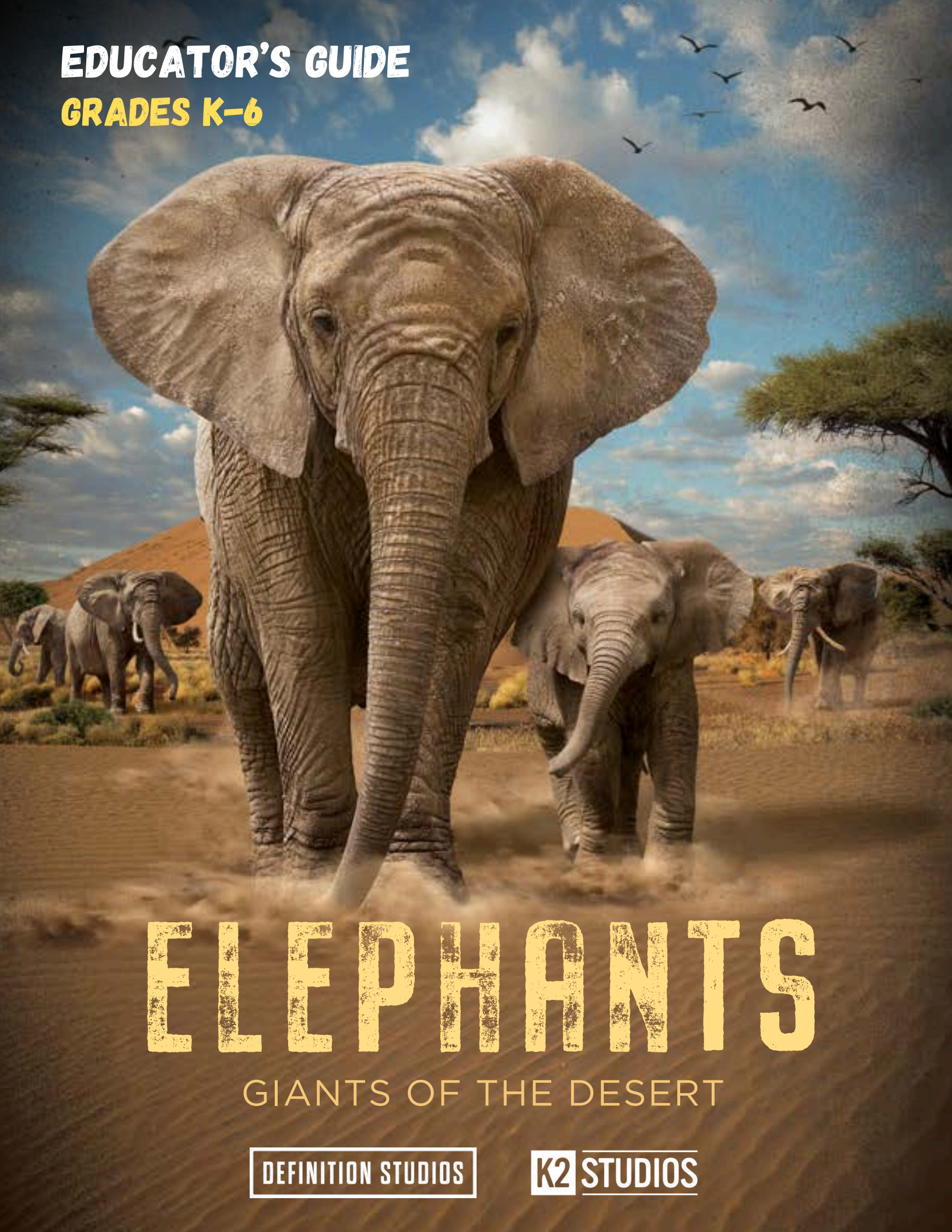


EDUCATOR'S GUIDE
GRADES K-6

A large herd of elephants is shown in a savanna landscape. A massive elephant dominates the foreground, facing the viewer. Behind it, several other elephants of various sizes are visible, some walking and others standing. The background features rolling hills, acacia trees, and a bright blue sky with scattered white clouds and birds in flight.

ELEPHANTS

GIANTS OF THE DESERT

DEFINITION STUDIOS

K2 STUDIOS



TABLE OF CONTENTS



2 WELCOME

3 GRADE K-2
Eat Like an Elephant

5 GRADE K-2
Where's the Water?

7 GRADE 3-5
Making a Climate Scene

9 GRADE 3-5
Elephant Talk

11 GRADE 4-6
Desert Memories

13 HOME ACTIVITIES
Bonus Fun for Everyone!

16 CREDITS & SOURCES

17 APPENDIX



WELCOME

Elephants: Giants of the Desert is a large format documentary made for IMAX®/Giant Screen and other specialty theaters located in science centers, museums, zoos, aquariums, and other cultural destinations and attractions worldwide. The film presents an epic journey across Africa's Namib Desert, getting up close and personal with the largest land mammals on the planet, desert elephants. Follow the journey of an elephant baby, Little Foot, as she learns how to elephant from her elephant family, and see how desert elephants are one of nature's most inspiring examples of survival and adaptation.

This educator's guide for grades K-6 offers experiential learning opportunities for students who watch *Elephants: Giants of the Desert*. Each lesson connects to the Next Generation Science Standards (NGSS).

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ATLANTIC OCEAN

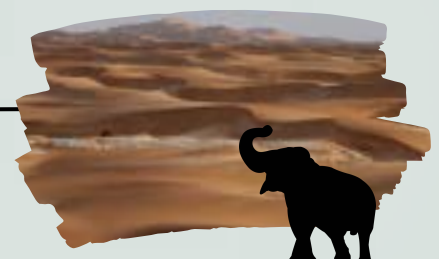
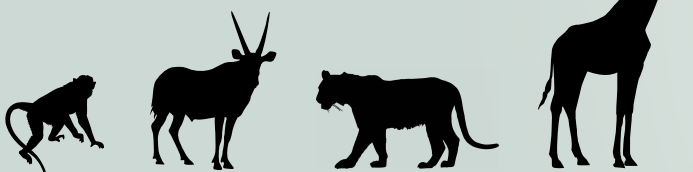
NAMIBIA

NAMIB DESERT

ABOUT THE NAMIB DESERT

The Namib Desert is located along the Atlantic Coast of Africa in the country of Namibia. It is one of the world's oldest and driest deserts - a scorched earth sculpted by searing winds.

