors that represent important things in your life.

1. Explain what your jewelry design means to you, just like the Maasai use colors to tell stories about their life.



THE RIGHT MATERIALS FOR LIFE IN THE SERENGETI

The Serengeti is a place of extreme weather, with hot, dry days and rainy seasons that bring sudden storms. To live and work here, people need materials that can handle both the heat and the rain. From tents to clothing and even safari vehicles, the right materials make a big difference in staying comfortable and keeping safe in the wilderness.

CANVAS TENTS: COOL IN HEAT, DRY IN RAIN

Most safari lodges in the Serengeti use canvas tents instead of buildings. Canvas is a special material because it can breathe, meaning air can flow through to keep the tent cool when it's hot. But canvas can also be waterproofed, so when rainstorms arrive during the wet season, the inside stays dry. Using tents instead of buildings is better for the environment because tents can be easily moved, leaving the land untouched.

THE MAASAI AND THEIR SHÚKÀS

The Maasai people live in the Serengeti and wear colorful blankets called shúkàs. These blankets are lightweight and breathable, perfect for keeping cool on hot days. But they also keep the Maasai warm on chilly mornings. The shúkàs are not just practical—they are also beautiful and represent important cultural meanings, with different colors symbolizing bravery, health, and nature.

JEEP COVERS AND RANGER GEAR: PROTECTION ON THE MOVE

Safari vehicles, called jeeps, need special covers to handle the Serengeti's changing weather. These covers are made from canvas or vinyl—materials that block rain but allow air to flow, keeping the inside cool. Rangers who protect animals in the Serengeti also need clothing that is breathable and durable. Their uniforms help them stay cool under the hot sun, and their waterproof gear protects them during sudden rainstorms.

WHY MATERIALS MATTER IN THE SERENGETI

Using the right materials in the Serengeti isn't just about staying comfortable—it's about working with nature. Whether it's a tent that doesn't damage the land or a uniform that helps rangers stay cool, every material plays an important role. People, tourists, and the Maasai all need breathable, waterproof, and durable materials to adapt to the Serengeti's climate. The use of smart materials helps everyone live in harmony with this wild and beautiful landscape.

WATERPROOF AND BREATHABLE MATERIALS

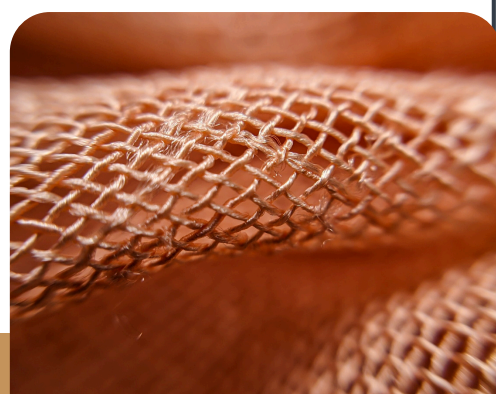
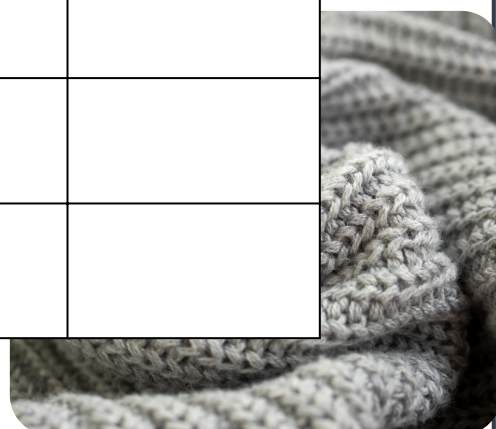
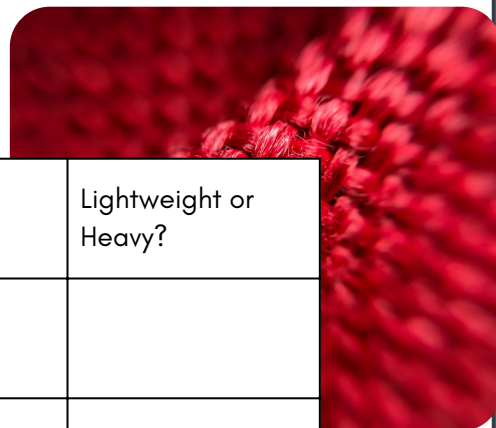
Explore the Science of What You Wear

Instructions:

1. Think about what you're wearing today. Look at the material and think about how it feels.
2. Is it breathable, waterproof, lightweight, or heavy? Fill in the chart below with details about your clothing material and what makes it useful in different weather conditions.

Item	Material	Breathable? (Yes/No)	Waterproof? (Yes/No)	Lightweight or Heavy?
Shirt/T-shirt				
Pants/Shorts				
Jacket/ Sweater				
Shoes/ Sandals				

3. If you were designing clothes for the Serengeti, what materials would you use? Why?





THE SCIENCE BEHIND WATERPROOF AND BREATHABLE MATERIALS

Why Some Materials Keep Us Cool and Dry

Materials like canvas and vinyl used in safari tents, ranger uniforms, and outdoor gear are carefully designed to be either breathable or waterproof, and sometimes both. But how does this work? Let's explore how air and water interact with materials and what makes some materials more useful than others in different environments.

