

Section 5: Home on the Range—Wildlife and Livestock

Learning Objectives:

- Identify and describe the four essential components of habitats: food, water, cover, and space.
- Describe factors that limit habitat
- Recognize that rangeland plants are a renewable resource
- Analyze the effect of different types of forage on different grazing animals.

Idaho General Education Performance Standards

- LS2-5-3, LS2-4-4, LS2-MS-2, LS2-MS-5, LS2-MS-3, LS2-MS-1

What is Habitat?

Time: 20-25 minutes

Supplies: Habitat worksheet for each student.

Introduction:

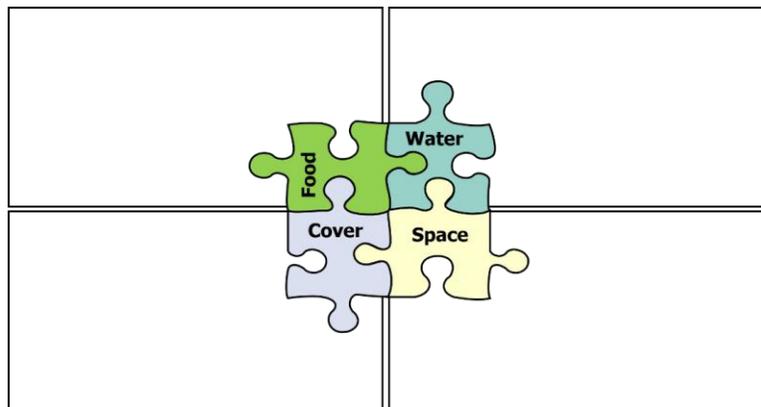
Rangelands (both private and public) provide essential **habitat** for livestock and wildlife. Their rich ecological diversity provides food, cover, and rearing-ground necessary for countless mammals, birds, amphibians, reptiles, fishes, and insects. A great majority (84%) of mammals found in North America spend at least a portion of their life in rangeland ecosystems. Large hoofed animals, called ungulates, are perhaps the most iconic rangeland animals. Wild grazing animals such as elk, pronghorn, and deer, as well as livestock species including cattle, sheep, goats, and horses, all inhabit rangeland landscapes. Other mammals commonly found on rangelands include rodents and rabbits.

A variety of birds make their home on the range, either seasonally or year-round. Large game birds such as grouse, pheasants, and chukars call rangelands home. Migratory songbirds including meadowlarks, buntings, sparrows, and doves fill the grasslands, shrublands, and woodlands with color and song. Raptors such as hawks and falcons can often be found in the rangeland skies. Some birds are so attached to rangelands that vegetation types are in their name: prairie falcon, meadow lark, sage thrasher, and scrub jay.

All wildlife and livestock require four basic habitat elements in order to survive, thrive and reproduce: food, water, cover, and space. The specific combination of food, water, cover, and space required by a given species, called its niche, is unique to every species that lives on rangelands. Because of these specific and varied requirements, any time the habitat is altered, it is improved for some species but made worse for others.

Do:

- Describe the components of a habitat. Explain why each component is essential, just like each piece of a puzzle is essential.



- **Food:** requirements for all animals, including those on rangelands, include energy, nutrients, and minerals. Energy in plants comes from starches, sugars, fats, and cellulose. Nutrients include protein and vitamins. Mineral requirements include phosphorus and potassium. The types of vegetation on the land, the diet preferences of animals, and the arrangement of available food plants must be assessed to determine the food or forage value of rangeland habitat.
- **Water:** requirements vary depending on the animal species and weather conditions. In general, sheep and goats require 1-1½ gallons of water once every two days; donkeys require 3-4 gallons of water every day; horses require 5-8 gallons of water each day; and cattle and bison require 8-10 gallons of water every day or two. Wildlife, such as whitetails need about ½-¾ a gallon of water per day per 100 pounds of body. Black bears need large amounts of water to process the large amounts of food consumed and rid the body of waste; daily urine volumes for one bear averages 1-2 gallons! Rangeland animals meet their water requirement by drinking fresh water and obtaining water from forage. Green plants can contain significant amounts of water. For example, immature grasses may be up to 75% water by weight. If an animal eats 28 pounds of immature forage, it will consume about 2.5 gallons of water.
- **Cover:** is required for shelter from weather conditions and from predators. Thermal protection is provided by plants when animals are shaded in the summer and sheltered from cold in the winter. Thermal cover for rangeland animals is provided mostly by trees and shrubs. Plants can also offer hiding cover for animals to protect them from predators. Many animals use large plants to hide under or to gain protection through visual obstruction. However, other animals, like pronghorn and prairie dogs, gain protection from predators by a lack of visual obstruction. These animals prefer to be out in the open where they can see predators coming and escape by running away or retreating underground.
- **Space:** is an important consideration for breeding and nesting, home range, and disease transmission. An animal's home range is the area in which an individual animal conducts its normal daily and yearly activities. This area can be shared with members of its own species, or with other species. The home range of an animal is directly related to its body weight: larger animals generally have a larger home range. Home ranges also vary by foraging habits: carnivores have very large home ranges, while the home ranges of herbivores are comparatively smaller.

