Unit 2 Overview

CLEAN WATER FOR ALL

This unit focuses on learners gaining an understanding about water as a human right and challenges in achieving clean water for all.

What's covered?

The lessons in this unit:

- Explore the importance of water as a human right, and what's needed to achieve this.
- Emphasize the importance of human actions and choices in helping to solve clean water issues and achieve water equity, both locally and globally.

Topics include: clean water access, sanitation, water equity, water filtration, bottled water

About these lessons:

Standards: These lessons are aligned to: Next Generation Science Standards, National Council of the Social Studies, and Common Core State Standards for English Language Art and Literacy, Framework for 21st Century Learning, Climate Literacy Principles, Water Literacy Principles. See our Overview Matrix for a listing of lessons and the standards to which they are aligned.

Timing: The suggested lesson duration included in the lessons can be used as a guide for how long they should take, as each classroom is different. Depending on the size and length of each class, these lessons can be taught in one sitting or over a few days.

Content: Many of the topics in these lessons can evoke an emotional response from learners. Modify the lessons as needed to ensure they are appropriate for your learners. Anticipate the questions and responses these discussions and activities may elicit.

Essential question for the unit:

What are the barriers to 'clean water for all' and how can I help overcome them?

The Learning Objectives of these lessons:

- The importance of the Sustainable Development goals (SDG), particularly SDG 6, which is about access to clean water and sanitation.
- How the different parts of water, sanitation and hygiene work together for human health.
- People face clean water and sanitation access issues in the U.S. and globally, and how some of these are being addressed.
- The importance of water filtration and how it works.
- The implications of the choices we make around bottled water vs. tap water.
- How individuals and organizations can change the lives of other humans for the better, as it pertains to access to clean water and sanitation for all, with an emphasis on Uganda.

THE 5 LESSONS:

THE FIVE LESSONS IN THIS UNIT CAN BE TAUGHT AS A COMPLETE SET OR INDIVIDUALLY.

Clean Water is a Human Right

Learners learn about the Sustainable Development Goals (SDG), specifically SDG 6, which focuses on clean water and sanitation access for all. They watch and reflect on a documentary that highlights Drink Local Drink Tap's work to address this issue.

Intro to WASH - Water, Sanitation, Hygiene

Learners develop an understanding of sanitation in different parts of the world by discussing how water, sanitation and hygiene work together to support good health.

We Have a Clean Water Problem

Learners discuss water protection and access issues faced in the United States. They research and present findings related to community water systems, water equity issues and possible solutions.

How Do Water Filters Work?

Learners discuss clean water access inequalities in the world, the importance of water filtration, and design their own filters.

Tap vs. Bottled Water

Learners learn about bottled water and its problematic impact through research and documentaries. They take a stand on issues related to bottled water and discuss the importance of individual choices.

Website suggestions:

CDC https://www.cdc.gov/healthywater/drinking/index.html
EPA https://www.epa.gov/sdwa
Food and Water Watch https://www.foodandwaterwatch.org/about/live-healthy/tap-water-vs-bottled-water
The Water Project https://thewaterproject.org/resources/elementary_books
Unicef https://www.unicef.org/stories/11-lessons-water-school

National Learning Standards

UNIT 2: CLEAN WATER FOR ALL

Lesson 1: Clean Water is a Human Right

National Council for the Social Studies (NCSS)
D2.Civ.3.6-8. D2.Geo.5.6-8. D2.Geo.10.3-5.

Framework for 21st Century Learning
Global Awareness
Environmental Literacy

Water Literacy Principles
Water is Essential for All life to Exist
Water is a Natural Resource
Water Resources Are Managed
Water Resources Exist within Social Constructs

Climate Literacy Principles
Life on Earth depends on, is shaped by, and affects climate.
Human activities are impacting the climate system. Climate change will have consequences for the Earth's systems and human lives.

Lesson 2: Intro to WASH – Water, Sanitation, & Hygiene

Next Generation Science Standards (NGSS)
3-5-ETS1-1.

National Council of the Social Studies (NCSS)
D2.Geo.5.6-8.

Framework for 21st Century Learning
Environmental Literacy Global Awareness Health Literacy

Water Literacy Principles
Water is Essential for All life to Exist
Water is a Natural Resource
Water Resources Are Managed
Water Resources Exist within Social Constructs

Climate Literacy Principles
Climate change will have consequences for the Earth's systems and human lives.

Lesson 3: We Have a Clean Water Problem

Next Generation Science Standards (NGSS)
5-ESS3-1.

National Council of the Social Studies (NCSS)
D2.Civ.3.6-8.

Common Core State Standards for English Language Art and Literacy (ELA)
CCSS.ELA LITERACY.W.4.7, 5.7, 6.7, 7.7, 8.7
CCSS.ELA LITERACY.W.4.2, 5.2, 6.2, 7.2, 8.2:

Framework 21st Century Learning
Global Awareness Environmental Literacy Health Literacy

Water Literacy Principles
Water is Essential for All life to Exist
Water is a Natural Resource
Water Resources Are Managed
Water Resources Exist within Social Constructs

Lesson 4: How do Water Filters Work?

Next Generation Science Standards (NGSS)
3-5-ETS1-1. MS-ETS1-1. MS-ETS1-2. MS-ETS1-3.

Water Literacy Principles
Water is Essential for All life to Exist
Water Resources Are Managed
Water Resources Exist within Social Constructs

Lesson 5: Tap vs Bottled Water

Next Generation Science Standards (NGSS)
5-ESS3-1. MS-ESS3-4.

Common Core State Standards for English Language Art and Literacy (ELA)
CCSS.ELA-LITERACY.W.4.7, 5.7, 6.7, 7.7, 8.7.

Framework for 21st Century Learning
Environmental Literacy

Water Literacy Principles
Water is Essential for All life to Exist
Water is a Natural Resource
Water Resources Are Managed
Water Resources Exist within Social Constructs

Climate Literacy Principle
Human activities are impacting the climate system. Climate change will have consequences for the Earth's systems and human lives.

Ohio Department of Education Standards

UNIT 2: CLEAN WATER FOR ALL

Lesson 1: Clean Water is a Human Right

Science Standards
3.ESS.1 3.ESS.2 3.ESS3 4. LS.1

ELA Standards
W.3.2 W.3.8 W.4.2 W.4.8 W.5.9

Social Studies Standards
4th Grade Geography 12: People have modified the environment throughout history resulting in both positive and negative consequences in Ohio and the United States.
4th Grade Economics 20: Tables and charts organize data in a variety of formats to help individuals understand information and issues.
5th Grade Economics 14: The choices made by individuals and governments have both present and future consequences.
6th Grade Economics 12: The choices made by individuals and governments have both present and future consequences. The evaluation of choices is relative and may differ across individuals and societies.
8th Grade Government 20: Active participation in social and civic groups can lead to the attainment of individual and public goals.

Lesson 2: Intro to WASH – Water, Sanitation, & Hygiene

Science Standards
3.ESS.2 3.ESS.3 3.LS.3 4.LS.1 5.LS.1 6.LS.4 7.LS.1 7.LS.2 8.LS.1

ELA Standards
W.3.8 W.4.2 W.5.9 W.6.1

Lesson 3: We Have a Clean Water Problem

Science Standards
3.ESS.1 3.ESS.2 3.ESS3

ELA Standards
W.3.8 W.4.2 W.5.9

Social Studies Standards
6th Grade Economics 12: The choices made by individuals and governments have both present and future consequences. The evaluation of choices is relative and may differ across individuals and societies.
8th Grade Government 20: Active participation in social and civic groups can lead to the attainment of individual and public goals.

