

DO YOU KNOW YOUR H₂O?



Tampa Bay
Times
NIE
newspaper in education
tampabay.com/nie

TAMPA
BAY 
WATER
Supplying Water To The Region

FOLLOW wATEr ON iTS INCReDIBLE JOURNeY



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.

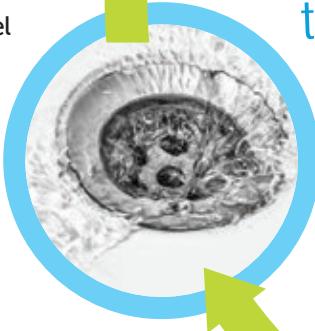
Watering Your Lawn

Some of the water used for sprinkling 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.



From raindrops to your faucet, the water you drink every day has an amazing journey that never really ends.

Water Sources

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



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.



At Your Home

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



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.



LET'S START AT THE SOURCE



It all begins with a raindrop. But after it 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. Tampa Bay Water is the only utility in the United States to take advantage of these three sources combined.



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

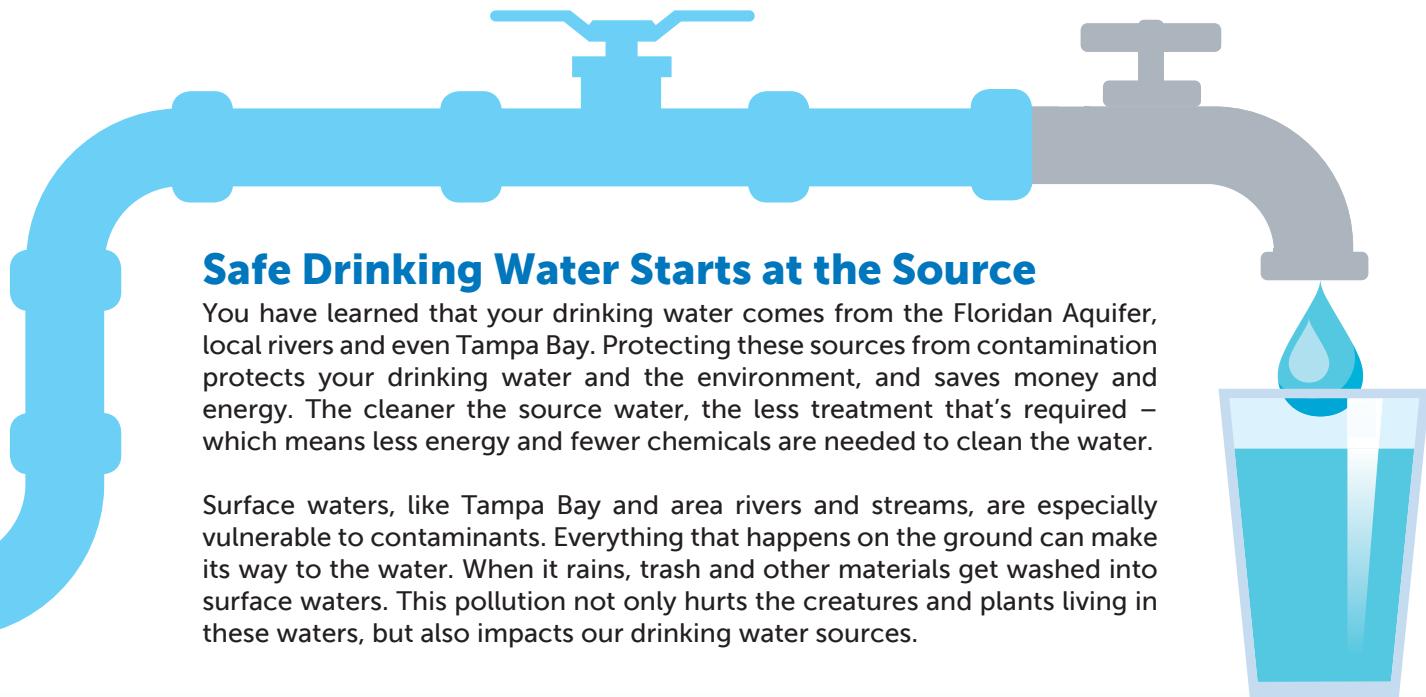
If that raindrop falls into the water of Tampa Bay, it might be destined for the Tampa Bay Seawater Desalination Plant. This facility is a drought-proof component of Tampa Bay Water's supply system that can provide up to 25 million gallons per day of fresh drinking water to the Tampa Bay region.

