

# Chapter 4 Overview

Activities	Science Concepts	Science Practices	Science Vocabulary	Teaching Periods
<p><b>Engage</b></p> <p><b>4.1 Introducing a New Species</b></p> <p><b>Guiding Question:</b> How might the introduction of the zebra mussel affect the health of the Great Lakes and Hudson River ecosystems?</p> <p>Students begin the chapter with an introduction to a different type of ecosystem disruption, an invasive species. Students access what they have learned previously in the unit to begin to ask questions about how the introduction of the zebra mussel might disrupt the Hudson River and Great Lakes ecosystems.</p>	MSLS2C.1 (prior knowledge)	Obtaining and Evaluating Information	health of the ecosystem	1-2
<p><b>Explore</b></p> <p><b>4.2 Hudson River Ecosystem</b></p> <p><b>Guiding Question:</b> What biotic and abiotic factors are affected when a new species is introduced to an ecosystem?</p> <p>Students will investigate the Hudson River ecosystem by constructing a food web before the introduction of the zebra mussel. Students will then predict what affects the zebra mussel introduction would have on that food web. They will choose three biotic and/or abiotic factors that might be affected by the zebra mussels and develop a testable question about the possible affects. Students will predict the answers to their questions, which they will test in the next activity.</p>	MSLS2C.1 Patterns Cause & Effect	Analyzing and Interpreting Data Using Models	biotic/ abiotic factors dynamic ecosystem	2
<p><b>Explain</b></p> <p><b>4.3 Biodiversity in Ecosystems</b></p> <p><b>Guiding Question:</b> How did the zebra mussel initially affect the health and biodiversity of the Hudson River ecosystem?</p> <p>Students will use a web-based graphing tool to graph and analyze how the zebra mussel affects the abiotic and biotic factors they chose in the last activity. Students will then read about the short-term effects of the zebra mussel on both the Hudson River and Great Lakes ecosystems, and engage in an oral debate about the effect of the zebra mussel on the Hudson river ecosystem.</p>	MSLS2C.1 MSLS2A.1 MSLS2A.2 MSLS4D.1 Cause & Effect Stability & Change	Asking Questions Planning & Carrying Out an Investigation Analyzing & Interpreting Data Constructing Explanations Engaging in Argument from Evidence	biodiversity ecosystem services biotic/ abiotic factors health of the ecosystem	2-3

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<p><b>Elaborate</b></p> <p><b>4.4 The Zebra Mussel Problem: 20 Years of Data</b></p> <p><b>Guiding Question:</b> What are the long-term effects of the zebra mussel invasion of the Hudson River?</p> <p>Students extend the prior investigation to analyze and interpret long-term data on the effects of the zebra mussel invasion on the Hudson River. Focusing on the same biotic/abiotic factors as in prior activities, students plan and carry out an investigation. Students graph and analyze long-term data and look for patterns. Students watch a video on the long-term monitoring by scientists of the Hudson River. They construct a scientific explanation about the long-term effects of the zebra mussels on the river ecosystem. Students read about the long-term changes in the river ecosystem and revise their explanations. They then construct a scientific argument to debate the question, “Has the zebra mussel had a positive or negative effect on the Hudson River ecosystem?” Students consider how the effects of the zebra mussel in the Hudson River relate to stability and change in ecosystems.</p>	<p>MSLS2C.1 MSLS2A.1 MSLS2A.2 MSLS4.D.1 Patterns Cause &amp; Effect Stability &amp; Change</p>	<p>Analyzing &amp; Interpreting Data Obtaining and Evaluating Information Constructing Explanations Engaging in Argument from Evidence</p>	<p>biotic/ abiotic factors health of the ecosystem</p>	<p>2-3</p>
<p><b>Evaluate</b></p> <p><b>4.5 A New Mussel in Town</b></p> <p><b>Guiding Question:</b> Has the quagga mussel had a positive or negative effect on the Lake Michigan ecosystem?</p> <p>Students construct a scientific argument about whether the quagga mussel has had a positive or negative effect on the Lake Michigan ecosystem. Students read about the quagga mussel invasion and look for patterns in long-term data by analyzing and interpreting both biotic and abiotic factors over time in Lake Michigan. Students use the prior scientific explanations about the short- and long-term impact of the zebra mussel in the Hudson River to help construct their scientific argument.</p>	<p>MSLS2C.1 MSLS2A.1 MSLS2A.2 Patterns Cause &amp; Effect Stability &amp; Change</p>	<p>Analyzing &amp; Interpreting Data Obtaining and Evaluating Information Engaging in Argument from Evidence</p>	<p>biotic/ abiotic factors health of the ecosystem</p>	<p>2</p>