

BE A PINELLAS COUNTY

water protector



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TAMPA
BAY 
WATER

Liquid life

Water is a liquid that makes life on Earth possible. From the tiniest bacteria to the world's largest mammals, all living things need water to survive. As the American Museum of Natural History notes, "As water cycles from the air to the land to the sea and back again, water shapes our planet — and nearly every aspect of our lives."

Water is crucial for life on Earth. In its three phases (solid, liquid and gas), water ties together the major parts of the Earth's climate system: air, clouds, the ocean, lakes, vegetation, snowpack and glaciers.

Sources: American Museum of Natural History; National Oceanic and Atmospheric Association

A special substance

While water may seem like an ordinary substance, it is special. Colorless, tasteless and odorless, water can take the form of liquid, solid and gas. A tiny molecule made up of three atoms — two hydrogen and one oxygen — water molecules join together in a force known as hydrogen bonding.

A hydrogen bond between water molecules forms because oxygen has a negative charge and hydrogen has a positive charge.

When in a liquid state, water comes out of faucets, flows underground and in rivers and oceans, and forms clouds and fog in the air. When water molecules escape from liquid water, they float into the air and turn into an invisible gas called water vapor. When water freezes into a solid, it can float! As water freezes, ice forms and water molecules arrange themselves in a crystal structure.

Source: American Museum of Natural History

On the move

Earth's water is always moving. It is in motion inside the planet, across its surface and in the atmosphere above. This movement is called the water cycle. The water cycle, or hydrologic cycle, describes the journey of water as water molecules make their way from the Earth's surface to the

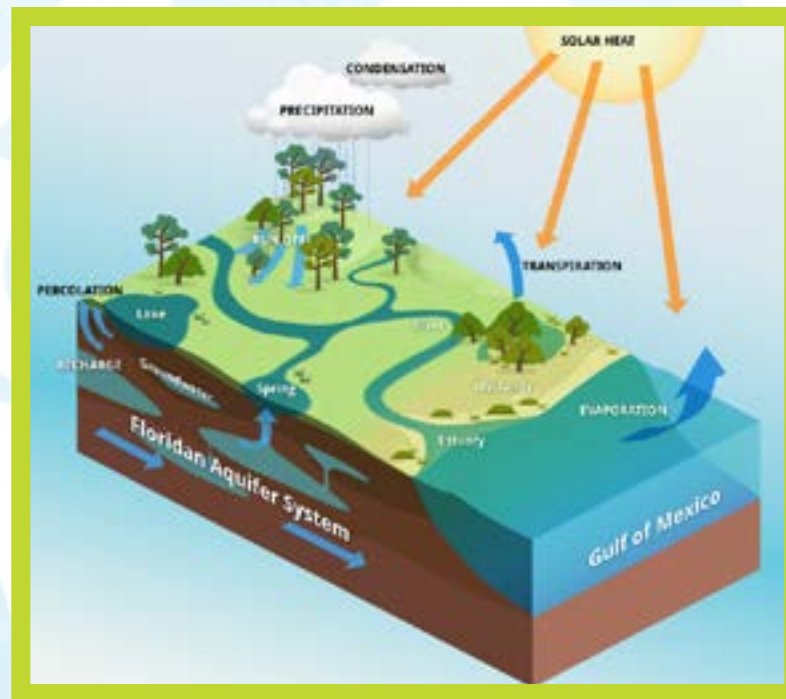
through the water cycle continues with a process called evaporation. Water stored in surface bodies of water, such as lakes, rivers and the ocean, is changed into water vapor by the heat of the sun. A process called convection then draws this warmer, wetter air upward, where it encounters cooler air and eventually condenses back into tiny water droplets.

► **Transpiration** — In addition to evaporation, a large percentage of the water is released into the atmosphere by trees and plants in a process called transpiration. To assist photosynthesis, plants absorb water from the soil through their roots, a process that also can clean water by filtering out nutrients and pollution. The plant then transpires, or gives, this water back into the atmosphere through its leaves and stems. Approximately 70 percent of all rainfall returns to the atmosphere in the form of evaporation and transpiration.

► **Runoff** — Rainfall that is not absorbed directly into the soil or through the roots and leaves of plants, or collected into existing bodies of water such as lakes or rivers, is called surface, or stormwater, runoff. Stormwater runoff is created from rain that flows over land or solid surfaces, such as paved streets, driveways and parking lots.

► **Percolation** — Rainfall drips underground through a process called percolation. Water travels downward through the tiny spaces between rocks and soil particles, and within the structure of the underlying limestone. The water eventually saturates, or soaks, the limestone in much the same way water fills the tiny holes of a sponge. It is this process of percolation that allows Florida's abundant rainfall to refill the large volumes of water flowing from Florida springs.

Sources: American Museum of Natural History; Florida Department of Environmental Protection; NASA; United States Environmental Protection Agency



atmosphere and back again, in some cases to below the surface. This gigantic system, powered by energy from the sun, is a constant exchange of moisture between the oceans, the atmosphere and the land.

► **Rainfall** — The journey of water begins in the sky. Rainfall is the result of various atmospheric and physical conditions. The most important of these are gravity and humidity.

► **Evaporation and condensation** — Water's journey



The importance of water

There is the same amount of water on Earth now as there was when the Earth was formed. The water from your faucet could contain molecules that dinosaurs drank! Water is essential for all life on, in and above the Earth. Did you know human beings are made up mostly of water?

- ▶ Water controls Earth's temperature. It also controls the temperature of the human body, carries nutrients and oxygen to cells, cushions joints, protects organs and tissues, and removes waste.
- ▶ 75 percent of the human brain is water, and 75 percent of a living tree is water.
- ▶ The lungs are about 83 percent water. The skin contains 64 percent water, muscles and kidneys are 79 percent, and bones have 31 percent water.

Source: The United States Environmental Protection Agency; United States Geological Society

Going beyond the text: Moving water

The world's water moves among lakes, rivers, oceans, the atmosphere and the land in an ongoing pattern called the water cycle. The water cycle describes how water evaporates from the surface of Earth, rises into the atmosphere, cools and condenses into clouds and falls again to the surface as precipitation, or rain. Visit <https://gpm.nasa.gov/education/videos/water-cycle-animation> to watch an animation of Earth's water cycle. Next, create an artistic depiction showing the water cycle. Finally, create a cartoon strip explaining the water cycle to share with your class. Use the cartoon strips in the Tampa Bay Times as models.