JOINING FORCES FOR CLEANER SOURCES

The pond behind your home ... the river where you like to fish ... the waters 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.



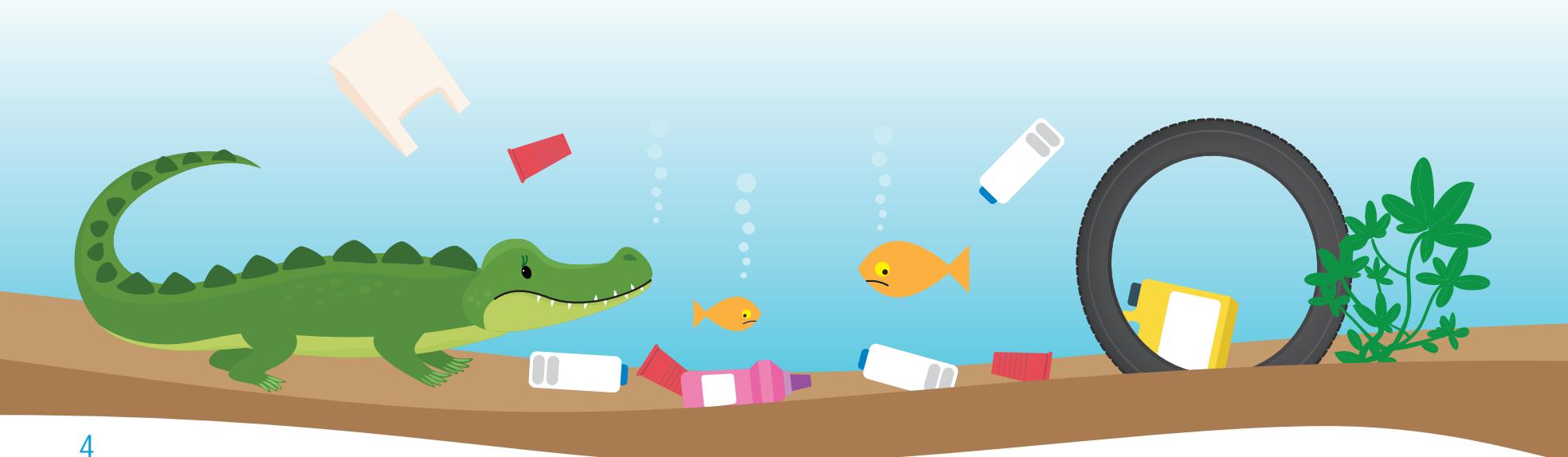
It's everyone's job to protect Florida's waterways and to ensure there will be plenty of clean, safe water for future generations.



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 vulnerable 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.



PROTECTING DRINKING WATER STARTS WITH YOU



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.



Remind your parents or guardians to take old medicine to approved Sheriff's Office drop-off sites. This is also a free service.



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 it in the garbage.



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.



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!



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.



GOING BEYOND THE TEXT

DO THE MATH:

If the average-size dog produces $\frac{1}{2}$ pound of poop each day and there are 500,000 dogs in the Tampa Bay area, how many total pounds of dog poop is produced each day? Each week? Convert both answers to tons. If 40 percent of dog owners don't pick up after their pets, how much dog poop is left on the ground each day?

Now that you know surface waters are vulnerable to contaminants, what happens to this poop that is left on the ground each day? Look in the *Tampa Bay Times* for articles about groundwater pollution. In addition, do research about this issue on the Internet. Use what you read to write a short editorial explaining how big the problem is and what residents can do about it. Use the editorials, columns and opinion articles in the *Times* as models.



WHY CLEAN, SAFE DRINKING WATER MATTERS

Did you know?

Before the early 1900s, many people died from diarrhea-causing diseases such as cholera and dysentery, as well as typhoid fever — all because of unsanitary drinking water.

Poor sanitary practices and a lack of treatment meant microbes and other parasites were often found in drinking water. Thousands of infants, children and adults died from contaminated drinking water.

All that changed in the early 1900s, when scientists found a way to disinfect drinking water using chlorine. Chlorination of drinking water has been called one of the most significant advances in public health protection. In fact, the mortality rate went down 50 percent in the 20th century thanks to water treatment.



Taking ACTION

In 1974, the United States Congress passed the Safe Drinking Water Act to protect public health by regulating the nation's drinking water supply. The law was amended 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 United States EPA sets maximum contaminant levels and treatment techniques for chemicals, metals and pathogens, and the regulation includes penalties for water utilities that don't comply with the standards.



