

## Hurricanes Over Time

### MATERIALS

#### For the leader:

Projector

Whiteboard to project data graph onto

#### For the activity:

Graphing paper

Markers

Globe

Copy of data cards

### OVERVIEW

Hurricanes occur in the North Atlantic Ocean each summer. Due to the impacts on local weather and communities when hurricanes make landfall, people have been recording the number of hurricanes per year for a long time. Many students are now intimately familiar with hurricanes after Hurricane Irene (2011) and Hurricane Sandy (2012) hit New Jersey hard in recent years.

In this activity, students will look at the number of hurricanes on average per year in the North Atlantic Ocean each decade between 1878 and 2007. The students first plot the data and then interpret it for conclusions. The group-graphing component of the lesson emphasizes teaching students how to interpret data in a supported setting. The activity also uses historical photos to provide context for the students to understand data through time. In using these data

interpretation skills, students will also gain a better understanding of how scientists look at evidence when asking questions about extreme weather events over time.

**Motivating Questions:** How many hurricanes happen in a year? Have the number of hurricanes per year changed over time?

### TAKE HOME MESSAGE

The number of hurricanes in a given year is similar year to year, and has been for a long time.

<b>Engage:</b> Lead the students in a discussion about what they know about the hurricanes.	10 minutes
<b>Explore:</b> Students graph data of the hurricane frequencies for the North Atlantic Ocean over the past century together as a class.	25 minutes
<b>Make Sense:</b> Students share their observations, ask questions, and discuss what they can learn from the hurricane frequency graph.	10 minutes
<b>Total:</b>	<b>45 minutes</b>

### AUDIENCE

Early elementary school students (K-4<sup>th</sup> grade).

### NEW JERSEY CORE CURRICULUM CONTENT STANDARDS - SCIENCE

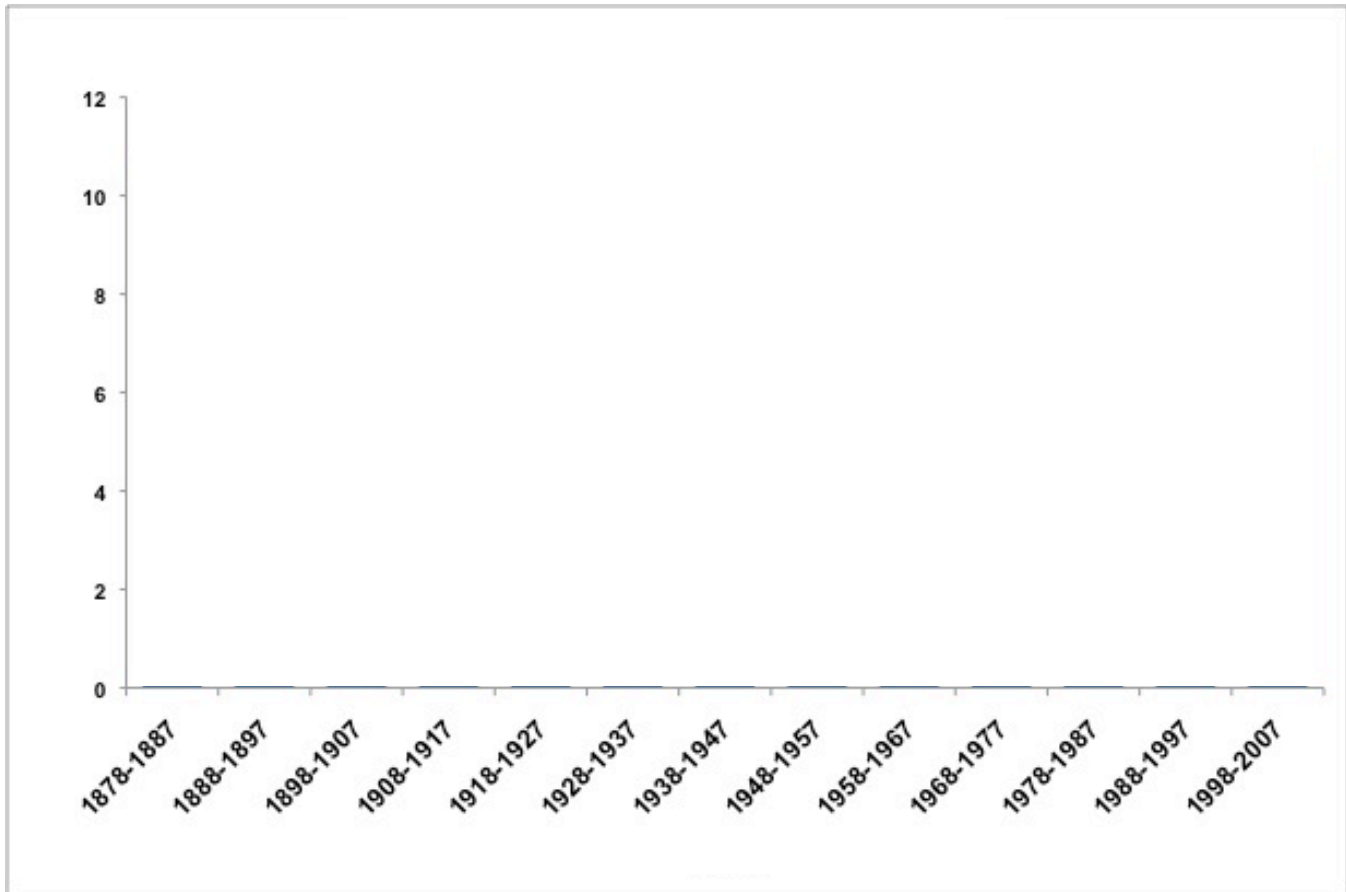
Grade	Content Statement	CPI#
4	Building and refining models and explanations requires generation and evaluation of evidence.	5.1.4.B.1
4	Tools and technology are used to gather, analyze, and communicate results.	5.1.4.B.2
4	Evidence is used to construct and defend arguments.	5.1.4.B.3
4	Reasoning is used to support scientific conclusions.	5.1.4.B.4

