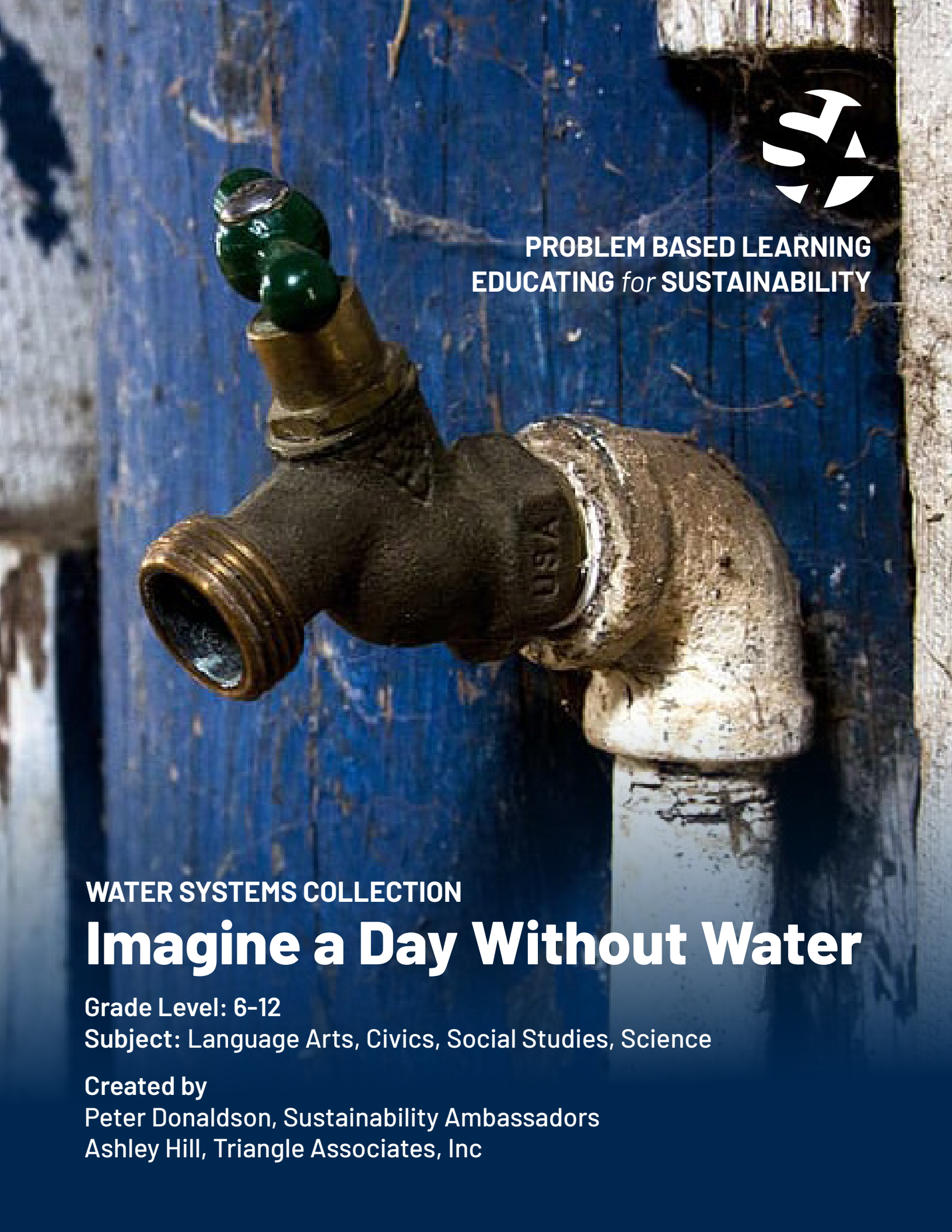


PROBLEM BASED LEARNING
EDUCATING *for* SUSTAINABILITY

WATER SYSTEMS COLLECTION

Imagine a Day Without Water

Grade Level: 6-12
Subject: Language Arts, Civics, Social Studies, Science

Created by
Peter Donaldson, Sustainability Ambassadors
Ashley Hill, Triangle Associates, Inc

PROBLEM STATEMENT

If we continue to take water for granted and something happens to the infrastructure that supports water supply, wastewater treatment, and stormwater management, how would we respond?

SUMMARY

Imagining a day without water is not a cute classroom prompt. It's a deep thought experiment on how we **take water for granted** in our daily lives. If it suddenly wasn't there what would we do? Surely a reason to write, to think, read, research, and take action.

It may occur as a sudden, violent catastrophe like an **earthquake.** Or as a slow motion catastrophe like the compounding impacts of **climate change.** Either way, the water systems we take for granted are vulnerable to external events. By water systems we mean, water supply, wastewater treatment, and stormwater management.

These systems are all **increasingly constrained** by infrastructure aging out, leaking, or failing, by increased demand from growing populations especially in cities, by obvious inefficiencies in the system, by lack of federal funding and equitable allocation of resources, by lack of coordination among water managers, by droughts, floods, hurricanes, forest fires, and by our changing water cycle driven by greenhouse gas emissions in the atmosphere.

Anyway, this is the reactive approach. What if we were **proactive?**

This intriguing collection of lessons provides teachers with a range of entry points, writing, reading, and research formats as a practicum in systems thinking. The lessons in this collection may be explored sequentially or separately. All of them are catalyzed by the same entry event based on a set of ***"strange story starts"*** which are short narrative descriptions of characters suddenly experiencing a day without water... or dirty water... or flooding.

Lessons feature narrative **fiction writing,** personal opinion **blogging,** developing an official **resolution**, and **scenario thinking** for projecting our water future based on selected parameters.

Students can choose to align their best work with the annual national awareness and action campaign, **Imagine a Day Without Water**, which is coordinated by the **US Water Alliance.** This event is organized around a single day in October each year, but really **we need water 365 days of the year**, so this lesson collection is thirsty for implementation any time.

Learning Objectives

1. **I can apply systems thinking to understand how to build a sustainable water future, integrating water supply, wastewater treatment, and stormwater management.**
2. **I can apply reading, writing, and speaking skills to analyze the challenges and design solutions for a sustainable water future.**
3. **I know how to take personal action to measurably improve my water footprint.**

Formative Assessment

Menu of possibilities...

