

SOLVING FLORIDA'S WATER PUZZLE

A Water Resources

MYSTERY

Southwest Florida
Water Management District



April 2001

What Can Be Done to Conserve and Protect Our Water Resources?

Get ready to help solve Florida's water puzzle by participating in a water resources mystery! YOU will play the role of an environmental detective. Throughout your investigation, you will gather several clues to help you learn more about water. For each clue, we have included a variety of information and activities about water. Be sure to check your facts so you can continue on your investigation to the next clue. Don't forget to complete the "piece it together" activities at the end of each clue. We have also included a water conservation game and a contest for you to enter.

This *Solving Florida's Water Puzzle* booklet focuses on water conservation, our current water conditions and alternative sources of water supply. The Southwest Florida Water Management District (District) is the regional agency responsible for managing water resources. A goal of the District is to ensure that there is an adequate supply of the water resource for all reasonable and beneficial uses, now and in the future, while protecting and maintaining water and related resources. When more people move into an area, they will need more water. Population in the District is projected to grow from the current 3.8 million to 5.6 million in 2020. In order to meet the increasing demands for water, we need to help solve the puzzle about what can be done to conserve and protect our water resources. It's up to all of us!

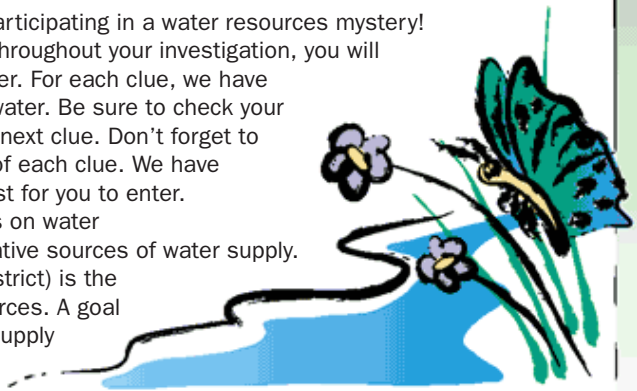
For additional information about water resources protection, please contact the District's Communications and Community Affairs Department at 1-800-423-1476, extension 4757.

The *Solving Florida's Water Puzzle* booklet is a special educational publication from the Southwest Florida Water Management District. The purpose of the publication is to educate students, residents and visitors about water resources issues and encourage protection of our water resources. A supplementary teacher's guide is available on request. Please contact the Communications and Community Affairs Department of the Southwest Florida Water Management District at (352) 796-7211 or at 1-800-423-1476 (Florida only), extension 4757.

The District serves all or part of these 16 west-central Florida counties: Charlotte, Citrus, DeSoto, Hardee, Hernando, Highlands, Hillsborough, Lake, Levy, Manatee, Marion, Pasco, Pinellas, Polk, Sarasota and Sumter.

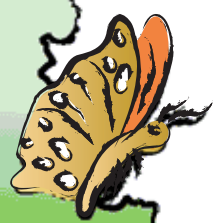
Content written and developed by Susan Awbrey.
Design and layout by Allen Yarbrough,
Southwest Florida Water Management District

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Water Mystery Guide

-  Page 3
 Discovering the Basics About Water
-  Page 4
 Surveying our Current Conditions
-  Page 6
 Investigating Water Conservation
-  Page 10
 Searching for Alternative Sources
-  Page 12
 Solving the Case Depends on Everyone





Discovering the Basics About Water

Think about a few of the different living things that exist on Earth. Some examples you may have thought of are a friend at school, the palm trees in your neighborhood or the pair of sandhill cranes nesting at a pond nearby. What do all living things depend on in order to survive? The answer is **water**.

It's a fact that...

water can exist in three different forms – liquid, solid and gas.

It's a fact that...

water makes up 70 percent of the human body.

It's a fact that...

water is the most common substance on Earth. Without water, life could not exist.

It's a fact that...

the water on Earth today is the same water that has always existed on Earth.

It's a fact that...

the water cycle has no beginning and no end.

We've already discovered that we need water to survive, but where does the water come from? In Florida, our water comes from rain. When rainwater falls, it typically follows one of three main paths. On the first path, water remains on the Earth's surface, and so is called *surface water*. This water may end up in fresh water bodies such as lakes, streams, rivers and creeks. The water could also find its way to the saltwater oceans. Surface water provides approximately 20 percent of our water supply.

