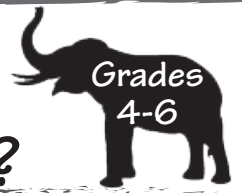




How much space does an African elephant need to survive in the wild?



This lesson will introduce students to one of the three major threats to elephants . . . habitat destruction. Students will use mathematical formulas to calculate the homerange of an elephant family. After mapping the home range, students will then become Environmental Planners for the day and design a wildlife corridor for elephants that avoids human development. This activity is based on real world ongoing conservation work in Mali, Africa.

Subject Area: Science, Geography, Math

Background Information: Page 6, 9-10

Vocabulary: Habitat, herd, home range, population, threat, tracking collar, wildlife corridor

Students will be able to:

- Graph and calculate the home range of an elephant family;
- Design a wildlife corridor that avoids villages and farms;
- Understand the difference between human & natural habitat destruction;
- Predict how humans and elephants can coexist.

Materials:

- Activity Sheet 18: Region Map
- Activity Sheet 19: Instructions for students
- Activity Sheet 20: Environmental Planning Pieces
- Coloring Pencils
- Scissors

Learning Activities

Preparation

1. The students will work in pairs for this activity. Print off two Activity Sheet 18 and one Activity Sheet 19 for every pair. Activity Sheet 20 has enough cutouts for two pairs, so print half as many as you have pairs.
2. Introduce the lesson on habitat destruction by playing the video “Why Protect Large Wild Animals...Like Elephants” (included as a separate download on this site).
3. After the video, lead a short discussion on the importance of elephants to their ecosystem and how habitat destruction has a negative impact on their survival.

Why are elephants important to their ecosystem?

Elephants open water sources, create shelters, and even open food sources for other animals.

Their dung also makes a great fertilizer for sprouting plants. Elephants also eat bushes which prevents grasslands from becoming forest. This is important for many species of animals.

What ecosystem benefits do elephants provide humans?

Clean water and air are tied to a functioning natural ecosystem. Elephants are a major cog in keeping those ecosystem cycles moving.

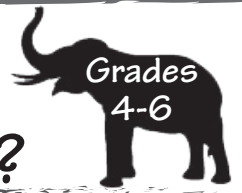
How do humans disrupt the balance of natural ecosystems?

Urban and rural development such as farming can disrupts natural ecosystems.

4. Distribute Activity Sheets 18 & 19 and one set of Environmental Planning Pieces to each pair of students.



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Activity

5. The Homerange activity has students becoming researchers and observing one elephant family's use of the Reserve. They will read observations and plot coordinates (by shading with coloring pencils) of the family's homerange. The students will then calculate (in km^2) the homerange of the family. *ANSWER: 648km^2*
6. In the Environmental Planning activity, students become environmental planners. The students will use *Advice from a Wildlife Expert* as their rules for the activity. The *Notes from Local Elders* will be students' step-by-step process to build their planned community that includes a safe wildlife corridor.
7. The students will then cut out their Environmental Planning Pieces and place them onto the Reserve Map in a variety of ways as long as they preserve a wildlife corridor for the elephants to reach all necessary resources (food and water).
8. Example Completed Maps have been provided for you at the end of this lesson.

Discussion

9. After all groups have completed their planned community, students can tape or glue their pieces to secure them onto the map.
10. Each group should share their map with the class to see the variety of possibilities to protect elephants and people in the region.
11. Lead a student discussion using the questions below to guide their thinking about how human development effects wildlife and ecosystems.

SUMMARY DISCUSSION

12. Are habitats changed by natural occurrences? *Natural causes of habitat destruction include: fire damage by lightning, loss of food availability through plant diseases, insect infestations and drought.*
13. Elephants depend on their habitat for survival. How do elephants and humans compete for the same resources? *We both need space. People add villages and farms that reduce the space for elephants. Trees are important to humans for cooking and elephants for food. Elephants and people need daily access to clean water. Planning human developments around these resources is crucial to both of our futures. Successful conservation means planning for the needs of people and wildlife.*
14. Can we have a positive effect on wildlife and wild places? Is it possible for humans and elephants to live in harmony? *Yes, as shown by your work today, with proper planning keeping both elephant and human needs in mind. We can develop land while still preserving native ecosystems.*
15. Will developing wildlife corridors always prevent human elephant conflict? *They can certainly lessen the impact and give animals the free choice of moving away from human development. However, wildlife corridors are complicated even if constructed with great care and planning. Even with our best planning, elephants may choose to travel through human development following historic migration routes to food sources.*
16. What are the benefits to involving wildlife and wildlife corridors in environmental planning? *There are many benefits. Wildlife is often a strong part of many cultures and the potential loss of a species can result in a significant loss of culture. An economic benefit, such as eco-tourism, is a viable option for many underfunded regions looking to raise their standard of living.*

