



Montana
Office of Public Instruction
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Science Model Teaching Unit

Where Have All the Bison Gone?

Ecology and Population Investigation

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Grade 6-8 - Approximate Duration: Four 50 minute class periods

Stage 1 Desired Results

Established Goals

Science Content Standard 3 Benchmark 8.4: Investigate and explain the interdependent nature of populations and communities in the environment and describe how species in these populations adapt by evolving.

Essential Understanding 1: There is great diversity among the 12 tribal Nations of Montana in their languages, cultures, histories and governments. Each Nation has a distinct and unique cultural heritage that contributes to modern Montana.

Essential Understanding 6: History is a story most often related through the subjective experience of the teller. With the inclusion of more and varied voices, histories are being rediscovered and revised. History told from an Indian perspective frequently conflicts with the stories mainstream historians tell.

Understandings

Students will understand...

- how bison populations were devastated by western expansion.
- how to construct, read, compare and analyze different population graphs.
- How the diets of most tribes of Montana included bison and how its demise affected the futures of some tribes.

Essential Questions

- How was the bison population decimated in such a short time?
- How does the bison population graph compare with a typical population graph?
- Why was the bison important in the traditional diets of many tribes of Montana?

Students will be able to...

- construct, read, compare and analyze population graphs.
- compare and contrast the traditional diets of tribes of Montana

Students will know...

- the difference between a typical population graph compared to a graph not adhering to typical population cycles.
- how the demise of the bison affected some Native American peoples and their future.



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Stage 2 Assessment Evidence

Performance Tasks

- Construct a bison population graph from provided data. Compare/contrast and analyze the graph with a typical population graph.
- Based on provided information, determine some of the reasons for the loss of the bison population and its affect on the Native peoples that used it. Present to class the top three reasons for the bison population crash.
- Use internet resources to research the traditional diets of specific tribes of Montana. Compare and contrast the traditional diets of tribes of Montana.

Stage 3 Learning Plan

This series of lessons assume that the students have some background in animal populations. If students don't have any experiences in these areas, the teachers will need to spend more time developing these concepts.

Learning Activities

Day 1

1. Establish a Question/Elicit ideas: Hand out the Moose Population graph or project it so that all students can see the graph. Explain to students that this is the population of moose on the Isle Royal in Michigan on Lake Superior. Ask them: Why do you think the population fluctuates (goes up and down) so much? Have students write in their science notebook/journal. After a few minutes, have students share their ideas with their small group. They may add to their reasons in their notebook/journal.
2. After students have had time to discuss, have groups share their ideas with the whole class. Write their ideas on the board. Students should bring up issues such as: predators, bad/good weather, increase/decrease of food, disease, habitat destruction immigration, emigration, and hunting (predators).
3. Explain: Explain to students that this is an example of a typical prey population graph. Scientists expect populations to increase and decrease overtime when there are predators in the area. This island had wolves on it. Other factors, such as food, weather, and disease also affect populations.
4. Engage/Explore: Tell students that they are now going to construct their own population graph. Hand out the data on Bison population that you have listed (refer to http://www.unco.edu/geography/Biodiversity/Unit2/Unit_2.pdf, page 45, #4) but don't tell students what animal they will be dealing with. Have students look at the data chart. Point out that the populations go from the millions to the thousands. This cannot be graphed in the typical way.

Science Grades 6-8 Where Have All the Bison Gone? Ecology and Population Investigation (continued)

5. You can show students exactly how big their graph paper would have to be if they made it the regular way by going outside. Have each student bring with them a metric ruler with millimeters on it. Depending on your time constraints, either measure out 60 meters before hand, or have students measure using meters sticks, measuring tape or a trundle wheel. Show them that if they made one millimeter (one tiny mark on their ruler) equal one thousand bison, they would need a paper 60 meters long to represent 60,000,000 bison.
6. Once you are back inside, show students how they will have to construct their graphs so that they can have all the numbers on there at the same time. They will have to split the graph twice to graph the millions, hundred thousands and thousands. See the sample graph on how to do this. Students may need help dividing up the time evenly across the x-axis (horizontal side of graph). They can add another sheet of graph paper to the right side to make the paper longer.
7. Have students construct their graphs.
8. Once students are done constructing the graph, have them compare their new graph to the graph of the moose population. The difference will be very obvious. As a class discuss the differences.
9. Establish a Question/Elicit Ideas: What could have caused this population to change so dramatically over 300 years? Again, have students write their initial impressions in their notebooks/journals. Have them share their ideas with their group. As a class, list all the possible ideas on the board or paper (to keep).
10. At this time, share with students that this is a population graph of bison. Have students add any additional ideas they may have to the list of ideas generated.
11. Explore: Create a worksheet from the timeline of information the National Bison Society provides or project their website (<http://www.fws.gov/bisonrange/timeline.htm>) for the students to use.
12. Working in pairs, have students add these events to the bottom of their graph on a timeline that mimics the dates on the graph. Attaching another piece of graph paper below the original graph may help. See sample. Depending on the level of your students, they may need some help doing this. You may want to do the first few together so that students get the idea.
13. Once students have most or all of the events plotted on the timeline, have them revisit the question, what could have caused the bison population to change so dramatically over the 300 year span. Have students look for events that coincide with major drops in population. Have them decide in small groups which factors seem to have the biggest effects. Have students determine their top 3 reasons. They will need to make a poster that supports and defend their reasons which they will present to the class in a 3-5 minute presentation.