Lesson 4: How do Water Filters Work?

Science Standards
3.ESS.1 3.ESS.2 3.ESS.3 7.ESS.1

ELA Standards
W.3.2 W.3.8 W.4.2 W.4.8 W.5.9

Social Studies Standards
4th Grade Economics 20: Tables and charts organize data in a variety of formats to help individuals understand information and issues.
5th Grade Economics 14: The choices made by individuals and governments have both present and future consequences.
8th Grade Government 20: Active participation in social and civic groups can lead to the attainment of individual and public goals.

Lesson 5: Tap vs. Bottled Water

Science Standards
3.ESS.1 3.ESS.2 3.ESS3 7.ESS.1

ELA Standards
W.3.2 W.3.8 W.4.2 W.4.8 W.5.9

Social Studies Standards
4th Grade Economics 20: Tables and charts organize data in a variety of formats to help individuals understand information and issues.
5th Grade Economics 14: The choices made by individuals and governments have both present and future consequences.
8th Grade Government 20: Active participation in social and civic groups can lead to the attainment of individual and public goals.

Unit 2, Lesson 1

CLEAN WATER IS A HUMAN RIGHT

GRADE LEVEL: 5-8 | SUBJECT: SOCIAL STUDIES | LENGTH OF LESSON: 90 MINUTES

Summary: Learners learn about the Sustainable Development Goals (SDG), specifically SDG 6, which focuses on clean water and sanitation access for all. They watch and reflect on a documentary that highlights Drink Local Drink Tap's work to address this issue.

Drink Local Drink Tap Connection: At DLDT, SDG 6, clean water and sanitation for all, is a driver for our work. We were founded because of access inequalities to clean water and sanitation. All of the work we do, both locally and globally, is devoted to education and projects that give access to clean, safe water.

Learning Objectives

Learners will:

- Discuss the United Nations Sustainable Development Goals, with an emphasis on SDG 6: Clean water and sanitation for all.
- Discuss what water and sanitation look like in a different part of the world.
- Watch a documentary about Drink Local Drink Tap's water, sanitation and hygiene work in Uganda.
- Reflect on what they can do with their knowledge about SDG 6.

Background

The United Nations (UN) works to better the world in many ways. In 2010, the UN declared access to clean water a human right in 2010. In 2015 the UN established the Sustainable Development Goals (SDG), a set of 17 universal goals intended to produce actions by 2030 to meet the urgent environmental, political and economic challenges facing our world. They are a commitment to help people all over the world who are struggling and to make sure that we continue the fight to end poverty, sickness and environmental issues. They aspire to leave no one behind and focus on issues that impact us all. Here's an excerpt from the UN's 2030 Agenda for Sustainable Development:

"We resolve, between now and 2030, to end poverty and hunger everywhere; to combat inequalities within and among countries; to build peaceful, just and inclusive societies; to protect human rights and promote gender equality and the empowerment of women and girls; and to ensure the lasting protection of the planet and its natural resources. We resolve also to create conditions for sustainable, inclusive and sustained economic growth, shared prosperity and decent work for all, taking into account different levels of national development and capacities."

An important SDG for this lesson is SDG 6, which is "Clean water and sanitation for all." This goal ensures availability and sustainable management of water and sanitation for all. For more information, see our SDG Fact Sheet.

Remote Learning Lesson

This lesson can be done as a remote learning activity. Here are the steps:

1. In advance, send the learners the words from Step 1. Convene a class video meeting to talk about the words. Use the background section to discuss: the United Nations, Sustainable Development Goals and the concept of water as a human right and why that's so important and difficult to achieve. Share your screen to review the website (Step #3) with learners. Have them respond in the Wavemaker Question Sheet.
2. Send learners the link to the video Making Waves from Cleveland to Uganda. Have them watch it and respond to questions in the Wavemaker Question Sheet.
3. Convene a video meeting to discuss the documentary and learners' responses from the Wavemaker Question Sheet.
4. Have learners research the SDG to determine their top 3 priority goals, and consider calls to action to help address water access issues. Convene for a final discussion.

VOCABULARY

Human Right: A right that is believed to belong justifiably to every person.

Sustainable Development Goals: The Sustainable Development Goals (SDG), also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030.

SDG 6: Clean water and sanitation for all.

United Nations: An international organization formed in 1945 to increase political and economic cooperation among its member countries.

ACTIVITY

LENGTH OF ACTIVITY: 90 MINUTES

SUPPLIES

- ◯ **Link to Sustainable Development Goal 6 (SDG 6): https://sdgs.un.org/goals**
- ◯ **Documentary: "Making Waves from Cleveland to Uganda": https://www.youtube.com/watch?v=Z6H7_u0_gKM**
- ◯ **Learner journals and/or writing paper**
- ◯ **Wavemaker Question Sheets**
- ◯ **Smart board/projector to show video**
- ◯ **Printable SDG poster (optional): https://www.un.org/sustainabledevelopment/news/communications-material/**

ACTIVITY STEPS

1. Word Activity Introduction: (15 min)

Before learners walk into the classroom, you should have the following words written on the board—Human Rights, Sustainability, Equality, Water, Sanitation, Hygiene, United Nations. As learners walk in, give them a few minutes to write down the first few things that come to their minds when they think of each word. After a few minutes, have learners share with the group what they came up with, and write the words on the board. Discuss the responses, the basics of the UN, and the purpose behind SDG, including SDG 6. Once they have shared their responses, discuss the idea of clean water as a human right. Ask learners what they think this means, why it is important, and what makes it hard to achieve.

3. Research and discussion: (10 min)

Either using a projector or individual computers/tablets, pull up the following page: **https://www.undp.org/content/undp/en/home/sustainable-development-goals/ goal-6-clean-water-and-sanitation.html**

As a class, read through the facts and figures related to SDG 6 and spend a few minutes allowing the information to sink in. Have some of the learners share how these facts make them feel and what emotions it brings up for them. Since this topic can bring up a lot of emotions, make sure to remind them they are in a safe space. Ask learners to discuss ways these issues could be addressed, and why this is important.

End this part of the lesson by explaining that even though the numbers are hard to imagine, there are organizations doing great work to get people access to clean and safe water, and the class will watch a documentary about one of these organizations.

4. Watch: (30 min)

Watch Drink Local Drink Tap's (DLDT) documentary "Making Waves from Cleveland to Uganda." This inspiring story focuses on DLDT's first clean water project in Uganda and how one person can make a difference in the world. **https://www.youtube.com/watch?v=Z6H7_u0_gKM**

5. Reflect: (10 min)

After watching the documentary, have learners write responses to these questions, which they then discuss as a group.

a. What are your initial thoughts/reactions to what you saw in this video?
b. What was one thing you learned from the documentary?
c. What was the most surprising thing you saw/learned?
d. What makes you feel hopeful about what you saw?
e. What are some steps you could take to educate peers at school about this issue?
f. How else can you help solve this problem?
g. Look at the graphic of the 17 SDG. Which of the SDG are connected to water?

6. Discuss: (10 min)

Have learners share a response to the questions with a partner and/or with the whole group. Learners may also ask questions about the documentary and what they've seen. Remind learners that while clean water access is a heavy topic, there are organizations working to solve this problem, and they can help by talking about the issue with peers and following the 'Take Action' ideas below.

ENRICHMENT ACTIVITY

Have learners research the SDGs and write about what they think are the top three most important ones and why. They can use this site as a reference:

https://www.undp.org/content/undp/en/home/sustainable-development-goals.html

TAKE ACTION

There are ways your learners and school can help people who need clean water get access to it.

