



INVASIVE SPECIES COUNCIL of BC Education Activity Musical Mussels!

Grade Level: 2 - 5
Subject Areas: Science, Life Sciences, Physical Education
Duration: 1 class period

Description:

In this active version of Musical Chairs, students will compete as aquatic species to show how basic needs are met. This activity highlights how certain adaptations enable invasive species to outcompete native species to attain water, food, shelter and room to grow. It can also be done outside using “*sit-upons*” for chairs.

(“*sit-upons*” are outdoor seating pads made from grocery bags filled with folded newspaper and duct-taped shut: have each student make their own and decorate them with waterproof markers for other outdoor uses).

Learning Objectives

Students will be able to:

- Define the terms: community, habitat, adaptations, basic needs, native species and invasive species.
- Describe the basic needs of an animal species (water, food, shelter, room to grow)
- Explain how an animal meets its basic needs.
- Explore how certain adaptations of invasive species enable them to outcompete native species to attain their basic needs.

Materials and Preparation

1. Photocopy and cut: Blackline Master: Musical Mussels into 10 card-sized pieces. (see **Resources** section below)

2. With a marker, draw stripes on ~16 mailing labels.

3. Print a “P” (for predator) on 2 labels.

4. Assemble chairs or “*sit-upons*” in two rows of 5 chairs, back to back.

Select music to play during the game. Optional: choose an aquatic theme - for example tunes from *The Little Mermaid* or *Finding Nemo*, or Handel’s *Watermusic*.

Procedure

1. Introduce or review the concept of basic needs such as food, water, shelter, and room to grow. Indicate that all animals, including humans, must meet these needs to survive.

2. Ask students to imagine being unable to get something that was a basic need (like having no water while playing soccer on a hot summer day, or not being able to get undercover during a

rainstorm). **Ask:** *Can you think of a situation where a human or animal has gone without getting a basic need?*

GAME I:

Explain to students that they will experience the struggle for survival through a version of Musical Chairs. Each of the chairs will represent all of an aquatic animal's basic needs (food, clean water, shelter and room to grow). Therefore, students that find a seat when the music stops are able to meet all their needs.

4. Choose 5 students to be native fish (such as trout or Dolly Varden) in a lake. Play one round of Musical Chairs as you normally would with the five students walking slowly around the 10 chairs and finding seats once the music stops.

5. Explain that due to their success at meeting their basic needs, these 5 students are able to reproduce. Add 5 more students and play again.

6. Explain that again, due to the success of the fish meeting their basic needs, reproduction occurs and five more students are added to the game due to reproduction. After this round, not all of the fish are able to meet their needs. Five must leave to find food elsewhere or perish.

7. Play several more rounds, allowing students who have not played yet to participate. Ask questions throughout to prompt their understanding of the simulation. For example: *What are the basic needs? What happens to those that don't meet their basic needs? What happens to those that do?*

8. Place a Musical Mussel card on three chairs face down. Play a round and ask those landing on a card to share it with the class.

Explain: Zebra Mussels are a non-native (new to the area) species accidentally brought to the lake. They are not yet found in BC but have impacted many lakes and waterways in Ontario and other eastern provinces. They compete for the same basic needs as the fish do. If a player gets a card that shows that a zebra mussel has taken a basic need, they must leave the lake along with the others who couldn't meet their basic needs.

10. Retrieve all cards and shuffle. Explain that the zebra mussels have got enough basic needs to reproduce, this time place a card down on 6 chairs. Play the round again and note that reproduction in fish is not occurring due to dwindling basic needs. Again, those with zebra mussel cards on their seats must leave the game.

11. Retrieve all mussel cards, shuffle and place 9 cards down on chairs. Play the round.

12. Retrieve all mussel cards, shuffle and place 10 cards down on chairs. Play the round. Ask remaining student(s): How are you feeling? Are you worried? Ask the class: What do you think would happen next? Do you think this could really happen in nature? How do you feel about zebra mussels taking over your lake?

Explain that the next two rounds will give insight into some of the reasons zebra mussels can outcompete native species.

ROUND I:

From the class group, choose 10 students to take on the role of a native aquatic species, 1 zebra mussel (identified with striped mailing labels) and 2 predators (“P” labels). Explain: during this round of Musical Chairs, predators will walk around and try to tag the native species only. This is because predators don’t like to eat zebra mussels. When a predator tags a native species, that student must leave the game. Therefore, natives species must try to both dodge the predators and get their basic needs met. (Note: As predators don’t compete with the native species and zebra mussels for the same basic needs they will not try and get a seat when the music stops.) Play one round

ROUND II: Add two mussels – representing successful reproduction – for every seat-finding mussel or try again with a new mussel if the one playing doesn’t make it.

