84 Clam Catch

Ecosystems and the populations that live in them usually vary from season to season and year to year, often depending on non-living factors such as rainfall or temperature variations. Populations of a species can also be affected by living factors, such as other species that may provide food, compete for food, or provide shade or shelter.

When a new species is introduced into an area, it can compete with native species for food and other resources. Clams and zebra mussels are both mollusks that feed by filtering plankton from the water. What happens when zebra mussels are introduced into a habitat containing a clam population?

CHALLENGE

How might the introduction of a competing species, such as zebra mussels, affect a population of native clams?

Zebra mussels growing on a native clam

MATERIALS

For the class

- **1 piece of chalk**
- **25 red arm bands**

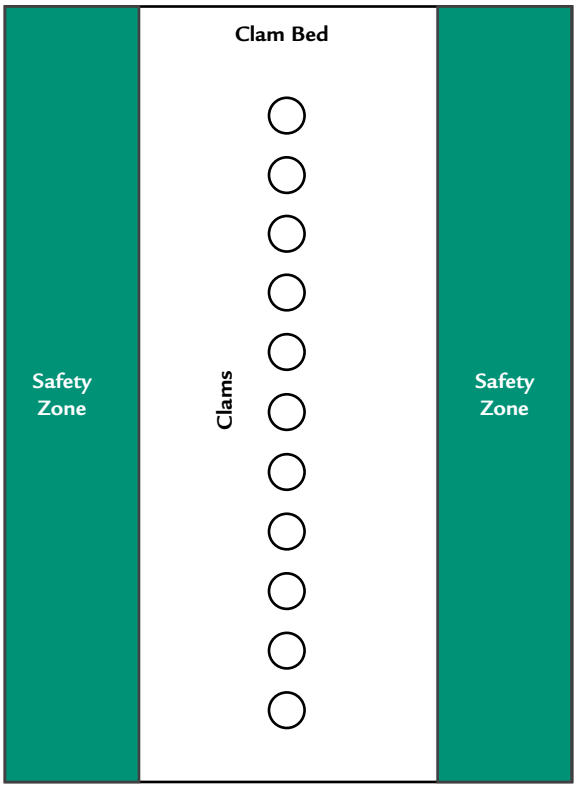
For each student

- **1 Student Sheet 84.1, "Population Data"**
- **1 sheet of graph paper**
- **Student Sheet 77.2, "Anticipation Guide: Introduced Species—Zebra Mussels," from Activity 77**

PROCEDURE

Part A: Clam Population Size

1. As directed by your teacher, determine which students will initially represent clams and which students will initially represent plankton.
2. If you represent a clam, stand inside a chalk circle. There should be only one clam per circle. The space between the clams represents the amount of space a clam needs to survive. As long as you represent a clam, you must stay inside the circle.
3. If you represent plankton, stand behind the safety line on one side of the clam bed.
4. Your teacher will instruct the plankton to run through the clam bed, from one safety zone to the other (see map below). A clam can use only one hand to tag its food. Each clam will try to "catch" (tag) plankton to survive; any plankton that is caught becomes a clam and has to find a home circle. Any clam that does not catch any plankton dies from lack of food; the student becomes plankton and must go to the safety zone.
5. Count and record the total population of clams.
6. Repeat Steps 4 and 5 at least ten times.



CLAM CATCH GAME MAP

Part B: Competition

7. Zebra mussels have invaded the clam bed! As directed by your teacher, determine which students will initially represent clams, which students will initially represent plankton, and which students will initially represent zebra mussels.

8. If you represent a zebra mussel, wear an arm band to identify yourself and then stand inside a chalk circle. Since zebra mussels grow very close together, a zebra mussel can grow in (i.e. share) the same circle as a clam. If no clams are present, two zebra mussels can occupy the same circle. As long as you represent a zebra mussel, you must stay inside a circle.

9. If you represent a clam, stand inside a chalk circle. There can still be only one clam per circle (although one zebra mussel can occupy the same circle). As long as you represent a clam, you must stay inside the circle.

10. If you represent plankton, stand behind the safety line on one side of the clam bed.

11. Your teacher will instruct the plankton to run through the clam bed, from one safety zone to the other (see the Clam Catch Game map). A clam can use only one hand to tag its food, while a zebra mussel can use both hands. Each clam and zebra mussel will try to catch plankton to survive; any plankton that is caught becomes a clam or a zebra mussel (depending on who catches it). If you become a zebra mussel, collect an arm band to wear.

    Any clam or zebra mussel that does not catch any plankton dies from lack of food and becomes plankton. When a zebra mussel dies, the arm band should be removed.

12. Record and count the total population of clams and zebra mussels.

13. Repeat Steps 11 and 12 at least ten times.

14. Record the class data on Student Sheet 88.1, "Population Data."

EXTENSION

Are Introduced Species Always Successful?

Introduce a mobile predator that eats only clams. Figure out how to modify the game to include this predator. Predict what you think will happen to the predator population and the clam population over time. Then test your ideas by playing the game for at least ten rounds.

ANALYSIS

Part A: Clam Population

1. **a.** Graph the population of clams over time from Part A of the Procedure. Decide which type of graph (bar or line) would best represent the data. Remember to label your axes and to title your graph.

   b. Look at your graph and describe how this population of clams changed over time.

2. What factor limited the size of the clam population?

Part B: Competition

3. **a.** Graph the population of clams and zebra mussels over time from Part B of the Procedure. Use the same type of graph you used in Part A. Remember to label your axes and to title your graph. Use a key to show what represents the clam population and what represents the zebra mussel population.

   b. Look at your graph and describe how the population of clams changed over time.

   c. Look at your graph and describe how the population of zebra mussels changed over time.

4. **a.** What happened to the clam population after zebra mussels were introduced?

   b. Why did zebra mussels have this effect on the clam population? Explain.

5. **a.** In a real lake, what non-living factors might affect the size of clam and zebra mussel populations? List them.

   Hint: Go outside and look at an ecosystem around you. Observing an actual ecosystem may help you think of more factors.

   b. In a real lake, what living factors might affect the size of clam and zebra mussel populations? List them.

6. Fill in the "After" column for Statements 6–8 only on Sheet 77.2, "Anticipation Guide: Introduced Species—Zebra Mussels." Did your thinking change?