- **Educate learners about the issue by inviting Drink Local Drink Tap to speak at your school.**
- **Contact us about fundraising for our most urgent water and sanitation project at a rural school in Uganda.**

Sources:

WaterFootprint: www.waterfootprint.org
Water Calculator: www.watercalculator.org
The Water We Eat: https://thewaterweeat.com/

NAME: DATE:

HEY WAVEMAKER, WE'VE GOT SOME QUESTIONS FOR YOU.

Answer the following questions below using prior knowledge and the Sustainable Development Goal 6 link in 'Supplies'.

1. Why is water a basic human right?

2. Why is it hard to achieve the goal of all humans having access to clean water?

3. What is Sustainable Development Goal 6 (SDG 6)?

4. What stands out for you about what you saw on the Sustainable Development Goals web page?

After watching "Making Waves from Cleveland to Uganda," answer these questions:

1. What are your initial thoughts/reactions to what you saw in this documentary?

2. What is one thing you learned from the documentary?

NAME: _____ DATE: _____

HEY WAVEMAKER, WE'VE GOT SOME QUESTIONS FOR YOU.

3. What was the most surprising thing you saw/learned?

4. What makes you feel hopeful about what you saw?

5. What are some steps you could take to educate friends at school about this issue?

6. How else can you help solve this problem?

7. Circle all of the Sustainable Development Goals related to water. Why is water connected to so many of them?

DRINK LOCAL DRINK TAP™

GET THE FACTS:
SUSTAINABLE DEVELOPMENT GOALS (SDG)

THE SUSTAINABLE DEVELOPMENT GOALS (SDG)

The Sustainable Development Goals (SDG) were created by the United Nations (UN) and its member countries in 2015 as a blueprint for peace and prosperity. The 17 interconnected goals intend to transform our world by taking a holistic approach to sustainable development for all people by 2030.

DEEPER DIVE

During 2016, the first year of SDG implementation, there was a call for all countries to take action on the 17 issue areas as global partners. These goals address topics including: ending poverty, improving water quality and access, spurring economic growth, and improving health and education - all while addressing climate change and working to preserve our waterways and forests.

Individual countries report regularly on SDG progress to the UN. The UN High-level Political Forum on Sustainable Development is the main global forum for reviewing successes, challenges and lessons learned on achieving the 2030 Agenda for Sustainable Development – and for countries to present their progress, called Voluntary National Reviews.

At Drink Local Drink Tap we focus on Goal 6: Clean Water and Sanitation for all. We are part of the change to bring safe access and affordable drinking water to all. We help to provide adequate sanitation and hygiene, paying special attention to the needs of women and girls and those who are most vulnerable. We do this because there are over 2 billion people living in areas of high water stress and it is estimated that by 2030 there could be 700 million people displaced by intense water scarcity due to climate change.

6 CLEAN WATER AND SANITATION

WHAT WE CAN DO

Find out what local and national organizations are working toward the goals and in what ways. Volunteer your time, resources or money to assist in accomplishing the goals through these organizations. Educate others on the SDG, their importance and how to get involved.

IMAGE SOURCE: un.org/sustainabledevelopment/news/communications-material/

SOURCES:

sustainabledevelopment.un.org/sdgs

un.org/sustainabledevelopment/sustainable-development-goals/

sustainabledevelopment.un.org/post2015/transformingourworld

gripp.iwmi.org/2018/06/19/gripp-gives-commentary-to-the-un-water-sdg-6-synthesis-report-and-calls-for-increased-attention-and-monitoring-tools-for-groundwater/

DRINK LOCAL DRINK TAP™
ACCESS - EDUCATION - ACTIVISM

DrinkLocalDrinkTap.org | 440-381-6430 | Cleveland, Ohio, USA

Unit 2, Lesson 2

INTRO TO WASH – WATER, SANITATION AND HYGIENE

GRADE LEVEL: 4-6 | SUBJECT: SCIENCE, SOCIAL STUDIES, HEALTH | LENGTH OF LESSON: 90 MINUTES

Summary: Learners develop an understanding of sanitation in different parts of the world by discussing how water, sanitation and hygiene work together to support good health.

Drink Local Drink Tap Connection: DLDT builds boreholes (deep water wells) and provides schools and villages with access to clean drinking water. DLDT also builds safe latrines and bathing areas. Through community listening and partnerships, DLDT realized that boreholes weren't enough to solve health and equity issues. DLDT also needed to include sanitation and hygiene facilities (latrines) to complete holistic WASH, improve health, keep water sources and environments safe.

Learning Objectives

Learners will:

- Discuss what water, sanitation and hygiene (WASH) means and why it's important.
- Discuss Sustainable Development Goal 6 and how it relates to more than drinking water.
- Reflect on global sanitation experiences through examples of school latrines in Uganda and facts about hygiene and sanitation in other countries.
- Synthesize information in a WASH diagram to conceptualize how engineering projects can solve community problems.

Background

Access to clean water and sanitation is a human right, as declared by the United Nations. And yet, there are over 2 billion people in the world without access to clean water, which means they don't have safe water for drinking, can't practice good hygiene and don't have access to latrines. Access to water, sanitation and hygiene, also known by the acronym WASH, includes clean, affordable, adequate sanitation (latrines), and hygiene education.

Access to WASH can reduce illness, death, and poverty, while improving socio-economic development. Access to WASH includes clean, affordable water, adequate sanitation and hygiene education. Attention to WASH can also improve health, life expectancy, student learning, and gender equality.

In order for all people to have access to clean water and sanitation, the United Nations has included this goal in the 17 Sustainable Development Goals that are supposed to be achieved by 2030. Sustainable Development Goal 6 states that it will ensure availability and sustainable management of water and sanitation for all.

Remote Learning Lesson

This lesson can be done as a remote learning activity. Here are the steps:

1. Have learners watch the video link on how a toilet works, then attend a class video discussion on toilets and what Water Sanitation and Hygiene (WASH) means. Have learners share thoughts about their school toilets. Share images of rural Ugandan toilets to discuss, along with hygiene and global statistics about WASH.
2. Individually, have learners use the diagrams to respond to questions in the Wavemaker Question Sheets.
3. Reconvene the class to talk about learners questions and reflections, and discuss possible next steps related to the Call to Action, if learners want to get further engaged in solving WASH issues.

VOCABULARY

Basic Sanitation Service: basic toilets or latrines that are not shared with other households

Basic Hygiene Service: a place to wash your hands with soap and water

Borehole: a deep round hole made by a special tool or machine, especially one that is made in the ground when searching for oil or water

Hygiene: conditions or practices of cleanliness conducive to health

Latrine: very simple toilet facility

Sanitation: conveyance, storage and treatment and disposal of human waste

WASH: acronym for Water and Sanitation and Hygiene

ACTIVITY

LENGTH OF ACTIVITY: 60 MINUTES

SUPPLIES

- ◯ **Toilet video link: https://www.youtube.com/watch?v=hAxAyoSMQhI**
- ◯ **Reference website: https://www.unicef. org/stories/11-lessons-water-school**
- ◯ **Images of toilets/school latrines - both in the USA and in Uganda (provided)**
- ◯ **DLDT WASH videos (links provided)**
- ◯ **Wavemaker Question Sheets**

ACTIVITY STEPS

1. Introduction: (10 min)

As learners enter the classroom, have the word WASH written on the board for them to see. Do a quick check in and ask the learners to share what comes to their mind when they see the word WASH. After everyone has shared, explain to the class that WASH stands for water, sanitation and hygiene. Ask the learners if they can describe in their own words what hygiene and sanitation mean. Explain what hygiene and sanitation mean, as needed.

