

GRADE: 3rd-Jr High

TIME: 1 hour

SEASON: All

HOW MANY CAN COME TO DINNER

National Science Teaching Standards

A. Science as INQUIRY

C. LIFE Science

F. Science in PERSONAL and SOCIAL PERSPECTIVE

G. HISTORY and NATURE of Science

Background Information:

All habitats have a limit on the number of animals or plants that can live there. This is called the carrying capacity. You may use the idea of a dining room table as a comparison - choose a student and ask if they have a dining room table. How many can fit around it? Can they add more chairs to include more people? However many can fit around that table and be able to eat is the carrying capacity for that table - then compare that as being similar to habitat. It can only support so many animals. All animals need food, shelter, water, and living space. The carrying capacity is determined by the availability and arrangement of food, shelter, water, and living space. When people alter the environment so one of these requirements is missing or reduced, wildlife will decrease or disappear. Hunters and predators can help keep a "balance of nature" by harvesting surplus animals so the remaining animals do not die of starvation, disease, or lack of shelter.

Part of the role of the wildlife manager is to develop and implement plans that will make the best use of land for both man and wildlife. This can involve a number of activities including improvement of existing habitat to make it better for particular animals, possibly coupled with restocking program to reintroduce animals to an area where they have disappeared. In Iowa, destruction of habitat has been the major factor causing animal and plant extinction.

Objective:

By becoming "predators" and competing with each other for food, students will understand the concept of carrying capacity. They also will understand survival of the fittest.

Pre Activity:

- Discuss Background Information and role play the dinner table.
- Discuss the key word: carrying capacity

Equipment:

- 200 objects to use as prey (paper cups with "prey" marking on the bottom of cup)
- "disabling" items (1 blindfold-to simulate a blind "coyote," 2 straps to strap legs of a "coyote" together to simulate broken leg, 1 wrist tie-to simulate a pregnant coyote)
- How Many Can Come to Dinner worksheet
- 1 pencil/pen for each "den of coyotes"
- chalkboard/chalk or overhead/overhead pen

Procedure:

1. **Prior** to the activity, distribute the "prey" randomly over a certain area (can be indoors or outdoors). The 200 "prey" are marked as such:
 - 90 with R for Rabbit
 - 40 with M for Mice
 - 40 with C for Carrion (dead animals)
 - 20 with S for Squirrel
 - 10 with P for Pheasant
2. Create a table on the chalkboard/overhead similar to the How Many Can Come to Dinner worksheet for logging the number of each den's prey collected.
3. Inform students they will become predators - coyotes - hunting down prey. Discuss how coyotes only collect one prey at a time and that each student is to WALK into the habitat to get their prey (coyotes don't run down prey, they stalk it). When a coyote finds a prey item, he/she picks it up and deposits it back at his/her den. The student continues "hunting," picking up one prey item per trip into the habitat, until all the prey has been retrieved from the area.
4. Choose some students and assign disabilities to them. For example, one coyote tackled a big buck and has a broken bone and must hunt on one leg (hand the strap to the student and help him strap his legs together, yet still be able to walk, once at the habitat site). Another coyote is blind as a result of an injury (hand the blindfold to that student) - assign someone from the blind coyote's den to accompany them to prevent injury. A third student is a female coyote that is pregnant with 2 pups/or already has 2 pups.
5. Take students, as a group, to the "hunting" sight and explain the habitat boundaries and den locations (where their den areas are) where they will bring their prey back to. Put coyotes in their dens to familiarize them with their area and to prepare them for the hunt.
6. After the hunt, have the students collect all the prey they caught and return to the classroom for discussion.
7. Hand out 1 How Many Can Come to Dinner worksheet to each den and have students count their prey, separating them by the letters at the bottom of the cups (put all R's together, all P's together, etc.). Discuss that each type of prey has a different weight associated with it (each Rabbit is worth 3 pounds, etc.).

Rabbit = 3 lbs Mice = 1 ounce Carrion = 2 lbs Squirrel = 2 lbs Pheasant = 3 lbs

8. Have students tally up the R's first and complete the first row of the worksheet. Have each den report their numbers to you so you can log them on the table you prepared beforehand. Once all numbers for each type of prey have been logged and discussed, inform students that each coyote needs to obtain 45 pounds of food to live for about a month. Inform the den who had the pups that and each pup needs 15 (fifteen) pounds of food to live for a month and they would need to add 30 pounds of food to the total they needed to get ($45\#s \times \# \text{ in den} + 30\#s = \text{total pounds needed}$).

9. Start with den 1 and have them stand. Add that den's total amount of prey pounds and divide by their number of coyotes. (Option: you may have a volunteer from each group go to the board to do the calculations.) Ask how many of the coyotes survived and have the coyotes that were not likely to survive from each den (injured, blind, pups) to sit down first, then any others. Do this for each den - leaving the survivors standing.

10. After all dens are logged, ask the students to look around and tell you what the carrying capacity was in the habitat they were just in, in other words, how many coyotes survived on the available food in the habitat. Have all students sit down and review the following:

- Is there enough food for all in the den?
- If not, how many coyotes can live in this area? What will happen in the case of too many coyotes? (starvation, disease, move to another area, etc.)
- How did the coyote with the broken leg do?
The blind coyote - would he, in nature, have another "coyote" helping him around?
The coyote with pups? If the mother catches less food than is needed, who will eat first? (the adult).
- Review what is meant by carrying capacity.
- Wrap up with the idea that any piece of land -- no matter how good -- can only support so many animals. Ask for questions from the students.

If you are teaching this activity to another group after this one, allow time for the students to distribute the prey back into the habitat area.

Post Activity:

- Revisit carrying capacity. Have students/or you prepare "dinner" for guest...could just be crackers.) Decide how many could come to dinner. Demonstrate the carrying capacity theory: let students eat, invite a friend each...then invite another friend and so on. What begins to happen to your serving? A cracker is just a snack, what if this was your meal for the day? How would you react? What would happen to you and/or your friends? What happens to the habitat? Other habitats in the surrounding area?

Post Discussion:

- Again revisit results of Springbrook activity and the results of the post activity. What are some solutions (changing the habitat, hunting, relocation of animals)
- What are pros and cons of the above solutions?
- Why is the balance so important? They are just animals and just a park? How does all of this affect us and you?
- What is being done by scientists to help maintain this balance in nature?
- How do environmental laws affect the balance? (Hunting and fishing licenses, hunting tags, no hunting, fish size)
- What have wildlife managers done in the past that has not worked? How does science progress and find better solutions to our environmental problems?

worksheet:

HOW MANY CAN COME TO DINNER?

PREY	HOW MANY	<i>times</i>	WEIGHT	<i>equals</i>	TOTAL POUNDS
R (Rabbits)		x	3 pounds	=	
M (Mice)		x	1 ounce	=	
C (Carrion)		x	2 pounds	=	
S (Squirrels)		x	2 pounds	=	
P (Pheasants)		x	3 pounds	=	
TOTAL PREY POUNDS				→	

One coyote needs 45 pounds of food per month. Did all coyotes in your "den" survive?

of coyotes in your den _____ x 45 pounds = _____ pounds of food needed to survive