Storm Warning

Strand Interrelationships in Earth/Space Systems
Topic Investigating the weather
Primary SOL 4.6 The student will investigate and understand how weather conditions and phenomena occur and can be predicted. Key concepts include
a) weather phenomena;
c) use of weather measurements and weather phenomena to make weather predictions.
Related SOL 4.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
m) current applications are used to reinforce science concepts.

Background Information

Thunderstorms consist of heavy rain, strong wind, lightning, and thunder. They occur when a warm, moist air mass near the ground is covered by a mass of cold air, causing an uplift of warm air. Severe thunderstorms have winds of 58 mph or greater.

Hurricanes are huge storms. A hurricane can be up to 600 miles across, have strong winds spiraling inward and upward at speeds of 75 to 200 mph, and usually last for over a week. Hurricanes only form over really warm ocean water near the equator. Depending on where they occur, these storms are called by a variety of names, such as typhoons or cyclones, The scientific term for all these storms is tropical cyclone. Only the tropical cyclones in the Atlantic Ocean or eastern Pacific Ocean are called hurricanes.

A tornado is defined as a violently rotating column of air extending from a thunderstorm to the ground. Tornadoes are associated with large (supercell) thunderstorms that often grow to over 40,000 feet. You need warm, moist air from the Gulf of Mexico and cool, dry air from Canada. When these two air masses meet, they create instability in the atmosphere. A change in wind direction and an increase in wind speed with increasing height create an invisible, horizontal spinning effect in the lower atmosphere. When there is wind coming from more than one direction at the same time, sometimes the air begins to spin around in one place. A funnel cloud is a rotating cone-shaped column of air extending downward from the base of a thunderstorm, but not touching the ground. When it reaches the ground it is called a tornado.

The most violent tornadoes are capable of a great deal of destruction with wind speeds of up to 300 mph. They can destroy large buildings, uproot trees and hurl vehicles hundreds of yards. They can also drive straw into trees

Materials

- Science journals or binders
- Reference materials on thunderstorms, tornadoes, and hurricanes such as encyclopedias, trade books, or Internet Web sites
- Copies of the attached Storm Chart for each student

- Glue
- Blank K-W-L chart about storm types
- Chart paper
- Video Cameras (optional)

Vocabulary

tornadoes, hurricanes, thunderstorms

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Introduction

1. Ask students about different types of storms that they have experienced that either have produced winds, rain, or snow.
2. Have students complete the "K" portion of a K-W-L chart to show what they "Know" about thunderstorms, tornadoes, and hurricanes.
3. Have students complete the "W" portion of the K-W-L chart to indicate what they "Want to learn" about these types of storms.

Procedure

1. Hand out the Storm Chart, and ask students to read it aloud. Have students glue the chart into their science journals or place it into the science section of their binder.
2. Provide reference materials, and have students find more information about each type of storm.
3. Allow students to access or show the students a local weather channel station on the computer or on the television. Have the students write down what they observe about how the meteorologist shows his forecast.
4. Ask students to create their own forecast for each storm type, focusing on why the storm formed. Allow students to draw their background maps on chart paper.

Conclusion

1. Have students present their forecast to the class or video tape each forecast (optional).
2. Have students complete the "L" part of their K-W-L chart after all presentations have been shown.

Assessment

- **Questions**
  - What is the difference between a tornado and a hurricane?
  - Why is a thunderstorm so common in Virginia?
- **Journal/writing prompts**
  - Imagine you are a storm chaser. Which storm would you chase and why?
- **Other**
  - Have students create a flip chart describing each of the different storms.

Extensions and Connections (for all students)

- Have students make a poster presenting safety rules to observe during each type of storm.
- Invite a meteorologist to discuss forecasts and different types of storms.

Strategies for Differentiation

- Provide the students with pictures of the storms and ask them to find the differences in the way the storms look. The pictures can be included in their science notebook for reference throughout the lesson.
- Provide leveled research materials.
- Create a "Similarities and Differences" matrix that compares and contrasts tornadoes, hurricanes and thunderstorms.

Similarities and Differences Matrix (example)

Characteristics	**Features to be Compared**			**Statement (What are the…)**
	1.	2.	3.	
tornadoes				Similarities
				Differences
hurricanes				Similarities
				Differences
thunderstorms				Similarities
				Differences
Summary statement:				

Storm Chart

Name: _____ Date: _____

Storm Type	Associated Weather Conditions	When Storms Occur	Any Other Information
Thunderstorm	• Heavy rain • strong wind • lightning • thunder	• When a warm, moist air mass near the ground is covered by a mass of cold air, causing an uplift of warm air • Severe thunderstorms have winds of 58 mph or greater	
Hurricanes	• Heavy rain • strong whirling winds • high tides • huge waves	• When a warm, low-pressure weather system is surrounded by cooler air over warm ocean waters • Winds exceed 75 mph	
Tornadoes	• Strong, whirling winds in a funnel-shaped cloud	• When a warm, moist air mass near the ground is covered by a mass of cold air and creates a strong, rotating column of air that reaches from a cumulonimbus cloud to the ground	