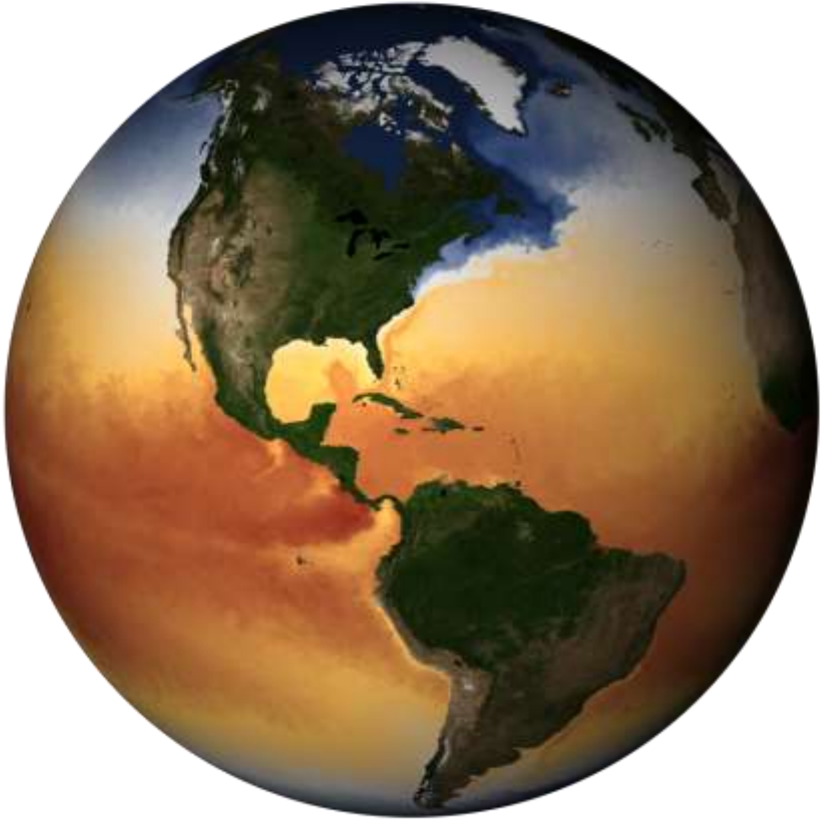

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE



National Oceanic and Atmospheric Administration

Satellite and Information Service

Data in the Classroom

Home El Niño Sea Level

Put Big Ocean Data to Work in Your Classroom!

With NOAA's Data in the Classroom, students use real-time ocean data to explore today's most pressing environmental issues, and develop problem solving skills employed by scientists. Access online and classroom-ready curriculum activities with a scaled approach to learning and easy-to-use data exploration tools.

El Niño

People blame El Niño for all kinds of abnormal weather. But how does El Niño really work?

Sea Level

Scientists know that global sea level is rising. But how are water levels monitored and measured to understand impacts?

Coral Bleaching

Coming Soon - new, updated module resources, curriculum and data tools.

Water Quality

Coming Soon - new, updated module resources, curriculum and data tools.

Ocean Acidification

Coming Soon - new, updated module resources, curriculum and data tools.