EXPLORE THE SAFE
DRINKING WATER ACT AT
epa.gov/sdwa

HIGH-QUALITY DRINKING WaTeR iS THE STaNDARd

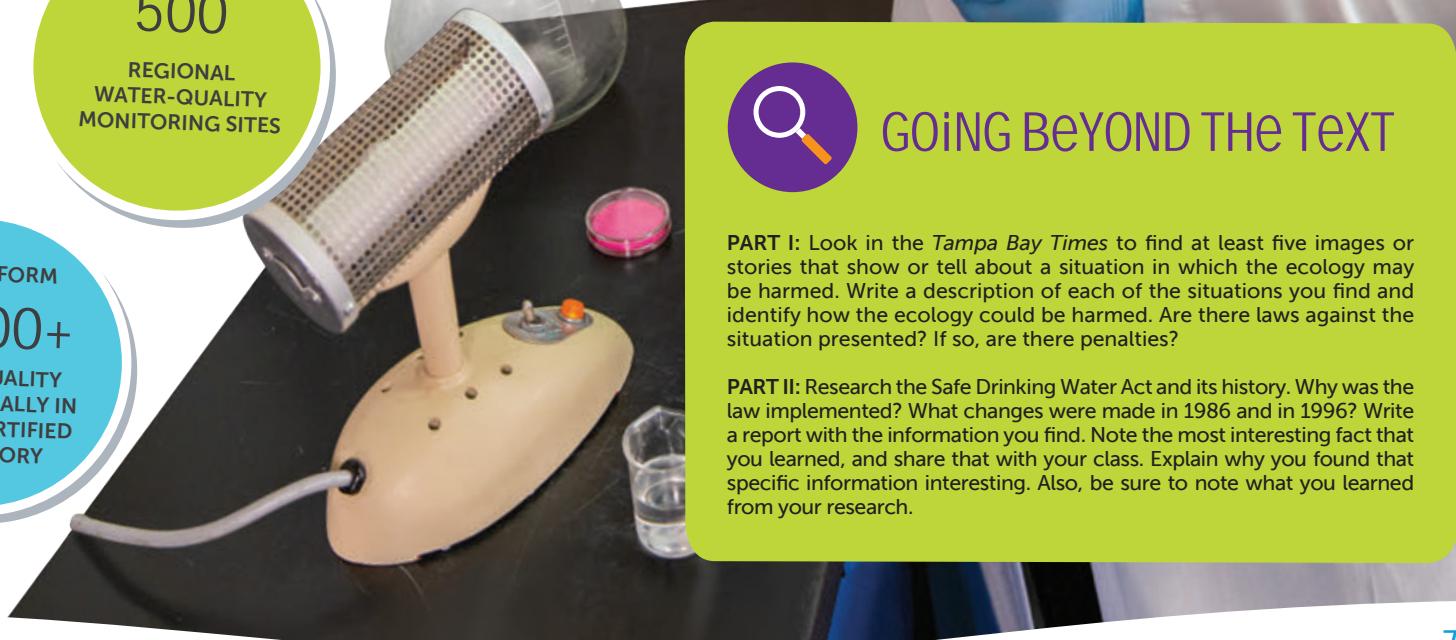
Providing clean, safe drinking water is a top priority at Tampa Bay Water. The drinking water we provide our member governments is safe: It meets or is better than all local, state and federal drinking water regulations.

Tampa Bay Water continuously monitors water quality through:

WaTeR QUaLiTY STaNDARdS



WaTeR QUaLiTY assURaNCE



GOING BEYOND THE TEXT

PART I: 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 ecology could be harmed. Are there laws against the situation presented? If so, are there penalties?