Florida Standards: SC.35.N.1.1; SC.35.N.1.2; SC.35.N.1.3; SC.35.N.1.4; SC.35.N.3.1; SC.35.P.9.1; SC.5.E.7.1; ELA.35.C.1.3; ELA.35.C.1.4; ELA.35.C.2.1; ELA.35.C.3.1; ELA.35.C.4.1; ELA.35.R.2.2; ELA.35.R.2.3; ELA.35.R.2.4; ELA.35.V.1.1; ELA.35.V.1.3; ELA.35.F.2.1; ELA.35.F.2.2; ELA.35.F.2.3; ELA.35.F.2.4



Did you know?

- ▶ A person can live about a month without food but only about a week without water.
- ▶ The average water use for each person in the U.S. is about 50 gallons a day.
- ▶ Water expands by nine percent when it freezes. Frozen water (ice) is lighter than water, which is why ice floats in water.
- ▶ Babies and kids have more water (as a percentage) than adults.
- ▶ Women have less water than men (as a percentage).
- ▶ People with more fatty tissue have less water than people with less fatty tissue (as a percentage).

Source: United States Geological Survey



Where does water come from?

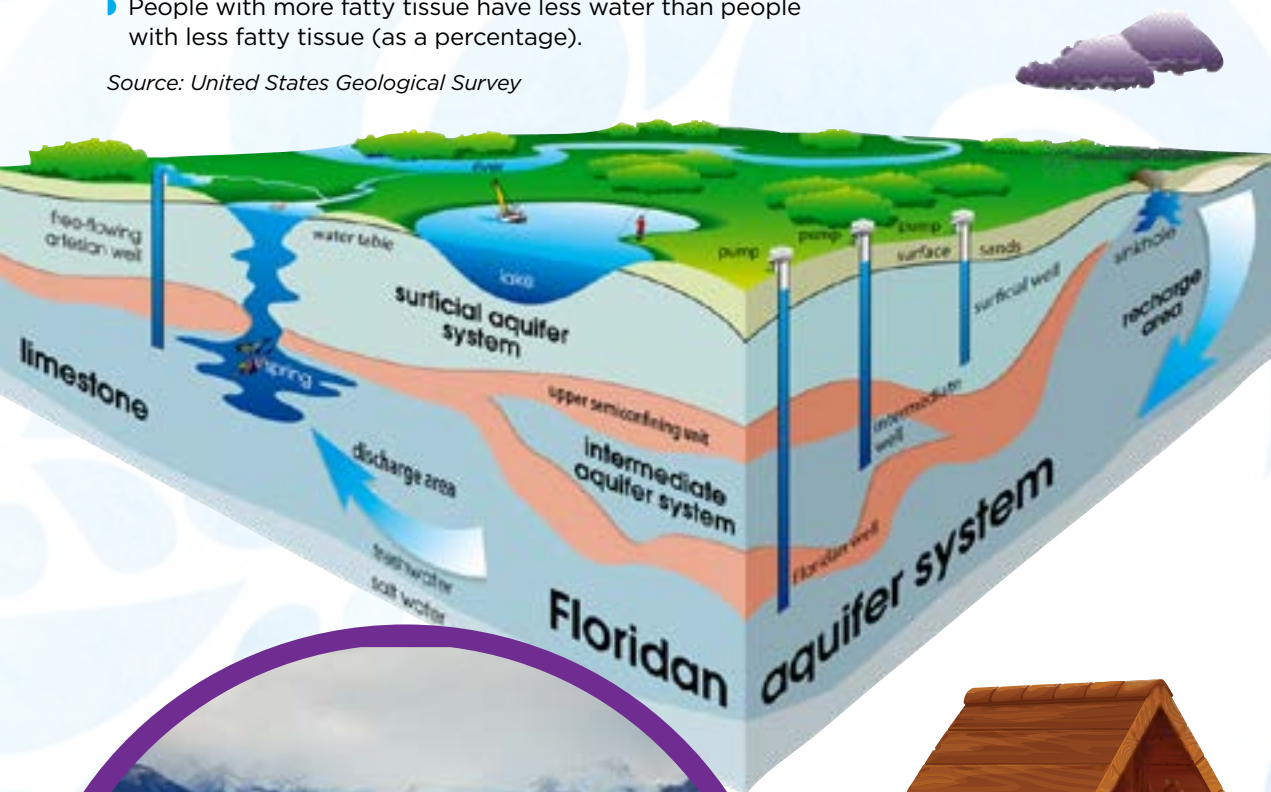
Do you know where your drinking water comes from? You might have poured it from a tap or bought it at the store, but it had to come from somewhere before that. Although oceans contain 97 percent of the Earth's water, you can't drink most of that water because the salt would make you sick.

Humans need fresh water, but not just any fresh water. Did you know most of the world's fresh water is frozen solid? Nearly 80 percent is locked up in ice sheets and glaciers. We can't drink that.

So where do you get your drinking water? In Florida, lakes, rivers and swamps all contain water that isn't frozen or too salty. So do ditches and retention ponds. However, water from those sources may be polluted, or spoiled, which also can make you sick.

Sometimes this contaminated water is treated to make it safe to drink. The water can be treated with chemicals, filters or even ultraviolet light. But there's a better way to get fresh, clean water. This hidden place is where most people in the world get their drinking water.

Source: Southwest Florida Water Management District



Hidden water

Water is hidden below our feet!

The aquifer is an underground water supply that is usually cleaner than surface water, especially if it's deep or has been underground a long time. An aquifer is an underground area that holds water in the gaps between rock, sand or gravel. In Florida, there's an underground layer of limestone called the Floridan Aquifer. That's where we pull drinking water from..

Sometimes the water comes to the surface in springs. A spring occurs when groundwater from the aquifer is forced to the surface of the Earth.

Some people get water by digging holes called wells. To think of a well, think back to the olden days. In the center of town is a circle of bricks with a little roof over it and a bucket that drops down into a hole in the ground. Although we still use traditional wells, in many places the bricks and buckets have been replaced with pipes and pumps.

