TEACHER OVERVIEW

Humans and Water

9th —12th Grade

Nature Vision Student Packet

The materials contained within this packet for students have been created by Nature Vision, an environmental education nonprofit organization that brings programming to schools and local greenspaces for over 70,000 PreK-12th grade students each year in King and Snohomish Counties. This curriculum is designed to foster an understanding of the importance of water and its integral role in supporting life and shaping our planet. Packets can be completed by students either independently from home or with the help of an adult caregiver. Materials for each day of the week build on the previous days' learning by offering a variety of activities that involve art, writing, and safe field exploration.

These materials are provided to you by Cascade Water Alliance (Cascade). Cascade wants everyone to understand the importance of conserving and protecting our limited water resources. Cascade supports Nature Vision in the development and delivery of water education programs and we are happy to offer these materials to our friends in the community. Learn more about Cascade at cascadewater.org.

This unit supports NGSS Performance Expectations across various disciplines, as well as supporting K-12 Integrated Environmental and Sustainability Standards. These are listed at the bottom of this page. Teachers will be supplied with PDF formats of materials to be emailed to families, or teachers may print and send to students to complete at home.

Students are introduced to how water is collected and transported, and how it is cleaned for human use. Next, students explore how we use water in the United States, as well as how water is used in other parts of the world. Students then learn about the integral role human impact plays on having adequate clean water. Lastly, they will learn ways that we can help to protect and restore the environment in our local watersheds.

If you have any further questions or concerns regarding this packet, please email our Office Coordinator at info@naturevision.org.

Grades 9-12
Supports NGSS Performance Expectations: HS-ESS2-5, HS-ESS3-1, HS-ESS3-4, HS-ESS3-6, HS-ETS1-1, HS-ETS1-3.

Grades 9-12
Day 1 - How We Obtain Our Water
Day 2 - How We Treat Our Water
Day 3 - How We Use Our Water
Day 4 - How the World Uses Water
Day 5 - Stewardship

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CASCADE WATER ALLIANCE

Nature VISION

PARENT/CAREGIVER OVERVIEW

Humans and Water

9th —12th Grade

Welcome to Nature Vision's student packet for home use. Nature Vision is an environmental education nonprofit organization that brings programming to schools and local greenspaces for over 70,000 PreK-12th grade students each year in King and Snohomish Counties. We are excited to be offering this version of our programming directly to students at home!

This packet is designed to be completed over the course of one week, with each day focusing on a different aspect of environmental science and stewardship. The majority of these materials can be completed independently, but we thought it would be important to provide background information for any adults who may be helping to complete or answer questions. We've included the basic learning objectives for each day along with some vocabulary.

These materials are provided to you by Cascade Water Alliance (Cascade). Cascade wants everyone to understand the importance of conserving and protecting our limited water resources. Cascade supports Nature Vision in the development and delivery of water education programs and we are happy to offer these materials to our friends in the community. Learn more about Cascade at cascadewater.org.

Another great resource to learn about saving water and how to help our salmon and watersheds is weneedwater.org. Check out the We Need Water webpage or on Instagram @WeNeedH20 to see how you can be part of this campaign! Challenge yourself to use #WeNeedWater to post all the things you are doing with your friends and family to conserve and protect water!

Please contact info@naturevision.org with any questions or concerns
Stay connected with Nature Vision! Follow us for updates @naturevisionorg

NOTE: Students may require support in reading directions and/or completing some tasks. While many activities in this packet are creatively oriented and open ended, you may consult the answer key located at the back of the packet for additional assistance or guidance.

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PARENT/CAREGIVER OVERVIEW: DAY 1

How We Obtain Our Water

Background Information: Our water comes from nature in two forms: surface water and groundwater. While there is plenty of available water in our environment, transporting water remains one of the biggest challenges people face in various communities and watersheds across the world.

Learning Objectives: Students will learn about the various sources of water before engaging in hands-on modeling of ways to move water from a reservoir to homes, schools, buildings, and other locations.

Main Activity: Water Transportation

- ***Overview****:* Students work with readily-available household items and materials to create models depicting the ways that people can transport water
- ***Parent/Caregiver Tasks****:* Provide supervision and materials support

Optional Activity: We Need Water Challenge

- ***Overview****:* Students complete a daily task related to a water conservation habit and a challenge to spread awareness on the importance of saving water
- ***Parent/Caregiver Tasks****:* If possible, help the student post their #WeNeedWater challenge on social media

Optional Activity: Video

- ***Overview****:* Students watch a video provided by Cascade Water Alliance that highlights the work they do to be able to provide us with clean drinking water
- ***Parent/Caregiver Tasks****:* Provide technical support

PARENT/CAREGIVER OVERVIEW: DAY 2

How We Treat Our Water

Background Information: The fresh water that we consume is filtered and treated before reaching our homes. Once it is used, the resulting waste is sent back to water treatment facilities where most of the pollutants are separated out and the remaining water is returned to the Puget Sound. Our water is collected from nature and treated to make it safe for us to drink and use in many ways, meaning the process that ensures our clean water is essential to our everyday lives.

Learning Objectives: Students will gain an understanding of the complicated process used by our local municipalities to ensure clean safe drinking water for our communities.

Main Activity: Water Treatment Article

- ***Overview****:* Students read an article about general water treatments as well as local water treatment practices and answer questions regarding our nation's history of water treatment
- ***Parent/Caregiver Tasks****:* None

Optional Activity: We Need Water Challenge

- ***Overview****:* Students complete a daily task related to a water conservation habit and a challenge to spread awareness on the importance of saving water
- ***Parent/Caregiver Tasks****:* If possible, help the student post their #WeNeedWater challenge on social media

Optional Activity: Water Filtration Video

- ***Overview****:* Students watch a video that details the ways that water is treated in our country
- ***Parent/Caregiver Tasks****:* Provide technical support

PARENT/CAREGIVER OVERVIEW: DAY 3

How We Use Our Water

Background Information: Water is used for a multitude of reasons beyond drinking, all of which require us to take water from the environment. This inevitably impacts the amount of water available and the amount of water that a community has access to. There are simple ways to save water at home, school, and work, but it first helps to know how we use our water before we learn how to improve.

Learning Objectives: Students will consider the numerous ways that a community engages with and uses water for drinking, cooking, cleaning, and farming, in addition to industrial water use.

Main Activity: Dryville

- ***Overview****:* Students read a story of a fictional town detailing numerous water needs as a community grows and the ways that water is used and managed before comparing this community water use example to that of our region
- ***Parent/Caregiver Tasks****:* None

Optional Activity: We Need Water Challenge

- ***Overview****:* Students complete a daily task related to a water conservation habit and a challenge to spread awareness on the importance of saving water
- ***Parent/Caregiver Tasks****:* If possible, help the student post their #WeNeedWater challenge on social media

Optional Activity: Water Use Calculator

- ***Overview****:* Students use a simple worksheet to calculate their personal weekly water use
- ***Parent/Caregiver Tasks****:* None

PARENT/CAREGIVER OVERVIEW: DAY 4

How the World Uses Water

Background Information: Water resources around the world are unevenly distributed, with some communities having access to plentiful, clean water and others without. This discrepancy plays a large part in global inequity in regards to community health and well being. Water shortages are a global crisis that affect billions of people and their environments.

Learning Objectives: Students will consider and explore various communities' access to and use of fresh water. They will critically analyze how their situation and access to clean water compares to that of the communities they learn about. They will also explore methods of improving water access.

Main Activity: Engineering and Community Solutions

- ***Overview****:* Students work with materials from Water.org to develop an understanding of the role that access to water plays in the health and well-being of people around the world. They will consider possible ways to bring water to various communities
- ***Parent/Caregiver Tasks****:* None

Optional Activity: We Need Water Challenge

- ***Overview****:* Students complete a daily task related to a water conservation habit and a challenge to spread awareness on the importance of saving water
- ***Parent/Caregiver Tasks****:* If possible, help the student post their #WeNeedWater challenge on social media

Optional Activity: Water Rationing

- ***Overview****:* Students compare their household's water use to the water use of communities in other parts of the world by engaging with a water rationing model
- ***Parent/Caregiver Tasks****:* None

PARENT/CAREGIVER OVERVIEW: DAY 5

Stewardship

Background Information: Stewardship is the action of caring for our natural resources. At its core, stewardship takes both knowledge and action to address environmental issues. By taking what you know and analyzing how we interact with the world around us, you are able to create solutions that to have a positive impact on the environment.