How Does a Material Become Breathable?

For a material to be breathable, it must let air and moisture pass through its surface. Imagine wearing a plastic raincoat—it keeps the rain out, but it can also trap heat and sweat, making you feel uncomfortable. Breathable materials solve this by having tiny pores that are small enough to block water droplets (like rain) but large enough to allow water vapor and air to pass through.

Some breathable fabrics, like cotton, absorb moisture from your skin and release it into the air, which helps keep you cool. Newer technologies, like Gore-Tex, use membranes with microscopic holes. These holes are so small that rain can't get in, but sweat vapor can escape, keeping you dry and cool at the same time.

How Do Materials Become Waterproof?

Waterproof materials are designed to repel water and prevent it from soaking through. This is done by using special coatings or tightly-woven fabrics that create a barrier against water. A raincoat or canvas tent can have a waterproof coating that makes water bead up and roll off the surface instead of soaking in.

The key to waterproofing is surface tension. Just like drops of water bead on a leaf, water beads on a waterproof surface because the coating creates a layer that water can't penetrate. Some materials, like vinyl, are naturally waterproof because they don't absorb water.



Balancing Breathability and Waterproofing

Some outdoor gear and tents combine breathable and waterproof materials. This is tricky because blocking water often means reducing airflow. Scientists work hard to create fabrics that strike a balance between keeping people dry and allowing air to move.

For example, a canvas tent may be coated to keep rain out, but it still allows air to flow, keeping the inside cool. On the other hand, vinyl Jeep covers are fully waterproof but less breathable, so air vents are added to allow airflow.

Why Does This Matter in the Serengeti?

In the Serengeti, people and animals need to stay cool during the hot, dry season and dry during the sudden rainstorms of the wet season. Using the right materials for clothing, tents, and gear helps people stay comfortable and safe. Whether it's a shúkà blanket that keeps someone warm at night or a canvas tent that provides shade and airflow, the right material makes all the difference.

Reflection Questions:

1. How do breathable materials help people stay comfortable in the Serengeti's heat?
2. Why do safari lodges use canvas tents instead of plastic or vinyl?
3. Can you think of a material you wear that keeps you dry? How does it work?



CREATE A WATERPROOF TENT

Your challenge is to design and build a model tent that can keep your “camper” (a cotton ball) dry during a rainstorm, while allowing air to flow through to keep it cool. Your tent must be built first, and only then can your camper be placed inside.

Materials I will use:

Imagine: How will you design your tent so that it stays dry but also allows air to move through?

Plan: Draw a sketch of your tent design and label the materials you plan to use.

- **Test & Improve:** After building your tent, test how waterproof and breathable it is. Use a spray bottle to simulate rain. Then use a fan or your breath to test if air can flow through.

Test 1: Did the cotton ball stay dry after the “rain”?

☐ Yes ☐ No

Test 2: Can you feel air moving through your tent?

☐ Yes ☐ No

Reflect: What did you learn from the activity? What worked? What did not work?



PROTECTING WILDLIFE IN THE SERENGETI

Imagine being responsible for protecting animals across an area the size of Belgium. That's the challenge faced by rangers in the Serengeti, where poaching (illegal hunting) threatens wildlife. Poachers often target animals like elephants and rhinos for their tusks and horns, which are valuable for various reasons. In some cultures, they are seen as symbols of wealth or status, and are used to make decorations or ornaments. Although poaching can bring quick profit, it comes at a cost—disrupting the ecosystem and pushing these animals closer to extinction.

THE PROBLEM WITH POACHING

Poaching doesn't just affect the animals being hunted—it harms the entire Serengeti ecosystem. When elephants are removed from their environment, it disrupts the delicate balance of nature. Elephants play an important role in shaping the land. They knock down trees, which creates open spaces for grasslands to grow. Without these grasslands, animals like zebras and wildebeests can struggle to find food. This ripple effect impacts other species too. Fewer grazers means less food for lions, cheetahs, and other predators. So, when poaching happens, it can cause a chain reaction that affects many more animals than just the ones being hunted.

THE STRUGGLES OF RANGERS

Rangers in the Serengeti have one of the toughest jobs in the world. For many years, they had to rely on old methods like walking or driving across the plains to try and catch poachers in the act. But the Serengeti is massive, making it easy for poachers to hide and escape detection. Covering thousands of square miles on foot or by vehicle is like trying to find a needle in a haystack. Now, thanks to new technology, things are changing. Drones and thermal cameras are helping rangers protect the animals more effectively. Drones can fly high above the plains and cover large areas in a short amount of time. They send video footage back to the rangers on the ground, helping them spot illegal activity from a distance. Thermal cameras, which detect body heat, can be used to track poachers even at night when it's dark and harder to see.

WHY PROTECTING THE SERENGETI MATTERS

The Serengeti is one of the most important wildlife areas in the world, home to animals like elephants, rhinos, lions, giraffes, and more. Without these animals, the Serengeti would not be the same. That's why stopping poaching is so important—not just for the animals being hunted, but for the entire ecosystem. Every animal plays a role in keeping the balance of nature. Without elephants, the landscape changes. Without grazers like zebras and wildebeests, the predators lose their food source.