Source: Southwest Florida Water Management District

Going beyond the text: Everything is connected

Everything in the natural world is connected. Safe drinking water may start with a raindrop, but its journey to the tap is extensive. As inhabitants of Earth, it is our job to not only realize that, but also to make an effort to protect the parts that contribute to the whole. An ecosystem is a biological community of interacting organisms and their physical environment. In other words, an ecosystem is a community of living and non-living things that work together. Think about all the different parts of the water ecosystems and how they interact. Look for articles and photos in the Tampa Bay Times about your community. Make a list of all the parts of your ecosystem.

Florida Standards: SC.5.E.7.2; SC.4.E.6.3; SC.35.N.1.1; ELA.35.C.1.3; ELA.35.C.1.4; ELA.35.C.2.1; ELA.35.C.3.1; ELA.35.C.4.1; ELA.35.R.2.2; ELA.35.R.2.3; ELA.35.R.2.4; ELA.35.V.1.1; ELA.35.V.1.3; ELA.35.F.2.1; ELA.35.F.2.2; ELA.35.F.2.3; ELA.35.F.2.4

The universal solvent

- Water is called the universal solvent because water dissolves, or melts, more substances than any other liquid. Wherever water goes, either through the ground or through our bodies, it takes along valuable chemicals, minerals and nutrients.
- There is a lot going on in a single drop of ocean water. It will most likely have millions of bacteria and viruses. A drop of ocean water also could have fish eggs, baby crabs, plankton, or even small worms.
- Water molecules are cohesive; the molecules stick together. Not only do water molecules stick to each other, but they also stick to other surfaces.
- Since water is sticky, water defies gravity in plants. This "stickiness" helps get water from the roots of plants up to the leaves. The water molecules are pulled upwards as water evaporates from the leaves at the top.
- Water has a high heat index. It absorbs a lot of heat before it begins to get hot. This is why water is valuable to industries and in your car's radiator as a coolant. The high heat index of water also helps control the rate at which air changes temperature.

Sources: U.S. Geological Survey; NASA

From raindrop to kitchen faucet...
down the drain and even back into the
air, the water you drink every day has an
amazing journey...that never really ends.

RAINFALL

Rain falls on Hillsborough,
Pasco and Pinellas counties,
where it seeps into the
ground, fills rivers, lakes and
wetlands, or ends up in the
waters of Tampa Bay.



WATER SOURCES

A variety of water
sources ensures
a diverse, reliable
water supply
network.



The incredible journey of water

WATERING YOUR LAWN

Some of the water
used for watering
your lawn will
eventually evaporate
and return to the
sky and fall as rain,
and the water cycle
begins again.

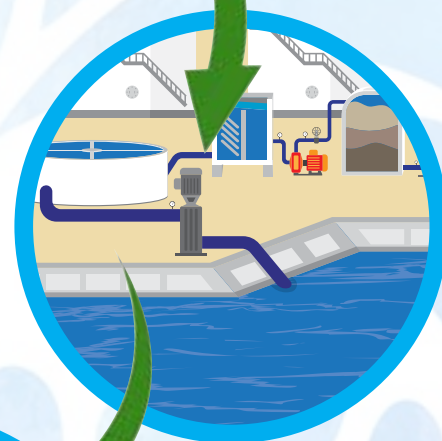


FROM YOUR DRAIN

Most water will travel to
a reclaimed water facility,
where it is cleaned for lawn
watering or discharge.

AT YOUR HOME

High-quality drinking water
is delivered to you, available
with the turn of a faucet.



TREATMENT

Water is pumped to treatment
plants, where it is cleaned with
proven technology and advanced
disinfection. Tampa Bay's drinking
water meets or is better than all
federal, state and local drinking
water standards.



DELIVERY

After being treated and blended, the
clean, safe water is pumped to local
utilities that treat and monitor the water
until it reaches homes and businesses.

Source: Tampa Bay Water

Let's start at the source



It all begins with a raindrop. But after that raindrop falls from the sky, where does it go? It depends on where that raindrop lands. Tampa Bay Water, the Tampa Bay region's wholesale drinking water provider, takes that raindrop – and billions more – from three different sources and blends them together. Those sources are groundwater, river water and seawater.



GROUNDWATER

If that raindrop falls on the ground, it will soak into the Earth and eventually be stored in the Floridan Aquifer, an underground layer of limestone that works like a sponge to store trillions of gallons of water. Groundwater was once the only source used for drinking water in the Tampa Bay region.



RIVER WATER

If that raindrop falls into the Hillsborough River, Alafia River or Tampa Bypass Canal, it is considered surface water or river water. Water is skimmed from these bodies of water – some is treated for immediate use at Tampa Bay Water's Regional Surface Water Treatment Plant, and extra water is stored in the C.W. Bill Young Regional Reservoir for use during dry times.



SEAWATER

If that raindrop falls into the water of Tampa Bay, it might be destined for the Tampa Bay Seawater Desalination Plant. This facility is a drought-proof part of Tampa Bay Water's supply system that can provide up to 25 million gallons per day of fresh drinking water to the Tampa Bay region!

Source: Tampa Bay Water

Going beyond the text: Learning new words

There are so many cool words on these pages — contamination, desalination, disinfect. Have you heard these words? What do they mean? How can you figure out what they mean using the context clues within the sentences? When you study new things, you often come up against some tough vocabulary words. While you read this publication, be sure to highlight or circle all the words you don't know. Try to figure out the words' meanings by looking for clues in the sentences around them. Write down your best guesses and then look up the words in a dictionary. As a group activity, make a list of the words your classmates identified and see which ones stumped the class. To add to your list, check out the vocabulary words here: swfwmd.state.fl.us/residents/education/kids/glossary, and add them to your list. Next, use these words for a news scavenger hunt. See if you can find these words in the Tampa Bay Times. The person or group that finds the most words wins the game.

Florida Standards: ELA.35.V.1.; ELA.35.V.2; ELA.35.V.3; ELA.35.EE.1.1; ELA.35.EE.3.1; ELA.35.F.1.3; ELA.35.F.1.4

Water treatment

With three different sources of supply, Tampa Bay Water has three different treatment processes. Each one is designed to clean and disinfect drinking water. The water will then meet or is better than the health-based standards for drinking water established in the Safe Drinking Water Act.

