



Marine Science and Technology - Unit 3 Science - Water Quality and its Effects on Living Systems

Unit Focus

In this unit, water chemistry will be explored through the raising of trout in the classroom and environmental testing of the Hammonasset River and local shell fishing beds. Hammonasset and shellfish bed water quality and population of soft-shelled clams will be assessed by the students through hands-on activities and partnerships with the Town of Madison town engineer and shellfish commission. Water testing results will be forwarded to the state and be used as a base data set. Field studies on the Hammonasset River and local shellfish beds will be conducted to reinforce the unit concepts and add to the longitudinal data used to assess the health of Long Island Sound. Units like this one, where students use their hands, help them build confidence and problem-solving skills useful for life's experiences. With appreciation to Robert Russo, Office of Town Engineer, for his help with the development of the water quality testing experiences.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
<p>Next Generation Science Standards (content standards) High School Earth and Space Sciences: 9 - 12</p> <ul style="list-style-type: none"> 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. (HSESS3-1) Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. (HS-ESS3-4) Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. (HSESS3-6) <p>Madison Public Schools Profile of a Graduate</p> <ul style="list-style-type: none"> Analyzing: Examining information/data/ evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2) Product Creation: Effectively use a medium to communicate important information. (POG.3.2) 	<p><i>Students will be able to independently use their learning to...</i></p> <p>T1 Analyze qualitative and quantitative data to interpret patterns, draw conclusions, and/or make predictions. T2 Use the scientific process to generate evidence that addresses the original questions.</p>	
	Meaning	
	Understanding(s)	Essential Question(s)
	<p><i>Students will understand that...</i></p> <p>U1 Ecosystems are a dynamic interaction of various factors. When one or more of these factors is altered, it can impact the health of the entire ecosystem. U2 Madison dedicates significant resources to assess the water quality in a variety of locations in town. This is done to check for illicit discharge and protect the local water supply and ecosystems.</p>	<p><i>Students will keep considering...</i></p> <p>Q1 How does the interdependence of abiotic and biotic factors in an ecosystem affect a the health and balance of an ecosystem? Q2 Why does the town of Madison monitor water quality?</p>
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<p><i>Students will know...</i></p> <p>K1 Excess phosphates and nitrates from detergent, fertilizer, and septic/sewer systems cause dead zones in bodies of water through a process called eutrophication.</p>	<p><i>Students will be skilled at...</i></p> <p>S1 Use data from water quality testing to assess and report the quality of water in our community.</p>

Stage 1: Desired Results - Key Understandings

K2 Many organisms are affected by the amount of dissolved substances in an aquatic ecosystem, including oxygen and salt.
K3 Many organisms require a particular pH range for survival.
K4 Nitrogen is an important component of a healthy ecosystem, however human activities can disrupt the natural cycle.
K5 The town engineer is responsible for assessing the water quality of local bodies of water and reporting the results of water quality testing to the state of Connecticut.