THE FUTURE OF ANTI-POACHING

While technology like drones and thermal cameras has made a big difference, poaching is still a huge challenge. Poachers continue to find new ways to hunt and hide from rangers. However, conservationists are hopeful that with better technology and more awareness of the importance of wildlife protection, the Serengeti can remain a safe haven for its incredible animals.



ANTI-POACHING EFFORTS

Anti-Poaching and Conservation in the Serengeti

The Serengeti is one of the most important ecosystems in the world, home to endangered animals like elephants, rhinos, and lions. Unfortunately, poachers threaten these animals by illegally hunting them for their valuable tusks, horns, and skins.

Protecting wildlife is crucial to keeping the Serengeti's ecosystem balanced. To stop poaching, conservation teams have developed new ways to track and catch poachers while also protecting the animals. Over the years, anti-poaching methods have evolved, using both technology and teamwork to keep wildlife safe.

Answer the questions below to explore how anti-poaching teams work and why their efforts are essential for the Serengeti's future

1. What methods do anti-poaching teams use to track poachers in the Serengeti?
2. How have these methods changed over time?
3. What would happen to the Serengeti ecosystem if animals like elephants and rhinos disappeared due to poaching?



CONSERVATION POSTER

Design a conservation poster that explains why poaching is a threat and how people can help stop it. Include animals that are endangered and ways people can support conservation efforts.



POACHING IN THE SERENGETI

Poaching is one of the greatest threats to wildlife in the Serengeti, targeting animals for their body parts to be sold on the black market. Animals like elephants and rhinos are hunted for their tusks and horns, while lions, pangolins, and even giraffes are poached for trophies, meat, or traditional medicines. These practices not only endanger the species but also disrupt the Serengeti's delicate ecosystem. Below are some key animals affected by poaching, along with the reasons they are targeted and the impacts on their populations and habitats.

ELEPHANTS – POACHED FOR IVORY

Elephants are primarily poached for their ivory tusks. Ivory has been used for centuries in the creation of jewelry, ornaments, and other luxury items. Despite international bans on the ivory trade, there remains a black market for ivory in some parts of the world.

Impact: Elephant populations have been heavily reduced due to poaching, threatening the species' survival. The loss of elephants also affects the ecosystem, as elephants play a crucial role in shaping the landscape and dispersing seeds.

RHINOS – POACHED FOR HORNS

Rhinos are poached for their horns, which are highly valued in some parts of Asia, where they are believed (incorrectly) to have medicinal properties. Rhino horn is made of keratin, the same substance as human hair and nails, but myths about its healing powers persist.

Impact: Poaching has pushed rhinos to the brink of extinction, particularly the black rhino. Anti-poaching efforts are in place, but demand for rhino horn remains high.

LIONS – POACHED FOR TROPHIES AND BONES

Lions are poached for their bones, which are sometimes used in traditional Asian medicine as substitutes for tiger bones. They are also targeted by trophy hunters, who kill lions for their skins, heads, and other body parts as symbols of wealth and power.

Impact: The lion population is decreasing due to both habitat loss and poaching. As apex predators, lions are crucial to maintaining the balance of the Serengeti ecosystem.

PANGOLINS – POACHED FOR SCALES AND MEAT

Pangolins, though less famous, are one of the most heavily poached animals in the world. They are poached for their scales, which are used in traditional medicine in some parts of Asia, and for their meat, which is considered a delicacy.

Impact: Pangolins are increasingly endangered, and their slow reproduction rate makes it difficult for populations to recover from poaching.



GIRAFFES – POACHED FOR MEAT AND SKIN

Giraffes are poached for their meat and skin. In some areas, giraffe tails are also used as a symbol of status or as ornaments.

Impact: While giraffes are less frequently poached than elephants or rhinos, their numbers are declining, and poaching contributes to their population reduction in some regions.

Additional Notes on Poaching:

Cultural Beliefs

In some regions, poaching is driven by deeply ingrained cultural practices or beliefs in the medicinal or status-giving properties of animal parts.

Economic Factors

Poverty and lack of economic opportunities can push individuals to engage in poaching as a way to make a living, often for powerful illegal trade networks.



PATHFINDER PROJECT: BRAINSTORM

Once you have chosen your Pathfinder Project, start brainstorming all of the ideas you have to bring this project to life.

The Pathfinder Projects I am most interested in:

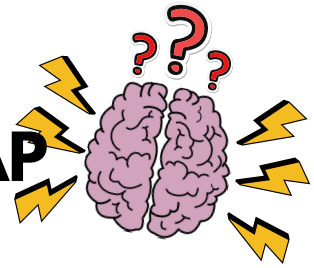
The materials that I will need:

Research I must do first:

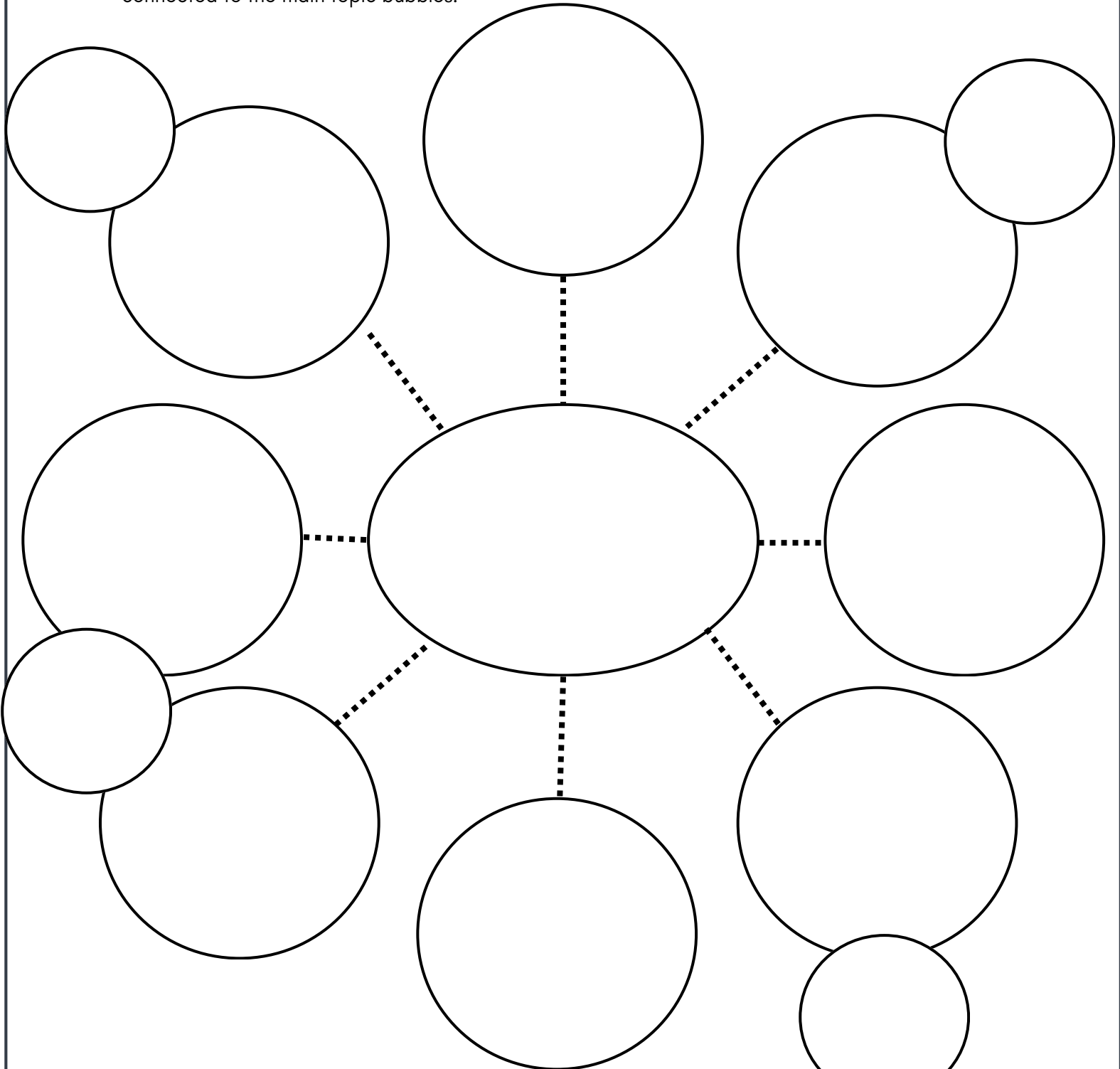
Someone I could interview or learn more from:

Other ideas:

PROJECT PLANNING: MIND MAP



1. **Start in the Center:** Write the name of your chosen project in the middle bubble.
2. **Branch Out:** Think of the main topics or ideas related to your project. Write each one in a separate bubble connected to the center.
3. **Add Details:** For each main topic, think of smaller details or questions. Write these in smaller bubbles connected to the main topic bubbles.





RIDDLE ME THIS

1 I rule the plains with a mighty roar,
guarding my pride and hunting for
more. Who am I, fierce and grand,
known as the king of this land?

2 I circle high in the sky, looking for
animals that have said goodbye. I
keep the Serengeti clean and
neat, who am I that eats what
others won't eat?

3 I travel far in a massive herd,
crossing rivers without a word.
Searching for grass, I roam all
day, what animal am I—can you
say?

4 With big ears and a trunk so long, I
move with a pace that's steady
and strong. I knock down trees to
clear the way, what giant animal
am I today?

5 I am the fastest on legs so lean, I
dash through the grass, unseen.
If you try to race, you'll lose for
sure—who am I, sleek and pure?

6 In the water, I float and play, but
on land, I come out at the end of
the day. My jaws are strong, my
body wide—who am I with a muddy
hide?

Can you think of a water related riddle to share with a friend?

.....

.....



CREATIVE WRITING PROMPT

The sun was setting over the Serengeti, casting a warm glow over the golden grass. My family and I were riding in the back of a safari vehicle when I noticed a trail of footprints leading toward a tall termite mound. When we stopped, curiosity got the best of me, and I decided to follow them.

At the base of the mound, hidden in a small crack, I found a tiny woven pouch tied with colorful beads—the kind the Maasai people use. Carefully, I opened it to find a ...

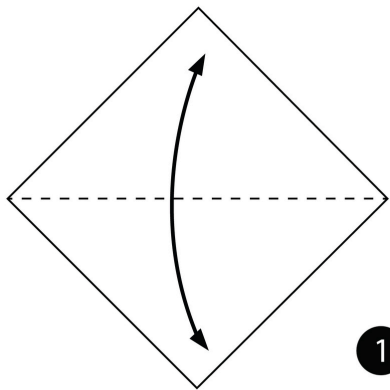
Task: Using the passage above as a prompt, write a short story.