1. A short piece of speculative fiction imagining a day without water.
2. A critical analysis of several blog posts and/or an original blog post.
3. A critical analysis of several resolutions and/or an original resolution.
4. Jigsaw notes for readings, webquests, and group discussion on the current status of our water infrastructure.
5. Review and prioritization of possible scenarios for a sustainable water future.
6. A draft impact project plan.

Summative Assessment

1. **Develop a team presentation on a preferred pathway for a sustainable water future based on selected elements from several different scenarios.**
2. **Design and implement an impact project that demonstrates a clear connection between personal action and one or more policy frameworks or performance measures from your city or water utility.**
3. **Produce a personal reflection, mind map, or video-self-interview on your growth as a learner.**

ACADEMIC STANDARDS

ELA: 9-12th grade Common Core Standards for Informational Text.

Determine the central idea of a text and analyze its development - be able to cite textual evidence to support claims. Analyze how evidence is organized, supported, and connected. Evaluate for sound reasoning and relevant evidence. Integrate and evaluate multiple sources of information presented in diverse formats.

Washington State Civics Standards C4.11-12.2 Analyze and evaluate ways of influencing governments to establish individual rights or promote the common good.

NGSS #HS-ESS3-1 - Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity

Examples include access to fresh water, fertile soils, and fossil fuels. Natural hazards can include volcanic eruptions, earthquakes, and severe weather. Changes in climate that can affect populations or drive mass migrations include changes to sea level, regional patterns of temperature and precipitation.

NGSS #HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

Examples for limiting future impacts could range from local efforts (such as reducing, reusing, and recycling resources) to large-scale geoengineering design solutions.

BIG PICTURE

NGSS Global Climate Change

NGSS Human Sustainability Standards

OSPI Environmental Sustainability Standards

OSPI Social Studies Standards

College, Career, and Civic Life (C3)

Common Core State Standards

COMMUNITY CONTEXT

My family's sustainable practices

My Neighborhood Association

Nonprofits focused on this issue

Nonprofits focused on equity

My School's Green Team goals

My School District Sustainability Policies

My City policies on this issue

My County policies on this issue

My City or County Equity Strategy

My Energy Utility (Hydropower)

My Water Utility

My Watershed Salmon Recovery Plan

Puget Sound Regional Council

Puget Sound Ecosystem - Vital Signs

Washington Dept of Ecology

Tribal Treaty Rights

Breaking Down the Problem Statement

If we continue to take water for granted... and something happens to the infrastructure... that supports water supply... wastewater treatment... and stormwater management... how would we respond?

If we continue to take water for granted...

- Who is the "we" here?" As a student, do I have a role in this? Does my family?
- How do I use water every day? Do I take it for granted?
- Did human society always take water for granted? What were the historical innovations that made this assumption possible?
- Do all people in the world have this same privilege?

and something happens to the infrastructure...

- What do we mean by infrastructure? How does the whole system work?
- What happens when it gets old or worn out?
- How would an earthquake affect water systems infrastructure?
- How will climate change impact water systems infrastructure? Do you see evidence of this already happening? Shrinking snowpack, fires, floods, heat waves, droughts, shifts in the timing and intensity of our water cycle?
- Is terrorism a possibility, poisoning a major water source, blowing up a pump station, or a water tower? What about cyberterrorism, disrupting the computer-automated elements of our water systems infrastructure?

that supports water supply...

- What is the source of my drinking water? Who manages it? How is it paid for?
- How is it treated and cleaned, transported, and stored?
- How is it transported to my neighborhood? How is it stored?
- Can the treatment and conveyance process ever stop? Even at night?
- How do I use water directly from pipes and faucets?
- How do I use water indirectly from the water inputs embedded in producing, processing, transporting and consuming products?
- Is it possible to harvest and store all of the water we need for our home or school just by collecting the rain that falls on the roof? How might that be engineered?

wastewater treatment...

- Do we really "waste" water? Or do we borrow it from the water cycle?
- What are all of the sources of wastewater? In my house? At school? In a factory?
- Make a list of what goes down the drain. What should never go down the drain?
- What engineered systems are needed to convey wastewater to the treatment plant? To treat it once it's at the treatment plant? To return it to Puget Sound?
- Can we recycle the water that we clean?
- Can we use the biosolids that are produced?
- Can we produce energy from burning methane produced in the digestion process?
- Can the treatment process ever stop? What happens if we fall behind?
- What do you predict happens to the system at halftime during the Super Bowl?

and stormwater management...

- What is stormwater? How do we manage it?
- How did the original forests across this landscape "manage" stormwater? Didn't they evolve to take advantage of it?
- Now, with all of our roads, rooftops, sidewalks and parking lots, where does the stormwater go?
- Is there pollution in the stormwater? What are the sources and how does it affect our ecosystem?
- How is the management of stormwater paid for in our cities?
- What are the traditional engineering solutions for managing stormwater?
- What are the new green infrastructure engineering solutions? Can we let nature work for us again?