Yet somehow, life has found a way. The harsh desert is a surprising sanctuary for a few extraordinary creatures.





EAT LIKE AN ELEPHANT

GRADE K-2



LESSON LENGTH: 1 HOUR

NGSS DISCIPLINARY CORE IDEAS

LS1.C Organization for Matter and Energy Flow in Organisms

LS1.B Growth and Development of Organisms

LS3.A Inheritance of Traits

LS4.D Biodiversity and Humans



INTRODUCTION

Little Foot is a baby elephant who like all mammals, needs milk from mom. To make milk, mom needs water and plants to eat, but finding plants in a desert is tough!

Discussion: What did you eat when you were a baby? Compare to Little Foot. What do both Little Foot and her mom need to survive? How are their needs different?

Some elephant calves will drink milk until they are 9.5 years old.¹

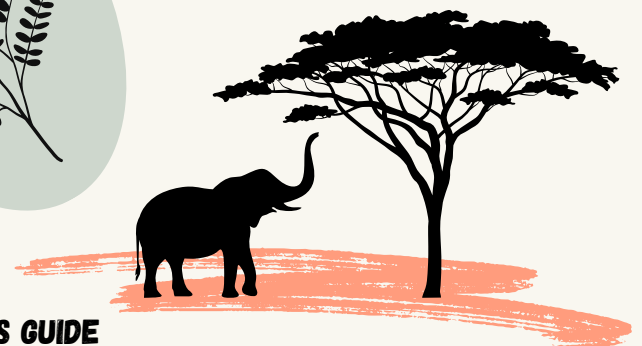
ACTIVITY INSTRUCTIONS

MATERIALS Leaves/twigs x 100, buckets x 6, baby elephant image x 2, cotton balls x 100, signs that say “milk” x 3-4, and tape.

Take students outside. Each student will gather 4-5 leaves and/or small twigs from the ground. *Ensure leaves are safe to touch in the area.*

Compare the collected leaves to the leaves of the Ana Tree, a plant eaten by desert elephants.

Which animals eat plants in your neighborhood?



EAT LIKE AN ELEPHANT

When a baby elephant is thirsty for milk, they can let mom know by walking next to her, pushing against her legs and rumbling.²

In a large indoor or outdoor space, set up and play the following game.

SET UP



Place all leaves/twigs in 3-4 piles.



Put “milk” signs on 3-4 buckets and fill with cotton balls.



Stick images of elephants to 2 buckets.

Spread out the leaf/twig piles and buckets in the play area.

GAME PLAY

ROUND 1: You are the mom of a baby elephant in the Namib. Eat a plant by picking up a leaf/twig. This plant has helped you make milk for your baby! Drop the plant beside a milk bucket and pick up a cotton ball, representing milk. Feed your baby by dropping the milk into a baby elephant bucket. Repeat!

*Give students 2-3 minutes to feed their babies or until most students have exchanged **three** plants for milk. Then, count how many babies were fed and put cotton balls back in the milk buckets.*

ROUND 2: The desert is now hotter and drier! Plants are not growing and one type of plant has disappeared. You can only eat leaves (no twigs).

Give students 2-3 minutes to feed their babies. Note: Leaves cannot be taken from the piles beside the milk buckets. Count how many babies were fed at the end of the round and put cotton balls back in the milk buckets. Compare with Round 1.

ROUND 3: Using your amazing elephant memory, you recall a spot with fresh plants to eat and travel there. Move leaves/twigs from the milk buckets back to the main piles.

Give students 2-3 minutes to feed their babies. Count how many babies were fed and compare with Round 2. End the game here.

CLOSING

In the game, did more baby elephants get milk when it was hotter and drier (Round 2) or when there were lots of plants to eat (Round 1 & 3)? Why might that be?

Do you think there are more plants in your neighborhood or in the desert? Why? With few plants in the desert, what does an elephant mom do when she cannot find food?





WHERE'S THE WATER?

GRADE K-2



LESSON LENGTH: 1 HOUR

NGSS DISCIPLINARY CORE IDEAS

ESS2.E Biogeology

LS1.A Structure and Function

LS1.C Organization for Matter
and Energy Flow in Organisms

LS1.D Information Processing

ESS2.C The Roles of Water in
Earth's Surface Processes

INTRODUCTION

Little Foot's family is desperate for water! Thankfully, her mom's got a special trick to find it. Using her sense of smell and the vibrations under her feet, she uncovers a hidden river underground!

Discussion: How did Little Foot's mom change the environment to get water? What parts of her body did she use? How do *you* change the environment to get what you need?

Little Foot's mom
needs to drink more
than 40 gallons of
water a day to survive!

