

Remarkable Oyster Lesson Plan

- I. Grading the Bay
 - a. Ask students how they would grade the Bay. “Just like you are graded in school in different subjects, so is the Bay. What subjects do you think the Bay is graded in?”
 - i. Water quality, SAV, Oyster, Fisheries (rockfish and menhaden, 2 main species)
 - ii. Overall grade of Bay is C in 2010, but upper Eastern Shore received D, at least that is the first improvement in the last 5 years!
 - b. Why is the grade so low? Ask students. If needed, prompt by asking students what color water they have seen in the Bay. Many will say brown (sediment) and green (algae from excess nutrients)
 - i. Trash
 1. Bright side= easily picked up
 - ii. Oils, toxins
 1. Chemicals, runoff
 - iii. Sediment
 1. Why is dirt pollution? Discuss how it clouds the water and blocks sunlight needed by SAV. For animals explain that fish use gills to breathe oxygen bubbles in the water. They get the oxygen by water flowing over their gills. Any particles in the water damage and clog the gills, choking the animals. Explain that it would be like locking a person in a closet with a chain smoker.
 - iv. Nutrients
 1. Runoff, especially from fertilizers applied to farm land and manure, septic tanks do little to remove nutrients. Algae absorb nutrients and “bloom” on surface blocking out sunlight. SAV need sunlight, die off. Decomposition of algae and SAV by bacteria uses up oxygen, setting off domino effect that ends in “Dead Zones” where there is little to no oxygen in the water.
- II. Historic Bay
 - a. Used to be able to see down 30 feet. There was little sediment clouding the water and little algae covering the surface of the water. Why? We used to have an animal that could naturally filter the whole Bay. Ask students – what was that filter?
- III. Oyster Biology
 - a. Invertebrate, hard shell, soft body, bivalve (2 shells joined at a hinge). Hinge on one end, muscle inside allows shells to open and close.
 - i. Pass around oyster shells
 - b. Life functions, just like us! Why do they have to open their shells?
 - i. Eating- look at picture of mouth. Looks just like a straw.
 1. Eats algae. Pump in water and extract food from it. As they filter the water for food, they also remove sediment and other organic matter, cleaning the water.
 2. Oyster dance – see dance description following lesson plan.

- ii. Breathing
 1. Open their shells and pull in water which has oxygen dissolved in it. If there is a lot of sediment in the water, their gills can get covered in sediment.
 - iii. Reproducing
 1. Oysters release eggs (and sperm) into the water. The larvae grow and begin to sink as they get heavier. If they land on something hard (oyster shell, artificial reef structure), they will begin to build their shell.
 2. Baby oysters are called spat once they have settled.
- IV. Oyster Game
 - a. Review reasons why oyster numbers have declined: overharvesting (hand tonging, dredging, mechanical tonging), sedimentation, loss of habitat, and disease (MSX and Dermo – 1960s-present).
- V. Benthic Communities
 - a. Oyster reefs are also great habitat for other animals. We will discover this as we search through a bag of oyster shells that has been out in the Bay for a couple weeks.
 - b. Each group will take a clipboard with “Between the Nooks and Crannies” and another with pictures of artifacts. Also give each group 2 glass dishes.
 - c. Divide into 4-5 groups. Each group goes to one kiddie pool. Cut open the oyster bags and let the students pick through the shells. Remind them to focus on identifying the critters using the ID packets. For the last 5 minutes, remind them to identify artifacts.
 - d. Come inside the Pavilion for show and tell. Let each group share a living organism and an artifact. Have the sharing group show their critter to any groups that did not find the same critter. Use the binder of pictures to show a larger image of critters and artifacts.
- VI. Restoration Efforts
 - a. Review why oysters are important
 - b. Leave students on a positive note! How can we affect the future of the oyster population:
 1. Reduce nutrient input into the Bay
 2. Plant native plants that require less fertilizer and water. Plant grasses along the shoreline to help prevent erosion. Reduce use of fertilizers and pesticides
 3. Start a compost pile, instead of using a garbage disposal
 4. Obey fishing, hunting, and harvesting regulations
 5. Artificial reefs
 6. Hatcheries produce larvae and then distribute larvae or spat to be placed in oyster sanctuaries
 7. Marylanders Grow Oysters (protect spat in cages for a year and then place oysters in protect sanctuaries)
 - c. Instruct students on how to re-bag oysters. Drain out as much water as possible, dump any sediment and critters in the red buckets with the bage