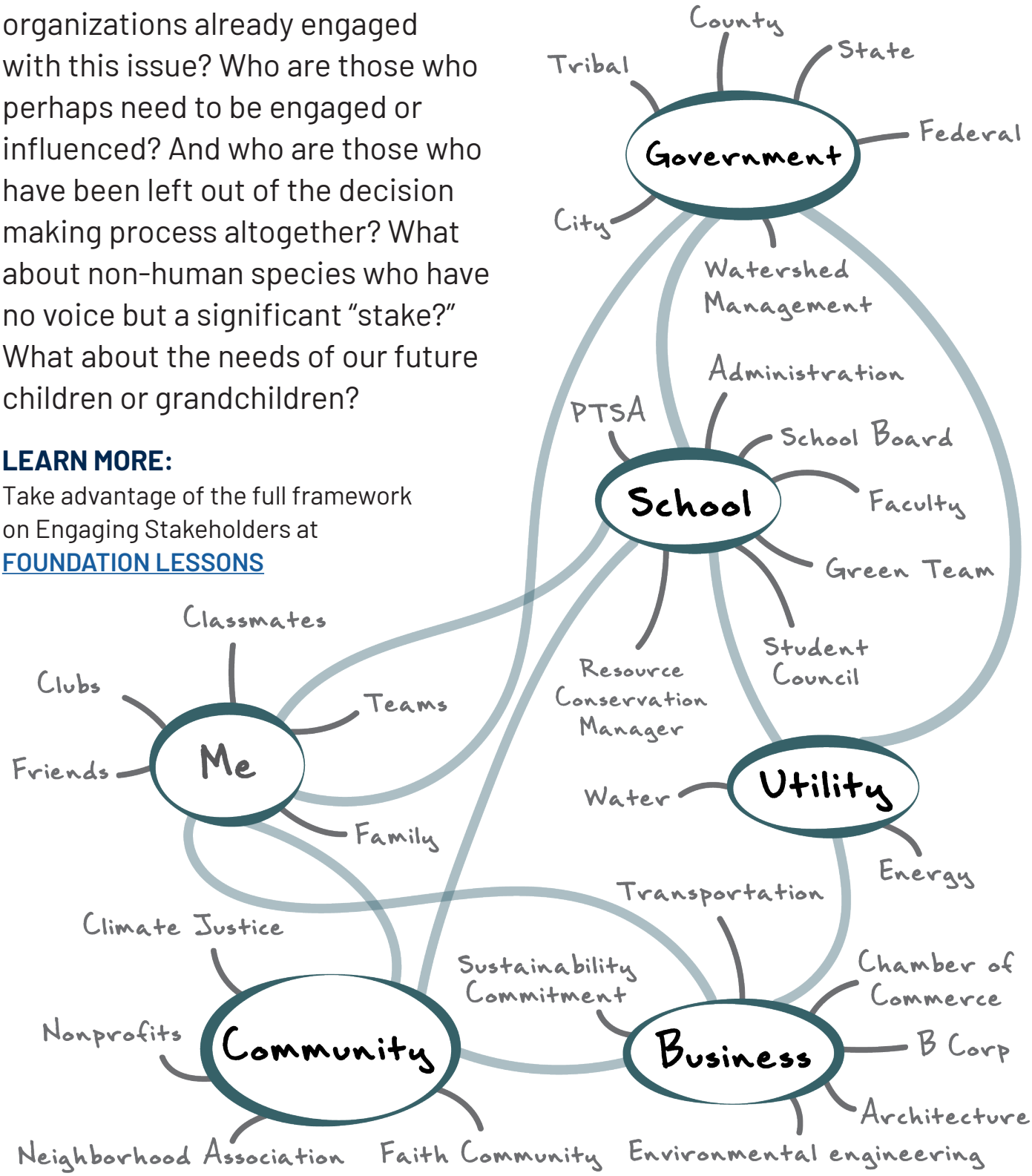
how would we respond?

- Is there an emergency plan in place for a sudden catastrophe like an earthquake?
- Is there a resilience plan in place for a slow motion catastrophe like climate change?
- How do we ensure an equitable response so that those most impacted are also engaged in decision making?
- Who are the stakeholders? Who is already working on this?
- What actions do we need to take to effectively "respond?"
- What skills or knowledge do we need to take these actions?
- How would we know if the actions we take have an actual impact?
- What kind of data do we need to gather? Who is already tracking this data? How can we access it? How can we analyze it?

Stakeholder Brainstorming

Who are the people and organizations already engaged with this issue? Who are those who perhaps need to be engaged or influenced? And who are those who have been left out of the decision making process altogether? What about non-human species who have no voice but a significant "stake?" What about the needs of our future children or grandchildren?

LEARN MORE:
Take advantage of the full framework on Engaging Stakeholders at
FOUNDATION LESSONS



Stakeholder Perspectives and Engagement Strategies

Students need to consider each point of view with integrity. This practice develops social-emotional learning skills and cultural competency by building an awareness of our own internalized biases and expanding our capacity for empathizing with stakeholder perspectives different than our own.

EXAMPLE: Stakeholder Engagement Table

STAKEHOLDERS	INTERESTS	GOALS	APPROACH
Name of stakeholder group	**What motivates them? What do they care about? What are they responsible for?**	**Do they have specific action plans, goals, or projects they are pursuing?**	**What is the best message and timing to engage with this group?**
My family	Survival and the ability to carry out normal activities (drinking, cooking, washing).	Survival. Saving money on water bills.	Word of mouth, informal family resolutions.
School (Green Team, RCM, PTA, ASB)	Implementing water conservation and efficiency actions at school.	Saving money. Conserving natural resources. Building community.	Green Team group chat or social media. PTA & school e-news.
My City	Ensuring residents have access to clean water for drinking, cooking, washing, and irrigation.	Functioning drinking water, wastewater, and stormwater infrastructure.	Presenting at City Council meetings. Proposing resolutions. Contacting city staff and elected representatives.
Local Water Utility	Ensuring rate-payers have access for domestic and commercial uses. Rate-payer capacity.	Meeting needs for future water use. Maintain and update infrastructure as needed.	Email or call utility staff responsible for community engagement. Speak at public hearings.
Tribal Goverments	Access to healthy fishing grounds for salmon, shellfish, plants as guaranteed by treaty rights.	Maintain natural resources for current and future livelihoods as well as cultural connections.	Letters of support and allyship acknowledging treaty rights and improving relationships.

Background on US Water Systems

The U.S. installed most of its water infrastructure in the **early 1900s**, and these pipes have a lifespan of only about 100 years. Instances of leaking pipes and full-on failures have been increasing as these pipes begin to age out. Unless municipalities across the U.S. fully overhaul the drinking water system, **safety and supply are at risk.**

Every day, six billion gallons of water are lost from **leaking drinking water pipes** across the United States – enough water to support the daily needs of 20,000 households. As this water leaks into the ground, it is an out-of-sight, out-of-mind problem. The effort to update the U.S. water supply system, even in the face of compounding threats like **growing population** and **climate change**, has been a slow process.

The United Nations recognizes access to safe drinking water and sanitation as a basic human right, yet providing clean water is an emerging global crisis. In the United States, infrastructure failures are compounded with **increasing demands, decreasing water supplies**, and **contamination.** Climate change is affecting **precipitation patterns** and decreasing the supply of urban drinking water sources. Unstable water access in minority and rural communities has created **serious human rights violations.**

DRYING UP

Securing water supply systems requires **planning for shortages.** In the face of a shortage, managers can either find more water to increase supply or they can reduce demand. The best approach will be a highly localized decision.