By taking the second path, water soaks into the ground and is called *ground water*. Ground water is held in soil and rock formations called *aquifers*. Aquifers are sponge-like underground layers of limestone full of holes that water can flow through. Approximately 80 percent of our water supply comes from ground water pumped from aquifers.

The third path water may follow is evaporating into the air. Evaporation occurs when solar power from the sun causes water to change its form from liquid to gas. Transpiration is a form of evaporation that happens when plants and trees give off moisture through their leaves. This vapor is carried through the atmosphere in clouds and contributes to the Earth's weather patterns, eventually falling as precipitation in the form of rain, snow, sleet or hail. In our region of Florida, we usually receive between 50-55 inches of rain every year.

The next time you brush your teeth, drink a glass of water, wash your face or take a shower, think about your part in the natural water cycle. Water is a precious resource and we need to encourage everyone to conserve water and use it wisely.

Check Your Facts

Check all of the phrases that are true about water.

- More of our drinking water comes from ground water than surface water.
- The average yearly rainfall in our area is 50-55 inches.
- The human body is made up of mostly water.
- The water cycle has no beginning and no end.
- Aquifers can hold ground water.

Answer: If you checked all of them, you have discovered a few facts about water.

Don't be Clueless — Piece it Together

1. Using a camera, take a few outdoor photos that illustrate something associated with water. Describe how each photo relates to part of the water cycle.
2. Search through newspapers, magazines or the Internet for an interesting picture or article about water. Describe how the piece relates to the water cycle.





Surveying Our Current Conditions

An important step in trying to solve any problem is gathering information about the current situation. Before you try to identify what can be done to conserve and protect our water resources, what should you do first? The answer is **examine the present water situation**. Let's survey our current conditions about water.

Our Current Situation

Surrounded on three sides by water and containing thousands of lakes and several major rivers, Florida seems to have plenty of water. As a matter of fact, Florida's average yearly rainfall amount is the second highest of any state in the country — 53 inches. In recent years, however, rainfall amounts have fallen far below this average. This is bad news because Florida depends on large amounts of rainfall to replenish its water supply. This means that your detective work must begin with weather.

How Our Climate and Weather Affect Us

Just think for a moment how weather affects our daily routines and activities. Weather conditions that are cloudy, stormy, hot, cold, sunny or dry have a direct impact on us, as well as on the plants, animals and just about everything in our environment. In west-central Florida, we live in a humid subtropical climate. A climate refers to the weather patterns that take place in an area over a long period of time. Our climate naturally fluctuates between wet and dry seasons. Typically, we get 60 percent of our rainfall between June and September, but lose nearly three-fourths to evaporation.

Our pleasant climate attracts visitors and new residents. Estimates are that by 2020, the Southwest Florida Water Management District's population will grow to 5.6 million, a 43 percent increase since 1995. You don't need to be a detective to know that is a lot of people! Our projected population growth shows that demand for water will exceed traditional supplies in many areas within our District. In fact, in some areas it already has. As long as Florida continues to be dependent on rainfall, and our population continues to grow, people will need to use water wisely.



Droughts are Dry

Usually people think that a drought exists only in a desert or other type of dry region. But a drought actually describes a period of time during which precipitation is much lower than the average amount of precipitation for that time of year at that particular place. The 2000–2001 drought has been one of the worst on record for Florida.

Droughts affect our environment in many ways. A drought causes water tables and water levels of streams, rivers and creeks to fall. A drought causes the soil to become dry, which then causes plants and crops to suffer. Forest fires can ignite easily and spread quickly during dry conditions. All forms of wildlife, including raccoons, armadillos, birds and even fish are faced with additional challenges for survival when droughts spread through their habitats. Often, people mistakenly think that a drought is over when a heavy rainfall occurs. However, it takes several heavy rainfalls to raise the water levels of surface water bodies, such as streams and rivers, and to recharge the aquifers. During drought conditions it is especially important that all water users understand and practice water conservation.