2. Sanitation discussion Part 1: (5 min)

Ask the learners if anyone wants to explain how a toilet works. After a few youth have shared, review as a class how a toilet works. Use the link below:
https://www.youtube.com/watch?v=hAxAyoSMQhI
Tell the learners that this is their chance to say all of the things they don't like about their school bathrooms (smell, dirty, gross, etc). After everyone has shared, give them a chance to talk about what they like about their school toilets. It's ok if no one has anything good to say, this will just make the next part more meaningful.

3. Sanitation discussion Part 2: (10 min)

Show learners examples of what a school toilet/latrine looks like in rural Uganda. Before showing, warn them that the images are graphic and might bring up some emotions they weren't expecting. After showing them a few pictures, use this time for learners to reflect on what they are feeling. Tell them the following statistics*:

a. Globally, only 66 percent of schools have a basic sanitation service.
b. Globally, 1 in 5 primary schools and 1 in 8 secondary schools have no sanitation service.
c. One third of schools in sub-Saharan Africa and Oceania have no sanitation service. In most countries where data is available, less than 50 percent of schools have toilets accessible to students with limited mobility.
d. Globally, 600 million children do not have a basic sanitation service at school. *UNICEF

After reviewing the statistics with your classroom, have them answer the following questions on the Wavemaker Question Sheets with examples of rural Ugandan toilets.

4. Hygiene: (5 min)

Ask the learners where they think that kids in rural Uganda wash their hands after they go to the bathroom. Remind them that without access to clean water, there is no way for them to take care of themselves or their bodies properly. Essentially, they cannot wash their hands in many cases, and disease is spread because of this. Read them these statistics:

a. Nearly 900 million children worldwide lack a basic hygiene service at their school.
b. Globally, 1 in 3 primary schools and over a quarter of secondary schools have no hygiene service (elementary and high schools)
c. Over one third of schools worldwide and half of schools in the least developed countries have no hygiene facilities.

5. Discussion: (15 min)

Explain that there are many organizations working to bring WASH to communities and schools around the world. They drill boreholes for water, build latrines, and conduct education about hygiene.
These links show:

a. A borehole being drilled: **https://www.youtube.com/watch?v=T-8zBuOfnnY**
b. An old latrine in rural Uganda: **https://www.youtube.com/watch?v=--uizP6OQvk&feature=youtu.be**
c. A new latrine in process of being built by DLDT: **https://www.youtube.com/watch?v=fDpw58FqISw**

ACTIVITY CONTINUED...

6. Diagram: (15 min)

In pairs, have learners complete two diagrams that show how engineering projects, like what DLDT does in communities in rural Uganda, can improve people's lives. In one diagram, learners show life without water, sanitation and hygiene projects. The second diagram shows how life can be improved with water, sanitation and hygiene projects. Each learner can work on one diagram or they can work on both together.

Diagram 1
- Describe the problem.
- What would help solve the problem?
- How are people's lives affected by NOT having:
  - Access to clean drinking water close by?
  - A clean latrine facility close by?
  - Clean water and soap for handwashing.

Diagram 2
- Describe solutions to water, sanitation and hygiene problems.
- What materials and skills might be needed to solve the problem?
- How are people's lives affected by having:
  - Access to clean drinking water close by?
  - A clean latrine facility close by?
  - Clean water and soap for handwashing

Summary Questions:
In Diagram 2, describe what happens if one part of the water, sanitation and hygiene solutions is broken? How does it impact the whole system if:
- The borehole stops working?
- The latrine becomes dirty and smells bad?

7. Discussion: (5-10 min)

Have some learners share their diagrams. Discuss questions learners have, ensuring they have time to ask questions about the heavy topics learned in this lesson. We want to make sure that everyone is going home with all of their questions answered and are feeling hopeful that they can help make a difference.

8. Journaling: (10 min)

Acknowledge that the lesson might have brought up a lot of different feelings and emotions. Tell the learners that they can always talk to you or any of their teachers about how they are feeling. Leave them time to reflect on what they saw, discussed and designed.to turn it in as they exit the room:

TAKE ACTION

Host a school fundraiser to raise money to help out one of DLDT's WASH projects at a primary school in Uganda. Use the DLDT Fundraising Guide to assist with this or come up with your own ideas.

Sources:

United Nations: https://sustainabledevelopment.un.org/sdg6
Unicef: https://www.unicef. org/stories/11-lessons-water-school

NAME: DATE:

HEY WAVEMAKER, WE'VE GOT SOME QUESTIONS FOR YOU.

As we discuss the issues in class, answer the following questions to the best of your ability.

1. What does WASH mean?

2. Below are some pictures of rural Ugandan toilets. What are your thoughts on how your toilets compare to these toilets?



3. Write some reflections about the information your teacher shared with you, and the website and videos you watched. What did you learn? How did it make you feel?

NAME: DATE:

HEY WAVEMAKER, WE'VE GOT SOME QUESTIONS FOR YOU.

Let's look at how engineering projects, like what Drink Local Drink Tap builds in communities in Uganda, can improve people's lives.

In Diagram 1, we see life WITHOUT access to safe water, sanitation and hygiene.

In Diagram 2, we see how life can be improved with proper access to clean water, sanitation and hygiene projects. Use the questions on the following pages to evaluate the two situations.

Diagram 1

Diagram 2

NAME: DATE:

HEY WAVEMAKER, WE'VE GOT SOME QUESTIONS FOR YOU.

Diagram 1

1. Describe the problem.

2. What would help solve the problem?

3. How are people's lives affected by NOT having:
   - Access to clean drinking water close by?
   - A clean latrine facility close by?
   - Clean water and soap for handwashing?

Diagram 2

1. What are solutions to water, sanitation and hygiene problems?

2. What materials and skills might be needed to solve the problem?

3. How are people's lives affected by having:
   - Access to clean drinking water close by?
   - A clean latrine facility close by?
   - Clean water and soap for handwashing?

4. Describe what happens if one part of the water, sanitation and hygiene solutions is broken. How does it impact the whole system if:
   - The borehole stops working?
   - The latrine becomes dirty and smells bad?

Unit 2, Lesson 3

WE HAVE A CLEAN WATER PROBLEM

GRADE LEVEL: 6-8 | SUBJECT: SCIENCE, LANGUAGE ARTS, SOCIAL STUDIES, HEALTH | LENGTH OF LESSON: 90 MINUTES

Summary: Learners discuss water protection and access issues faced in the United States. They research and present findings related to community water systems, water equity issues and possible solutions.

Drink Local Drink Tap Connection: DLDT partners with organizations that work to keep our water clean. We educate community members about the work that these organizations do to make sure we have safe, clean water to drink.

Learning Objectives

Learners will:
- Discuss the importance of access to clean water equity.
- Research and discuss the Safe Drinking Water Act (SDWA).
- Research, develop and share presentations about water equity issues and solutions in the USA.

Background

All people should have convenient access to clean, safe water at a price they can afford, yet many do not. Why is this the case? This lesson explores these issues and some of the solutions to these critical problems.

