

From the Mountains to the Estuary: From the Schoolyard to the Bay

**Meaningful Watershed Experiences
for Grade 6 Students**

Created by:



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The NOAA Bay Watershed Education Training (B-WET) Program**



In partnership with:



**Occoquan Bay National Wildlife Refuge
Manassas Battlefield National Park**



Water Quality

What Happens When Things Go Wrong?

Overview

Students will play a game of tag to experience the community relationships that exist in a wetland.

Materials

- Small Ziploc bags
- Four cones to mark boundary of wetland
- Strips of three different color fabrics that students can tie around arms (about 16 each)-green, blue, red
- Food Chain Cards
- Popcorn- 2 large bags
- Cheese popcorn – 1 large bag
- Large area for playing field
- Four hula hoops

Set up

Place four cones at corners of square to mark boundaries of wetlands

Place two hula hoops in middle of square- these are shelter for prey

Place two hula hoops outside of playing field- these are “decomposition piles”

Setting the Stage

Ask if anyone of the students like seafood. What kind of seafood do you eat? Some of it comes right from the Chesapeake Bay, like anchovies and bass. Explain that the students are going to play a game where they get to be some of the organisms that live in the Bay.

Acquisition of Learning:

1. Use food chain cards and have students create food chain:
 - Algae ->copepods-> anchovies-> striped bass
2. Divide the class into 3 even groups. Give each group of students a different color fabric. Green = copepods Blue = anchovies Red = Bass.
3. Pass out the towels and have each student tie it around his or her wrist in a bow, so that they are easy to remove at the end of the game.

Q: What is the predator/prey relationship in this food chain?

Bass hunt anchovies, anchovies hunt copepods, and copepods eat algae (algae represented by popcorn.)

4. Explain **Rules of Game**. Each student will get a small plastic bag. This bag represents the stomach. For the animals to survive they must not be tagged during the game and their stomachs must be filled as follows by the game's end: copepods – 1/3 full, anchovies – 2/3 full, bass full.

The copepods will get 15 seconds to put popcorn from the ground into their baggies. After 15 seconds, the students playing anchovies will come onto the field and try tag the copepods. If they are successful the copepod is “dead” and the contents of its baggie are emptied into the anchovy's bag (the empty baggie stays with the copepod to be used again in the next round.)

After 15 seconds, send the bass in to try to tag the anchovies.

Anchovies and Bass may not pick up popcorn from the ground. Bass may only tag anchovies and if successful, get the contents of the anchovies' baggie.

Safe zone or shelter: If the students have the correct amount of popcorn for their organism, they can go into the safe zone- represented by hula hoops. These students survive. Students can also 'hide" in the safe zone (they represent shelter), but can only stay a short while if their stomach isn't full.

If the students are tagged, they need to go to the “decomposition” hula hoop at the edge of the playing field.

Show students the playing field. Mark the corners with cones. Students may not leave the area during the game. Spread out a large bag of popcorn over the ecosystem and a little bit of cheese popcorn (the cheese popcorn represents pesticides- but don't tell the students!)

5. Start the game. Signal the primary consumers, the copepods, to begin eating algae (gathering popcorn.)
6. After 15 seconds allow the anchovies, secondary consumers, to enter the area. After 15 more seconds allow the bass, the tertiary consumers, to enter the ecosystem.
7. Allow the students to play for several minutes or until there are no more prey. At the end of play all remaining animals must have the right amount of food in their baggies, or they too are dead. Note the length of time the game lasted. Tally the number and kinds of animals that survived (had enough food in their stomachs)

Q: Why did the game only last a few minutes?

Habitat crowding, and the number of predators, verses the number of prey-too many predators, not enough prey

9. Play the game again but change the number of organisms (and amount food if necessary). The second round can be played in the same area as round one, with the following changes, half the students will play copepods, the other half should be divided so that 2/3 of them are anchovies and 1/3 are bass.
10. Discuss the effects of changing the population numbers on the time the game lasted.

Did more organisms survive?

Yes, the ecosystem needs the right number of each organism

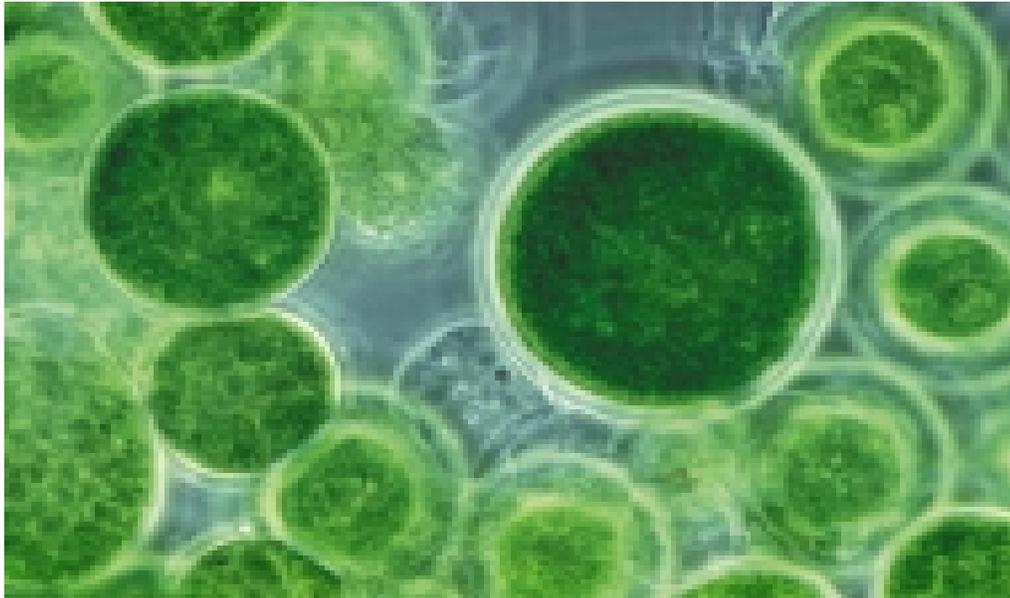
11. Finally- have students that survived game check their bag to see if they have any cheese popcorn. If copepods have 3, if anchovies have 5, or bass have 7- –they were killed by pesticides ☹
Discuss **bioaccumulation**- since bass are larger it takes more pesticide to kill but it still might make them sick or unable to reproduce

Closure:

Discuss how organisms are dependent on each other. Could they survive without the other organisms?

How did the pesticides (orange popcorn) affect the organisms?

Do you know of any organisms in the Chesapeake that are declining in population (*oysters, blue crabs, shad, submerged aquatic vegetation SAV*)



Algae



Copepod



Anchovy



Striped Bass