Over 70 percent of U.S. watersheds could expect decreased water supplies under future climate scenarios. Furthermore, the highest demands for water occur in areas with the lowest supply levels like the Southwest and Great Plains.

To protect against shortages, conventional solutions could include increasing the use of groundwater and surface water sources or increasing reservoir storage capacity. Solutions can also include increased **irrigation efficiencies** and **soil management** practices that hold more water. Any solutions in the agriculture sector need to be balanced with **food security issues**, and, in the Pacific Northwest, with the legal requirement to have enough water in running rivers to **support salmon populations** as laid out in long-standing **treaty rights** with Native American Tribes.

AGING OUT

In addition to planning for shortages on a w**atershed scale**, it will be important to

address aging infrastructure. A secure and reliable water supply requires a robust system to deliver water to end users. As population grows and climate change **adds stress to compromised infrastructure,** securing the water supply pipes across the U.S. should be a priority for managers. The U.S. Environmental Protection Agency estimates that **nearly $475 billion** will need to be invested in the drinking water infrastructure system over the next 20 years to secure supplies. On a municipal scale, utility infrastructure improvements are funded by **fees charged to end users,** which may not generate enough revenue to fund expensive system-wide improvements. Significant federal funding will be needed to help cities and water utilities cope with the scale of repairs and upgrades needed. This can generate millions of **green collar jobs.**

Aging infrastructure also puts people at higher risk from **waterborne diseases and contamination**. Examples include illnesses caused by bacteria such as E. coli or Salmonella or poisoning due to pipe materials.

LEAD PIPES

Lead pipes, known sources of contamination, are often still found in US communities. Cities like Flint, Michigan are focusing their attention on **environmental justice issues** related to water supply. This highlights the dire need to improve the quality of drinking water nationwide. It is important to know that today most illnesses from drinking water can be traced to deteriorating infrastructure, not to inadequately treated water.

URBAN EFFICIENCY

After addressing watershed supply security and infrastructure upgrades, there is also an opportunity to shift water use and waste management at **much smaller scales** such as neighborhood and household levels.

Current urban wastewater management strategies rely on **huge quantities of water, large infrastructure investments, and long planning timeframes.** These qualities have slowed many cities' abilities to adapt to challenges such as climate change and population growth.

Water use efficiencies can be expanded at the household scale by adopting **WaterSense appliances** that use less water, **smart water meters**, **drip irrigation**, and **natural yard care** strategies.

RECYCLED WATER

Expanding the **reuse of treated wastewater,** such as using it for agricultural irrigation or groundwater recharge, can remove pressure on treatment systems by creating another option for some of the largest water users. See **King County Recycled Water.** If the agricultural sector had methods for accessing treated wastewater, for example, a significant portion of demand would be shifted away from the drinking water supply. Recycled water use in **California** is a rapidly growing strategy.

Additional efficiencies can come from separating sanitary wastewater into its components to reduce the burden on waste treatment plants. Currently, all wastewater from households is combined in the sewer system as it moves to the water treatment plant. If water from **showers, laundry, and kitchen sinks** was kept separate from toilet wastes, this lightly used **"greywater"** could be used locally for activities like watering lawns and gardens.

HARVESTING THE RAIN

Harvesting rainwater that falls on the rooftops of homes, schools, and commercial buildings can also improve local water security. **Large underground cisterns** can be engineered to hold water harvested during the rainy season so that it can be used during the dry season for toilet flushing, laundry, and irrigation.

See VIDEO - Stone 34 Case Study

INTEGRATION

The key is to move to more local, flexible, and **integrated water management** systems that allow for innovation and adaptation. Policy makers have been averse to overhauling drinking water systems because the process is widely disruptive. However, forecasted water shortages and infrastructure failures could become even more disruptive to daily life, especially when we factor in the dual pressures of population increase and the way that climate change is altering our local water cycle.

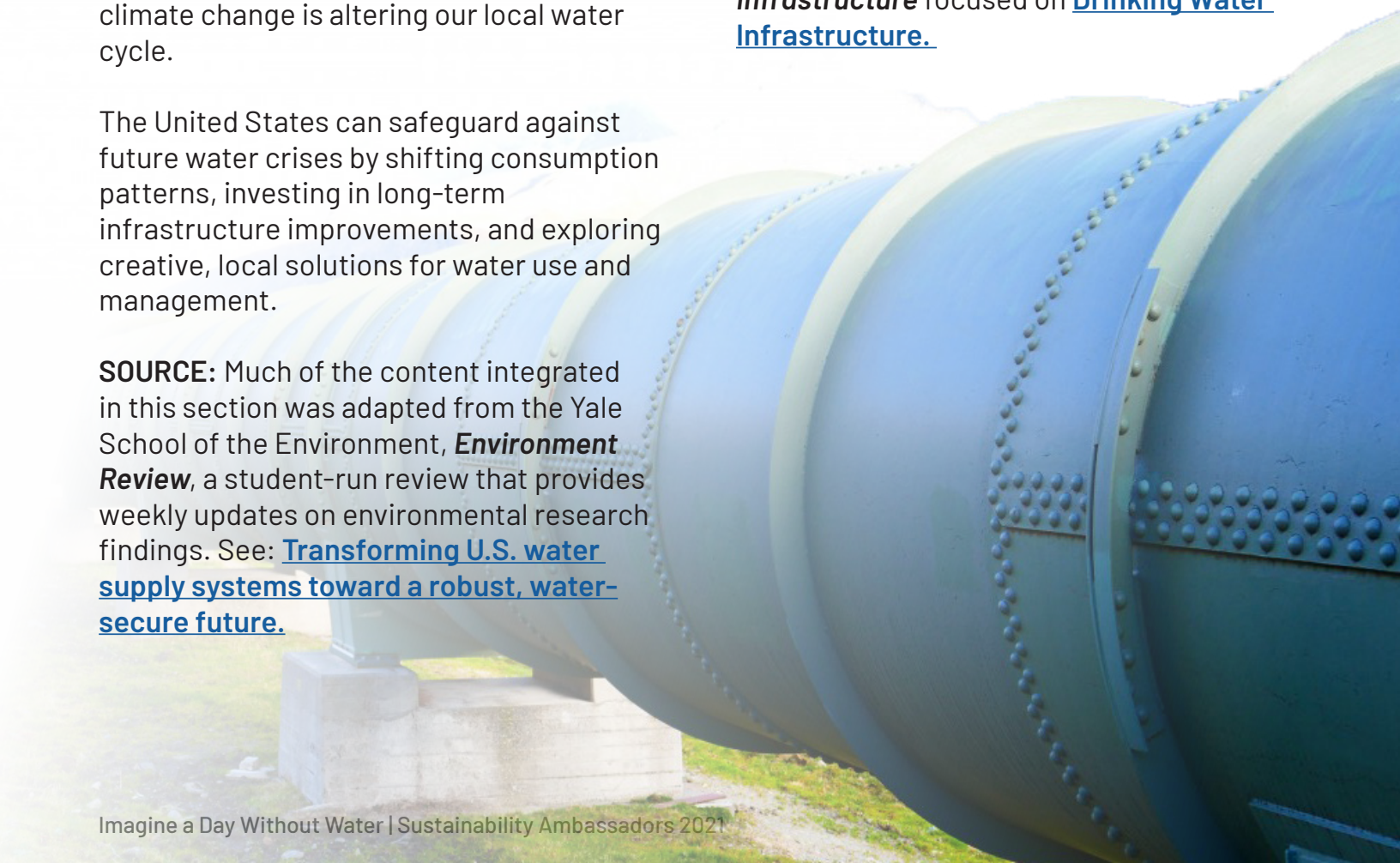
The United States can safeguard against future water crises by shifting consumption patterns, investing in long-term infrastructure improvements, and exploring creative, local solutions for water use and management.