Groundwater requires less treatment than river water and seawater because nature does most of the cleaning for us. The Floridan Aquifer serves as a natural filter as water moves through it, leaving only the need to disinfect and stabilize water before it is blended with other sources.

The area's river water treatment plant and seawater desalination plant strain water to remove large debris, then use a conventional treatment process in which chemicals are added that cause small particles to clump together and settle out.

At the surface water treatment plant, the water is disinfected using ozone, one of the most powerful disinfectants available in water treatment. The water is filtered and disinfected with chloramines, a mixture of nitrogen and chlorine, before being blended with other sources and distributed.

At the seawater desalination plant, after the treatment process, water flows through filters to remove any remaining contaminants. Highly filtered seawater is then forced at high pressure through reverse osmosis membranes that remove salt. The size of each membrane pore is about .001 microns, which is about 1/100,000th the diameter of a human hair. Chemicals are added to stabilize the desalinated seawater, which is then disinfected with chloramines before being blended and distributed.

Protecting Florida's waterways

It's everyone's job to protect Florida's waterways and to ensure there will be plenty of clean, safe water for now and the future. The pond behind your home ... the river where you like to fish ... the waves at your favorite beach. ... This water belongs to all people in Florida, and we all must be considerate of what we do in and around it.



Safe drinking water starts at the source. You have learned that your drinking water comes from the Floridan Aquifer, local rivers and even Tampa Bay. Protecting these sources from contamination protects your drinking water and the environment and saves money and energy. The cleaner the source water, the less treatment that's required – which means less energy and fewer chemicals are needed to clean the water.

Surface waters, like Tampa Bay and area rivers and streams, are especially sensitive to contaminants. Everything that happens on the ground can make its way to the water. When it rains, trash and other materials get washed into surface waters. This pollution not only hurts the creatures and plants living in these waters but also impacts our drinking water sources.

Source: Tampa Bay Water



Think about it

We all use water every day for many reasons; in fact, we can't live without it. But do you ever wonder what it takes to get water to flow from your tap every time you turn it on? It's a complex process to make sure that you, your family and the other 2.6 million people in the Tampa Bay area have a constant supply of safe, clean drinking water any time you want it.



Pumping it up

So how does Tampa Bay Water get our drinking water? Well, it all depends on the source, but each process involves pumping.

Groundwater is pumped from the Floridan Aquifer through wells drilled hundreds of feet into the ground. Tampa Bay Water has 12 wellfields that include nearly 200 wells.

River water is withdrawn by pumps and is either pumped to the surface water treatment plant or into the regional reservoir for storage. Because the reservoir is elevated, or uplifted, gravity lets the water flow back to the facilities for treatment. When gravity isn't enough, big pumps push the water to the treatment plant.

Desalinated seawater from the Tampa Bay Seawater Desalination Plant starts as seawater used by the Big Bend Power Plant in Apollo Beach, in Hillsborough County, to cool the equipment that creates electricity. The desalination plant uses pumps to move up to 44 million gallons per day of that water for desalination.

Source: Tampa Bay Water



Booster pumps

Tampa Bay Water's system has dozens of booster pumps throughout its 2,000 square miles, ranging in size from 100 horsepower to 3,000 horsepower. That is the difference between a motorcycle and a professional drag racer!

Tampa Bay Water has more than 200 miles of pipeline. Your local water utility also has hundreds and, in some cases, thousands more miles of pipes that move the water to businesses and to homes. On average, our drinking water travels 20-50 miles from the source to Tampa Bay Water's treatment plant to your local utilities water treatment plant and, finally, to your home.

The water makes that trip quickly thanks to hydraulic engineering – the science of collecting, storing and transporting water.

Source: Tampa Bay Water

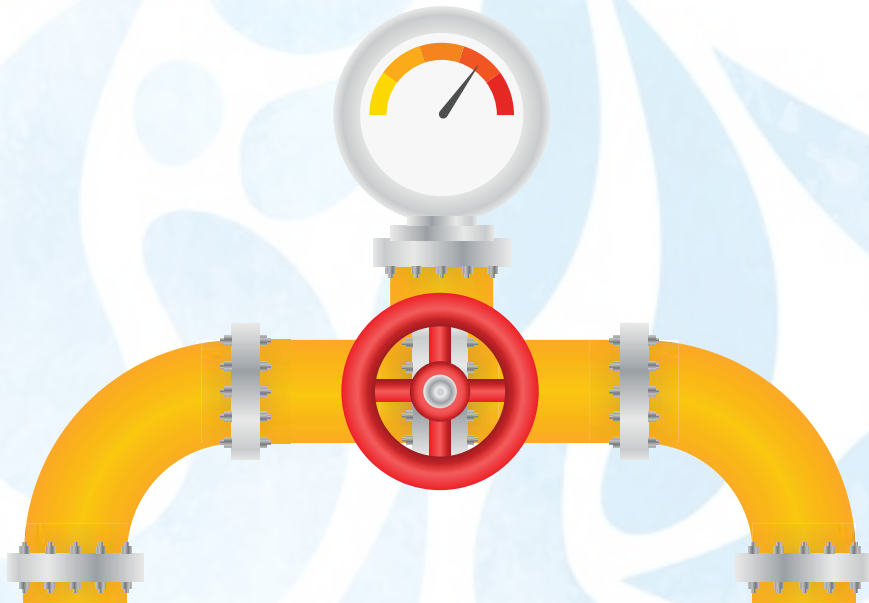
Water pressure

Water pressure is the force with which water is pushed through pipes and fixtures in a home. Water pressure is usually measured in pounds per square inch, or psi.

Water pressure is important to the public's safety. If a water system ever loses pressure, contaminants could enter the system. System pressure ensures water can reach top floors of hospitals, hotels and other tall buildings, but it is also important for fire suppression. Fire hydrants must be able to supply 1,000-3,000 gallons per minute to fight fires.

Hydraulic engineers must always keep acceptable water pressure everywhere in the system – even though people use different amounts of water at different times during the day. Why would that be hard? Because pipelines aren't straight and aren't the same size or age. Pipeline sizes vary, with some connecting to larger pipes and others connecting to smaller ones. Also, there are turns to consider as well as the amount of water in the pipeline.

