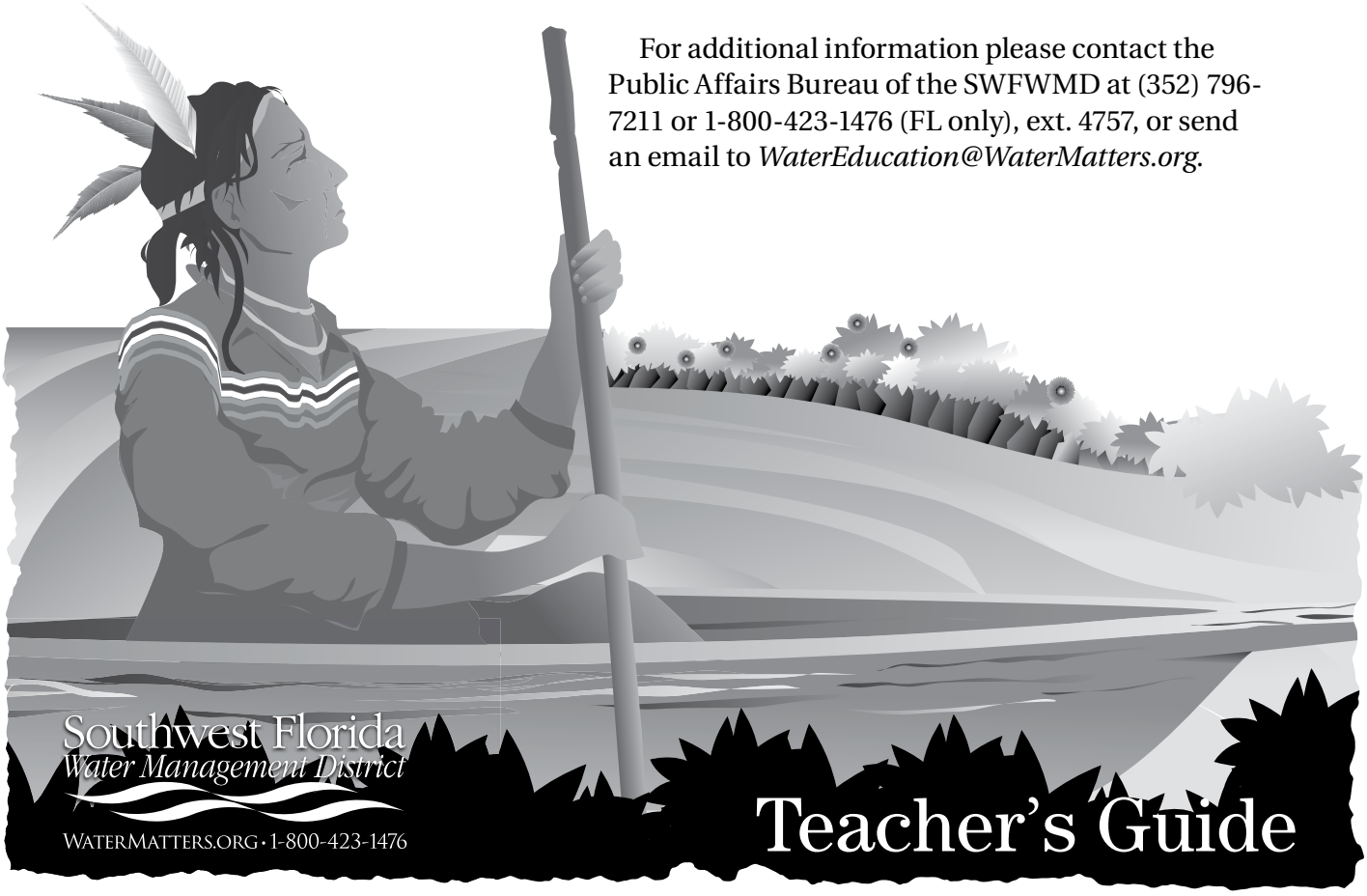
A Drop in Time

How Water Resources Shape Our History

A Drop in Time is targeted for grades 6–8 and correlated to the Next Generation Sunshine State Standards and the Common Core State Standards. All information and activities are designed to teach students about the connection between our history and water resources. In addition, we have included "A Drop in Time Challenge," which contains items similar to those students could expect to find on the Florida Comprehensive Assessment Test (FCAT).

