

Dall Sheep in Las Vegas?

Grade levels: 1st -8th

Cross-curriculum connections: Writing

Key vocabulary:

- Adaptations
- Natural environment vs. captive environment



Objective:

Students will design and draw a zoo structure that is appropriate for the survival of Dall sheep in a hot climate that is unlike their natural environment and identify problems for Dall sheep that must be addressed in the zoo structure to mimic its natural environment.

Materials:

- Drawing paper
- Crayons or colored pencils
- Lined paper

Procedures:

1. Build engagement by having students share a few quick stories of zoos that they have been to. Ask students why they think zoos exist. Some major reasons include: entertainment, allow for a place for humans to connect to wildlife and learn about them, conservation of some animal species, and rehabilitation of hurt animals.
2. Ask students who have been to zoos to what animals they have seen at zoos that seem to be living there but are out of their normal climate Many zoos are in warm climate areas and examples may include: polar bears, caribou, moose, arctic fox, etc. Discuss that when zoo structures are created for each species, their unique characteristics, habitat, adaptations, and habits have to be considered in order to build a structure that mimics their natural environment as best as possible.
3. Explain that today each student will have the opportunity to design their own zoo enclosure for a herd of dall sheep that are being moved from their natural habitat in Alaska to a zoo in Las Vegas (or other warm climate city, such as Phoenix or San Diego...as Las Vegas doesn't have a large, public zoo), which is a desert environment. These sheep are being moved to help educate the vast populations of tourists who visit on the majestic animals and the impacts humans are having on them.
4. Allow time for research on the dall sheep, or print out the "Dall Sheep" informational text that is included at the end of the lesson plan. For younger students, reading the text to them would work.
5. Hold a class discussion. This could be done whole class, or first in small groups to discuss items such as: What needs to be considered for the dall sheep structure? Compare and contrast the two environments (alpine vs. desert ecosystems). Identify

and describe the dall sheep's habitat needs. What can be done to meet those needs in Las Vegas?

6. Have students create a list of possible features a dall sheep structure in Las Vegas would need to have. This could be done whole class, small group, or individually before beginning to draw their zoo structure.
7. Work either in groups on large paper, or individually on smaller white paper, to draw their enclosure. Possibly have them turn it into a diagram with labels or a key that describes each feature.
8. Individually, students connect writing to the project by writing a short essay about their zoo structure, connecting in concepts about dall sheep and how those concepts are addressed in their zoo enclosure.

Evaluation:

The writing component becomes the main evaluation piece. An additional, or substitution piece could be used, such as having students describe five problems a dall sheep could face in a captive environment and suggest possible solutions for each of these problems, as seen in their zoo structure.

Extension:

- Connect to English Language Arts by researching pros and cons of zoos in general. Creating a T-chart of these and then holding a debate in class.

Dall Sheep

Description

Dall Sheep (*Ovis dalli dalli*) live in the mountain ranges of Alaska. These white creatures stand out among other species of sheep. Until rams reach the age of 3 years, they tend to resemble the ewes quite a bit. After that, continued horn growth makes the males easily recognizable. Horns grow steadily during spring, summer, and early fall. In late fall or winter, horn growth slows and eventually ceases. This start-and-stop growth results in a pattern of rings called **annuli**, which are spaced along the length of the horn, and can help determine age (see sheep skull in kit to identify annuli and age the sheep). Dall rams as old as 16 years have been seen, and ewes have been known to reach 19 years of age. Generally, however, a 12 year old sheep is considered quite old. An adult weighs around 300 pounds and a female usually gives birth to only one lamb a year.

Feeding Ecology

The diets of Dall sheep vary from range to range. During summer, food is abundant, and a wide variety of plants are consumed. Winter diet is much more limited and consists primarily of dry, frozen grass and sedge stems available when snow is blown off the winter ranges. Some populations use significant amounts of lichen and moss during winter. Many Dall sheep populations visit mineral licks during the spring and often travel many miles to eat the soil at these unusual geological formations. A **mineral lick** (also known as a salt lick) is a place where animals can go to lick essential mineral nutrients from a deposit of salts and other minerals. Mineral licks can be naturally occurring or artificial (such as blocks of salt that farmers place in pastures for livestock to lick). Natural licks are common, and they provide the biometals (sodium, calcium, iron, phosphorus, zinc, and trace elements) required in the springtime for bone, muscle and other growth.

Habitat

Dall sheep are found in relatively dry country and frequent a special combination of open alpine ridges, meadows, and steep slopes with extremely rugged “escape terrain” in the immediate vicinity. They use ridges, meadows, and steep slopes for feeding and resting. When danger approaches they flee to the rocks and crags to elude pursuers. They are generally high country animals but sometimes occur in Alaska in rocky gorges below timberline.

Status

Dall sheep populations in Alaska are generally considered to be healthy. Sheep numbers typically fluctuate irregularly in response to a number of environmental factors. Sheep populations tend to increase during periods of mild weather. Then, sudden population declines may occur as a result of unusually deep snow, summer drought, or other severe weather. Low birth rates, predation (eaten by predators primarily like wolves, coyotes, and golden eagles) and a difficult environment tend to keep Dall sheep population growth rates lower than many other big game species. However, their adaptation to the alpine environment seems to serve them well.

Alpine Biome: Where the Dall Sheep Lives

The Alpine biome is full of snow, high winds, ice, and all the typical winter things. In Latin the word for 'high mountain' is 'alpes'. That is where today's word alpine comes from. Alpine biomes are found in the mountain regions all around the world. They are usually at an altitude of about 10,000 feet or more. The Alpine biome lies just below the snow line of a mountain. In the summer average temperatures range from 10 to 15° C . In the winter the temperatures are below freezing.

Because the severe climate of the Alpine biome, plants and animals have developed adaptations to those conditions. There are only about 200 species of Alpine plants. At high altitudes there is very little CO₂, which plants need to carry on photosynthesis. Because of the cold and wind, most plants are small perennial groundcover plants that grow and reproduce slowly. They protect themselves from the cold and wind by hugging the ground. Taller plants or trees would soon get blown over and freeze. When plants die they don't decompose very quickly because of the cold. This makes for poor soil conditions. Most Alpine plants can grow in sandy and rocky soil. Plants have also adapted to the dry conditions of the Alpine biome. Plant books and catalogs warn you about over watering Alpine plants.

Alpine animals have to deal with two types of problems: the cold and too much high UV wavelengths. This is because there is less atmosphere to filter UV rays from the sun. There are only warm-blooded animals in the Alpine biome, although there are insects. Alpine animals adapt to the cold by hibernating, migrating to lower, warmer areas, or insulating their bodies with layers of fat. Animals will also tend to have shorter legs, tails, and ears, in order to reduce heat loss. Alpine animals also have larger lungs, more blood cells and hemoglobin because of the increase of pressure and lack of oxygen at higher altitudes. This is also true for people who have lived on mountains for a long time, like the Indians of the Andes Mountains in South America and the Sherpas of the Himalayas in Asia.

Threats

The remoteness of sheep habitat and its unsuitability for human use has protected Dall sheep from most problems in the past. However, an increasing human population and more human use of alpine areas may cause future problems for Dall sheep.

Disease is an important issue with Dall sheep. Bacteria and viruses cause respiratory illnesses; almost always pneumonia, and these illnesses have profoundly affected some populations in the Lower 48. Mountain sheep in general are extremely susceptible to disease introduced by domestic livestock. If domestic sheep and goats (and possibly cattle) are allowed to occupy sheep ranges, mass die-offs from disease can be expected.