ADrop INTime

How Water Resources
Shape Our History

Southwest Florida Water Management District

WATERMATTERS.ORG • 1-800-423-1470

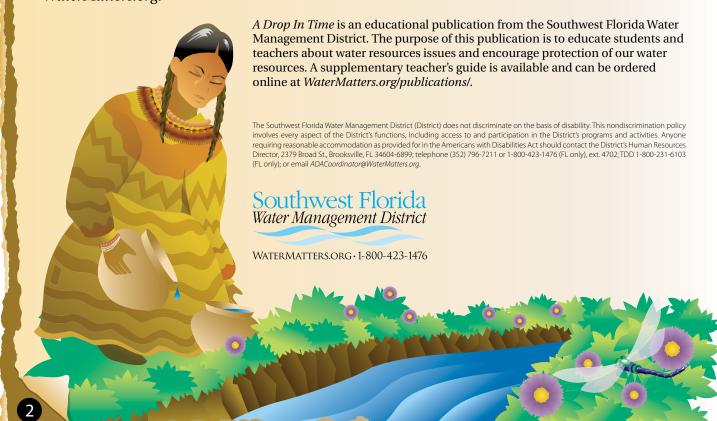
Grades 5-8
WaterMatters.org

Introduction

Water is one of the most important resources on earth. In fact, without water there would not be any people, animals or plants. All living things need water. Here in Florida we are fortunate to have a variety of natural resources, as well as a rich and fascinating history. Within the United States, Florida is considered to be the state with the longest recorded history, and it was Europe's first frontier in North America. In *A Drop in Time* we will focus on our past, study current events and consider future trends. For each chapter we have included a variety of information and activities about our history and its connection to water resources. Be sure to take the "Time-Out Quiz" and complete the "Time Posts" at the end of each chapter. We have also included puzzles, games and a water resources vocabulary list. Don't forget to display the timeline poster and enter the contest. *A Drop in Time* will help you appreciate the importance of our natural environment and encourage you to protect Florida's water resources.

The Southwest Florida Water Management District (SWFWMD) is responsible for managing water resources in our area. The SWFWMD's goal is to make sure there is enough water, now and in the future, and to protect and maintain water and related resources. We know that as more people move into the area, the landscape of the environment will change and more water will be needed. In order to meet these increasing demands for water, we must become more aware of our past, understand our present conditions and prepare for our future.

To make sure Florida's water resources will be valued and protected, we must learn how to balance the demands of humans and, at the same time, protect the environment. For additional information about water resources protection, please contact the SWFWMD's Communications Department at 1-800-423-1476, ext. 4757, or visit our web site at *WaterMatters.org*.



Water and Weather Over Time

The Timeless Water Cycle

It may be hard to believe, but the water dinosaurs drank millions of years ago and the water that Native Americans used for cooking and drinking a few hundred years ago may have been the same water! In fact, we may be using that same water even today. This is possible because the water on earth recycles itself over and over again through the environment. This timeless process is called the *hydrologic cycle*, or water cycle. Let's learn more about this never-ending water cycle.

Study the picture below of early pioneers pumping water to use in their home. Each number represents a different phase in the hydrologic cycle and is described as follows: (1) The *sun* is the source of energy. (2) *Evaporation* is vapor created when the sun heats water in lakes, streams, rivers, oceans and other bodies of water in contact with air. (3) *Condensation* occurs when tiny droplets of water form as vapor, rise into the air and cool. (4) *Precipitation* is moisture released from clouds in the form of rain, snow or hail. (5) *Percolation* is the downward movement of water through the ground. (6) *Transpiration* is vapor created when plants and trees give off moisture. It is important to remember that without the sun the hydrologic cycle wouldn't exist. The sun is the energy source that causes the timeless water cycle to occur over and over again with no beginning and no end.



Weather

Did you know the Gulf of Mexico was formed more than 200 million years ago when the earth shook and created a ridge? This ridge became exposed land when glaciers from the Ice Age lowered sea levels around the world. The exposed area of land, which includes the Panhandle and the peninsula, became what is now called *Florida*. West-central Florida has a subtropical climate with short winters and hot summers.