SOURCE: Much of the content integrated in this section was adapted from the Yale School of the Environment, ***Environment Review***, a student-run review that provides weekly updates on environmental research findings. See: Transforming U.S. water supply systems toward a robust, water-secure future.

Background on US Drinking Water Infrastructure

Our nation's drinking water infrastructure system is made up of 2.2 million miles of underground pipes that deliver safe, reliable water to millions of people. Unfortunately, **the system is aging and underfunded.** There is a water main break every two minutes and an estimated 6 billion gallons of treated water is lost each day in the U.S. However, there are signs of progress as federal financing programs expand and water utilities raise rates to reinvest in their networks. Water utilities are improving their **resilience** by developing and updating risk assessments and emergency response plans, as well as deploying **innovative water technologies** like sensors and smart water quality monitoring.

SOURCE: From the American Society of Civil Engineers, ***Report Card for America's Infrastructure*** focused on Drinking Water Infrastructure.



Background on US Wastewater Infrastructure

The nation's more than 16,000 wastewater treatment plants are functioning, on average, at **81%** of their design capacities, while **15%** have reached or exceeded it. Growing urban environments signal a trend that these facilities will increasingly accommodate a larger portion of the nation's wastewater demand. Though large-scale capital improvements have been made to systems experiencing sanitary sewer overflows, efforts have slowed in recent years. As many treatment plants and collection networks **approach the end of their lifespans**, the financial responsibilities for operation and maintenance will become more costly. The sector has made some strides to address current and future needs through **resilience-related planning** and innovations that produce **profitable byproducts** or cost savings from wastewater treatment.

SOURCE: From the American Society of Civil Engineers, ***Report Card for America's Infrastructure*** focused on Wastewater Infrastructure.

Background on US Stormwater Infrastructure

Stormwater systems range from large concrete storm sewers, roadside ditches, and flood control reservoirs, to rain gardens and natural river systems and wetlands. While stormwater utilities are on the rise, with more than 40 states having at least one, the **impervious surfaces** in cities and suburbs are also expanding, exacerbating urban flooding, which results in **$9 billion in damages annually.** Stormwater also affects water quality as **polluted runoff** from pavement enters water bodies. Nearly 600,000 miles of rivers and streams and more than 13 million acres of lakes, reservoirs, and ponds **are considered impaired.** Many of the country's legacy stormwater systems are struggling with the high cost of retrofits needed to address **urban flooding** and **climate change.** Upgrading large networks of aging systems underneath densely populated areas carries significant costs and engineering challenges.

SOURCE: From the American Society of Civil Engineers, ***Report Card for America's Infrastructure*** focused on Stormwater Infrastructure

LESSON OUTLINE

Materials Needed

Internet Access
PDFs and websites linked in lessons
Templates for study and replication.
[See Foundation Lessons]

- Impact project Design
- Engaging Stakeholders

Time Needed

Each of the lesson sections in this unit may take 2-3 class periods.

VOCAB AND KEY SEARCH WORDS

Water Cycle

Climate Change Impacts

Precipitation Patterns

Consumption Patterns

Supply Demand

Water Conservation

Water Supply / Water Quality

Water Infrastructure

Drinking Water Treatment

Reservoir

Conveyance Pipes and Pumps

Water Meter / Smart Meter

Water Tank / Tower

Rainwater Harvesting

Cistern

Grey Water Reuse

Polluted Stormwater Runoff

Green Stormwater Infrastructure

Stormwater Management Plan

Point Source Pollution

Nonpoint Source Pollution

Wastewater Treatment

Methane Digester

Biosolids

Recycled Wastewater

Integrated Water Management

Fee Structure / Ratepayer

End User / Consumer

Resolution / Ordinance

Scenario Futures Planning

Water Equity / Water Justice

Waterborne Diseases

Contamination

Green Jobs

ENTRY EVENT

Strange Story Starts...

Share a collection of short narrative paragraphs that start but do not finish a story about the actual day that we suddenly do not have access to water ... or it's dirty... or it's flooding. Something strange has happened. We are not sure what, but the situation is tense right from the beginning. Below is one example with more here: **Strange Story Starts.**

"There was no bottled water left on any of the shelves in the grocery store. We drove to Costco, and had to park a mile away. The parking lot was packed, cars and pickup trucks jammed in illegal places, overflowing, cars backed up into the intersection. Almost every shopping cart streaming out of the store had two or three cases of bottled water haphazardly thrown in. The fruit juice was gone too. Watermelon sold out, which was weird, but people weren't really thinking in a rational way. Except my Dad, who said, "We're going to need to get water from Issaquah Creek." Mom said, "Do we have a water filter?' The camping equipment store in the mall was sold out of water filters. So was Home Depot. On the way home my Dad told me to look up water filters on Amazon on my phone. The red text came up, "Out of Stock..."