Source: Tampa Bay Water



**Pump room at a
Tampa Bay Water
treatment facility**

Going beyond the text: How to help

Look in the Tampa Bay Times for articles about conservation and how you can help make your community's environment better. Using ads in the newspaper as models, create an ad to promote a conservation action related to water. Look at the ads in the newspaper. Think about the details of the ads (images, words, placement of items, colors). Think about ways to draw people's attention to your ad and message. Next, design an ad for the print edition of the newspaper and for the website. How is the ad on the print edition going to be different than the web version of the ad? Write a fully developed paragraph showing the differences in the ads and what your main point of the ads is. Share your ad and the information in your paragraph with your class.

Florida Standards: ELA.35.C.1.3; ELA.35.C.1.4; ELA.35.C.2.1; ELA.35.C.3.1; ELA.35.C.4.1; ELA.35.R.2.2; ELA.35.R.2.3; ELA.35.R.2.4; ELA.35.V.1.1; ELA.35.V.1.3; ELA.35.F.2.1; ELA.35.F.2.2; ELA.35.F.2.3; ELA.35.F.2.4

Going with the flow

We use water every day for many reasons. In fact, we can't live without it. But do you ever wonder what it takes to get water to flow from your tap every time you turn it on?

It's a complex process to make sure you, your family and the other 2.6 million people in the Tampa Bay area have a constant supply of safe, clean drinking water any time you want it.

Today, Tampa Bay is served by a combination of groundwater, river water and desalinated seawater. But this wasn't always the case. In 1998, before Tampa Bay Water existed, the regional drinking water system was 100 percent groundwater.

The first alternative water supply source, river water, began serving the region in 2002. Then, in 2007, the largest operating seawater desalination plant in the United States at the time began serving the region with a drought-proof supply.

Source: Tampa Bay Water

High quality drinking water

In 1974, the U.S. Congress passed the Safe Drinking Water Act to protect public health by controlling the nation's drinking water supply. The law was revised in 1986 and 1996 and requires many actions to protect drinking water and its sources. The Safe Drinking Water Act authorizes the United States Environmental Protection Agency (EPA) to set health-based standards for drinking water and requires

treatment and monitoring to meet those standards.

The drinking water provided to the Tampa Bay region meets or is better than all local, state and federal drinking water regulations.

Source: Tampa Bay Water; United States Department of Environmental Protection

The need for clean, safe water

Before the early 1900s, many people died from diseases such as cholera and dysentery, as well as typhoid fever. These diseases were the result of unsanitary, or contaminated, drinking water.

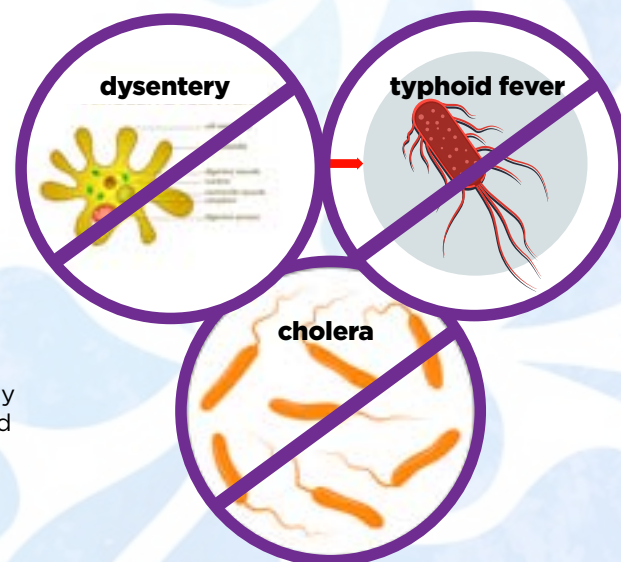
Poor sanitary practices and a lack of treatment meant microbes and other parasites were often found in drinking water. That changed in the early 1900s, when scientists found a way to disinfect drinking water using the chemical chlorine. Chlorination of drinking water has been called one of the most significant advances in public health protection.

The Federal Water Pollution Control Act of 1948 was the first major U.S. law to address water pollution. Growing public awareness and concern for controlling water pollution led to changing laws in 1972. As amended in 1972, the law became commonly known as the Clean Water Act (CWA).

Source: United States Department of Environmental Protection



The Tampa Bay area is home to one of the largest operating seawater desalination plant in the United States.



Safeguarding water

Because our region depends on surface and groundwater for most of our water supply, it is important to safeguard those sources from pollution and contamination. Surface water, which makes up nearly half of our water supply, is present above the ground and includes lakes, rivers, streams, creeks, seas and oceans. Groundwater is below the ground and includes underground aquifers.

Source: Tampa Bay Water

Going beyond the text: Protecting our water at the source

It's everyone's job to protect Florida's waterways. The ecology, the pattern of relations between organisms and their environment, of Florida springs is a vital part of our world. Look in the Tampa Bay Times to find at least five images or stories that show or tell about a situation in which the ecology may be harmed. Write a description of each of the situations you find and identify how the environment could be harmed. Are there laws against the situation presented? If so, are there penalties? Next, research the Safe Drinking Water Act and its history. Why was the law passed? What changes were made in 1986 and in 1996? Create an infographic showing the information you find. Note the most interesting fact that you learned and share that with your class. Explain why you found that specific information interesting. Also, be sure to note what you learned from your research. Using the articles in the Tampa Bay Times as models, write a news or feature article to accompany your infographic. Share what you have learned with your class.

Florida Standards: SC.4.E.6.3; SC.4.E.6.6; SC.4.N.1.1; SC.4.N.1.2; SC.4.N.1.4; SC.4.N.2.1; SC.5.N.1.1; ELA.35.EE.1.1; ELA.35.EE.2.1; ELA.35.EE.3.1; ELA.35.EE.4.1; ELA.35.EE.5.1; ELA.35.EE.6.1; ELA.35.C.1.3; ELA.35.C.1.4; ELA.35.C.1.5; ELA.35.C.2.1; ELA.35.C.3.1; ELA.35.C.4.1; ELA.35.F.1.3; ELA.35.F.1.4; ELA.35.R.2.2; ELA.35.V.1.1; ELA.35.V.1.3

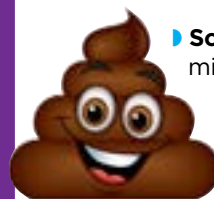
Protecting our water

While Tampa Bay Water protects the quality of our source water, protecting that water actually starts with you. Here are some ways you can help keep our drinking water safe:

► **Safely dispose of household pollutants.** Tell your parents or guardians that old paint, motor oil and household chemicals don't belong in the household garbage. These can be recycled at your local county collection center for free.



