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Classroom Resource:

Where Does Your Drinking Water Come From?

Supports learning on a variety of topics including the water cycle, environmental science, STEM and engineering, community development, and history.

Topics:

- Where Does Your Water Come From
- How Your Water is Treated
- How Your Water Gets to You
- Modernizing Our Water System
- The Value of Water

Resource Components:

- Topic Overview
- Key Words
- Water System Timeline
- Critical Questions

This resource is provided by the Springfield Water and Sewer Commission to help educators and students explore the region's water and wastewater system and enhance classroom learning. For more information please contact the Commission at info@waterandsewer.org or 413-452-1300.

Additional resources are available on the Commission's website: waterandsewer.org/education/

Cobble Mountain Reservoir
Blandford and Granville, MA

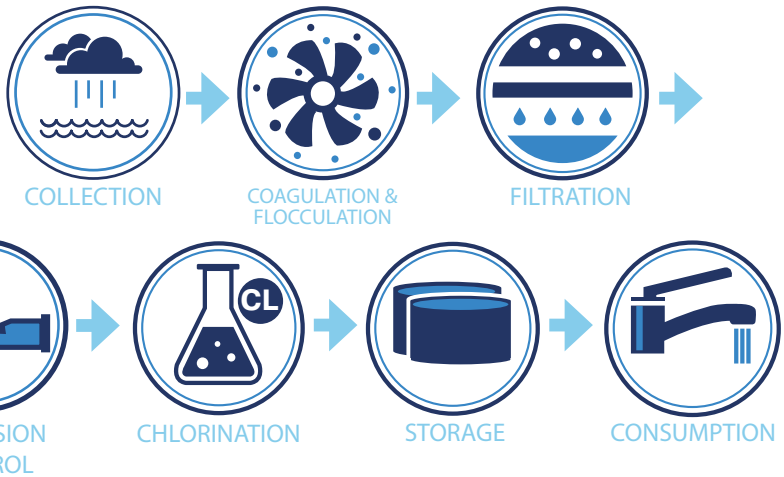
How Your Water is Treated

Water flows from Cobble Mountain Reservoir to West Parish Filters where is it filtered and treated to make it safe to drink.

Although the reservoir is in a pristine location raw water from the reservoir still contains natural organicmatter like soil, twigs, leaves, and microorganisms that must be filtered out.

The primary method of treatment at West Parish Filters is filtration, through which water flows through coagulation and flocculation tanks, to help remove suspended particles in the water. The water then moves on to filter beds and flows through a layer of anthracite (coal) and a layer of sand that removes most organic material and impurities. After filtration, the water undergoes "corrosion control," which is the process of changing water chemistry to stop metals like lead and copper from leaching out of pipes into the water. Finally, the water is disinfected with chlorine to kill bacteria and prevent waterborne diseases.

West Parish Filters Water Treatment Plant
Westfield, MA



Key Words

Watershed

Area of land where water—such as rain or melted snow — flows into the same place, such as a river, lake, reservoir, or ocean.

A watershed stream flows to Cobble Mountain Reservoir in Blandford and Granville, MA.

Water Cycle

How water moves around the Earth. Water evaporates into the sky as steam or clouds, falls back down as rain or snow (precipitation), and flows into rivers, lakes, reservoirs, and oceans. Then the cycle starts all over again.

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How Your Water Gets to You

From West Parish Filters water flows by gravity to the Provin Mountain Storage Tanks in Agawam, MA. These storage tanks are built into the mountain and their elevation above the city allows water to flow from Provin Mountain through 3 large transmission mains that run through Agawam and West Springfield, under the Connecticut River and on to the Commission's direct customers in Springfield and Ludlow.

In Springfield and Ludlow there are more than 500 miles of water pipes buried under city streets that help convey the water directly to homes, businesses, schools, health care centers and more.

Commission crews work to maintain the distribution system to help ensure reliable water service. This includes repairing or replacing old pipes (some are more than 100 years old!), checking for leaks, and exercising valves. Crews also maintain the fire hydrants including repairs, painting, and routine hydrant flushing.

Reservoir

A reservoir is a giant, man-made lake, often created by building a giant wall called a dam across a river to hold water back. People build reservoirs to store water when it rains a lot and then use it later such as for drinking water for a community. In Springfield, our primary drinking water supply reservoir is Cobble Mountain Reservoir located in Blandford and Granville, MA.

Water Filter

A water filter is like a special strainer that cleans dirty water by catching dirt, sand, and other tiny bits as water passes through it.

Water Utility/ Water Supplier

A department or organization responsible for treating water and delivering it to your home. Utilities must follow strict drinking water regulations to ensure your tap water is safe to use and drink. In Springfield our water utility is the Springfield Water and Sewer Commission, a regional, public water utility.