Remember to use a variety of nouns, adjectives, verbs and adverbs to make your story more interesting for your readers!

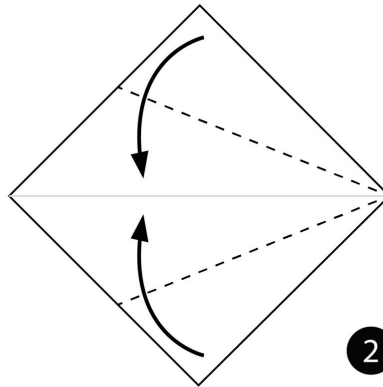
This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on the right side, suggesting it's resting on a surface.



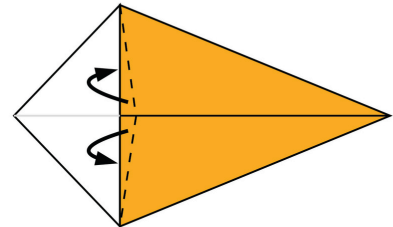
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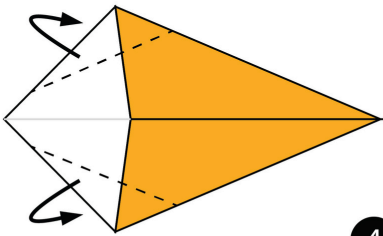
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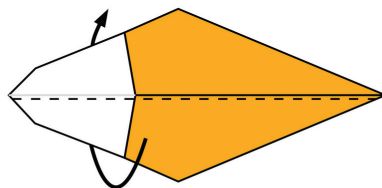
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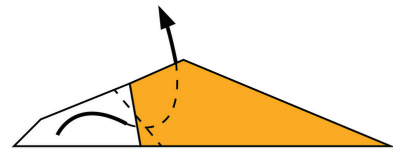
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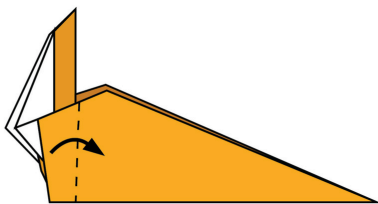
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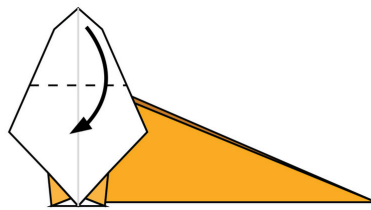
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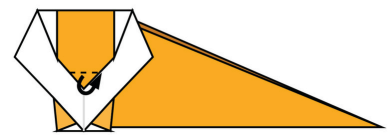
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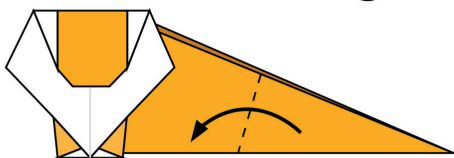
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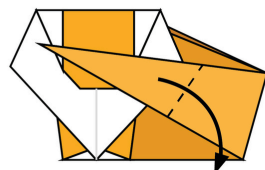
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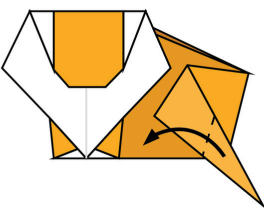
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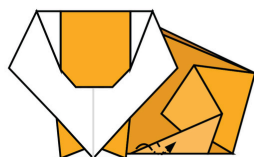
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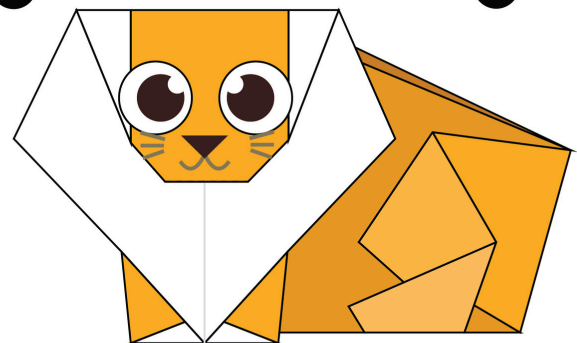
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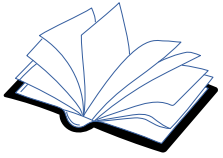
A Lion

BONUS LESSONS

Water in the Serengeti

Wildebeest and the Great Migration

Tourism: Helping each other



WATER IN THE SERENGETI: A PRECIOUS RESOURCE

A LAND OF WET AND DRY SEASONS

The Serengeti in East Africa is famous for its wide-open plains and amazing wildlife, but it's also a place where water can be difficult to find. This region experiences two main seasons: the wet season and the dry season. During the wet season, which lasts from March to May, rain fills rivers, lakes, and water holes, and the landscape turns green with life. But in the dry season, from June to October, the sun beats down, rivers shrink, and water becomes scarce, making it harder for animals to survive.

HOW MUCH RAIN DOES THE SERENGETI GET?

