



Sage Grouse:

Adaptations & Habitat

Learner Objectives

Students will:

- Understand habitat and adaptations of Sage Grouse and discuss the importance of habitat for species survival
- Students will be able to define habitat
- Students will be able to identify 3 adaptations of Sage Grouse
- Students will learn the basics of how to use a field guide

Getting Ready!

- Read over background information
- Set up and outdoor field or indoor classroom with space to play the game

Grade Level

Third to Fifth

Subject Areas

- Habitat
- Adaptations

Content Standards

Duration

- 45 to 90 minutes

Vocabulary

- Habitat
- Adaptations

Materials

- Paper and colored pencils, markers, or crayons
- Sage Grouse Mount
- Chips
- Snowshoe (or picture)
- Camouflage jacket
- Filter

Background Information

A habitat is the arrangement of food, water, shelter, and space suitable for the needs of a plant or animal to survive. Different habitats support different communities of flora and fauna. Sagebrush grasslands are a unique and important habitat found in the Klamath Basin and can be seen at the Clear Lake National Wildlife Refuge. Sagebrush grasslands are found in arid environments with dry flats and plains, rolling hills, and rocky slopes. This habitat is found throughout eastern Oregon and northeastern California, east of the Cascade Mountains and Sierra Nevada extending throughout the Great Basin bioregion. Dominant plant species of sagebrush grasslands include big sagebrush, low sagebrush, bitterbrush, and western juniper and a diversity of native grasses including bluebunch wheatgrass, Idaho fescue, needle-and-thread grass, and bottlebrush squirreltail grass. Sagebrush grasslands are also called shrub-steppe or sagebrush steppe.

While sagebrush grasslands support fewer species than many other habitat types, approximately 100 bird and 70 mammal species, there are several species that are considered sagebrush obligates. These obligate species are restricted to sagebrush habitats during the breeding season or year round (Paige and Ritter 1999) and do not occur in any other habitat types in Oregon or California. Obligate species include: Sage Sparrow, Sage Thrasher, Brewer's Sparrow, Sage Grouse, pronghorn antelope, pygmy rabbit, sagebrush vole, and sagebrush lizard. Due to these obligate species' specific habitat requirements, it is very important that healthy intact sagebrush grassland habitats are maintained and managed.

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Throughout their range, many Sage Grouse populations are in decline, primarily due to loss of intact sagebrush grassland habitat. Sage Grouse are habitat obligates and permanent residents making them vulnerable to changes in habitat composition, degradation, and loss. These birds rely on sagebrush as a primary source of food and for nesting sites. While Sage Grouse eat mainly sagebrush, they will also feed on other plants and insects if they are available, however they lack a muscular crop and cannot digest hard seeds. Sage Grouse do have a special adaptation to filter the toxins and tar out of sagebrush by regurgitating tar balls. If you are out in Sage Grouse habitat in the spring, you will discover these tar balls scattered on the ground.

Sage Grouse are notable for their elaborate courtship rituals. Each spring males congregate in leks and perform “strutting displays.” Groups of females observe these displays and select the most attractive males to mate with. The dominant male will locate himself in the center of the lek and he typically copulates with around 80% of the females on the lek grounds. Males perform in leks for several hours in the early morning and evening during the spring months. Leks generally occur in open areas adjacent to dense sagebrush stands. Often the same lekking ground is used by grouse for decades making it important to conserve these areas.

Historically, wildfire was an important disturbance in the Basin and Range bioregion maintaining healthy sagebrush grassland habitats. Fires that burned every 20 to 25 years in wetter areas and 60 to 110 years in more arid sagebrush grasslands (Paige and Ritter 1999) recycled nutrients back into the soil. These naturally occurring fires enhanced the flowering, sprouting, and reproduction of wildfire adapted plant species. Wildfire also restricted the growth of junipers to areas where wildfire could not spread, such as rocky outcrops, maintaining large expanses of sagebrush and native grasslands. However, beginning in the early 20th Century land managers suppressed wildfires to protect rangelands. As a result, sagebrush grassland habitat became encroached by western junipers and the diversity of native grasses decreased. Wildlife managers are working to restore sagebrush grasslands and reintroduce Sage Grouse to the Klamath Basin and Clear Lake National Wildlife Refuge. Land managers can then use the presence of Sage Grouse as an indicator for the health of the sagebrush grasslands they are working to restore.

Discuss!

1. Ask students if they know what makes a habitat. *A habitat is an area where an animal, plant, or other type of organism lives. What are the four parts that make up a habitat? Habitats provide food, water, shelter, and space.*
2. Have students draw what their human habitat looks like. What would you include? Encourage students to include food, water, and shelter. Ask students how much space they need. *What if their kitchen was 10 miles from their bathroom, is that ideal habitat?*
3. Have students pick one animal and draw its habitat. Make sure that students include food, water, shelter, and space for the animal. *What are the similarities between their human*

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and animal habitat?