► **Properly dispose of old medicines.** Remind the adults in your household to take old medicines to approved pharmacies and sheriff's office drop-off sites.



► **Scoop the poop.** One ounce of dog poop contains 23 million microorganisms of fecal coliform bacteria and can add nutrients to our waterways that cause algae growth. Always pick up after your pet and put waste in the garbage.

► **Use Florida Friendly fertilizer.** Tell your parents or guardians to use slow-release fertilizer on the lawn. Watch the weather and never fertilize before rain. Rain can wash excess fertilizer into bodies of water and cause harmful algae blooms.

► **Reduce the amount of trash you produce.** Single-use products such as grocery bags, straws and water bottles may make life easier but can also harm our environment. Switch to reusable products that are designed to last!

► **Put trash in the proper place.** Whether it's the trash can or recycle bin, put trash where it belongs. Plastic does not decompose and can harm many animals and fish as well as pollute the water.



Source: Tampa Bay Water

To protect and preserve

The Cambridge Dictionary defines the word conserve as “to keep and protect something from damage, change or waste. When it comes to natural resources, conservation is one of the most important factors.

Water conservation is the most important action humans can take to maintain our water supplies, meet future needs and reduce demands on Florida’s water-dependent ecosystems. An ecosystem is a community of organisms and their environment. Water conservation activities can be applied by utilities, but most importantly, water conservation can be implemented by you!

Conserving water year-round is an important part of managing and protecting water supplies. Did you know that approximately 3 billion gallons of

water are used every day in central and southern Florida by 9 million residents and visitors? People use that water for watering lawns, drinking and bathing, growing crops and servicing industries.

Future water needs are projected to increase to approximately 25 million gallons per day by 2043! One of the best ways to address increasing water needs is through water conservation.

Sources: Florida Department of Environmental Protection; Southwest Florida Water Management District; Cambridge Dictionary



Water efficiency and conservation

Think about your day. It starts and ends with water, and water plays a central role throughout the day. As you go through each day, think about how much water you can save if you only use what you need. Did you know that you use about 10-12 gallons of water at school every day by using the toilet, washing your hands and drinking from the water fountain?



▶ Older dishwashers use 10-15 gallons per load; newer water-efficient dishwashers use 4-7 gallons. TIP: Only run the dishwasher when you have a full load.

▶ Washing laundry uses 20-45 gallons of water per load. High-efficiency clothes



washers use 14-25 gallons per load. TIP: Only run the washer with a full load.

▶ Brushing teeth uses about 2 gallons of water per minute. TIP: Don't let the water run while you brush your teeth.

▶ Drinking water can be conserved by refilling a water bottle or glass instead of washing it every time you need a drink.

▶ Toilets use about 2.6 gallons per flush. TIP: to avoid unnecessary flushing and water use, dispose

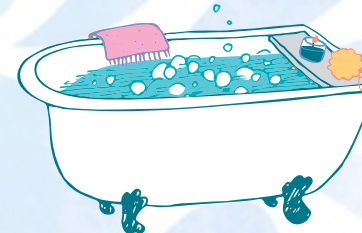


of tissues, insects and other small wastes in the trash.

▶ Showers use about 2 gallons a minute, or 16 gallons for the average 8-minute shower. TIP: Shorten your shower to 5 minutes and use only 10 gallons per shower.

▶ Taking a bath uses 50 gallons of water. TIP: To save water, fill the tub only halfway.

Source: Tampa Bay Water



Desalination plant facts

▶ The Tampa Bay Seawater Desalination Plant, located in Hillsborough County, uses a process called reverse osmosis to produce drinking water from seawater. Osmosis occurs when a substance, such as water, is absorbed into a membrane.

▶ The United States Environmental Protection Agency explains that reverse osmosis is the process by which pressure forces water through a semi-permeable, or porous, membrane, creating a stream of treated water. These systems can potentially remove water contaminants such as lead, volatile, or unstable, organic compounds, per- and polyfluoroalkyl substances, arsenic, bacteria, and viruses.

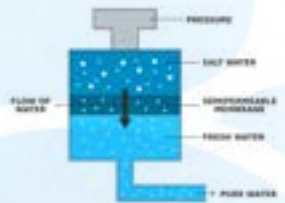


▶ The desalination plant takes up to 44 million gallons per day of warm seawater, separates it into drinking water and concentrated seawater and dilutes the twice-as-salty seawater before returning it to the bay. If the desalination plant's membranes were unrolled and connected, they would stretch the 223 miles from Tampa to Tallahassee!

▶ The size of each membrane pore in the desalination plant is about 1/100,000th the size of one human hair.



REVERSE OSMOSIS



Regional reservoir facts



▶ The C.W. Bill Young Regional Reservoir makes the region's water supply more drought-resistant, reliable and flexible. Surface water from the Tampa Bypass Canal and Hillsborough and Alafia rivers is stored in the reservoir during wet times, or rainy season.

▶ The reservoir holds up to 15.5 billion gallons, or 33 times the volume of Raymond James Stadium (where the Bucs play).

▶ When full, the reservoir can provide 25 percent of the region's needs for more than six months.

