

WaterWeb

current water info for schools

A publication of the Southwest Florida Water Management District in conjunction with the Charlotte Harbor Environmental Center, Inc.

Groundwater Issue

Teacher's Guide

Welcome to the groundwater issue of WaterWeb! As part of the Splash! Water Resources Education program, the Southwest Florida Water Management District offers the WaterWeb water resources newsletter for middle and high school students. The newsletter is correlated to grades 6-8 and 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 WaterWeb focuses on ground water. It includes nonfiction articles, a media reprint, information about water under the surface, a career focus, a classroom activity, a crossword puzzle and word scramble, and a Web site to explore. All of the information and activities are designed to teach students about ground water. In addition, we have included WaterWeb Challenge, which contains items similar to those students could expect to find on the Florida Comprehensive Assessment Test. Let WaterWeb make a splash in your classroom today!

Many other free materials are available from the Southwest Florida Water Management District. We also offer water resources workshops for teachers in your county. Please contact us if you have any questions or suggestions about our water resources education programs.

Sincerely,

Beth Bartos

Beth Bartos
In-School Education Coordinator
Southwest Florida Water
Management District



Ground Water

Page 1

Ground water can be found beneath the surface almost everywhere on Earth. Within the United States, approximately half of the population depends on ground water on a daily basis. In our region, approximately 80 percent of our water supply comes from the aquifer. Before reading the introductory article on ground water, review the concepts associated with the water cycle. Key terms include: solar energy, precipitation, evaporation, percolation, condensation and transpiration. After reading the article, ask students why they think ground water is important and why they should learn more about it. During the discussion, emphasize the responsibility citizens have in protecting the water resources.

Sunshine State Standards *Science (6-8):* Processes that Shape the Earth, SC.D.1.3. *Social Studies (6-8):* People, Places and Environments, SS.B.1.3. *Science (9-12):* Processes that Shape the Earth, SC.D.1.4. *Social Studies (9-12):* People, Places and Environments, SS.B.2.4.

WaterWeb Query

Page 1

Ask two students to read the parts of Question and Answer. Then ask students if they can identify any wells near their homes.

Sunshine State Standards *Science (6-8):* Processes that Shape the Earth, SC.D.2.3. *Social Studies (6-8):* People, Places and Environments, SS.B.2.3. *Science (9-12):* Processes that Shape the Earth, SC.D.2.4. *Social Studies (9-12):* People, Places and Environments, SS.B.1.4.

Media Reprint & The Floridan Aquifer

Pages 2 & 3

As a class, read the article and facts about aquifers. Try a few of the extended activities with your students.

Sunshine State Standards *Science (6-8):* Processes that Shape the Earth, SC.D.1.3, SC.D.2.3; The Nature of Science, SC.H.2.3. *Social Studies (6-8):* People, Places and Environments, SS.B.1.3, SS.B.2.3. *Science (9-12):* Processes that Shape the Earth, SC.D.1.4, SC.D.2.4; The Nature of Science, SC.H.2.4. *Social Studies (9-12):* People, Places and Environments, SS.B.1.4, SS.B.2.4; Government and the Citizen, SS.C.2.4.

Water Under the Surface

Page 4

Prior to reading the article, ask students if they have heard of the term "karst." Read descriptions together about Florida's terrain and its prevalence of sinkholes and springs.

Sunshine State Standards *Science (6-8):* The Nature of Matter, SC.A.1.3; Processes that Shape the Earth, SC.D.1.3; The Nature of Science, SC.H.2.3. *Science (9-12):* The Nature of Matter, SC.A.1.4; Processes that Shape the Earth, SC.D.1.4; The Nature of Science, SC.H.2.4.

Don't Be a Groundwater Polluter!

Ask students to list several types of pollution that affect surface water bodies. Then read the article together. Discuss the difference between the effects of pollution on ground water and surface water. For an extended activity, have students write about lessons they have learned over time for reducing pollution in our water resources.

Sunshine State Standards Science (6-8): Processes that Shape the Earth, SC.D.2.3; How Living Things Interact with Their Environment, SC.G.2.3. **Social Studies (6-8):** People, Places and Environments, SS.B.2.3, SS.C.2.3. **Science (9-12):** Processes that Shape the Earth, SC.D.2.4; How Living Things Interact with Their Environment, SC.G.2.4. **Social Studies (9-12):** People, Places and Environments, SS.B.2.4, SS.C.2.4.

Career Focus

Emphasize to students that there are many career opportunities for those who choose to work in the environment. For additional information, use the Web sites listed at the end of the article.

Sunshine State Standards Language Arts (6-8): Reading, LA.A.2.3. **Language Arts (9-12):** Reading, LA.A.2.4.

Classroom Activity

Create Your Own Sinkhole

Before beginning this activity, make sure that your students understand the concept of a sinkhole. For additional background, guide students through a review of other sections of the newsletter. Proceed with the activity and use the discussion questions to enhance their understanding of ground water.

Sunshine State Standards Science (6-8): Processes that Shape the Earth, SC.D.1.3, SC.D.2.3; The Nature of Science, SC.H.2.3. **Social Studies (6-8):** People, Places and Environments, SS.B.1.3, SS.B.2.3. **Science (9-12):** Processes that Shape the Earth, SC.D.2.4; The Nature of Science, SC.H.1.4, SC.H.2.4. **Social Studies (9-12):** People, Places and Environments, SS.B.1.4, SS.B.2.4.

