

Alternative Water Sources

CURRENTS

TEACHER'S GUIDE
current water info for high schools

Welcome to the alternative water sources issue of Currents! 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 water resources.

This issue of Currents focuses on alternative water sources. It includes an introduction to alternative water sources, a primer on reclaimed water, interesting facts about reclaimed water projects, information about desalination, activities and suggestions for learning more about alternative water sources 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/. We also offer free water resources workshops for teachers. Please contact us if you have any questions or suggestions about our education programs.

Youth Education
Communications Department
Southwest Florida Water Management District
(352) 796-7211, ext. 4757
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Alternatives
are available
now.

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Introduction

Page 1

Ask students if they can describe the traditional water sources currently used in Florida. Have students read the article. Discuss the importance of alternative water sources for the future generations of people who will live in Florida.

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.1.4, SC.H.3.4.*
Social Studies (9–12): *People, Places, and Environments, SS.B.2.4.*

Currently Wondering

Page 2

Ask students to describe places where they have seen purple pipes. Have students read the question and answer.

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.*

Reclaimed Water

Page 2

Don't let water go to waste. Instead, reclaim it!

Have students read about reclaimed water. Discuss the importance of reclaimed water as an alternative water source. Then ask students to look ahead for other possible uses of reclaimed water.

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.1.4, SC.H.3.4. Social Studies (9–12): People, Places, and Environments, SS.B.2.4.

Reclaimed Water Facts

Page 2

Read the information about reclaimed water. Ask students to search the SWFWMD web site for news articles about alternative water sources. Have students write a brief summary about one of them.

Sunshine State Standards: Language Arts (9–12): *Reading, LA.A.2.4; Writing, LA.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; The Nature of Science, SC.H.3.4.

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

Living in a High-Tech World

Page 3

Squeezing Fresh Water from Seawater

Ask students if they can define the meaning of desalination. Desalination means to “de-salt” or remove the salt from water. Read the information about the desal plant located in Hillsborough County. Then have students solve the math problems at the end of the article. Answers: 40 percent, 1.76 million gallons, 61.6 million gallons.

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.*

Mathematics (9–12): *Number Sense, Concepts and Operations, MA.A.2.4, MA.A.3.4; Measurement, MA.B.1.4, MA.B.3.4.*

Students' Corner – Activities

Page 3

This activity will help students practice their math skills by solving real-world problems on the topic of alternative water sources. Answers: 1-a; 2-c; 3-b

Sunshine State Standards: Mathematics (9–12): *Number Sense, Concepts and Operations, MA.A.1.4, MA.A.2.4, MA.A.3.4; Measurement, MA.B.3.4.*

Cleaning Our Water

Page 4

Before beginning this activity, have your students discuss any visits they may have had to wastewater treatment plants. Have them read the background information and complete the activity. Then discuss the information recorded on the charts and analyze the results.

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

Sites for Currents Readers to Explore

Page 4

A lot of information is available on the subject of alternative water sources. Use the key words that are listed to help students get started on their search for additional information. Also, be sure to visit the SWFWMD web site listed in this section.

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. Social Studies (9–12):* *People, Places, and Environments, SS.B.2.4. Language Arts (9–12):* *Reading, LA.A.2.4.*



CURRENTS Challenge

See pages 3 and 4 of this Teacher's Guide.

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

Answers to multiple-choice items:

1-c, 2-d, 3-c, 4-a, 5-d, 6-b, 7-c, 8-c, 9-d, 10-d

Answers to extended-response items:

Question 1. Responses will vary. Students should be able to demonstrate an understanding of the importance of alternative water sources.

Score 2 points if... The response indicates that the student has a thorough understanding of the importance of alternative water sources. The student has provided a response that is accurate and complete.

Score 1 point if... The response indicates that the student has a partial understanding of the importance of alternative water sources. The student has provided a response that is essentially correct, but the information is too general or too simplistic.

Score 0 points if... The response is inaccurate, confused or irrelevant.

Question 2. Responses will vary. Students should be able to describe one type of alternative water source and its effect on the increasing demand for water.

Score 2 points if... The response indicates that the student has a thorough understanding of an alternative water source and its effect on the increasing demand for water.

Score 1 point if... The response indicates that the student has a partial understanding of an alternative water source and its effect on the increasing demand for water.

Score 0 points if... The response is inaccurate, confused or irrelevant.

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.1.4, 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 prove what you have learned about alternative water sources. It is also an opportunity for you to practice answering questions that are similar to those on the FCAT.

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

- 1** In this issue of *Currents*, you have learned about various water sources. Which one below is considered a traditional source of water in Florida?
 - a. polluted water
 - b. reclaimed water
 - c. ground water
 - d. salt water
- 2** Why was purple chosen as the international identifier for reclaimed water?
 - a. PVC pipe accepts purple dye.
 - b. Purple is not used for identifying any other substances.
 - c. Water flows faster through purple pipes.
 - d. Both a and b are correct.
- 3** Which statement below is TRUE?
 - a. Floridians use an average of 39 gallons of water per person per day.
 - b. Approximately 12 million people live in Florida.
 - c. Most people in Florida live along the coast.
 - d. Groundwater and surface water supplies are unlimited.
- 4** Why is reclaimed water an effective alternative water source?
 - a. Because it helps to offset the demand for traditional water sources.
 - b. Because it is a good source of potable water.
 - c. Because it makes use of unlimited supplies of seawater.
 - d. Because it only needs primary treatment.
- 5** The term *reuse* is often used in discussions about alternative water sources. What is reuse?
 - a. water that has received primary treatment at a facility
 - b. increasing the amount of water entering the aquifers
 - c. the removal of minerals and other dissolved solids
 - d. the act of reusing reclaimed water according to rules set up by state and regional water authorities
- 6** What is the purpose of desalination?
 - a. to increase the amount of salt in fresh water
 - b. to change seawater into potable water
 - c. to remove pollutants from seawater
 - d. to provide a traditional water source
- 7** Which analogy can be used to describe the cleaning of water?
 - a. desalinated water — ground water
 - b. reclaimed water — wastewater treatment plant
 - c. wastewater treatment plant — the water cycle
 - d. reverse osmosis — ground water
- 8** Which one below does NOT belong in a list of activities associated with the use of reclaimed water?
 - a. irrigating citrus groves
 - b. washing cars and boats
 - c. preparing meals
 - d. restoring wetlands
- 9** Which statement below is TRUE?
 - a. Seawater provides a droughtproof supply of water.
 - b. The largest desal plant in North America is in Hillsborough County.
 - c. Reverse osmosis is used in the desal process.
 - d. All of the above.
- 10** What is an important message of this issue of *Currents*?
 - a. More water treatment plants are needed in our area.
 - b. It is unlikely that desalinated water will ever be cost-efficient.
 - c. There is limited information available on alternative water sources.
 - d. Alternative water sources can help supply us with more water.

