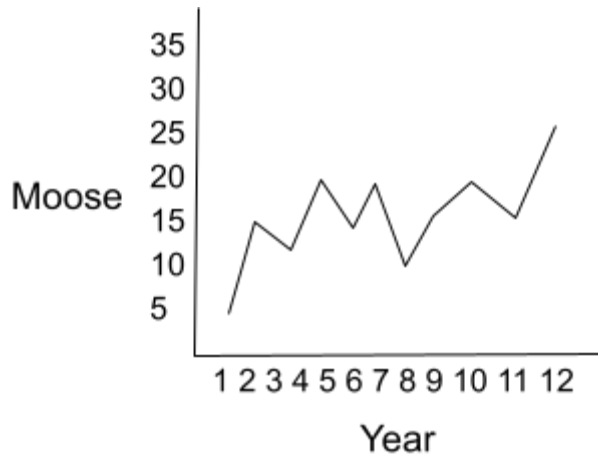


TTCD Lesson Plan (7): What I “Moose” Have!

Unit:	Grade(s): 3-12	Class Size: 1-30	Lesson Duration: 30 minutes	Location: Field or Gym
Topic(s):	Moose, mammals, habitat, resources and land management			
Student Prerequisites:	Students should have a general understanding of habitat, and the resources animals need in order to survive.			
Essential Questions:	What makes a habitat a good place for animals to live and reproduce?			
Student Objectives:	Students will be able to identify and describe food, water, and shelter as three essential components of habitat. Students will learn that a population will continue to increase until a limiting factor is imposed.			
Standards:	Supports NGS Standards: K-LS1-1: Use observations to describe patterns of what plants and animals (including humans) need to survive. 3-LS4-3: Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. 5-PS3-1: Use models to describe phenomena. MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem HS-ESS3-6 Earth and Human Activity Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. Cultural Standards E.2: Culturally-knowledgeable students demonstrate an awareness and appreciation of the relationships and processes of interaction of all elements in the world around them by: understand[ing] the ecology and geography of the bioregion they inhabit.			
Local Context:	Discuss which limiting factors are of most concern in the Tyonek region.			
Vocabulary:	Habitat, food, water, shelter, predator, prey, population, limiting factors			
Dena'ina language words:				
Materials:	• Tape or rope			

	• Laminated photographs of moose food, water, and shelter sources within local habitats • Notepad and pencil • Optional: large Post-It paper
Instructor Prep:	Mark two parallel lines on the floor 10-20 yards apart, using the tape or rope.
Introduction:	<i>Pair and Share:</i> Give students 1minute to discuss each question with a partner then have several pairs share their ideas with the whole group. • What is a habitat? • What things does a habitat need to have in order to support animals like moose? (Consider food, water, shelter, and space.) Explain that in this activity we will focus on food, water, and shelter, but remember that animals will die if they don't also have adequate space to live. Ask students: Have you seen or do you know of places where moose get water? Food? Take shelter? As students answer, show them the photos of local places that meet one or more of these needs for moose. Explain that limiting factors are the influences that prevent an animal population from continuing to increase. Give a few examples, then ask the group if they can name some more limiting factors. Examples of limiting factors include food, water, shelter, space, disease, predation, climatic conditions, pollution, hunting, poaching, habitat destruction and accidents.
Activity:	1. Count off in fours, and have all the one's line up behind one of the parallel lines, and the two's, three's, and four's line up behind the other line. 2. The one's have become the moose. Ask students again, by raising hands, what these moose need in their habitat in order to survive: food, water, shelter, and space. Let's assume that for this activity, the moose have enough space. So, our one's (the moose) only need to find food, water, and shelter in order to survive. 3. Explain that we know that a moose is looking for food when it clamps a hand over its stomach. When it is looking for water, it clamps its hands over its mouth, and when it is looking for shelter, it holds its hands together over its head. Have all of the one's do each motion along with you. 4. A moose can choose to look for any one of its needs during each round, but it cannot change what it is looking for after it sees what is available. 5. The two's, three's, and four's are food, water, and shelter. Each student gets to choose which of these components they will be during each round, but cannot change their mind after the round starts. The students will show which habitat component they are using the same motions as the moose - hand on stomach,