Sources: United States Environmental Protection Agency; Tampa Bay Water

Going beyond the text: Cause and effect

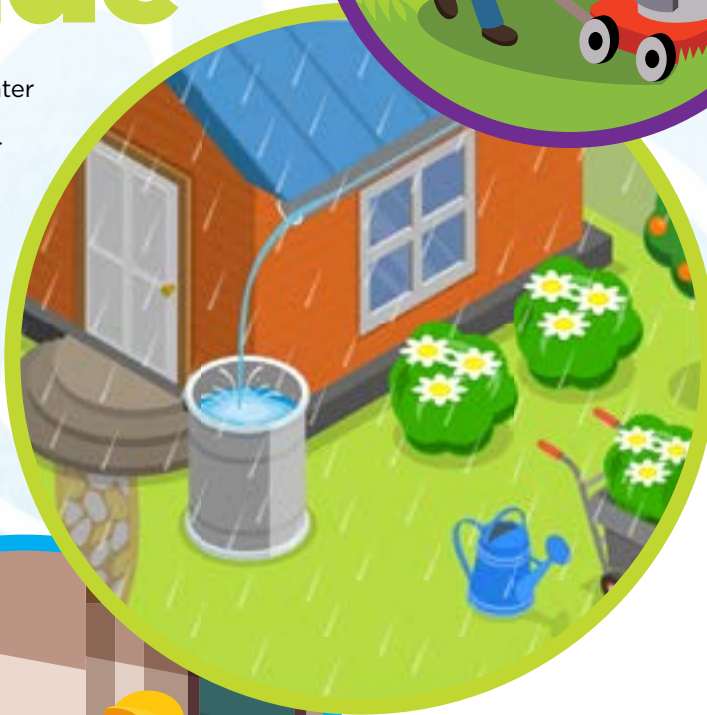
Waste can result in a shortage of natural resources, including water. Wasting resources is increasing at an alarming rate in the world and in our neighborhoods. Waste can be the result of carelessness or convenience. Look for an article in the Tampa Bay Times that focuses on wasting resources. Discuss the article with your class. Write down the main points presented in the article. Discuss the ways you can offset this problem. As a class, write down the steps you can take to offset the problem. Then break into small groups and create a poster outlining those steps to share with others.

Florida Standards: ELA.35.C.1.3; ELA.35.C.1.4; ELA.35.C.2.1; ELA.35.C.3.1; ELA.35.C.4.1; ELA.35.R.2.2; ELA.35.R.2.3; ELA.35.R.2.4; ELA.35.V.1.1; ELA.35.V.1.3; ELA.35.F.2.1; ELA.35.F.2.2; ELA.35.F.2.3; ELA.35.F.2.4; SC.4.E.6.6

Being waterwise outside

Did you know that much of the water waste at home can happen outside? You and your family can reduce your outdoor water use by taking a few simple steps. Tell the adults in your home to take the following actions:

- ▶ Cover your pool or spa to reduce evaporation.
- ▶ Apply fertilizers to your grass and plants cautiously.
- ▶ Remove weeds often.
- ▶ Know and follow your local watering restrictions, and water only when your yard needs it.



- ▶ Cut your grass at the highest recommended height for that type.
- ▶ Water slowly to reduce runoff and allow water to soak into the soil.
- ▶ Use a rain barrel to collect rainwater.
- ▶ Do not hose down your driveway or sidewalk.
- ▶ Use a shutoff nozzle on your hose that can be adjusted.
- ▶ Avoid purchasing recreational water toys that require a constant stream of water.
- ▶ Install only ornamental water features (such as fountains) that recycle water.



Lawn watering restrictions are year-round in the Tampa Bay area. To find your watering days, go to MyWaterDay.org



Be Florida friendly

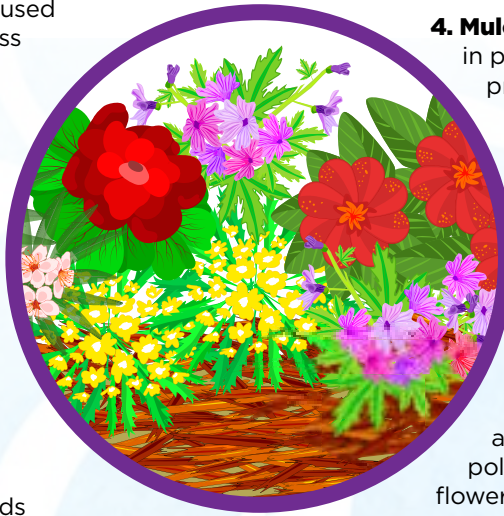
Up to 50 percent of water used at home is used to water grass and plants. You can help your parents or guardians save water and money by helping them follow the nine Florida-Friendly Landscaping™ principles.

1. Right plant. Right

place: Select plants that match your yard's soil type, amount of sun and shade, and amount of water received.

2. Water efficiently: Group plants with similar water needs together and only water in the early morning. Be sure to follow your local watering restrictions.

3. Fertilize appropriately: Never fertilize within 10 feet of a water body or before it rains.



4. Mulch: Keep 2-3 inches of mulch in plant beds to hold in moisture, protect plants and prevent weeds. Leave 2 inches of space around trees to prevent rot.

5. Attract wildlife: Choose plants with seeds, fruit, foliage and flowers to attract wildlife and insects that eat pests and pollinate flowers.

6. Manage yard pests responsibly: Minimize pesticide use by choosing pest-resistant plants.



7. Recycle yard waste: Try composting yard clippings and trimmings. You can mix grass, branches, weeds, eggshells, coffee grounds, tea bags, pine needles, corncobs and even shredded cardboard. Adding this mixture to your soil releases nutrients back into your yard for a healthy landscape – and less garbage in landfills!

8. Reduce stormwater runoff: Create porous walkways and driveways to allow rain to soak into the ground.

9. Protect the waterfront: If you live on or near the water, create a 10-foot “maintenance free” zone around your landscape where you don't have to mow, fertilize or use pesticide. This will help keep our waterways clean.

Source: Tampa Bay Water

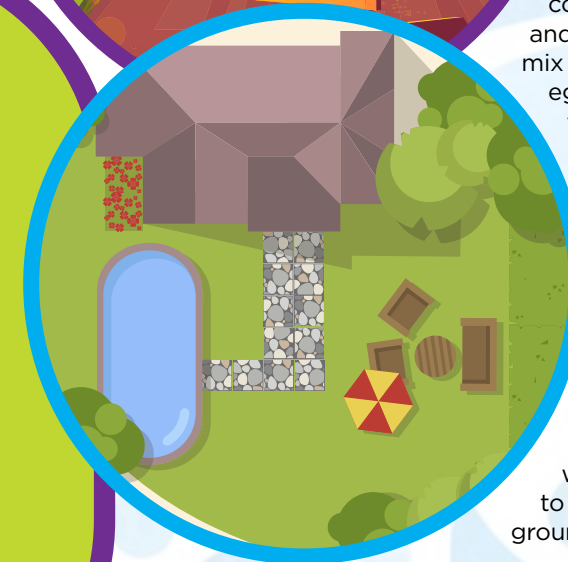
Going beyond the text: Water conservation

Think about the importance of water to our lives and how water, the aquifer, conservation and pollution relate to the future of mankind and the quality of life. Watch the NBC Learn/National Science Foundation video series “Sustainability: Water,” [youtube.com/watch?v=b4YPtgJwOQU](https://www.youtube.com/watch?v=b4YPtgJwOQU).

