



# PROJECT OCEANOLOGY



## Lobsters & Climate Change

### **Overview**

Students will complete a variety of stations in which they will examine live lobsters, practice skills related to the lobster fishery, such as lobster measurement and banding, examine a lobster trap, learn about lobster life cycles, interpret data from CT DEEP and Project Oceanology on climate change and lobster populations in Long Island Sound, and create a graph based on Project Oceanology's lobster catch dataset. Students will then discuss the implications of their observations by identifying causes and consequences of lobster die-off in Long Island Sound in terms of ecosystem health as well as economic benefit.

### **Alignment with NGSS (Middle School)**

#### **Performance Expectations**

**MS-LS2-1:** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. *Students will study environmental changes in Long Island Sound over the past 40-50 years, specifically those thought to be connected to Global Climate Change.*

**MS-LS2-4:** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. *Students will analyze the human impacts on the environment related to global climate change and study the lobster die-off phenomenon in Long Island Sound.*

#### **Science and Engineering Practices**

**Analyzing and interpreting data:** Analyze and interpret data to provide evidence for phenomena. *Students will observe and conduct experiments to understand how biotic and abiotic factors influence the lobster population.*

**Engaging in argument from evidence:** Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. *Students will study the life cycle of lobsters, lobster industry, and abiotic factors impacting lobster population and distribution. Students will use evidence to determine the impacts of climate change on lobster populations in LIS.*



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## Crosscutting Concepts

**Cause and Effect:** Cause and effect relationships may be used to predict phenomena in natural or designed systems. *Students will study the impacts of climate change and human activity on lobster populations in LIS.*

**Stability and Change:** Small changes in one part of a system might cause large changes in another part. *Students will conduct an experiment to determine the impact of abiotic changes (pH, temperature, CO<sub>2</sub>) on lobster populations.*

## Disciplinary Core Ideas

**LS2.A: Interdependent Relationships in Ecosystems:** Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. Growth of organisms and population increases are limited by access to resources. *Students will evaluate the evidence to make a claim about possible causes of the lobster fishery collapse in LIS.*

**LS2.C: Ecosystem Dynamics, Functioning, and Resilience:** Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. *Students will recognize patterns as empirical evidence for causality in supporting their explanations of the lobster die-off phenomenon.*