

Links in the Chain of Life



Summary:

Examine the interconnectedness of the species in an ecosystem.

Objectives:

Completing this activity will allow students to:

- Understand each component of an ecosystem has a role and how the roles are connected.
- Predict the consequences of losing a species integral to the ecosystem.

Grade Level: 6-12

Subject Areas:

science and language arts

Materials Needed:

- pens and paper
- research materials

Time to Complete:

One or more class periods plus research time.

Background

Members of an ecosystem are often interconnected in complex ways: The actions of one species may impact numerous other species. Looking at the role of the prairie dog in its ecosystem provides a perfect example of how one creature affects many others. *What would happen if there were no more prairie dogs?* This is a question you can pose to your students after they have investigated the role of the prairie dog in its plains ecosystem.

Prairie Dogs: Important Members of a Plains Community

Prairie dogs are rodents that live in the western plains of the U.S. They were named for their barking call, which the dogs yip out to warn others in their colony of predators or other danger. Prairie dogs live in large groups in prairie dog towns—vast networks of underground tunnels and burrows. The burrows are not only home to the dogs, but they also shelter snakes, insects, spiders, amphibians, small rodents and rabbits. Prairie dog towns are also home to burrowing owls, whose numbers are declining in many places (mostly due to habitat loss) and to black-footed ferrets, which are highly endangered. Black-footed ferrets, like hawks, foxes and other predators, depend on prairie dogs for food. But other animals and plants benefit from prairie dogs in less obvious ways.

Prairie dogs eat grass, which they clip low to the ground. This enables them to see far around their town and keep an eye on intruders. Birds such as mountain plovers are drawn to the openness of the prairie dog towns. Even though the grass is shorter, the constant clipping raises the nutrition in the new shoots, and species such as bison and pronghorn seem to prefer grazing on dog towns. Even the dogs' habit of tunneling serves an important function. All that digging mixes the prairie soil, and the dogs' manure helps to enrich it, which leads to healthy prairie grasses.

It was the systematic extermination of prairie dogs that drove the black-footed ferret to near extinction. Farmers and ranchers often see the prairie dogs as pests that compete with their cattle for grazing land. Private landowners and federal agents poisoned prairie dogs in droves. But wiping out prairie dog towns also wiped out black-footed ferrets. In 1987, the last few known ferrets were captured by scientists in an attempt to save the species. Luckily the ferrets bred well in captivity, and since 1991 as many as 600 captive-bred ferrets have been released in Arizona, Montana, South Dakota and Wyoming. Scientists are pleased with the released ferrets' success, but they know that the ferrets' survival depends on the prairie dogs, whose numbers have dropped precipitously.

In addition to being shot and poisoned, prairie dogs have lost as much as 98 percent of their habitat, mostly to farming and grazing. Others have died from disease. Where there used to be more than 600 million prairie dogs, there may now be only 2 million. Only one of

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the five species of prairie dogs in the U.S. is listed as threatened—the Utah prairie dog. Conservation groups, including the National Wildlife Federation, have asked that the remaining four species of prairie dogs be listed as threatened.

Procedure

1. Form teams of two or three students and assign each team a species from the list below. Explain that each team's job is to report on their species' role in the plains ecosystem. They should provide a brief description of the species and its characteristics, explore the species' relation to others in the ecosystem and find out the status of the species (whether it is in decline, endangered, etc.). *Does the species have a connection with the prairie dog?*

Species found in or near a prairie dog town:

- badger
- bison
- black-footed ferret
- black-tailed prairie dog
- black widow spider
- burrowing owl
- coyote
- ferruginous hawk
- mountain plover
- prairie grasses
- pronghorn

- rabbit
 - rattlesnake
 - swift fox and more...
2. Each team should present its report to the class. Once everyone has finished, initiate a discussion about the interconnectedness of the species in the ecosystem. *Which species do they believe would cause the most disruption should it vanish? How might the disappearance of prairie dogs affect the ecosystem?*
 3. List species besides prairie dogs that are also in decline (black-footed ferret, burrowing owl, ferruginous hawk, mountain plover, and swift fox) . Ask students what might happen to these and other species in the ecosystem if prairie dogs were to become extinct.
 4. Extend this lesson by asking students to come up with plans to help save prairie dogs. *How would they educate people about the importance of prairie dogs? How might they address the concerns of ranchers? What other issues would they address and how? Should other species besides the Utah prairie dog be listed as threatened with extinction?*

Modifications and Adaptations

Explore the process of listing a species under the Endangered Species Act. Take the case of a real or imagined species and write a report outlining the steps required to get the species listed.