The Serengeti is considered semi-arid, meaning it doesn't receive much rain—only about 20–40 inches a year, mostly during the wet season. While rain plays a role in filling water sources, the Serengeti's intense heat causes water to evaporate quickly. This process, where water turns into vapor and rises into the air, makes it harder to keep rivers and lakes full. As the water disappears, animals have to search for other sources to survive.

WHERE DO ANIMALS FIND WATER?

When water becomes scarce, animals rely on permanent rivers, shrinking lakes, and hidden water holes. Elephants have an amazing ability to smell underground water and use their trunks to dig into dry riverbeds. Other animals follow ancient migration paths that lead them to water sources used by their ancestors for generations.

WHY DOES WATER EVAPORATE SO QUICKLY?

The Serengeti's hot, dry air speeds up evaporation, especially during the dry season. With little moisture in the air to slow down the process, water vanishes from rivers and puddles faster than it can be replaced by rainfall. This makes it a constant struggle for animals to find enough water until the next rainy season begins.

HOW FAR DO ANIMALS TRAVEL FOR WATER?

During the Great Migration, animals like wildebeests and zebras travel up to 1,200 miles a year in search of water and fresh grass. Along the way, they must cross dangerous rivers like the Mara River, where crocodiles wait to ambush them. The journey is long and difficult, but without it, these animals wouldn't survive the dry season.

WATER IS LIFE IN THE SERENGETI

The Serengeti teaches us that water is the lifeblood of the ecosystem. Rivers, lakes, and seasonal water holes provide the resources that every living thing depends on—from towering elephants to tiny insects. Animals migrate, adapt, and sometimes even share scarce water sources to make it through the toughest times. In this harsh but beautiful land, water truly means survival.



WATER SURVIVAL STORY WORKSHEET

In this activity, you'll pick an animal that lives in the Serengeti and imagine its journey to find water. You'll map out how the animal survives during both the dry and wet seasons, and then use your imagination to create a story about its adventure. Use the story starters below to help spark your creativity, or come up with your own idea!

Step 1: Choose Your Animal

Pick one animal that lives in the Serengeti. (Circle one)

- Animal: _____

Step 2: Map Out the Animal's Journey

When it is dry:

Where does your animal look for water? _____

What dangers might it face? _____

When it rains:

How does the wet season help your animal? _____

Does your animal act differently? _____

Get Inspired!

- Wildebeest's First Migration: "The sun was hot on my back as I followed the herd. The river ahead looked deep and dangerous, but we had no choice. I needed to find water, and fast..."
- A Lost Zebra's Search: "I woke up to find the herd gone. The water hole we stopped at yesterday was dry, and now I have to find a new one before the sun gets too hot..."
- Elephant's Journey to a Hidden Water Hole: "I could smell the water underground, but the dry riverbed stretched for miles. If I can dig deep enough, my family and I might have enough water to last through the day..."
- A Giraffe's Wet Season Adventure: "The rains finally came, and the grass was taller than I had ever seen! But finding a water hole wasn't as easy as I thought with so much water everywhere..."



WATER SYSTEMS AND MIGRATION PATTERNS MAP

Use what you learned to reflect on how water availability affects animals and ecosystems in the Serengeti. Write short answers to the following questions.

Impact of Drought:

1. What happens to migration patterns when drought hits the Serengeti?
2. Which animals are most affected by drought, and how do they respond?

Seasonal Water Holes vs. Permanent Rivers:

1. What is the difference between seasonal water holes and permanent rivers?
2. How do animals know where to find water when seasonal holes dry up?

Ecosystem Balance and Predators:

1. How does water availability affect the relationship between predators and prey?
2. What might happen if too many animals gather at the same water source?



EVAPORATION EXPERIMENT

How Temperature and Humidity Affect Water

In this activity, you'll test how different conditions—like sunlight, room temperature, and humidity—affect the evaporation of water. You'll track how quickly water disappears from containers placed in various environments and compare the results. This will help you understand how temperature and humidity impact water availability, just like in the Serengeti during dry and wet seasons.

Part 1: Setup Summary

1. List where you placed your three containers:

- Container 1 (Sunny Window): _____
- Container 2 (Room Temperature): _____
- Container 3 (Covered with Plastic Bag): _____

Part 2: Initial Observations

- Initial Water Levels (mL):
 - Container 1: _____
 - Container 2: _____
 - Container 3: _____
- Temperature: _____ ° _____
- Humidity Conditions:
 - Container 1: Low
 - Container 2: Normal
 - Container 3: High

Did You Know?

The Serengeti only gets about 20–40 inches (500–1,000 mm) of rain each year, with most of it falling during the wet season (March to May). This is when the landscape turns green and rivers fill up, making it a key time for the animals.



EVAPORATION EXPERIMENT

Part 3: Track Water Levels Over 48 Hours and Beyond

Time	Sunny Window	Room Temperature	High Humidity
Initial Level	_____ mL	_____ mL	_____ mL
12 Hours	_____ mL	_____ mL	_____ mL
24 Hours	_____ mL	_____ mL	_____ mL
48 Hours	_____ mL	_____ mL	_____ mL
_____ Hours	_____ mL	_____ mL	_____ mL

Part 4: Graph Your Results

Use this space (or graph paper) to draw a line graph showing how water levels changed for each container.

Discuss:

1. What effect did high humidity have on evaporation compared to the sunny window?
2. How do these results relate to what happens during the Serengeti's dry season?



