Investigating Sea Level – NGSS Alignment

This module was developed to build data literacy, engaging students in increasingly sophisticated modes of understanding and manipulation of data. It was completed prior to the release of the Next Generation Science Standards (NGSS)[1*] and has recently been adapted to incorporate some of the innovations described in the NGSS.

This document outlines the ways in which each level of the module provides learning experiences that engage students in the three dimensions of the NGSS Framework while building towards competency in targeted performance expectations. Note: the document identifies the specific practice, core idea and concept directly associated with a performance expectation (shown in parentheses in the tables).

Performance Expectations – Middle School
Earth's System's > MS-ESS3-2: Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. *Students build towards aspects of this standard by using NOAA tide data to analyze the effect of storms on coastal sea level (Level 4). Students optionally analyze and interpret satellite data to investigate the history of hurricanes and related sea surface height deviations in the Gulf of Mexico (Level 5).*   > MS-ESS2-4: Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. *Students access and analyze NOAA data tools (data being used as a basis for models) to identify and explain changes in sea level resulting from winds and tides. Students use tide data to construct a diagram describing the approximate orientation of the moon relative to the earth (Levels 1, 2 and 3).*

[1*] NGSS Lead States. 2013. Next Generation Science Standards: For States, By States. Washington, DC: The National Academies Press. Next Generation Science Standards is a registered trademark of Achieve. Neither Achieve nor the lead states and partners that developed the Next Generation Science Standards was involved in the production of, and does not endorse, this product.

NOAA Data in the Classroom – Investigating Sea Level

Science and Engineering Practices (SEPs)	Middle School SEP	How the SEP Is Addressed by the Module	Level				
			1	2	3	4	5
Analyzing and Interpreting Data	Analyze and interpret data to determine similarities and differences in findings. (MS-ESS3-2).	Students compare their data assessments of typical tidal range at a given location, from Level 3, with tide data during a storm event to determine the effect of storms on coastal sea level				x	x
Developing and Using Models	Develop and use a model to describe phenomena. (MS-ESS2-4)	Students access and analyze NOAA data tools (data being used as a basis for models) to identify and explain changes in sea level resulting from winds and tides. Students use tide data to construct a model (diagram) to describe the approximate orientation of the moon relative to the earth.		x	x		

Disciplinary Core Ideas (DCIs)	Middle School DCI	How the DCI Is Addressed by the Module	Level				
			1	2	3	4	5
The Roles of Water in Earth's Surface Processes	**MS-ESS2.C:** Global movements of water and its changes in form are propelled by sunlight and gravity. (MS-ESS2-4)	Students understand that sea level continually fluctuates due to variations in wind, currents and water density (all by-products of the sun's energy) and tides (caused by gravitational forces).	x	x	x		
Natural Hazards	**MS-ESS3.B:** Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events.	Students optionally analyze and interpret data to investigate past storms/ hurricanes and associated flooding.					x

Crosscutting Concepts (CCCs)	Middle School CCC	How the CCC Is Addressed by the Module	Level				
			1	2	3	4	5
Patterns	Graphs, charts, and images can be used to identify patterns in data. (MS-ESS3-2).	Students use tide graphs (and optionally satellite maps) to identify sea level patterns associated with storms.				x	x
Energy and Matter	Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (MS-ESS2-4)	Students understand that sea level continually fluctuates due to variations in wind, currents and water density (all by-products of the sun's energy) and tides (caused by gravitational forces).	x	x	x		