

WOOD BISON CURRICULUM

Lesson 3

Tracks and Trails (Natural History Lesson)



Photo credit: Doug Lindstrand

Synopsis:

Working as a class, students define the term ungulate, identify ungulate characteristics, and create a list of ungulates that live in Alaska. Working in four different groups, students learn about wood bison natural history, as well as the natural history of four other Alaskan ungulate species. Students work together to compare track size, habitat, food sources and native home ranges among wood bison and other Alaskan ungulates. Students chart their findings and identify potential conflicts that might occur between other ungulates and wood bison after wood bison are restored in Alaska.

Objectives:

1. Students will learn about ungulate species in general, and about ungulate species native to Alaska
2. Students will learn about wood bison natural history, including food requirements, habitat, and historical range
3. Students will learn about the natural history of four other Alaskan ungulates: caribou, elk, Sitka black-tailed deer, and moose
-this part of the lesson includes fact sheets that were created by Alaska Department of Fish and Game

Grade Level: 7-8

Alaska Standards: Math: S&P-1, S&P-4, S&P-6; PS-2, PS-3, PS-5. Science: SC1.2, SE2.1, SF1.1, English/Language Arts: Standard A, C, and D

National and STEM Standards: Science: Standard A 1, 4, and 6, Standard C, ABET: Standards 1-3

A complete list of standards is available at the end of this lesson.

Subjects: Science, Math

Duration: 1-2 class periods

Materials: Student Pages, Fact Sheets for Moose, Elk, Caribou, and Sitka Black-tailed Deer (provided with permission by Alaska Department of Fish and Game), Wood Bison Fact Sheet, Scissors, Writing Utensil, Blank Paper

Vocabulary: ecology, natural history, prey species, ruminant, tracks, ungulate,

Additional Resources:

www.alaskawildlife.org

http://www.adfg.alaska.gov/statistic/education/educators/pdfs/wild_wonders.pdf

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4. Students will compare tracks among ungulate species
5. Students will practice communication skills as they share information with their peers
6. Students will evaluate whether restoring wood bison to their native habitat will have an effect on other ungulates.

Background Information for Teachers:

Correctly identifying animals is an important skill for scientists, hunters, wildlife viewers, and wildlife managers. Looking at animal tracks and signs can tell us a lot about different animals. Tracks and signs provide insight into the ecology and natural history associated with animals. **Ecology** is the scientific study of the relationships that organisms have with each other and with their natural habitat. **Natural History** is the study of organisms, including plants and animals, in their environment. By studying tracks and signs we can often: estimate the number of animals in a particular location, determine if the animals return to a location regularly, estimate what the animals were eating, determine if the area was used for sleeping or grazing, and evaluate whether other animals frequented the same area. We can even tell if the animals were running or walking! All of this information helps us learn about animals and what impact they have on the environment.

During this lesson, students compare the tracks of different Alaskan ungulates, and identify their habitat, home range and relationship with other ungulates. The term **ungulate** refers to several groups of mammals, most of which use the tips of their toes, usually hooved, to sustain their whole body weight while moving. The term roughly means, "hoofed animal." There are two major categories of ungulates: odd toed and even-toed. Wood bison fall into the category of even-toed as they have two hooves and two reduced hooves (dew claws) on each foot.

Ungulates are a common prey species. Many top predators, including wolves, bears and humans, depend on these hoofed animals for food. It is therefore no surprise that ungulates, many of which live in open grasslands and savannahs, have evolved adaptations for speed. These adaptations include a reduced number of toes, long limbs (achieved by elongated toe and foot bones), and unguligrade locomotion; walking and running on the tips of their toes! Because they are herbivore grazers and browsers and must process large amounts of vegetation, ungulates have also evolved complexly grooved molar teeth for grinding this rough material at the start of the digestive process. Wood bison digest plant-based food as it travels through their 4-chambered stomach. Bacteria breaks down the food before it is regurgitated and chewed as cud. These processes further break down the plant material and is known as ruminating.

