

Prairie Dog Evidence Sort: Who Gains, Who Loses, and How Do We Know?

Learning target: I can sort evidence about prairie dogs by the population it describes and by how strong it is, and use the strongest evidence to argue how losing a keystone species affects other populations.

Collaborative investigation

About 50 min

Small group

MS-LS2-4 · assesses

MS-LS2-1 · supports

collaboration

discussion

writing

Name _____

Date _____

Period _____

Directions

Work in a group of four. Each person is the expert on three cards: person 1 takes cards 1 to 3, person 2 cards 4 to 6, person 3 cards 7 to 9 and person 4 cards 10 to 12. Read your cards and complete Part A on your own. Then teach your cards to the group and complete Part B together. Part C is individual: everyone writes their own answers. Some cards report real published findings, some give teaching data with invented numbers (marked 'teaching data'), and some are opinions or single observations. Part of your job is to tell them apart.

You will need: This worksheet, one per student, One set of the twelve cards per group, cut apart, Pencil

Black-tailed prairie dogs are ground squirrels that gather in big colonies, called towns, on the grasslands of the Great Plains. Plowing, poisoning and disease have shrunk their range to a small fraction of what it once was. A rancher says prairie dogs ruin grassland. A biologist says many grassland species depend on them, which would make them a **keystone species**. Your group will sort the evidence and decide what it actually shows.

Twelve evidence cards about prairie dogs

1 Card 1: Owl survey (teaching data)

Biologists searched 10 prairie dog colonies and 10 grasslands without prairie dogs, matched for size, soil and grass type. They found burrowing owl nests on 8 of the 10 colonies and on 1 of the 10 grasslands without prairie dogs. (Invented numbers that follow a pattern real surveys have found.)

2 Card 2: What ferrets eat (published fact)

Prairie dogs make up about 90 percent of the black-footed ferret's diet, and ferrets sleep and raise their young in prairie dog burrows. (U.S. Fish and Wildlife Service; National Park Service)

3 Card 3: Ferrets nearly lost (published history)

As prairie dog colonies shrank during the 1900s, black-footed ferrets became so rare that in 1986 and 1987 the last 18 known wild ferrets were captured in Wyoming to start a breeding program. Ferrets raised in captivity have been released at prairie dog colonies since 1991.

4 Card 4: Shrub experiment (published study)

In a desert grassland in Chihuahua, Mexico, scientists removed prairie dogs from some fenced plots and left them in others. After five years, mesquite shrubs were three to five times more abundant where prairie dogs had been removed. Prairie dogs clip shrubs and eat their seedlings. (PLOS ONE, 2016)

5 Card 5: Grazers (published observation)

Prairie dogs clip the grass on their colonies again and again, so the plants keep putting out fresh growth that is more nutritious. Bison and pronghorn often choose to graze on prairie dog colonies. (National Park Service)

6 Card 6: Mountain plovers (published study)

Mountain plovers are ground-nesting birds that need short grass and patches of bare ground. A study in eastern Colorado found many more plovers on prairie dog colonies than on nearby grassland without colonies.

7 Card 7: Plague (published fact)

Sylvatic plague is a bacterial disease that arrived in North America around 1900 and spreads among prairie dogs through flea bites. An outbreak can kill 90 percent or more of the prairie dogs in a colony. (U.S. Geological Survey)

8 Card 8: After an outbreak (teaching data)

Plague killed almost all the prairie dogs in one monitored colony in 2019. Burrowing owl nests on the colony: 12 in 2018, 2 in 2021. With no prairie dogs clipping the plants, taller grass and young shrubs grew over the old burrows. (Invented numbers.)

9 Card 9: A rancher's view (opinion and experience)

'I've run cattle here for thirty years. Prairie dogs eat the grass my cows need, and the pastures with colonies always look worse to me. I'd rather they were gone.'

10 Card 10: Grass amount and quality (teaching data)

In six pastures, researchers clipped and weighed the grass in squares on and off prairie dog colonies in July. Colonies had 40 percent less grass by weight, but each kilogram of colony grass contained more protein. (Invented numbers that follow a pattern real studies report.)

11 Card 11: One sighting (single observation)

A hiker photographed a prairie rattlesnake sliding into a prairie dog burrow on a cool morning and posted the picture online.

12 Card 12: A website claim (no evidence given)

A pest-control company's website says: 'Prairie dogs destroy grasslands and have no value to any other wildlife.'

Part A: Expert round (on your own)

1. Write the numbers of your three cards in the first column. For each card, name the population or resource it is about, whether that population gains or loses when prairie dogs are present, and what kind of evidence it is: a measured comparison or experiment, a measured fact that explains a mechanism, a single observation, or an opinion or unsupported claim.

Population or resource	Gains or loses with prairie dogs?	Kind of evidence
Card ____		
Card ____		
Card ____		

Part B: Group sort

1. Each expert teaches their three cards in under a minute per card: what it says, which population it is about, and what kind of evidence it is.
2. As a group, give every card a strength. **Strong**: a measured comparison of many places, an experiment, or a before-and-after record. **Supporting**: a measured fact that explains how prairie dogs could affect another species but does not compare places. **Weak**: a single observation or a very small sample. **Not evidence**: an opinion or a claim with nothing measured.
3. Record every card in the group table. If the group disagrees about a card's strength, write both views and the reason for each.
4. Answer q2 to q4 together. Every member must be ready to explain one answer to the teacher.

Group evidence record

Card	Population or resource	Gains or loses with prairie dogs	Kind of evidence	Strength
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

Card	Population or resource	Gains or loses with prairie dogs	Kind of evidence	Strength
12				

2. Group answer: Which **two** cards are the strongest evidence that prairie dogs affect another population? For each, explain what makes it strong.

3. Group answer: The rancher (card 9) and the biologist both say they are right. Use card 10 and at least one other card to explain how both could be describing real effects. Then say what the rancher would need to measure to turn the claim into strong evidence.

4. Group answer: Use cards 2, 6, 7 and 8 to write the chain of effects (the cascading change) that follows a plague outbreak in a colony. Include at least four links, written as 'A leads to B because...'.

Part C: On your own

5. Write an argument that answers this question: **Does losing prairie dogs from a grassland affect other populations?** Make a claim, support it with at least three cards (at least one must be a card your group rated strong), and for each card explain the mechanism: what prairie dogs provide or remove that the other population depends on.

6. Choose card 11 or card 12. Explain why it is weak or not evidence at all, and describe what someone would have to measure to test the idea it raises.

7. Card 1 compares places that already exist; card 4 is an experiment in which scientists removed prairie dogs on purpose. Explain why the experiment gives stronger evidence that prairie dogs **cause** a difference.

A quick test for each card

Ask three questions of every card. Was something measured or counted? If not, it is an opinion or claim. Were places with and without prairie dogs compared, or was one place followed before and after a change, or did scientists change something on purpose? If yes, it is a comparison or experiment. Is it one sighting or one place? Then it is weak by itself. For the cascade in q4, start with 'Plague kills most prairie dogs' and follow each resource they provided: prey, burrows, short grass.

Keystone or just common?

Some ecologists argue that a species should be called a keystone only if its effect on the community is large compared with how much of the community it makes up. Prairie dogs are very abundant where they live, so a critic might say they are simply a dominant species, not a keystone. Using the cards, write a paragraph taking a side. Then compare prairie dogs with sea otters in kelp forests: which case fits the keystone idea more clearly, and why?