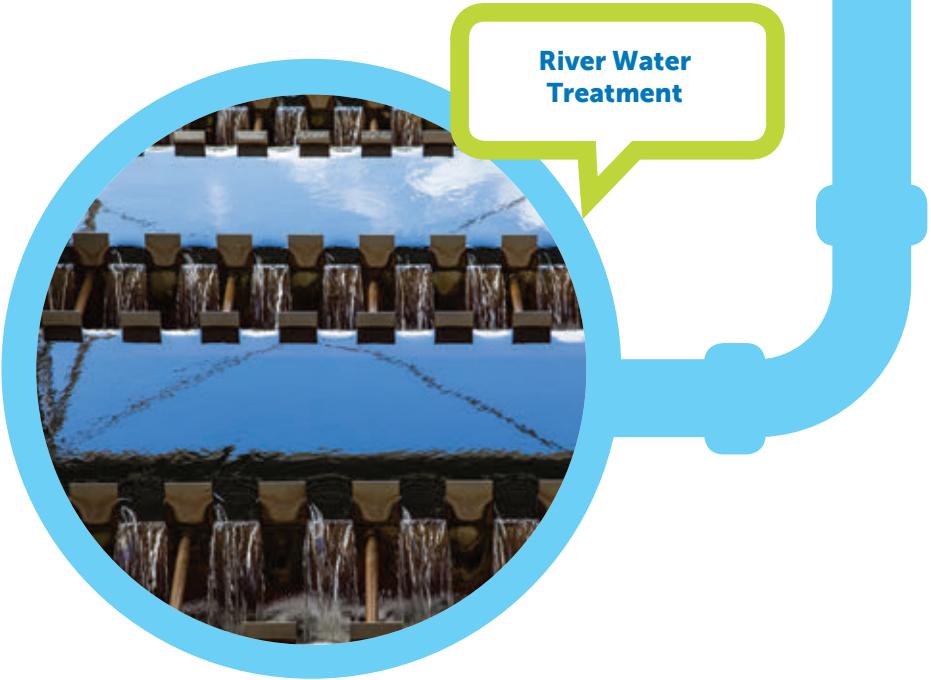
PART II: Research the Safe Drinking Water Act and its history. Why was the law implemented? What changes were made in 1986 and in 1996? Write a report with the information you find. Note the most interesting fact that you learned, and share that with your class. Explain why you found that specific information interesting. Also, be sure to note what you learned from your research.

THE TREATMENT IT DESERVES

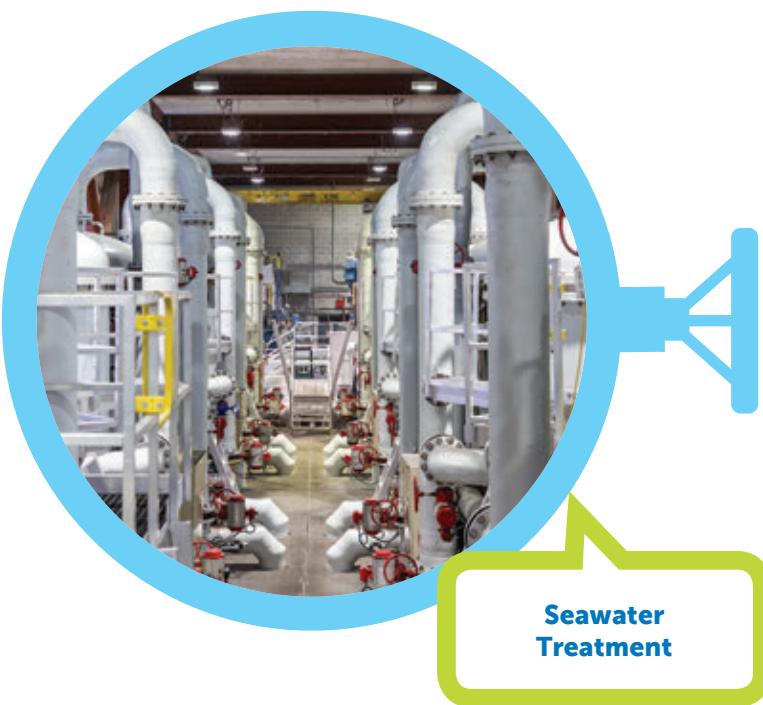
With three different sources of supply, Tampa Bay Water has three different treatment processes, each engineered to clean and disinfect drinking water so it meets or is better than the health-based standards for drinking water established in the Safe Drinking Water Act. Water treatment plants use proven technology, advanced disinfection, corrosion control and state-certified operators to ensure a high-quality product.



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 we blend it with our other sources.



The area's **river water** treatment plant and **seawater** desalination plant use multi-step processes for added safety. Both facilities 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.



Ozone Disinfection



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 again filtered and disinfected with chloramines before being blended with other sources and distributed to Tampa Bay Water's member governments.