Our Current Water Users

Type	1995	2020	% Change
Public Supply	428.1	609.5	up 42%
Domestic Self-Supply/Small Public Supply	88.8	141.0	up 59%
Agriculture	684.7	852.0	up 24%
Commercial/Industrial/Mining	226.8	196.0	down 14%
Thermoelectric Power Generation	10.2	61.8	up 506%
Recreational	66.5	104.0	up 56%
Total	1,505.1	1,964.3	up 30%

Figures are given as million gallons per day averages in the Southwest Florida Water Management District

To help determine the water demands throughout the District for now and in the future, current water users are grouped according to the way they use water. Use the chart above to gain a better understanding of how much water is currently being used as of 1995 by different types of water users and what the anticipated demand for water will be in the next 20 years. To help protect our valuable water resources, all types of water users are finding more efficient ways of using water.

The Land and Water Connection

Further stress is placed on the available water resources as land is altered and developed to accommodate our rapidly growing population. There is a strong connection between land and water. Florida's natural systems depend on fresh water and fresh water depends on healthy natural systems. Special care must be given to avoid causing harm to water resources and natural ecosystems. Improved planning about how land should be used and ways it can be developed more efficiently can help minimize the impact land development has on resources in the surrounding environment.

One way natural Florida ecosystems are preserved, protected and restored is through land acquisition. In fact, the District has acquired and manages more than 300,000 acres considered important for water management, water supply and the conservation and protection of water resources.

More than 95 percent of land acquired by the District is open for public recreational activities such as biking, hiking, camping and bird watching. Annually, more than 2 million people are attracted to these lands for an opportunity to enjoy recreational activities and experience the natural beauty of real Florida.



Don't Be Clueless — Piece it Together

1. Study the chart above that shows the water demands throughout the District. Identify the groups that used the most and least amount of water in 1995. Compare their projected increase and decrease for water in 2020.
2. Look through your newspaper, search the Internet, or watch television for the daily weather forecast. Select three different cities and describe how the weather forecast could affect a person's activities for that day.

Check Your Facts

True or False? Circle T or F.

T or F

1. Fewer people are moving into our area each year.

T or F

2. Water should be conserved only during droughts.

T or F

3. A drought can occur in a subtropical humid climate.

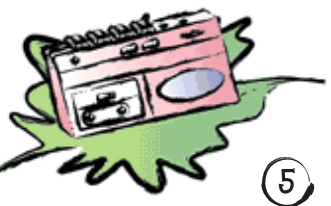
T or F

4. By 2020, water demands will decrease by about 30 percent.

T or F

5. Agriculture is the area's largest user of water.

Answer: 1.F, 2.F, 3.T, 4.F, 5.T





Investigating Water Conservation



While discovering a few basics about water and surveying our current conditions, you learned that water is one of our most important resources. What do you think is one of the easiest and least expensive ways to protect this valuable resource? The answer is **water conservation**.

EVERYONE is a water user. Consider a situation in which every person wastes just a few gallons a day. Can you imagine the total amount of water wasted in a year? The numbers would be shocking! It's so important to consider easy ways that your family can save water. Remember, water conservation is all about practices that use less water and it's up to all of us to find ways of using water more efficiently. There's no time OR water to waste!

It has been estimated that each of us uses about 140 gallons of water each day. We use water in a variety of ways inside and outside our homes. Most indoor water use occurs in the bathroom. Gallons of water are used every time you brush your teeth, wash your hands, flush a toilet and take a shower or bath. In the kitchen, water is used to prepare food, run a disposal and wash dishes. In the laundry area, every load of wash depends on lots of water. Outside, water is used to irrigate the lawn and plants, and wash the family car. In fact, a typical family uses about 30 percent of its water on outdoor activities. All of these clues tell you there is a lot of water being used every day in and around your home.

Here is your chance to use your environmental detective skills and investigate the inside and outside of your home. Your investigation may give you a few clues about how your family uses water. For each area, the goal is to be able to answer "YES" to as many questions as possible. Try to get your whole family involved and repeat the activity each month.



In the Kitchen

Yes

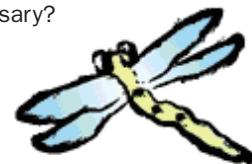
- Have you checked faucets and pipes for any leaks?
- Do you use the automatic dishwasher for only full loads or use water-saving settings, if available?
- When washing dishes by hand, do you turn the water on only when needed?
- Do you chill water in the refrigerator, rather than letting it run until cool?
- Do you use the garbage disposal only when necessary?