On the surface, it looks promising:
- Globally, the United Nations has declared clean water a human right and their Sustainable Development Goal 6 focuses on actions necessary to achieve clean water and sanitation for all.
- According to the United States Environmental Protection Agency (US EPA): "In the U.S., the Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law requires many actions to protect drinking water and its sources—rivers, lakes, res- ervoirs, springs, and groundwater wells. SDWA authorizes the US EP) to set national standards for drinking water to protect against contaminants that may be found in drinking water. US EPA, states, and water systems work together to make sure that these standards are met." (Visit the EPA website to see recent changes or attempts to change the SDWA)

While millions of Americans receive high quality water every day from their public water systems, there's still a large clean water gap that needs to be addressed. According to the US Water Alliance, more than 2 million Americans live without basic access to safe drinking water and sanitation (toilets and pipes that remove wastewater from the home), which is unacceptable.

While drinking water in the United States is mostly safe, between 2015 and 2018, about 5.5 million Americans in communities around the nation got their tap water from systems that exceeded the Environmental Protection Agency's lead action level of 15 parts per billion. This means that these people's tap water was shown to have excessive lead, which is a neurotoxin and causes serious health issues. Aging water pipes and systems, many of which are 50-100 years old in the U.S., may cause there to be lead and other contaminants in our drinking water. To protect public health, drinking water infrastructure and old housing must be updated. All in all, more than 44 million people have public water systems that recently had health-based Safe Drinking Water violations.

In the U.S., race is a strong predictor of water and sanitation and access. African American and Latinx households are nearly twice as likely to lack complete plumbing than white households and Native American households are 19 times more likely. Households with higher income were more likely to have access to complete plumbing, meaning that poverty is another strong determinant, according to the US Water Alliance.

Globally, there are over 2 billion people in the world without access to clean water. This means they can't practice good hygiene and don't have access to clean water and toilets (4.5 billion people don't have access to a safe, basic toilet). For more information, use the lesson plan: Into to WASH: Water, Sanitation and Hygiene, found in this unit.

VOCABULARY

Community Water System: Supplies water to the same population year round. It serves at least 25 people at their primary residences or at least 15 residences that are primary residences (for example, municipalities, mobile home park, sub-divisions).

Equity: Just and fair inclusion, and a condition in which everyone has an opportunity to participate and prosper.

Flint Water Crisis: Public health crisis that started in 2014 when the City of Flint changed their water source, and, to save money, city officials did not add proper treatment to the water and pipes, which caused lead from pipes to contaminate the water.

Safe Drinking Water Act (SDWA): Passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. SDWA authorizes the United States Environmental Protection Agency (US EPA) to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water.

Sanitation: Conveyance, storage and treatment and disposal of human waste.

Water Equity: occurs when all communities:
- Have access to safe, clean, affordable drinking water and wastewater services;
- Share in the economic, social, and environmental benefits of water systems, and are resilient in the face of floods, drought, and other climate risks.

ACTIVITY

LENGTH OF ACTIVITY: 90 MINUTES

SUPPLIES

- ◯ Wavemaker Question Sheets
- ◯ Link to the Safe Drinking Water Act
  https://www.epa.gov/sites/pro- duction/files/2015-04/documents/ep- a816f04030.pdf
- ◯ Link to US Water Alliance Report: Closing the Water Gap
  http://uswateralliance.org/sites/uswat- eralliance.org/files/Closing%20the%20 Water%20Access%20Gap%20in%20 the %20United%20States_DIGITAL.pdf
- ◯ DLDT's Documentary "Making Waves from Cleveland to Uganda"
  https://www.youtube.com/ watch?v=Z6H7_u0_gKM

ACTIVITY STEPS

1. Introduction: (10 min)

Ask the learners for examples of how they used water today. Have a handful of learners share (bathroom, drinking water, shower, brushing teeth, etc). Then ask the learners where their water came from (the sink, refrigerator, shower, etc). Lastly, ask the learners how it got to their sinks, showers, refrigerator, etc. Briefly discuss your community's water source and the process to get to your homes. If you and your learners need more information about this, conduct research online or directly contact your local water utility to learn about your drinking water, its source, and how it is treated. For many communities, they access tap water from a nearby source that goes through a drinking water treatment plant.

2. Discuss water issues: (10 min)

Ask the learners if they have heard of Flint, Michigan and the water issues the people in this city have had. Flint citizens have had serious problems because of lead contamination in their drinking water. You can also choose another community, such as Newark, New Jersey, that has been impacted by water quality issues. Discuss the situations in these communities. Have a brief class discussion on what the consequences would be if your community's water was contaminated and how that would impact lives.

Learners can write or discuss the following:

a. Where would you get your drinking water from?
b. What happens when you drink polluted water?
c. How would this impact your daily life?
d. What is the government's role in making sure communities have safe drinking water?

3. Safe Drinking Water Act: (10 min)

Ask the learners if they have heard of the Safe Drinking Water Act. Provide the link in this lesson, or a printed version, and have them take a few minutes to read about what it is and why it was created. Have a class discussion about the SDWA using the following questions as a guide.

Learners can write or discuss the following questions on their Wavemaker Question Sheets.

a. What is something that stood out to you while reading about the SDWA?
b. What are your initial reactions to reading about this?
c. How does this make you think differently about water in your country?
d. Have you ever been in a place or situation where your drinking water wasn't clean? If so, describe the experience.
e. How are communities like Flint experiencing water issues, given the SDWA? (Communities should be protected against this, but that is not always the case.)

4. Research and develop presentations (40+ min):

Ask learners to talk about what's wrong with this picture: The SDWA exists, yet millions of people in the U.S. struggle to access clean, affordable water.
In small groups of 3-4, learners research communities struggling with clean water access throughout the U.S. They can use the U.S. Water Alliance document which has information on communities around the country, in which community has its own section(*see below). One group should research YOUR community.
Have learners research and develop presentations on the following:

Choose a community or area struggling with clean water access.

a. What community are you researching?
b. What are the problems impacting this community's water?
c. What is this community doing to solve this problem?
d. What does your group think would be helpful to support this community's efforts?
e. Why isn't the Safe Drinking Water Act working for all people?
f. What is water equity and why is it important?
g. What changes should the federal and state governments make to ensure clean water access for all, as stated in the Safe Drinking Water Act?

For the group assigned to research YOUR community, have them find out the following:

a. What entity provides you with water?
b. Where does the water come from?
c. What is the process the entity uses for cleaning the water?
d. How does it get to your house?
e. How does the entity ensure there are no public health issues, such as lead in the drinking water?
f. Can you take a tour of the facility?
g. What are three things you learned about where your water comes from?

*Learners can research communities using a 2020 report from the US Water Alliance, in which follwoing communities are highlighted:
http://uswateralliance.org/sites/uswateralliance.org/files/Closing%20the%20Water%20Access%20Gap%20in%20the%20United%20States_DIGITAL.pdf

Communities in this Report

- Apache County, Arizona
- Cochran in El Paso County, Texas
- East Orosi in Tulare County, California
- Lowndes County and Bibb County, Alabama
- Red Mesa, Arizona
- McDowell County, West Virginia
- Mississippi Delta Region, Mississippi
- Puerto Rico
- Seville, California

Other Communities to Research:

- Flint, Michigan
- Newark, New Jersey

ACTIVITY CONTINUED...

5. Share presentations: (25+ min)

The following day, have your learners present to each other and discuss key insights, commonalities, and differences that they found as a result of their research. Use the Background Information and US Water Alliance report to discuss the racial and economic implications for these situations.

6. Homework:

Acknowledge that the lesson might have brought up a lot of different feelings and emotions. Tell the learners that they can always talk to you or any of their teachers about how they are feeling. Leave them time to reflect on what they saw, discussed and designed.