HOW ELEPHANTS KEEP COOL & ALL ABOUT HEAT DISSIPATION

Today, we're going to learn about one of the largest and most fascinating animals on our planet: the elephant! Elephants are not just known for their size; they have some incredible adaptations that help them survive in their habitats, especially in hot climates.

THE BIG EARS

Let's start with their ears. Did you know that an elephant's ears can be as big as a small car? These enormous ears aren't just for hearing; they play a vital role in helping elephants stay cool! When elephants get too warm, they flap their ears back and forth. This action allows air to flow over the surface of their ears, which helps them dissipate heat. You see, elephants have many blood vessels close to the surface of their ears. When the warm blood flows through these vessels, the air cools it down before it returns to the elephant's body. This process is called heat dissipation.

UNDERSTANDING HEAT DISSIPATION

So, what exactly is heat dissipation? It's the process by which an animal loses heat to its surroundings to maintain a healthy body temperature. For elephants, having large ears means they have a greater surface area to release heat. The more surface area they have, the more heat they can lose! This is why elephants can often be seen flapping their ears, especially when it's extra hot outside.

OTHER COOL ADAPTATIONS

But that's not all! Elephants have other adaptations that help them cope with heat, too. For example, they love to take mud baths. When they cover themselves in mud, it cools their skin and protects them from the sun. The mud also acts like sunscreen, shielding their sensitive skin from harmful UV rays. Elephants are also social creatures. They live in herds, which helps them take care of one another. When one elephant finds a cool spot or a water source, they can share this information with the rest of the herd. This social behavior is essential for their survival in the wild.

Oh and we can't forget their trunk! Elephants can use their trunks to spray water on themselves, further cooling their bodies. Their trunks are versatile tools that help them drink, eat, and even greet one another!

WHY THESE ADAPTATIONS MATTER

These adaptations are vital for elephants, especially as they face the challenges of living in hot environments. By efficiently dissipating heat and using strategies to keep cool, elephants can thrive in their habitats.



ELEPHANT HEAT DISSIPATION

Read the Following information and answer the questions below.

Air Conditioners (AC):

An air conditioner works by pulling warm air from a room and passing it through cold metal coils filled with a refrigerant (a special cooling liquid). As air flows over these coils, the refrigerant absorbs the heat, making the air cooler. The warm air is then sent outside, and the cold air is blown back into the room. This constant cycle helps keep the room cool. Think of it like how the elephant's ears cool the blood—both remove heat to make things cooler.

- Why is this important? When it's really hot, air conditioners help people stay comfortable by reducing the temperature. Without this cooling, heat can build up and make it harder to stay cool and safe.

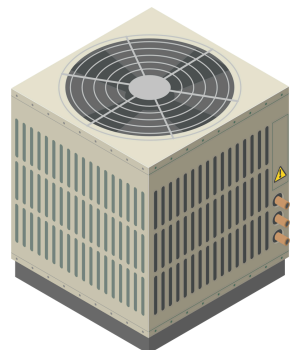
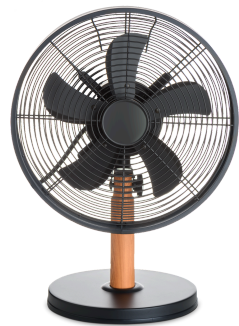
Fans:

A fan helps you stay cool by creating a breeze. It doesn't change the temperature of the air itself but helps your body cool down by moving air across your skin. This makes sweat evaporate faster, which lowers your body temperature. It's like standing outside on a hot day and suddenly feeling a breeze—your sweat evaporates quicker, and you feel cooler right away.

- This is just like how elephants flap their ears! The breeze helps cool the blood inside their large ears, making it easier for the heat to leave their bodies.

Reflection Questions

1. How is flapping an ear like turning on a fan?
2. How are blood vessels in the elephant's ears like an air conditioner?
3. What might happen to an elephant if it couldn't flap its ears?





BUILD AND TEST AN ELEPHANT EAR

Elephants use their large ears to stay cool. Your challenge is to build a model elephant ear that helps move heat away. Use a thermometer to test. Let's see what works best!

Materials I will use:

Imagine: What are your ideas for making an elephant ear that cools down?

Plan: Draw a sketch of your design and label the materials you will use.

- **Test & Improve:** Hold your ear in front of a heat source (like a lamp or hot sun). Use a thermometer to measure the temperature before and after waving the ear to see if it lowers the heat.

Was your plan successful? Yes. ☐ No. ☐

Reflect: What did you learn from the activity? What worked? What did not work?



BUILD AND TEST AN ELEPHANT EAR

How Do Elephant Ears Help Dissipate Heat?

Instructions:

After completing the heat dissipation experiment, record your observations and results below.

- Initial environment temperature (before using the ear): _____
- Temperature in the space directly around the ear after flapping: _____
- Temperature after 1 minute of no flapping: _____
- Difference in temperature: _____

Reflection Questions:

- How did the temperature change when you flapped the elephant ear?
- How does this show how elephants stay cool in the wild?

Extension: Look into the differences between the African Elephant and Asian Elephant. What are there main differences and what do they tell you about their adaptations for survival in their unique habitats?