In the Laundry Area

Yes

- Do you wash only full loads of clothes or adjust the water level for the correct load size?
- Have you checked faucets and pipes for leaks?





In the Bathroom

Yes

- Have you checked faucets and pipes for any leaks?
- Do you turn off the water while brushing your teeth?
- Do you limit the amount of water you use when taking a bath or shower?
- Do you have a low-flow showerhead?
- Do you have a low-volume toilet?
- Do you avoid using the toilet as a trash basket?



Outdoors

Yes

- Do you water your lawn only when necessary?
- Do you follow the watering restrictions for your community?
- Do you use a broom instead of a hose to clean driveways and sidewalks?
- Do you have trees and plants that don't need a lot of water?
- Do you wash the car with a sponge, bucket and a hose with a nozzle?
- Did you install an automatic rain shut-off device?



Water Restrictions

Water restrictions are an important aspect of water conservation. Check with your community to find out the days and times that you are allowed to water outdoors. If your local government does not have watering restrictions, follow those set down by the District. Following watering restrictions not only demonstrates good citizenship, but also shows support of water conservation efforts. Remember to reuse water whenever it is possible. Instead of wasting water from leftover drinks or baths, reuse the water on a few plants and trees. Your family may also want to consider Xeriscape™ principles for gardening, such as planting trees, shrubs, foliage and flowers that require less water and are right for the soil, sun and other natural features of an outdoor area.

Don't be Clueless — Piece it Together



1. Select three friends, classmates or relatives to interview. Ask them to describe what water conservation means to them in their daily lives. Use a tape recorder or notebook to record each of their responses. Discuss their responses.
2. Look through newspapers or magazines for pictures of water or water scenes. For each picture, write a caption that includes a water conservation message.

Check Your Facts

For each statement, decide whether the person is saving or wasting water.

Circle Save or Waste.

SAVE or WASTE

1. Your friend turns the water off while brushing his teeth.

SAVE or WASTE

2. Your neighbor waters the lawn every afternoon.

SAVE or WASTE

3. Your friend is always tossing tissues into the toilet and flushing them away.

SAVE or WASTE

4. A relative uses a Xeriscape plant guide to choose plants for his garden.

SAVE or WASTE

5. A classmate sweeps leaves from the sidewalk.

Answers: (S=Save, W=Waste) 1-S, 2-W, 3-W, 4-S, 5-S



WATER CONSERVATION GAME

Don't be puzzled over Florida's Future.
Take steps today to conserve water.

Get ready to save water for our future! This game is for 2 or more players and the goal is to be the environmental detective who saves the most water. Players will follow the steps around the state of Florida and end their journey at the Southwest Florida Water Management District.

Instructions:

1. Cut out the game pieces located at the bottom of the game. One die, a pencil and paper will also be needed.
2. The first player puts his/her game piece on START, throws the die and moves the number of spaces on the die.
3. Players landing on a **special square** follow these instructions:
 - **Water Drop 1-10:** Read the water drop statement below aloud and move ahead or score drops.
 - **Save:** Suggest one way a water user could conserve water. Score 2 points.
 - **Waste:** Tell one way a water user may waste water and offer a suggestion for improvement. Score 3 drops.
 - **Lose Turn:** Lose one turn.
 - **Extra Turn:** Take an extra turn.
 - **Finish:** The first player to reach **FINISH** scores a bonus of 5 drops.
4. After all players have reached **FINISH**, count the number of drops each has saved. The player who saved the most drops is the winner.

1 Our traditional water supply comes from ground water and surface water.
Score 4 drops.

2 Water moves through our environment in an endless cycle called the hydrologic cycle.
Move ahead 3 steps.

3 Florida depends on its average yearly rainfall of 53 inches to replenish the water supply.
Score 2 drops.

4 The demand for water will increase as land is altered and developed for our rapidly growing population.
Move ahead 4 steps.

5 Water conservation is all about practices that use less water.
Score 3 drops.

6 Xeriscape™ gardening is a way to have an attractive landscape while practicing water conservation.
Move ahead 4 steps.

7 Desalination is a way to provide us with an alternative water supply.
Move ahead 1 step.

8 Although storm water is one of the biggest sources of water pollution, it can be an alternative water supply.
Score 3 drops.

