

Unit 4: Oyster Aquaculture Aquaculture & Resource Management

20 Classes

Rev. June 2019

Essential Questions

- What are the environmental and economic impacts of farming oysters?

Essential Understandings with Unit Goals

EU 1: Oysters plays a vital role in oceanic waters, providing filtration, and a food source to various organisms.

- Examine the impact that oyster have on an ecosystem

EU 2: Oysters are aquacultured through a variety of culture methods in order to boost populations and provide a food source

- Analyze the advantages and disadvantages of various methods of oyster aquaculture
- Design a plan for MSMHS to start aquaculturing oysters

EU 3: Oysters have been a major food and monetary source throughout the history of Connecticut

- Evaluate the oyster aquaculture industry in Connecticut

Standards

Common Core State Standards

- **CCSS.ELA-Literacy.RST.11-12.7** Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
- **CCSS.ELA-Literacy.RST.11-12.9** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

Next Generation Science Standards

- **HS-ESS3-1.** Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
- **HS-ESS3-4.** Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

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- **HS-ETS1-2.** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

MSMHS Academic, Civic, and Social Competencies

Competency 1: Read and write effectively for a variety of purposes

Competency 2: Speak effectively with a variety of audiences in an accountable manner

Competency 3: Make decisions and solve problems independently and collaboratively

Competency 4: Apply scientific knowledge and concepts to a variety of investigative tasks.

Competency 5. Contribute to a positive learning environment with respect and responsibility

Unit Content Overview

- Aquaculture
- Fouling Organisms
- Oyster life cycle
- Broadcast spawning
- Bag Culture
- Suspended Culture
- Pollution
- Oyster Economics
- Historical importance oysters in LIS
- The ecology of Oysters
- Oyster Populations
- Marketing
- Economic Fluctuation

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Learning Objectives with *TWPS Activities*

Students will be able to...

- Compare and contrast the various species of Oysters
 - *Why would the same species of oyster grown in different places look much differently?*
- Investigate the history between humans and oysters
 - *What is the cultural significance of oysters to ancient populations?*
- Analyze the unique life cycle characteristics of the Eastern Oyster
 - *What is the process involved with the development of an oyster from planktonic larvae?*
- Identify the anatomical features of the Eastern Oyster through dissection
 - *How do you think oysters process phytoplankton?*
- Identify the methods used to grow oysters commercially
 - *What is the logic behind the different methods of aquaculturing oysters?*
- Evaluate the various oyster aquaculture methods
 - *How might different oyster aquaculture methods affect the growth and shape of an oyster?*
- Identify the challenges that affect oyster aquaculture
 - *What environmental factors must be taken into account when selecting an ideal oyster aquaculture site?*
- Design a proposal to grow oysters at MSMHS
 - *What kind of setup would be needed to grow oysters at MSMHS?*
- Investigate phytoplankton production at MSMHS
 - *What factors need to be considered when culturing algae in captivity?*
- Compare and contrast different species of microalgae used in oyster aquaculture
 - *What constitutes a healthy food source for the Eastern Oyster?*
- Communicate a proposal for oyster aquaculture at MSMHS
 - *How would closed system aquaculture of oysters be different from growing them in LIS?*
- Research the history of oysters in Long Island Sound
 - *How has the habitat of LIS changed within the last few hundred years? What affect do you think that has had on the wild oyster population?*
- Evaluate the effect oysters have on water quality in LIS
 - *What role do oysters play in the nutrient cycle of LIS?*
- Demonstrate the impact of oysters on a habitat
 - *What other habitats might be affected by the presence/absence of oysters?*
- Identify the laws and regulations associated with growing, harvesting, and keeping oysters in Long Island Sound
 - *Why would oyster aquaculture sites need to be regulated by the Department of Agriculture?*

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- Analyze the impact that oysters have on the economy of Connecticut
 - *What is the economic value of an oyster to restaurants, consumers, and producers?*
- Create a poster that outlines the economic importance of oyster in LIS
 - *How can oyster aquaculture create a healthier habitat in LIS?*

Instructional Strategies/Differentiated Instruction

- **HLP** Academically Productive Talk
- **HLP** Writing to Learn (TWPS)
- **HLP** Effective Feedback
- Warm up
- Teacher Modeling
- Student self-assessment
- Flexible Grouping
- Youtube/videos
- Small Group Discussions
- Independent reading
- Collaborative group activities
- Lectures and Note-taking

Assessments

FORMATIVE ASSESSMENTS:

- Warm Up Activities
- Exit Slips
- Summarizing relevant texts
- Homework Checks
- Daily Check-Ins
- Oyster Aquaculture at MSMHS
 - MSMHS Rubric 3: Problem Solving
- Oyster Aquaculture Poster
 - MSMHS Rubric 3: Problem Solving

SUMMATIVE ASSESSMENTS:

- Quiz EU 1
- Quiz EU 2 & 3
- Oyster Aquaculture Poster

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- Unit Exam

Unit Task

Unit Task Name: Oyster Aquaculture Poster

Description: Students will utilize the knowledge they gained in this unit to compose a report that details the historical importance of oysters in LIS and proposes a solution to the problem of their decline (EU 3). In an effort to raise awareness of the importance of oysters (EU 1), students will elaborate on the process of growing oysters (EU 2), and the impact they have on the Long Island Sound environment. Students will produce a professional scientific poster as their product and then showcase them to their peers.

Evaluation: MSMHS Rubric 3: Problem Solving

Unit Resources

- Internet databases
- Laptops
- Shellfish Guide
- Long Island Sound Study
- SRAC Oyster Aquaculture