Individual Reflection: Invite students to read several of the strange story starts, to picture themselves in that situation, and to follow their own imagination with what's happening and why. You may want to offer some of these useful inquiries.

What is happening here? How is this day not like any other day? What is not typical here?

What do you think the people are feeling? Or starting to realize?

What happens next in this story? What do you think may have happened just before this story starts? What event may have triggered this strange moment?

Small Group Discussion: Work in a small group to discuss what you noticed in your story starter and where your imagination leads you. Use the round robin method to make sure everyone has a turn to share before you open up for discussion.

Unearthing Assumptions, Patterns, and Projections: Go deeper. Discuss with your group how we take water for granted in our daily lives. Some useful inquiries...

What are all the ways we consume water each day? Keep going. See if you can identify all of them. Some might be direct water consumption. Others might be indirect water consumption like the water it takes to produce a gallon of gas, or a cheeseburger, or a pair of jeans.

What kinds of infrastructure do we depend on each day to ensure that we have water when we want it? How is this infrastructure engineered? Who manages it on our behalf? Who pays for it?

What do you already know about various nations in the world where the scarcity of water is a humanitarian crisis, one that is being compounded each year by population pressure, climate change, and governments weakening and collapsing?

But how does the story end? Invite students to follow their own voice in developing an initial outline or storyboard for what happens in one or more of the **Strange Story Starts.** They also may be inspired to invent one of their own. Students will have an opportunity to return to this initial draft in Activity 2 after a webquest to gather more knowledge.

ACTIVITY 1

Webquest to Learn About the Issues

This is a chance for students to practice navigating a given website and develop their skills in discerning how it's organized and why some of its content may be useful for supporting additional research at another time in the lesson. **Invite students to explore these three websites:**

ONE: Imagine A Day Without Water: What is the purpose of this website? How is it organized? Who is the audience? What can we learn from the resources provided? How do you see yourself participating in this annual event and the message that it is promoting?

TWO: Imagine A Day Without Water, is supported by the US Water Alliance. This is a big association of many partners all involved in either water supply, wastewater treatment, stormwater management, freshwater natural resource protection, or climate action. What is the vision and mission of this organization? How do they describe their work? Which one of their initiatives interests you the most?

THREE: Every four years, the American Society of Civil Engineers (ASCE) gives the U.S. water infrastructure system a letter grade. We are failing badly, based on poor pipe conditions, the difficulty of repairing them quickly, and lack of funding for improvement projects. Using a simple A to F school report card format, ASCE examines current infrastructure conditions, assigns grades, and makes recommendations for how to improve in 17 categories of infrastructure. In relation to water systems, here are three categories for your webquest.

Drinking Water Infrastructure
Wastewater Infrastructure
Stormwater Infrastructure

You also might like to review the Executive Summary of how the Infrastructure Report Card is designed and what the key findings are.

ACTIVITY 2

Speculative Fiction Writing

Support students in fleshing out and completing one of the strange story starts they outlined as part of the entry event. They may also want to develop an original story. Encourage them to use new information from their **Webquest** and to conduct other **keyword searches** to learn more. They also may want to use one or more of these images as a visual prompt to fire up their imagination. Or perhaps they can create their own **photo essay** of evocative images.

TEACHER NOTE: For an interesting discussion read What is Speculative Fiction?

Challenge students to use this criteria when developing their story.

1. My story responds directly to the theme "Imagine A Day Without Water."
2. My story makes people really think about how we take water for granted.
3. My story is super specific in location, time frame, and sensory detail. That's what gives it a sense of "being there."
4. The characters in my story and the relationships among them are three-dimensional. They seem real, not cartoons or stereotypes.
5. Does my story end badly in a way that makes people think more deeply, or is there a positive resolution of some kind that makes people feel a sense of relief?

Option: Students may want to discuss as a class whether to submit a few examples of their strongest writing to the Imagine A Day Without Water organizers. See the contact information on the website and share your work!

ACTIVITY 3

Blogging as a Communication Tool

Blogging is a great tool for **student communication.** With a less formal tone, it can provide a space to explore thoughts, feelings, and emotions about what a day without water might be like. Stream-of-consciousness, diary entry-style writing is encouraged! We want to hear the blogger's voice. Invite students to **consider the purpose** of their writing and the **intended audience.** Is it their peers? Their families? Their school or community at large?

Students can utilize ideas from their Speculative Fiction writing and integrate any compelling tidbits from their Webquest. The informal, personalized nature of blogs and the practice of blogging can **give permission for critical thinking** without the expectation of a polished piece of writing.

Embolden students to investigate how they feel with a few prompts...

When you think about what a day without water might be like for you, what is the first thing that comes to mind? How does that make you feel?

If the day without water happened tomorrow, what is the first thing you would do? Where would you get the resources you needed? Who would you call/text/communicate with?

What would it feel like, look like, sound like, taste like to experience a day without water?

How do you want to use this emotional detail to hook your readers? Once hooked, what are the key messages you want to share in your blog?

SAMPLE BLOG POSTS with different authors and intended audiences.

Native POV Water Is Life
Esperanza Project
Winona LaDuke: Return to Rice Lake

Water and Environmental Justice
National Wildlife Foundation
Hey Flint! How Are You?
Candice Mushatt

Water Food Energy Nexus
Sustainability Ambassadors
Food: A Truth that Demands Change,
Middle School Student, Arushi Agarwal

Water Scarcity
Grist
This drought is so bad that even
Seattle is running out of water
Katie Herzog

Water Utility / Technical Style Blogging
Water Online
22-Year-Old Drinking Water Operator
Recognized For Averting Deadly Disaster,
Peter Chawaga

IDEAS for places where students might publish their blogs.

- Classroom blog
- Teacher webpage
- PTA e-news
- School district e-news
- School yearbooks
- Local nonprofits
- Letter to the editor for local publications
- Regional or national youth blogs
- Youth contribution to industry blogs

ACTIVITY 4

Writing a Resolution

We each make resolutions all the time. Facilitate the generation of everyday personal and family resolutions relevant to students' current, lived experiences. For example....