Learning Objectives: Students will learn how water resources are distributed unequally throughout the globe, how to measure their household use, and how best to conserve water for the future.

Main Activity: Fundraising Event Planning

- ***Overview****:* Students create a fundraising plan for stewardship projects to practice how to engage in environmental stewardship when offering physical support to projects (i.e. restoration) isn't an option
- ***Parent/Caregiver Tasks****:* None

Optional Activity: We Need Water Challenge

- ***Overview****:* Students complete a daily task related to a water conservation habit and a challenge to spread awareness on the importance of saving water
- ***Parent/Caregiver Tasks****:* If possible, help the student post their #WeNeedWater challenge on social media

Optional Activity: Persuasive Letter to Organizational Partners

- ***Overview****:* Students practice writing a letter to a local government office, business, or another organization asking for support with their fundraising plan from the Main Activity
- ***Parent/Caregiver Tasks****:* None

PARENT/CAREGIVER OVERVIEW: VOCABULARY

DAY 1
Aquifer: An underground water supply flowing through sand and gravel
Groundwater: Water that lies beneath the earth's surface
Reservoir: A large natural or artificial lake used as a source of water supply
Surface Water: Water on the earth's surface in lakes, rivers and streams

DAY 2
Coagulation: The process of gathering small impurities together
Disinfection: Adding chemicals to remove parasites and bacteria
Filtration: Physically removing small particles
Flocculation: Suspending solids for removal
Ozone: A highly reactive gas molecule made up of three oxygen atoms with no color but a strong odor
Sedimentation: Using gravity to remove suspended particles

DAY 3
Aquaculture: Water associated with raising organisms that live in water
Domestic: Includes indoor and outdoor uses at residences
Industrial: Water for such purposes as fabricating, processing, washing, diluting, cooling, or transporting a product
Irrigation: Water that is applied by an irrigation system to sustain plant growth
Livestock: Water associated with livestock watering, feedlots, dairy operations, and other on-farm needs
Mining: Water used for the extraction of minerals that may be in the form of solids, such as coal, iron, sand, and gravel; liquids, such as crude petroleum; and gases, such as natural gas
Public-Supply: Water that is delivered to users for domestic, commercial, and industrial purposes
Thermoelectric: Used in the process of generating electricity with steam-driven turbine generators

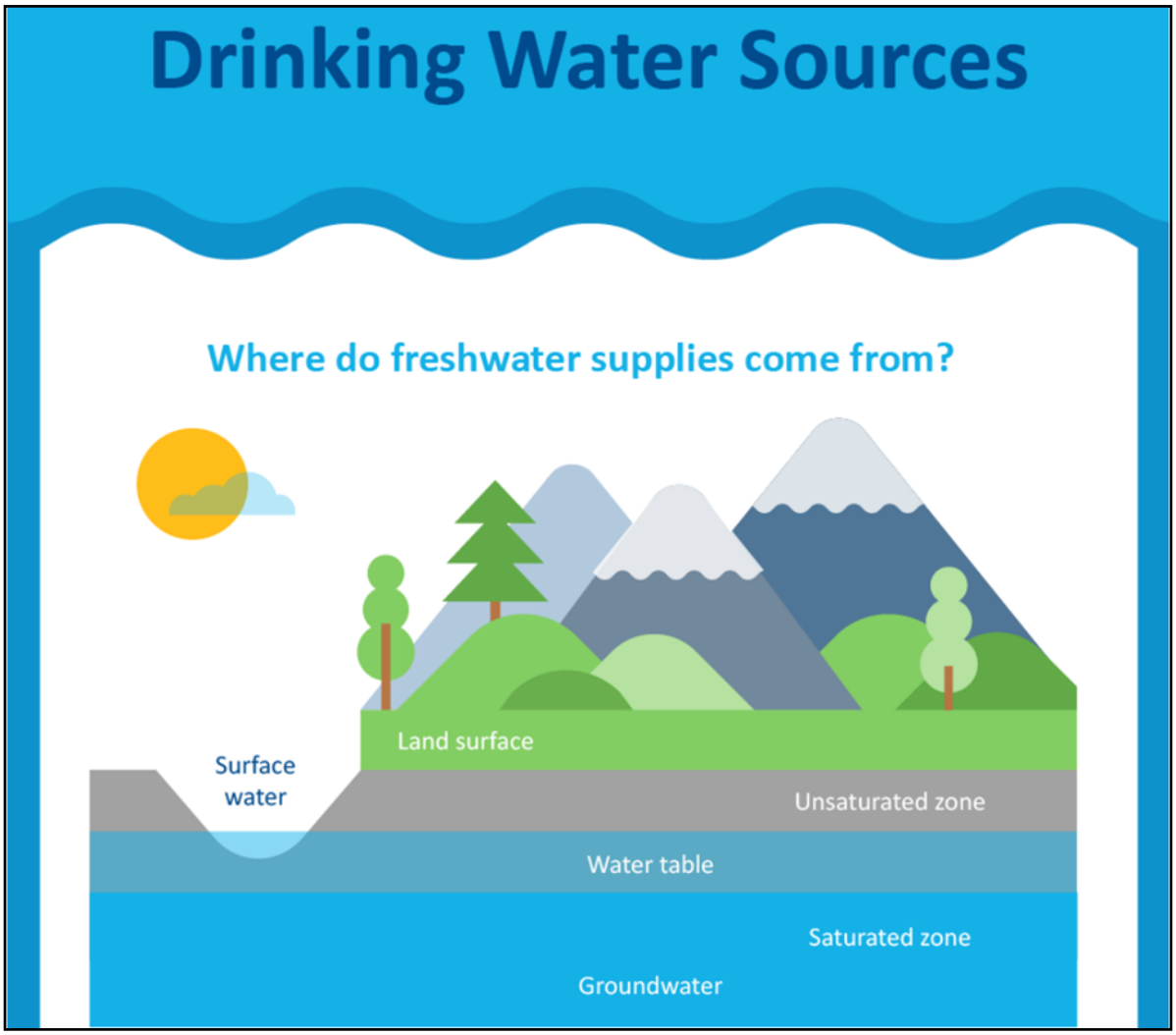
DAY 4
Rationing: A controlled use of a resource like water

DAY 5
Pledge: A promise
Stewardship: The act of caring for and thinking carefully about our resources

DAY 1

How We Obtain Our Water

We obtain our drinking water from a variety of specific sources, but ultimately it all comes from the environment in some form. As part of the hydrologic cycle, water is stored both on the surface of the earth — as **surface water** — or underneath the surface of the earth — as **groundwater**. All of this water has to be collected, cleaned and transported to the places where we can use it. Historically, this has been accomplished in a myriad of ways, from physically carrying water from a source, to digging wells, to using gravity to move water from higher places.



Source: https://www.waterlogic.com/en-us/resources-blog/where-does-our-drinking-water-actually-come-from/