Science Grades 6-8 Where Have All the Bison Gone? Ecology and Population Investigation (continued)

Day 2

1. Establishing a Question/Elicit Ideas: Ask students what they think tribes of Montana used the bison for. Have students write their answer in their notebook/journal. When they are done, have them share their answers with their group. Students can add additional ideas to their original lists.
2. After a few minutes, have groups share out their ideas.
3. When the class is done discussing their ideas on the uses of bison, provide materials that list the uses of the bison. A great resource is: <http://www.aite.sk.ca/saskschools/firstnations/bison.html>. This website provides a list and a diagram that can be downloaded and shared. It also provides several hunting techniques. This is not tribal specific, however, but focuses on the Northern Plains Indians. You can also find information related to specific tribes of Montana at www.trailtribes.org and www.montanatribes.org.
4. Explain: Explain that many Great Plains Indian tribes including the Blackfeet, Sioux, Assiniboine, and Crow, were nomadic, meaning they followed the bison herds. They relied heavily on the bison for a great deal of their food, clothing, shelter, and weapons.
5. Explore/Investigate: Tell students that they are going to compare and contrast the traditional diets of various tribes of Montana. Explain that the food that was available was specific to the location of the tribe. A tribe from western Montana may not have the same berries and roots available to those that lived in eastern Montana. Pass out the research collected or have students research the food eaten by specific tribes in Montana. Have each group research the diets of different tribes so that the class can look for similarities and differences. The following are great resources:
www.trailtribes.org; <http://www.trailtribes.org/greatfalls/home.htm>; www.montanatribes.org;
http://www.montanatribes.org/links_&_resources/films.html
6. Once students have compiled lists of the traditional foods eaten by the tribe they have researched, they should have the opportunity to share their information with the rest of the class.
7. Establishing a Question/Elicit Ideas: After students have compared the lists of traditional foods of each tribe, pose the question: What do you think happened to the tribes in the eastern part of the state when the bison disappeared?
8. Have students write their ideas in their notebooks/journals. After a few minutes, have them share in their small groups. Discuss the idea as a class.

Science Grades 6-8 Where Have All the Bison Gone? Ecology and Population Investigation (continued)

Optional Addition

9. Download and show the movie, “Native Americans: Contact and Conflict” from Discover Learning/United Streaming at <http://streaming.discoveryeducation.com/>. It takes 27 minutes and gives a rundown of white and Indian contact and conflicts. One segment focuses on the Plains Indians and the bison.

10. After the movie, talk to students about how you didn’t show the movie to make them feel bad, but to show them the mistakes of the past. Many non-Indian students will feel depressed about how the white treated Native people. They may need reassurance that they are not to blame for what happened long before they were born, but they need to know the truth about what happened so that similar things don’t happen in the future.

Teacher Planning/Preparation

The teacher will need to find an area that is at least 60m long. This can be measured out ahead and marked or allow students to do this as a class.

Create a list of data on the bison population, which can be found in question #4, page 45 at http://www.unco.edu/geography/Biodiversity/Unit2/Unit_2.pdf.

Download and print the information about bison <http://www.aitc.sk.ca/saskschools/firstnations/bison.html>, you can also find information about bison at www.trailtribes.org and www.montanatribes.org.

Download information on traditional diets of different Montana tribes if you are not going to have students do the research. You may find information at www.trailtribes.org, www.montanatribes.org, and each of the websites of each of Montana’s tribes (click on the reservations at

<http://www.opi.mt.gov/programs/indianed/reservationmap.html> to go directly to the tribal websites)

and tribal colleges (http://www.opi.mt.gov/Programs/IndianEd/IEFAResources.html?gpm=1_3&pnl=1_4). If you have access to Discover Learning, United Streaming, download the movie, Native Americans: Contact and Conflict at <http://vimeo.com/75164916>.