As your students read *A Drop in Time*, they will learn that we should all be actively involved in the protection of water resources. Contributing to that effort is the Southwest Florida Water Management District (SWFWMD), one of five regional agencies directed by state law to preserve and protect water resources in Florida. The SWFWMD is responsible for managing water resources and maintaining a balance between the water needs of current and future water users without causing negative impacts to the environment. All or part of 16 counties lie within the boundaries of the SWFWMD. We must never forget that the future of our water resources depends on ALL of us working together.

Many other free education materials are available from the SWFWMD and can be ordered online at *WaterMatters.org/publications/*. We also offer water resources workshops for teachers.



For additional information please contact the Public Affairs Bureau of the SWFWMD at (352) 796-7211 or 1-800-423-1476 (FL only), ext. 4757, or send an email to *WaterEducation@WaterMatters.org*.

Southwest Florida
Water Management District

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Teacher's Guide

Vocabulary

Review these vocabulary terms with students before they begin the student publication.

aquifer
a spongelike layer of underground limesone and rocks that can hold and release water

desalination
the process of converting salt water into fresh water

drought
a period of time during which precipitation is much lower than average for that time of year in that particular place

evaporation
vapor created when the sun heats water in lakes, streams, rivers and oceans

groundwater
water beneath the earth's surface

hydrologic cycle
the endless cycle of water moving through the environment

precipitation
moisture released from clouds in the form of rain, snow, sleet or hail

reclaimed water
water that has been filtered and treated with chemicals so it can be used for irrigation purposes

reclamation
restoring areas into useful natural systems

water conservation
practicing habits that use water wisely and avoid wasting water

Water Reflections

Read aloud the following Water Reflections questions based on each of the chapters in the student publication and ask students to answer the questions on a piece of paper.

Chapter 1
Imagine it rained 3 inches last month and 50 percent evaporated into the air. How many inches of rain were not lost to evaporation?

Chapter 2
Of the 7,000 lakes in Florida, there are about 1,800 in our area. What percent of lakes are located in our area?

Chapter 3
In 1940 a serious desease killed many of the sponges in the Tarpon Springs area. About how many decades ago did this occur?

Chapter 4
It is estimated that the average person in our area uses 106 gallons of water each day. How much water does a family with four people use per day?

Chapter 5
In 2011 there were about 19 million residents in Florida. If this population doubled by th eyear 2030, how many people would live in the state?

All Chapters
After every chapter or after completing all chapters, ask students to use the einformation he or she learned to list several actions they could take to contribute to a clean and healthy environment in the future.

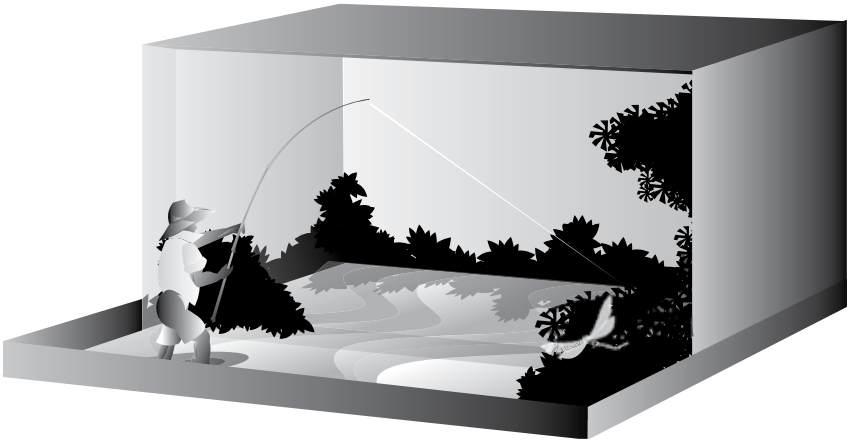
Supplemental Activities

Supplemetnal activities for chapters 2–4 are provided as an option to enhance student learning.

