Unit 3 Overview

CLIMATE CHANGE & WATER

This unit focuses on learners gaining an understanding about the connections between water and climate change. It emphasizes how equity issues influence current and future impacts and outcomes for humans and the planet.

What's covered?

The lessons in this unit:

- Explore why climate change is happening, how it impacts people and the Earth in different ways, and what can be done to adapt and mitigate to achieve a more sustainable future.
- Emphasize the importance of human choices and actions in helping to solve climate change and water security issues, both locally and globally.

Topics include: greenhouse gases, climate change, adaptation and mitigation strategies, water equity, climate justice, and how to be a changemaker.

About these lessons:

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

What are the connections between climate change and water issues?
What effects do these issues have on humans and the Earth?

The Learning Objectives of these lessons:

- Science related to greenhouse gases and their connection to human-induced climate change.
- How climate change affects them, their local community, and other parts of the world.
- Climate change impacts manifest in issues such as: flooding, drought, water quality problems and climate migration.
- How adaptation and mitigation strategies can reduce climate change impacts.
- The connections between climate change issues, climate justice, water equity and institutional racism.
- The relationship between climate change and water security problems.
- How to take action to be a positive changemaker related to climate change and water issues.

**Note: modify lessons and terms as needed for your learners ages as you see fit*

THE 5 LESSONS:

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

The Problem with Greenhouse Gases

Learners understand green- house gases, how they impact the climate, and humans' contribution to the advancement and impact of climate change. They do this by watching brief videos, developing a model and making a commitment to reduce their reliance on fossil fuels.

Too Much, Too Little, Too Dirty

Learners learn about climate change through a brief documentary that focuses on impacts in Tanzania, create a mind map of climate change implications in different parts of the world, and consider positive local actions that can have global results.

Climate Change Where We Live

Learners research and discuss how climate change and related water issues impact their own and other communities, and understand how adaptation and mitigation strategies can reduce this impact.

It's Intersectional

Learners learn about the equity and justice issues connected to climate change and water, research related issues and plan for a transformed future.

Water Security + Climate Change Wavemakers

Learners investigate how to make positive change in the world through brainstorming, examples, and reflecting on their own strengths. They use climate change and water security issues as a base to design a real-world project that they present to their classmates.

UNIT 3: CLIMATE CHANGE AND WATER

Lesson 1: The Problem with Greenhouse Gasses

Next Generation Science Standards (NGSS)
MS-ESS3-5. MS-ETS1-2.
Framework for 21st Century Learning
Environmental Literacy
Climate Literacy Principles
The sun is the primary source of energy for Earth's climate system.

Climate is regulated by complex interactions among components of the earth's system.

Life on Earth depends on, is shaped by, and affects climate. Our understanding of the climate system is improved through observations, theoretical studies, and modeling.

Human activities are impacting the climate system. Climate change will have consequences for the Earth system and human lives.

Lesson 2: Too Much, Too Dirty, Too Little

Next Generation Science Standards (NGSS)
5-ESS3-1. MS-ESS3-2
National Council of the Social Studies (NCSS)
D2.Eco.1.3-5. D2.Geo.10.3-5. D2.Geo.5.6-8.
Common Core State Standards for English Language Art and Literacy (ELA)
CCSS.ELA-LITERACY.W.4.2, 5.2, 6.2
Framework for 21st Century Learning
Environmental Literacy Global Awareness Health Literacy

Climate Literacy Principles
Climate is regulated by complex interactions among components of the earth system.

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.
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 3: Climate Change Where We Live

Next Generation Science Standards (NGSS)
5-ESS3-1. MS-ESS3-2. MS-ESS3-3.
National Council of the Social Studies
D2.Eco.1.3-5. D2.Geo.10.3-5. D2.Geo.5.6-8.
Common Core State Standards for English Language Art and Literacy (ELA)
CCSS.ELA-LITERACY.SL.4.4, 5.4, 6.4
CCSS.ELA-LITERACY.W.4.7, 5.7, 6.7
CCSS.ELA-LITERACY.W.4.2, 5.2, 6.2

Framework for 21st Century Learning
Environmental Literacy Global Awareness
Water Literacy Principles
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 4: It's Intersectional

Next Generation Science Standards (NGSS)
5-ESS3-1
National Council of the Social Studies
D2.Civ.6.6-8.
Common Core State Standards for English Language Art and Literacy (ELA)
CCSS.ELA-LITERACY.SL.4.4, 5.4, 6.4 CCSS.ELA-LITERACY.W.4.2, 5.2, 6.2

Framework for 21st Century Learning
Environmental Literacy Global Awareness
Water Literacy Principles
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 5: Water Security + Climate Change Wavemakers

Common Core State Standards for English Language Art and Literacy (ELA)
CCSS.ELA-LITERACY.SL.4.4, 5.4, 6.4 CCSS.ELA-LITERACY.W.4.2, 5.2, 6.2

Framework for 21st Century Learning
Environmental Literacy Global Awareness

Water Literacy Principles
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.

