

NGSS Connections

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Chesapeake Bay Critter Investigation

Grade Level: High School

Performance Expectations: Students' ability to complete the following performance expectation(s) will be supported by participation in this activity.

MS-LS2-6: Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

Dimension	NGSS Code or citation	Corresponding student task in activity
Disciplinary Core Idea	LS2.C. Ecosystem Dynamics, Functioning, and Resilience <ul style="list-style-type: none"> • A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status, as opposed to becoming a very different ecosystem. 	Students measure the pH, temperature, and salinity of the Inner Harbor's water column at three different depths (1 m, 3 m, 5 m), then compare the biodiversity found on biodisks cultured at each of the three depths. They draw the connection between differences in the characteristics in different columns depths with the difference in organisms found there. Students answer the question of if and how the water quality characteristics measured might change over a day, season, year, and how the organisms living there might have to adjust.
Practice	Constructing Explanations and Designing Solutions <ul style="list-style-type: none"> • Make a quantitative or qualitative claim regarding the relationship between dependent and independent variables. 	Students collect water quality and biodiversity data then use that to make claims regarding biodiversity and differences at different levels in the water column.
	Analyzing and Interpreting Data	

	<ul style="list-style-type: none"> Consider limitations of data analysis (e.g., measurement error, sample selection) when analyzing and interpreting data. 	<p>Students use data collected in their investigations to provide evidence for differences in biodiversity at different depths.</p> <p>In some classes, students consider the number of disks observed and measurements made in data collection in terms of reliability of the data collected.</p>
Crosscutting Concept	<p>Scale, Proportion, and quantity</p> <ul style="list-style-type: none"> Phenomena that can be observed at one scale may not be observed at another scale. 	<p>In some classes, students observe that the organisms on the biodisks are very different and much smaller than the organisms they observe casually walking along the harbor (i.e., we are observing very small organisms on the biodisks and the students consider larger organisms such as large fish and aquatic fowl).</p>
	<p>Stability and Change of Systems</p> <ul style="list-style-type: none"> Small changes in one part of a system might cause large changes in another part. 	<p>Students consider how different parts of the watershed might alter the salinity and pH of the Inner Harbor's water. For example, a large storm runoff would likely reduce salinity while an extended drought might serve to increase salinity. This, in turn, changes living conditions for the organisms in the Inner Harbor.</p>
	<p>Engaging in Argument from Evidence</p> <ul style="list-style-type: none"> Make and defend a claim based on evidence about the natural world or the effectiveness of a design solution that reflects scientific knowledge, and student-generated evidence. 	<p>In class discussion during the analysis and conclusion of the lab activity, students are asked to use the data collected during lab as evidence to support their claims regarding biodiversity's possible correlation with water quality and characteristics at different depths.</p>

Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Science knowledge is based upon logical and conceptual connections between evidence and explanations.

Science is a Way of Knowing

- Science is both a body of knowledge and the processes and practices used to add to that body of knowledge.
- Science knowledge is cumulative and many people, from many generations and nations, have contributed to science knowledge.

Science is a Human Endeavor

- Men and women from different social, cultural, and ethnic backgrounds work as scientists and engineers.

Connections to [Common Core State Standards](#)

English Language Arts/Literacy

RST.9-10.3

RST.11-12.3