Reverse Osmosis Filters



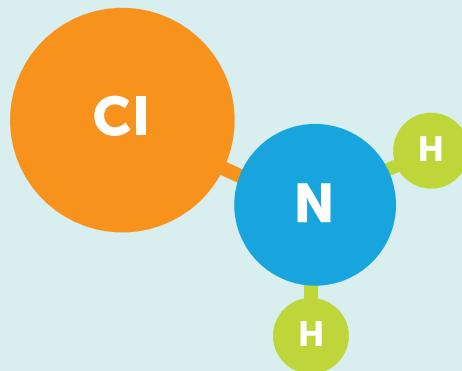
At the **seawater desalination plant**, after the conventional process, water flows through progressively finer filters to remove any remaining matter. Highly filtered seawater is then forced at high pressure through reverse osmosis (RO) membranes that remove salt. The size of each RO membrane pore is 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 to Tampa Bay Water's member governments and eventually to you.



GOING BEYOND THE TEXT

LEARNING NEW WORDS

There are so many cool words on these pages — **contamination**, **utilities**, **disinfectant**. Have you heard these words before? 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 of 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. Next, use these words for a news scavenger hunt. See if you can find these words in the *Tampa Bay Times*. The group that finds the most words wins the game.



KEEPING IT SAFE ON THE WAY TO YOU

Tampa Bay Water uses chloramines, a combination of chlorine and ammonia, as a final disinfectant because it reduces disinfection byproducts, reduces the chlorine smell and produces better-tasting water. It is a powerful disinfectant that ensures the water stays clean and safe throughout our vast distribution network and to our most distant customers.

DeLiveriNG UNDER PRESSURE

Pump It Up

So how do utilities get our drinking water? It 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's 13 wellfields 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, gravity lets the water flow back to our facilities for treatment, as in the aqueducts of ancient Rome. 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 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.

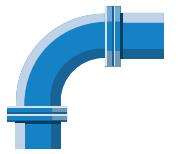
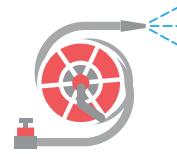
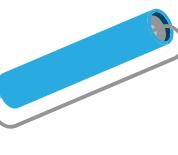


Booster Pumps Put the Pressure On!

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's the difference between a motorcycle and a professional drag racer!