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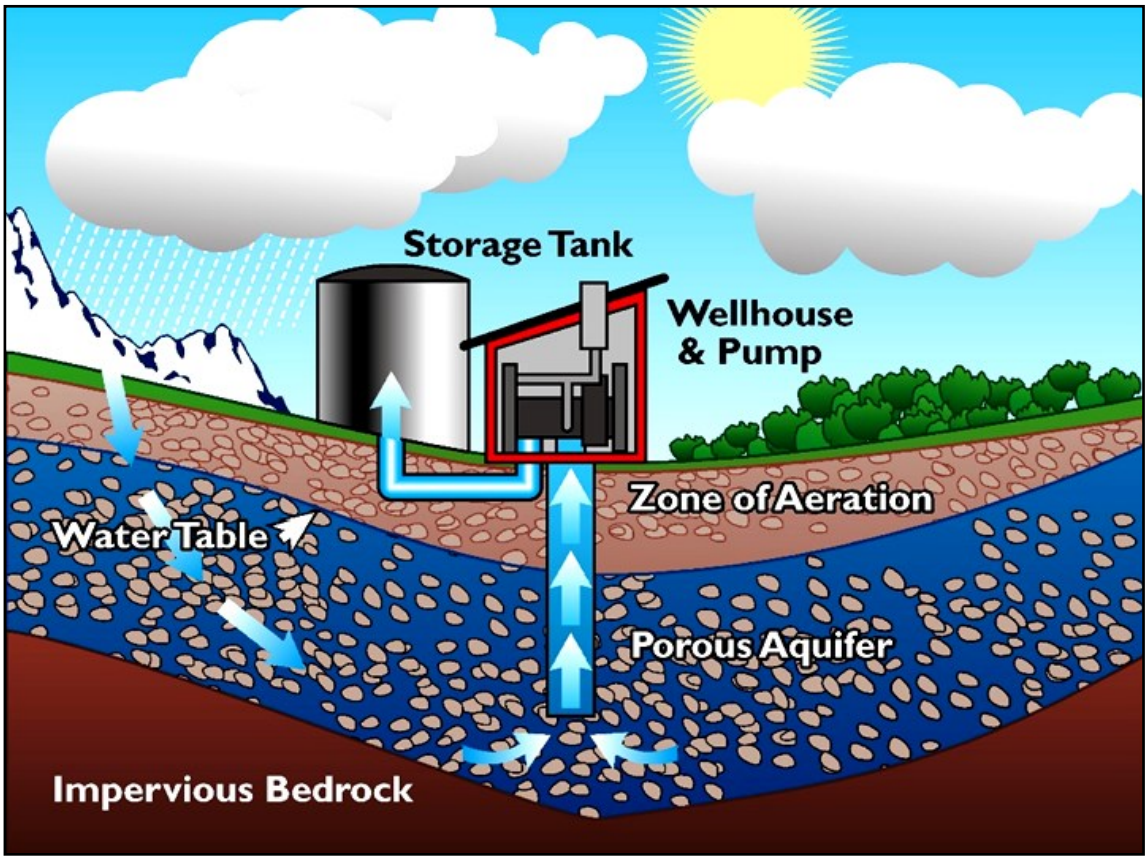
Groundwater is stored in what is called an **aquifer**, an underground source of water that can be accessed by a well through either digging down to the water or pumping the water up to the surface. Some wells are still dug by hand today, but more modern methods are also available. Wells remain extremely important to all societies. In many places around the globe, wells provide a reliable and ample supply of water for home use, irrigation purposes, and industries.



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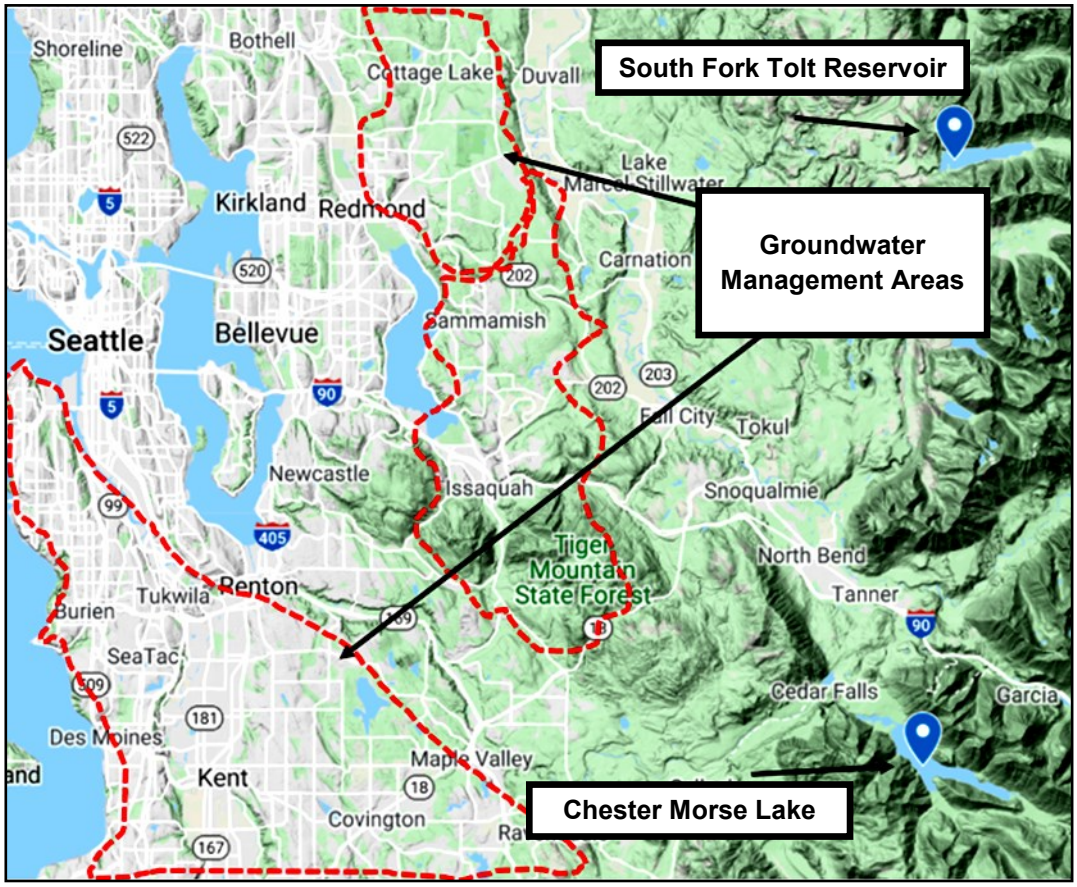
Most of the surface water that we use comes from two different sources, the Cedar River and the Tolt River. Water is stored in **reservoirs**, which are protected lakes that are reserved for storing our drinking water. The stored water in these reservoirs is then treated so that we are able to drink it. The treated water can then be transported to our homes, schools, and businesses.



Source: Google Maps

Vocabulary
Aquifer: An underground water supply flowing through sand and gravel
Groundwater: Water that lies beneath the earth's surface
Reservoir: A large natural or artificial lake used as a source of water supply
Surface Water: Water on the earth's surface in lakes, rivers and streams

Main Activity

Water Transportation

One of the biggest challenges for people is how to transport our water from the source where it's found in nature to places where we can treat and use it. Today, you'll participate in an activity learn first-hand that moving water takes a *lot* of effort.

Materials: Water source in your house, either a 2 liter bottle or 1 gallon jug, spoons, straws, drink bottles, ladles, and other household items that allow you to scoop and carry water

You'll experiment with your own engineering skills to build models that represent how water is moved from a reservoir or an aquifer.

Using items around your home like spoons, straws, or drink bottles, design and then build a method to move 1 liter of water from a "reservoir" — such as a sink or bathtub — to a place where you would want to use it. You might scoop the water by hand or build a pipe using drink bottles. Be creative to see which method is most efficient and works best in your situation!

Communities around the world use various objects that they have available to them to transport their water, so there is no right or wrong way to decide how best to transport the water as long as you are careful and safe. Be sure to have an adult's help and be mindful to spill as little water as possible while implementing your water project. This activity is best done over a sink, a bathtub, or outdoors with an adult's permission.

After you try out your water transportation design, answer the questions below:

What ways can you find to move the most water in the fastest and easiest manner?

Why do you think it's important for us to be able to move as much water as possible?

Optional Activity

We Need Water Challenge

There are so many ways to save, protect, and care for our water. At the end of every daily lesson, we will be giving a challenge to help you show off what you've learned.

Materials: Timer, computer/phone/tablet, internet connection

Did you know that your shower uses about 2 gallons of water every minute? Most people shower for about 10 minutes, and use almost 20 gallons of water for every shower. One of the simplest ways to save water is to think about the amount of time that we are in the shower. It's recommended that we take showers that are just 5 minutes long to save water. For today's We Need Water challenge, time how long you are in the shower and figure out how much water you used today. Can you use less tomorrow?

One fun way to keep track of the time is to listen to music, most songs are about 2.5 minutes long, so if you listen to 2 songs while you shower, you'll shower for 5 minutes. What 2 songs will you play to stay on time and save water?

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!

Optional Activity

Video

Please ask for an adult's permission to watch this video.

"Cascade's Vision… for today and tomorrow": Watch Cascade Water Alliance's video about their mission and many ways they support the responsible use and preservation of our water resources.

This video can be found on their website under the "About Cascade" section, or by clicking the following link and watching the video at the bottom of the page: https://cascadewater.org/about/about-cascade/

Materials: Computer/phone/tablet, internet connection

DAY 2

How We Treat Our Water

Treating our water after it's obtained from the source is an important step in ensuring it is safe for people to drink. Our water comes from areas that are protected, so it needs less treatment than many places in the country, but we still need to treat it to be safe.

