# EAT OR BE EATEN

**In the desert grasslands of southern Arizona, life-and-death struggles happen every day.**

Carl and Jane Bock are scientists who have studied the Sonoita grasslands for more than 20 years. They were interested in learning about the trials that living things face in this dry, southeastern Arizona area. One of their areas of study was predator-prey relationships, especially among coyotes and rodents such as rats and mice. First, the Bocks learned all they could about coyotes, in both legend and science. They observed coyotes and rodents in the wild. Then they conducted experiments to learn more about how predators and their prey interact.

## Before You Read

**THINK ABOUT IT** Every ecosystem is a study in survival. Animals must constantly look for food and avoid being food for something else. Plants (producers) make food by photosynthesis. Plant-eaters (herbivores) eat plants. Meat-eaters (carnivores) eat herbivores. Carnivores are also called predators, and the animals they eat are their prey.

Any series of eating relationships is called a food chain. Grass → mouse → snake → hawk is an example of a food chain. The arrows point from the organism being eaten to the organism doing the eating. In nature, many food chains usually overlap to create a food web.

Think of the wild organisms in your area. Who eats what? What would happen to the prey if its predators were removed?

**DRAW A FOOD CHAIN** Show the feeding relationships between some wild organisms that live in your area. Label the producers, herbivores, and carnivores. Then label the predators and prey.



## Read

**Here is what the Bocks observed about how coyotes and rodents interact.**

### The View from Bald Hill

Few animals provoke such strong and varied opinions as coyotes. They are "ruthless" if they kill livestock and they are "useful" if they kill mice and jackrabbits that otherwise might "overrun the range."

Coyotes, of course, are neither ruthless or useful. They just are, and at the Research Ranch they were welcomed as part of the natural scene. We found dens...where coyotes raised their pups, some surprisingly close to roads and houses. Coyotes hunt the mesas and washes at dawn and at dusk, mostly alone but sometimes in pairs. They watched us as intently as we watched them and usually did not run unless we got too close.

When we examined coyote scat, we found the digested remains of desert cottontails, black-tailed jackrabbits, rock squirrels, pocket mice, woodrats, harvest mice, cotton rats, white-tailed deer, mule deer, pronghorn, peccaries, cattle, grasshoppers, beetles, moths, spiders, sparrows, lizards, grass, acorns, juniper seeds, cactus fruits, and mesquite beans.

**ruthless:** without mercy
**mesa:** flat-topped elevation of land
**wash:** often dry bed of a creek or small river
**scat:** animal droppings, feces

From: Bock, Carl E., and Jane H. Bock. *The View from Bald Hill: Thirty Years in an Arizona Grassland.* University of California Press.

NOTE ZONE

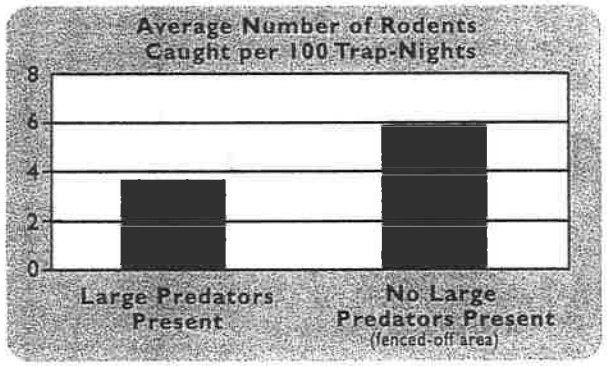
Circle the producers ar
underline the
prey.

**FORM A HYPOTHESIS** The Bocks counted and recorded the number of rodents in an area of the Research Ranch for three years. Then they asked, "What would happen to the number of rodents if coyotes were eliminated from one area of the Research Ranch?" After asking the question, they formed a hypothesis—a prediction that can be tested.

► ***Form your own hypothesis to answer the question. Use an "if / then" sentence: IF something happens, THEN something else will happen.***

The Bocks hypothesized that if they eliminated coyotes and other predators from one area, then the number of prey animals in that area would increase. The Bocks carried out experiments to test their hypothesis. In one such experiment in 1989, they counted and recorded the number of rodents trapped in two areas of the Research Ranch. One area was open to predators. The other area was fenced off so that large predators could not eat any of the rodents, but the rodents could enter and exit the fenced-off area.

The Bocks set out thousands of traps during the year. Each trap set out overnight was called one "trap-night." They recorded the number of rodents that were trapped, then calculated the average number caught per 100 trap-nights. The following graph shows their results.




**ANALYZE THE DATA**

► ***Examine the results shown on the graph. Do the data support your hypothesis? Explain your answer using the data.***

**WHAT DO YOU THINK?** Based on the Bocks' results, what conclusion could they draw about coyotes and rodents in the Research Ranch ecosystem?

► ***What could be the reasons for the difference in the number of rodents in the fenced and unfenced areas? Try to think of as many reasons as you can.***

**IDENTIFY VARIABLES**

► ***What factors other than predators would affect how many rodents are in the area? (Hint: What do rodents need to survive?)***

**DO RESEARCH** Form groups in your class and choose an animal from the list below. Then do research to find out if any local or state agencies have plans to eliminate or control that animal. Based on what you've read about coyotes and rodents, describe the effect that killing the animal you chose would have on the ecosystem in which it lives.

| | | | | |
|---|---|---|---|---|
| Raccoons | Rats | Crows | Skunks | Foxes |
| Deer | Opossums | Pigeons | Woodchucks | Mice |
| Alligators | Snakes | Buzzards | Squirrels | |