Modernizing Our System – the New West Parish Water Treatment Plant

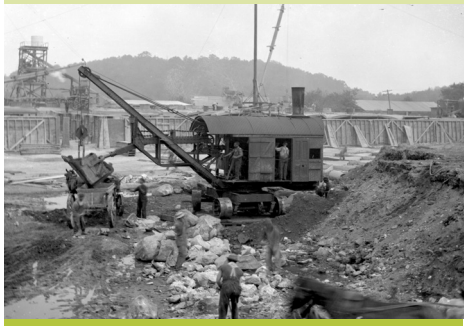
In 2024 the Commission broke ground on a major reinvestment in the water system – a new water treatment plant. The new plant is being constructed on the site of the existing treatment plant and will replace aging infrastructure and improve resiliency and service reliability for decades to come.

Learn more: ***newwestparish.com***

Value of Water

Water is critical for public health and daily life. We rely on it to drink, to cook, to clean, and for fire protection – essentially to live. The water system plays an important role in our economy too – supporting business, industry, and health care.

History



Early 1900s construction of West Parish Filters.

In the early 1900s the City of Springfield sought to expand its water supply for the growing city and looked west to the pristine Little River Watershed to construct a large water supply reservoir. The location in the hills of Western Massachusetts was ideal because water could flow by gravity to homes and businesses in Springfield.

Early 1900s – Engineers and labor crews begin construction of the new water system

1909 – 2.2-billion-gallon Borden Brook Reservoir completed

1909 – First filters constructed at West Parish Filters

1909 – Storage Tank #1 completed at Provin Mountain

Provin Mountain Storage Tank construction, 1909.

1925 -1931 – Additional filters constructed at West Parish Filters and additional storage tank constructed at Provin Mountain.

Water is supplied to the City of Springfield
Springfield, MA

Field Services Crews

Commission in the Community

Questions

01 What does water mean to you?

02 How did you use water today?

03 What would it mean if we didn't have clean, safe water?

History

continued from page 3

Construction of Cobble Mountain Dam in the 1930s.

1931 – Cobble Mountain Reservoir and Dam completed. At the time, was the tallest earthen dam in the world (approximately 200 feet); engineers came from all over the world to see its ingenuity.

Early - Mid 1900s - Water transmission and distribution system constructed to carry water from the filters and storage to the homes and businesses in Springfield.

1907 water pipe construction in the city.

1930s-1960s Additional filters at West Parish Filters and two more storage tanks at Provin Mountain constructed.

1974 – Modern filtration plant constructed at West Parish Filters following the passage of the Safe Drinking Water Act.

2024 – Construction of the new West Parish Water Treatment Plant begins to modernize the drinking water system for the 21st century.

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Cobble Mountain Reservoir
Blandford and Granville, MA

Supplemental Activties and Resources

Design and Build Your Own Water Filter

Water Filter Activity
Use household materials in this hands-on activity design and build your own filter to learn more about the water filtration process.

Click here to view the activity.

Water Filtration Video
See how your water filter compares to the Commission's filters – which can treat approximately 60 million gallons of water per day!

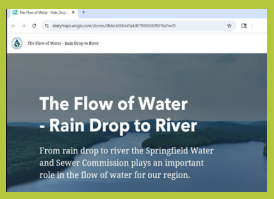
Check out the Commission's video *Modernizing Our Water System for the 21st Century* to learn more about how Springfield's water is filtered and treated. The video also highlights the new West Parish Water Treatment plant – currently under construction – that will modernize the drinking water system.

Multimedia Resources

Story Map

Following the Flow of Your Water

Follow the flow of Springfield's water from Cobble Mountain Reservoir to the wastewater plant on Bondi's Island in this story map that includes a brief description and photos of each step of the way.

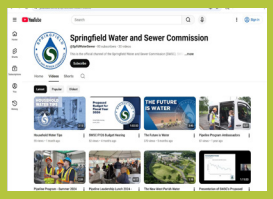


Waterandsewer.org/flow-of-water/

Videos

Video Library

Explore the water system in action! Watch how Springfield's water is treated, meet the people behind the process, and explore rewarding careers in the water sector — all on the SWSC YouTube channel.



Youtube.com/@SpfldWaterSewer

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Supplemental Activity: Design Your Own Water Filter

Purpose

Explore how filtration helps remove impurities from water to make it safe to use and drink.

Introduction

What happens to water before it comes out of your faucet?
Show two clear cups, one filled with clean tap water and one with "dirty" water (a mix of soil, small twigs, etc).