Materials/Resources Needed

Large outside area of at least 60 meters

Meter sticks or trundle wheels (several for the class)

Metric rulers (one per student)

Student notebooks or journals (paper can also be used if students don’t keep one)

Moose population graph, one copy per group or one projected for class

Graph paper, enough for 4 sheets per student

Timeline of Events Related to Bison sheet, one for a pair of students

Use of Bison information, see suggestions

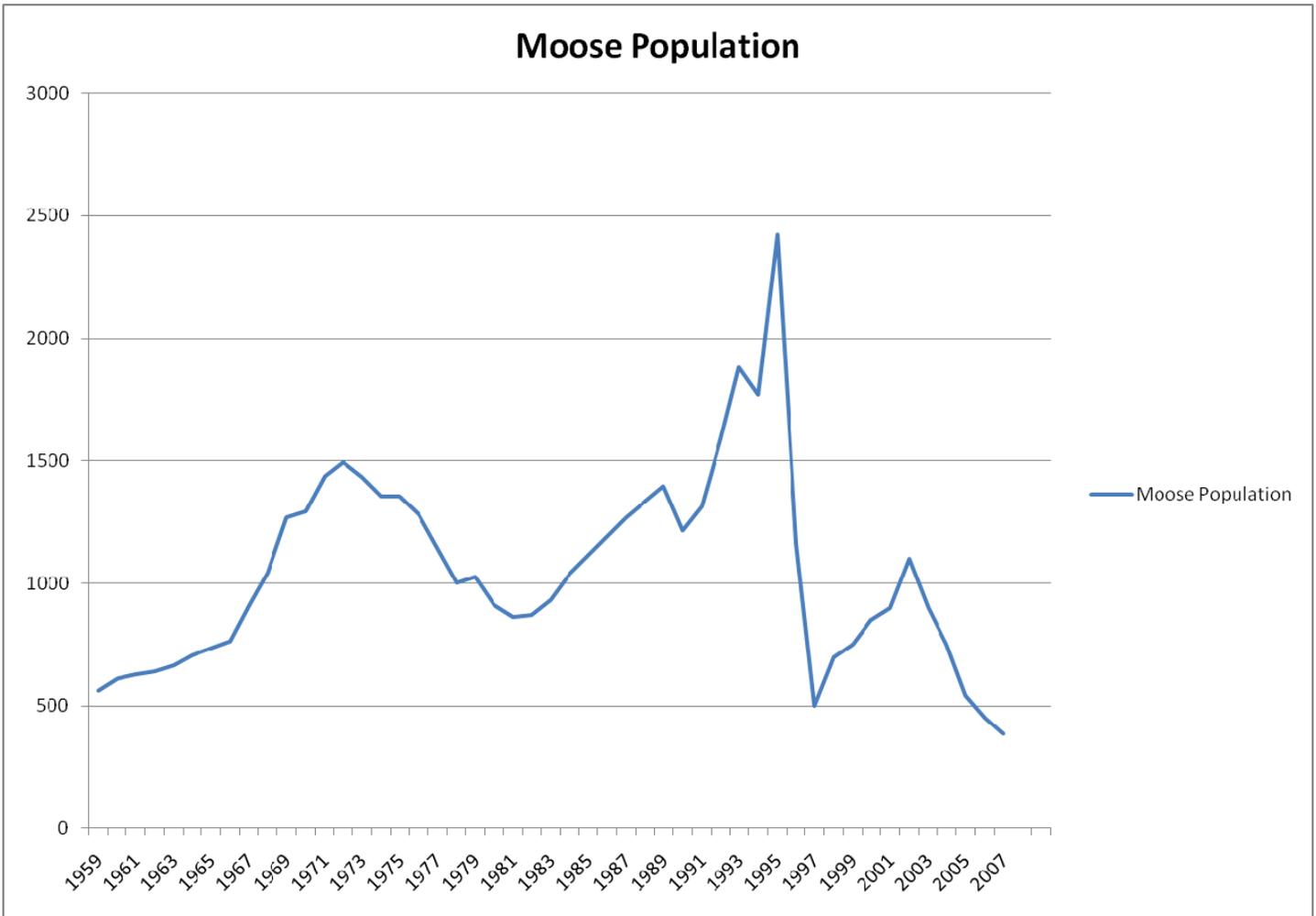
Poster board for each group

Access to the internet for research, one for the teacher or one per small group.

Computer with projection screen

Resources and Worksheets

Following pages



Graph created from data available online, from: The Big Bad (?) Wolf Predator and Prey: The Wolves and Moose of Isle Royale, http://www.wolfmoose.mtu.edu/C.Hill_BigBadWolf.pdf