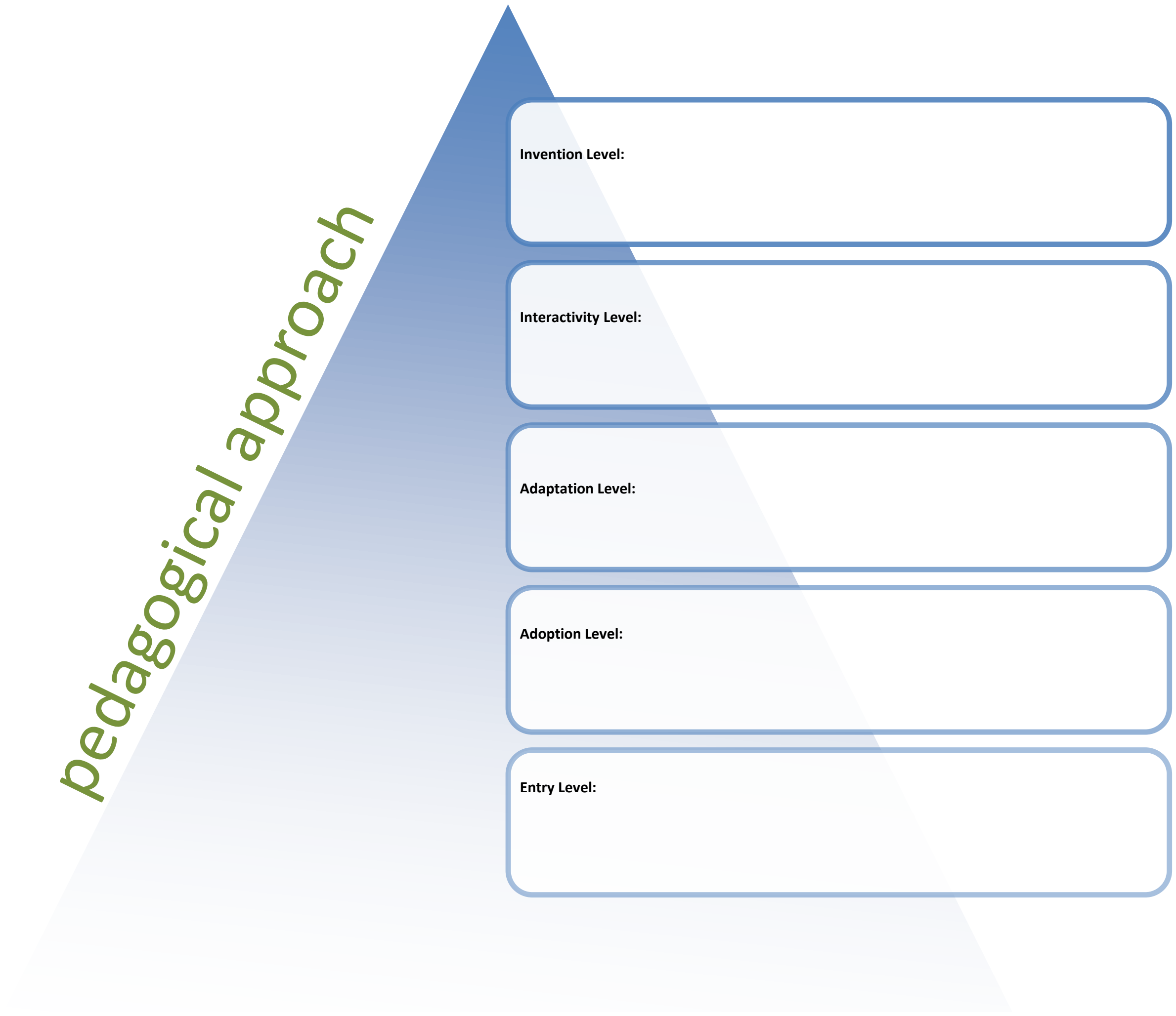
Teaching Resources

In Each Module

Using the Technology

Pedagogical Approach

Community and News



pedagogical approach

Invention Level:

Interactivity Level:

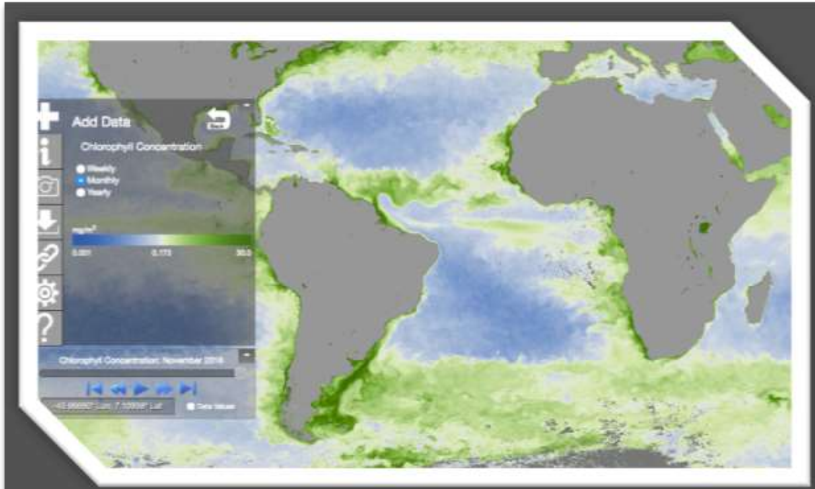
Adaptation Level:

Adoption Level:

Entry Level:

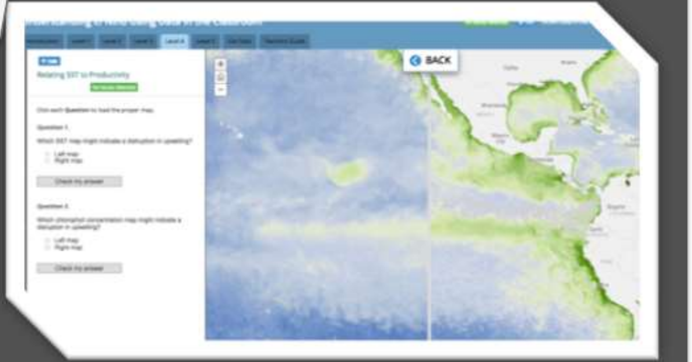
Disciplinary Core Ideas (DCIs)	Middle School DCI	How the DCI Is Addressed by the Module	Level				
			1	2	3	4	5
Interdependent Relationships in Ecosystems	**MS-LS2.A:** Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (MS-LS2-1)	Students will understand the relationships between upwelling, sea surface temperature and phytoplankton during El Niño and non-El Niño events.				x	
	MS-LS2.A: Growth of organisms and population increases are limited by access to resources. (MS-LS2-1)	Students analyze and interpret satellite data to provide evidence for the effects of disrupted upwelling on phytoplankton populations.				x	
Ecosystem Dynamics, Functioning, and Resilience	**MS-LS2.C:** 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. (MS-LS2-4)	Teachers could slightly modify the activities in Level 4 to better address this DCI. For example, following data investigations, students could predict how disruptions to phytoplankton blooms impact the food web during El Niño.				x	
Weather and Climate	**MS-ESS2.D:** Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MS-ESS2.6)	Students will understand the changes that occur in the tropical Pacific Ocean as a result of the complex weather phenomenon, El Niño.			x	x	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. *Builds toward MS-ESS2-6*, MS-LS2-1 & *MS.LS2-4*	Students use satellite maps and graphs to identify data patterns during El Niño and non-El Niño years.			x	x	x
	Patterns can be used to identify cause-and-effect relationships. *Builds toward MS-LS2-4*	Students investigate patterns between sea surface temperature and phytoplankton distribution to identify cause and effect relationships associated with El Niño.				x	
Cause and Effect	Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-LS2-1)	Teachers could slightly modify the questions on the student worksheet to better address this concept.				x	
System and System Models	Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-ESS2-6)	Students understand that El Niño events are a result of interactions between the ocean and atmospheric systems in the tropical Pacific.			x	x	x
Stability and Change	Small changes in one part of a system might cause large changes in another part. (MS-LS2-4)	Students explain that changes that occur in the Pacific as a result of El Niño cause changes in upwelling systems and phytoplankton distributions.				x	