The Centers for Disease Control lists 4 main steps to treating water to be suitable for drinking. Drinking water sources are subject to contamination and require appropriate treatment to remove disease-causing agents. Public drinking water systems use various methods of water treatment to provide safe drinking water for their communities. Today, the most common steps in water treatment used by community water systems — mainly surface water treatment — include:

1. **Coagulation and Flocculation**
   Coagulation and **flocculation** are often the first steps in water treatment. Chemicals with a positive charge are added to the water. The positive charge of these chemicals neutralizes the negative charge of dirt and other dissolved particles in the water. When this occurs, the particles bind with the chemicals and form larger particles, called floc.

2. **Sedimentation**
   During **sedimentation**, floc settles to the bottom of the treatment area, due to its weight. This settling process is called sedimentation.

3. **Filtration**
   Once the floc has settled to the bottom of the water supply, the clear water on top will pass through filters of varying compositions (sand, gravel, and charcoal) and pore sizes, in order to remove dissolved particles, such as dust, parasites, bacteria, viruses, and chemicals. This process is called **filtration**.

4. **Disinfection**
   After the water has been filtered, a disinfectant (for example, chlorine, chloramine) may be added in order to kill any remaining parasites, bacteria, and viruses, and to protect the water when it is piped to homes and businesses. This part of the process is called **disinfection**.

Locally, our water treatment process is slightly different. Our water comes from the Cedar River, the Tolt River, and from groundwater sources. The melting snow and rain from the Cascade Mountains are initially stored in reservoirs. At the Cedar River, the water is stored in two reservoirs – Chester Morse Lake and the Masonry Pool. At the Tolt River, the water is stored in the Tolt Reservoir.

From these reservoirs the water is then fed into treatment centers to undergo six specific treatment steps:

1. The water from the river goes through a physical screen to remove debris.
2. The chemical chlorine is added to remove bacteria and viruses from the water.
3. Another chemical fluoride is added to help keep our teeth strong.
4. **Ozone** is added as a gas for odor and bacteria control.
5. Ultraviolet light is used to further remove bacteria and viruses that might be resistant to the added chemicals.
6. Finally lime is added to the water to help with possible issues with pipes in older homes.

Vocabulary
Coagulation: The process of gathering small impurities together
Disinfection: Adding chemicals to remove parasites and bacteria
Filtration: Physically removing small particles
Flocculation: Suspending solids for removal
Ozone: A highly reactive gas molecule made up of three oxygen atoms with no color but a strong odor
Sedimentation: Using gravity to remove suspended particles

Main Activity

Water Treatment Article

This article details the ways that our water is treated and the basic history of water treatment in the United States. This article is provided by the Water Education Foundation and is copied in full below and on the following pages. This article is also available via the following link: https://www.watereducation.org/post/how-drinking-water-treated.

After reading this article, answer the questions that follow.

Materials: Writing utensil, paper

HOW IS DRINKING WATER TREATED?

Nearly a century ago, controlling water-borne disease was the main treatment goal of water providers. Today, water agencies large and small provide their customers with the highest quality drinking water in the world. Before disinfection became a common practice, widespread outbreaks of cholera and typhoid were frequent throughout the United States. These diseases are still common in less developed countries, but largely disappeared in the United States when chlorine and filtration became widely used 80 years ago.

A tremendous amount of time and technology is expended to make surface water safe to drink. At the treatment plant, it is put through many processes before it reaches a consumer's tap.

Water treatment technology must deal with a number of potential perils resulting from the movement of water from its source to our tap. Mountain springs might flow through sulfur, zinc or arsenic-laden formations. Groundwater can pick up contamination from fertilizers, septic tanks, mine drainage, naturally occurring minerals, industrial chemicals and metals such as arsenic and chromium. Rivers and streams sometimes carry harmful microorganisms from animals or humans, presenting a risk of disease. Storm drains can carry polluted runoff from cities into rivers and streams.

U.S. drinking water supplies are heavily regulated. Public and private water suppliers operating treatment systems today have methods to control nearly all of the properties found in water: hardness, acidity and alkalinity, color, turbidity, taste and odor, as well as the biological and organic chemical characteristics. Large water suppliers have their own laboratories to test water while smaller agencies use commercial labs.

In some systems, fluoride is added to reduce tooth decay. California law requires fluoridation of water in systems with 10,000 or more connections if outside funding is provided. According to the state, 30 percent of all public water providers in California fluoridate their water. The treatment of groundwater varies from community to community, and even from well to well within a city depending on contaminants in the water. The water may be treated as it is pumped from the ground to remove certain contaminants or it may be chlorinated if there is concern of bacterial or parasitic infection.

The driving force behind the development of drinking water standards and regulations is the protection of public health. Many laws have been adopted concerning water quality standards, going as far back as the Interstate Quarantine Act of 1893, which sought to control the introduction of communicable diseases from other countries. The first drinking water regulations prohibited the use of a common drinking cup on trains.

The first federal drinking water standard, adopted in 1914, was limited to bacteriological quality of water and not physical and chemical requirements. By 1925, cities were using filtration, chlorination or both and had little difficulty complying with the coliform standard. Eventually, limits were established for lead, copper, zinc and excessive soluble mineral substances. In 1941, an advisory committee of federal agency representatives, scientific associations and at-large members was formed to revise drinking water regulations. In 1942, the committee agreed on significant initiatives such as required bacteriological examinations in water distribution systems and maximum concentrations for lead, fluoride, arsenic and selenium. Twenty years later, the U.S. Public Health Service developed drinking water standards that were used by California.

During the following decades, federal water pollution control efforts focused on physical, biological, chemical and industrial waste. Passed by Congress in 1974, the Safe Drinking Water Act (SDWA) regulates drinking water quality in the United States. Under the SDWA, the U.S. Environmental Protection Agency (EPA) can delegate implementation of drinking water regulations to states that have developed programs at least as stringent as the federal one. Such states, including California, have primary enforcement responsibility for administering their own programs.

Under the SDWA, public water systems are required to conduct testing on a regular basis. Monthly monitoring for microbial contaminants is required for both surface water and groundwater systems, while organic chemical monitoring must be conducted annually by surface systems and every three years by groundwater systems.

Contaminants fell into several categories: those that occur naturally, such as arsenic and uranium, those that are manmade, such as solvents or pesticides; and those that derive primarily from the materials used in supplying water, most notably disinfection byproducts (DBPs). The byproducts emerge from the treatment process when chlorine reacts with naturally occurring organic compounds found in the water supply. Public health experts note the possible risks from DBPs are limited compared to inadequate disinfection of drinking water.

EPA established pollutant-specific minimum testing schedules for public water systems. If a problem is detected, there are immediate retesting requirements that go into effect and strict instructions for how the system informs the public about the problem. Until the system can reliably demonstrate that it is free of problems, the retesting is continued.

QUESTIONS:

- ***When was the first federal drinking water standard put in place?***

- ***What are two of the most common water borne illnesses?***

- ***When was the Safe Drinking Water Act passed?***

Optional Activity

We Need Water Challenge

Human actions can affect a lot of different things in nature, sometimes in positive ways but often in very negative ways. One of the worst and most well-known human impacts on nature is climate change. Climate change is the increase of Earth's overall temperature. When humans burn fuel, such as by driving their cars, making goods in factories, or flying planes they release chemicals called greenhouse gases into the air. These greenhouse gases increase the Earth's temperature and changes the global climate. A changing climate affects the weather, water quality, and all living things.

Materials: Writing utensil, markers/colored pencils (optional), computer/phone/tablet, internet connection

For today's #WeNeedWater challenge, you will take on the role of a reporter investigating climate change. You are writing an article about the effects of climate change on everyday people, so you're going to need a real-life story from somebody who has seen the impacts of climate change first-hand.

Find an older person in your family that you can interview and ask them about the changes in the environment that they have noticed throughout their life. If you're wondering what exactly to ask about, maybe see if they have noticed…

- Changes in normal temperatures throughout the year?
- Changes in the amount or intensity of rain and snow?
- More floods, storms, fires, or other natural disasters?

Don't forget to ask how these changes have affected them or the people around them. Do you think these changes are something that can be easily fixed or reversed? Why or why not?

If your storyteller agrees, you can present your findings as a filmed interview on the TV news or as a written article for a newspaper or website.

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!

Optional Activity

Water Filtration Video

Please ask for an adult's permission to watch this video.

