

HOW MANY BEARS CAN THIS FOREST HOLD?



BENCHMARKS and TASK

SC.G.1.2.1 The student knows ways that plants, animals, and protists interact.

SC.G.2.2.1 The student knows that all living thing must compete for Earth's limited resources; organisms best adapted to compete for the available resources will be successful and pass their adaptations (traits) to their offspring.

- The student recognizes that plants and animals share and compete for limited resources such as oxygen, water, food, and space.

KEY QUESTION

How many bears can find what they need to survive in the forest?

BACKGROUND INFORMATION

Organisms must have adequate food, water, space, and shelter in order to live and thrive in their **habitat**. If any of these essential components become scarce, they limit the number of organisms that can survive. Within a habitat, organisms share and compete for **resources** they need. Some organisms are more successful in meeting their needs. These organisms are able to survive and reproduce.

MATERIALS

Teacher

six colors of construction paper (several sheets each of orange, blue, yellow, red, green, brown)
1 black marker or pen

Per student

How Many Bears Can This Forest Hold? sheet
1 envelope
1 calculator

Per class

food and water cards (see Teaching Tips)
1 blindfold

TEACHING TIPS

1. Select an appropriate outdoor area for the activity.
2. Make a set of 2 in. x 2 in. cards out of the construction paper. For a classroom of 30 students, make 30 cards of each color. If you have 25 students, make 25 cards of each color. Represent food by using each of the five colors below. The only exception is water, which requires 50 cards.

- Orange – berries and fruit; mark 5 cards B-20; mark 25 cards B-10
- Brown – nuts; mark 5 cards N-20; mark 25 cards N-10
- Green – plants; mark 5 cards P-20; mark 25 cards P-10
- Yellow – insects; mark 5 cards I-12; mark 25 cards I-6
- Red – meat; mark 5 cards M-8; mark 25 cards M-4
- Blue – water; mark 10 cards R, 10 cards L, 10 cards ST, 10 cards SP, 10 cards M
(These letters represent rivers, lakes, streams, springs, and marshes.)

ENGAGE

Tell students to imagine they are bears living in the forest. Ask them to help you make a list of what they would need to survive. Write the students' ideas on the board for all to see. Ask students to think about what might happen if the bear population became very large. Ask: *Which bears do you think would survive?*

EXPLORE

1. Scatter the cards in a large, open area, which will represent the forest where the bears live. Keep in mind that there is NOT enough food for each “bear” to survive. (Note: Do not tell students what the information on the cards represents. Just tell them that the colors represent a wide variety of foods that the bears need.)
2. Give each student an envelope. Tell them the envelope represents their “den” and should have their name written on the outside. The envelopes will be left on the ground at the starting line.
3. Students should line up on the edge of the forest where the cards have been scattered. Their envelopes should be between or next to their feet on the ground.
4. Assign some students roles as particular bears.
 - Say: *Some bears have had a very difficult time lately. A larger bear hurt one young bear when he invaded his territory. The young bear must hop on one foot to hunt because he has a broken leg.* Assign one student to be the bear with the broken leg. Tell this student he must hop rather than walk when the simulation begins.
 - Another bear had a fight with a porcupine and was blinded. Assign a student to be the blind bear. Place a blindfold over his eyes.
 - The last bear is a mother bear and she has two cubs. She needs to gather twice as much food. Assign a student to this role.
5. Tell students they will need to walk (not run!) through the forest to gather food and water. The students should pick up one card (food) at a time and return it to the envelope (den) before gathering another card. (Emphasize that students must always return to their den to leave one card before gathering another.)
6. When all the cards have been picked up, have students return to class with their filled envelopes.
7. Distribute the activity sheets. Tell students that each color card in their envelope represents a type of food a bear eats. On the card is the amount of food in pounds. Show students how to use the table on the activity sheet to record the total amount of food they gathered in the forest.
8. Tell students the blue card represents water and the letters on the card show the source of the water.

9. Give students time to complete the activity sheets.

EXPLAIN

Tell students that a bear needs 80 pounds of food to survive and at least one water source (one water card). Discuss:

Which bears survived?

Was there enough food in the forest to feed all the bears? How do you know?

Did the blind bear gather enough food? Will he survive?

The mother bear needs twice as much food to feed her cubs. Did she gather enough food?

If not, how will she divide the food?

Is it more important for the mother to eat or for the cubs to eat? Why? (The mother bear will eat first to ensure the survival of the species. The cubs will get what is leftover, if any.)

Are there other factors which may limit a bear's ability to survive?

EXTEND/APPLY

1. Students can compute a class total for all of the food they gathered. Divide the total pounds of food collected by 80. This number will represent the number of bears that can be fed in the habitat the class created. Ask: *How many bears can our habitat support?*
2. Provide students with the information about the percentages of food a bear requires for ten days. Students should then use calculators to convert these numbers into percentages and compare their percentages with the original percentages. Ask: *Does your bear have a healthy diet? Why or why not?*

An estimate of the total pounds of food a bear needs for 10 days is as follows:

Berries and fruit	20 pounds = 25%
Nuts	20 pounds = 25%
Plants	20 pounds = 25%
Insects	12 pounds = 15%
Meat	8 pounds = 10%
TOTAL	80 pounds = 100%

EXTENSION

Have students compare and contrast a bear's balanced diet with a human's balanced diet.

ASSESSMENT

Tell students to think about the simulation that they did in order to answer the following questions: What resources does a habitat need to contain in order for an organism to live and thrive? What happens in a habitat when some of the necessary resources become scarce?

Student Scientist _____

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1. Complete the table below with the amount of food that you gathered.

Type of Food Gathered	Total Number of Pounds
Orange – berries and fruit	
Brown – nuts	
Green – plants	
Yellow – insects	
Red – meat	

2. Find the total amount of food in pounds that you gathered.

I gathered _____ pounds of food.

3. Did you get at least one water card? _____