

My NASA Data - Interactive Models

Hurricanes as Heat Engines Story Map

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Hurricanes as Heat Engines

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Purpose:
This story map provides authentic sea surface temperature data and visualizations, and allows students to explore the energy exchange that occurs when hurricanes extract heat energy from the ocean surface.

Phenomenon: Hurricane Dynamics

Sphere(s):

- Atmosphere
- Hydrosphere

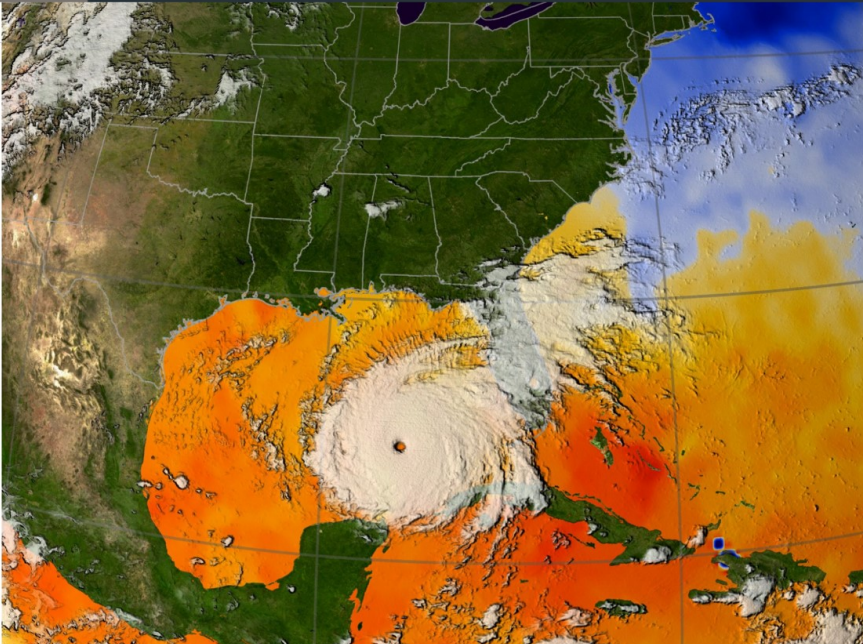
Essential Questions:

1. How is the development of a hurricane affected by sea surface temperature?
2. How does energy flow through the various stages of hurricane development?
3. How does a hurricane affect the different spheres within the Earth System?

Estimated Time for Completing Activity: 90 Minutes

Tasks:

- Practice making line plots and data maps.
- Make a claim about the relationship between hurricane formation and sea



The passage of a hurricane causes a large transfer of heat between the ocean surface and the atmosphere. It also causes surface waters to diverge, bringing cooler water from below to the surface (upwelling). These effects are so large that they can be seen by a drop in sea surface temperature (SST) in satellite data observations along the path of the storm. The cooler water conditions may last for a week or longer after the storm.

To learn more, visit:

- The [Hurricane Dynamics Phenomena page](#) for background information

Virtual Teachers: Make a copy of the  Google Form of your choice so that you may assign it directly from your Google Drive into your Learning Management System (e.g., Google Classroom, Canvas, Schoology, etc.). Do you need help incorporating these Google Forms into your Learning

Management System? If so, read this  [Guide to Using Google Forms with My NASA Data.](#)

Teachers who are interested in receiving the answer key, please complete the [Teacher Key Request and Verification Form](#). We verify that requestors are teachers prior to sending access to the answer keys as we've had many students try to pass as teachers to gain access.

Grade Band

- 6-8
- 9-12

Supported NGSS Performance Expectations

- [3-ESS2-1: Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.](#)
- [4-ESS2-2: Analyze and interpret data from maps to describe patterns of Earth's features.](#)
- [5-ESS2-1: Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.](#)
- [MS-ESS3-2: Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.](#)

NGSS Disciplinary Core Ideas

- ESS2A: Earth Materials and Systems
- ESS3B: Natural Hazards

Science and Engineering Practices

- Developing and Using Models
- Analyzing and Interpreting Data

Crosscutting Concepts

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- Patterns
 - Systems and System Models

Related Resources

- [Hurricanes as Heat Engines Story Map](#)
- [Hurricanes as Heat Engines - Lesson Plan](#)
- [Instructional Strategies for the Earth Science Classroom](#)
- [Data Literacy Cube Guide](#)