ENRICHMENT ACTIVITY

Have learners watch the DLDT documentary "Making Waves from Cleveland to Uganda" (link in 'Supplies'), which has an international perspective on creating clean water access in Uganda. Discuss how learners feel about their own water access after seeing how other people access water.

TAKE ACTION

Have learners write reflections about this activity and share the writing with Drink Local Drink Tap to be included in a blog post or social media.

Encourage learners to find out about the access to and safety of the drinking water in their community and neighboring towns. How can they help ensure that all people have safe, affordable drinking water?

Sources:

EPA www.epa.gov/sites/production/files/2015-04/documents/epa816f04030.pdf
The Atlantic www.theatlantic.com/health/archive/2019/09/millions-american-homes-have-lead-water/597826/
US Water Alliance uswateralliance.org/wec/framework
US Water Alliance uswateralliance.org/sites/uswateralliance.org/files/Closing%20the%20Water%20Access%20Gap%20in%20the%20United%20States_DIGITAL.pdf

NAME: _____ DATE: _____

HEY WAVEMAKER, WE'VE GOT SOME QUESTIONS FOR YOU.

What would the consequences be if your community's water was contaminated and how that would impact lives?

1. Where would you get your drinking water from?

2. What happens when you drink polluted water?

3. How would this impact your daily life?

Safe Drinking Water Act (SDWA) Research

1. What is something that stood out to you while reading about the SDWA?

2. What are your initial reactions to reading about the SDWA?

3. How does this make you think differently about water in your country?

4. Have you ever been in a place or situation where your drinking water wasn't clean? If so, describe the experience?

NAME: _____ **DATE:** _____

HEY WAVEMAKER, WE'VE GOT SOME QUESTIONS FOR YOU.

Research and Develop Presentations: Using the information provided to you from the US Water Alliance report, and your own research, answer the following questions and develop a presentation about what you find. You will present it to your classmates.

1. What community are you researching?

2. What are the problems impacting this community's water?

3. What is this community doing to solve this problem?

4. What does your group think would be helpful to support this community's efforts?

5. Why isn't the Safe Drinking Water Act working for all people?

6. What is water equity and why is it important?

If your group is assigned to your own community, find out the following:

1. What entity provides you with water?

2. Where is the water source?

3. What processes does the entity use to clean the water?

4. How does it get to your house?

5. What are three things you learned about where your water comes from?

Unit 2, Lesson 4

HOW DO WATER FILTER WORK?

GRADE LEVEL: 4-6 | SUBJECT: SCIENCE, LANGUAGE ARTS, ENGINEERING | LENGTH OF LESSON: 120 MINUTES

Summary: Learners discuss clean water access inequalities in the world, the importance of water filtration, and then design, build and test their own filters.

Drink Local Drink Tap Connection: At DLDT we understand that 'water is life' and that having access to clean water is a basic human right. We work in Uganda in East Africa to build clean water projects. Sometimes using a water filter is necessary even after accessing a new water source. Filters are chosen based on the type of pollutant that needs to be filtered and the type of community using the water, for example: a school, village, home, etc.

Learning Objectives

Learners will:

- Discuss how water filters work and their importance for clean water.
- Design, create and test water filters by experimenting with different materials.
- Make design improvements based on observation and discussion.

Background

There are over 2 billion people without access to clean water in the world today. In this lesson, learners will learn about water filtration by making one type of filter. While filtering water doesn't solve the problem of water access, it allows people the ability to filter out contaminants in order to make their water safer to drink. There are many ways to filter water to varying degrees, and this lesson explores how to remove particles from water.

VOCABULARY

Filtration: The process in which solid particles in a liquid or gaseous fluid are removed by the use of a filter medium that permits the fluid to pass through but retains the solid particles.

Pollution: The presence in or introduction into the environment of a substance or thing that has harmful or poisonous effects.

Turbidity: The cloudiness or haziness of a fluid caused by large numbers of individual particles that are generally invisible to the naked eye, similar to smoke in the air. The measurement of turbidity is a key test of water quality.

Water Pollution: The contamination of water bodies, usually as a result of human activities.

Water Filter: A device for removing unwanted sub- stances such as bacteria or harmful chemicals from drinking water.

ACTIVITY LENGTH OF ACTIVITY: 120 MINUTES

SUPPLIES

- ◯ Pre-cut plastic soda or juice bottle
- ◯ Vase or tall drinking glass (to collect their filtered water)
- ◯ Gravel or small stones
- ◯ Clean sand
- ◯ Activated charcoal
- ◯ Cotton balls, small cloth or coffee filter
- ◯ Gardening dirt (mix with water to make dirty water)
- ◯ Basin (so the classroom doesn't get too messy)
- ◯ Water
- ◯ Paper
- ◯ Scraps of cotton (old t-shirts)
- ◯ Gauze
- ◯ Tulle/netting
- ◯ Aluminum foil
- ◯ Plastic wrap
- ◯ Toothpicks

ACTIVITY STEPS

1. Introduction: (5 min)

Ask learners to imagine what they'd do if they turned on the tap at home and school and dirty water had been coming out for 24 hours. Have them share how life would be different. Do they know places in the US or in other countries where this is an issue? Ask them to give examples. Ask learners to explain how water in your community gets clean for people to drink.

2. What are water filters? (10 min)

Explain to the learners that they are going to be studying water filters over the next two days. You can begin by asking them what water filters are and why we might need them. If possible, bring in a Brita filter or another at-home water filter and ask the learners if they have ever seen and/or used one of these. Open up the discussion about why they might use a filter and what they remove. Different types of filters can be used to filter out larger particles, which reduces turbidity, or particles as small as bacteria that can contaminate drinking water. Reminder, all filters filter different things.

After a brief discussion on why they might use a water filter, use this time to talk about water inequality in the world and explain that over 2 billion people don't have access to clean water. Explain that while water filters aren't a solution to gaining access to clean water, they are a step in the process to getting people cleaner water to drink and use.

3. What are we filtering?: (5 min)

Ask learners where their drinking water comes from and what might need to be filtered out to make it safer. Explain the process of filtering water, the concept of turbidity, and talk about what types of things they are going to be filtering out (dirt, sediment, impurities, copper, zinc, and reducing chlorine (for the taste and smell). Tell them that they are going to be working in groups to design their own filters.

4. Materials (5 min):

Once in small groups, show learners all of the materials they will have access to use for their filters. Each group must use a 2-liter plastic bottle as the base for their filter. The other materials are available to them but don't have to be used. Remind the learners that they must have a few different layers/materials to their filters and the goal is to see which group has the clearest water, with the least turbidity.

5. Research and design: (30-45 min)

Each group has 30-45 minutes to design their filter and draw out an example of how it will be built. They will have 15 minutes to do research on the internet about water filters before they start designing. They can use search terms such as "homemade water filter". In the remaining time, learners design the water filter they plan to build. If there are any materials that they want to use that aren't in class, they are allowed to bring them the following day when they start building their filters.

6. Build it!: (30 min)

Have all of the materials ready for the groups as they come into class. Remind them that they have 30 minutes to build their water filters using the materials provided, or that they brought from home. Once the 30 minutes are up each group will present what they built and test their filters.

ACTIVITY CONTINUED...

7. Test it!: (20 min)

Have each group come to the front of the class and explain the materials they used to make their filters and why they used them. Each group will fill their filter with "dirty water" and see how "clean" their water comes out of their filter.

a. Ahead of time you will need to make "dirty water" for the learners to filter. Combine tap water with natural products that you have close by--soil, dirt, sand, grass, etc.
b. Remind your learners that they are not filtering out any bacteria or micro-contaminants. This lesson is a basic filter to remove turbidity and particles.