9 There are many ways for people to become involved in projects that contribute to water resources solutions.
Move ahead 2 steps.

10 It's up to all of us to do our part to help conserve water for our future.
Score 1 drop.





searching for Alternative sources

In an earlier clue, you learned that our traditional sources of water are ground water and surface water. Using your detective instincts, can you think of other ways to meet our area's increasing demand for water? The answer is **we need to search for alternative sources**. Let's take a look at a few of the possibilities.

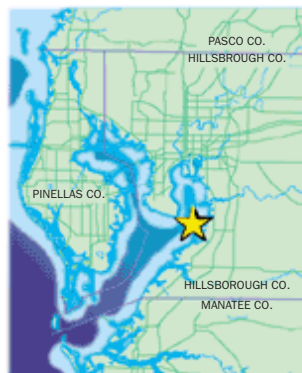
Desalination

An alternative water source that is receiving a lot of attention lately is desalination, also called desal. Desalinate means to "de-salt" or remove the salt from water. Therefore, desalination is a process that removes salt from salty or brackish water, leaving fresh water that can be used for drinking and other purposes.

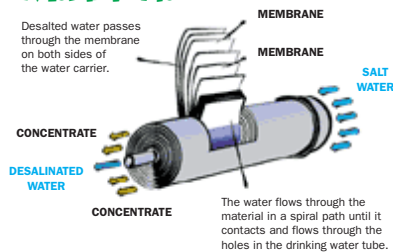
Did you know soon there will be a seawater desalination facility in the Tampa Bay area? It will be located near Apollo Beach in southern Hillsborough County. By the end of 2002, the plant, which will be the largest seawater desalination facility in North America, is planned to produce up to 25 million gallons a day (mgd) of desalinated water.

The Tampa Bay seawater desalination facility will use a process called reverse osmosis to remove salt from the seawater. The process uses pressure to force seawater through long, tube-like membranes. Several layers of membranes remove salt as the water passes through, leaving behind only the salty concentrate. This concentrate is approximately twice-as-salty as the source water was in the beginning of the process. Diluting this concentrate with more than 1 billion gallons of water used to cool power units at the nearby Big Bend Power Station ensures that the Bay's salinity will stay within normal ranges. Therefore, desalinated water can be produced in an efficient manner without harming the environment. To learn more about the seawater desalination project, be sure to visit the Web site at www.saw-water.com. Click on Desal Process to view a graphic of the reverse osmosis process.

Future Desalination Facility Location



Reverse Osmosis Membrane



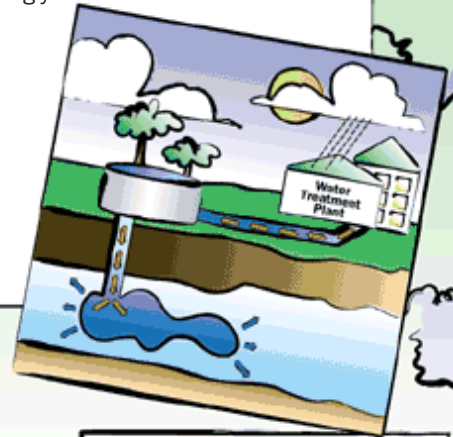
Using Reclaimed Water

Another alternative water source is reclaimed or reuse water. You may have seen signs posted with the words "Reclaimed Water" at places such as community parks or golf courses where attractively landscaped areas need water for irrigation and other purposes. Reclaimed water is the result of a process where wastewater is highly treated with filters and chemicals. It is important to remember that reclaimed water should not be used for drinking.



Aquifer storage and recovery - ASR

Can you imagine being able to pump water into an aquifer and months later pump it out of the same place? Through Aquifer Storage and Recovery (ASR), that is exactly what happens. During Florida's rainy season, excess surface water can be captured, treated and injected into an underground aquifer for storage. The aquifer is an effective place to store the water since it has a seemingly infinite storage capacity. In the dry season, when there is little rain and less water in the rivers and streams, the injected water can be recovered, treated and pumped into public water systems. Although there is mixing between existing ground water and the injected water, more than three-fourths of the water injected can be recovered. In this way, ASR helps humans balance our demand for water, which is highest during winter months, with our water supply, which is replenished during our summer rainy months. Currently, 17 ASR sites are in operation, under construction or being considered for construction within the District.