ACTIVITY INSTRUCTIONS

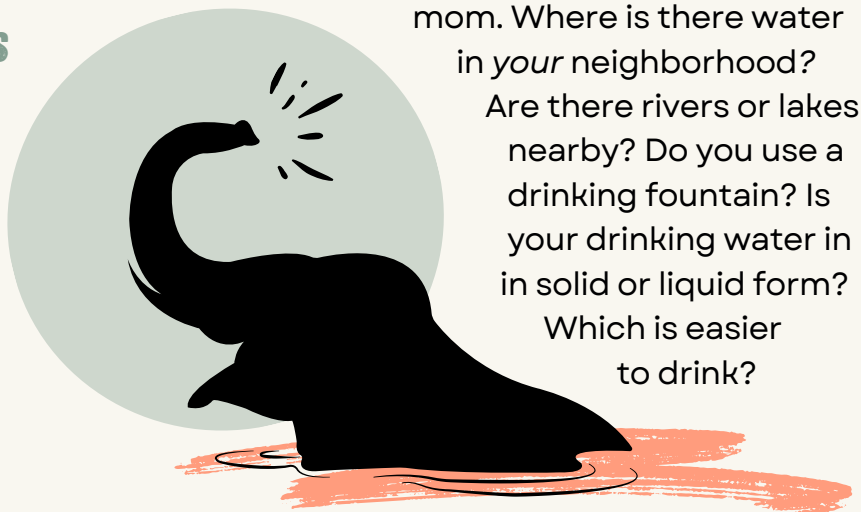
MATERIALS Small opaque bowls/containers with a lid x 12, water, ice cubes, sand, fruit juice, writing utensils, and paper.

Every animal needs water to survive and each animal has a special way of finding it, just like Little Foot's

mom. Where is there water in *your* neighborhood?

Are there rivers or lakes nearby? Do you use a drinking fountain? Is your drinking water in solid or liquid form?

Which is easier to drink?



WHERE'S THE WATER?

When elephants dig up water, it creates an oasis in the desert for other animals like antelope, giraffe, and lions.

Set up the following experiment. Duplicate the set up so you have two station zones. Split the class in half and send each half to a zone.

SET UP

Station 1: Fill one bowl with water. Fill one bowl with fruit juice. Label the bowls A and B.



Station 2: Fill both bowls with sand. Add water to one bowl and mix it. Label the bowls C and D.



Station 3: Fill one bowl with ice cubes. Fill one bowl with crayons. Label the bowls E and F.



EXPERIMENT

You are an elephant searching for water in the desert. Using your **nose**, **hands**, and **ears**, you will determine which bowl contains water for your herd.

Hand out blank paper and a writing utensil to each student. On their paper, students will write:

#1. A B #2. C D. #3. E F

STATION 1: Sniff Bowls A and B. Can you tell which bowl contains water and which contains juice? Guess which bowl contains water by circling A or B on your paper.

STATION 2: Take the lids off the bowls. At Bowl C, scoop up sand in your hands and feel it. Put the sand back. Repeat at Bowl D. Which bowl has water in the sand? Take a guess by circling C or D on your paper.

STATION 3: Starting with Bowl E, hold the bowl up to your ear and shake it. Do you think it contains ice cubes or crayons? Repeat with Bowl F. Guess which bowl contains ice cubes by circling E or F on your paper.

Once complete, reveal the answers.

CLOSING

Now that you have examined all the bowls, which would you lead your herd to and why?

Where did Little Foot's mom find water in the desert? Was it in solid or liquid form? Why?

During the experiment, what parts of your body did you use to find water? Was it easier for you to find water using your nose, hands, or ears? Compare to Little Foot's mom.





MAKING A CLIMATE SCENE

GRADE 3–5



LESSON LENGTH: 2 HOURS

NGSS DISCIPLINARY CORE IDEAS

ESS2.A Earth Materials and Systems

ESS2.B Plate Tectonics and Large-Scale System Interactions

ESS2.D Weather and Climate

INTRODUCTION

Little Foot's family lives in one of the hottest and driest deserts on Earth, the Namib, and they are not alone! Amidst the scorching heat and sandstorms, a variety of plants and animals call this desert home.

Discussion: Does your neighborhood experience hotter or drier parts of the year? When is it less hot and dry? Do you think your neighborhood is in a desert? Why or why not?

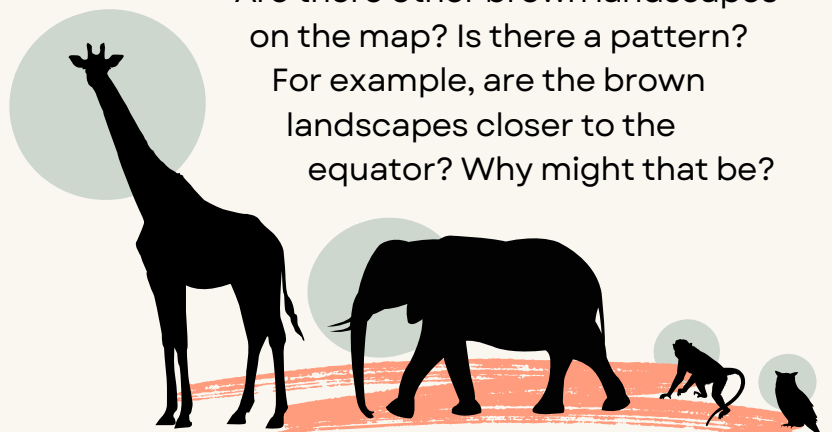
In the Namib Desert, Little Foot's family lives in valleys where the air is cooler and more plants can grow!

ACTIVITY INSTRUCTIONS

MATERIALS Physical world map, world climate data, paper, rulers, and drawing or painting supplies.

Look at a physical world map and locate the Namib. Is the landscape green or brown in color? What might this mean about rainfall, plants and animal life in this area? Are there other brown landscapes on the map? Is there a pattern?

For example, are the brown landscapes closer to the equator? Why might that be?



MAKING A CLIMATE SCENE

Elephants help other animals survive the harsh desert climate by spreading seeds that grow into trees. These trees provide food, shade and protection.

The Earth has four major interconnected systems that exist everywhere, including the desert. These systems are the geosphere, hydrosphere, atmosphere, and biosphere.

ATMOSPHERE AND HYDROSPHERE



Explore air temperature and precipitation data for Namibia **and** your neighborhood. Compare the two locations. See Appendix A for Namibia's climate data.