With your class, make a list of the concepts and ideas you discover in the video. Next, in a small group, look for articles in the Tampa Bay Times about water conservation, the environment, pollution or any other topics you discussed with your class.

Based on the information you read in these articles and watched in the video, write an editorial on the importance of water in your community and to the future of mankind. Use the editorials in the Tampa Bay Times as models for your article.

Florida Standards: SC.35.N.1.1; SC.35.N.1.2; SC.35.N.1.3; SC.35.N.1.4; SC.35.N.3.1; SC.35.E.6.6; SC.35.P.9.1; ELA.35.C.1.3; ELA.35.C.1.4; ELA.35.C.2.1; ELA.35.C.3.1; ELA.35.C.4.1; ELA.35.R.2.2; ELA.35.R.2.3; ELA.35.R.2.4; ELA.35.V.1.1; ELA.35.V.1.3; ELA.35.F.2.1; ELA.35.F.2.2; ELA.35.F.2.3; ELA.35.F.2.4



About NIE

The Pulitzer Prize-winning Tampa Bay Times is the largest daily newspaper in Florida. Locally owned and independent, the Times has long been celebrated for its outstanding and credible journalism, practiced with integrity in the public interest. The Times has been part of the Tampa Bay community for more than 140 years.

The Tampa Bay Times Newspaper in Education program (NIE) is a cooperative effort between schools and the Times to encourage the use of newspapers in print and electronic form as educational resources – a “living textbook.”

Since the 1970s, NIE has served educators, students, families and community members in the Tampa Bay area by providing classroom access to the Times plus award-winning original educational publications, teacher guides, lesson plans, educator professional development resources, and more – all at no cost to schools, teachers or families.

NIE is a member of Florida Press Educational Services (FPES), a 501(c)(3) nonprofit organization of Florida newspaper professionals whose mission is to promote literacy, civic engagement and critical thinking, particularly for young people.

For more information about NIE, visit tampabay.com/nie, call 727-893-8138 or email ordernie@tampabay.com. Find us on Facebook at facebook.com/TBTNIE.

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Florida Standards

This publication and its activities incorporate the following Florida Standards:

SC.4.E.6.3; SC.4.E.6.6; SC.4.L.17.4; SC.4.N.1.1; SC.4.P.8.2; SC.5.E.7.2; SC.5.N.1.6; ELA.45.EE.1.1; ELA.45.EE.2.1; ELA.45.EE.3.1; ELA.45.EE.4.1; ELA.45.EE.5.1; ELA.45.EE.6.1; ELA.45.C.1.3; ELA.45.C.1.45; ELA.45.C.1.5; ELA.45.C.2.1; ELA.45.C.3.1; ELA.45.C.45.1; ELA.45.C.1.3; ELA.45.C.1.45; ELA.45.C.1.5; ELA.45.C.2.1; ELA.45.C.3.1; ELA.45.C.45.1; ELA.45.F.1.3; ELA.45.F.1.45; ELA.45.R.2.2; ELA.45.R.2.45; ELA.45.V.1.1; ELA.45.V.1.2; ELA.45.V.1.3

Win a classroom pizza party!

Letter to the editor challenge

Pinellas County elementary teachers: As a class, write a letter to the editor of the Tampa Bay Times about a local water issue and submit it to nieonline.com/tbtimes/letter_to_the_editor.cfm. The best three letters will win their class a pizza party and will be considered for publication in the Tampa Bay Times!

A letter to the editor is a way for people to share their opinions on current events and issues with the editor and the readership of the paper.

Using the articles in this publication and the Tampa Bay Times as a source, find articles focusing on water and source water protection.

Next, write a letter to the editor advocating for or against the ideas you have read. In your letter, explain the issue and its importance. Use plain language that most people will understand, and keep it brief. A letter to the editor should be 300 words or less.

Your purpose in this letter is to state your opinion and support it with evidence. Use the letters to the editor in the Tampa Bay Times or at tampabay.com/opinion as models for your letter.

Your letter should include:

- ▶ A salutation (“Dear Editor:”).
- ▶ The date, article title and author of the article that you are responding to.
- ▶ An introductory statement (a topic sentence) clearly stating the main point you are going to make.
- ▶ One or two facts, examples or evidence to support that point.
- ▶ A concluding sentence, which gives a call to action or a statement of how this issue will affect others.
- ▶ A signature block with your class, teacher and school (“Mrs. Smith’s Fifth Grade Class, Any Elementary School”).

Visit https://nieonline.com/tbtimes/letter_to_the_editor.cfm for more information and complete official rules.

Sources: *The New York Times*; *ReadWriteThink.org*; *National Education Association*

Florida Standards: ELA.35.

EE.1.1; ELA.35.EE.4.1; ELA.35.EE.5.1; ELA.35.EE.6.1; ELA.35.F.2.1; ELA.35.C.1.3; ELA.35.C.1.4; ELA.35.C.1.5; ELA.35.C.2.1; ELA.35.C.3.1; ELA.35.C.4.1; ELA.35.C.5.1; ELA.35.C.1.5; ELA.35.R.2.2; ELA.35.R.2.3; ELA.35.V.1.1; SC.5.E.7.2; SC.4.E.6.6



Tampa Bay Water

This publication was funded by the Water Conservation and Protection Mini-grant Program. Tampa Bay Water supplies wholesale drinking water to Hillsborough County, Pasco County, Pinellas County, New Port Richey, St. Petersburg and Tampa. Tampa Bay Water supplies water to more than 2.6 million people through the governments they serve. Tampa Bay Water’s mission is to provide clean, safe water to the Tampa Bay region now and for future generations.

Visit tampabaywater.org to:

- ▶ Request a speaker for your classroom.
- ▶ Book a tour of Tampa Bay Water’s facilities.
- ▶ Learn about source water protection and conservation.
- ▶ See the blend of water you’re drinking. ▶ See how much water is stored in the regional reservoir.
- ▶ Find your watering days.