	mouth, or head. - Have them practice each symbol when you shout it out. Then explain that during the game, the moose are going to run across and tag someone who is showing the same symbol they are. Model with a co-leader or a student what a gentle and respectful tag will look like. - Start each round with all players lined up on their line (moose on one and food/water/shelter on the other) with backs facing each other. - Ask all students to make their sign by placing their hands on either stomach, mouth, or above head. Give students a few moments to get their hands in the right place. You will generally see a lot of variety in what students choose, but it is also okay if they do a lot of the same one. For example, if all the habitat component students choose shelter, that would represent a drought year. - When students appear ready, count to three and have them turn around to face each other. - Then the moose should run to the other side of the playing field to tag someone showing the symbol that matches their own symbol. Each moose must hold the hand sign of what it needs until reaching their habitat component. - Once the moose tags its habitat counterpart, both the moose and the food, water, or shelter that it tagged go back to the moose line. This represents the moose successfully meeting its needs, and reproducing. Those habitat components that are tagged “become” moose. - Any moose that cannot find its food, water, or shelter (all of the ones available have been tagged) dies, decomposes, and becomes part of the habitat, starting the next round on the habitat line. Note: When more than one moose reaches a habitat component, the student who gets there first survives. Habitat components stay in place on their line until a moose needs them. If no moose needs a particular habitat component during a round, that component just stays where it is but can change what it represents at the beginning of the next round. - Keep track on your phone or notepad of how many moose there are at the beginning of the game, and at the end of each round record the number of moose. Continue the game for about 10-15 rounds, trying to move through them quickly so that students stay engaged.
Wrap Up:	Gather students back in the classroom, or around a large flip chart. Write down your population data in a line graph, where the round numbers are years on the x-axis, and moose population is on the y-axis.



Ask the students if the moose population could ever remain the same from year to year. Could there ever be a perfect balance in this habitat? Use the graph to explain that wildlife populations naturally will follow a pattern of peak, decline, and rebuild over and over **as long as there is good habitat**.

Have students think to themselves and then share with a partner their response to the question: **“What can we as humans do to make sure there is good habitat for moose?”** Choose a few volunteers to share their ideas with the whole group.

Lesson Adaptations:

- Create a set of cards representing water, food, and shelter for moose. These could be simple symbols, or photos of habitat components from the area. Rather than have students use hand symbols, have them choose a card to hold up each round.
- Stop a few times during game play to pause and notice what happens when there is an abundance of one resource (eg. lots of shelter) but not the other resources needed. Moose who cannot find the resource they selected may not change to a different resource in order to survive. The instructor can coordinate with the resource side once or twice for everyone to choose the same symbol to emphasize this point.

Extensions:

- For younger students: Have students explain verbally or in writing what the moose in the game required to survive. Working in small groups, have them compare these needs to their own survival needs. Have them identify at least three needs moose and humans share. This can be done verbally, in writing, or through labeled drawings. Have them identify one need that is similar for plants, and one need that might be different between animals and plants
- For older students: ask students to replicate the graph in their science notebook or on paper. In small groups, ask them to analyze the data to make a claim about the approximate carrying capacity of the ecosystem for moose in the model. When was the population most stable? (Usually this number is about half the size of the class—the more rounds you play, the easier it is to estimate carrying capacity). Have them draw the carrying capacity they’ve estimated on their graph. This number should stay more or less constant over time, unless there are major changes in the ecosystem.

Have students brainstorm in a small group: What events or factors could affect

	resource availability enough to change the carrying capacity for moose in this model ecosystem? Which are likely to increase carrying capacity? Which are likely to decrease carrying capacity? Optional: Discuss the relationship between human hunting, habitat needs, and carrying capacity. (Generally, sustainable hunting helps to keep moose populations close to carrying capacity but not way below or way above).
Reflections:	How did it go? What did students understand most/least? What could change about instruction or lesson plan?
Resources Used	Project WILD Activity “Oh, Deer!” PWSRCAC “Oh Moose Survival Game”