GEOSPHERE AND BIOSPHERE



Does the Namib landscape have mostly rocks, soil (mainly organic matter), sand, and/or molten lava? Compare to your neighborhood.



Make a list of 8 plant and animal species in the Namib Desert and in your neighborhood. See Appendix A for a list of 8 Namib Desert species.

Next, draw or paint a scene **from each location** to accompany the story. Include a climate graph (average air temperature and precipitation annually), and at least one animal and plant.

EXAMPLE SYSTEM SCENE

LOCATION: Canada

It was summer in southern Ontario, and there was a cool breeze in the shade of an Oak Tree. The leaves were lush and green from rain earlier in the week. An Eastern Grey Squirrel was already burying an acorn in the soil, to prepare for a snowy winter.



SYSTEM SCENES

Write a **one paragraph** story for each location - the Namib Desert and your neighborhood - that incorporates each system. Color code or underline systems with a unique pattern as it appears in the story. See below for sample patterns.

Atmosphere

Hydrosphere

Biosphere

Geosphere

CLOSING

How is the climate the same or different between your location and Namibia or the Namib Desert?

How do Earth's major systems interact in the Namib Desert? How is this the same or different from interactions in your area?





ELEPHANT TALK

GRADE 3-5



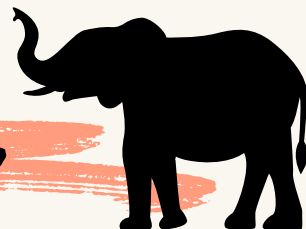
LESSON LENGTH: 1 HOUR

NGSS DISCIPLINARY CORE IDEAS

LS1.A Structure and Function

LS2.D Social Interactions and Group Behaviour

ESS3.C Human Impacts on Earth Systems



INTRODUCTION

As a social species, Little Foot and her family depend on good communication to survive in the desert. Elephants “talk” using their ears, vocal cords, trunk, and more. Their vocabulary of gestures and sounds range from giving warnings to the group to simply having fun!

Discussion: Recall when Little Foot was in danger from lions. What gestures and sounds did her family use to protect her? Recall when Little Foot met her bestie. What gestures and sounds did Little Foot make?

Elephants have two main call types: laryngeal calls (using vocal cords) and trunk calls.³

ACTIVITY INSTRUCTIONS

MATERIALS List of scenarios (page 10) x 1 per student

Elephant researchers Joyce H. Poole and Petter Granli have studied the communication of African elephants extensively.⁴ Using the observations of Poole and Granli, you will practice “talking” like an elephant by learning gestures and calls from a herd’s matriarch.

ELEPHANT TALK

Just like you, elephants can be playful! When older calves want to play with younger calves, they will lie down or kneel down to look smaller and less threatening.⁵

Arrange students in pairs. One student will be the herd's matriarch and one will be Little Foot.

Matriarchs will choose a scenario in random order from the list provided and demonstrate the corresponding gestures and calls (Little Foot may be part of the demonstration). Little Foot will guess which scenario the matriarch is demonstrating. Once correct, Little Foot will copy the matriarch's gestures and calls to practice their "elephant talk." Repeat until all scenarios have been practiced.

Note: You may wish to print the scenarios for each pair to reference.

SCENARIOS, GESTURES AND CALLS⁶

You are playing.

Gesture: Raise your trunk in the air and let it flop down on your head.
Call: *Squelching* - Wrinkle up your trunk and push air through it to make a "squelching" or bubbling noise.

You are excited to see a friend.

Gesture: Open your mouth wide and flap your ears. Turn toward and away from your friend rapidly.
Call: *Trumpet* - Forcefully blow air through your trunk to make a loud trumpet-like sound.



You hear the roar of a lion far away.

Gesture: Raise your head and lift your ears. Stop moving.
Call: *Short* - Blow air through your trunk to make a short, sharp, and noisy sound.

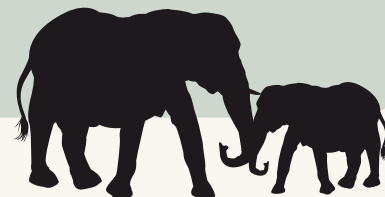


You and your family are in immediate danger from a predator.

Gesture: Cluster together with the youngest elephant in the center.
Call: *Roar* - Make a loud bellowing or squealing sound.

You are greeting a family member.

Gesture: Extend your neck up and out to raise your head. Rub your head against the family member.
Call: *Rumble* - Make a low frequency (deep voice) sound lasting 0.5 seconds to 12 seconds.

