# My NASA Data - Interactive Models Hurricanes as Heat Engines StoryMap

#### **Grade Band**

- 6-8
- 9-12

## Time

• 90 minutes

## **Directions**

- 1. Using an internet accessible device, students open the link to the <u>Hurricanes as Heat Engines</u> <u>StoryMap Lesson</u> to begin their exploration of this phenomenon.
- 2. Distribute the <u>Hurricanes as Heat Engines StoryMap Student Data Sheet</u>. Have students navigate on their own through the Engage, Explore, Explain, Elaborate, and Evaluate tabs of the StoryMap to answer the questions and complete the activities on their student data sheet.

## **Teacher Note**

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 <u>Hurricane Dynamics Phenomena page</u> for background information

Teachers who are interested in receiving the answer key, please complete the <u>Teacher Key Request</u> and <u>Verification Form</u>. 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.

# **NGSS Three Dimensional Learning**

## **NGSS Disciplinary Core Ideas**

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

## **Crosscutting Concepts**

- Patterns
- Systems and System Models

## **Science and Engineering Practices**

- Developing and Using Models
- Analyzing and Interpreting Data

## **Learning Objectives**

- Students will analyze NASA sea surface temperature data to use as evidence to explain a phenomenon.
- Students will explore how hurricanes gain energy from the ocean surface.

## **Essential Questions**

- 1. How is the development of a hurricane affected by sea surface temperature?
- 2. How is thermal energy transferred within a hurricane system?
- 3. How does a hurricane affect the different spheres within the Earth System?

## **Document Resources**

Student Sheets

## **Google Docs Interactive Files**

Student Sheet (All E's)