- *Would you want to drink this dirty water?*
- *How could we make it cleaner?*

That is what water treatment plants do every day - they take water from the environment and treat it to make sure it's safe for people to drink.

Background

- The Springfield Water and Sewer Commission filters and treats drinking water from Cobble Mountain Reservoir at the West Parish Filters Drinking Water Treatment Plant located in Westfield, MA.
- West Parish Filters has treated Springfield's drinking water since 1909, starting with slow sand filtration. Following the Safe Drinking Water Act, the plant was modernized with a rapid sand filtration facility in 1974.
- Construction of a new state-of-the-art treatment plant at West Parish got underway in 2024.

Materials

- 2-liter plastic bottle, empty, clean and cut in half (one per person or group)
- Dirty water (make your own with stuff like coffee grounds, dirt, crunched-up old leaves, cooking oil, etc.)
- As many of the following filter materials as you can get: activated charcoal (available in the fish section at a pet store), gravel, sand (coarse and/or fine), cotton balls, etc.
- Coffee filter (a bandanna, old sock, napkin, or paper towel works too!)
- Measuring cup
- Spoon
- Stopwatch or clock with a second hand
- Pencil and paper

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Rapid Sand Filter Beds, West Parish Filters

Supplemental Activity: Design Your Own Water Filter

How Water Filtration Works

Filtration is one of the oldest and most widely used methods to clean water. Water flows through porous layers of materials that trap larger particles while water flows through. This mimics the Earth's own purification processes.

Filtration Process at West Parish Filters

Coagulation and Flocculation

Raw water is mixed with coagulants in large tanks to help solids and natural organic matter like twigs, leaves, and dirt bind (stick) together for removal. Coagulants are chemicals used to make tiny bits of dirt and particles stick together so they can be filtered out more easily.

Rapid Sand Filtration

After coagulation and flocculation the water flows to filter beds where it passes through a layer of anthracite (coal) and a layer of sand, both porous materials, to further remove any particles or cloudiness.

Activity: Design Your Own Water Filter

To operate the filters and ensure clean water flows to our homes, schools, and businesses, a team of water operators and engineers work behind the scenes to make it all happen.

For this activity, we are the water engineers and will design a mini water filter system similar to what is used in real water treatment plants like West Parish Filters.

Key Words

Porous
Something that has many small holes that allow water or air to pass through slowly. For example, sponges, paper towles, and clothing or fabric are porous.

Water Filter
A water filter is like a special strainer that cleans water. It lets the water pass through while trapping dirt, sand, and other tiny bits along the way.

Safe Drinking Water Act
A law originally passed in 1974 that helps ensure the water from your tap is clean and safe to drink. It sets rules for water systems so they can remove germs and chemicals that could make people sick.

West Parish Filters Water Treatment Plant

Pipes keep water flowing through the filtration process.

An average of **30 million gallons of water per day** is treated at West Parish Filters. The filtered drinking water is supplied to 250,000 people in Springfield, Ludlow, Agawam, Longmeadow, East Longmeadow, and Southwick.

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West Parish Filters Water Treatment Plant

Supplemental Activity: Design Your Own Water Filter

Activity Steps

Pre-activity: Cut the 2-liter bottles in half.

Step 1: Flip the 2-liter bottle's top half over and put it in the bottom, so the top looks like a funnel. You'll build your filter in the top part.

Step 2: Place the coffee filter (or bandanna, sock, etc.) at the bottom of your filter.

Step 3: Add cotton balls, charcoal, gravel, sand, and / or other materials in layers. You can use just one of them or all of them. Tip: Think about which order to add them. Bigger filter materials usually catch bigger impurities.

Step 4: Write down which filter materials you used and in what order you layered them.

Step 5: Stir your dirty water and measure out a cup of it.

Step 6: Get your timer ready!

Step 7: Pour a cup of dirty water into your filter. Start the timer as soon as you begin pouring.

Step 8: Time how long it takes for all the water to go through the filter. Then write down how long it took.

Step 9: Carefully scoop out the filter materials, one layer at a time. What did each layer take out of the water?

Step 10: Experiment! Clean the bottle and try again. Put the filter materials in a different order each time and time each experiment. What do you discover?

What did you notice about your filter?

The longer it takes for water to move through a filter, the cleaner it gets. Water slips easily through the filter materials, but bigger gunk, like dirt, gets trapped. The filter materials usually get finer and finer, so they can catch whatever was missed earlier.

Your filtered water is *not* clean enough to drink. But a plant will love it!

Filter Examples

Show us what you come up with!

The Commission wants to see your water filters. You can email pictures or videos to info@waterandsewer.org or share them on social media and tag @SpfldWaterSewer.

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