4. If time allows, have a few students share and discuss their two habitat drawings.
5. Discuss with students why sagebrush habitats unique and why they are important.
 - a. *Sagebrush habitats are found in cool arid climates across the Intermountain West and Great Basin bioregions. Most of the annual precipitation comes from snow pack in the winter. Dominant plant species of sagebrush grasslands include big sagebrush, low sagebrush, bitterbrush, and western juniper and a diversity of native grasses including bluebunch wheatgrass, Idaho fescue, needle-and-thread grass, and bottlebrush squirreltail grass.*
 - i. *Without Sagebrush habitat we don't just lose Sage Grouse we lose all kinds of different plants and animals that need that habitat to live – butterflies, deer, pronghorn antelope and much, much more!*
 - b. *Sagebrush is an important habitat in the Klamath Basin and we need to protect it to maintain species diversity.*
 - c. *Land managers are working to restore sagebrush habitats by thinning (reducing) the number of western junipers and other trees that have encroached into sagebrush grasslands. These trees out compete sagebrush, reducing food availability for sagebrush obligate species. Further more western junipers provide habitat for Common Ravens and jays that are nest predators of many sagebrush obligate bird species.*
6. Ask students if they know what a habitat obligate species is, define, and give examples of sagebrush habitat obligates. *Sage Grouse, pronghorn antelope, pygmy rabbit, Sage Thrasher, etc.*
7. Share information on Sage Grouse biology and what they need in their sagebrush habitats. *Sagebrush is an important source of food, especially in the winter, and provides shelter for Sage Grouse young. In the spring, Sage Grouse congregate in leks where males will compete for females by putting on strutting displays and fighting with other males. Sage Grouse have evolved to live in open sagebrush grasslands, with few trees, and diverse native grasses which support insect populations, another important source of food for grouse.*
8. Define Adaptations: *an alteration or adjustment in structure or habits by which a species or individual improves its conditions in relation to its environment Something a plant or animal has that helps it survive.*
 - a. Discuss adaptations of birds: *hollow bones, beaks, feathers, crop, gizzard*
 - b. Discuss adaptations of Sage-Grouse:
 - i. *Camouflage – can blend in during winter as well by hiding by rocks (**Sage Grouse Mount**)*
 - ii. *Feathered Feet – can walk easily over snow and stay warm (**snowshoe**)*
 - iii. *Food – can live 100% off of Sagebrush in the winter time (**chips**)*
 - iv. *Have the ability to store the bad parts of the plant and regurgitate it (**filter**)*

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- v. *Mating Display – Have air sacs that puff out and feathers that make them look big and they strut around for the females to attract them (Sage Grouse Mount)*

Investigate!

1. Tell students that we will be playing a game to demonstrate how animal populations, in this case Sage Grouse, dependent on their habitat.
2. Split class into two teams, one team will represent the Sage Grouse and the other the habitat (food, water, and shelter). The Sage Grouse need to find either food, water, or shelter to survive. For this activity we will assume that there is enough space for the Sage Grouse population.
3. Show both teams the symbols for each habitat component. Food is represented by placing students' hands over their stomachs. Water is represented by placing students' hands over their mouths. And shelter is represented by placing their hands over their heads.
4. Each team should line up on opposite sides of the classroom or field with their backs to one another.
5. Have the Sage Grouse Team decide what habitat component they need and the Habitat Team decide what habitat component they represent.
6. Ask students to turn around so they can see each other and the habitat components they need/have. The Sage Grouse Team should run (or walk) over to the Habitat Team and find one classmate who has the same habitat component as them. For example, if a Sage Grouse needs shelter, that student needs to find a Habitat Team member who is showing the sign for shelter.
7. Once the Sage Grouse has matched with someone on the Habitat Team, both students should walk over to the Sage Grouse Team's side of the classroom or field.
8. If a Sage Grouse Team member finds and brings back the match from the Habitat Team, it means that that Sage Grouse was successfully able to raise one offspring. The Habitat Team member now becomes a Sage Grouse.
9. If the Sage Grouse does not match with a member of the Habitat Team, they die and join the Habitat Team.
10. After each round, you can graph the population size of the Sage Grouse. A round would represent a year, and the number of students on the Sage Grouse Team, the population size.
11. Let students complete a couple of rounds on their own, and then discuss the changes they see in the population. Now introduce the encroachment of western juniper to the habitat. Select a few students to be western juniper, these students will keep their backs turned to show that they are not suitable habitat. After one or two rounds, add a few more western junipers and introduce one or two nest predators. These students can tag one Sage Grouse Team member per round. Slowly add western junipers and predators for a few rounds. Until the population goes extinct or comes very close to extinction.
12. Discuss with students the effects that western junipers and nest predators had on the population. Now share with students that land managers and biologists are working to

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reduce the numbers of western junipers from sagebrush habitats and are trying to reintroduce Sage Grouse back to the Klamath Basin in places like Clear Lake National Wildlife Refuge. Add one or two students back to the Sage Grouse Team and slowly remove western junipers and nest predators. Does the population come back? How long does it take?

13. At the conclusion of the activity, discuss with students what was realistic and unrealistic about the game. Be sure to ask students to summarize some of the things they learned from the activity.

Resources and Citations

Council for Environmental Education. 2006. *Project Wild: K-12 Curriculum & Activity Guide*.

Paige, C., and S. A. Ritter. 1999. Birds in a sagebrush sea: managing sagebrush habitats for bird communities. Partners in Flight Western Working Group, Boise, ID.