

## Extreme Weather and Mapping



Welcome to the extreme weather and mapping issue of *Currents*! As part of the *Splash! Water Resources Education program*, 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.

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### Introduction

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; climate refers to weather patterns over a longer period of time. Discuss various forms of extreme weather.

### Sunshine State Standards

**Science (9–12):** *The Nature of Matter, SC.B.1.4; Processes that Shape the Earth, SC.D.1.4; The Nature of Science, SC.H.2.4.*

**Social Studies (9–12):** *People, Places and Environments, SS.B.2.4.*

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Our weather  
can be  
totally extreme!

Southwest Florida  
Water Management District

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## 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.

### Sunshine State Standards

**Science (9–12):** *The Nature of Matter, SC.A.1.4, SC.B.1.4; Force and Motion, SC.C.2.4; Processes that Shape the Earth, SC.D.1.4, SC.D.2.4; The Nature of Science, SC.H.2.4.*

## 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:

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

### Sunshine State Standards

**Mathematics (9–12):** *Number Sense, Concepts and Operations, MA.A.1.4; Measurement, MA.B.2.4.* **Science (9–12):** *The Nature of Matter, SC.A.1.4, SC.B.1.4; Processes that Shape the Earth, SC.D.1.4, SC.D.2.4.* **Language Arts (9–12):** *Reading, LA.A.2.4.*

## 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.

### Sunshine State Standards

**Science (9–12):** *Processes that Shape the Earth, SC.D.1.4, SC.D.2.4; How Living Things Interact with Their Environment, SC.G.1.4, SC.G.2.4.*

## Hurricanes and Floods

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Students who lived in Florida during the 2004 hurricane season will probably have a lot to share with others about the deadly forces of hurricanes. 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 that is included in this section.

### Sunshine State Standards

**Science (9–12):** *The Nature of Matter, SC.A.1.4, SC.B.1.4; Processes that Shape the Earth, SC.D.1.4, SC.D.2.4.* **Language Arts (9–12):** *Writing, LA.B.2.4.*

## 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 for the *Currents* Quiz for a free prize. For convenience, you may want to send the questions in as a class set.

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

### Sunshine State Standards

**Mathematics (9–12):** *Number Sense, Concepts and Operations, MA.A.1.4; Measurement, MA.B.2.4.* **Science (9–12):** *Processes that Shape the Earth, SC.D.2.4; How Living Things Interact with Their Environment, SC.G.2.4.* **Language Arts (9–12):** *Writing, LA.B.2.4.*

## Classroom Activity

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### Tracking a Storm

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.

## Sunshine State Standards

**Mathematics (9–12):** *Number Sense, Concepts and Operations, MA.A.1.4, MA.A.2.4; Measurement, MA.B.1.4, MA.B.2.4, MA.B.3.4, MA.B.4.4; Geometry and Spatial Sense, MA.C.3.4, MA.D.1.4, MA.D.2.4.* **Science (9–12):** *Processes that Shape the Earth, SC.D.1.4.*

## Sites for Currents Readers 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.

### Sunshine State Standards

**Science (9–12):** *Processes that Shape the Earth, SC.D.2.4; How Living Things Interact with Their Environment, SC.G.2.4; The Nature of Science, SC.H.2.4, SC.H.3.4.* **Language Arts (9–12):** *Reading, LA.A.2.4.*

# CURRENTS challenge ANSWERS

Items included in the Challenge are similar to those presented on the Florida Comprehensive Assessment Test (FCAT). Make copies of the challenge on the following pages and explain to students that this provides good practice for preparing for the FCAT.

Answers to multiple-choice items: 1-a, 2-d, 3-a, 4-c, 5-b, 6-b, 7-a, 8-c, 9-a, 10-d

Answers to extended-response items:

**Question 1.** Responses will vary. Students should be able to demonstrate an understanding of the concept of droughts. Droughts may occur in any area. They are defined as a weather condition in which an area receives 30 percent or less of its normal rainfall during a period of time. See page 2 of the newsletter.

**Score 2 Points If ...** The response indicates that the student has a thorough understanding of the concept of droughts. The student has provided a clear explanation of how drought conditions can exist in Florida.

**Score 1 Point If ...** The response indicates that the student has a partial understanding of the concept of droughts. The student has provided a brief description that is partially correct.

**Score 0 Points If ...** The response is inaccurate, confused or irrelevant.

**Question 2.** Responses will vary. Students should be able to describe one form of extreme weather and describe some damaging effects it can have on an area in its path.

**Score 2 Points If ...** The response indicates that the student can effectively describe a form of extreme weather and provide examples of damaging effects to an area.

**Score 1 Point If ...** The response indicates that the student has a partial understanding of a form of extreme weather and is unable to provide good examples of how an area may be affected.

**Score 0 Points If ...** The response is inaccurate, confused or irrelevant.

### Sunshine State Standards

**Science (9–12):** *The Nature of Matter, SC.B.1.4; Processes that Shape the Earth, SC.D.1.4, SC.D.2.4; How Living Things Interact with Their Environment, SC.G.2.4; The Nature of Science, SC.H.3.4.* **Social Studies (9–12):** *People, Places and Environments, SS.B.2.4.* **Language Arts (9–12):** *Reading, LA.A.2.4; Writing, LA.B.2.4.*

# 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** In the classroom activity, 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 winds is equal to which of the following?
  - a. the square of the increase in wind speed
  - b. the square root of the increase in wind speed
  - c. two times the increase in wind speed
  - d. one-half the increase in 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.