TOURISM IN THE SERENGETI – THE GOOD AND THE CHALLENGES

The Serengeti is one of the most famous places in the world, filled with incredible wildlife like lions, elephants, zebras, and giraffes. It's also home to the Maasai people, who have lived on these lands for hundreds of years. Every year, thousands of people travel from all over the world to visit the Serengeti. They come to see the animals in their natural habitat and experience the beauty of the African plains. As you may know by now, this is called tourism, and it can be both good and challenging for places like the Serengeti.

THE GOOD: HOW TOURISM HELPS

Tourism can be a very positive thing for the Serengeti and the Maasai people. When visitors come to the Serengeti, they spend money on things like staying in safari lodges, going on guided tours, and buying souvenirs. This helps the local people, including the Maasai, earn money to support their families. Tourism also provides jobs, like being tour guides or lodge workers, and it helps local businesses grow. Tourists also learn about the importance of protecting wildlife and the environment. When they see animals like elephants or cheetahs in their natural habitat, they realize how important it is to keep the Serengeti safe for future generations. Many tourists become advocates for conservation, helping raise money or support projects that protect the Serengeti's animals and environment. In this way, tourism can actually help protect the very place people come to visit!

THE CHALLENGES: HOW TOURISM CAN CAUSE PROBLEMS

However, tourism can also bring some challenges. One of the biggest problems is when too many people visit at once. Large numbers of tourists can disturb the animals, making them feel stressed or scared. For example, if a jeep full of tourists gets too close to a lion pride, it might cause the lions to leave the area and lose their chance to hunt.

Another problem is waste. When tourists come to the Serengeti, they sometimes leave behind trash, which can harm the environment. Too many vehicles driving through the park can also damage the land, crushing plants and causing soil erosion. If not managed carefully, tourism can create a negative impact on the very places people want to see.

RESPONSIBLE TOURISM: FINDING THE BALANCE

The key to making tourism work well for everyone is called responsible tourism. This means finding ways to let people visit the Serengeti while still protecting the land, the animals, and the Maasai people's way of life. Many safari lodges in the Serengeti are now focusing on eco-friendly practices. This includes using solar power instead of electricity, recycling waste, and making sure they don't harm the land.

Some lodges also work directly with the Maasai people, hiring them as guides or sharing profits with the community. This helps the Maasai continue their traditional way of life while also benefiting from tourism. Responsible tourism helps ensure that the Serengeti stays beautiful and wild for years to come, while allowing visitors to have an amazing experience.

PLAN YOUR SAFARI LODGE

Taasa Lodge: A Partnership with the Maasai and Nature

Read About This Great Example Before Designing Your Own Lodge!

Taasa Lodge, located just outside the Serengeti National Park, is a great example of how a safari lodge can benefit both the environment and local communities. In this lesson, you'll learn about how this lodge operates in harmony with nature and the Maasai people. Use these ideas to inspire your own lodge design, thinking about how tourism can make a positive impact.

Supporting the Maasai Community

Taasa Lodge works closely with the Maasai tribe by providing jobs and opportunities for local people. About 70% of the lodge's staff members come from Maasai communities, creating stable employment that helps families afford education, healthcare, and other essentials. This employment also encourages younger generations to stay connected to their heritage while working in sustainable tourism.

In addition to jobs, the lodge offers cultural activities such as storytelling, traditional dances, and guided tours with Maasai hosts. These experiences not only preserve Maasai traditions but also allow visitors to gain a deeper understanding of the Maasai way of life.

Memorable Attractions and Unique Guest Experiences

Taasa Lodge goes beyond the typical safari experience with a variety of unique attractions. Guests can enjoy breakfast in the bush and sunset dinners overlooking the savanna, surrounded by wildlife. The lodge also offers night game drives, giving visitors a rare opportunity to see nocturnal animals in action under the stars. For those looking to relax, there's a swimming pool, perfect for cooling off after a hot day on safari. The lodge also prepares delicious meals from scratch using fresh ingredients, ensuring every dining experience feels special.

Finding the Balance Between Tourism and Community

Taasa Lodge shows that tourism can benefit both people and nature when done responsibly. By working with the Maasai and focusing on providing unique and meaningful experiences, the lodge ensures that tourism supports the Serengeti ecosystem and local communities.

Now it's your turn! Use what you've learned from this example to design your own safari lodge. How can you make it welcoming to tourists while protecting the wildlife and supporting the local community?



PLAN YOUR SAFARI LODGE

You are going to create your own safari lodge in the Serengeti. First, think about the name of your lodge and what makes it special.

Did you know: **Swahili** is the native language. Consider using a word with meaning!

1. Name Your Lodge: What will you call your lodge?

Write the name here:

2. Why Should People Stay at Your Lodge?

Write three reasons why tourists would want to stay at your lodge:

-
-
-

3. Location:

Where is your lodge located? Is it near a river, a migration route, or a scenic area?

THINK ABOUT HOW YOUR LODGE CAN HELP THE PEOPLE AND THE ANIMALS OF THE SERENGETI.

4. How Does Your Lodge Help the Maasai People?

Write two ways your lodge helps the Maasai community:

-
-

5. How Does Your Lodge Protect Wildlife and the Land?

Write two ways your lodge helps protect the Serengeti's animals and environment:

-
-

MY SAFARI LODGE

Now it's time to design your lodge!

You can either draw a picture of your lodge or use materials to make a 3D model.

