Comparing the Force of Hurricanes
Lesson Plan

Subject Area: Science

Grade Levels: The lesson can be adapted for grades 4–12 (ages 9–18).

Time: At least one 50-minute class period; time outside of class as necessary

Lesson Objectives:

Students will:
• Develop an understanding of the factors and forces that influence hurricane development and strength.
• Build data literacy skills by analyzing the hurricanes using dynamic, visual plots.
• Explain their findings in writing and visual slide shows.

Standards:

National Science Education Standards¹:
Science as Inquiry – Content Standard A
All students should develop
• Abilities necessary to do scientific inquiry.
Earth and Space Science – Content Standard D
All students should develop understanding of
• Energy in the earth system.

Common Core State Standards²:
Common Core State Standards for Mathematics:
Mathematical Practices
• Make sense of problems and persevere in solving them.
• Use appropriate tools strategically.
Measurement and Data
• Represent and interpret data.
Statistics and Probability
• Summarize and describe distributions.

College and Career Readiness Anchor Standards for Writing:
Standard 6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

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Standard 7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

Overview:
Hurricanes can have a devastating impact on coastal communities. Nevertheless, students have a natural fascination with these immensely powerful forces of nature. In this lesson, students will use InspireData’s Hurricanes database to study historical hurricane data. They will analyze and compare features of the hurricanes, including barometric pressure and wind speeds, and use latitude and longitude coordinates to recreate the paths of the storms. Next, they will conduct research to gather data on additional hurricanes, such as any that may have affected your community or another part of the country where students have family or friends, and then analyze and compare the data to the other hurricanes in the database. Students will record their data in the table in the Database Template tab and share their findings with the class through annotated slide shows.

Preparation:
- This lesson requires the InspireData® software application published by Inspiration Software, Inc. You can download a 30-day trial at http://www.inspiration.com/InspireData.
• Arrange access to library resources and/or the Internet for student research.
• Have a map of the United States and/or world available to use during class discussions.

Lesson:
1. Ask students what they know about hurricanes, including what makes them dangerous, what causes them, and what impacts they can have on human communities and natural environments. Discuss familiar past hurricanes as a class, including details about the hurricanes’ locations and the types of destruction that occurred. Refer to a map of the United States and/or world if possible.

2. Open InspireData’s *Hurricanes* database located here: **InspireData Starter>Databases>Science>Hurricanes**.

3. Review **Table View** to familiarize students with field headings and the available data. Be sure to discuss the table notes and sources of the data listed at the bottom of them.
4. Click the **Plot View** button on the **Toolbar** and demonstrate for students how they can click through the slides in the **Slide Sorter** for examples of the types of plots and slides they will create.
5. Demonstrate how students can create plots like those shown in the slides. Your demonstration should include how to select plot types via the buttons on the Toolbar. Demonstrate how to define the x/y axes in the plots (e.g., for in the Axis plot tool, click on X Axis and choose Data>Longitude.) Use the InspireData handouts to help with plotting and analysis (Help>Documentation>Handouts). You may want to print out one or more sets of handouts to make them available for students. You should also remind students how they can refer to the plots created with the sample data for examples.

6. Click the 2004 Hurricanes tab and explain to students that they will be analyzing the data in the table, using the plots in the 2003 Hurricanes tab for reference. Tell students that they will be using the Possible Investigation questions in the table notes, as well as additional questions you share with them, such as:
   - Which hurricanes were the most powerful in 2004?
   - Which hurricane(s) that struck in 2004 had barometric pressure less than 950 millibars? What was the category of the hurricane(s)?
• What is the relationship between wind speed and category of storm? Choose one hurricane to plot and discuss.
• What was the latitude and longitude path of Hurricane Ivan? What landmasses did that path cause it to hit? What was the category of the storm? Student can conduct additional research to determine how much destruction Ivan caused.

7. Divide students into groups of two or three and explain that they should create at least one plot that will address each question. Answers should be recorded with plots in the Notes area. Remind them to use the Capture Slide button in the Slide Sorter to create a slide show of their plots. You might also suggest that they use the Color by Field and Label features to show more detail in the plots.

8. If time allows, have the groups research at least one other hurricane, using the table in the Database Template tab to record the data. The Historical Hurricane Tracks page at the National Oceanic and Atmospheric Administration is ideal to help students with this step and provide additional hurricane visualizations. Visit http://www.csc.noaa.gov/hurricanes.

9. Lead a class discussion about the students’ findings. What did they learn about hurricanes? Why is it so important that scientists study and track them?
Adaptations/Extensions:

• Students can make presentations to the class about their findings using their slide shows.

• Use Inspiration® or Kidspiration® to help with brainstorming and recording student ideas in step 1. Spend some time discussing them, and refer to the diagram at the end of the lesson to help summarize what students have learned about hurricanes and identify continuing questions.

• Have students research how to convert knots to miles per hour (mph) or kilometers per hour (kph). Then they can add a formula field that will convert the wind speed data in knots to either mph or kph to the database.

• Have students research hurricanes to uncover other factors that influence how much devastation they cause and how those factors have impacted specific communities. For example, students could research the effect of storm surge on communities such as New Orleans during Hurricane Katrina.

• For younger students, consider analyzing the data as a whole class, at least until students understand the process. Data can also be gathered as a class and recorded in the table of the Database Template tab as discussed in step 8.

• Students can use Inspiration® or Kidspiration® to create an observation and conclusion document to record their findings. They can use the Internet to further their research about the characteristics of hurricanes and create hyperlinks to all sources used.

• Students can enhance their plots by adding other InspireData features and computations. Pass out the “Learn to Use Plots” handout in InspireData for student reference (Help>Documentation>Handouts>Learn to Use Plots).

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