I resolve to floss my teeth because it avoids cavities later.

Our family agrees to take turns washing the dishes.

Our family agrees to recycle everything we can and to compost food scraps.

My friends and I resolved to stop using single-use plastics.

My classroom resolved to put our pronouns on our name tags.

Ask students about what they think the goal of a resolution might be. Is it to cause social change? To invoke a media response? Inspire community action? Ignite a conversation that leads to local policy change?

Ordinance vs Resolution

Why write a resolution instead of an ordinance?

An **ordinance** is local law, enacted by a government body such as a city or county that prescribes rules of conduct relating to the official policies of the government. A resolution is a formal expression of opinion, will, or intent from an official body that often addresses a matter of special or temporary nature. Sometimes a resolution is a first step toward developing a policy and a policy can lead to an ordinance. **(Municipal Research and Services Center of Washington)**

Inquiries:

Has the student council used resolutions? The School Board?

Why do local governments use resolutions? Visit your city's website and read their definitions or explanations of resolutions and ordinances.

Does the website make it clear how resolutions and ordinances are passed? As a resident of your city, do you understand how this process works? How might you participate directly in commenting on a resolution as it is being developed?

Components of a resolution

There are two central components - **the preambular clauses** (usually starting with "whereas") and **the operative clauses** (usually starting with "be it resolved"). If you explore examples of resolutions, you may see more introductory information or even appendices or attachments with reports or other supporting documents.

Preambular clauses give background information on the "why" of the resolution proposed. They can refer to:

- the topic itself
- recent incidents, and recent developments
- previous resolutions
- the Constitution
- local history or community characteristics

Examples of ***preambular clauses*** from the Imagine a Day Without Water 2021: Resolution Template

Whereas, the infrastructure that brings [XXX] residents an average of [XX] gallons of water per person, per day, and then safely returns water to the environment is essential to the quality of life, environment and economic vitality of [the City of XXX]; and

Whereas, water infrastructure is the lifeline of our communities; a day without water would be a public health and safety crisis, limiting the abilities of safety personnel, such as firefighters and hospitals staff, as well as businesses and homes to function; and

Whereas, communities and families need jobs, and closing the gap in water infrastructure investment would bring new jobs to our communities and families and raise the household disposable income; and

Whereas, our water infrastructure is necessary for a thriving economy, and a single nationwide day without water service would put our entire economy at risk; and

Whereas, America's water infrastructure is aging and failing—and two million Americans are living without water infrastructure, often relying on bottled water, potentially living in unsafe and unsanitary conditions; and

Whereas, we can help secure a better future for the millions of Americans who don't have reliable water service today and the generations to come.

Whereas, valuing and investing in water systems provides a path to economic recovery; now;

Operative clauses call upon specific governmental bodies to take action. They can include:

- recommendations for specific action
- statements of opinions
- requests for further consideration or monitoring

Examples of ***operative clauses*** from the Imagine a Day Without Water 2021: Resolution Template

THEREFORE, BE IT RESOLVED, that [the organization] recognizes water is essential to the quality of life and economic competitiveness and acknowledges the importance of educating the public about the value of water through the "Imagine a Day Without Water" campaign.

BE IT FURTHER RESOLVED, that [the organization] is dedicated to investing in safe and reliable water and wastewater infrastructure and calls on our federal partners to bring much-needed funding and innovation to protect and restore our critical water infrastructure.

Examples of resolutions from local governments addressing water issues

City of Issaquah | Search All Resolutions
Approving Shoreline Master Program Resolution

Relating to sanitary sewer rates

City of Redmond | Search All Resolutions
Constructing sewer infrastructure improvements

City of Kirkland | Search All Resolutions
Approving study for regional construction of stormwater infrastructure

City of Bellevue | Search All Resolutions
Approving public works contractor

City of Tukwila | Search All Resolutions
Adopting a new public works fee schedule

Supporting King County cities in addressing climate change and sustainability

City of Seattle | Search All Resolutions
Ratifying the update to the Lake Washington/Cedar/Sammamish Watershed, WRAI 8, Chinook Salmon Conservation Plan

Small group inquiries

What do you notice about the language used in these resolutions? How easy or hard was it to understand the goal of the resolution? If you were responsible for passing this resolution, would you?

Is there something that struck you or felt particularly effective in the resolution writing? Was there anything that made you cringe? What about something you didn't really understand?

How can you take your observations from these example resolutions and apply it to your own?

Try writing resolutions

Use the **resolution template** from the US Water Alliance to build a possible resolution for a particular stakeholder group. This could be at one or many levels of influence and commitment, including your family, neighborhood association, school Green Team, or Student Council. The resolution could also be for your city, county, or local water utility. Even though writing a resolution may sound official and possibly challenging, never fear! Writing resolutions offers a chance to make real change.

Tips for writing and getting a resolution passed

1. **Find out who else supports your efforts and build a team.** When a diverse group of people bring ideas for resolutions to local government, it demonstrates valid concern for the topic and community investment.
2. **Learn and study the legislative processes where you live.** For example, in some cities you can present the resolution yourself, in others it requires a council person to officially bring the resolution forward to their colleagues. Consider connecting with a local council person to get support, advice, or review of your proposed resolution. Explore examples of previous resolutions passed by the local government.
3. **Use direct, clear language.** Read your resolution out loud to your team. Read it to your dog or cat, read it many times until you can talk about it without needing a document in front of you. This can prepare you to talk with other stakeholders and city council.
4. **Know that revisions may be necessary.** To get your resolution adopted, there may be some discussion and compromise needed. It may be passed right away or require further research and consideration. Don't be discouraged if this happens!
5. **Track progress and accountability:** Stay in touch with your supportive team and be attentive to the implementation of your resolution. Is the resolution doing what you thought it would do for your community? Come back to your resolution in six months to a year. What do you think about it now? Is there anything you want to change? If so, find out the process to make changes to the original resolution.

SOURCE: **rightsanddissent.org**

ACTIVITY 5

Scenario Planning for a Sustainable Water Future

Individual Research and Reflection: Invite students to take some individual time to review statistics about the current status of our water systems infrastructure. Here is a great starter kit. It might make a great jigsaw exercise.

Facts from the **social media campaign** for Imagine A Day Without Water.