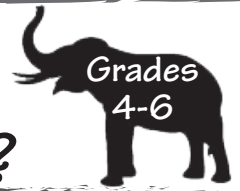
Extension

Have the students research the palm oil crisis in Asia and how our purchases affect wildlife. Encourage them to develop a creative presentation of their choice on the subject.



Lesson
7

How much space does an African elephant need to survive in the wild?



Grades
4-6

TEACHER RULES & STEPS FOR THE ENVIRONMENTAL PLANNING ACTIVITY

Advice from Local Wildlife Expert

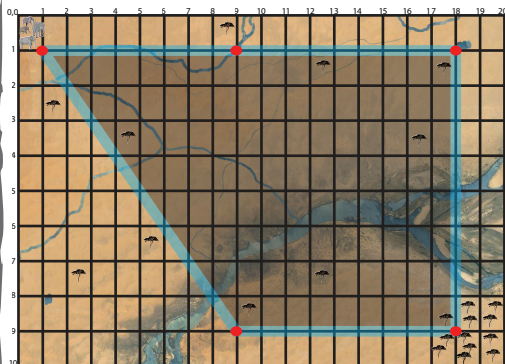
- Elephants need to have access to water and nutritional food sources.
- Elephants need a path that protects migration routes and keeps them as far as possible from human development.
- Farms must be placed beside at least one village.
- Roads must start and end at a village.



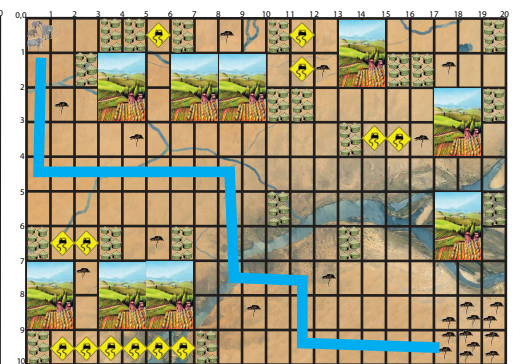
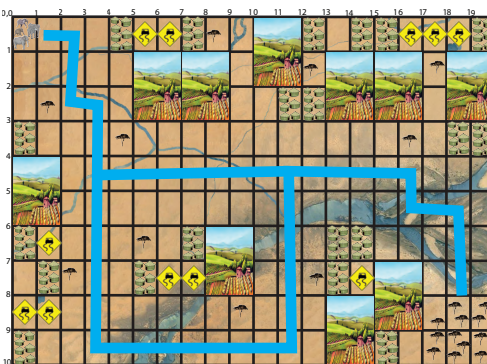
Notes from Elder's Townhall Meeting

- For the first time, people build homes in the pristine reserve. Build 4 VILLAGES.
- The villages need to be able to travel between themselves. Build 1 ROAD.
- Food supplies are running short, more food is needed. Build 2 FARMS.
- The farms require more workers to work the fields. Build 7 VILLAGES.
- Locals are complaining about how travel around the region is limited. Build 2 ROADS.
- A massive charcoal plantation has moved into the area. Build 3 FARMS
- The plantation needs more efficient roads to move product. Build 1 ROAD.
- The local charcoal company has hired more workers. Build 2 VILLAGES.
- With a new population, there is a food shortage in the region! Build 3 FARMS.
- A local politician approves new jobs. Build 2 VILLAGES.
- Traffic is congested around the new development. Build 1 ROAD.
- Zoning has been approved for a large construction project. Build 4 VILLAGES.
- The charcoal plantation develops a new method to increase their profit. Build 2 FARMS.
- With higher profits, larger populations are drawn to the area. Build 1 VILLAGE.

