

## Extreme Weather and Mapping



The Southwest Florida Water Management District (SWFWMD) offers the Currents water resources newsletter for high school students. The newsletter is correlated to grades 9–12 of the Sunshine State Standards and provides an interesting way for students to increase their awareness and respect for Florida's precious water resources.

This issue of Currents focuses on extreme weather and mapping. It includes an introduction to extreme weather phenomena, information about common types of lightning, an explanation of how droughts can exist in Florida, information about tornadoes, hurricanes and floods, a problem-solving activity on extreme winds, a hurricane tracker mapping activity and suggestions for learning more about extreme weather using the Internet. In addition, we have included Currents Challenge, which contains items similar to those students could expect to find on the Florida Comprehensive Assessment Test (FCAT).

Many other free materials are available from the SWFWMD and can be ordered online at [WaterMatters.org/publications/](http://WaterMatters.org/publications/). We also offer water resources workshops for teachers. Please contact us if you have any questions or suggestions about our water resources education programs.

Youth Education — Communications Section  
Public Affairs Bureau  
Southwest Florida Water Management District  
(352) 796-7211, ext. 4757  
1-800-423-1476, ext. 4757 (FL only)  
[WaterEducation@WaterMatters.org](mailto:WaterEducation@WaterMatters.org)

### Introduction

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Ask students to share their experiences with extreme weather conditions. Emphasize the difference between weather and climate. Weather describes outdoor conditions on a day-to-day basis, while climate refers to weather patterns over a longer period of time. Discuss various forms of extreme weather.

### High Voltage Bolts

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Help students become familiar with common forms of lightning. Emphasize the importance of seeking shelter whenever lightning is present. Encourage students to search the Internet to learn more about various forms of lightning.

### A Vortex of Destruction

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Students may recall seeing films such as “The Wizard of Oz” or “Twister.” Discuss the dangers associated with tornadoes. Read about the different intensities of tornadoes and then have students take the quiz.

### Twister Quiz Answers:

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1-False, 2-True, 3-False, 4-True, 5-True

### Currently Wondering

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Ask students if they have ever experienced droughts. Have students read this section. Discuss the heightened importance of water conservation during drought conditions.

### Hurricanes and Floods

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Help students learn how a hurricane forms and the different categories associated with hurricanes. Encourage students to use their creative writing skills to complete the activity included in this section.

### Students' Corner

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Ask students to use the Saffir-Simpson Scale to solve the problems on extreme winds. You may also want to create additional problems to reinforce use of the metric/customary systems of measurement. Also, encourage students to develop questions about extreme weather conditions.

Answers: 1-9 times, 2-15 mph, 3-4 times, 4-100 times, 5-10 mph.

### Tracking a Storm

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This activity can be a lot of fun for your students and will help them improve their map-reading skills. If possible, have students use the map on this page just as a model for creating their own maps. When they finish the activity, have them compare their maps with others. Their storm tracking paths should dissipate in the Atlantic Ocean, southeast of Cape Hatteras.

### Websites to Explore

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A lot of information is available about weather on the Internet. Simply have students use their search engines and type in key terms associated with extreme weather conditions. Many sites include photos, maps and simulations of weather patterns.



# CURRENTS Challenge

Directions: This is your opportunity to demonstrate what you have learned about extreme weather and mapping. It is also an opportunity for you to practice answering questions similar to those on the FCAT.

For each multiple-choice item, select the best answer.

- 1** In which of the following areas does most of our weather occur?
  - a. within the troposphere
  - b. beneath the earth's surface
  - c. within the stratosphere
  - d. above our surface waters
- 2** The most common form of lightning occurs as a result of flashes that form inside a storm cloud. What term is used to describe this type of lightning?
  - a. ball lightning
  - b. cloud-to-air lightning
  - c. cloud-to-ground lightning
  - d. intra-cloud lightning
- 3** On page 5, which information was used for tracking storms?
  - a. latitude and longitude
  - b. water temperature
  - c. amount of rainfall
  - d. air temperature
- 4** Over a period of time, which of the following could create drought conditions?
  - a. when an area receives the same amount of its normal rainfall
  - b. when an area receives 50 percent or more of its normal rainfall
  - c. when an area receives 30 percent or less of its normal rainfall
  - d. when an area receives 10 percent or less of its normal rainfall
- 5** What scale is commonly used to describe the intensity of a tornado?
  - a. Saffir-Simpson scale
  - b. F-scale
  - c. tracker
  - d. Fugita wind scale
- 6** The terms *red sprites* and *elves* are used to describe what type of weather condition?
  - a. hurricanes
  - b. lightning
  - c. tornadoes
  - d. droughts
- 7** The destructive power of wind force is equal to which of the following?
  - a. the square of the wind speed
  - b. the square root of the wind speed
  - c. two times the wind speed
  - d. one-half the wind speed
- 8** Which level tornado has never been reported in weather history?
  - a. Category 1
  - b. Category 5
  - c. F-6
  - d. F-2
- 9** Which of the following events causes a hurricane to slow down and lose much of its energy?
  - a. passing over land
  - b. passing over warm waters
  - c. moving along coastal areas
  - d. increasing its rotating wind speed
- 10** What is an important message of this issue of *Currents*?
  - a. Meteorologists can help us prevent extreme weather patterns from happening.
  - b. Hurricanes rarely cause storm surges and flooding of inland areas.
  - c. Meteorologists are unable to predict future weather patterns.
  - d. Extreme weather patterns are part of our never-ending cycle of water moving in our environment.

Activities in *Currents Extreme Weather and Mapping* address the following Next Generation Sunshine State Standards for grades 9–12:

- SC.912.N.1.1: Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:
1. Pose questions about the natural world
  2. Conduct systematic observations
  3. Examine books and other sources of information to see what is already known
  4. Review what is known in light of empirical evidence
  5. Plan investigations
  6. Use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems and also the generation and interpretation of graphical representations of data, including data tables and graphs)
  7. Pose answers, explanations, or descriptions of events
  8. Generate explanations that explicate or describe natural phenomena (inferences)
  9. Use appropriate evidence and reasoning to justify these explanations to others
  10. Communicate results of scientific investigations, and
  11. Evaluate the merits of the explanations produced by others.
- SC.912.E.7.1: Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
- SC.912.E.7.2: Analyze the causes of the various kinds of surface and deep water motion within the oceans and their impacts on the transfer of energy between the poles and the equator.
- SC.912.E.7.3: Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.
- SC.912.E.7.5: Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.
- SC.912.E.7.6: Relate the formation of severe weather to the various physical factors.