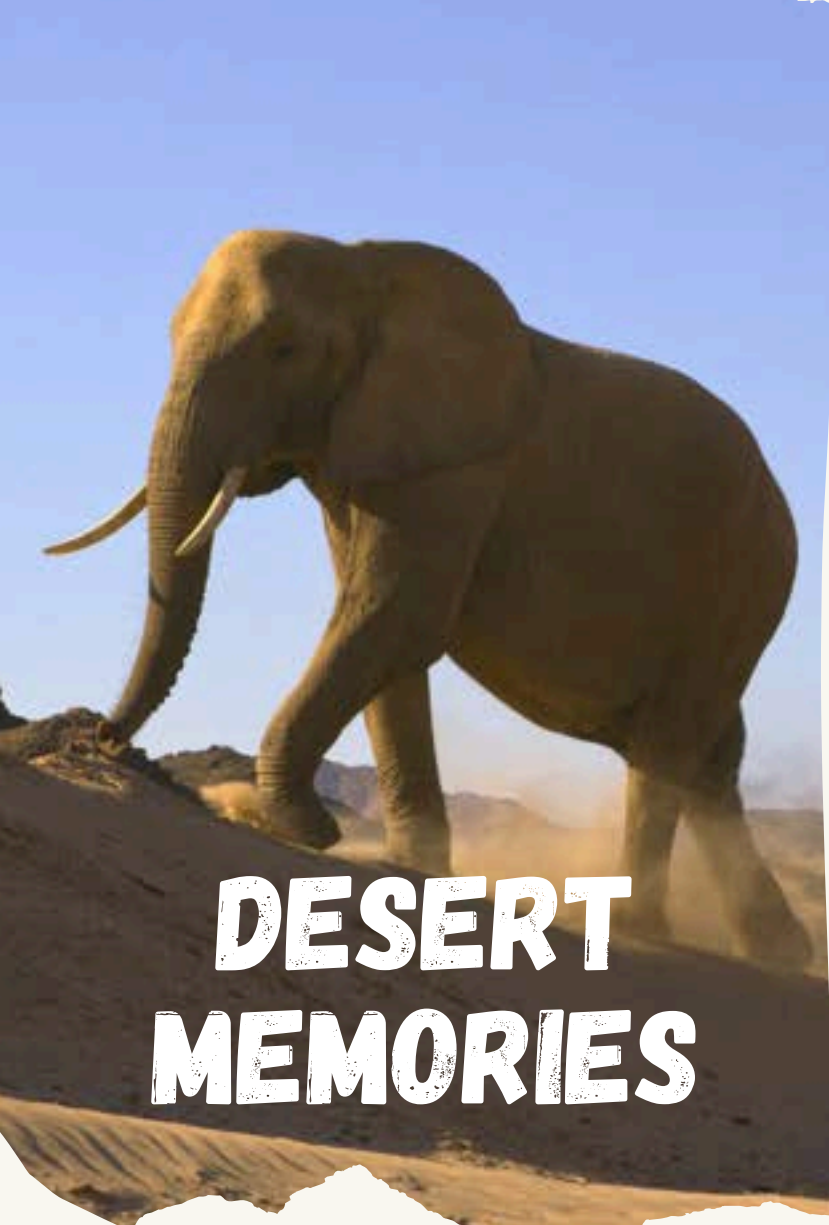


CLOSING

What are the internal and external structures of an elephant that are used for communication? Compare to your own communication structures.

How does the work of Joyce H. Poole and Petter Granli help protect elephants?





DESERT MEMORIES

GRADE 4-6

LESSON LENGTH: 1 HOUR

NGSS DISCIPLINARY CORE IDEAS

LS1.C Organization for Matter and Energy Flow in Organisms

LS1.D Information Processing

LS2.C Ecosystem Dynamics, Functioning, and Resilience

INTRODUCTION

As the global climate changes, desert life becomes even harder for Little Foot. Water is scarcer, weather is wilder and precious plants - her family's only food source - are in short supply. The survival of Little Foot and her entire family will depend on the oldest and wisest members of the herd.

Discussion: How do the oldest elephants know where to find food, water, and shelter in the desert?

Little Foot's mom must eat more than 200 pounds of plants a day to keep her and her baby alive.

ACTIVITY INSTRUCTIONS

MATERIALS Blank paper, scissors, and drawing utensils.

Draw a map of a desert based on scenes shown in the film. The map must include two Ana Trees, two water sources, and one shelter, along with 5 other desert features for **a total of 10 desert features**.

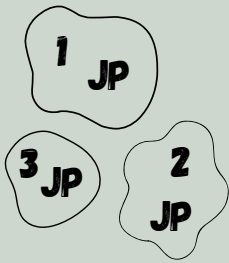
What sense receptors did you use to watch the film? Where was the information stored and processed in your body for you to recall later?



DESERT MEMORIES

Families with older matriarchs survive better in droughts, as the experienced females use their memory to lead the herd to food and water.⁷

SET UP



Cut out each feature on your map until you have 10 map pieces. Write numbers 1-10 on the back of each piece along with your initials.

Hide the pieces in the play area in any order.

GAME PLAY

ROUND 1: Retrace your steps. Use your memory to find all map pieces **in order** from #1-10. You cannot pick up a number until you have found the previous number in the sequence! *How many pieces did you find out of order?*

Once you have found all the map pieces in the correct order, re-hide them in the same locations.

ROUND 2: You are an elephant in the Namib. Global climate change is causing more extreme weather in the desert and a sandstorm is starting to form. You need to take shelter immediately. Find your map piece that shows a shelter by memory. *How many pieces did you pick up before finding the shelter piece?*

Once you have found the shelter piece, re-hide the piece in the same location.

ROUND 3: The storm has passed, but now the desert is in a drought. To survive, you need to find food and water immediately. Find all Ana Trees and water map pieces by memory. *How many pieces did you pick up before finding the trees and water?*

Once you have found these pieces, re-hide them in the same location.

ROUND 4: You are now the matriarch of the herd and must show the younger elephants your map of the desert, so they too can find food and water. Find all 10 map pieces **in order** from #1-10. You cannot pick up a number until you have found the previous number! *How many pieces did you find out of order? Did your memory improve since Round 1?*

CLOSING

What sense receptors do elephants use to gather information? What kind of memories are important for elephants to store using this information? How do these memories help elephants survive?

