

Activity: Eco Games

Grade Level: Grade 4

Major Emphasis: Habitat and Population Games

Major Curriculum Area: Science

Related Curriculum Areas:

Refer to Outdoor Education Curriculum Matrix 3-5
Physical Education

Program Indicator: (DL3)

The students will explain the interdependency of organisms and their environments.

Student Outcomes: The student will:

- 1. identify conditions that contribute to changes in population. **(DL2)**
- 2. conclude that non-living and populations of living things affect each other. **(DL3)**

Readiness: (DL2)

- 1. Introduce vocabulary:

Activity A - Habitat Lap Sit

interdependent
habitat
Word Cards (food,water,shelter,space)

Activity B - Population Game

survive predictions
data reproduce
carrying capacity

Materials:

Activity B - Population Game

small plastic bags chart paper
large bag of lima beans magic marker

Procedures:

Activity A - Habitat Lap Sit:

This activity is included to illustrate the dependency of all living things on food, water, shelter and space. It also stresses these factors are interrelated and therefore must be found in the proper quantities for life to continue. It serves as a good introduction to "Activity B - Population Game."

- 1. Divide students into four (4) even groups as follows:
 - !"ones" = food !"threes" = shelter
 - !"twos" = water !"fours" = space

Have students "wear" the word cards (food, water, shelter, space) for identification. It will be necessary to simulate this activity a couple of times with groups that are not evenly divisible by four.

2. Have students line up in numerical order and then form a tight circle standing shoulder to shoulder. Make sure that the students are on a soft surface such as a grassy field.
3. Ask the students to turn towards the right and take one sideways step toward the center of the circle. Students should be standing close together one in back of the other.
4. Instruct students to place their hands on the shoulders of the person in front of them. At the count of three, have them sit (all at the same time) on the knees of the person behind them. *Hint: Remind them to keep their knees together to support the person in front of them.*
5. Verbalize, "Food, water, shelter and space are all necessary for life to thrive."
6. Announce, "Let's see what happens when we have a drought." Ask what would happen if one or more of the "water students" left the circle. *Do not remove "water students" from the circle for safety reasons.*
7. Discuss how a lack of water negatively affects life (reduction of food source). Guide students toward the conclusion that these four factors are interrelated.
8. Discuss what would happen to the circle if there was a loss of habitat (space), deforestation (shelter), over-hunting or use of harmful pesticides (food), etc.

Activity B- Population Game:

1. Before the students arrive, choose two areas to play the game. Make sure the second site cannot be seen by the children. Scatter the lima beans throughout the first site. Hide about two hands full of lima beans in the second site (Refer to Game Variation found in procedure 9).
2. Make a data sheet. (Refer to Figure 2)

Year	Number of deer at beginning of year	Number of deer that survive the year	Predictions of carrying capacity
1	10	10	12, 15, 19
2	20	18	28, 30, 32
3	36		

Figure 2

3. When the students arrive, explain that during this activity they will pretend to be deer. Give each student a paper bag. Explain that this will represent their stomachs.
4. Explain that the lima beans represent the plants that deer eat. For each deer to survive the year, they must collect at least ten (10) lima beans. They can collect more if they wish. Students should predict survival numbers before each round (or year).
5. *First Year:* To start the first year, allow the students to collect food for a year. After all the beans have been collected, ask the student to count how many beans they collected to determine if they survived or not (10 or more beans). Record information on data sheet.

6. *Second Year:* Explain to the students that since they all survived (hopefully), all the deer will reproduce too! To simulate the effect of reproduction, give each child a stomach (paper bag) to collect food for their baby. Make sure the children know how many beans they will need to collect this year (20). Collect the beans they gathered and scatter them around the area again. After all the beans have been collected, ask the students if they and their fawns survived and compare the number of survivors with the number that started the year. Record on data sheet.
7. *Third Year:* Explain to students that each surviving deer will reproduce, so some students will now have to collect for as many as four deer (40 beans). Explain that the term "carrying capacity" is defined as the number of animals that can survive in a certain area. Ask the students to make predictions regarding the deer population's carrying capacity. Collect and scatter the beans again. At the end of the round, compare the actual number of survivors with predictions. Record data.
8. *Game Variation:* Continue the rounds with variations that illustrate human impacts on the deer population. These include hit by car, hunting, food poisoning by pesticide spraying and house building on the deer's natural habitat. This can be done by marking four beans as follows:
- | | |
|----------------------|--|
| ! Green (hit by car) | ! Black (food poisoning by pesticides) |
| ! Red (hunting) | ! Orange (house building) |
- Do not tell the students that the beans are marked. Collect and scatter all the beans including the marked beans. When the students count their beans, anyone with a marked bean will be considered as having a dead deer.
9. *Game Variation:* During the final round, ask the group what a herd of deer might do when its home doesn't produce enough food. Hopefully, the answer "migrating" will be included in the suggestions. Eventually, the students should find the alternate food source (site 2) hidden at the beginning of the game.

Summary: Discuss the following questions with students.

1. How did it feel to be a deer?
2. What limits a population?
3. Why doesn't the forest produce more food for the deer?
4. How do humans affect a deer population?
5. Why do Park Rangers sometimes let people hunt deer?

Follow-Up:

1. Use the decision-making model graphic organizer to discuss the question, "How can we control the over-population of deer on the property of the Smithsonian Environmental Research Center in Edgewater?"
(DL4)
2. Experiment with fruit flies as a means for population observation. (DL4)
3. Have students create habitat bulletin boards focusing on food, shelter, space and water. (DL2)

Extension Activities:

1. Construct collages of the four components using pictures of plants and animals. **(DL2)**
2. Writing Prompt: Have students imagine themselves as a canvasback duck being threatened by a loss of habitat and food source due to construction, pollution and hunting. Instruct "duck students" to write a letter of persuasion convincing humans to preserve their habitats. **(DL2&3)**
3. Debate Prompt: Should deer hunting be legal? Have students research and debate the issues. Students can either be "assigned" to a particular side or research both sides to prepare for the debate; assignment is recommended. **(DL4&5)**

Teacher Resources:

Books:

< *Project WILD, Western Regional Environmental Education Council.

Supplementary Material:

< *OBIS, Games and Simulations.