Oyster Gardens
No Soil Required!

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Credits: Maryland Sea Grant Oyster Gardening Program

Summary
Using data from Maryland Sea Grant Oyster Gardening Program, calculate oyster survivorship rates in Chesapeake Bay rivers.

Grade Level:
9-12

Lesson Time:
1 - 1.5 hrs.

Materials Required:
Chesapeake Bay map (pdf)

Natl. Science Standards
Click here for a list of the aligned National Science Education Standards.

Related Resources
Molluscs, Aquaculture, Seafood, Estuary

Objectives

- Recognize the oyster's role in water quality.
- Identify factors contributing to the decline of oysters and restoration options.
- Formulate oyster survivorship rates in different rivers in the Chesapeake Bay.

Vocabulary
Filter feeders, Dermo, MSX

Introduction
Along America's coastlines, a new type of gardening is growing in popularity. It doesn't require soil or shovel; however, other unique equipment is necessary. Water is essential; but saline, not fresh. And, like traditional gardening, a bit of back-aching work and a lot of tender loving care are also required.

Oysters are in need of some tending these days because various human activities have drastically reduced their populations. Being stationary filter feeders, these bivalves cannot relocate when runoff from land carries silt or toxins to their immediate area, or when dissolved oxygen levels become critically low due to algae blooms. Populations have been hit hard by diseases, Dermo and MSX, and overharvesting by humans has also made it difficult for oyster populations to sustain themselves.

Oysters play a critical role in the ecosystem by consuming phytoplankton and improving water quality through their filtering. When the first settlers arrived, oyster reefs were plentiful, and even poked out of the water like mountains peeking through the clouds. Chesapeake Bay, whose name means "Great Shellfish Bay," was historically replete with high numbers of oysters that were able to filter the bay water in a period of about three days. It takes the current oyster population approximately one year to filter the bay water.

Oyster gardening activities have evolved with the strategy of raising hatchery-produced oyster seed in floating cages to a size that allows them to be transplanted safely onto reefs for restoration. With the current knowledge about disease problems, the oyster gardening approach allows the grower some control in overcoming them. It generally takes wild oysters three years to get to harvestable size, but because of Dermo and MSX, the oysters are not likely to survive that long. Hatchery operators can spawn oysters earlier than under natural conditions. This gives young oysters a big headstart in growth before they are potentially exposed to diseases. While optimum growth in oysters occurs in higher salinities, disease pressure is generally less intense at lower salinities, and the hope is that oysters can survive to maturity there before being stocked on reefs.

Oyster gardening programs are cropping up in New York Harbor, the Hudson River, and Galveston Bay, Texas, but perhaps the most visible is in the Chesapeake Bay, historically one of the country's foremost oyster production areas.

Around the Chesapeake Bay, both private homeowners and students are getting involved. The Virginia Institute of Marine Science (VIMS) oyster gardening efforts include the Gardener REsearch Extension Network (GREEN), which involves gardeners with testing new strains of oysters at their sites, and the CHesapeake Oyster Monitoring Program (CHOMP), which gathers water quality and oyster growth and mortality data collected by participating gardeners. Information from these programs will assist both researchers and gardeners with predicting oyster growing performance in various locations around the Bay. Another program, the Oyster Gardening Program is a cooperative effort of the Oyster Alliance, which includes the Chesapeake Bay Foundation, the Maryland Sea Grant Extension Program, the University of Maryland Center for Environmental Science, and the Oyster Recovery Partnership. The Chesapeake Bay Foundation's Student Oyster Corps is comprised of 40 classes in Maryland and 56 classes in Virginia. They raise oysters in floats attached to docks, monitoring and tracking their size and the environmental conditions that may affect their growth. At the end of the project students have the opportunity to board a boat and transplant their oysters onto reefs.

The Maryland Sea Grant Oyster Gardening page has great information on getting started, oyster ecology, oyster seed, and oyster care. Let's also look at their Oyster Garden Data.

Data Activity
Go to the Maryland Sea Grant Oyster Garden Data page. To get an overall picture of the success of oyster gardening in the Chesapeake Bay and its tributaries, select the box for Survival (and unselect average length), leave the default choice for Rivers (All) and click on **Compute Statistics**. You will see a list by water body of average percent survival based on samples of 50 randomly selected oysters. The "n" stands for number of samples. For each location, calculate the average survival over the sampling years. (The "n" stands for sample number, or number of oyster gardens surveyed.)

Write the survival rates in the appropriate area on this map from the Chesapeake Bay Program. For higher salinities, a survival rate above 50% is good, while in lower salinity areas, 70-75% is considered good.

Discussion Questions:
Are you impressed by the numbers?
Which areas have the best survival?
Which the worst?

If your classroom has access to a dock in a river or bay, perhaps you too could contribute to oyster restoration efforts in your area.