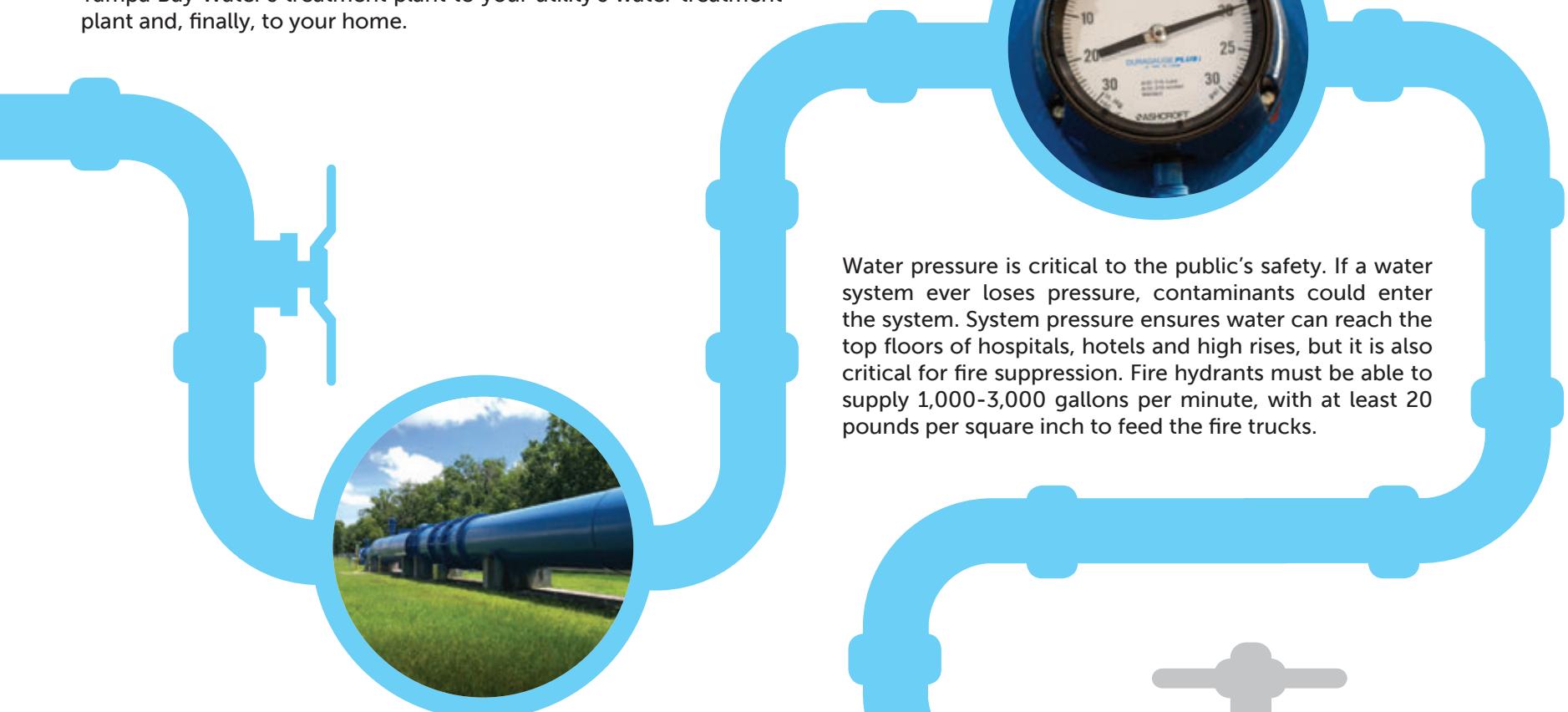
WaTeR PReSSURe BY THE NUMBeRS

Water pressure is commonly measured in pounds per square inch (psi).

 AVERAGE GARDEN HOSE 50 	 WATER PRESSURE IN TAMPA BAY WATER'S PIPELINES 50-150 	 TYPICAL FIRE HOSE 200-275 
 COIN-OPERATED CAR WASH SPRAY NOZZLE 700 	 DESALINATION REVERSE OSMOSIS PRESSURE 1,000 	 PRESSURE WASHER 1,000-4,000 

Under Pressure

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 utility's 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.



HYDRAULICS CaN Be COMPLEX

Hydraulics may sound simple but can be complex. Hydraulic engineers must keep adequate water pressure everywhere in the system at all times – 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.

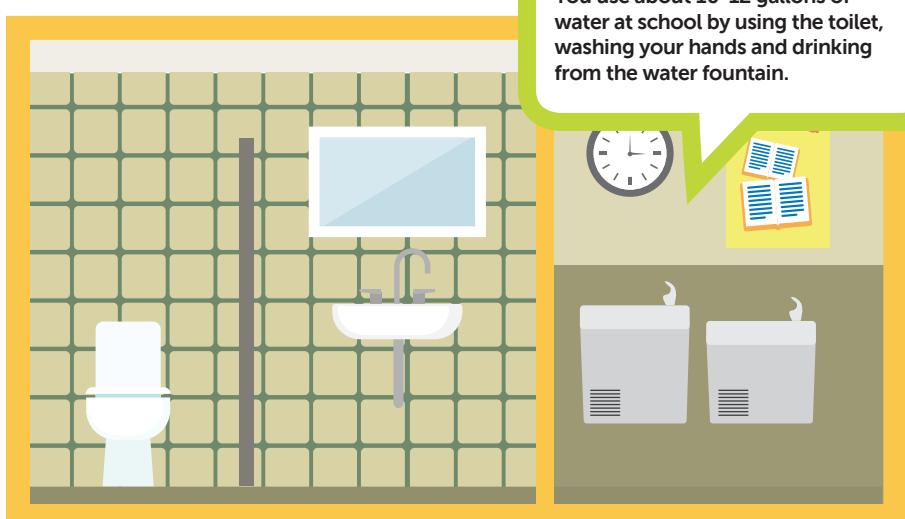


WaTER eFFICIeNCY & CONSeRVATION

iNSiDe YOUR HOME



aT SCHOOL



Your Day in Water

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.



GOING BEYOND THE TEXT

DO THE MATH:

The average person uses 16 gallons of water per shower. If the average number of students in your class live in a household with three other people, what is the total number of people represented by your class? How many gallons of water does each household from your class use each day? What is the total amount of water used for showering for each household in a month? What is the total water used from showering by all of the households? Explain how you arrived at this answer. Can you think of other ways people use excessive amounts of water? Using the advertisements in the *Tampa Bay Times* as models, create an advertisement educating people about their water use and what they can do to conserve water. Include information from the Go on Yard Patrol page.

GO ON YaRD PaTROL

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.

9 Principles of Florida-Friendly Landscaping™

- 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, egg shells, 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 permeable 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 keep our waterways clean!



For help with
Florida-Friendly Landscaping™,
ask your local
UF/IFAS County Extension.