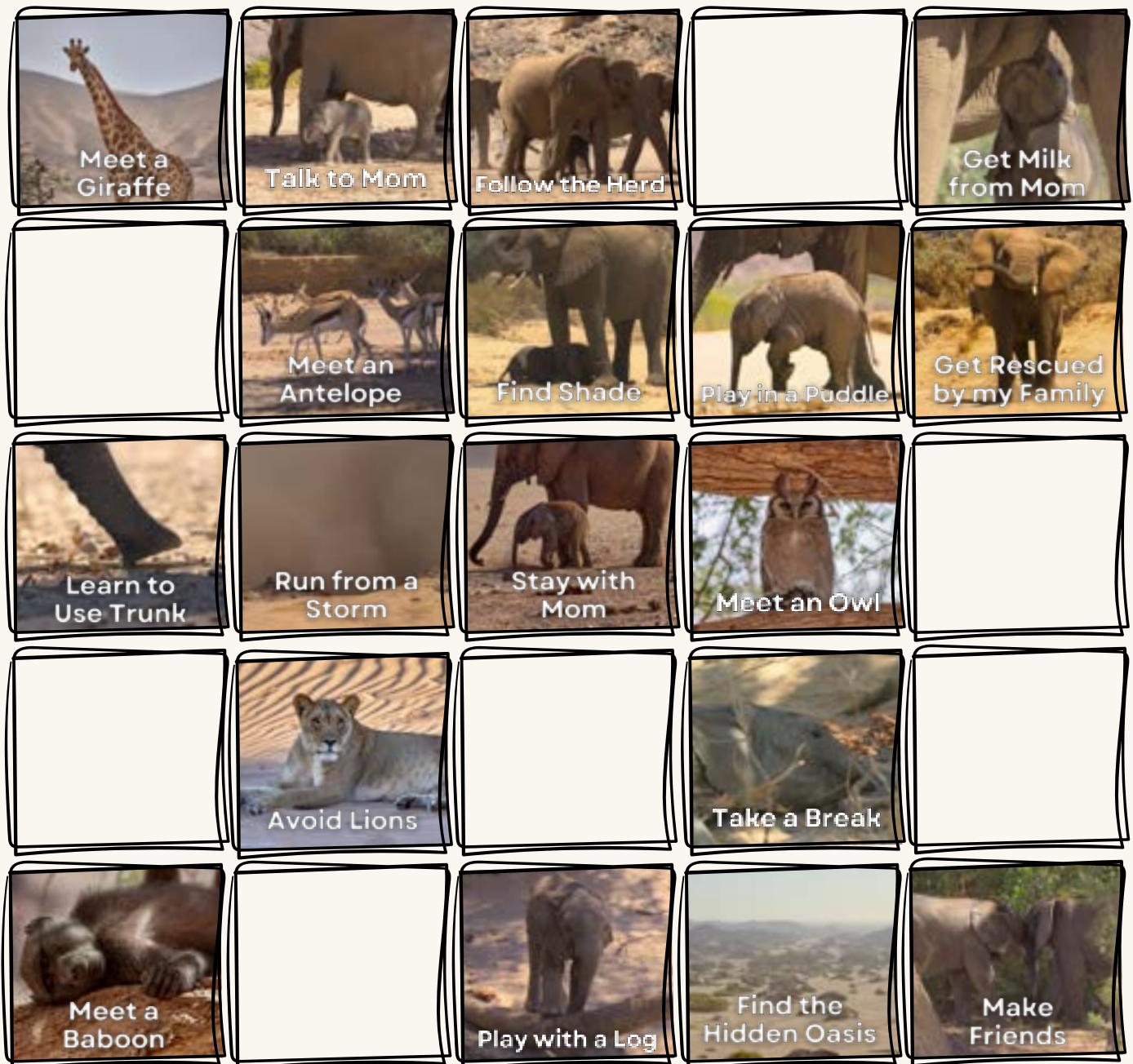
What factors are contributing to the extreme weather events in the Namib? How do these events impact elephants? What everyday actions can help reduce the impact of global climate change?



HOME ACTIVITY: THE ADVENTURES OF LITTLE FOOT

LEARNING HOW TO ELEPHANT

Little Foot is learning how to elephant in the Namib Desert! Can you find all of Little Foot's adventures in the film? Fill in the blanks with new adventures for Little Foot.



HOME ACTIVITY: DO YOU HAVE A MEMORY LIKE AN ELEPHANT?

ELEPHANT MEMORIES

Elephants of the Namib often travel long distances across the desert to find food and water. Some researchers believe that these elephants can remember routes that they have not traveled on in decades! This extraordinary long-term memory is key to the herd's survival.⁸

PRACTICE YOUR MEMORY SKILLS

Short-term Memory: Study the picture below for 10 seconds. Immediately cover the picture. Redraw the picture in the blank space **by memory only**. Once you think the picture is complete, uncover the original picture and see how close you were to matching the original.

Long-term Memory: Cover both pictures below. Return 3-5 days later and try to draw the original picture again **by memory only**. Compare to the original.