Example Completed Maps



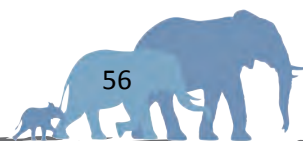
$$\frac{1}{2} [(8 \times 2) \times (8 \times 3)] + (9 \times 2) \times (8 \times 3) = 624 \text{ km}^2$$



RESOURCES

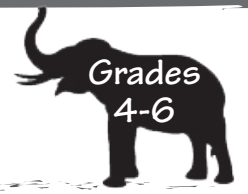
<http://www.wild.org/where-we-work/the-desert-elephants-of-mali/>

<http://elephanttag.org>

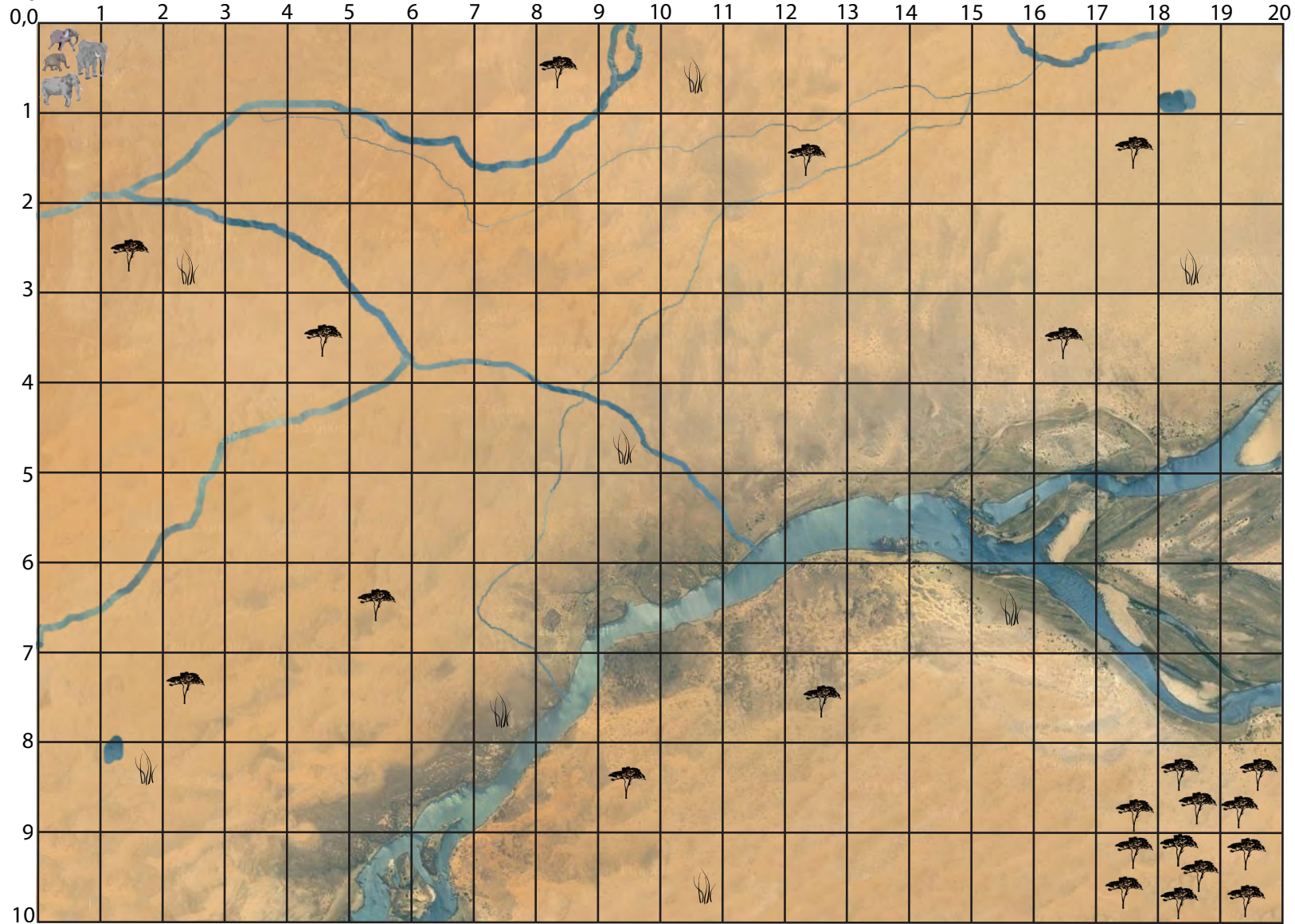




How much space does an African elephant need to survive in the wild?