Background information from the EPA's WaterSense Program on **How We Use Water** plus **Statistics and Facts** on Water use.

Product Gallery from the Water Footprint Network on the embedded water in different consumer products.

Reviste the **Report Card categories** developed by the American Society for Civil Engineers for each of these water systems.

Drinking Water Infrastructure

Wastewater Infrastructure

Stormwater Infrastructure

Notice that each of these webpages is organized with the same report card criteria: ***Overview, Condition & Capacity, Funding, Operations & Maintenance, Future Need, Public Safety, Resilience & Innovation, Raising the Grade.*** Skim these links for each water system looking for statistics that describe our current conditions. Also make note of any emerging solutions.

Small Group Synthesis: Students gather in small groups to compare, refine, and prioritize their ideas about the current status of our water systems infrastructure. Use some or all of these inquiries:

What do the statistics suggest to you?

How would you assess the current status of our water systems infrastructure?

How are each of us contributing to these numbers either positively or negatively by the things we do on a daily, weekly, or annual basis?

What elements of the system do we have the most control over? Where do we have the least control?

What tools or actions can we use to remove the biggest obstacles? How do we prioritize the best tools, actions or choices?

What are the easiest actions? The hardest?

Which sector is leading or should be leading on solutions?

Will the government solve the problem? At what level, city, county, state, federal?

Will business innovation solve the problem?

Will civil society (the people) rise up and advocate for change?

What would it look like if we actually achieved a sustainable water future? What is the vision we are going for here?

What can we do as individuals, as a classroom, a city, or as society to bend these numbers towards a sustainable water future?

Scenario Teams Justify Plausible Pathways: Decide as a class on 3-5 unique scenarios for what might happen given a certain ***"What if"*** question. Once the questions are decided on, form teams to build a logical path for what will happen to our water infrastructure if their selected scenario holds true. Students present their scenarios as a panel supported by a set of PowerPoint slides.

SCENARIO THINKING ROUND 1

"What if?" Questions...

Earthquake: (sudden catastrophe) **What if...** an earthquake in our region so violently disrupts our water infrastructure, that it forces us as a society to wake up, come together, fix what's broken, and build back better?

Climate Crisis: (slow motion catastrophe) **What if...** the frequency and intensity of hurricanes, floods, forest fires, and droughts forces us to wake up, come together as a society, and design more resilience and efficient water systems?

Money: What if... we had all the funding we needed to upgrade our water infrastructure? Would this be federal spending, state tax increases, ratepayer increases, or a combination?

Innovation: What if... government policymakers, business entrepreneurs, inventors, and investors teamed up to clear bureaucratic obstacles and subsidize innovations for rapidly advancing water efficiencies and integrated systems?

Collaboration: What if... the different agencies and utilities responsible for water supply, wastewater treatment, and stormwater management learned how to work together to generate efficiencies and innovation at the local level?

Education: What if... every student graduated from our school district knowing exactly what to do and how to engage in rapidly advancing a sustainable water future?

Business As Usual: What if... we made no changes to our current water infrastructure management choices and hoped for the best?

SCENARIO THINKING ROUND 2

Explore an Expert Model: Students pause in the development of their scenario presentations to interact with an example of professional scenario building related to water systems. This **summary report** from the Rocky Mountain Institute does a great job of explaining the value of scenario thinking. It provides a graph along with brief narratives for four scenarios, it features a table comparing the old paradigm of water system management choices to an emerging paradigm, and it lists a range of solutions going forward.

Students can use this model to improve their own scenario presentations.

Each team presentation is followed by rigorous Q & A from the audience. This might be a good time to invite one or more local water systems experts to sit in and offer advice and direction.

Preferred Pathway

SCENARIO THINKING ROUND 3

Preferred Pathway: Students take elements of one or more of the scenarios offered by the presentation teams and develop a single preferred pathway.

This can be in the form of a student-facilitated classroom discussion or an individual or team final report in a format that gives agency and choice to student voice such as a spoken word piece, skit, infographic, or video.

ACTIVITY 6
Making an Impact

There are many ways we can conserve water and increase water use efficiency. But sometimes it is hard to know where to start. Or, if we do take an action, it can sometimes feel too small to make a difference. Not true. **Every action adds up.** Here are some resources to inspire and guide student impact project development.

Use the **Water Footprint Calculator** to assess your own water use. This will give you a measure of the water you consume ***directly*** from the plumbing in your home, as well as the water you consume ***indirectly***, like the water used to grow, process, clean, or transport the products you buy. Once you know your water footprint you can identify actions to reduce it.

See Sustainability Ambassadors' **Student Project Ideas.**

What types of project ideas are you drawn to?

How many of the project ideas listed are you and your family already practicing?

If you were to pick three more project ideas that you and your family are not currently practicing but you think would be pretty easy to do, which ones would you choose?

Water Systems Living Textbook: Scroll through Sustainability Ambassadors' handy set of annotated links.

Study some of Sustainability Ambassadors' sample **Student Impact Projects.** Especially this one which describes a **Water Footprint Campaign for Clubs or Classrooms**

It is important for students to feel agency, voice, and choice in how they are called to make a difference in their community. And it adds rigor to the impact project design process when students are empowered to demonstrate a direct and measurable connection between the project they design and the policy goals and performance measures built into local water management plans.

For more on how to support students on designing effective impact projects, review the lesson plan frameworks for **Impact Project Design** and **Engaging Stakeholders** that you will find at Sustainability Ambassadors' **Foundation Lessons.**

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About Sustainability Ambassadors

Sustainability Ambassadors is a professional development program for student leaders, teacher leaders and community leaders committed to rapidly advance a sustainable future by aligning classroom rigor with community relevance for real world impact.

We support a year-round training program for over 60 highly motivated youth, a paid Equity Advocacy Internship, a Green Jobs Youth Pathways Portal, and a Teacher Fellows Program, working with hundreds of educators to design new models of problem-based, place-based learning around a shared vision of ***educating for sustainability.***

We focus on middle school and high school youth, the teachers and school districts that guide their learning, and the community stakeholders, local government and business leaders who are relying on the next generation to be engaged voters, informed taxpayers, conscious consumers, and employees who can create and lead sustainability initiatives.

Visit: https://www.sustainabilityambassadors.org/