

Lesson 2: Climate Change and Sea Level Rise: HRECOS Water Temperature (High School)

Day: 2

Unit Plan: [Hudson Data Literacy Collection](#)

Time: One 40-minute class period

Setting: Classroom

Objectives: Students will use HRECOS to generate graphs of Hudson River water temperature data from the month of July in the years 2010-2016, identify trends in the data, exceptions to the data, and make predictions about possible causes of the data trends.

Lesson Overview

1. Students will use daily average water temperature data from the month of July taken from Piermont Pier, NY to generate line graphs for each of the following years: 2010, 2011, 2012, 2013, 2014, 2015, and 2016.
2. Students will identify trends in the data for each graph.
3. Students will identify and discuss any exceptions or outliers that they observe in the data.
4. Students will discuss possible causes of the trends in the data.

Materials

- Student readings: Sea Temperature Rise
- Google slides presentation [Climate Change and Sea Level Rise](#)
- Computers with internet access
- Digital copies of the [Student Worksheet](#) (with link to HRECOS embedded)
- Hard copies of “Student Exit Ticket”
- Projector

Procedure

Preparation:

Students should be familiar with the concept of climate change. They should read the Sea Temperature Rise reading from National Geographic before class.

Provide a digital link to the [Student Worksheet](#) and link teacher computer to a projector.

Engage: Ask, “What happens to water as it freezes into ice? What do you imagine happens to water as it heats up? What evidence do you have? Hint: Think of phase changes and thermal expansion.”

Explore: Students will work from the [HRECOS Current Conditions](#) page to create a graph of the daily average water temperatures for the month of July as outlined in the worksheet. They will begin with the year 2010, and create six more graphs for the years 2011-2016. You can walk them through this process for the first graph on the teacher computer, and then they will use the worksheet to guide them through the rest of the process. Students will then answer questions about their graphs, trends in the data, and consequences. Use the Google Slides presentation starting on Slide 18 to guide the lesson. After discussing the data and graphs, discuss causes of the water temperature increase. This will take you through Slide 30 in the presentation.

Explain: The year 2016 marks the third consecutive year of record warmth for the earth. Since the beginning of the 21st century, the annual global temperature record has been broken five times: 2005, 2010, 2014, 2015, and 2016.

Extend: Students create additional graphs for daily average water temperature for a month in different seasons and compare the trends to the trend that see in the July graphs. Students select variable to graph independently, and make comparisons to the July graphs.

Students provide a CER written response to the question: "What are the effects of higher sea temperatures?"

Evaluate: Assess student understanding by their answers on the associated worksheet and exit ticket.