

LESSON OBJECTIVE

- Students will understand patterns of interactions between biotic and abiotic components in an ecosystem

GRADE

- 6

STANDARDS

- Life Science

TIME REQUIRED

- 45-60 min

VOCABULARY

- Predator/prey
- Symbiosis
- Mutualism
- Parasitism
- Commensalism

MATERIALS

- Student handout (photos for each group) of 4-5 students
- Scrap paper

RECOMMENDED

ASSESSMENT

- Student discussion/acting

Introduction

Students will understand competitive, predatory, and mutually beneficial interactions across ecosystems as well as patterns of interactions of organisms with their environments, both living and nonliving. This lesson includes a large interactive game for students to practice animal and abiotic interactions.







State Standards

MS-LS2-2: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. Emphasis is on predicting consistent patterns of interactions in terms of the relationships among and between organisms and abiotic components of ecosystems (examples of types of interactions could include competitive, predatory, and mutually beneficial like symbiosis).

Lesson Plan

Background Knowledge –

- Predator:** an animal that eats other animals
- Prey:** an animal that gets eaten by other animals
- Herbivory:** when an herbivore (plant-eater) eats plants
- Pollination:** the act of transferring pollen grains from the male anther of a flower to the female stigma to allow fertilization
- Seed dispersal:** the movement or spread of seeds away from the parent plant via wind, water, or animal movement
- Symbiosis:** when two organisms work together
- Mutualism:** two organisms working together for the benefit of both
- Parasitism:** when two species interact and one benefits but the other is harmed
- Commensalism:** when two species interact and one benefits and the other is neither harmed nor helped

INTERACTION	TYPE OF SYMBIOSIS	EXAMPLE
 <p>Benefits Benefits</p>	<p>Mutualism Species A benefits Species B benefits</p>	 <p>Sea anemone Clown fish</p>
 <p>Benefits Unaffected</p>	<p>Commensalism Species A benefits Species B unaffected</p>	 <p>Whale Barnacle</p>
 <p>Benefits Harmed</p>	<p>Parasitism Species A benefits Species B harmed</p>	 <p>Dog Tick</p>

- Biotic:** living parts of an ecosystem



- *Abiotic*: non-living parts of an ecosystem

Activity –

Explain it: Each group of 4-5 students will be given a set of photos of plants and animals interacting with each other (alternatively, project these for the students to save paper). Students must explain their answers to the questions on the pictures.

Answer Key:

1. Animals congregate in the shade of a tree. This is called commensalism as the tree is not helped or harmed, but the animals are kept cool from the sun.
2. Mushrooms are growing from the back of an ant. This is called parasitism as the ant is harmed.
3. A bear picks up burrs as it travels. This is called seed dispersal.
4. A bee visits a flower for some nectar and picks up pollen grains on its legs. This is called pollination.
5. Birds on the back of a rhino eat bugs off of the rhino, getting a free snack while helping the rhino stay clean from parasites. This is called mutualism as both species are benefiting.
6. A giraffe eats leaves from a tree. This is called herbivory.

Categorize it: Students will compete to see how many items they can come up with for each category. Set a timer for 2 minutes! Students will need 4 blank sheets of paper per group. On the first page, write "Plant/Animal Pairs." Students will have 2 minutes to come up with as many animals as they can that either eat a specific plant or help that specific plant (cannot use animals more than once, even if they eat or help multiple plants). On the second page, students will have 2 minutes to come up with "Predator/Prey Pairs". On the third page, students will have 2 minutes to come up with examples of animals that compete for the same resources ("Competition Pairs" must compete for food, shelter, or space in the same environment). On the last page, students will have 2 minutes to come up with as many "Symbiotic Pairs" as they can think of (mutualism, parasitism, and commensalism are all acceptable). Each answer gets them a point! How many points can they get?

Act it: Each group will choose two animals or an animal and a plant interaction to act out for the class to guess. But wait! So far we've only looked at the biotic components of an ecosystem. What happens if we throw in an abiotic component such as changes to the amount of available water, air, soil, sunlight, or temperature? Once each group has their chosen interaction, teachers will randomly assign an abiotic component that must be introduced into their skit. Other groups must try to guess what interaction is happening and what the abiotic component is. Give the students 2-3 minutes to decide how to act out their interaction. Winners from Categories get to choose who acts first!

Abiotic factors to choose from (either an excess of one of these or a lack of one of these):



Some example scenarios (these could get silly depending on what the students choose as their interacting pair and what abiotic factor you give them):

- What does it look like when a lion comes face to face with a frog? What about if there is an abundance of water/precipitation?
- What if a hummingbird interacts with a flower? What if there is an excess of wind?
- What happens when a zebra shark interacts with a sea turtle with low temperatures in the water?

Post Activity –

Collect the category lists and give students a group quiz by choosing pairs off of their lists and having students decide what the interaction between the two would be (competition, predatory/prey, symbiosis).

Discover Further

Extending the Lesson –

Assign each group one of the 7 major ecosystems (tundra, desert, deciduous forest, tropical rainforest, grasslands, freshwater, marine/saltwater) and have them brainstorm what abiotic factors would affect their animal populations the most. Can they write a paragraph explaining what effect those factors would have on their ecosystem?

Learn More –

Most of the exhibits at the Fort Wayne Children's Zoo contain multiple species of plants and animals. It's important for zookeepers to understand how these species interact and how things like abiotic factors can contribute. The next time you're at the Zoo, take a look at one of our exhibits and think about how those elements work together!

Look at the plants and animals in each photo and match the word that BEST describes what is happening in the photo. Be sure to explain what is happening!

WORD BANK

- Herbivory
- Pollination
- Seed Dispersal
- Symbiosis (Mutualism)
- Symbiosis (Parasitism)
- Symbiosis (Commensalism)



- 1
- A. What is happening?
B. What is this called?



- 2
- A. What is happening?
B. What is this called?



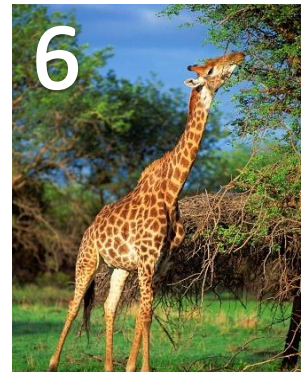
- 3
- A. What is happening?
B. What is this called?



- 4
- A. What is happening?
B. What is this called?



- 5
- A. What is happening?
B. What is this called?



- 6
- A. What is happening?
B. What is this called?