Weather can be Florida's best friend and its worst enemy. The hydrologic cycle plays an important role in our weather. Changes in weather are caused when different kinds of air masses meet. Florida is known for having more thunder, lightning and hurricanes than any other state in the country. During the rainy season, which usually lasts from June to September,

people must prepare for hurricanes, tropical storms and other types of severe storms. This is because throughout this season the sun heats moist air over the ocean and can create a spiral motion of swirling winds, heavy rainfall and even a hurricane. In 1960, Hurricane Donna caused a lot of damage and severe flooding in the Tampa Bay area. You probably know of someone who has been through a hurricane, or maybe you have experienced one yourself.

In recent years our area has experienced dry periods of time when the amount of precipitation was much lower than normal. These conditions, called *droughts*, cause water tables and water levels in streams and rivers to fall and the soil to become dry. Fortunately, we have learned to practice ways of saving water in our homes and communities. We have also learned that regardless of whether or not we are experiencing a drought, it is important for all of us to protect and conserve our water resources.

Time Posts

- 1. Hurricane guides are available throughout our area to help people prepare for the hurricane season. List several ways you and your family could be better prepared for the next hurricane season.
- 2. Search through a newspaper or magazine for an outdoor scene and paste it onto a sheet of paper. Use the information about the hydrologic cycle to label your picture and develop a chart that describes each phase of the cycle. You may need to add features to your picture, such as the sun, a cloud, rain, etc.



Time-Out Quiz

Check all statements that describe phases of the hydrologic cycle.

- ☐ Water percolates through the ground.
- ☐ Plants and trees give off moisture.
- ☐ Tiny droplets of water form as vapor rises and cools.
- Precipitation is released from the clouds.

Our Natural Systems

Florida is known as the "Sunshine State," but it could also be known as the "Water State." This is because our state is surrounded on three sides by water and has the longest coastline of any state except Alaska.

Beneath Florida's large landmass lies highly porous rock called *limestone*. Because this rock is so porous, these underground layers of limestone, also called *aquifers*, can hold and release water. Water found in underground aquifers is called *groundwater*. The most important water source in our region of the state is the Floridan aquifer system, which provides us with most of our drinking water. Let's take a closer look at some facts about a few of our natural systems.

- A lake is a large depression in the ground that is filled with standing water. Lakes can be natural or constructed. There are about 7,000 lakes in Florida and our part of the state has 1,800 of them. That's a lot of lakes!
- A river is water on the move. The flowing water of a river can vary in temperature, clarity and speed as the river twists and turns on its journey to an estuary and the sea.
- Wetlands are land areas that are saturated or flooded with water all or part of the year. Wetlands are natural reservoirs and filtering systems, and they provide habitat for a variety of plants and wildlife.
- An estuary is a partially enclosed body of water formed when fresh water from rivers and streams flows into the ocean, mixing with the salty seawater. Tampa Bay, Sarasota Bay and Charlotte Harbor are the three largest estuaries in our area of the state.



Our Past

There were about 10,000 to 25,000 Native Americans living in Florida when the Europeans arrived on the shores. The Timucuans lived in the central and northeast regions in large villages, which were often located near lakes and rivers. The Tocobaga tribe lived near Tampa Bay. The Native peoples in west-central Florida fished and trapped wild food in inland water bodies as they navigated through shallow rivers and swamps in their dugout canoes. In the 1500s, Spanish explorers made their way to Florida in search of gold and other riches. The most famous of these, Juan Ponce de León, came to Florida in search of the "Fountain of Youth." Soon Spanish fishermen and early pioneers set up villages throughout the Tampa Bay area. By the early 1700s almost all of Florida's Native American groups were gone — many died from diseases brought to the area by Europeans.

Current Events

While early explorers were looking for eternal youth and gold, they often overlooked Florida's natural treasures. As a matter of fact, residents and visitors didn't realize the importance of our natural resources and often thought our state had too much water and swampland. People often used natural resources without thinking about harmful effects on the surrounding environment. Logging activities stripped away the natural landscape, causing erosion. Canals were carved out to provide drainage and increase navigation activities, but they altered natural drainage patterns. Wetlands were drained for farms and housing developments, eliminating storage areas for floodwaters and removing natural vegetation that helped filter and clean water before it entered water bodies. Releasing pollutants into rivers and lakes affected water quality and plants and animals that depended on that source of water. Today we realize the value of our natural resources. Several laws passed in 1972 encouraged us to protect the environment. These laws include the Clean Water Act, the Environmental Land and Water Management Act, the Comprehensive Planning Act, the Land Conservation Act and the Water Resources Act. Today most people understand the important role we all play in protecting and preserving our ecosystems. Do you?