Reflect/Apply:

Location and size of home ranges and habitats are set by **limiting factors** such as water, food, climate, and topography. These factors are basic requirements that restrict the size, growth, and/or vigor of an animal population.

- Rangeland habitats can be influenced by human activities that either add or remove limiting factors.

Have students brainstorm ideas of how they can positively or negatively influence habitat.

- For example, when ranchers add water tanks to pastures, they may remove a habitat-limiting factor (i.e., access to water) for wild and domestic animals. On the other hand, building roads and housing subdivisions may create factors that limit access to food and cover. However, habitat modification does not always affect a wildlife species' ability to survive, thrive, and reproduce.

What's for Dinner?

(Modified from "Please Pass the Wheatgrass")

Time: 20-25 minutes

Supplies:

- Pie pan, wrapped candy (one student has a strong preference for, and one that may not automatically select). You will need approximately equal numbers of candy so each student could choose either type.
- Kidney beans, black beans, lima beans, cookie sheet.

Background:

In natural ecosystems, each animal species occupies its own niche, **which enables the animals to share the same habitat**. Some niches overlap, leading to competition between animals. Most animals, however, have food or other habitat preferences slightly different than those naturally occurring in the same area. Domestic animals (sheep, cattle, horses, goats) likewise have preferences depending on their species. Some strongly prefer grass, forbs (weeds and flowers), or the leafy parts of shrubs.

Depending on which animals live in a particular area, which types of forage grow there, the amount of precipitation, and numerous other conditions as well, the amount of food available may grow quickly or slowly. In attempting to manage the land for a variety of animals, land managers must monitor the forage and water as well as the number and types of animals present. Adjustments must be made so that the animals do not suffer and the rangelands don't deteriorate.

Directions:

1. Pass around a pie pan with an approximately equal number of wrapped candies likely to elicit a strong preference toward one type. *Count out enough candies that each student could choose either type and place them on the pie plate.*
2. Instruct students to take one candy as the pan is passed by, tell students to remember which type they take, and let them eat their candy. While eating their candy, answer the following questions:
 - What are **renewable resources**?
 - Are rangeland plants a renewable resource? *(Yes, if managed carefully, plants will continue to grow back (just like your lawn!). What do rangeland plants (any plants) need to grow? Sunlight, water, soil nutrients.*
3. Review how to identify forbs, grasses, and shrubs (see Section 3: Rangeland Plants). Ask students the following questions (if necessary).
 - If a plant has a hollow stem, what would it be? *Grass*
 - If a plant had a pretty flower and non-woody stems, it would be? *Forb*
 - If a plant has long leaves with parallel veins, what would it be? *Grass*
 - If a plant is woody with leaves that may be eaten by livestock and wildlife, what would it be? *Shrub*
4. In this activity, beans represent grasses, forbs, shrubs (*may consider writing what each bean represents in a prominent location for reference*),
 - Kidney beans (red) are grasses
 - Black beans are forbs
 - Lima beans (white) are shrubs

5. Show the students the candies remaining in the pie plate—comment, “I see that you like _____ most”. Just like the candies, different rangeland animals prefer certain types of plants to eat. Write in a prominent location the food preference of each type of animals.

- **Cattle** prefer grasses
- **Elk** have a similar diet to cattle
- **Horses** may consume slightly less grass and more forbs and shrubs than cattle
- **Deer** tend to prefer forbs and shrubs
- **Goats** also prefer forbs and shrubs
- **Sheep** (domestic or wild) tend to select shrubs in the winter, forbs in the spring, and grasses in the summer.

6. Assign each student to one of these animals (e.g., 2 cow, 1 deer, 2 sheep, etc.). Have students stand around the cookie sheet with the beans in the middle.