Concerning Reality: This video details how water treatment facilities work and the treatment processes they use on water.

This video can be found by doing a YouTube search for "How Do Water Treatment Plants Work?", or by clicking the following link: https://www.youtube.com/watch?v=0_ZcCqqpS2o.

Materials: Computer/phone/tablet, internet connection

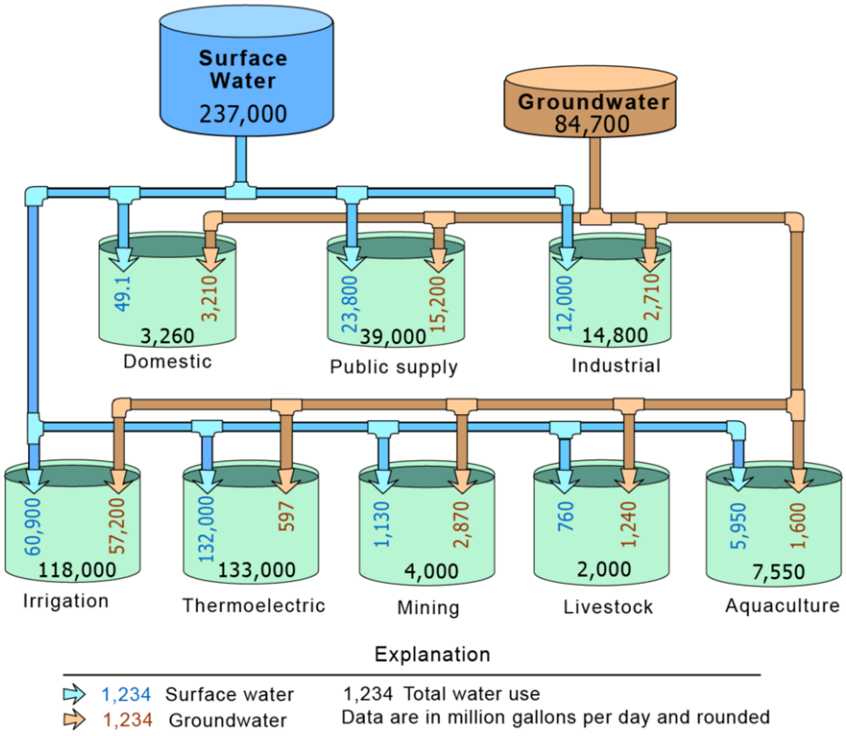
DAY 3

How We Use Our Water

We use water for numerous reasons and that water comes from both surface water and groundwater sources.

The following chart shows how much water is used each day (in millions of gallons) in the United States for different activities. We've learned that water is a limited resource, and we need to use it wisely to fulfill all of our needs. It's important to understand where else our water is used so we have a full picture of our country's water use consumption.

Source and use of water in the United States, 2015



Source: https://www.usgs.gov/special-topic/water-science-school/science/surface water-use-united-states?qt-science_center_objects=0#qt-science_center_objects

The top row of cylinders above represents where America's freshwater came from (i.e. the source) in 2015, either from surface water (in blue) or from groundwater (in brown). You can see the majority of the water we use comes from surface water sources, such as rivers and lakes, while about 26 percent of water used comes from groundwater. The pipes leading out of the surface water and groundwater cylinders on the top row and flowing into the bottom rows of cylinders (in green) illustrate the categories of water use where the water was sent after being withdrawn from a river, lake, reservoir, or well.

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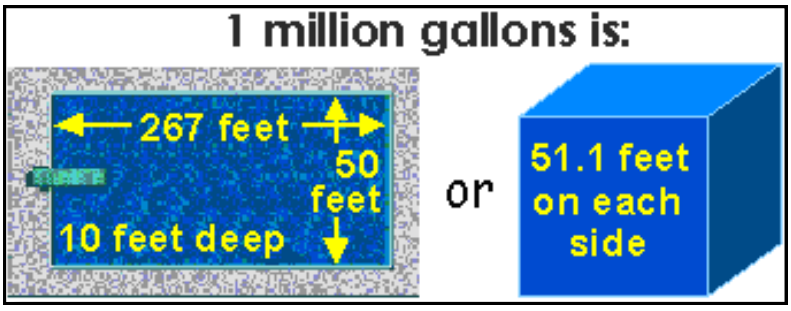
For example, the blue pipe coming out of the surface water cylinder and entering the public supply cylinder shows that 23,800 Mgal/d (million gallons per day) of water was withdrawn from surface water sources for public-supply uses (you probably receive your water this way). Likewise, the brown pipe shows that public suppliers withdrew another 15,200 Mgal/d of water from groundwater sources. Each green cylinder represents a category of water use. The industrial cylinder, for instance, shows how much groundwater, surface water, and total water was used in the United States, each day, by industries.

***A Million Gallons of Water – How Much Is It?**

USGS water-use information is most often reported in "million gallons per day" (Mgal/d) that we discussed above. You'll understand the data better if you can visualize how much a million gallons of water is. If you were a swimming-pool builder and a customer asked you to build a pool that would hold a million-gallons, then they better have a big yard! You would need to build a pool about 267 feet long (almost as long as a football field), 50 feet wide, and 10 feet deep.



Source: https://www.usgs.gov/media/images/some-ways-visualize-a-million-gallons-water

Vocabulary

Aquaculture: Water associated with raising organisms that live in water
Domestic: Includes indoor and outdoor uses at residences
Industrial: Water for such purposes as fabricating, processing, washing, diluting, cooling, or transporting a product
Irrigation: Water that is applied by an irrigation system to sustain plant growth
Livestock: Water associated with livestock watering, feedlots, dairy operations, and other on-farm needs
Mining: Water used for the extraction of minerals that may be in the form of solids, such as coal, iron, sand, and gravel; liquids, such as crude petroleum; and gases, such as natural gas
Public-Supply: Water that is delivered to users for domestic, commercial, and industrial purposes
Thermoelectric: Used in the process of generating electricity with steam-driven turbine generators

Main Activity

Dryville

In this activity, imagine yourself in the position of someone who needs to make decisions about rationing water for a relatively small community. This story illustrates the ways that a community can grow and the particular water needs that arise from that growth.

Read the following story and answer the questions at the end. The original publication of this story can be found using the following link: https://www.usgs.gov/special-topic/water-science-school/science/story-water-dryville?qt-science_center_objects=0#qt-science_center_objects

Alternatively, the story is copied at the bottom of this page and the pages that follow.

Materials: Writing utensil, paper

The Beginnings of Dryville

From the founding day of Dryville, you need water. Drinking water is your first priority, as well as water to bathe in, clean dishes and clothes, and to wash your hands after you've cleaned that fish you caught for supper. And, of course, a toilet will come in very, very handy. So, your first priority will be to find a SOURCE of water. The obvious source is the creek or pond nearby. Maybe you can hire a beaver to create a dam in the creek and create a ***lake*** *(actually, a reservoir).*

In your free time go ahead and start digging a hole in the ground for a ***well****. If you dig deep enough you might hit the* ***water table****, where there will be standing water. You'll be able to lower a bucket down to get the available* ***groundwater****. Things are starting out great — you've already started using surface water (the creek and pond), ground water (your well), and you've even created your own water-storage system (the reservoir). So you now have a reliable source for your water needs. Time to relax? Not yet...*

Getting Water to Your Homes

Since you are the mayor Horace of Dryville, you naturally chose the best spot for your home — on top of the hill. Great view, but it sure is a pain lugging pails of water (at over 8 pounds a gallon, your 100 gallons of water per day gets heavy in a hurry!) from the creek up the hill all day long. And now all your best buddies and neighbors are beginning to move in. Many of them are building on hills, too, so what you need now is a "water-supply distribution system" to get water to everyone's homes. The way to do this is to lay a system of pipes (which you make from clay from the creek bed) from the creek to each house.

The problem is, the houses are higher than the creek, and water does not flow uphill. Water does flow downhill, so you build a big water storage tank on a hill (hopefully at the highest point in town) and establish a water brigade to fill it full of water. You can run pipes from the storage tank down to everyone's home. The pipes go right to your faucet and you use gravity (it's free!) to get the water delivered. Works great -- just like it did in the big city you came from.