Play again, doubling the number of successful mussels from the last round.

Play again, allowing 2 mussels to share one seat if all others are taken. Explain that zebra mussels have small space requirements and live in colonies attached to one another by sticky threads they produce to stay on hard surfaces. Continue until most or all of the basic needs (seats) are taken by zebra mussels.

Discuss the game observations with students. *Ask: What happened to the native species competing with the zebra mussels? Why were the zebra mussels so successful?* (They are not sought by predators, they need less space to live, and they produce many offspring.)

Explain that zebra mussels (and other invasive species) have adaptations that make them very successful in nature and enable them to expand throughout waterways.

Ask: How do you think zebra mussels affect humans? (Because their populations grow quickly, they take food away from native fish. This decreases fish stock and impacts humans. In addition, they clog water pipes and cling to boat hulls, ruin beaches and cut swimmer’s feet with their sharp edges.)

Ask: How do you think we can manage them and prevent their spread? (Take care to ensure they don’t get into new habitats.)

Clean Drain Dry

Introduce the **Clean Drain Dry** slogan to students: this is the main provincial program targeting boaters to clean, drain and dry their boats, trailers and fishing equipment before entering another water body, to ensure that they do not spread invasive species from place to place, especially zebra mussels, but also other aquatic invasive plants such as Eurasian watermilfoil. Learn more about how to protect our waterways from invasive species at:

<http://bcinvasives.ca/resources/programs/clean-drain-dry/>

Extension Activity: Have students prepare a short write-up that describes the game’s outcome and includes the words: community, habitat, adaptations, basic needs, native species and invasive species. They can illustrate their report with some of BC's top invasive aquatic species.

Notes for Teacher: Some Background

A *native species* is one that naturally occurs in an area. Native species have co-evolved with other competing species, predators, diseases, climate factors and other aspects of a region and an ecosystem.

Non-native or alien species do not naturally occur in an area and were likely brought to a place by humans, either accidentally or intentionally. A non-native species has not evolved as part of the native ecosystem and does not have the same balance and place in the ecosystem.

Invasive species are one of the biggest threats to native ecosystems worldwide. The United Nations Environment Programme states that invasive species are recognized as “one of the greatest biological threats to the environment and economic welfare of the planet. The threat to biodiversity due to invasive alien species is considered second only to that of habitat loss”. Invasive species are able to out-compete native species for their basic needs such as food, shelter and space.

There are approximately 133 different ***aquatic invasive species*** in British Columbia, many of which continue to spread causing serious damage, such as clogging waterways, reducing habitat, outcompeting native fish and wildlife populations, and impacting recreation, fishing and swimming. These include:

- Eurasian Watermilfoil
- Brazilian Elodea
- Purple Loosestrife
- Largemouth Bass
- Northern Pike
- American Bullfrog
- Yellow Flag Iris
- Parrot Feather

Quagga and zebra mussels are a High Alert species in BC – We do not want them to establish here! They have invaded the Great Lakes, causing significant economic and environmental damage through their ability to spread rapidly and establish in underwater infrastructure such as hydroelectric intakes.

ISCBC asks all boaters and outdoor recreation enthusiasts to commit to following the Clean Drain Dry principles as soon their boat or watercraft is removed from the water:

CLEAN off all plant parts, animals, and mud from boat and equipment (e.g. boots, waders, fishing gear). Use a power wash station if available.

DRAIN onto land all items that can hold water (e.g. buckets, wells, bilge, and ballast).

DRY all items completely before launching into another body of water.

Learn more about how to protect our waterways from invasive species at:

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Adapted from the curriculum resource: Making Waves: Protecting Ontario’s Aquatic Habitats:
www.invadingspecies.com

Musical Mussels Playing Cards

<p>You are meeting your basic needs!</p>	<p>Zebra mussels are taking your food. You can't stay! (Basic Need: FOOD)</p>
<p>Zebra mussels are crowding you out! (Basic Need: ROOM TO GROW)</p>	<p>The zebra mussels on your back make it hard to move. This makes you vulnerable to predators. (Basic Need: SAFETY)</p>
<p>Because zebra mussels eat so much, there is less food for you! Go away! (Basic Need: FOOD)</p>	<p>Your eggs won't hatch among zebra mussels. Lay them somewhere else! (Basic Need: SHELTER)</p>
<p>Zebra mussels are crowding you out! (Basic Need: ROOM TO GROW)</p>	<p>Zebra mussels are taking your food. You can't stay! (Basic Need: FOOD)</p>
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