

INTRODUCTION

Gorongosa National Park is a 1,570-square-mile protected area in Mozambique. After several decades of war devastated Gorongosa's wildlife populations, park scientists and conservation managers are now working to restore the Gorongosa ecosystem and the wildlife that depend on it. Lion researcher Paola Bouley and her team are using motion-detecting trail cameras to learn more about Gorongosa's lions. The lion population in Gorongosa has gone from an estimated 500 lions before the war to fewer than 50 today. To monitor the population growth and the factors that may be affecting it, Bouley and colleagues are using photos from the cameras to identify individual lions and their prides, and to track their locations around the park.

But lions are not the only animals whose images are captured by these cameras. Gorongosa National Park is home to wildebeest, elephants, zebras, and many other types of animals. The trail camera photos provide a peek into the unexplored parts of Gorongosa and the animals that live there, recording valuable information for scientists and park managers.

By observing different animals and their behaviors in different habitats, scientists can learn about Gorongosa's wildlife and its recovery. In this activity, you will be an ecologist studying Gorongosa's wildlife. Using the trail camera photos, you will make observations and then formulate questions for further study based on these observations. The observations and questions that you will generate are the first important steps toward understanding and protecting Gorongosa's wildlife. Questions like these can then lead to further research and conservation action.

You can learn more about the trail camera project and help identify animals at WildCam Gorongosa (<http://www.wildcamgorongosa.org>).

PROCEDURES AND QUESTIONS

Follow the instructions below and answer the questions in the spaces provided.

Part 1: Making Observations

The first step in scientific inquiry is often making observations of the natural world. Observations can inspire questions that lead to hypotheses. To practice making observations, your instructor will show you a single photo from a Gorongosa trail camera. In the time allotted, write down as many observations as you can about each photo. Be a detailed observer and make sure to look at the animals, their behaviors, and the environment.

1. Write down as many observations as you can about this photo.



Classroom Resource
Gorongosa: Making Observations

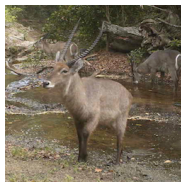
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Student Worksheet

2. After you are finished making observations, write down some questions that you now have based on your observations. In other words, think about what you would like to learn more about as an ecologist in Gorongosa.

Part 2: Observations Across Time

In this part of the activity, you will investigate how natural cycles affect the animals of Gorongosa National Park. You will compare sets of photos from one camera taken at two different times of the year—the wet season in October and the dry season in August—and at two different times of day, day and night. Your teacher will divide you into groups that represent different areas of the park, turning your classroom into a “map” of Gorongosa. Each group will get a set of 40 photos from a single trail camera.



Classroom Resource
Gorongosa: Making Observations

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Student Worksheet

1. Read the description of your camera site in Appendix 1 of this worksheet.
2. As a group, separate your photos into four piles: 1) August during the day; 2) August at night; 3) October during the day; and 4) October at night.
3. The photos have the names of the animals written on them. In the table below, record the total number of each animal that you find in the four photo sets.

AUGUST - DAY	
Animal Name	Total Count
AUGUST - NIGHT	
Animal Name	Total Count



OCTOBER - DAY	
Animal Name	Total Count
OCTOBER - NIGHT	
Animal Name	Total Count

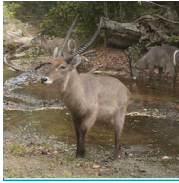
4. Now your job as Gorongosa's ecologist is to make observations and identify trends. As a group, write down as many observations as you can for the photos from August (dry season) and the ones from October (early wet season), and then compare the two seasons.



August (20 Photos)

October (20 Photos)

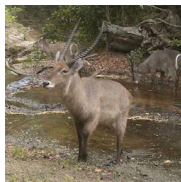
Comparison



Night (20 Photos)

Comparison

7. As a group, write down some questions inspired by your observations.



Part 3: Observations Across Space

1. Each group of students in your class looked at a set of photos from a camera at a different location. You will now compare the data from these different locations to identify trends. As a first step, add all the animal counts from part 2, question 2, to get the total number of each type of animal in your photo set.

Animal Name	Total Count

2. Your teacher will display a “map” of the classroom and will ask each group to share their animal counts and some of the observations they made. Each group will also read aloud the description of their camera location (Appendix 1).



- Look at the class map of observations from the six cameras. As a group, write down as many observations as you can about trends across the six camera locations.



Part 4: Making Observations in Science

Making observations and posing questions is at the foundation of scientific exploration. These observations and questions provide direction for a scientist's research. Answer the following questions about your experience making observations and asking questions.