8. Conclusion: (10 min)

As a class, take a few minutes to answer the following questions. If you run out of time these can always be done for homework or the following class period.

a. What materials worked well for filtration?
b. What materials worked poorly for filtration? Why?
c. What about your filter design worked well? What worked well for other groups' filters?
d. What about your design needed improvement or change? What needed improvement or change for groups' filters?
e. What did you learn through this project?
f. What did you enjoy about working as a group for this project?
g. What challenges did your group face?
h. How can you take action to help ensure others have access to clean water?

TAKE ACTION

As a class and/or school community, hold a fundraiser to help DLDT purchase one or more water filters for a school in Uganda. For $150, a classroom can have a filter that removes both particles and bacteria.

Sources:

United Nations: https://sustainabledevelopment.un.org/sdg6

NAME: _____ DATE: _____

HEY WAVEMAKER, WE'VE GOT SOME QUESTIONS FOR YOU.

Using the questions below, you will be researching and designing your group's water filter. Capture everything you and your group have collected for each of the questions below.

Before Build Test

1. Water Filter Research Notes: Write key points about water filters.

2. Sketch the water filter your group intends to build. Label the items you will use to build your filter.

Build Test

3. What materials worked well for filtration?

4. What materials worked poorly for filtration? Why?

5. What about your filter design worked well? What worked well for other groups' filters?

6. What about your design needed improvement or change? What needed improvement or change for groups' filters?

After Build Test

7. What did you learn through this project?

8. What did you enjoy about working as a group for this project?

9. What challenges did your group face?

10. How can you take action to help ensure others have access to clean water?

Unit 2, Lesson 5

TAP VS. BOTTLED WATER

GRADE LEVEL: 5-8 | SUBJECT: SCIENCE, LANGUAGE ARTS | LENGTH OF LESSON: 120 MINUTES

Summary: Learners learn about bottled water and its problematic impact through research and documentaries. They take a stand on issues related to bottled water and discuss the importance of individual choices.

Drink Local Drink Tap Connection: Single-use plastic is a pressing environmental problem. At DLDT, we choose to take action on this issue and you can too. We don't serve single-use plastic water bottles at our events and we make sure to have stations for people to fill up their reusable bottles or offer compostable cups and ensure they get composted.

Learning Objectives

Learners will:

- Collect data on their own bottled water use.
- Research tap vs. bottled water.
- Research and discuss the process of the bottled water industry and its impact on the Earth.
- Conduct calculations related to bottled water use.
- Reflect on how they can help to address problems caused by bottled water through their own actions.

Background

Bottled water is connected to many issues, related to expense, health and the environment. In communities that have clean drinking water, we should choose to reduce our use of bottled water. Single-use plastic bottles create environmental problems, so use a reusable water bottle.

Some facts:

- Bottled water is often no healthier than tap water, and it can be 3,000 times more expensive.
- Approximately 25-45% of bottled water sold in the United States actually comes from municipal sources. Bottling water and shipping transport is a very energy-inefficient method of water supply.
- The production of plastic water bottles in the U.S. alone creates 2.5 million tons of carbon dioxide, a key greenhouse gas responsible for global warming.
- The number of water bottles used in the U.S. each year alone could encircle the Earth 150 times if laid end-to-end. Less than 25% of the bottles are recycled.

Source: **https://www.allfilters.com/waterfilter/bottledwater**

VOCABULARY

Single-Use Plastics: Disposable plastics, used only once before they are thrown away or recycled. These items include: plastic bags, straws, coffee stirrers, utensils, soda and water bottles and most food packaging.

BPA: BPA stands for bisphenol A, an industrial chemical used to make certain plastics and resins since the 1960s. BPA is found in polycarbonate plastics and epoxy resins. Polycarbonate plastics are often used in containers that store food and beverages, such as water bottles.

ACTIVITY

LENGTH OF ACTIVITY: 120 MINUTES

SUPPLIES

- ◯ **"Waking up to water" 20 min documentary**
  https://www.youtube.com/watch?v=ALmHd5CnlVA
- ◯ **The Story of Bottled Water:**
  https://www.youtube.com/watch?v=Se12y9hSOM0
- ◯ **Fiji Water video clip:**
  https://www.youtube.com/watch?v=juHtVC60Kuo
- ◯ **Articles listed in A Deeper Dive section**
- ◯ **Wavemaker Question Sheets**
- ◯ **Bottled vs. Tap Water Fact Sheet**

ACTIVITY STEPS

PART 1 (45 MINUTES)

1. Pre-lesson activity:

For one full week, have learners tally the number of plastic water bottles they use. If there are learners who don't use them, then they can tally the number of times they see someone in their community using them. Each morning in class, have the learners total up their numbers as a class and record this number.

2. Introduction: (5 min)

Using the tally you're keeping, start the lesson by calculating how many water bottles were used/seen the prior week. Once you have the total, divide this number by the number of learners in the class. (If the total was 336 bottles, and there are 22 learners in the class, you would divide 336 by 22 to get 15.27 bottles per week per learner.) This will give you an average number of bottles used/seen per learner in one week. Quickly go around the room and ask the learners if they think this is a high number, low number, no opinion, etc. Use this information to assess learner understanding as they begin the activity.

3. Tap vs. bottled water: (10 min)

In groups or partners, have learners make a pro/con list of both tap water and bottled water. This can also be done as a whole class. Give them about 5-7 minutes to work on this before coming back together. Share out as a group and record all of their pros and cons on the board so everyone can see.

4. "Waking up to water" documentary: (20 min)

Briefly discuss where bottled water comes from and read the accompanying Drink Local Drink Tap Fact Sheet: Tap vs. Bottled Water. This can also be assigned for pre-homework the night before this lesson. As a class, watch the documentary "Waking up to water": **https://youtu.be/ALmHd5CnlVA**. Have learners journal about their responses to the documentary in the Wavemaker Question Sheets, and discuss some of the responses together.

PART 2 (45-60 MINUTES)

5. Near and far (20-25 min):

Explain to learners that one issue related to bottled water is the distance it travels to reach the consumer. Ask if they know why. If not, explain that the many miles it travels causes increased carbon dioxide to be released into the atmosphere through ground, water or air transport, which increases the severity of climate change.

- Have learners list different companies that make bottled water. (Fiji, Dasani, Crystal Geyser, Evian, Aquafina,Smartwater)
- Show them the following clip that highlights where Fiji Water comes from. **https://www.youtube.com/watch?v=juHtVC60Kuo**
  After the clip is shown go around the room and have learners give a one-word summary of the clip. (thirsty, beautiful, beaches, etc).
- Pull up a map of the world, ideally on a projector/smart board, and have learners find Fiji on the map. Draw a line from where you are located to Fiji. Using technology--either as a whole class or individually, have learners look up the distance from where they are to Fiji and write that number on the board. If in Cleveland in the United States, the distance would be 7,538 miles, which breaks down to 3,919.760 feet.
- Have class break up into six different groups. Assign one brand of bottled water to each group and have them find out the following information:
  a. Where is this water bottled?
  b. Are there more than one bottling facilities for this brand?
  c. How many miles is it from the bottling plant to your city?
  d. After they find out the distance, have them write on the board how many miles it is from your city.
- Once all groups are finished and the information is on the board, have them order the bottling facilities from closest to furthest away.
- Ask the learners where the closest water fountain is to the classroom. Using tape measures and/or rulers, calculate how many feet it is to the water fountain.
- Discuss why these distances matter for the choices we make.