Chapter 2:

Our Natural Systems

Water Over Time:
Natural System Viewing Box



Materials:

- shoebox
- colored pencils, crayons and markers
- colored construction paper
- glue
- modeling clay
- miniature items, such as plants, animals, people, buildings, etc.
- 3" x 5" index card

Directions:

1. Remove lid from shoebox.
2. Decide whether to position your box so that the viewer will look down vertically into the box or horizontally at the box. Plan where the individual pieces of your scene will be located in the box.
3. Use a pencil and lightly sketch on the inside of the box a panoramic scene of a natural system. This may include a lake, river, wetland, estuary, etc.
4. Create the different pieces of your scene using construction paper, colored pencils, crayons and markers.
5. Use modeling clay to represent different elevations in your scene.
6. Position miniature items, such as plants, animals, people and buildings, in the box.
7. Make a small sign, write the title of your scene on it and attach to viewing box.

Extension:

1. Using a 3" x 5" index card, write a short paragraph that describes your natural system scene.
2. Have your classmates place their index cards in a pile. Read each description and try to match it with the correct viewing box.

Chapter 3:

The Economics of Agriculture, Industry and Tourism

Water Over Time: It's Happening in My Area

Directions:

Complete this survey to learn more about agriculture, industry and tourism activities taking place in your area. You may want to interview people, visit a library or surf the Internet to find out about your local economy. You may decide to work as a group to "pool your brainpower" for this activity.

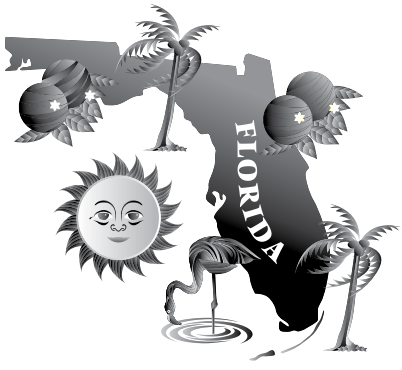
Survey

Agriculture

- What kinds of agricultural activities are in your area?
- What are some things agricultural groups do to help protect our water resources?
- What would you suggest agricultural groups do to prepare for the future?

Industry

- What kinds of industrial activities are in your area?
- What are some things industries do to help protect our water resources?
- What would you suggest industries do to prepare for the future?



Tourism

- What kinds of tourism activities are in your area?
- What are some things tourism groups do to help protect our water resources?
- What would you suggest tourism groups do to prepare for the future?

Drawing Conclusions

1. What did you learn from this assignment?
2. How do you think your area will change in the future?
3. Do you think people who work in agriculture, industry and tourism are adequately preparing for the future? Give reasons for your response.

Chapter 4:

Supplying and Managing Our Water Resources

Water Over Time: Surfing for Information About Water Resources

Directions:

There is a lot of information about water resources available on the Internet and at your media center or local library. Try to find at least one new fact about each of the innovations listed below. Discuss your facts with other classmates. As a class or in groups, create a large poster or PowerPoint that includes all the information your class learned about the innovations.

Innovations	Name of Website or Other Source	What I Learned
Agricultural Methods and Tools		
Desalination		
Stormwater Storage		
Reclaimed Water		
Aquifer Storage and Recovery (ASR)		
Supervisory Control and Data Acquisition (SCADA)		
Geographic Information System (GIS)		
Land Acquisition		
Water Conservation		

Time-Out Quiz Answers

Chapter 1. Answers: If you checked all of them, you understand the water cycle.
Chapter 2. Answers: 1-F, 2-T, 3-T, 4-F, 5-T
Chapter 3. Answers: 1-1945, 2-2000, 3-1940, 4-1800s
Chapter 4. Answers: 1-a, 2-c, 3-b
Chapter 5. Answers: All are yes.