<https://ffl.ifas.ufl.edu/>

Dive into a career in Water

HIGH SCHOOL DIPLOMA / VOCATIONAL TRAINING / SOME COLLEGE

ACCOUNTING TECHNICIAN

Average Annual Salary: \$35,000 to \$50,000

Education: Associate degree with an emphasis in accounting, finance or business administration; supplemented by three years of experience; or a high school diploma supplemented by six years of experience.

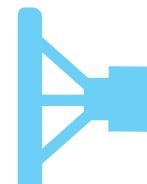
Description: Manages money moving into, through and out of the organization; prepares financial reports and coordinates payroll.

SURVEY & CAD TECHNICIAN

Average Annual Salary: \$37,000 to \$61,000

Education: Associate degree relating to computer-aided design (CAD), engineering or surveying. Five years of experience in land survey, geographical information systems (GIS) and/or computer-aided design.

Description: Uses computers to prepare design drawings and charts; prepares maps of an area showing distribution facilities; creates and updates plot books, charts, graphs and contract designs.



MECHANICAL TECHNICIAN

Average Annual Salary: \$33,000 to \$68,000

Education: High school diploma, vocational diploma or GED.

Description: Maintains, troubleshoots and repairs equipment according to safety, predictive and productive maintenance systems and processes.



The people who work at Tampa Bay Water make a difference in the community. From doing construction to testing water or communicating with the public, there are career opportunities for all education levels and areas of interest.

RECORDS TECHNICIAN

Average Annual Salary: \$28,000 to \$52,000

Education: High school diploma or GED.

Description: Performs administrative duties for managing records, archives, public records requests and other related inquiries.

WATER TREATMENT PLANT OPERATOR

Average Annual Salary: \$43,000 to \$75,000

Education: High school diploma, vocational/technical school diploma or GED and a current Florida Class C, B, or A certification for water treatment operators.

Description: Operates equipment that controls water treatment processes; monitor the treatment process and maintain operation logs; collect water samples and record various readings.



GOING BEYOND THE TEXT

HELP WANTED

What is the difference between a career and a job? Look up the word "job" and the word "career." Write down the definitions and think about how these terms differ in terms of what you want to do when you grow up. The jobs listed on this page would fit into the definition of a career. Look at classified listings in the *Tampa Bay Times*. Make a chart listing whether these "help wanted" ads would fit in the job category or career category. Write a sentence or two explaining why they would or would not be a career. Be ready to defend your answers to your classmates.

FOUR-Year DeGree / HiGHeR eDUCATiON

LABORATORY SCIENTIST

Average Annual Salary: \$51,000 to \$100,000

Education: Bachelor's degree in biology, chemistry, microbiology or a related field.

Description: Utilizes analytical instrumentation and techniques to perform standard, well-documented testing of drinking water and source water, as necessary to maintain compliance with state and federal regulatory requirements.



CONSTRUCTION PROJECT MANAGER

Average Annual Salary: \$66,000 to \$110,000

Education: Bachelor's degree in engineering.

Description: Oversees the entire construction process; reviews plans; oversees schedules and budgets; manages workflow and ensures the work meets contractual requirements.

ENGINEER

Average Annual Salary: \$45,000 to \$110,000

Education: Bachelor's degree in civil, environmental, mechanical, electrical or chemical engineering. Valid certificate passing the engineering fundamental examination or professional engineer's license.

Description: Applies engineering principles to evaluate problems and recommend and implement solutions for drinking water supply, treatment and transport infrastructure. Performs advanced engineering work to inspect, investigate, document, analyze, develop and implement recommendations to improve efficiency, reliability and quality; and ensure the proper construction of facilities. Position provides management of complex projects or programs.



HYDROGEOLOGIST

Average Annual Salary: \$56,000 to \$93,000

Education: Bachelor's degree in geology, hydrogeology or water resources/environmental engineering.

Description: Performs work relating to water-use permitting and resource evaluations. Requires a working knowledge of regional hydrogeology. Conducts activities in areas such as water use permitting compliance, well construction and testing, hydrogeologic testing programs, hydrogeologic data compilation and analysis, and groundwater flow modeling.

PUBLIC AFFAIRS COORDINATOR

Average Annual Salary: \$43,000 to \$71,000

Education: Bachelor's degree in communications, journalism or a related field.