The Future

Because Florida's population has grown dramatically in recent years, preserving and protecting our limited natural resources is essential. The strong connection between land and water means special care must be given to preserve and protect lands that are important to the area's water resources. One way west-central Florida's water can be protected, preserved and restored is through the purchase of land by agencies such as the Southwest Florida Water Management District. Another

way to protect our natural systems is to follow regulations set up for the minimum flows and levels of rivers, lakes, wetlands and aquifers. By determining how much water can be pumped safely out of the ground or withdrawn from a river, we can avoid causing harm to the ecology of an area. Restoring lakes, rivers and ponds often depends on a lot of citizens. The next time you hear about a restoration event in your area, roll up your sleeves, help out and get involved in your future!

Time Posts

- 1. Select a natural system (lake, river, wetland, etc.) close to your home. Find out what the condition of the area was like several years ago. Then describe what the area is like today. Finally, predict what you think the area will be like 50 years from now.
- 2. Search through newspapers, magazines or on the Internet for announcements about a "cleanup" taking place in your area. Describe the event and list several reasons why citizens should take part. Talk to your family about making plans to attend the event.

Time-Out Ouiz

True or False? Circle **T** or **F**.

- **T F 1.** The Europeans arrived in Florida before the Native Americans.
- **T F 2.** A wetland is an example of a natural system.
- T F 3. Native American villages were often located near a source of water.
- **T F 4.** Florida's population has not increased in recent years.
- T F 5. Citizens should be involved in protecting the environment.



The Economics of Agriculture, Industry and Tourism

Can you guess how the state of Florida makes most of its money? It is from tourism and all the goods and services related to it. Agriculture is also important to Florida's economy. In fact, about one-third of the land in our state is used for agricultural activities, such as raising livestock and growing fruit and vegetable crops. Let's learn more about a few of the industries that have affected our past and may influence our future.

Our Past

Without Christopher Columbus our state flower probably wouldn't be the orange blossom nor would our state beverage be orange juice. More than 500 years ago the famous explorer brought orange seeds to Haiti, which were then carried by other explorers into our area. By the early 1800s farmers in Pinellas County began growing oranges as a commercial crop. Frosty weather during the winter of 1894 to 1895 ruined citrus crops in the northern counties and forced many growers to move farther south to clear more land for growing oranges and grapefruits. In 1945 scientists in our state invented frozen concentrated orange juice. Orange juice is so popular today that more than 90 percent of Florida's oranges are processed into orange juice.

Before Texas became famous for raising cattle,
Florida was the leading producer of beef. During the Civil War, Florida provided
the Confederate Army with most of its beef and leather products. When the
war ended, Florida's cattle industry continued to grow. The cowmen who
worked the herds carried long, braided buckskin whips that made a sharp
sound when they were cracked. Some people say native Floridians were
given the name "Crackers" because of sounds made by the cracking whips

used in cattle herding.

Sponging, which took place in the shallow waters off Florida's coast, brought most of the money into the state before tourism became our largest industry. Tarpon Springs became a popular spot for harvesting sponges growing in the waters of the Gulf of Mexico. At the turn of the century, many Greek immigrants settled in the Tarpon Springs area and used their expertise to expand the sponging industry. Tarpon Springs eventually became known as the "Sponge Capital of the World." Unfortunately, a disease infected the sponge beds in 1940 and killed many of the sponges. Although sponging is no longer a large part of Florida's economy, Tarpon Springs is still known as the largest natural sponge market in the world.



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How Water Resources Shape Our History

It is essential that we appreciate the importance of our natural environment and encourage others to help protect Florida's water resources. Just as many water drops make up the flow of a river, events in our history create patterns that help describe who we are and how we live in our environment. Here are just a few of the highlights that have contributed to a drop in time.