Water Reflections Answers

Chapter 1. The amount that did not evaporate is 1 1/2 inches.
Chapter 2. Approximately 25.7 percent of the lakes are in our region.
Chapter 3. The event occurred approximately seven decades ago.
Chapter 4. A family of four uses an average of 444 gallons of water per day.
Chapter 5. If the population doubled, there would be 36 million residents.

The Water Cycle Answers
(Chapter 1))

1. sun
2. evaporation
3. condensation
4. precipitation
5. percolation
6. transpiration

A Drop in Time Challenge
(pages 9 and 10 of this teacher's guide)

Items included in "A Drop in Time Challenge" are similar to those presented on the FCAT.

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

Extended-response items:

Students should be able to demonstrate an understanding of how important it is for everyone to learn from past events and participate in water resources solutions by assimilating information presented in the student booklet.

Students should be able to use creative thinking skills to identify topics that could be used in an article for a future web site on environmental issues.

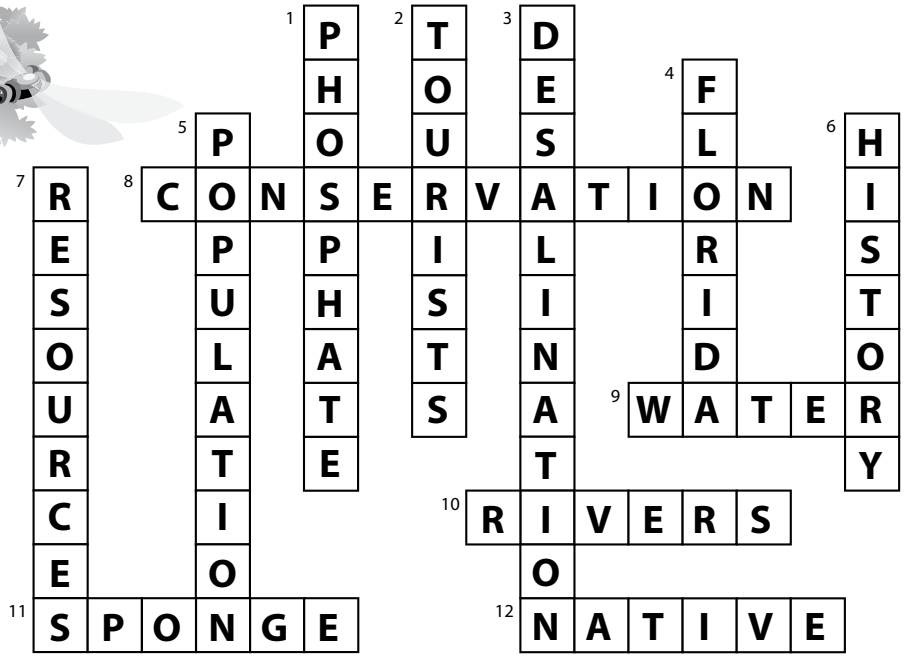
Crossword

Across

8. When we avoid wasting water, we are practicing water _____.
9. An estuary is a partially enclosed body of _____.
10. The flowing waters of _____ can vary in temperature, clarity and speed.
11. Tarpon Springs is known as the largest natural _____ market in the world.
12. Thousands of _____ Americans lived in Florida before the Europeans arrived.

Down

1. An important industry in Florida is _____ mining.
2. Millions of _____ visit Florida every year.
3. A process of removing salt from salty or brackish water is called _____.
4. We are fortunate to have a variety of natural resources in _____.
5. Florida's _____ has increased in recent years.
6. In the United States, Florida has the longest recorded _____.
7. It is important that we all help protect our water _____.



Unscramble

Unscramble the letters to form real words.

STUROSIT
T O U R I S T S

CRURESSOE
R E S O U R C E S

NNNROTEMIEV
E N V I R O N M E N T

SONVIOTCERAN
C O N S E R V A T I O N

SHYROTI
H I S T O R Y

Hidden Message

Break the code and learn an important message.