Surface Water stored for Future Use

If you have ever walked along the edge of a river or lake, then you are already familiar with a few forms of surface water. Since surface water is any water that has not seeped into the ground and is exposed to the air, it can exist in many different shapes and forms. Although most of the water that people in Florida use comes from aquifers, there are six rivers and creeks within the boundaries of the District that supply fresh water to the cities of Tampa, Bradenton, Punta Gorda, Port Charlotte, North Port and the counties of Manatee and Sarasota.

By expanding existing facilities, constructing new reservoirs, and developing ASR systems to store and recover water during periods of high flow, additional amounts of water can be provided to consumers when rainfall is scarce. Of course, it is very important that any use of surface waters be carefully managed to protect the environmental quality of the natural resources.

Getting the Most out of storm water

During a rainfall, we are often surrounded by sheets of water flowing across roads, parking lots and land surfaces. This water is called storm water. As storm water flows over different surfaces, it picks up pesticides, fertilizers, and other pollutants that it carries to its final destination. Storm water is one of the biggest sources of water pollution, but it also can be considered an alternative water supply. Storm water can be collected and stored in areas called detention ponds. After treatment, this water can be used for irrigation purposes or rehydration. Rehydration is the process of applying storm water or reclaimed water to the surface of well fields and wetlands. This increases the amount of water going into the aquifer.

Don't be Clueless — Piece it Together

1. Investigate your neighborhood to locate areas that use reclaimed water. Make a list of these areas and search for signs that indicate reclaimed water is being used for irrigation.
2. Look through newspapers, magazines, or search the Internet for an article that discusses an alternative water supply. Write a summary of the article.



Check Your Facts

Now that you know more about alternative water sources, match each term with its description.

Write the correct letter next to each term.

- _____ 1. ASR
- _____ 2. desalination
- _____ 3. reclaimed water
- _____ 4. storm water

- a. process of storing water in an aquifer and withdrawing it later
- b. water from a rainfall that flows across the land surface
- c. also called reuse water
- d. process of removing the salt from seawater

Answers:
1-a, 2-d, 3-c, 4-b





Solving the Case Depends on Everyone

Students, teachers, parents and other citizens are taking positive steps to conserve water and protect our water resources. How can we solve the case of Florida's water puzzle? The answer is **solving the case depends on everyone**. Following are just a few examples of ways that help contribute to water resources solutions.

The Art of Conservation

You probably never thought of water conservation as art, but a creative group of teachers and students in Hillsborough County did just that. With support of a Splash! water resources education mini-grant provided by the Southwest Florida Water Management District, hundreds of students at Temple Terrace Elementary School and King High School teamed up to produce a series of water conservation murals for public display. Water messages such as "treasure every drop," "helping hands save water" and "water, water everywhere, but not a drop to drink" were included as part of the creative artwork displayed on the brightly colored sheets of plywood hinged together to form the murals. To prepare for the project, students studied ways to conserve water, the effects of wasting water and the impact of drought on wetland communities. Students agreed that their participation in the project has made them and their families better water savers!



Xeriscape™ University

Citizens who are interested in being part of a community solution to water conservation can do so by attending Xeriscape University. People who attend a Xeriscape University workshop learn all about the basic principles of Xeriscape landscape, Florida-friendly yards and water-conserving landscapes. They find out about such things as turf, rain sensors, drip irrigation, pest management, mowing height, pruning, mulch, soil analysis, fertilization and plant selection. If you are interested in attending one of these learning events, please contact the Communications and Community Affairs Department of the Southwest Florida Water Management District at (352) 796-7211 or 1-800-423-1476 (Florida only), extension 4757.



Community Neighbors Making a Difference

This past year, the eight basin boards of the Southwest Florida Water Management District funded 30 community education grants throughout the 16-county area. These grants provide educational experiences for residents that lead to the protection and conservation of the Florida ecosystem, specifically the water resources closest to their homes. The emphasis is on creative projects that offer the public the opportunity to learn more about the water resources they rely on daily and to develop a desire to become active stewards of our natural resources. Up to \$5000 per grant can be awarded.

