Lesson: Oh Deer

Overview & Objectives

Students will become different components of an ecosystem and learn about habitat interactions in this kinesthetic learning activity. By graphing the results of this game, students can discuss topics in population dynamics, limiting factors, and carrying capacity.

Students will understand animals' basic needs for survival: food, water, shelter, and space.

Students will learn that limiting factors such as lack of resources or diseases naturally regulate animal populations.

Students will understand that some population fluctuations are part of natural cycles.

> **Area of Study:** Life Science and Ecology
>
> **Grades:** 3 – 8
>
> **Subjects:** Ecology, graphs, physical education
>
> **Time:** 30-45 minutes

Materials

- Chalk board or dry erase board
- Chalk or dry erase markers

Vocabulary

- **carrying capacity:** the maximum population size of the species that the environment can sustain, given the food, habitat, water and other necessities available in the environmen
- **limiting factors:** a factor that controls an organism's population, size, or distribution
- **habitat:** the natural environment in which an organism lives

Preparation

Set up boundaries by marking out two parallel lines 10 - 20 yards apart on the floor or ground.

Activity

Part I - Procedure

Brainstorm with students the four essential resources: food, water, shelter, and space.

- Teach students the game and play for up to 15 rounds. (Instructions for playing the game are listed below.)
- After each round, students count the number of deer and the number of resources. The teacher keeps two running totals, one for the deer and one for all the resources.
- After multiple rounds, students gather together to share any observations they made during the game.

- Graph the deer population and analyze the data for any patterns, reminding students that each round represents a season in a deer's life.

- On the same graph, track the number of resources as a whole in a different color. This visual helps students analyze trends.

The deer population fluctuates with the availability of resources, increasing and shrinking in opposition to each other.

Part II – Game Instructions

- Divide the students into two groups, one representing deer and the other representing the resources animals need to survive (food, water, shelter and space)

- Teach everyone hand signals representing: food, water, shelter and space.

- The deer line up behind one line and the students playing the resources do the same at the opposite line. While you are explaining the game, the two lines face each other.

- Count the number of deer and the number of resources and write them down. At the start, both lines should be even.

- Instruct the deer that they are trying to survive by deciding what resource they need this season. They indicate whether they are seeking food, water, shelter, or space with the appropriate hand signals.

- Once the deer have chosen which resource they are looking for, they cannot change it until the next round.

- At the same time the students who are representing the resources repeat the same process as the deer, choosing which resource they represent and use the appropriate hand signal. Once the students in the resource line have which resource they represent, they may not change their hand signal until the next round of play.

- Once both sides have chosen their hand signals the deer can run to the line of resources and pick a student who represents the resource that they are seeking (i.e. their hand signals match.) and take them back to the deer line. A student playing a resource cannot move until a deer has claimed her or him.

- If a deer cannot find the resource he or she is looking for then he or she dies and becomes part of the resource line. Resources that are not claimed remain on the resource line.

- Once everyone understands the game, all students stand with their backs turned so they cannot see the other line.

- Ask the students to choose which resources they want to represent and to make the hand signals.

- On the count of three, all the students turn around and show their signs to the opposite line and the game begins

- The deer bring their resources back to their line, showing that they have met their needs for this season and reproduced successfully. The students claimed by deer now become deer themselves for the next round.

Part III – Discussion Questions

- What do animals need to survive?

- What are some of the limiting factors?

- Do populations remain the same or change?

- What are other factors that might affect the deer population? (Examples include disease, dramatic weather changes, habitat destruction, elimination or introduction of predators, pollution, the introduction of competing species, etc.)

Adaptations

If there is a student who cannot run due to a disability, illness, etc. have her or him toss a Nerf ball from the sidelines at the running deer, role-playing a car or a hunter. Any deer that get hit by the Nerf ball become a resource for the next round.

Extensions

In at least one round quietly instruct all the resources to pick one resource to be, e.g. water. In the debrief you can highlight that round. What could have happened in the round where the only resource available was water? (Limiting factor/event was a flood.)

Discuss the fact that students will probably see deer when they visit a NatureBridge campus. What issues might affect this population? What might be the limiting factors there? Do the deer have natural predators to control their population?

Have students study what happened when deer were introduced to a certain area such as Angel Island State Park in San Francisco Bay. For details, see the References section.

Background

There are 4 basic resources for any animal species' survival: food, water, shelter and ample space. The place where all 4 are present is known as the animal's habitat. A wildlife population grows when there is access to all 4 resources. As the population grows and the habitat is used more, sometimes resources decline to a point at which the population can no longer be supported. When this happens, the population declines, which enables the resources to replenish themselves. The cycle begins again with the animal population increasing, peaking, declining, and repopulating. A population is affected by a variety of factors, including disease, extreme weather conditions, environmental pollution, predator and prey relationships, and habitat destruction. These are collectively known as limiting factors, as they prevent a population from growing so large that it depletes all resources in the habitat. However, if too many limiting factors are present, a wildlife population can decline significantly or even become extinct.

Standards

National standards

Grades K-4
Content Standard C: Life Science
   The characteristics of organisms
   Organisms and their environment

California standards

3rd grade
Science 3c-d, 5c
Math: Statistics/data analysis 1.1, 1.3
Language arts: Reading 1.5, Listening and
    speaking 1.1-1.3

Content Standard F: Science in Personal and
    Social Perspectives
    Changes in environments
Grades 5-8
Content Standard C: Life Science
    Populations and Ecosystems

4th grade
Science 3b, 6d-e
Math: Statistics/data analysis 1.1, Mathematical
    reasoning 1.1
5th grade
Science 6g-h Math: Mathematical reasoning 1.1
6th grade
Science 6g-h
Math: Mathematical reasoning 1.1
7th grade
Math: Mathematical reasoning 1.1

This activity is adapted from the Western Regional Environmental Education Council, Project Wild. 1986

References

Journal of Wildlife Management. 49(1).
"Survival of black-tailed deer following relocation in California" by M.K. O'Bryan and D.R. McCullough

Heart and Blood: Living with Deer in America by Richard Nelson, Richard.