7. All the animals are now on the range. The members of each animal type now goes to the feeding area—one at a time. The first animal will take one bean at a time—choosing their preferred type of food. This process continues until the supply of one type of food is exhausted. Stop and note which type of food is gone first. You can continue until animals are no longer able to find any food, or stop for discussion.



Reflect:

- What do you think animals are likely to do if their preferred food supply runs out in a single growing season? (*Animals could eat something else, move to another part of the range, or go hungry and die.*)
- What would happen if the number of horses in the area doubled? (*The amount of food in the area—particularly their favorite foods, such as grasses and shrubs—would decline more rapidly.*)
- How would this affect the food supply of cattle and elk? (*Their food supply would decline as well*)
- How might the situation change if the dominant form of wildlife in the area was deer, which tend to eat more forbs and shrubs? (*The supply of grass for horses and cattle would last longer*)
- What other factors might alter the situation? (*Many answers are possible, including drought, fire, and a prolonged winter*)

Remind students that this situation showed what would happen in a single summer. Show them that the next growing season would produce... a second tray of beans! You could repeat the activity with different ratios of plants (beans) of different numbers of each type of animal.

Ice Cream Plants and Animal Skull Discovery

Time: 20-25 minutes

Supplies:

- At least 3 pieces of wrapped candy for each student.
- Skulls or skull pictures
- Skulls worksheet

Background:

Who likes ice cream? What kinds of ice cream do you like? Are there flavors that you don't like?

Animals are the same way. Cows will eat plants that deer won't and that's why they can coexist on the range. They eat different plants, so they don't always compete.

Directions:

1. Tell students that they are NOT to eat the candy; they are going to do an activity first.
2. Hand each student at least 3 pieces of candy (1 from each flavor)
3. Have the students split the candy into 2 different groups.
 - Group 1: their **favorite** flavor.
 - Group 2: the candies that they **like the least**.
4. Plants that the animals like are what we are going to call ice cream plants—because it is their favorite. These plants are the tastiest for some animals just like ice cream is tasty to us. Plants they don't like as much are going to be called celery plants.
5. Explain to students that land managers use different grazing management systems (you will learn more about grazing systems in Section 7) so that the ice cream plants will have time to grow back and reseed so that there will always be enough ice cream plants.
 - For example: one grazing system you will learn more about is the “Rest Rotation” grazing system. This rotation allows one pasture to rest (i.e., no grazing) for one whole year allowing the plant to grow and reseed. This is great for ice cream plants.
 - Another example: “Continuous” grazing system. This is a good strategy when you have a lot of celery plants. It forces the animals to eat plants that are good for them (at least during part of the season) but is not their favorite. Continuous grazing is used on cheatgrass monocultures (dominated by one species) for example. Cheatgrass in the spring has high protein (nutritious) so with continuous grazing, we can reduce the amount of cheatgrass which may lower wildfire risk in the summer (learn more in Section 6).

Animal Skull Discovery:

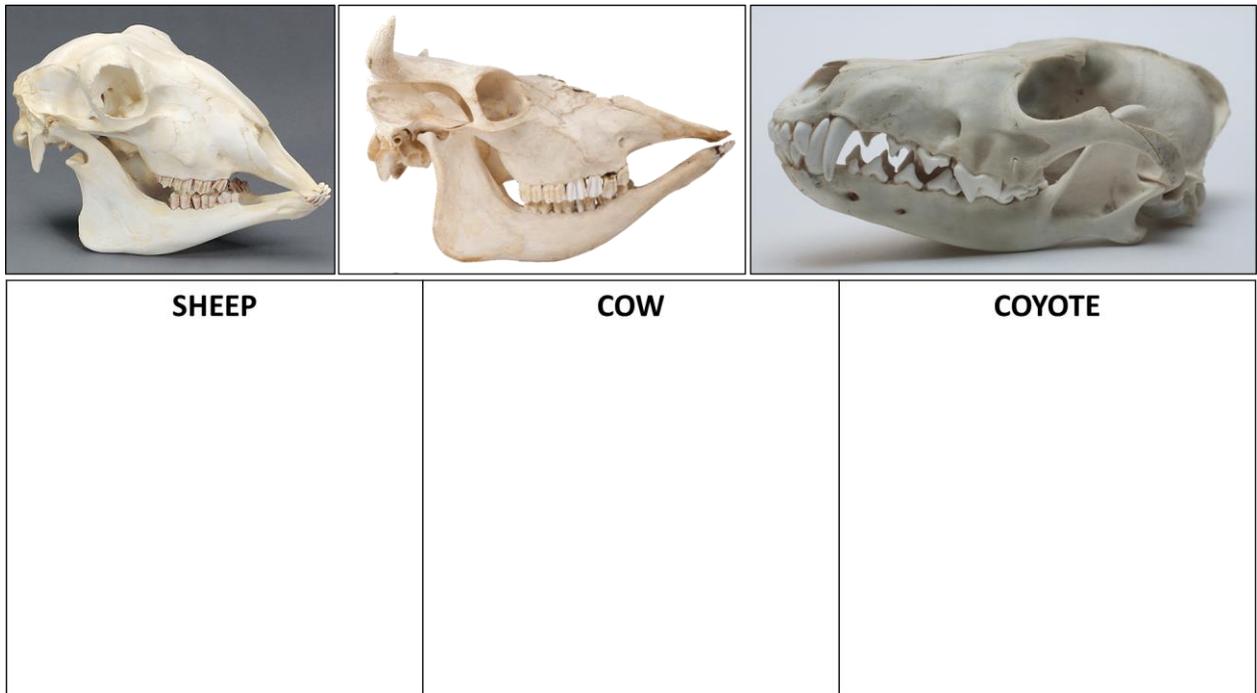
Do:

Show the various skulls pictures and lead the following discussion:

- Discuss how **sheep** graze. Show students the sheep skull (*pictures will work*)—note that sheep teeth influence what they eat.
 - The split lip allows sheep to pick the preferred leaves off of the plant.

- The bottom front incisors are sharp like knives, and the back teeth grind the plants.
- **Cattle** have similar teeth to sheep, but cattle chew their cud several times. How does that affect what they eat?
- The next skull is a **predator**.
 - What are predators? What are prey? Can an animal be both a predator and prey?
 - A predator is an organism that eats another organism; Prey is the organism that predators eat.
 - Top predators, like cougars and bears, are only predators. Most other wildlife species (carnivores) can be both.
 - *In this exercise, predators are carnivores, prey are herbivores (it should be noted that carnivores can eat carnivores as well, but for today's activity that is not the case).*

Have students compare the skulls. What is similar, what is different?



Reflect:

- Why do predators have sharp teeth?
- Why does the coyote have more teeth than the sheep?
- How does the shape of the animals teeth affect the type of food it eats.

Explain to students the importance of both predator and prey in the environment. Without both, the ecosystem would be unbalanced.

Remind students that each animal species occupies its own niche (as learned in the last few sections), which enables the animals to share the same habitat.

How much food do Animals Eat?

Time: 10-15 minutes

Supplies: Forage Demand of Animals worksheet for each student.

Introduction:

Different types of animals require different amounts of food each day. As a general rule, **ruminants** like bison, deer, cattle, and sheep will eat about 2.5% of their body weight per day (in dry weight of forage); **hind-gut fermenters** such as horses and rabbits will eat about 3.0% of their body weight each day; and **concentrate selectors** such as birds, bears, and mice will eat about 0.25% of their body weight daily.

Do:

- Fill in the Blank: Forage Demand of Animals.
- Calculate how much forage a 800 pound cow eats each day.
- Calculate how much forage a 1,200 pound horse eats each day.
- Calculate how much forage a 3 pound rabbit eats each day.

Example:

A 200 pound deer eats 2.5% of its body weight each day. In one day, it will eat 5 pounds

(200 pounds x 0.025 = 5 pounds)

Forage Demand of Animals

RUMINANTS

Eat _____ of body weight/day in dry matter of forage.



HIND-GUT FERMENTERS

Eat _____ of body weight/day in dry matter of forage.



How much food do Animals eat a day?

A _____ pound cow eats _____% of its body weight each day. In one day, it will eat _____ pounds.

A _____ pound horse eats _____% of its body weight each day. In one day, it will eat _____ pounds.

A _____ pound rabbit eats _____% of its body weight each day. In one day, it will eat _____ pounds.

Answers:

- **Cattle:** 800 lb x 2.5% = 20 pounds in one day.
- **Horse:** 1200 lbs x 3.0% = 36 pounds in one day.
- **Rabbit:** 3 lbs x 3.0% = 0.09 pounds in one day.

Skills Challenge: Animal Identification

Identifying animals is an important job in rangeland management. We need to know all the components of the habitat for each species so we can manage healthy populations.

Identifying animals can be a challenge, but with practices it can also be fun! Identification starts with observing animal characteristics—by sight, pelts/feathers, skulls, scat, tracks, and calls—and then distinguishing differences between different animals. Every animal is unique, the question is, can you find how they are unique?

