

OH DEER AND HABITAT (GIANT) JENGA

MODEL SHARED HABITAT RESOURCES IN AN ECOSYSTEM AND POPULATION FLUCTUATIONS (CARRYING CAPACITY) DUE TO LIMITED RESOURCES

6th Grade NGSS DCI Addressed:

- [LS1.B](#): Growth and Development of Organisms
 - [MS-LS1-5](#)
- [EE3.C](#): Human Impacts on Earth Systems
- [LS2.A](#): Interdependent Relationships in Ecosystems
- [MS-LS2-4](#): Ecosystems: Interactions, Energy, and Dynamics

Pre-Trip Information:

[Abiotic and Biotic Factors Video](#)

[Limiting Factors Video](#)

[Carrying Capacity](#)

Materials:

- Giant Habitat Jenga Set
- Spinner

Objectives:

- Give examples of different animals sharing habitat resources in an ecosystem
- Understand what happens to populations when habitats are overused or stressed
- Understand the concept of limiting factors

Introduction:

A **habitat** typically refers to the area where an organism (animal, plant, or other organism) lives. It consists of 4 resources: **food, water, shelter, and space**.

Healthy ecosystems provide diverse habitat for a variety of organisms. It will support many different types of life that are well **adapted** to that environment. If there are many of the same (or similar) species in one area, they are competing for the resources provided by that habitat. In ideal conditions the ecosystem can provide enough of these resources to maintain a healthy population. However, **limiting factors** are often present and keep populations from growing too rapidly.

A limiting factor is a resource that limits the growth, size, or distribution of a population. They can be physical or biological, and constant or based on circumstances. For example, sunlight in the rainforest is a limiting factor that is constant physical; growth is limited for plants that grow on the forest floor since not much light filters through the canopy at the top of the trees. Low growing plants must compete for the light, and this prevents dense underbrush from forming.

Activity part 1(Oh Deer! Adapted from Project WILD):

- Review the essential components of habitat with the students: food, water, shelter and space in a suitable arrangement. For the purpose of this activity, we will assume that the deer have enough space in which to live. We are emphasizing food, water and shelter as limiting factors.
- Ask your students to count off in fours. Have the *ones* go to one area; the *twos*, *threes*, and *fours* go together to another area. Mark two parallel lines 10-20 yards apart: the *ones* line up behind one line; the rest behind the other.
- The *ones* become “deer.” The deer need to find food, water and shelter in order to survive.
 - When a deer is looking for food, it should clamp its hand over its stomach.
 - When looking for shelter, it holds its hand together over its head.
 - When looking for water it should mime a glass of water in front of them
 - A deer can choose to look for any one of its needs during each round; a deer CANNOT however, change what it is looking for during THAT round. It can change what it is looking for in each of the next rounds, if it survives.
- The *twos*, *threes* and *fours* are food, water and shelter - components of habitat. Each chooses at the beginning of each round what he will be during that round. “Components” display what they are in the same way for the “deer” show what they are looking for.
- Before beginning the game, demonstrate the symbols for the component habitat: shelter --holding hands together over heads, etc.
- Each round begins with the students lined up on their respective lines with their backs to each other. Direct the students to make their signs - each deer decides what it is looking for, each habitat decides which component it is. On the count of three, students face each other, continuing to hold their signs clearly.
- When deer see the habitat component they need, they should run to it. **Each deer that reaches its necessary habitat component takes the “food”, “water”, or “shelter” back to the deer side of the line. This is to represent the deer successfully meeting its needs, and successfully reproducing as a result. Any deer that fails to find its need “dies.” and becomes part of the habitat.** NOTE: when more than one deer goes for the same habitat component, the one who gets there first survives. Habitat components stay in place on their line until a deer needs them. Remember - each player can choose what they are or need in each round.
- Keep track on your chart how many deer there are at the beginning of the game and at the end of each round. Continue the game for 8-12 rounds. Keep the pace brisk.

- You may want to introduce human-induced limiting factors to a few rounds. For example, you can tell the “components of habitat” that the river the deer normally drink out of has been contaminated; therefore, there is no water that round, and students should refrain from being that symbol during this round.

Activity part 2 (Habitat Jenga):

- Have students sit in a circle around the Jenga set
- Discuss the background information and limiting factors with the class
- Introduce the river ecosystem as the set up Jenga set
 - There are 4 different colors of blocks in the Jenga set- blue for water, green for food, brown for shelter, and yellow for space
 - When the Jenga set is first set up, it is very stable. This is a healthy ecosystem with plenty of resources and very limited stress.
- Tell students they will be playing a game of Jenga with a twist: they will need to spin the spinner to determine which type of block they need to take out on their turn
- Explain that this is a ‘drought year,’ meaning animals are having a harder time finding water
 - The spinner reflects this, as the ‘water’ section of the spinner is larger than the other sections, meaning students are more likely to land on water
- Have students take turns spinning the spinner and taking a block of the indicated color out of the Jenga set
 - Before they take the block out, they should state what type of animal they are and what habitat resource they are using (e.g.: ‘I am beaver and I am chewing down this tree to use it as part of my shelter,’ or ‘I am a deer and I am drinking from the river’)
- Students cannot take blocks from the top two rows of blocks
- Once they have removed the block they must place it back on top of the tower
- As the game progresses, the tower will become very unstable. Explain that this is what happens to an ecosystem when resources are stressed, or populations of animals grow too large
- Optional: Every few turns, offer a student a chance to do some ‘habitat restoration.’ Instead of explaining how an animal might use a habitat resource, have the student choose one of the blocks from the top of the tower and explain how that resource might be replenished (e.g. ‘there was a massive 2-day storm and fresh water refilled the pond’ or ‘a class of 6th graders planted more trees’). Then have the student carefully take that block off the top and place it into one of the holes lower in the tower.

Wrap Up/Discussion

- What are some “limiting factors” that affect their survival in Oh Deer?
- Did our deer population stay the same, or did the population fluctuate? Why?
- Ask students why the tower eventually fell. Explain that the ecosystem could no longer sustain all the animals living in it.
- Rebuild the tower and explain that over time, the ecosystem and populations will slowly rebuild themselves to a stable condition, but if the population grows too big or the resources are limited it will once again become unstable
- Ask students if there were some resources that were being used by several animals throughout the game
 - How might different animals use the same resource in different ways? (e.g. the beaver cut down the tree to use in his lodge, but an acorn woodpecker had been storing food in holes it drilled into the tree)
- Ask how humans might affect the ecosystem? What are some negative ways we might affect it? What are some positive ways?