ACTIVITY CONTINUED...

6. TAKE A STAND: (20-25 MINUTES)

Based on what learners have learned so far, ask them to list key points in categories related to bottled water issues. Use these categories, or others you want to include: Human Health, Environmental Impact, Economic Issues. Write down learners points for all to see.
Once each category has key points identified, have learners stand in groups around the room to show which category they think is the biggest problem with bottled water. Each group can make a sign to identify their category and have a few learners say why they think it's the biggest problem. Acknowledge that all issues related to bottled water are problematic. Ask the whole class how their knowledge has changed since the initial Pro/Con list they made at the start of class.

7. A DEEPER DIVE:

If you want to do a deeper dive into this issue, we've provided articles for you. The list provided has articles on bottled water and related issues. This can be assigned individually, or you can tell the learners they will work with a partner to investigate issues related to bottled water and the impact water extraction has had on communities and states. Give each pair of learners the same article, or section of an article to read. After they have read the articles, have them come up with a list of important points from the article and share them with the class as part of Taking a Stand.

Article List:
This article is an overview of the issues with bottled water. If needed, split the article up into more manageable sections for learners.
https://www.consumerreports.org/bottled-water/should-we-break-our-bottled- water-habit/
This article has multiple sections. Choose 1 or 2 sections for each pair of learners to read and report on.
https://science.howstuffworks.com/environmental/green-science/bottled-water. htm
This article focuses on harmful impacts of water extraction.
https://www.nytimes.com/2019/09/15/opinion/bottled-water-is-sucking-flori- da-dry.html

8. WRAP-UP DISCUSSION: (10 MINUTES)

Have a class discussion on what they learned and how they are feeling. You can use these questions to prompt responses or just have learners share out what they are thinking and feeling.
a. What are your thoughts about the activities we did?
b. What have you learned and tap vs. bottled water?
c. How does increased consumption of bottled water impact the Earth's systems? What is your evidence for this?
d. What will you do differently now that you have this information?

ENRICHMENT ACTIVITY

Have the learners watch The Story of Bottled Water: https://www.youtube.com/watch?v=Se12y9hSOM0 and answer the following questions:

- **a. What three facts were the most surprising to you?**
- **b. Name at least one fact that you weren't aware of before today?**
- **c. What is something you can do to reduce your use of plastic bottles?**
- **d. What are some situations where using bottled water would be necessary?**
- **e. What is something you can do to teach others about some of the things that you have learned about plastic bottles?**

TAKE ACTION

Commit to not using any plastic bottles for one week.

Share what you've learned with family and friends and ask them to reduce their consumption of bottled water.

If learners don't use bottled water, have them reduce another single-use plastic from their life.

Sources:
All Filters www.allfilters.com/waterfilter/bottledwater
Tapp Water https://tappwater.co/en/carbon-footprint-bottled-water-2/#:~:text=About%20the%20CO2%20footprint%20stud-%20ies,592%20km)%20with%20a%20car.

NAME: _____ **DATE:** _____

HEY WAVEMAKER, WE'VE GOT SOME QUESTIONS FOR YOU.

Using the information from your tally sheet, answer questions 1 and 2.

1. What were the total number of bottles counted from you and your family?

2. Write a list of the pros and cons for bottled water.

3. After watching "Waking up to water", reply to the following:

   a. What are 3 things you learned from this documentary?

   b. What surprised you about what was shown in the documentary?

4. List 3-5 key facts you learned from the Drink Local Drink Tap Fact Sheet and/or any additional articles your teacher assigned to you.

5. What bottled water company did you research and how far away is their bottling plant from your community? Why does this matter?

6. How does increased consumption of bottled water impact the Earth's systems? What is your evidence for this?

7. What will you do differently after learning about bottled water issues with your classmates?

DRINK LOCAL DRINK TAP™

GET THE FACTS:
TAP WATER VS. BOTTLED WATER

TAP WATER

Tap water is water supplied to a **faucet**.

Its uses include:

✓ drinking ✓ cooking
✓ washing ✓ flushing toilets

In developed countries it is generally potable, although water quality issues exist. In many cities and towns in America, municipal water comes from **large wells**, **lakes**, **rivers**, or **reservoirs**. Most cities and towns process the water at treatment plants before the water is tested for quality and is then piped to residential homes and industries.

Access to clean water is essential to human health and survival.

In 1974, The United States Congress enacted the **Safe Drinking Water Act**. This federal law intends to **ensure that the quality of Americans' drinking water is clean and safe**. The law authorized the Environmental Protection Agency (EPA) to set national quality standards for drinking water to protect humans against harmful effects from exposure to naturally-occurring and human-made contaminants in public water systems. This law helped improve the safety of public drinking water sources. The EPA continues to oversee more than 150,000 public water systems across the U.S.

BOTTLED WATER

Tests have shown that the quality of bottled water can be questionable. The Food and Drug Administration (FDA) monitors the production and distribution of bottled water, **BUT** there is **NO** mandatory testing program for bottled water. According to some estimates, it can take up to

THREE LITERS OF WATER 

to produce **ONE** liter of bottled water, which is not an efficient use of water.

Bottled water companies draw heavily on underground water sources called aquifers as they pump groundwater for bottling.

This can harm watersheds and deplete natural water supplies.

Bottled water has become a multi-billion-dollar industry. Bottled water companies gain high profits by drawing water from public water sources, putting it in plastic containers, and reselling it at

3,000

times the price of regular tap water.

An interesting fact is that the EPA, Clean Water Act and the Safe Drinking Water Act were established out of the environmental movement in the 1960's. **This movement was inspired by the Cuyahoga River in Cleveland**, and other rivers around the nation, which caught fire in the late 1960's, due to pollution and contamination.

THE PLASTIC PROBLEM

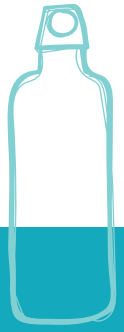
The plastic used to make **single-use water bottles contains chemicals** known to be endocrine disruptors. These chemicals, such as bisphenol A (BPA), alter the way the body makes and uses certain hormones, and can have negative health consequences. Plastic bottles can also leach additional chemicals in the water, which is dangerous to human health.

IMAGE SOURCE: img.wonderhowto.com/img/original/77/53/63573686141237/0/635736861412377753.jpg

Many types of plastics are considered safe if they are only used once, such as #1 polyethylene terephthalate (PET or PETE). However, if this type of plastic is used over and over it can leach harmful chemicals. The leaching of these various plastic chemicals has been linked to hormone disruption and cancers.

In addition to these safety issues, **there is also a huge waste issue associated with using bottled water**. More than 80% of recyclable plastic bottles end up in landfills each year. They do not break down naturally and release toxic chemicals as they do break down.

The Environmental Working Group, a non-profit, non-partisan organization dedicated to protecting human health and the environment does not recommend using bottled water unless it's in the case of an emergency.



WHAT WE CAN DO

Get your tap water tested. If you have safe drinking water, drink from your tap. If not, first get a water filter to remove contaminants to ensure your water is as clean and safe as possible.

To reduce the amount of plastic waste from bottled water consumption use your own reusable water bottle. There are many great bottle options, from glass to stainless steel.

SOURCES:

health.usnews.com/wellness/articles/bottled-water-vs-tap-water

nationalgeographic.com/news/2010/3/why-tap-water-is-better/

mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/expert-answers/tap-vs-bottled-water/faq-20058017

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