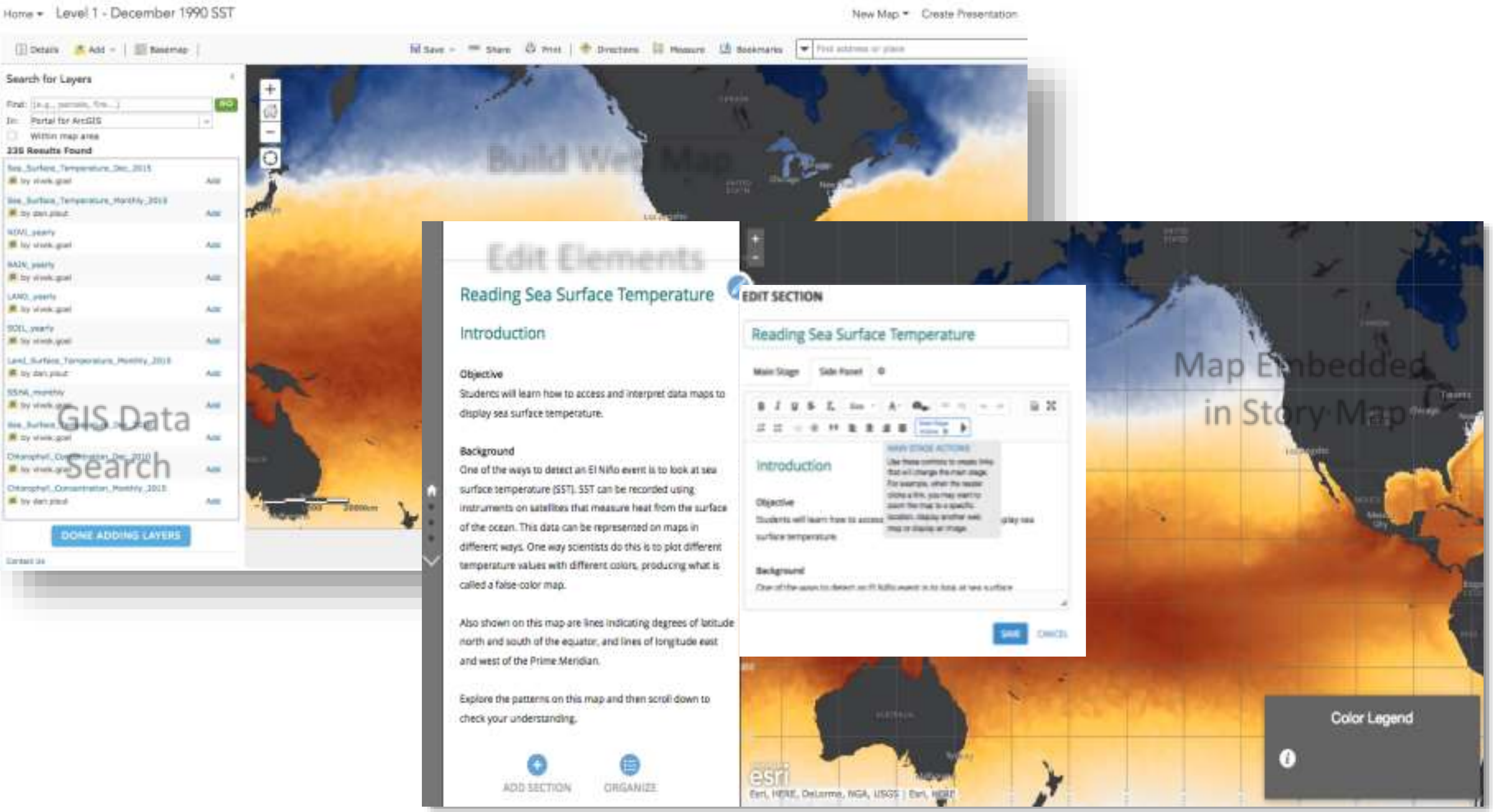


NOAA View

Science On a Sphere



Data in the Classroom



Build Web Map

GIS Data Search

Edit Elements

Map Embedded in Story Map

Reading Sea Surface Temperature

Introduction

Objective

Students will learn how to access and interpret data maps to display sea surface temperature.

Background

One of the ways to detect an El Niño event is to look at sea surface temperature (SST). SST can be recorded using instruments on satellites that measure heat from the surface of the ocean. This data can be represented on maps in different ways. One way scientists do this is to plot different temperature values with different colors, producing what is called a false-color map.

Also shown on this map are lines indicating degrees of latitude north and south of the equator, and lines of longitude east and west of the Prime Meridian.

Explore the patterns on this map and then scroll down to check your understanding.