But you still have the problem of keeping the storage tank full. Lugging water up to it is no better than lugging it up to your house; so you need to find a way to pump the water from the creek uphill into the storage tank. Since Dryville doesn't have any industry to produce products to sell to the outside world to bring in money to buy things with yet, you need to build your own pump. And you can't use electricity since you haven't built a power plant yet (but you will). Can you think of a source of energy that can run your pump? A windmill could do the job, but in the desert there isn't always wind. Your creek! The water in your creek is flowing nicely -- so you build a paddle wheel in the river. The paddle spins in the creek's current and turns a rod that runs your homemade pump. Voila! You've got water being pumped uphill into your storage tank where gravity lets it flow to your homes.

Dryville's First Water Works

Now everyone is enjoying running water in their homes. But it took a lot of work to build your water-supply plant ("Horace's Water Works"). Being mayor, you decide that the town of Dryville will be the owner of the new Dryville Water Plant and you'll charge everyone to get water delivered to their houses. Since the Water Plant is owned by Dryville, it has to respond to the needs of its citizens -- such as Mr. Milford, who overcooked his possum stew and started a fire in his kitchen. "Where was the Dryville Fire Department when I needed them!" he complains to the mayor. Very well, you add some fire hydrants to the water-supply pipes and now you are the Fire Chief as well as mayor.

Soon you start getting money from the citizens buying water from you - and that gives you an idea. You're going to write an acquaintance back home and tell him he needs to build another town down the road from Dryville. Then when your friend gets his town started, Dryville will offer to sell them water that you get from your public-supply system! You can build an ***aqueduct system*** *to move water from Dryville to them. Of course, there will be a mark up to cover the cost of delivering the water — nothing wrong with making a little profit.*

Be Gone, Dirty Water

One night you again sit down to a dinner of fresh-caught catfish — don't forget to wash your hands in the water bucket after cleaning those fish! And those dirty dishes, just wash them in the bucket, too. Then get rid of that smelly bucket of water —just throw it out in the yard. But your neighbor complains about having to smell rotten fish all night, and you complain to him about the water they wash their dirty clothes in finding its way to your front step. And then there's that hole your neighbor dug for his toilet — well, use your imagination.

It seems that there is something more to life than just getting and using water — you need to get rid of your wastewater. You need to build a "water-return system," commonly known as a sewer network. Again, lay a network of pipes from your homes back downhill. Connect your sinks, baths, and toilets to the pipes to take away unwanted water. Run the pipes back into the creek (downstream from your water-intake pump!) and let the creek carry away your waste water.

You're happy until the Hewlett family downstream starts complaining about your raw sewage flowing in the creek beside their home. You realize you need to send the waste water from your house to some place where you can clean it up before putting it back in the creek. You build a ***sewage-treatment plant,*** *run pipes from the town's houses to it, and begin treating wastewater before releasing it into Dryville Creek.*

Your First Flood

You're again happy until the first desert downpour hits. The rain flows down the hills (runoff) into Dryville's town center and suddenly you have your first flood — more unwanted water (and the mud it carries with it) to deal with. You decide to build a set of storm drains to fix this problem. Lay some more (this time BIG) pipes through town with intakes where the water collects in low spots. Storm water will flow into these pipes and be sent on its way downhill into your creek. Another problem solved.

But when the storm hit, Dryville Creek overflowed and flooded some houses that were built on the flood plain, the flat ground alongside of the creek. You can do two things here. Look at the lay of the land and decide what parts of the creek bed will flood most often when it really rains and don't allow people to build houses there, or build a dam upstream to create a reservoir to trap storm water before it floods into town. Your reservoir can then release the water slowly over a long period, thus preventing floods and recharging ground water.

Storing Water for a Rainy Day

You start thinking... a reservoir (you can call it a lake) above town could really serve a lot of purposes. A lake will provide a place for you to have fun — go swimming, boating, catch catfish, and relax. You can run your water-supply intake pipes from the lake instead of from your creek, especially since the flood destroyed your water-intake pumping station. With a dam you can release only the amount of water you want into the creek below the dam, thus making sure you have just the right amount of water running in Dryville Creek at all times. A dam would even help prevent flooding downstream because you can hold extra rainfall and runoff during a storm and slowly release it afterward. You can build a bigger paddle wheel, or, better yet, construct a real hydroelectric power plant in your dam to start generating electricity! More problems solved.

Dryville Residents Need Their Greens

You again hire the beaver that built your pond (he has his own contracting company now) to help build your dam. After the dam is built you're mighty hungry — and you're sick of eating possum and catfish. It's time for you to open Dryville Farm and grow your own fruits and vegetables. You plow your plot of land, throw down your seeds, pop open a jar of salad dressing, and wait.

But, you're in DRYville, remember? The rainy season is over and your lettuce seeds are screaming "A drink, please!" Get yet another pump and draw water from Dryville Creek through pipes laid across your fields and let the water drip onto your crops — your first irrigation system.

But what about your "Upper Forty" (acres of fields, that is)? This is a long way from Dryville Creek. You need to dig a water well. Dig down until you strike water, line your well with metal tubing, and put an electric pump (powered by your new hydroelectric facility up at the dam) at the bottom of the well to force water up the well. You pump the well water through long metal pipes suspended above ground on a set of big frames with wheels on the bottom. You've built your first center-pivot irrigation system. The whole contraption can extend for one-half of a mile! The system is fixed at the center (the well) and it all rolls around squirting water everywhere in a big circle using the center as a pivot. It lets you irrigate about one square mile (about 600 acres) using one well. This spray irrigation system really gets your farm going, and soon you are making a killing selling "exclusive Dryville artichokes."

Forget the Salads, Where's the Beef?

The next complaint you hear is "Burgers! Dogs! Filet-O-Chicken! Sushi! I'm sick of salads! Give us some real food!!" You realize not everyone in Dryville is a vegetarian, so you open Horace's Game and Fish Ranch. You're going to grow cows, chickens, pigs, and even start ***farming fish****.*

Even a chicken needs a drink, and your son refuses to clean out the chicken pens unless you give him a hose to use. Your catfish are demanding a pond with fresh, running water to live in. So you dam a small creek for the fish pond and dig a small well to get water for the other animals. Your livestock water needs are now taken care of, and you're making more money selling Horace's Home-Grown Catfish Delights to Dryville Grocery.

There's Gold in Them Thar Hills - Let's Get It

With downtown Dryville so nice and dry (due to your storm sewers), residents start coming out in the evenings to socialize. And now that you're rich from selling artichokes and catfish - well, you want everyone else to KNOW you're rich from selling artichokes and catfish. You need some metal to make jewelry to impress them.

There just happens to be a nice spot west of town for a mine, so you open Horace's Mines and start digging away. You use water to remove the dirt and wash the ore, and you build furnaces and use things like acids to refine the metals. Too bad some of the water you use in the mining process ends up as wastes that would be too toxic to just put back into Dryville Creek. You have to build storage ponds to hold the wastes and special treatment plants to clean it. You also have to make sure the water from your mining storage pond doesn't seep into the ground and contaminate the underground aquifers. That means you'll have to line your storage ponds with a waterproof material, like plastic or clay.

Become Industrious

By now the Dryville citizens are ready to really become industrious. Your neighbor Henrietta is so jealous of your new jewelry that she wants some of her own. With the hot summer coming, she sees that Dryvillites are really going to need lawn umbrellas to provide some shade. She picks out a spot near the metal mine and builds an umbrella factory. And Henrietta's neighbor Hawthorn realizes that she will need trucks to transport her finished umbrellas to the hardware store, so he builds an assembly plant to build trucks. It takes a lot of water to build umbrellas, and even more to build trucks, and the new industries become one of Dryville's largest water users. The factories could buy water from Dryville's water-supply facility, but they find they can save money by digging their own wells and building their own water-storage tanks (filled by pumping ground water from the wells into them). Like the mines, the waste water from factories may not be very clean, so the factories build their own water-treatment plants to keep from polluting the rest of Dryville.

More Power!

Houses! Ice Cream Parlors! Factories! Catfish Farms! Dryville is growing faster than the arti-chokes. Every new building needs electricity to keep it going. Fine then, you'll build a power plant to supply electricity. You can't expand your hydroelectric plant up at the dam — there's only so much water that can be released by the dam to generate electricity. The next step is to build a coal or oil-burning "thermoelectric power plant." These plants burn fuel to create heat that generates steam from water to turn turbines to generate electricity.