UNIT 3: CLIMATE CHANGE AND WATER

Lesson 1: The Problem with Greenhouse Gasses

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

ELA Standards
W.3.8 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.
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: Too Much, Too Dirty, Too Little

Science Standards
3.ESS.1 4.ESS.2 7.ESS.1 7.ESS.2 3.ESS.3 4.LS.1

ELA Standards
W.3.8 W.5.9

Social Studies Standards
8th Grade Government 20: Active participation in social and civic groups can lead to the attainment of individual and public goals.

Lesson 3: Climate Change Where We Live

Science Standards
3.ESS.1 3.ESS.3 7.ESS.2 3.ESS.2 4.LS.1

ELA Standards
W.3.2 W.3.8 W.5.9 W.6.1

Social Studies Standards
8th Grade Geography 18: Cultural biases, stereotypes, and prejudices had social, political, and economic consequences for minority groups and the population as a whole.
8th Grade Government 20: Active participation in social and civic groups can lead to the attainment of individual and public goals.

Lesson 4: It's Intersectional

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

ELA Standards
W.3.2 W.4.8 W.5.9 W.6.1

Social Studies Standards
7th Grade Government 16: Analyzing individual and group perspectives are essential to understanding historic and contemporary issues. Opportunities for civic engagement exists for students to connect real-world issues and events to classroom learning.
8th Grade Geography 18: Cultural biases, stereotypes, and prejudices had social, political, and economic consequences for minority groups and the population as a whole.
8th Grade Government 20: Active participation in social and civic groups can lead to the attainment of individual and public goals.

Lesson 5: Water Security + Climate Change Wavemakers

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

ELA Standards
W.3.8 W.4.8 W.5.9 W.6.1

Social Studies Standards
7th Grade Government 16: Analyzing individual and group perspectives are essential to understanding historic and contemporary issues. Opportunities for civic engagement exists for students to connect real-world issues and events to classroom learning.
8th Grade Government 20: Active participation in social and civic groups can lead to the attainment of individual and public goals.

Unit 3, Lesson 1

THE PROBLEM WITH GREENHOUSE GASES

GRADE LEVEL: 6-8 | SUBJECT: SCIENCE | LENGTH OF LESSON: 90 MINUTES

Summary: Learners understand greenhouse gases, how they impact the climate, and humans' contribution to the advancement and impact of climate change. They do this by watching brief videos, developing a model and making a commitment to reduce their reliance on fossil fuels.

Drink Local Drink Tap Connection: DLDT recognizes that climate change impacts the whole planet and has a strong connection to water. To help reduce the impact and adapt to climate change, DLDT works locally and globally so that people have climate resilient water, sanitation, and hygiene services.

Learning Objectives

Learners will:
- Discuss greenhouse gases, and their effect on the Earth
- Plan and revise a model about greenhouse gases
- Describe the connection between greenhouse gases, climate change and the role humans play
- Understand that climate change impacts climate patterns all around the world
- Understand that climate change has been largely caused by human impact/activity
- Reflect on human reliance on fossil fuels and ways to decrease this

Background

Globally, most scientists agree on the facts about greenhouse gasses and human-induced climate change. The information in this background section is from NASA's website.

According to the NASA scientists, on Earth, all life depends on energy coming from the sun. About half the light reaching Earth's atmosphere passes through the air and clouds to the surface. There, it's absorbed and then radiated outward as infrared heat. Most (about 90 percent) of this heat is absorbed by the greenhouse gases and radiated back toward the surface. Certain gases in the atmosphere block heat from escaping. We need this natural "greenhouse" to keep Earth's temperature hospitable for human life.

On Earth, human activities are changing the natural "greenhouse." Over the last century, the burning of fossil fuels including coal and oil has increased the concentration of carbon dioxide (CO_2) in the Earth's atmosphere. This happens because the coal and oil burning process combines carbon with oxygen in the air to make CO_2. The clearing of land for agriculture, industry, and other human activities has increased concentrations of greenhouse gases to a lesser extent.