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1900

Many Greek immigrants settle in the Tarpon Springs area, which eventually becomes known as the "Sponge Capital of the World."

1972

Several laws are passed to protect our na They include the Clean Water Act, the En-Land and Water Management Act, the Co Planning Act, the Land Conservation Act Resources Act.

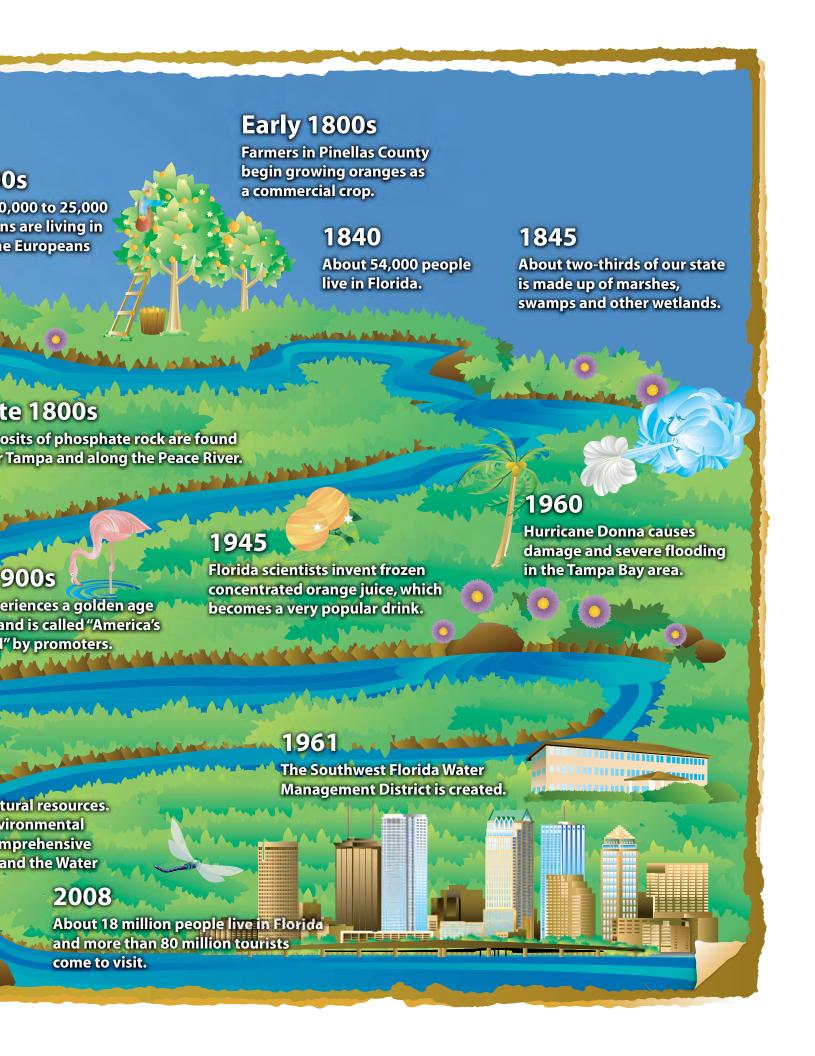
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Early 1

Florida exp of tourism playground



Current Events

If your family uses fertilizer on trees, lawns or plants, it was most likely produced from one of Florida's phosphate mines. Phosphate mining is an important industry for Florida. In fact, Florida's phosphate mines provide about 75 percent of all the phosphate rock in the United States. As far back as the late 1800s, deposits of phosphate rock were found in places near Tampa and along the Peace River. Because phosphate rock is underground, the mining process changes the landscape, removing vegetation and altering natural drainage patterns. However, phosphate companies have learned how to restore this land by turning these large areas into useful natural systems, such as lakes and wetlands. This process is called "reclamation."

The Future

It seems everyone wants to visit Florida. The natural beauty, theme parks, clear skies and sandy beaches attract millions of tourists each year. In 2008 it is estimated that more than 80 million visitors came to Florida — that's a lot of people!

