

# The Fluidity of Hurricanes

**Subject Area(s)** Earth and Space, Measurement, Data Analysis and Probability, Science and Technology, Physics

**Curricular Unit Title** The Fluidity of Hurricanes

**Header** Insert image 1 here, centered



ISS017E015703

## Image 1

**Image file:** hurricane\_ike\_space\_station.jpg

**ADA Description:** A view of Hurricane Ike (2008) from the International Space S

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**Caption:** None

**Grade Level** 10 (9 - 12)

## Summary

The purpose of this unit is to use hurricanes as a gateway to understanding the physics of fluid mechanics and its application. Students will identify, calculate, and understand the forces related to winds (air) and storms surge (water) and then be challenged to apply these principles to a greater understanding of hurricane safety and emergency management and protection for industrial and chemical facilities along a coast.

## **Engineering Connection**

Hurricanes are one of the strongest and most dangerous weather phenomena that are destructive due to their strong forces from air and water. Engineers must have a great understanding of hurricanes in order to design and protect society from critical facilities in its community. Structural engineers must apply their knowledge of forces in order to design buildings and structures that will withstand the winds of a hurricane. Water resources engineers must be able to understand and predict the pressures related to water so that appropriate infrastructure is in place. Geotechnical Engineers must apply their knowledge of friction and stresses in order to understand the movement of sediment in an estuary system when strong waves and high water levels come rolling in. Environmental engineers must use their knowledge of fluid mechanics and contaminant transport in order to assess the risk of a region to a hurricane. Hurricanes provide a realm in which engineers play a key role in applying science and using it to better protect and prepare coastal regions for a potential disaster.

**Engineering Category** = #1, #2, and #3

## **Keywords**

Hurricanes, Fluid Mechanics, Emergency Management, Structures, Storm Surge, Water, Wind,

## **Educational Standards**

See individual lessons for educational standards

## **Related Lessons & Activities**

### Related Lessons:

1. The Forceful Blow of a Hurricane (1.5 minutes)
2. A Hurricane's Surge of Water (1.5 hours)
3. Protect Your Assets: Storm Approaching! (3 hours)

### Related Activities:

1. And it huffed, and it puffed, and it blew the house down (Related to Lesson 1)
2. Feeling the pressure of storm surge (Related to Lesson 2)
3. Protect your facility! (Related to Lesson 3)

## **Time Required**

6 hours – Class time

## **Unit Overview**

Overview of topics by lesson (1) The Fluidity of Hurricanes: Wind Speed, (2) The Fluidity of Hurricanes: The pressure and current of storm surge, and (3) Protect Your Assets: Storm Approaching! (3 hours)

**Unit Schedule**

None (Leave Blank)

**Summary Assessment**

Students will present their results of the activity “Protect your assets!”. Each student will present their part of the project as an “expert” in that area. After the presentations, the students will be given an alternative scenario (different wind speed or storm surge height from famous historical storms) and will have to do the calculation and make alternations to their protection accordingly.

**Attachments**

None (Leave Blank)

**Other****Redirect URL****Contributors**

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**Supporting Program**

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