

Lesson: How Deforestation Impacts Biodiversity

Ohio Science Standard: 4.LS.1: Ecosystems can change gradually or dramatically. When the environment changes, some plants and animals survive and reproduce and others die or move to new locations.

Objective:

- Students will be able to explain different types of seed dispersal.
- Students will summarize why the orangutan population is endangered.
- Students will define zoochory seed dispersal and laugh and be grossed out all at the same time.
- Students will analyze situations and judge the best course of action.
- Students will reflect on an experience in small groups taking notes.
- Students will link the experience that they had with the story about the orangutans.
- Students will predict what could happen based on real world situations and what they experienced.

Duration: 2 to 4 days depending on allotted time for science.

Materials:

- tennis balls or something like it
- cones
- sidewalk chalk/or mats if the activity is being completed in the gym.
- 12 sided dice
- [copies of the article](#)
- examples of seeds
- reflection sheets or regular notebook paper
- pencils

Set Up:

- On the day that you complete the game, if able use sidewalk chalk to create 12 large squares (vary based on time and space). Each square will be represented by a number that will correspond with a number on the dice.

Activities

Anticipatory Set:

- Pass out a cup with some seeds and the investigation sheet to students in pairs. Have the pairs inspect the seed and brainstorm how the seeds get from one place to another. Have the students sketch a picture of the seed and write down their best prediction of how each seed travels. Share our ideas with the class and discuss why.
- Explain that today we will look at one type of seed dispersal, an animal that is important to this and what is happening in the world.

Building Background:

- Pass out a copy of the article from Newsela to each of the groups. Have them read independently or with a partner. Pull a small group of struggling readers to read with them.
- Pass out a sticky note to each student for unknown words or questions that might come up while they are reading.
- Once complete, discuss the article. Have students share words they were confused about and work as a class to define them. Discuss questions they may have written down.
- Pass out note cards and have students write a short summary of the article. Take a few and share them. Have other students provide a positive and an improvement.

Defining zoochory seed dispersal

- Ask students why they think that we would talk about seed and how they move from one area to another, then we would focus on orangutans? How do orangutans help seeds dispersal?
- Have groups of students discuss possibilities and move around the room engaging groups about their thoughts.
- On the board write ideas that students share.
- Return to or lead students to think about animals eating and then going to the bathroom. There will almost certainly be laughter at this point. Allow it to die down and then engage students in a real conversation about it. Point out that while we think these things are gross, they are a pretty normal part of biodiversity in an ecosystem.
- Explain that in biology there is a term for this action; zoochory seed dispersal. It literally means to eat a fruit, then move around as you digest before releasing it back into the world away from the original plant.
- Have students discuss why they think this process could be beneficial to both the orangutans and the plants?
- Discuss ideas and misconceptions.
- Say, "As we read, orangutans are on the endangered list. How might that impact this process?"
- Share that students will be taking a look at what this experience is like on a smaller scale. They will need to consider the lasting implications of what is happening.

Fragmentation Activity:

- NOTE: Setup should be complete prior to the activity if possible.
- Explain the activity as follows.

Orangutan Deforestation Activity	
Rules	● Each student will be given a tennis ball and will be assigned two numbers to travel between each turn. Explain that in the wild many animals have a range that they travel in. This is theirs. Each spot may only allow four players.

	● Explain that each turn students will go from their first number to their second number and place their ball on the ground and then pick it up and return it to their other point. In between each turn we will roll the dice and our landscape will change. As it does, spots will be removed. If the spot you are currently in is removed, you are eliminated. If the spot you are going to is removed, you will need to join the nearest number. ● If a player joins your spot you must look at who is taller. The shorter player is out. ● If for any reason you have to cross an open space that has been eliminated you will have to roll a dice. Odds, you may cross. Evens, you are eliminated. ● The game will end when only two players are left standing.
Play	● Allow students to make it from place to place on the first try with no issues. ● Once they have made it from one location and back. Role the 12 sided dice and remove that area from the game. Explain that this area of land was sold to a farming company who will use the space for palm oil. ● If any student tries to cross that are on their way to their space, they must roll the dice to do so. Again... ○ Odds = Safety ○ Evans = Elimination. ● Repeat this process eliminating students from play with each turn.
After	● Once two players remain, gather students together to discuss observations about what happened. ● Ask: "What did you notice?" ● Ask: "What happened as more places got eliminated?" ● Ask: "Why do you think that changing a location into a plantation eliminated players?" ● Ask: "How did the elimination of players affect the seeds?" ● Ask: "What sort of impact do you think fewer seeds would have on other species?"

Reflection/Assessment:

After completing the activity students need to reflect on the experience by answering the question...

How do changing environments impact the plants and animals that live there?