**PREPARATION (20 MINUTES)**

1. Write the motivating questions on the board:

**How many hurricanes happen in a year? Have the number of hurricanes per year changed over time?**

2. Make class copies of data cards (at the end of this write-up). There are 13 cards and each student should get at least one card.
3. Make or project the outline of the graph of the data on the board.

**ENGAGE (10 MINUTES)**

1. Lead the students in a discussion about what they know about the hurricanes. Be accepting of all answers, as this is a group brainstorming activity. It might be helpful to capture the information the students are sharing by writing it down on the board for them to see.

**Q. What is a hurricane?**

**Q. Where do they occur?**

**Q. When do they occur?**

**Q. How many hurricanes happen in one year?**

**Q. Why do scientists study hurricanes?**

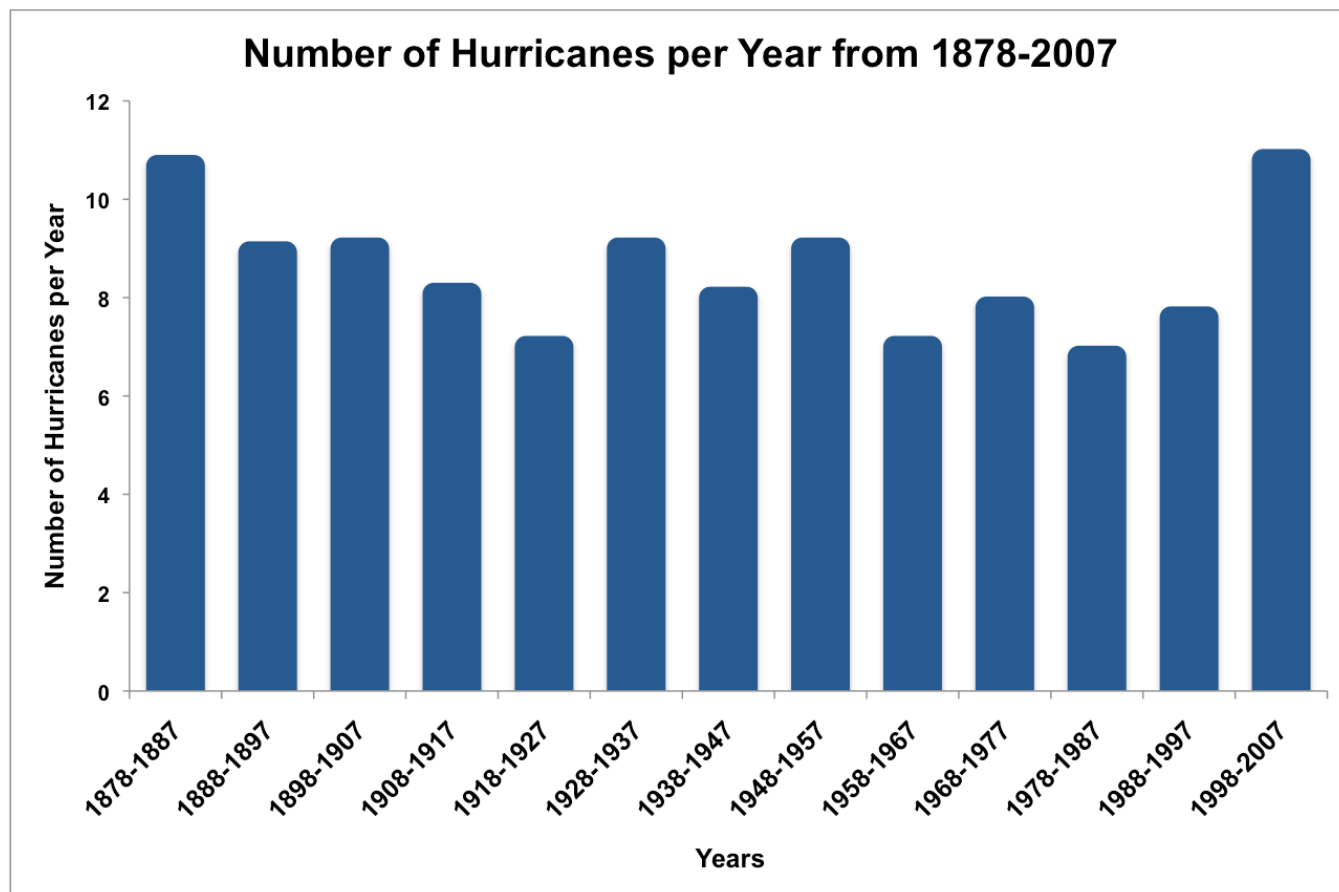
2. After a few minutes, and depending on what the students already know, share some information with them that you feel they need to know to understand the activity of the day.

### **EXPLORE (25 MINUTES)**

1. Explain to the students that they will be hurricane scientists and together as a class they will be taking a closer look at how many hurricanes have happened in a year in the North Atlantic Ocean over the past century. Use the globe to point out where the North Atlantic Ocean and New Jersey are located.
2. Explain the data organization portion of the investigation to the students:
  - a. In a few moments they will each receive a data card. These data are from a data table, but unfortunately everything got messed up and they are no longer in the correct order. As hurricane scientists they need to know the correct order of the data to plot the information from a long time ago to most recently.