W	A	T	E	R		R	E	S	O	U	R	C	E	S
23	1	20	5	18		18	5	19	15	21	18	3	5	19

H	A	V	E		S	H	A	P	E	D		O	U	R
8	1	22	5		19	8	1	16	5	4		15	21	18

P	A	S	T	,	A	F	F	E	C	T	E	D
16	1	19	20		1	6	6	5	3	20	5	4

O	U	R		P	R	E	S	E	N	T		A	N	D
15	21	18		16	18	5	19	5	14	20		1	14	4

W	I	L	L		I	N	F	L	U	E	N	C	E
23	9	12	12		9	14	6	12	21	5	14	3	5

O	U	R		F	U	T	U	R	E	.
15	21	18		6	21	20	21	18	5	

1 = A	4 = D	7 = G	10 = J	13 = M	16 = P	19 = S	22 = V	25 = Y
2 = B	5 = E	8 = H	11 = K	14 = N	17 = Q	20 = T	23 = W	26 = Z
3 = C	6 = F	9 = I	12 = L	15 = O	18 = R	21 = U	24 = X	

A Drop in Time Challenge

Directions: *This is your chance to show what you have learned about how water has shaped our history, our current water conditions and our future. It is also an opportunity for you to practice answering questions similar to those found on the FCAT. Do your best to meet the challenge!*

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

1. What process makes it possible for us to drink the same water that was used by early explorers of Florida?

a. hydrologic cycle
b. desalination
c. water conservation
d. sponging

2. During the rainy season, which weather condition below is least likely to occur?

a. hurricanes
b. tropical storms
c. temperatures near freezing
d. thunder and lightning flashes

3. Many lakes, rivers, wetlands and estuaries can be found in Florida. What are these examples of?

a. water bodies made by humans
b. natural systems
c. areas without plants and wildlife
d. effects of hurricanes

4. How is the population of Florida expected to change in the future?

a. Fewer people will decide to live here.
b. The population of Florida will continue to increase.
c. The population of Florida will remain the same.
d. The number of people over the age of 65 will decline.

5. Phosphate mining changes the landscape, removes vegetation and alters natural drainage patterns. What process is now used to restore these areas and turn them into useful natural systems?

a. desalination
b. fertilization
c. reclamation
d. conservation

6. Which industry below does NOT contribute much money to Florida's economy?

a. tourism
b. sponging
c. growing citrus crops
d. raising livestock

7. Choose the statement that best describes what the earliest residents of Florida thought about water.

a. Our clean and plentiful water supply will be available forever.
b. Our water is a limited resource that needs protection.
c. Only desalinated water can be used for drinking.
d. SCADA should be used for removing salt from salty or brackish water.

8. Who does the water belong to in Florida?

a. the public
b. water bottling companies
c. individual property owners
d. the Southwest Florida Water Management District

9. What is considered the most important water source in our region of the state?

a. Tampa Bay
b. Floridan aquifer system
c. estuaries
d. wetlands

10. What is an important message about protecting our water resources?

a. An individual can have a positive impact.
b. Groups of individuals can make a difference.
c. Everyone should serve as an environmental citizen.
d. All of the above

READ
THINK
EXPLAIN

Describe lessons learned from our history that can help us prepare for an environmentally clean and healthy future. Support your answer with details and information you learned from *A Drop in Time*.

READ
THINK
EXPLAIN

Pretend that it is the year 3000 and your school is developing a web site on current water resources issues. Describe three topics that could be developed into articles for the site. Then select one of these topics and develop a short article about it.

The Southwest Florida Water Management District (District) does not discriminate on the basis of disability. This nondiscrimination policy involves every aspect of the District's functions, including access to and participation in the District's programs and activities. Anyone requiring reasonable accommodation as provided for in the Americans with Disabilities Act should contact the District's Human Resources Bureau Chief, 2379 Broad St., Brooksville, FL 34604-6899; telephone (352) 796-7211 or 1-800-423-1476 (FL only), ext. 4702; TDD 1-800-231-6103 (FL only); or email ADACoordinator@WaterMatters.org.