These plants are no small potatoes — and they use tons and tons of water. Most of the water is used to cool the power-generating equipment. They use so much water that they usually are built next to a large water body. They use a system that gets water to flow into the powerplant, cool the equipment, and then flow back out. It is easiest just to dig a canal from Dryville Creek to the power plant and lay pipe to return water from the plant back to Dryville Creek. It's really not that simple, though, because when Dryville Power runs cold water over hot equipment, the water gets hot. Putting the heated water back into Dryville Creek might not make Dryville Catfish Farms downstream of the power plant very happy, since they want to catch fresh catfish, not parboiled catfish. So, Dryville Power agrees to erect some huge ***cooling towers*** *to cool hot water via evaporation and to build storage ponds to keep hot water in until it cools back to normal creek temperatures. Then, they either reuse the pond water again to cool equipment or send it on its way downstream.*

Going Commercial

Now with your neighbors wearing jewelry that they bought from the money they made from selling umbrellas and trucks, you decide you need to make more money so you can impress them even more. Well, all of those workers at the truck and umbrella factories need to eat lunch, and they need their trucks washed, so you build your first commercial venture: Happy Horace's Burger and Car Wash. Water use here is similar to water use in your homes - water for drinking, washing dishes (and trucks), and for toilets. You don't use near as much water as the truck factory, so you find it more economical to just buy your water from the Dryville Water Department than to dig your own well. Yep, more running of intake and outflow pipes (you should have built a pipe factory - you'd really be rich).

Still More Power!

Well, Happy Horace's Burgers really "upset the apple cart." Ezmerelda wanted to build a pizza joint next, but there wasn't enough electricity to supply it. The solution to this is to "Go Nuclear!" You buy up that land way out west of Dryville and build Horace's Nuclear Power Plant. The equipment in nuclear plant gets hot, so again you need a lot of water. You again cool the used water by putting it through tremendous ***cooling towers*** *that look like huge, round chimneys. Hot water is sprayed inside the tower and is cooled by the surrounding air. The joke around the plant is that it is a great way to let off steam.*

Finally, you realize your Dryville has grown up. You have homeowners using water for their own DOMESTIC uses; you have a WATER-SUPPLY system to deliver water all over town to houses and businesses; your WASTEWATER TREATMENT facility cleans up used water; you have water being used in thriving umbrella and truck INDUSTRIES; your LIVESTOCK are mooing and clucking happily; you are using water to IRRIGATE your crops; you're MINING metals to create jewelry; Dryville's kids are downing burgers and fries from successful COMMERCIAL establishments; and your HYDROELECTRIC and THERMOELECTRIC POWER plants send electricity to all who need it.

But, still you're not satisfied and you know why. Dryville is too big!!!! This isn't a little town anymore — you've now built a big city just like the one you left in the first place. You make a decision to leave Dryville and find some nice desolate spot to start building a new town. This time you're not going to let it get too big and crowded, and THIS time you're going to call it Horaceville — you figure "How many people will ever move to a town called Horaceville?"

Once you've read "The Story of Dryville", create your own town! Feel free to use the next page to store your ideas of your town. After you do so, use the following questions to write about the ways that you'll use water.

What are some of the problems that Dryville ran into? Did you experience some of the same in planning your new town?

What if you only had enough financial resources for half of what you planned to build? How would your plan change?

As the mayor, how would you respond to a series of drought years where water was significantly less plentiful? What if towns downstream complained that your town was using more water than it should and it was causing shortages in their homes?

What if there was a significant increase in pollution that was threatening your water supply? How would you assess the source and try to solve the problem?

Each of these scenarios requires people and equipment to solve. How would you raise the significant amount of money needed to solve these problems?

Optional Activity

We Need Water Challenge

A lot of what we have been learning about is ways that we can take care of our world for the years to come.

Materials: Writing utensil, markers/colored pencils (optional), computer/phone/tablet, internet connection

For this We Need Water challenge, you are going to write a letter to your future self. In the space below, write about some of the things you've learned about conserving water and protecting our environment.

- What advice would you give yourself in ten years?
- What do you hope the environment will look like by then?
- What are you concerned about and what are you doing or planning on doing to make the world a better place for your future self?

Once you've written this letter, seal it up and write a date on it for some time in the future. Find a safe place to put this letter and don't open it up until that future day arrives. Who knows, maybe when the future you opens this letter the world will be completely different!

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!

Optional Activity

Water Use Calculator

Using this handy water calculator from the EPA, find out how much water you use in a week source:

https://www.epa.gov/sites/production/files/2015-08/documents/mgwc-gwa21.pdf

Materials: Writing utensil, paper

How Much Water Do You Use?

▶ **DIRECTIONS** This is a survey to find how much water you use in your home during one full week. Place a tally mark in the Times Per Day column every time someone in your family does the activity.

ACTIVITY	TIMES PER DAY							WEEKLY TOTAL	WATER PER ACTIVITY*	TOTAL WATER USED
	Sun	Mon	Tues	Wed	Thurs	Fri	Sat			
Toilet Flushing	+	+	+	+	+	+	=	_____	x 5 gallons	= _____
Short Shower (5-10 minutes)	+	+	+	+	+	+	=	_____	x 25 gallons	= _____
Long Shower (>10 minutes)	+	+	+	+	+	+	=	_____	x 35 gallons	= _____
Tub Bath	+	+	+	+	+	+	=	_____	x 35 gallons	= _____
Teeth Brushing	+	+	+	+	+	+	=	_____	x 2 gallons	= _____
Washing Dishes with Running Water	+	+	+	+	+	+	=	_____	x 30 gallons	= _____
Washing Dishes Filling a Basin	+	+	+	+	+	+	=	_____	x 10 gallons	= _____
Using Dishwasher	+	+	+	+	+	+	=	_____	x 20 gallons	= _____
Washing Clothes	+	+	+	+	+	+	=	_____	x 40 gallons	= _____
									GRAND TOTAL	= _____

DAY 4

How the World Uses Water

Today, we are going to think about how clean water is a necessary resource for all humans. We are fortunate to live in a place where we have access to plentiful water to drink and use in our day to day lives. Outside of our small region, there is a global water crisis affecting 2.5 billion people around the world. Many of the world's poorest communities are without access to clean water or even a toilet. This causes a myriad of problems, but today we are going to focus on exploring solutions that tackle this crisis.

To help us better understand these global water issues, we will compare our local water usage to the amount of water collected and used daily by people living in the world's poorest communities. We will brainstorm ways that we can save water every day to make sure we aren't taking our access to water for granted, and making sure we don't end up with an inadequate water supply. For instance, one way we can save water if we only have access to a small amount of water each day is **rationing**, which means controlling the use of water. We will also learn about the many problems that arise when people do not have access to clean drinking water in order to engineer one type of solution by building a water systems model.

Vocabulary
Rationing: A controlled use of a resource like water

Main Activity

Engineering and Community Solutions

In this exercise you will be designing infrastructure to supply clean water to a town in need.

Please ask for an adult's permission to watch this video.

"The Power of Water": Watch the video by the organization Water.org. They are working to end poverty by building lasting water systems in towns around the world.

This video can be found by doing a YouTube search for "The Power of Water" by Water.org or by following this link: https://www.youtube.com/watch?v=LSqan1xmMpY

If you are unable to play the video, look at the key points below! Afterwards, look at the directions on the following page in order to design your own plan for transporting water.

Materials: Writing utensil, computer/phone/tablet, internet access

Lack of Access to Clean Water Impacts Children's Health:

- 2.5 billion people worldwide do not have access to clean water and a toilet.
- Surviving diarrhea is the greatest single challenge for our world's children. Children weakened by frequent diarrheal illnesses are malnourished and vulnerable to other infections like pneumonia, leaving them physically and mentally underdeveloped.

Lack of Access to Clean Water Oppresses Women & Girls:

- Women and girls are traditionally responsible for water collection. Every day, 200 million women and girls walk miles to nearest water source to carry every drop of water their families use.
- 100 million children, mostly girls, receive no education because they are carrying water.

Lack of Access to Clean Water Traps People in a Cycle of Poverty:

- People living in poverty spend a high percentage of their household income on the treatment of frequent illnesses caused by the lack of clean water and toilets.
- Since millions of women and girls around the world spend hours each day simply carrying home water, they are unable to engage in paid work.

On the next page you will find a map of a community that is in need of clean water. You will plan and design the work necessary to transport water from a source to the homes by drawing on your map.

