Hurricane Applet Teachers Guide

This applet was developed by Tom Whittaker and Steve Ackerman with Weather Wise at the University of Wisconsin. The web page for all of their applets can be found at

http://profhorn.meteor.wisc.edu/wxwise/

The hurricane applet is available at http://profhorn.meteor.wisc.edu/wxwise/hurr/hurr.html

Benchmarks

SC.5.E.7.2 Recognize that the ocean is an integral part of the water cycle and is connected to all of Earth's water reservoirs via evaporation and precipitation processes.

SC.5.E.7.3 Recognize how air temperature, barometeric pressure, humidity, wind speed and direction, and precipitation determine the weather in a particular place and time.

SC.5.E.7.7 Design a family preparedness plan for natural disasters and identify the reasons for having such a plan

Before you begin—Assess student's prior knowledge with these questions or do a KWL chart to see what they know and want to know.

*Have you ever been in a hurricane before?
*During what seasons/months do hurricanes usually occur?
*Where do hurricanes come from?

Start the hurricane applet and let it play a few times (just hit reset). Point out the following or guide the students using these questions.

*Where did the hurricane originate from? (Africa)
Point out that many hurricanes start off as tropical waves in the atmosphere that originate from Africa.

*In what direction did the hurricane travel? (Across the Atlantic Ocean from East to West)
Point out that hurricanes can travel across the Atlantic Ocean, but not all hurricanes do. Show students a map of hurricane tracks (http://www.nhc.noaa.gov/2005atlan.shtml other years are available) and point out that some hurricanes can curve Northward into the Atlantic Ocean. Some can form in the Caribbean Sea/Gulf of Mexico and move north into the United States.

*What does the "L" stand for in the hurricane? (Low pressure)
*In what direction do the clouds in the hurricane turn—clockwise or counterclockwise? (Counter-clockwise)

Go over the fact that hurricanes are low pressure systems. The atmospheric pressure inside of the hurricane is lower, much lower than the surrounding atmosphere. Since they are low pressure areas their winds turn counter-clockwise. Point out that since it is an area of low pressure it will affect the weather by bringing clouds, rains and high winds wherever it passes by. Even if the hurricane is hundreds of miles away it can affect these weather variables.

*Do you notice that the "L" is replaced by the number 1 and then the number 2. What do you think the different numbers stand for? (These are hurricane categories)

Go over tropical depressions, tropical storms, hurricanes, and the Saffir-Simpson Hurricane Intensity scale (http://www.srh.noaa.gov/srh/jetstream/tropics/tc_classification.htm). Explain that hurricanes start off as tropical waves of low pressure. If these waves become stronger they can become tropical depressions (L). If they have winds of 39 mph they become a tropical storm and get a name. If the winds reach 74 mph they become a category 1 hurricane. If the winds reach 96 mph they become a category 2 hurricane.

*What happens to the hurricane when it goes over land? (The hurricane loses its strength and weakens)
*Why do you think the hurricane weakens when it goes over land? (It loses its energy source—the warm ocean)

Connection to the Water Cycle:
Explain to the students that hurricanes draw their energy from the warm waters of the ocean. When the ocean water evaporates the water vapor has a special kind of energy called latent heat. When the water vapor condenses into clouds in the hurricane this latent heat is released. The latent heat warms the atmosphere and gives energy to the hurricane. Make the connection between hurricanes and the water cycle. Water evaporates from the ocean, rises and condenses into clouds, and falls back to the ocean as rain (precipitation). All parts of the water cycle are present in a hurricane. When a hurricane moves over land it will bring rain to the land, but the source of the evaporation is from the ocean. As a hurricane moves further inland it is further away from its source of water vapor and energy. You can click and drag the hurricane over warmer and colder water to demonstrate it getting stronger and weaker. Emphasize that hurricane season is between June and November when the ocean waters are warm enough for hurricanes to form.

*What does the big "H" in the middle of the Atlantic Ocean stand for? (High Pressure)
*In what direction do the winds turn around this high pressure system? (Clockwise)

Explain to the students that hurricanes are steered by the larger scale atmospheric circulations. The large high pressure system in the Atlantic Ocean is called the Bermuda High. It is a semi-permanent high pressure system. The location of the Bermuda High can influence the direction that a hurricane travels. You can demonstrate this by doing the following (hit reset after each one)

Move the high pressure system to the east (so that the H is over the Azores) The hurricane will travel towards Cuba and Florida.

Move the high pressure system to the west (so the H is just off of North Carolina). The hurricane will take a more southerly route into Mexico.

You can use this activity as a spring board for benchmark SC.5.E.7.7 (Design a family preparedness plan for natural disasters and identify the reasons for having such a plan). Emphasize to the students that hurricanes can strike anywhere in the Caribbean, Mexico, and the United States. Revisit the Saffir-Simpson scale to show the destructive power of hurricanes and the dangers that they bring—storm surge, flooding, high winds, and tornadoes.

Name_____

Hurricanes

1. Hurricanes are areas of (high/low) pressure. Winds in a hurricane turn (clockwise/counter-clockwise).

2. Which of the following changes in the weather may occur when a hurricane comes close to or strikes an area?

___Calm Winds
___Change in the Wind Direction
___Lower Air Pressure
___Sunny Skies
___Rain
___Tornadoes

3. Hurricanes form over the (cold/warm) waters of the ocean.

4. Hurricanes are most likely to form in (August/January).

5. Hurricanes will get (stronger/weaker) as they move over the land.

6. True or False—A hurricane only has these parts of the water cycle: evaporation and precipitation.

7. True or False—Hurricanes can be steered by other weather systems.

8. Hurricanes have wind speeds of at least (39/74) miles per hour.

9. Why do you think it is important to have a family emergency plan for a hurricane?