Description: Responsible for a wide variety of public relations, outreach and education functions, including writing key messages, fact sheets, articles, newsletters, brochures and other agency collateral materials; coordinating and attending public events and meetings; managing projects; enhancing the agency's partnerships and communications with local and state government agencies and community-based organizations.

DEMAND MANAGEMENT COORDINATOR

Average Annual Salary: \$40,000 to \$70,000

Education: Master's degree in environmental science, resource management or environmental policy.

Description: Uses water conservation expertise to calculate water savings of large conservation programs, help forecast short-term and long-term water supply and demand, recommend ways that businesses, agriculture and consumers can save water; help create and promote conservation regulations.

WATER RESOURCES SYSTEM ENGINEER

Average Annual Salary: \$58,000 to \$96,000

Education: Master's degree in water resources engineering or closely related field with one year of post-master's experience.

Description: Performs scientific modeling of river and groundwater systems; makes predictions to support supply and demand decisions and participates in planning for future water needs.

Learn More about The Water around You



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.

About Tampa Bay Water

Tampa Bay Water is the largest wholesale water supplier in Florida, providing high-quality drinking water to its members, who, in turn, supply water to more than 2.5 million residents of the Tampa Bay area. Tampa Bay Water member governments include the cities of New Port Richey, St. Petersburg and Tampa, and the counties of Hillsborough, Pasco and Pinellas.



HANDS-ON
Learning
AT THE
**Glazer
Children's
Museum**
glazermuseum.org

Visit the Glazer Children's Museum to experience Tampa Bay Water's interactive water exhibits, including:

The Ocean Sandbox: An augmented reality environment controlled by you.

Educational Kiosks: Featuring the voices and ideas of local students.

Water's Journey: You become a drop of water in the water cycle.

Your Tampa Bay Water: Water treatment in action! Turn levers, push buttons and follow the journey that water takes to get to your house.



NewSPaPer iN eDUCaTiON

The *Tampa Bay Times* Newspaper in Education program (NIE) is a cooperative effort between schools and the Times Publishing Co. to encourage the use of newspapers in print and electronic form as educational resources — a living textbook. Our educational resources fall into the category of informational text, a type of nonfiction text. The primary purpose of informational text is to convey information about the natural or social world.

NIE serves educators, students and families by providing schools with class sets of the Pulitzer Prize-winning *Tampa Bay Times* plus award-winning original educational publications, teacher guides, lesson plans, educator workshops and many more resources — all at no cost to schools, teachers or families. In 2018-2019, NIE provided more than 1.4 million print copies and 10 million digital editions of the *Times* to area classrooms free of charge thanks to our generous subscribers and individual, corporate and foundation sponsors. NIE teaching materials cover a variety of subjects and are aligned to the Florida Standards.

For more information about NIE, visit tampabay.com/nie, call 727-893-8138 or email ordernie@tampabay.com.

Follow us on Twitter at twitter.com/TBTimesNIE. Find us in Facebook at facebook.com/nie.

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Credits

Content written by Tampa Bay Water
Educational activities written by Jodi Pushkin

Florida Standards

This publication and the newspaper activities focus on the following Florida Standards for middle school:

Science

SC.6.E.6.1; SC.6.N.1.1; SC.6.E.6.2; SC.6.E.7.2; SC.7.E.6.2; SC.7.E.6.6; SC.7.N.1.1; SC.7.L.17.3; SC.8.N.1.1; SC.8.N.4.1; SC.8.N.4.2

Language Arts Standards

LAFS.68.L.1.1; LAFS.68.L.1.2; LAFS.68.L.2.3; LAFS.68.L.3.4; LAFS.68.RI.1.1; LAFS.68.RI.1.2; LAFS.68.RI.1.3; LAFS.68.RI.2.4; LAFS.68.RI.2.5; LAFS.68.RI.2.6; LAFS.68.RI.3.7; LAFS.68.RI.3.8; LAFS.68.W.1.1; LAFS.68.W.1.2; LAFS.68.W.2.4; LAFS.68.W.2.5; LAFS.68.W.2.6; LAFS.68.W.3.7; LAFS.68.W.3.8; LAFS.68.W.3.9; LAFS.68.W.4.10; LAFS.68.SL.1.2; LAFS.68.SL.1.3; LAFS.68.SL.2.4; LAFS.68.SL.2.6



GOING BEYOND THE TEXT

As you read on P. 2 and throughout this publication, 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, which 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 nonliving things that work together. Think about all of 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 of the parts of your ecosystem. Choose some of the most important parts and create a cartoon depicting your personal ecosystem.