Lesson Plan #2:

Oh, Deer! (Modified from Project WILD, an interdisciplinary conservation and environmental education program focusing on wildlife and habitat.)

Objectives
Students will:
- identify the three essential habitat components for all wildlife populations: food, water, and shelter.
- recognize that the arrangement and availability of these components determine the size of wildlife populations.
- describe the factors influencing carrying capacity, including habitat fragmentation, human activities, and resource competition.
- define the term 'limiting factors' and provide examples.
- understand that some fluctuations in wildlife populations occur naturally as ecological systems constantly change.

Overview
Students portray deer and habitat components in a physical activity.

Materials
- ☐ large area (preferably outdoors)
- ☐ clipboard and pencil/pen (for the facilitator to record data)

Background Information
Carrying capacity refers to the dynamic balance between the habitat components available for wildlife, determining the number of animals that can be supported in a given area. Factors that affect carrying capacity can impact the ability of wildlife species to reproduce and maintain their populations over time. Habitat components like food, water, and shelter are crucial for survival, and their arrangement in the habitat plays a significant role. The absence of these components can lead to animals' inability to survive. Disease, predator-prey relationships, weather conditions (e.g., early freezing, heavy snows, flooding, and drought), accidents, pollution, and habitat destruction and degradation can impact carrying capacity.

Certain local species are more affected by natural limiting factors. These limiting factors help maintain species populations within predictable ranges. Some species fluctuate annually, including the lynx, bighorn sheep, and grizzly bear. Lynx populations, for instance, can be affected by fluctuations in prey populations, while bighorn sheep populations can be impacted by diseases such as pneumonia. Grizzly bear populations can be affected by habitat fragmentation and human-caused mortality. Habitat components that are limiting factors are fundamental and critical in most natural settings and appear to be the primary controlling factor behind these cycles.

Procedure

1. Ask students if they believe food, water, and shelter are always available in nature. Provide examples of situations where these components increase or decrease. (Examples are listed above.)
2. Explain that students will participate in a game that demonstrates how wildlife populations change over time in relation to the availability of food, water, and shelter.
3. Instruct students to count off in fours. Students assigned as "ones" will act as deer on one side of the playing field while students assigned as "twos," "threes," and "fours" will represent habitat components on the other side.
4. Clarify that the deer must choose a habitat component to search for - food, water, or shelter - and stick with that choice for the entire round. Habitat students must choose one component to represent and cannot change it during the round.
5. Provide signs for the habitat components:
   - Food: Hold both hands on the stomach.
   - Water: Cup hands under your chin like you're drinking water.
   - Shelter: Make a roof over your head with your hands.
6. Have all players stand in two parallel lines about 20-30 yards apart, facing each other. Instruct them to stretch their arms out to avoid touching the person next to them.
7. Record the number of deer at the beginning of the activity and after each round to create a line graph depicting the deer population. Continue the activity for 8-10 rounds or until the time runs out.
8. Ask students to turn around and choose their signs for food, water, or shelter without peeking. Then, have them turn back around to face each other.
9. When both sides are ready, each deer must keep their sign of what they are looking for until they reach the habitat side. (For example, if they choose water, they can't change it when they see that water isn't available.) The deer should walk to the matching habitat component and tag it. Each habitat component can only be chosen by one deer. The chosen food, water, and shelter should then return to the deer starting area, and the habitat student tagged becomes a deer for the next round.

10. If a deer doesn't find a match, they "die" and become habitat.

Optional challenges to make the game more exciting:

- Introduce a predator like a mountain lion or wolf after a few rounds.
- Have all three components of habitat link arms to simulate development.
- Assign one student on the habitat side to act as a bow hunter who can only take two deer per season (per round).

- Have one deer act as a doe with twin fawns who must find three of their chosen habitat components to survive.
- Have one deer pretend to be injured and try to find their habitat component.
- Introduce Chronic Wasting Disease (CWD) by giving some students on the habitat side a token representing the disease. If a deer chooses an infected habitat component, they also contract CWD. At the end of that round, all deer with CWD die and become part of the habitat. The infection persists in the habitat and further infects deer in subsequent rounds. Before proceeding to subsequent rounds, ask students to predict what might happen to the population as CWD continues in the environment.

11. At the game's end, gather students to discuss their observations. Display the data collected during the activity, showing the number of deer at the beginning and after each round. The data will show that the deer population fluctuated over the years, with peaks, declines, and rebuilding. Wildlife populations tend to rise, fall, and rebuild if there is good habitat.

12. On the board, draw the graph and instruct the students to explain their observations. Ask questions such as:

- Why did the deer population experience a rise and fall?
- Which types of development could potentially wipe out food, water, and shelter?
- Can you deduce when CWD was introduced?
- Did the hunter have a significant impact on the deer population?

   Clarify that the highest point on the graph represents the population's carrying capacity, and emphasize that it's our responsibility to regulate wildlife populations to avoid drastic fluctuations. Striving for balance is crucial.

Reflection/Evaluation
As a reflection and evaluation activity, students can answer the following question(s):
With any wildlife species in mind, ask…
1. **What does it eat?** *(herbivore, carnivore, omnivore)*
2. **Where does it get water?** *(river, pond, moisture from food)*
3. **Where does it sleep/roost?** *(daybed, cavity nester)*
4. **Where does it live?** *(riparian, forests, sagebrush, aspen community, etc.)*