  - b. Each Data Card has a picture and a date range of when the data is from on the right hand side and information about how many hurricanes per year occurred in that time frame on the left hand side.
  - c. The students will need to look at the photos and dates to make a timeline of the data. (Note – this can be done in small groups, as a class, in pairs, etc. and the timeline can be made by students standing in a line or by placing the cards in the correct order on a table.)
  - d. Ask the students if they have any questions about the data organization portion of the activity.
  - e. Allow them to work through this for a few minutes.
3. Ask the students: How the data organization went? Call on different students or student groups to share their opinions of how easy or hard it was to order the data from a long time ago to most recently.
4. Once everyone has agreed upon the order of the data, explain the data plotting and interpretation portion of the investigation:
  - a. Each student needs to look at their Data Card and determine how many hurricanes happened per year during their time frame (left side of the Data Card).
  - b. Show the students the outline of the class graph. Ask the students:
    - i. What should we label the x-axis? (Years)
    - ii. What should we label the y-axis? (Number of Hurricanes per Year)
    - iii. What title should we use for the graph? (Number of Hurricanes per Year from 1878 to 2007)
  - c. Have the students look at the data on their Data Card and find the date range on the graph. They should then color in how many hurricanes per year happened in that decade on the class graph. (Or you can have them tell you how many and you can complete the graph.)