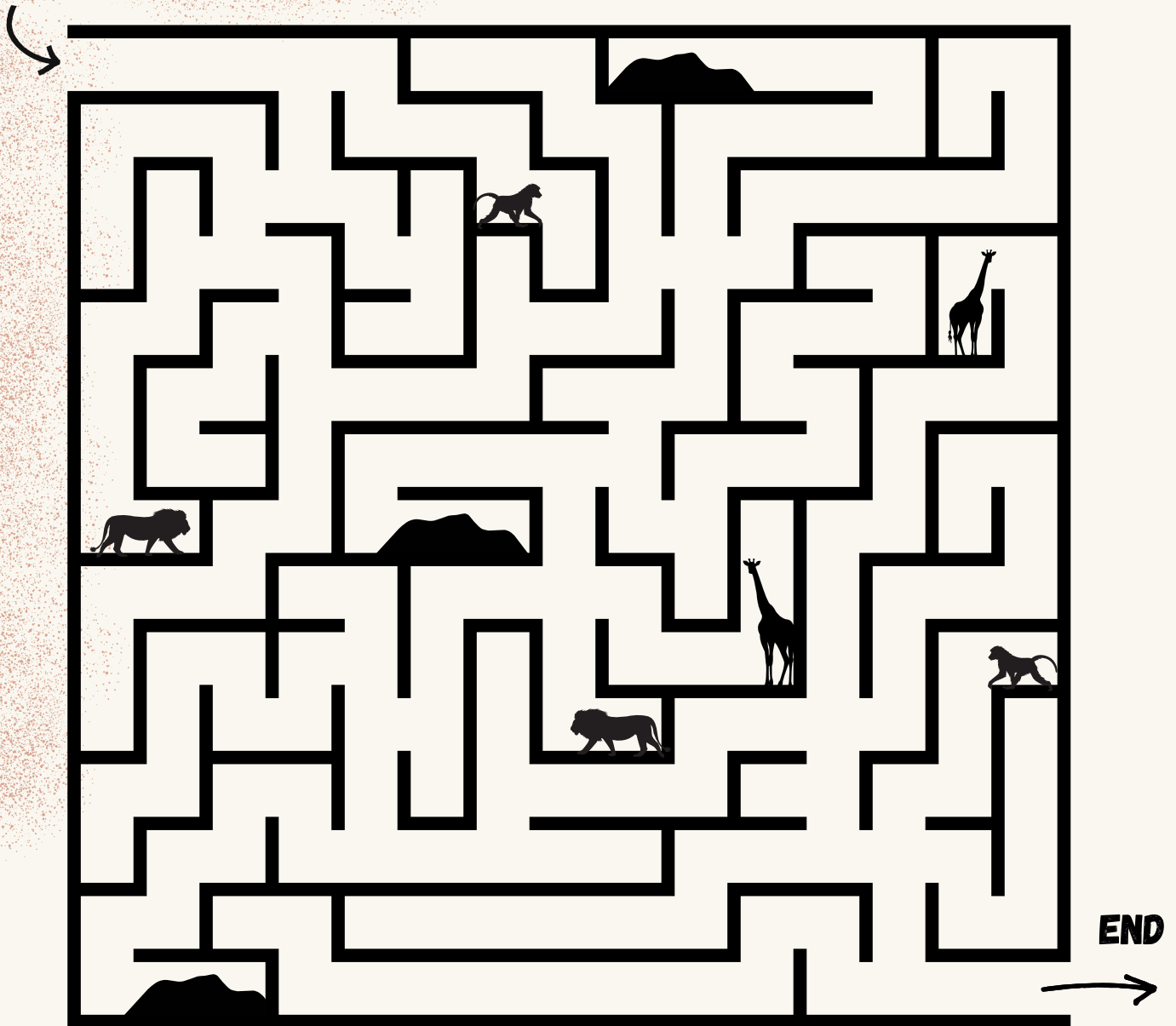


HOME ACTIVITY: OUTRUN A SANDSTORM!

A SANDSTORM IS COMING!

Sandstorms appear when strong winds blow sand through the desert. Elephants can sense the vibrations of the storm through their feet, which is a sign to take cover! Help Little Foot outrun the storm and find shelter by making your way through the desert maze.

START



**LITTLE FOOT
IS SAFE!**



CREDITS

Elephants: Giants of the Desert is produced by Definition Studios, and distributed by K2 Studios in IMAX®/Giant Screen and other specialty theaters located in science centers, museums, zoos/aquariums, and other cultural destinations and attractions worldwide.

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Elephants: Giants of the Desert Educator's Guide (K-6) is written and designed by Back to Earth Science Inc.

www.backtoearthscience.com

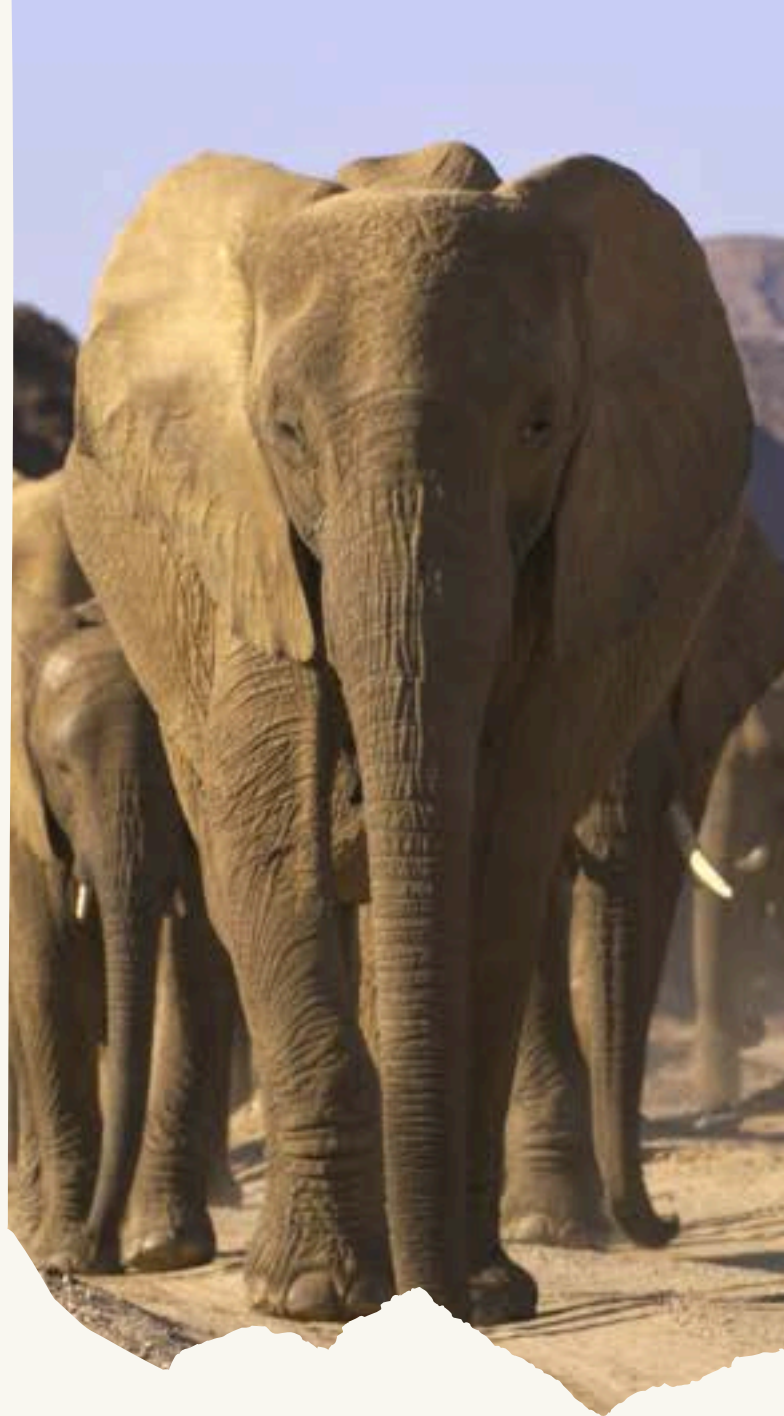
Back to Earth Science Inc. is located on the traditional territory of the Anishinaabek and Haudenosaunee. K2 Studios is situated within the traditional territory of the Gabrielino/Tongva Nation.