Activity Sheet 18



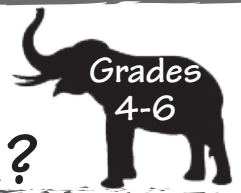
Key

I = 3 km
 — = 2 km
 □ = 6 km²





How much space does an African elephant need to survive in the wild?



Activity Sheet 19

Plot an Elephant Family's Homorange

Tracking elephants in a region is the best way to learn more about what elephants need. Elephant conservation includes managing many factors, both natural and human-caused, that threaten the safety of elephants. Droughts, loss of food, and human development can all disturb their natural habitat. Read the observations below from the Reserve staff as they follow the elephant family as they make their way to resources throughout the day. Reserve staff have identified this family by the large ear notches on the matriarch.

Follow the coordinates in the field reports to plot the elephant family as they move through their habitat. Use coloring pencils to plot each point, and then shade in the homorange of the elephant family.

At dawn, a researcher identifies the family of elephants resting near an old ravine around (1,1).

The reserve safari driver saw the family mud-wallowing in the river at (9,1).

Warden says he has seen the family of elephants drinking from a water hole at (18,1).

The reserve anti-poaching unit has spotted the family of elephants feeding from a group of acacia trees near (18,9).

At dusk, the family is spotted scratching on termite mounds by (9,9).

Area Formula

Triangle: $\frac{1}{2} \times \text{Base} \times \text{Height}$



Rectangle: $\text{Length} \times \text{Height}$



Using the information provided on the Map and Field Reports, answer the following questions:

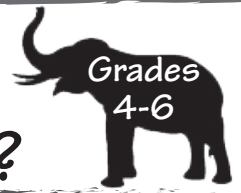
What are the resource requirements for an ideal elephant habitat? _____

How much area (in km²) did these elephants need to survive? _____





How much space does an African elephant need to survive in the wild?



Activity Sheet 19

Planning a Community with a safe Wildlife Corridor

A parcel of land within the Reserve has been given to the community by the government. The local Elders want to plan a village with farmland while conserving the Reserve for wild elephants. They have contacted a local wildlife expert, who has given advice on how to protect the elephants. The Elders provided meeting notes from the last townhall meeting that offer a plan for building the new community. It is your job to create a plan where elephants and people can coexist.

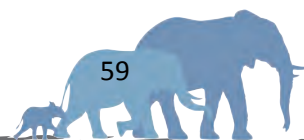
Following the Advice and Notes below you can create your own environment plan for the community and elephants. Cut out the environmental planning pieces (villages, farms, and roads) and place them onto the map, while preserving wildlife corridors.

Advice from Local Wildlife Expert

- Elephants need to have access to water and nutritional food sources.
- Elephants need a path that protects migration routes and keeps them as far as possible from human development.
- Farms must be placed beside at least one village.
- Roads must start and end at a village.

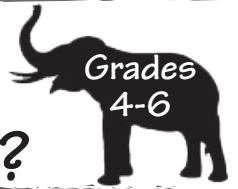
Notes from Elder's Townhall Meeting

- For the first time, people build homes in the new reserve. Build 4 VILLAGES.
- The villages need to be able to travel between themselves. Build 1 ROAD.
- Food supplies are running short, more food is needed. Build 2 FARMS.
- The farms require more workers to work the fields. Build 7 VILLAGES.
- Locals are complaining about how travel around the region is limited. Build 2 ROADS.
- A livestock industry member has moved into the area. Build 3 FARMS
- The livestock industry needs more efficient roads to move product. Build 1 ROAD.
- The livestock needs more farmers to support the operation. Build 2 VILLAGES.
- With a new population, there is a food shortage in the region! Build 3 FARMS.
- A local politician approves new jobs. Build 2 VILLAGES.
- Traffic is congested around the new development. Build 1 ROAD.
- Zoning has been approved for a large construction project. Build 4 VILLAGES.
- The livestock needs more grass pastures to feed their herds. Build 2 FARMS.
- With a booming industry, larger populations are drawn to the area. Build 1 VILLAGE.





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Activity Sheet 20

Activity Sheet 20

100 water buckets (10x10 grid)

100 yellow diamond-shaped signs (10x10 grid)

10 landscape photos (2x5 grid)

Activity Sheet 20

100 water buckets (10x10 grid)

100 yellow diamond-shaped signs (10x10 grid)

10 landscape photos (2x5 grid)