Things to consider:

- Construction and materials are expensive! Can you design a system with as little pipe as possible? It's easier to put pipe into places that don't have buildings on them. Is there a way to put pipes and other materials into spots that don't already have things on them?
- Where is the water coming from? Is it from a lake or a stream? What about from a well?
- How will the water move through the pipes? Will it use gravity, pumps or something else?
- How will you measure where the water is going?
- How is the water going to be cleaned and treated before it goes into the community?
- How will people be able to reach all of the parts of this system to repair it when it breaks?

Optional Activity

We Need Water Challenge

Water Conservation means to save water. You will learn more about this in tomorrow's lesson! We learned our water is a shared resource and it originates from our local bodies of water. It is our responsibility to not waste this water and use it wisely.

Materials: Writing utensil, markers/colored pencils (optional), computer/phone/tablet, internet connection

Let's make a pledge to conserve water! A pledge is like a promise. Below is a pledge card that lists several water conservation pledges you could do daily. Read the pledges with an adult and choose the water conservation pledges that you can commit to starting today or have already been practicing. Mark the water conservation pledges and sign your name on the bottom. With an adult, post your pledge card on social media to show your friends and family how you are dedicated to water conservation!

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!

CASCADE WATER ALLIANCE

Nature VISION

Optional Activity

Water Rationing

Quick fact: An average person in the United States uses around 100 gallons of water each day!

In many communities around the world people do not have access to a water supply in their homes the way we do. Instead of turning on a faucet, typically women and girls spend up to five hours a day carrying five gallon water containers many miles to and from their local water source. These five gallons of water is the daily water supply for their *entire* household, meaning they share the water with their whole family. Each jug weighs 40 pounds or more! Imagine carrying one or more of these for many miles every day…

Today we are going to see how well your household would adjust if it could only use five gallons of water each day.

Materials: Usage sheet or a piece of paper, writing utensil, 20 tokens

Gather 20 tokens. These can be pebbles, pieces of paper, coins, or a collection of other small objects. These tokens represent the five gallons of water that is used daily by the households in the poorest communities around the world. For instance, you could use dry beans as tokens, where one bean equals one quart of water and four beans will equal one gallon of water.

On the next page, you will find a water usage sheet with various water fixtures you have around your home and an average of how much water they use daily.

Use the water usage sheet to help your household ration out the five gallons of water (20 tokens) to meet your daily household needs. Place the tokens on each household fixture card that your household has decided is important to use that day. Remember you only have five gallons for your entire household for today! Some fixtures like the washing machine use a set number of gallons and if you don't have enough water you cannot use that appliance. Some fixtures like the sink you can choose how much to run. So some fixtures might receive fewer gallons than they typically uses during a day, or you might have to break down gallons even smaller to quarts. One token equals one quart, four tokens equals one gallon. It all depends on what is necessary for your household's survival that day.

Once you have finished, answer the questions on the following page.

The average showerhead uses 2.5 to 5 gallons of water per minute.

This is where you collect your water to bathe in our scenario.

The average toilet uses 1.28 to 1.6 gallons of water per flush.

This is your toilet if you don't have access to proper sanitation.

The average washing machine uses 20 to 50 gallons of water per load.

This is the water you collect to wash your clothes in our scenario.

The average faucet uses 3 to 7 gallons of water per minute.

This is where you collect your water for things like brushing your teeth and washing your hands in our scenario.

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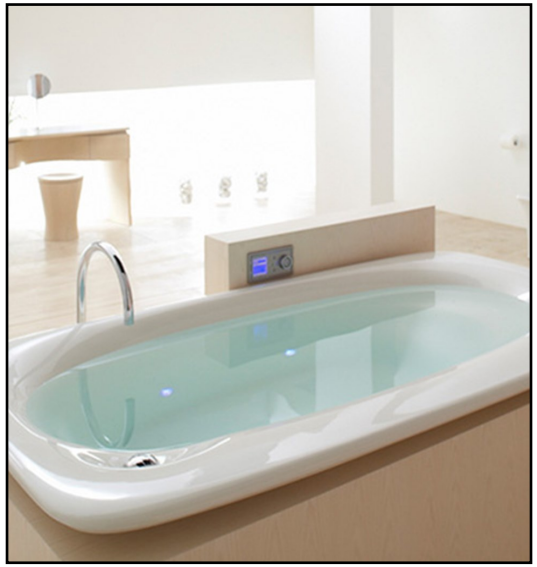
The average dishwasher uses 3 to 6 gallons of water per load .

This is where you gather water for washing your dishes in our scenario.



Most bathtubs take over 30 gallons of water to fill.

Here is an example of a place you could wash yourself in our scenario.

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Questions:

What fixtures did you decide were necessary to use today?

How much water in gallons or quarts did you ration for each of these water fixtures?

What water fixture(s) did you sacrifice for the day?

Was the five gallons enough to meet your daily household water needs?

How does the amount of water that is used by our local households everyday compare to the five gallons being used by the world's poorest communities?

DAY 5

Stewardship

Stewardship is the act of thinking carefully about and caring for resources. One of the ways that we can be effective stewards is to not only care for ourselves and our water, but to help make sure that other people have access to fresh clean water as well. While we're not all able to physically participate in projects to build water infrastructure, we can help support these projects in other ways. Two of the most effective things that we can do are raising awareness (i.e. publically making a **pledge** to commit to smarter water use) and raising funds for these projects.

Vocabulary
Pledge: A promise
Stewardship: How we take care of the world around us

Main Activity

Fundraising Event Planning

Today's stewardship task is to consider a way that you could organize an event to help raise awareness and funding for an organization that helps less fortunate people develop safe drinking water resources**.** Or, you could choose a cause that you are passionate about.

Materials: Writing utensil, paper

Fundraising Event Planning Steps:

1. Think about something that you are passionate about, and that other people might be interested in. Many fundraisers are based around concerts, bike rides, or walks that encourage many people to come together for a fun time AND raise money for a good cause. So, choose an activity that you and your community enjoy doing to help bring people in to the event.

2. Set goals for your event being successful. Decide how many people you hope will attend, and approximately how much money you would like to raise. For example, you could host a bike ride that visits important places in your watershed and encourage people to donate $10-$20 to participate. If you want to raise $500 for your event, you would need approximately 50 people to participate.

3. Consider how you'll encourage people to donate. Most events have an entrance fee or donation that goes directly to the organization that funds are being raised for. Some also have additional opportunities for people to donate like raffles with prizes, or pledges for completing the event. This will change depending on what type of event you are holding. For example, if you and your friends really enjoy bowling, you might host a bowling fundraiser and encourage people to donate 10 cents for every pin that you knock down during the event. If you are holding a walking or a running event, you might set a "time to beat" and have sponsors donate a certain amount for every second faster you are than this time. If you are hosting a talent show or musical event, you might consider selling snacks that will also be a part of the money that your raise.

4. Make partnerships with other members of your community. Many businesses and organizations are excited about the chance to help people that are doing something for a good cause. You can talk to people that you think will be interested in donating food for participants, prizes to encourage people to participate, or items to be raffled or auctioned.

5. Have fun, and plan something that you will enjoy. If you are excited about your event, it's much easier to convince other people to participate. Remember that what you are doing is to help inspire people to do something good and learn more about something that is important to you.

Optional Activity

We Need Water Challenge

There are so many ways to save, protect, and care for our water. At the end of every daily lesson, we will be giving a challenge to help you show off what you've learned.

Materials: Writing utensil, markers/colored pencils, computer/phone/tablet, internet

Using what you've learned this week, and the other We Need Water challenges you've done, it's time to be creative! Create a challenge you can pose to those in your household, to your friends, to your community, or to a broader audience on the internet through social media. Think about each topic the packet covered this week and list one aspect you can take from each lesson to incorporate into a new stewardship challenge for today:

-
-
-
-

Final #WeNeedWater challenge:

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn, too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!

Optional Activity

Persuasive Letter to Organizational Partners

Fundraising efforts are often more successful when they are engaged with local organizations that can help access people, material resources, and help get the word out to people you might not have access to.

Materials: Writing utensil

Now that you've spent some time considering the type of fundraiser you might hold, and the materials you would need to be successful, consider how you would write a letter asking for support from a local business or organization. Think about what you are asking for and be specific. Do you want this organization to help you with money, materials, or coordinating volunteer support? How can you convince them that what you are doing is valuable to them and the community?

Use the space below to write a draft of your letter as practice.