Learn more about ***Elephants: Giants of the Desert***, a giant screen format film at www.desertelephantsfilm.com.

DEFINITION STUDIOS

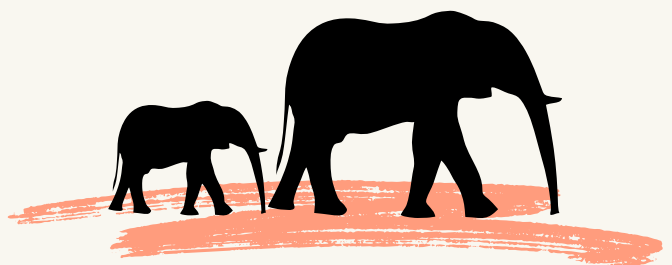
K2 STUDIOS

BACK TO EARTH
SCIENCE 



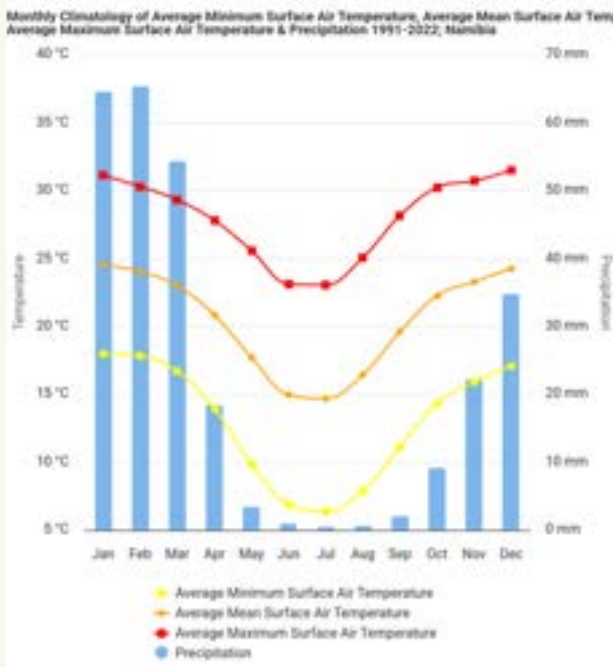
SOURCES

1-8 Moss, C. J., Croze, H., & Lee, P.C. (Eds.). (2011). *The Amboseli Elephants: A Long-Term Perspective on a Long-Lived Mammal*. The University of Chicago Press.



APPENDIX A

CLIMATE DATA FOR NAMIBIA

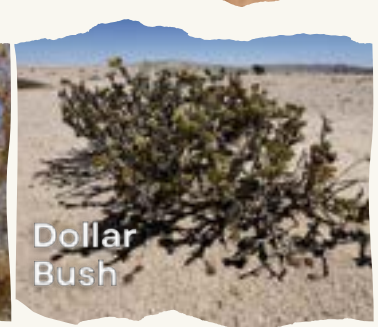
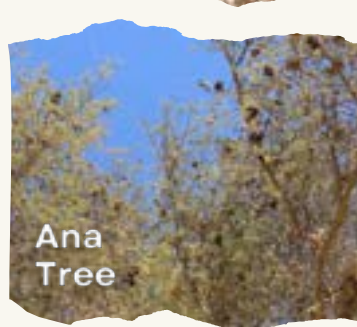
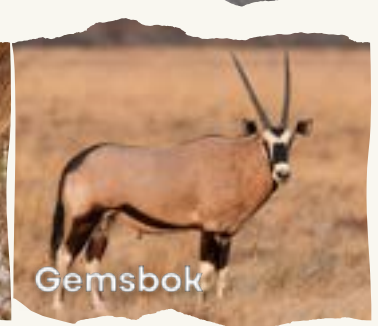
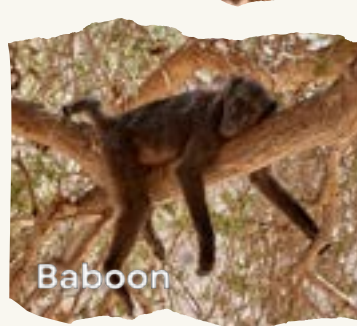
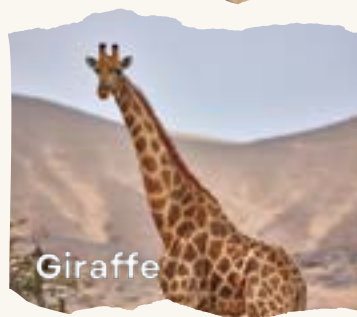


CLIMATE DATA FOR THE NAMIB DESERT

Average annual rainfall
0.2 inches / 5 mm (western region) to 3.4 inches / 85 mm (eastern region)

Temperature range
32°F to 122°F /
Below 0°C to over 50°C

8 NAMIB DESERT ANIMALS AND PLANTS



Sources

Namib Desert. Ecoregion Snapshots: Descriptive Abstracts of the Terrestrial Ecoregions of the World, (2021). Developed by One Earth and RESOLVE. <https://www.oneearth.org/ecoregions/namib-desert/>

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<https://climateknowledgeportal.worldbank.org/country/namibia>