

Lesson 1: Climate Change and Sea Level Rise

Day: 1

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

Time: One 40-minute class period

Setting: Classroom

Objectives: Students will graph Hudson River sea level data from 1970-2015, identify trends in the data, and make predictions about future levels.

Lesson Overview

1. Students will use mean sea level yearly averages data from 1970-2015 to create line graphs and scatter plots.
2. Students will identify trends in the data by adding trend lines to each graph.
3. Students will discuss the benefits and limitations of scatter plots and line graphs to represent this data set.
4. Students will use their graphs to predict and discuss sea level data for the next decade and the decade that precedes this data set.
5. Student will identify and discuss three possible consequences of this data trend.

Materials

- Student readings: Why is Sea Level Rising?; Climate Change Indicators
- Cary Institute Graph Choice Chart
- Google slides presentation [Climate Change and Sea Level Rise](#)
- Student computers with access to Google Drive*
- Digital copies of [NOAA Sea Level Activity Student Worksheet](#)
- Access to [Student Sea Level Rise Data](#)
- *For middle school classrooms or classrooms without internet access, this can be done on graph paper as a gallery walk or as stations
- Projector

Procedure

Preparation:

Students should be familiar with the concept of climate change and have basic graphing skills using Google Sheets. Assign the 2016 Climate Change Indicators reading and the Why is Sea Level Rising? reading before class.

Provide a digital link to the Student Worksheet and link teacher computer to a projector.

Engage: Open the [Climate Change and Sea Level Rise](#) Google Slides presentation.

Ask: What do you know about climate change? What types of impacts have you heard about or seen? Show students various images of climate change impacts: photos of lower Manhattan after Hurricane Sandy, upper Hudson River after Hurricane Irene, drought regions, forest fires, increase in Lyme disease cases, islands under water, etc.

Ask: What types of changes do you expect to see in the Hudson River? Make a list on the board of student ideas. Identify their ideas as claims. Lead a discussion of the need for evidence to support a claim. Choose sea level rise as an expected change in the Hudson River. Show students various images of the Hudson River and its connection to the Atlantic Ocean. Discuss what NOAA is and discuss why it is part of the US Department of Commerce. This will take you through Slide 9 in the presentation.

Explore: On a computer attached to a projector, open Sea Level Data at the Battery NYC datafile, found [here](#). Make sure you are on the green tab titled "Student Data Set".

A teacher version of this dataset with example graphs can be found [here](#). In the teacher version:

- Green tab represents the student data set.
- Pink tabs are what student graphs should look like.
- Following tabs are raw data in various forms.

Model how to make different types of graphs with your students:

1. Select all the data EXCEPT the last row titled "Grand Total". Make sure you are selecting Row 1 as well (Year and Change in Sea Level).
2. Show students how to create their line graph and how to select for it. Point out the scatter plot option.
3. Once students have created their line graph with you, have them create the scatterplot on their own.
4. Next, show students how to copy their graph into a new tab.
5. Now, show students how to create a trendline on their line graph.
6. Have students create a trendline on their scatterplot.
7. Check that students have at least 4 tabs including 4 graphs:
 1. Line graph
 2. Line graph with trendline
 3. Scatter plot
 4. Scatter plot with trendline
8. Show students how to save and submit all four graphs.

Explain: After the graphs are made, students answer the questions based on their graphs on the worksheet [NOAA Sea Level Activity](#). Lead a class discussion about answers to the worksheet questions, through slide 17 of the Google Slides presentation.

Extend: Students use the data sets to graph other variables and identify trends.

Evaluate: Assess student understanding by their answers on the associated worksheet and the four graphs they generated.