The five categories of projects are:

- Alternative water sources
- Natural systems, watersheds, or ecosystems
- Water quality
- Water conservation
- Flood protection

For more information on community education grants, please call 1-800-423-1476, ext. 4755, or visit our Web site at WaterMatters.org.



Tools for Conservation

One of the Southwest Florida Water Management District's priorities is water conservation. Here are a few ways the District helps people conserve water.

- **The Water Conservation Task Force** is made up of members representing government, public supply, recreation, agriculture, business and industry, development, and the environment. The Task Force provides guidance to the District and all water users in the promotion of water conservation as a way to meet the challenges of the region's rapidly growing water demands.
- **The District's Leak Detection Program** provides assistance to public water supply utility companies by locating leaks in pipes so they may be repaired. Since 1990, nearly 700,000,000 gallons per year have been saved within the District.
- **The District's water conservation online library** is an information resource that includes reports, research and a conservation database. To access the information, visit WaterMatters.org.
- If you are **interested in learning how to save water indoors and outdoors**, call the District's Communication and Community Affairs Department at (352) 796-7211 or 1-800-423-1476 (Florida only), extension 4757, and request a free copy of **50 Ways to Do Your Part**.

Don't be Clueless — Piece it Together

1. Discuss with your class some water conservation projects that could take place at your school. Take a vote to decide which one to do.
2. Look through newspapers, magazines, or search the Internet for pictures, announcements or articles about water conservation projects. Describe one of these projects and explain the positive effect it may have on our future.



Check Your Facts

Help solve the case by completing each of these sentences with the best choice.

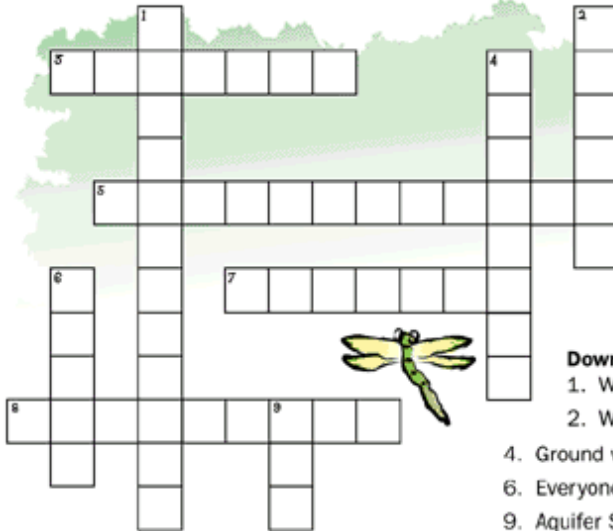
Circle a, b or c.

1. It is no longer a secret that everyone is a _____ user.
a. computer
b. water
c. cell phone
2. It is up to all of us to protect and _____ our water resources.
a. conserve
b. damage
c. consume
3. To meet our demands for water, we must try a variety of _____.
a. problems
b. solutions
c. gadgets

Answers: 1-b, 2-a, 3-b



Crossword



Across

- 3. A _____ can occur when there is less precipitation than normal.
- 5. The process that removes salt from seawater or brackish water is called _____.
- 7. Water that remains on the Earth's surface is called _____ water.
- 8. A _____ garden uses less water than a traditional garden.

Down

- 1. Water _____ is all about practices that use less water.
- 2. Water that soaks into the ground is called _____ water.
- 4. Ground water is held in soil and rock formations called _____.
- 6. Everyone is a _____ user.
- 9. Aquifer Storage and Recovery is also called _____.

Unscramble

Unscramble the letters to form real words.

SVNOCTEIORAN

TDGHRU

SALNIOEDAIN

GOLHDYORIC

MENIRONTENV

Word search

CONSERVATION DESALINATION AQUIFER XERISCAPE
 RESOURCES DROUGHT WATER CYCLE
 PRECIPITATION CLIMATE RAINFALL ASR



Hidden Message

Break the code and learn an important message.