Materials Needed:

- 1 sheet of blank paper for each student; 2 sheets of blank paper for each of the 4 groups
- Wood Bison fact sheet; 4 copies (1 copy for each of the 4 groups) * provided as a pdf with this lesson
- Moose fact sheet ("Map full of Moose" by Alaska Department of Fish and Game); 1 copy
* provided as a pdf with this lesson
- Elk fact sheet ("Introducing Elk" by Alaska Department of Fish and Game); 1 copy
* provided as a pdf with this lesson
- Sitka Black-tailed deer fact sheet (by Alaska Department of Fish and Game); 1 copy
* provided as a pdf with this lesson
- Caribou fact sheet ("Bunches of Caribou" by Alaska Department of Fish and Game); 1 copy
* provided as a pdf with this lesson
- Student Pages called "Ungulates!"; 4 copies; 1 copy for each of the 4 student groups
- Scissors and rulers (4 sets; 1 set for each of the 4 student groups)
- Writing utensils

Procedure Steps:

1. Discuss with your class what makes an animal an ungulate. Ask your students the following questions:
 - a. How many ungulates can you think of?
 - b. Do you know which ungulates are native to Alaska?
 - c. Are humans ungulates? How about wolves or bears? Why or why not?
 - d. Do all ungulates make the same kind of track? Why or why not?
2. Pass out 1 sheet of blank paper to each student. Ask students to outline their bare feet onto a piece of paper. Have students cut out the bare foot outline. Make sure students write their names on the footprints so they can identify them later.
3. Break the class into four groups: Moose, Elk, Caribou, Sitka Black-Tailed Deer
4. Give each group a wood bison fact sheet. Then, hand out a fact sheet that corresponds to each group's ungulate species. Example; give the moose group the moose fact sheet. Please note: fact sheets for the 4 other ungulate species were provided by Alaska Department of Fish and Game and are also available for free download at:
5. Within the groups have students compare foot outlines. Ask students the following questions:
 - a. Does everyone have the same size foot? Ask students to organize their footprints from smallest to largest.
 - b. Is the shape of everyone's foot about the same?
 - c. Could you tell the difference between a wood bison footprint and a human footprint? What makes them different?
6. On the fact sheets, the students will find dimensions and track traits for wood bison and for their ungulate species. Ask students to use a ruler to draw and cut out an actual sized drawing of the tracks for their ungulate species and for a wood bison. Inside their ungulates tracks, have students write down three identifying track traits.
7. Give students time to read the rest of the fact sheet about both the wood bison and about their group's ungulate.
8. Hand out Student Pages called "Ungulates!". Give one copy of this Student Pages to each group and ask students to work together to answer the questions.
9. Charting Ungulates

When all groups have completed the student pages, invite each group to share with the class what they have learned about their ungulate and how their ungulate compares with wood bison. Re-create the chart below and present it at the front of the room. Ask students to fill in the different categories. Will any of the 4 ungulate species compete with wood bison for food or habitat?

	What is this animal's range in AK?	Habitat	Primary Foods	Native to Alaska?
Wood Bison				
Caribou				
Sitka Black-Tailed Deer				
Moose				
Elk				

Student Pages: Ungulates!

Using the fact sheets about wood bison and about your group's ungulate, answer the following questions:

	Wood Bison	Your Group's Ungulate Species
What do they eat?		
Where do they live?		
What type of habitat do they need to survive?		
List three interesting facts		

Looking at the track of your ungulate and the track of the wood bison, answer the following questions:

1. Which track is larger?
2. How can you tell them apart?
3. Can you think of a situation when it might be difficult to tell the tracks apart? For example: Could you mistake the track of a juvenile wood bison for that of a full grown animal of a different species?