Florida's water attracts visitors because it is found throughout the state. The coasts and inland water bodies are great locations for water sports such as surfing, windsurfing, snorkeling, scuba diving, waterskiing, jet skiing, sailing, canoeing and fishing. The golden age of tourism in Florida began in the early 1900s. Promoters of the era called Florida "America's playground." Millionaires vacationed in Florida and built luxurious homes here. They also brought their elegant lifestyles, fine arts and recreational activities. They dined on saltwater catches, such as shrimp, lobsters, scallops, red snapper, grouper, mackerel, oysters and crabs, or freshwater catfish. With the passing of every decade, more and more tourists came to visit our state, and many decided to live here permanently.

It is easy to predict that Florida will continue to draw millions of tourists each year, which also places a higher demand on our water resources. Often when visitors are surrounded by so much water, it is easy for them to forget about the importance of conserving our limited water resources. Fortunately, hotels and resorts are encouraging their visitors to save water in simple ways, such as requesting that towels and linens not be changed every day. Glasses of water may be served only by

request in restaurants. Conservation reminders may also appear on signs and in brochures in restrooms at popular tourist attractions. Maybe you can think of other ways to encourage people to avoid wasting water. We should all do our part to conserve our limited water supply.

Time Posts

- **1.** Select a year from the past, present or future. Develop a travel brochure or advertisement that includes different features illustrating that era.
- 2. Search for an article in the newspaper, a magazine or on the Internet that focuses on an industry nearby. Write a paragraph that could be used to persuade this industry to use less water or avoid polluting an area.

Time-Out Quiz

When did it happen? Fill in the year or era when the event occurred.

- Frozen concentrated orange juice was invented in ______.
- **2.** In ______, Florida had more than 80 million tourists.
- **3.** A disease killed many Tarpon Springs' sponge beds in _____.
- **4.** In the late _____ phosphate was discovered near Tampa.



Supplying and Managing Our Water Resources



Conserve Florida's Water.

Do Your Part.

Every Drop Counts.

Reduce Your Use.

Protect Florida's
Water Resources.

Do the Right Thing. Conserve Water.

The slogans above probably weren't on the minds of Florida's early residents. In fact, it has only been within recent history that we have learned to appreciate the importance of protecting our water supply and managing water resources. Today, with the help of local, county and state governing groups, all of us can play an active role in preserving our natural resources. We can also look forward to exciting possibilities for meeting the demand for clean and healthy water in our future.

Our Past

The earliest residents of Florida had little difficulty finding the water needed for their survival. Homes were set up near freshwater rivers, streams or swamps. Like the residents of today, water was used for activities such as drinking, cooking, bathing, washing and irrigating crops. For many centuries the people who lived here were able to enjoy an abundant supply of water. In fact, it is estimated that in 1845, two-thirds of the state was made up of marshes, swamps and other wetlands. Residents of earlier times believed a clean and plentiful water supply would be available forever. However, as more people moved to the area, many wetlands were drained and turned into dry land on which homes and businesses could be built. Eventually people realized wetlands protected our limited water resources.

Current Events

Water in Florida belongs to the public rather than to individual property owners and is managed through a unique system of five water management districts. These agencies are responsible for water use and water quality regulation, long-range water supply planning, flood control and the protection of natural systems. The water management districts also coordinate their activities with Florida's Department of Environmental Protection (DEP). Water in our area of the state is managed by the Southwest Florida Water Management District (SWFWMD). The SWFWMD was created in 1961 as a result of severe flooding and damage in southwest Florida by Hurricane Donna, which struck in 1960. The SWFWMD is divided into eight hydrologic areas called basins, and includes part or all of 16 counties. The SWFWMD's mission is to manage and protect water and water-related resources. Water is supplied through water supply authorities and water utilities. Contact or visit your water supplier's web site to learn how water is provided to nearby homes and businesses.

The Future

Now that you understand how important it is for us to protect our limited water resources, how do you think this can be accomplished in the future? Many innovative methods and projects are already taking place and many others may occur in the near future. Following are a few highlights of ways to make sure we always have enough clean and healthy water for future generations. Maybe you can add to this list!

Agricultural Methods and Tools

Modern tools such as tensiometers — devices that measure the surface tension of a liquid — and efficient farming methods such as drip irrigation can be used to help save water.