2 25 23 15 18 11 9 14 7 20 15 7 5 20 8 5 18
 23 5 3 1 14 8 5 12 16 19 15 12 22 5
 6 12 15 18 9 4 1 19 23 1 20 5 18 16 21 26 26 12 5

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

Vocabulary

aquifer

a sponge-like underground layer of rocks that can hold and release water

Aquifer Storage and Recovery (ASR)

injecting treated surface water into underground aquifers during periods of high flow and withdrawing it later for use during dry seasons

brackish water

fresh water that is mixed with salt water

desalination

process of removing salt from seawater or brackish water to produce a fresh water supply

drought

a period of time during which precipitation is much lower than the average amount of precipitation for that time of year at that particular place

evaporation

process by which water changes from liquid to gas

ground water

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, hail, etc.

reclaimed or reuse water

the result of a process by which wastewater is highly treated with filters and chemicals so it can be used for irrigation purposes

reverse osmosis

a process of desalination that uses pressure to force salt water through membranes to separate the water into salt-free water and a salty concentrate

surface water

water that stays on top of the Earth's surface

transpiration

process by which plants and trees give off moisture through leaves



Web sites

You can surf the Internet to learn even more about water resources. Below is a list of interesting Web sites that include information, educational activities and links to other sites about water topics.

Southwest Florida Water Management District
www.WaterMatters.org

U.S. Geological Survey's (USGS)
 Water Science for Schools
www.ga.usgs.gov/edu

Learning to be Waterwise
www.getwise.org/wwise/main.html

U.S. Drought Monitor
enso.unl.edu/monitor/monitor.html

American Water Works Association
 Blue Thumb Activities for Kids
www.awwa.org/bluethumb/activitieskid.htm



Answer Key

Crossword Answers

- | | | |
|-----------------|-----------------|--------------|
| 1. conservation | 4. aquifers | 7. surface |
| 2. ground | 5. desalination | 8. Xeriscape |
| 3. drought | 6. water | 9. ASR |

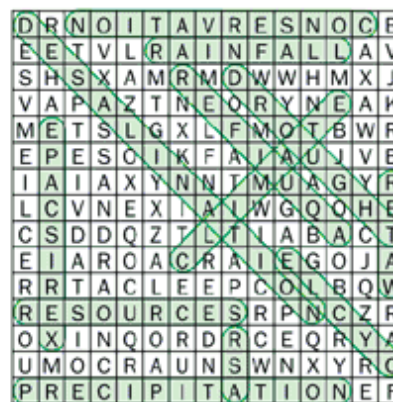
Unscramble Answers

conservation	desalination	environment
drought	hydrologic	

Hidden Message Answer

By working together, we can help solve Florida's water puzzle.

Word search



SOLVING FLORIDA'S WATER PUZZLE

CREATE YOUR OWN CLUES

Now that you have completed your water resources mystery, use your creative writing skills to develop a few interesting water clues for others to try to solve.

Directions:

Use the information presented in this booklet to create a question for each character to ask the reader. For example, "What can be found in the form of a solid, liquid or gas?" The answer is - **water**. Be sure to include your correct answers in the space provided. Don't forget to be creative!

Rules:

- The entry must be submitted on this page or a copy of it.
- Remember to keep a copy of your entry. Only one entry per student will be accepted. This activity is open to students in grades 4-7 in the following counties within the District's boundaries: Charlotte, Citrus, DeSoto, Hardee, Hernando, Highlands, Hillsborough, Lake, Levy, Manatee, Marion, Pasco, Pinellas, Polk, Sarasota and Sumter.

Prizes:

Prizes will be awarded to entries based on creativity and an understanding and respect for our water resources.



We want to know...

Check the appropriate box:

- Student - Please specify grade: _____
 Teacher Adult

What did you learn from reading this booklet?

What will you do differently as a result of reading this booklet?

What role can you play in helping conserve Florida's water?

Return by mail to address at right or by fax to (352) 754-6883, or e-mail responses to beth.bartos@swfwmd.state.fl.us.

Answers: 1. _____
 2. _____
 3. _____

Please return your entry and this form to:
 Solving Florida's Water Puzzle
 Communications and Community Affairs Department
 Southwest Florida Water Management District
 2379 Broad Street
 Brooksville, Florida 34604-6899



Student's name: _____
 Home address: _____
 City: _____ ZIP Code: _____
 Home phone number: _____ County: _____
 School name: _____ Grade level: _____