Do:

Study the animals from the animal list. Learning to identify animals by sight is an excellent skill to have when managing rangelands.

COMMON NAME	SCIENTIFIC NAME
Mammals	
1. American Badger	<i>Taxidea taxus</i>
2. American Pine Marten	<i>Martes americana</i>
3. Bighorn Sheep	<i>Ovis canadensis</i>
4. Black Bear (American)	<i>Ursus americanus</i>
5. Bobcat	<i>Lynx rufus</i>
6. Canada Lynx	<i>Lynx canadensis</i>
7. Coyote	<i>Canis latrans</i>
8. Elk	<i>Cervus canadensis</i>
9. Grizzly Bear	<i>Ursus arctos</i>
10. Ground Squirrel	
11. Moose	<i>Alces americanus</i>
12. Mountain Lion (cougar or puma)	<i>Puma concolor</i>
13. Mule Deer	<i>Odocoileus hemionus</i>
14. Pronghorn Antelope	<i>Antilocapra americana</i>
15. Pygmy Rabbit	<i>Brachylagus idahoensis</i>
16. Red Fox	<i>Vulpes vulpes</i>
17. White-tailed Jackrabbit	<i>Lepus townsendii</i>
18. Gray Wolf	<i>Canis lupus</i>
19. Wolverine	<i>Gulo gulo</i>
Birds	
20. Burrowing Owl	<i>Athene cunicularia</i>
21. Chukar	<i>Alcetoris chukar</i>
22. Golden Eagle	<i>Aquila chrysaetos</i>
23. Great Gray Owl	<i>Strix nebulosa</i>
24. Greater Sage-grouse	<i>Centrocercus urophasianus</i>
25. Long-bill Curlew	<i>Numerius americanus</i>
26. Prairie Falcon	<i>Falco mexicanus</i>
27. Ring-necked Pheasant	<i>Phasianus colchicus</i>
28. Ruffed Grouse	<i>Bonasa umbellus</i>
29. Sharp-tailed Grouse	<i>Tympanuchus phasianellus</i>
Reptiles, Amphibians, and Invertebrates	
30. Common Gartersnake	<i>Thamnophis sirtalis</i>
31. Long-nosed Leopard Lizard	<i>Gambelia wislizenii</i>
32. Western Rattlesnake	<i>Crotalus oreganus</i>
33. Western Skink	<i>Plestiodon skiltonianus</i>
34. Columbia Spotted Frog	<i>Rana luteiventris</i>
35. Idaho Giant Salamander	<i>Dicamptodon aterrimus</i>
36. Northern Leopard Frog	<i>Lithobates pipiens</i>
37. Western Tiger Salamander	<i>Ambystoma mavortium</i>
38. Western Toad	<i>Anaxyrus boreas</i>
39. Burrowing Scorpion	<i>Anuroctonus phaiodactylus</i>
40. Giant Palouse Earthworm	<i>Driloleirus americanus</i>
41. Western Harvester Ant	<i>Pogonomyrmex occidentalis</i>
Fish	
42. Bull Trout	<i>Salvelinus confluentus</i>
43. Chinook Salmon	<i>Oncorhynchus tshawytscha</i>
44. Coho Salmon	<i>Oncorhynchus kisutch</i>
45. Sockeye Salmon	<i>Oncorhynchus nerka</i>
46. Steelhead (or rainbow trout)	<i>Oncorhynchus mykiss</i>

Words to Explore*:

Carnivore: means “meat eater”, is an organism that derives its energy and nutrient requirements from a diet mainly or exclusively of animal tissue (i.e., meat).

Habitat: the natural abode of a plant or animal, including all biotic, climatic, and edaphic factors affecting life.

Herbivore: An animal that subsists principally or entirely on plants or plant material.

Limiting Factors: influences that prevent an animal population from reaching biotic (reproductive) potential. Examples of limiting factors are: food, water, shelter, space, disease, predation, climatic conditions, pollution, hunting, poaching, habitat destruction and accidents.

Omnivore: is an animal that has the ability to eat and survive (obtain energy and nutrients) on both plant and animal tissue.

Renewable Resources: A resource that is replaced by natural processes faster than their consumption.

Ruminant: Even-toed, hoofed mammals that chew the cud and have a 4-chamber stomach. Ruminants are herbivores.

Additional Resources

Visit the <https://idrango.org/education-2/i-roam-curriculum/> for each topic to see videos and other additional educational links and materials.