Desalination

The process of removing salt from salty or brackish water, with the remaining fresh water used for drinking and other purposes. The Tampa Bay area is home to the Tampa Bay Seawater Desalination Plant, which provides up to 25 million gallons of drinking water to the region each day.

Stormwater Storage

Water collected from rainfall and stored in detention ponds can be chemically treated for effective irrigation purposes.

Reclaimed Water

Wastewater can be treated with chemicals for reuse in irrigation and other purposes.

Supervisory Control and Data Acquisition (SCADA)

This complex technology network can monitor weather and other conditions that affect changes to water resources.

Aquifer Storage and Recovery (ASR)

Excess surface water or reclaimed water can be treated and pumped into an aquifer and withdrawn at a later time.

Geographic Information System (GIS)

This computer mapping system can show data about places important to the water supply.

Land Acquisition

The SWFWMD can acquire and manage land considered

important for water management, water supply and conservation, and protection of water resources.

Water Conservation

You can become involved in water conservation simply by learning how to save water whenever possible and by following water restrictions that may apply to your community.

Time-Out Quiz

Choose the best answer. Circle **a**, **b** or **c**.

- **1.** What is the process of storing water in an aquifer and withdrawing it later?
 - a. ASR
 - **b.** desalination
 - c. land acquisition
- **2.** When was the Southwest Florida Water Management District created?
 - **a.** 1845
 - **b.** 1960
 - **c.** 1961
- **3.** What can you do to help protect our water resources?
 - a. Use SCADA.
 - **b.** Save water.
 - **c.** Drink salty water.



Time Posts

- Use the map of Florida to find where you live. Select an example from the list above and explain how it could affect the quality of life in your area.
- 2. Search for an article in the newspaper, a magazine or on the Internet that focuses on an issue related to water resources. Write a short summary of the article.

Keeping Up With Our Population Growth and Development



The history of Florida has been shaped by patterns of tremendous population growth and development. Most of Florida's residents came from somewhere else. By 1987 Florida became the nation's fourth most populated state. The metropolitan area surrounding Tampa, Clearwater and St. Petersburg is the most densely populated area in the state. Let's find out more about our population growth and development.

Our Past

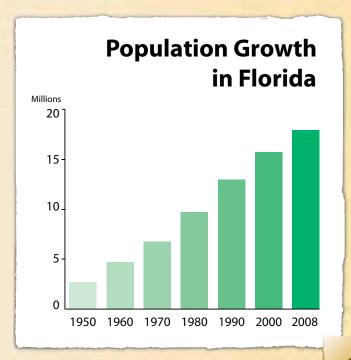
By 1840 approximately 54,000 people lived in Florida. At that time, almost half the population was made up of slaves who worked the territory's prosperous plantations.

Since the 1880s railroads, tourism, citrus fruits and other industries have contributed to Florida's rapid growth. Settlers snatched up land for plantations and orange groves. When the railroads were built, resorts appeared along the palm-lined coastal areas.

In 1886 Vincente Martinez-Ybor, a Cuban immigrant, established a huge cigar factory outside Tampa. The community became Ybor City. Thousands of Cubans, as well as immigrants from Italy, Germany and Spain, came to work in the city's cigar factories. As the workers sat at long tables rolling cigars, someone often stood on a raised platform and read aloud newspaper articles, stories and poems. By the early 1900s Ybor City was known as the "Cigar-Making Capital of the World."

Current Events

According to the 2008 U.S. census, approximately 18 million people live in Florida. Between 1970 and 1995 the population more than doubled. In the period from 2000 to 2008 there was a population increase of 14.7 percent in the state of Florida compared to an 8 percent increase for the entire country. Use the bar graph showing the population growth in Florida to see how much Florida has grown over the past several decades. For more information about Florida and the county in which you live, be sure to visit http://quickfacts.census.gov/qfd/ and click on "Florida."





The Future

Florida's population growth and land development will most likely continue to increase throughout the twenty-first century. As more people move into the state, additional housing, schools, hospitals, shopping centers, energy sources and services will be needed. This also means there will be a greater demand for water by public users, industry and commercial users, power

plant users, agricultural users and recreational users. It is estimated that each person in our area uses around 111 gallons of water each day. A large power plant often uses more than 2 million gallons of water per day. With the increased demands on our natural resources, it is important that we all serve as environmental citizens. Instead of wasting water, whether it's drops or gallons, we should find ways to conserve. Rather than harming wetland areas and water bodies with litter and pollutants, we must work to keep our water clean. When you hear someone say that one person can't make a difference to the quality of our environment, try to describe ways in which one person or a group of people can have a positive impact on protecting our water resources.

