

## UNIT 3 | HOW MANY IS ENOUGH?

# PANTHER HUNT

### METHOD

Students gain an understanding of carrying capacity when they act as predatory animals in a finite area and attempt to accumulate enough food to stay alive.

### MATERIALS

- 200 paper cups (3 oz)
- Blindfold

## INTRODUCTION

It's been said that every person on the planet, all seven billion of us, could fit into the state of Texas. But being able to fit a certain number of people into a space doesn't mean they'd be able to live there for any length of time. We need more than just a certain amount of space to survive; we need things like food and water. There isn't enough farmland or drinking water in Texas to support seven billion people. Texas, the United States, and the planet all have limits to how much they can give to support people. Every habitat has a limit – that is its **carrying capacity**. This simulation helps students understand the concept of carrying capacity in nature by having them act out the survival attempts of panthers living in an area with limited food resources.



## PROCEDURE

1. Prior to class, label the bottom of each cup to represent a prey animal as follows:
  - 80 cups marked S (squirrel = 1 kg)
  - 60 cups marked R (rabbit = 2 kg)
  - 36 cups marked P (porcupine = 7.5 kg)
  - 22 cups marked B (beaver = 20 kg)
  - 2 cups marked D (deer = 75 kg)

Set the cups out around the classroom so that the bottom is facing up, showing students the letters indicating what type of prey the cup represents. This activity could also be done in an outdoor space.



### CONCEPT

Every piece of land has a limited carrying capacity for the number of animals and/or humans it can support.

### GRADE LEVEL

Upper elementary

### SUBJECTS

Science, Social Studies, Math

### OBJECTIVES

Students will be able to:

- Define carrying capacity and explain how it relates to animals and people.
- Calculate the carrying capacity of a determined area.
- Determine the similarities and differences between animal and human population growth patterns and carrying capacities.

### SKILLS

Observing, understanding cause and effect, adding, role playing, using metric weights, finding averages, multiplying, dividing

Note: For classes of roughly 25 students, 200 cups works best. To adjust for class size, decide how many panthers will survive and determine the carrying capacity by multiplying that number by 50, and subtracting from 1,060 (total amount of kg in a 200-cup set). There shouldn't be enough prey available for all the panthers to survive – the simulation works best when only 50-70 percent of the panthers survive the season to show how finite resources affect carrying capacity.

2. Write what each cup represents, the animal and the weight, on the board so the students will know what they're hunting.
3. When ready to begin the simulation, indicate the area where you have set out the cups, and say, "This is the habitat of a population of panthers and each of you represents one panther. Right now you will each try to find enough food in this habitat to survive for about a month, 50 kg." Explain to students that 1 kg = 2.2 lbs, so 50 kg = 110 lbs. It may be helpful to show a picture of a panther to the class.
4. Select one student from the class and explain, "This panther has been injured by tackling a big buck and now has a broken leg so he/she will have to hunt on one leg." Tell the student to hop on one foot.
5. Select another student and say, "This panther is blind due to an injury caused by a porcupine." Give the student a scarf or bandana to use as a blindfold.
6. Select a third student and explain, "This panther is a female with two cubs and each cub needs 25 kg of food to live, so if they are all going to survive, she needs to find 100 kg of food."
7. Indicate the chart on the board and read it aloud to be sure the students understand what they're looking for. Ask each student to set up a panther den by selecting a small area where they will bring their prey. This could be their desks or areas along the wall.
8. Give students the following instructions: "Each panther must walk into the habitat to hunt. (Panthers don't run down prey, they stalk it.) When a panther finds a prey animal, he or she picks it up and carries it to his or her den. Each panther can only carry one prey animal at a time. Remember that in the wild, panthers don't fight over prey, as a resulting injury may kill them. Once the prey is in a panther's den, it is safe from other panthers (panthers don't steal)." Students continue to repeat the process until all the prey has been collected.
9. When all the paper cups have been gathered, the hunting is over. Each student should return to his or her den to calculate the quantity of food he or she gathered. Then, discuss with the class the following questions.

## DISCUSSION QUESTIONS

1. How many kilograms did each panther gather? How many panthers survived in this habitat? Is that the carrying capacity of this habitat for panthers? (No) How can we calculate the carrying capacity for this habitat?

*Answers will vary. To calculate the amount of panthers that could have survived in the simulation, add up all of the prey (1060 kg) and divide by the amount each panther needs to survive (50 kg). The habitat could have supported 21 panthers.*

2. If more panthers played the game, would this habitat support them? How many kilograms of prey would be needed for the whole class of panthers to survive?

*No, the habitat would not support more panthers playing. The amount needed for the entire class to survive could be found by taking the total number of students and multiplying by 50.*

3. How many kilograms did the blind panther gather? The injured panther? Can a blind or injured panther survive in the wild? What about the mother panther? What are the chances of her cubs surviving in this habitat? Who is the mother going to feed first?

*Answers will vary. In regards to the mother panther, explain that she will probably feed herself first to keep healthy so that she can tend to her cubs. If she stays healthy, perhaps the habitat will support healthy cubs in the future.*

4. What would happen to the panther population if all the rabbits died of a disease? What would happen to the prey animals if all the panthers were captured and removed from the habitat?

*If all the rabbits died of a disease, the carrying capacity of the panthers would drop. The panthers' food supply would be cut; therefore, fewer panthers would survive. If all the panthers were captured and removed from the habitat, the prey animals would have no predators and the balance of the ecosystem would shift – population levels of the prey animals may significantly increase; over-grazing would affect the plant populations causing a food shortage; the changes in the ecosystem would increase competition for resources because the population levels are not sustainable.*

5. What would happen to the panther population if the water became polluted? Why would the concentration of the pollutant be greatest in the panthers?

*The panthers and all the other animals drinking the water would become sick and some may die. The panthers would have the highest concentrations of pollutants in their bodies because panthers are at the top of the food chain; they eat the other creatures that are also drinking the water. This is called **bioaccumulation**. Not only are they consuming the polluted water themselves, they are taking in all of the pollution that is stored in the tissue of each animal they eat.*

6. Do you notice anything about where the surviving panthers are located? (You may want the surviving panthers to raise their hands so they're easy to see.) Where are they in relation to the food supply?

*Often, the students seated closest to the paper cups will survive while those further away will not.*

7. Though this game is about the carrying capacity of panthers in a region, do the same rules apply to humans? How are they similar and dissimilar?

*Yes. Similarities include: humans are at the top of the food chain; just as the panthers compete for prey, humans compete for a number of limited resources within our own habitat, or society; in some cases, whether or not you get resources depends on how close you are to them (your access level and their availability). Dissimilarities include: humans generally don't stop "hunting" when we have enough of something (we continue competing for things that we don't really need while panthers stop when they are full).*

## MEASURING LEARNING

Have students write their thoughts and ideas about the following questions in their journals. “Think about our classroom. What is the carrying capacity of our classroom? What classroom resources determine the maximum number of students that can be in a class? Looking around the room at the resources we have, how many additional students do you think we could add before reaching our carrying capacity?” Younger students could work in groups to determine carrying capacity of one of the following: the classroom, the school, or a neighborhood.

## FOLLOW-UP ACTIVITY

Now that students have completed a simulation of carrying capacity for wild animals in a finite habitat, follow up with *From Island to Island*, an activity that encourages students to consider the carrying capacity for people on an island with limited resources.

Adapted, with permission, from Joan Wagner, Science Education Consultant/Author, Focus on Learning, Albany, NY. Panther Hunt is based on “How Many Bears Can Live in the Forest?” an activity developed by Project WILD, [www.projectwild.org](http://www.projectwild.org) ©2000.