Using the information from the fact sheets answer the following questions:

4. Before wood bison were extirpated from Alaska, did wood bison live in the same area as does your ungulate?

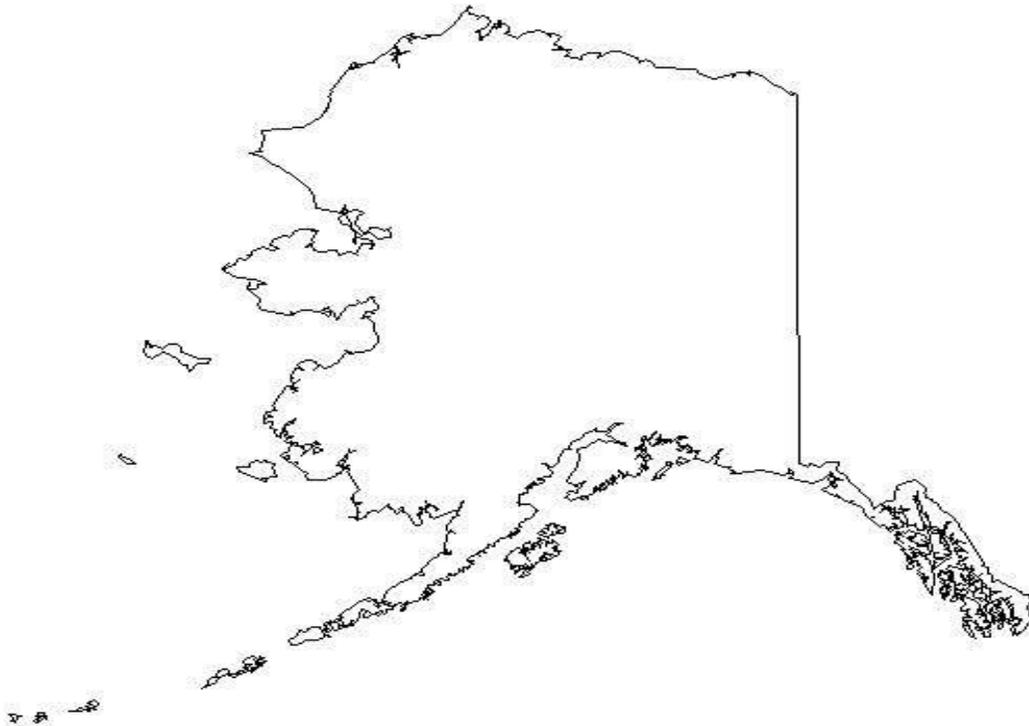
5. Do wood bison and your ungulate require the same type of habitat?

Explain:

6. Do wood bison and your ungulate eat the same food?

Explain:

7. On the map below, label and color the restoration site where wood bison are most likely to be reintroduced (from the lesson "Where will the wood bison roam?"). Next, color in the area that corresponds with the range of your group's ungulate species.



State and National Standards

Alaska State Standards: Math 7-8

The student demonstrates an ability to classify and organize data (S&P-1, S&P-4, S&P-6)

The student demonstrates an ability to problem solve (PS-2, PS-3, PS-5)

Alaska State Standards: Science 7-8

The student demonstrates an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection and biological evolution (SC1.2)

The student demonstrates an understanding that solving problems involves different ways of thinking (SE2.1)

Alaska Content Standards for English/Language Arts

Standard A: A student should be able to speak and write well for a variety of purposes and audiences

Standard C: A student should be able to identify and select from multiple strategies in order to complete projects independently and cooperatively.

Standard D: A student should be able to think logically and reflectively in order to present and explain positions based on relevant and reliable information.

National Standards, each of the following standards are also National STEM Standards

NSES National Science Standards

Standard A: Science as Inquiry 1-6

1. Identify questions and concepts that guide scientific investigations
4. Formulate and revise scientific explanations and models using logic and evidence
6. Communicate and defend a scientific argument

Standard C: Life Science 6; Students will understand the behavior of organisms

National Engineering Standards ABET

1. Students will have an ability to design and conduct experiments as well as interpret data
2. Students will have an ability to function on multi-disciplinary teams
3. Students will have an ability to communicate effectively

National Math Standards NCTM

Standard 4: Measurement

- a. Understand measurable attributes of objects and the units, systems and the processes of measurement.
- b. Apply appropriate techniques, tools and formulas to determine measurements