Time Posts

- 1. Create a bar graph that shows what you think the population will be for each decade through 2050. Describe how these numbers could affect your community.
- 2. Look through the newspaper, a magazine or on the Internet for pictures, announcements, advertisements or articles that demonstrate ways in which your community is growing and changing.

Time-Out Quiz

For each question, circle **Yes** or **No**.

- Yes No 1. Are there states with populations greater than Florida?
- Yes No 2. Will an increase in population mean an increased demand for water?
- Yes No 3. Will our population most likely continue to increase in the future?
- Yes No 4. Can each of us have an impact on the quality of our water resources?

Crossword **Across** 8. When we avoid wasting water, we are practicing water _ 9. An estuary is a partially enclosed body 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. 10 12. Thousands of Americans lived in Florida before the Europeans arrived. Down 11 12 1. An important industry in Florida is ____ mining. D|E|E|L|E|N|V|I|R|O|N|M|E|N|T2. Millions of _____ visit Florida every year. **Word Search** V|N|O|||T|A|N|||L|A|S|E 3. A process of removing salt from salty W|N|D|O|J|E|Q|J|O|U|E|R|E|V|T or brackish water is called _ M E S P R P A A G V D B V L Desalination 4. We are fortunate to have a variety of ESTJBEBCRRKEEC Wetlands natural resources in _____. NTELIVHEOUL Conserve 5. Florida's _____ has increased in recent years. A|U|N|O|A|G|S|Y|W|P|C| Aquifers 6. In the United States, Florida has the DAMAONDHTMR Development longest recorded IRJPOODRHEODM Growth 7. It is important that we all help protect RISCZQLSWNEHER Estuaries our water _____. OETCAHTSRTSTNFO Hydrologic SREROLPXERETJ **Explorers** F|U|S|C|O|N|C|A|O|V|T|Z|U|B|D Environment T|A|Q|U|I|F|E|R|S|T|O|A|G|K|Y|Water ESTFLORWA Florida Hidden Message Unscramble Break the code and learn an important message. 18 5 19 15 21 18 3 5 19 Unscramble the letters to form real words. STUROSIT 1 22 5 19 8 1 16 5 4 16 1 19 20 1 6 6 5 3 20 5 4

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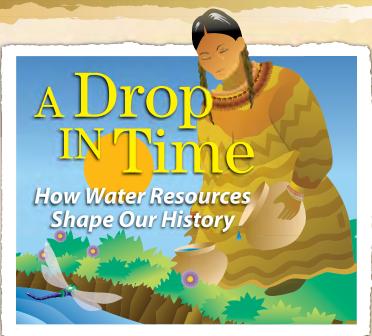
Now that you have learned about water resources from a historical perspective, it is time for you to create something that could be a drop in time.

Directions:

Select a time in history that interests you and write about it. It could be an article, a page from a diary, a journal entry, a short story or poem, or an interview with a friend or relative who lived during that period in history. Be sure to include information about water resources in your written piece. You may also decide to include a picture.

Rules:

• The entry must be typed or handwritten on 8.5"x 11" paper, on one side only, and it should not be more than two pages.



• Remember to keep a copy of your entry. Only one entry per student will be accepted. This activity is open to students in grades 5–8 in the following counties within the SWFWMD's boundaries: Charlotte, Citrus, DeSoto, Hardee, Hernando, Highlands, Hillsborough, Lake, Levy, Manatee, Marion, Pasco, Pinellas, Polk, Sarasota and Sumter.

Prizes:

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

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Entry Form

Grade level __

Student's name ______ Address _____ ZIP _____ ZIP _____ School name _____

Please return your entry and this form to:

A Drop In Time

Communications Department Youth Education Section Southwest Florida Water Management District 2379 Broad Street Brooksville, FL 34604-6899

Southwest Florida Water Management District