**MAKE SENSE (10 MINUTES)**

1. After everyone has plotted their data, tell the students that they are going to interpret and analyze the data as a class.



2. Have the students look at the graph and think about:

**Q. What patterns do you observe in the data?**

**Q. Is there a pattern between the number of hurricanes and time? If so, what is the pattern?**

3. As the students are looking at the data make sure to have them support their statements of the patterns by stating what evidence they are using.

- a. Help the students see that the number of hurricanes does vary year-to-year very much.
- b. Help the students also see that overall the number of hurricanes per year is similar over time frame that we have data from, as the data ranges from 7 to 11 hurricanes per year.

4. Once the discussion slows down, point to the motivating questions and ask the students to share this ideas about the following questions with a partner:

**Q. How many hurricanes happen in a year? Have the number of hurricanes per year changed over time?**

5. After a minute, ask volunteers to share the ideas they discussed with the entire class. Be accepting of all responses from the students. This is your opportunity to make sure the students understand the “take home message.”
6. Ask if the students have any final questions about the activity or hurricanes.

11 Hurricanes per Year



DATA CARD

1878 – 1887



DATA CARD

9 Hurricanes per Year



1888 – 1897



# 9 Hurricanes per Year



## DATA CARD

# 1898 – 1907



# 8 Hurricanes per Year



## DATA CARD

# 1908 – 1917





# 7 Hurricanes per Year



## DATA CARD

# 1918 – 1927



# 9 Hurricanes per Year



## DATA CARD

# 1928 – 1937



# 8 Hurricanes per Year



## DATA CARD

# 1938 – 1947



# 9 Hurricanes per Year



## DATA CARD

# 1948 – 1957





# 7 Hurricanes per Year



## DATA CARD

# 1958 – 1967



# 8 Hurricanes per Year



## DATA CARD

# 1968 – 1977

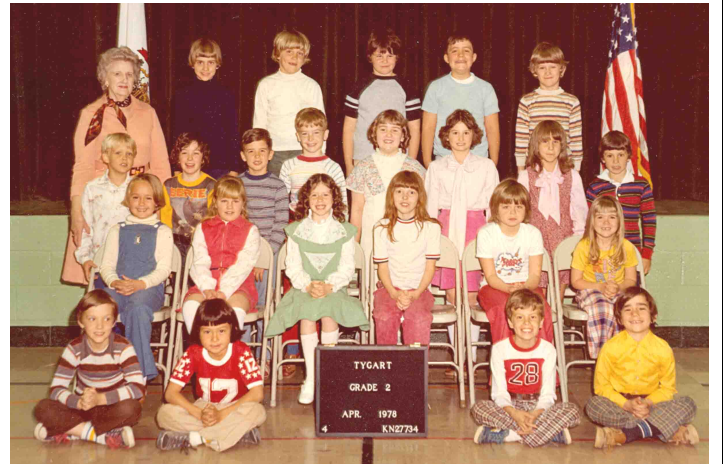


# 7 Hurricanes per Year



## DATA CARD

# 1978 – 1987



# 8 Hurricanes per Year



## DATA CARD

# 1988 – 1997



# 11 Hurricanes per Year



## DATA CARD

# 1998 – 2007