1. Why do you think making observations is an important part of science?

2. In your experience doing this activity, how did making observations help you to ask questions?

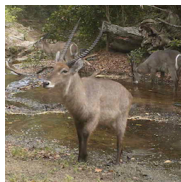
3. What prior knowledge about ecology or animal behavior did you use to help inspire your questions?



Classroom Resource
Gorongosa: Making Observations

4. Choose one of the questions that you came up with during this activity. If you were an ecologist in Gorongosa, how might you answer this question by gathering more data? You can use data from the trail cameras or other types of data that you collect in the field.

5. Making observations and asking questions are two of the first steps of the process of scientific inquiry. What do you think the next steps in scientific inquiry are?



APPENDIX 1: SITE DESCRIPTIONS

C19: Cheringoma Plateau

The Cheringoma Plateau, on the east side of Gorongosa National Park, is the eastern plateau of the Great African Rift Valley. This region is higher in elevation than the valley in the center of the park and is covered in a dense “miombo woodland” forest. The small-leaved miombo trees can grow in poor, rocky soils of the plateau. This forest has a dense, closed canopy that blocks most sunlight and prevents grass from growing on the forest floor. Because of this dense tree cover and very little grass, this forest is usually home to antelopes that feed on leaves (browsers) and mixed feeders that feed on both grass and leaves. Primates are also commonly found in miombo woodland habitat, foraging on the ground or high in the trees.

C26: Archway Gorge

The limestone gorges of Gorongosa National Park were formed over many millions of years as erosion from rivers and rain carved out deep gorges in the side of the Cheringoma Plateau. This camera is located in a small limestone gorge, called Archway Gorge, along a river surrounded by lush, riparian forest. The gorge stays cool and moist, even in the dry season, and provides nutritious green vegetation for a variety of animals year-round. Sunlight only reaches the floor of the gorge for a limited period of time each day, so very little grass covers the ground. The river attracts a variety of wildlife that live in the gorge, including antelopes, baboons, birds, and carnivores.

C35: Floodplain

Floodplain grasslands cover almost 20% of Gorongosa National Park and lie in the center of the park. The grasslands are maintained by the seasonal flooding of Lake Urema and its rivers, natural fires during the dry season, and grazing by herbivores. Elephants also play their part by knocking down trees along the edge of the floodplain to reach the leaves and fruit at the tops of trees. Grasslands are an extremely productive ecosystem, providing food to support a vast diversity of species. Gorongosa’s large grazers, including hippos, buffalo, wildebeest, zebra, and waterbuck, eat a staggering amount of grass each day and help “mow” tall grasses, creating patches of short grass. Smaller antelope, like impala, reedbuck, and oribi, feed on the lush, green grass shoots that grow in these short patches. These herbivores attract large predators, like lions. Grasslands are also home to less conspicuous animals, like birds, reptiles, amphibians, and insects.

D09: Midlands

The Midlands, on the west side of Gorongosa National Park, is the western plateau of the Great African Rift Valley. This region is higher in elevation than the valley in the center of the park and is made up of a patchwork of dense miombo woodland and open savannas. This camera is located in an open savanna covered in grass and a variety of different acacia trees. The soils on this rocky plateau are not as rich as the soils of the valley below, and the grasses here are less nutritious. Still, this area is home to a variety of grazers and browsers that feed on the grass and leaves.



Classroom Resource
Gorongosa: Making Observations

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Student Worksheet

D53: Savanna

The rift valley is made up of a patchwork of different types of savanna, woodland, and grassland. The tree canopy of the savanna is open, allowing enough light to reach the ground for grasses and herbs to blanket the ground. This mosaic of landscapes includes distinct forest patches—including bright yellow fever trees, tropical palm trees, and miombo woodland—which provide habitats for many different wildlife species, from the smallest creatures, like insects, to the largest, like elephants. This camera is located along a road that park staff and tourists drive on daily.

D63: Urema River

The Urema River is the outlet for the massive Lake Urema at the center of Gorongosa National Park. The river flows southeast from the eastern tip of Lake Urema and connects with the Pungue River to the south. The Urema River is home to crocodiles, hippos, and waterbirds and is a common place for elephants to get a drink. This camera is located a few miles west of the Urema River along one of its small tributaries. During the wet season, this tributary is full of life, but during the dry season the river goes completely dry. The vegetation in this area is open savanna, which is covered in grass and scattered trees. The grass in this area grows tall and thick because of the good soil and moisture from the nearby river.