Activities

Crossword Puzzle

Although these activities are meant to be fun, they are designed to reinforce important vocabulary and concepts associated with understanding ground water.



Many other free materials are available from the Southwest Florida Water Management District. We also offer water resources workshops for teachers in your county. Please contact us at 1-800-423-1476, ext. 4757, if you have any questions or suggestions about our water resources education program. Visit our Web site at www.swfwmd.state.fl.us.



WaterWeb Scramble

Words: ground, polluters, water, Floridan

Paragraph:

It's up to us to protect the ground water in the Floridan aquifer. Tell people you know about how important ground water is to our well-being. Encourage them not to be groundwater polluters.

Sunshine State Standards Language Arts (6-8): Reading, LA.A.1.3, LA.A.2.3. **Language Arts (9-12):** Reading, LA.A.1.4, LA.A.2.4.



There is a variety of information available on ground water at the following Web site: www.groundwater.org.

Be sure to try a few of the other sites that are linked to it. As an extended activity, ask students to prepare research questions about ground water and search for answers on the Internet.

Sunshine State Standards Science (6-8): Processes that Shape the Earth, SC.D.1.3, SC.D.2.3; The Nature of Science, SC.H.2.3. **Language Arts (6-8):** Reading, LA.A.2.3. **Science (9-12):** Processes that Shape the Earth, SC.D.1.4, SC.D.2.4; The Nature of Science, SC.H.2.4. **Language Arts (9-12):** Reading, LA.A.2.4.

WaterWeb Challenge

WaterWeb Challenge

Items included in the Challenge are similar to those presented on the Florida Comprehensive Assessment Test (FCAT). Make copies of the Challenge (on following pages) and explain to students that this provides good practice for preparing for the FCAT. Students should be allowed to use the *WaterWeb* issue as they complete the Challenge.

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

Extended Response Items

- Responses will vary. Students should be able to demonstrate an understanding of the water cycle and provide an explanation regarding the importance of ground water within the water cycle.
- Responses will vary. Students should be able to accurately describe a sinkhole and its features based on information presented on page 4 and results from completing the classroom activity on page 6 of the newsletter.

Sunshine State Standards Science (6-8): Processes that Shape the Earth, SC.D.1.3, SC.D.2.3. **Social Studies (6-8):** People, Places and Environments, SS.B.2.3, SS.D.1.3. **Language Arts (6-8):** Reading, LA.A.2.3; Writing, LA.B.2.3. **Science (9-12):** Processes that Shape the Earth, SC.D.1.4, SC.D.2.4. **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.

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WaterWeb Challenge



Directions: This is your opportunity to demonstrate what you have learned about ground water. It is also an opportunity for you to practice test items similar to the FCAT. Do your best and meet the challenge!

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

- In this issue of *WaterWeb*, you have learned about the importance of ground water. What is ground water?
 - water that is in lakes, ponds and rivers
 - water that is under the Earth's surface
 - water that is stored in an aquifer
 - both b and c
- Which one below does NOT belong in a list of facts about the Floridan aquifer?
 - It consists primarily of limestone rock.
 - It is replenished through a natural process called recharge.
 - It was created within the last decade due to the effects of sinkholes and springs.
 - It is the largest and deepest aquifer in the state of Florida.
- What can be generalized about groundwater pollution?
 - It is easy for a variety of pollutants to soak into the groundwater supply.
 - Florida's sandy soils keep pollutants from soaking into the water table.
 - Stormwater runoff helps filter out other pollutants from ground water.
 - Ground water rarely becomes polluted due to the actions of people.
- How is ground water drawn out from the aquifer for use in our cities, homes and farms?
 - Sinkholes are created and pumps are used to move the water to surface water towers.
 - Wells are drilled into the aquifer, with pipes and pumps used to bring the water to the surface.
 - Computers are programmed to locate and collect surface water.
 - Computer technology is used to create springs and draw water from them.
- Much of Florida is made up of karst terrain. Which of the following characteristics could be used to describe karst terrain?
 - land surface produced by water dissolving the underlying bedrock
 - sinkholes
 - springs
 - a, b and c
- In the Career Focus section, *WaterWeb* interviewed an environmental scientist who is involved in a water quality monitoring program. What is the primary goal of the program?
 - to educate the public about water quality issues
 - to write reports about the effects of pollutants on surface water bodies
 - to examine the water quality of the major aquifers and surface water bodies in the area
 - to examine the water quality of the drinking water in the area
- A spring is a natural place where ground water under pressure discharges through an opening in the Earth's surface. Which of the following statements is TRUE?
 - There are fewer than 10 springs in the state of Florida.
 - A spring is another name for a sinkhole.
 - Springs provide areas for recreational activities such as water-skiing, fishing and swimming.
 - Springs rarely exist in a landscape that has a karst terrain.
- What can cause a sinkhole to occur in the landscape?
 - the development of several new springs
 - a situation in which acidic water erodes and dissolves underground limestone
 - an increase in the number of pollutants in the ground water
 - a decrease in the volume of stormwater runoff soaking into the aquifer
- Which one below is NOT an example of a groundwater pollutant?
 - pesticides
 - herbicides
 - motor oil
 - drinking water
- What is an important message for readers after completing this *WaterWeb* issue?
 - Use your knowledge about ground water to encourage others not to be groundwater polluters.
 - Realize that ground water is not an important part of the water cycle.
 - Teach others that most of Florida's drinking water comes from rivers, lakes and ponds.
 - Avoid visiting natural tourist attractions such as springs.