While Earth's climate has changed throughout history, the current warming trend is significant because most of it is extremely likely the result of human activity since the mid-20th century. The warming trend is proceeding at a rate that is unprecedented. Climate change impacts we are seeing include:

- Global temperature rise
- Warming oceans
- Shrinking ice sheets
- Glacial retreat
- Decreased snow cover
- Sea level rise
- Declining Arctic Sea ice

Also according to NASA, the Intergovernmental Panel on Climate Change, a group of 1,300 independent scientific experts from countries all over the world connected to the United Nations, has concluded that there's a more than 95 percent probability that human activities over the past 50 years have warmed our planet.

While humans have had a strong hand in creating climate change, we can also have a hand in reducing the impact of climate change by taking individual action and working for much-needed larger systemic changes.

Remote Learning Lesson

This lesson can be done as a remote learning activity. Here are the steps:
1. Have learners watch the first 2-minute video link, answer the Wavemaker Question Sheets and individually diagram a model of the greenhouse effect.
2. Convene the learners via videoconference to discuss the difference between climate and weather, the greenhouse effect, greenhouse gases and their impact on climate change, as well as their initial diagrams.
3. Have the learners independently watch the second video clip, redesign their diagrams and answer the questions related to climate change and their fossil fuel reliance.
4. Convene the learners via videoconference to share their revised diagrams and their thoughts on how to reduce their reliance on fossil fuels, and why this is important.

VOCABULARY

Carbon Dioxide: Is a colorless, odorless gas found in Earth's atmos- phere. Its chemical formula is CO_2, which means it is one carbon atom bonded to two oxygen atoms. It is a waste product in our bodies and is also produced by burning fossil fuels.
Climate: Average daily weather for an extended period of time, at a certain location.
Climate Change: A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.
Fossil Fuels: A fuel (such as coal, oil, or natural gas) formed in the earth from plant or animal remains.
Global Warming: An increase in the earth's atmospheric and oceanic temperatures widely predicted to occur due to an increase in the green-house effect resulting especially from pollution.
Greenhouse Effect: A process that occurs when gases in Earth's atmos-phere trap the sun's heat. This process makes Earth much warmer than it would be without an atmosphere. The greenhouse effect is one of the things that makes Earth a comfortable place to live.
Weather: Short-term conditions of the atmosphere.

ACTIVITY

LENGTH OF ACTIVITY: 90 MINUTES

SUPPLIES

- ◯ **The Greenhouse Effect:** **https://www.youtube.com/watch?v=VYMjSule0Bw**
- ◯ **NASA Kids: Greenhouse Effect:** **https://climatekids.nasa.gov/greenhouse-effect/**
- ◯ **Bill Nye Climate 101 Video:** **https://www.youtube.com/watch?v=3v-w8Cyfoq8**
- ◯ **Drink Local Drink Tap Climate Crisis and Water Security Fact Sheet**

ACTIVITY STEPS

1. Climate vs. Weather (5 min):

Ask Learners to explain the difference between "weather" and "climate." Climate is the long-term pattern of weather in a particular area. Weather can change from hour-to-hour, day-to-day, month-to-month or even year-to-year. A region's weather patterns, usually tracked for at least 30 years, are considered its climate.

2. Basics about the Greenhouse Effect (10 min):

Ask your learners what they have heard about the "greenhouse effect." Ask them to explain whether they think it is good or bad and how it affects the Earth's climate. Lead a short class discussion around this topic. Your learners may think the greenhouse effect is "bad" because of what they've heard about the role of the greenhouse effect in climate change. Like many natural phenomena, the greenhouse effect is neither "good" nor "bad". Without the greenhouse effect, which is caused by gases that occur naturally in our atmosphere, Earth would be an inhospitable, frozen ball of ice. The greenhouse effect helps to keep our climate habitable. However, too much greenhouse effect, produced mostly by humans burning fossil fuels, is warming our climate to an extent that causes many problems.

3. Video and reflection (5 min):

Have learners watch this 2 minute video about the greenhouse effect: **https://www.youtube.com/watch?v=VYMjSule0Bw**
For variety, here's another video link about this topic: **https://climatekids.nasa.gov/greenhouse-effect/**
After they watch one or both videos, give learners a few minutes to silently reflect and write down what they learned. Have learners share the main ideas with their classmates.

4. Share and diagram with partner (15 min):

In pairs, have learners respond to the following questions, which challenges them to design a model of the greenhouse effect in the classroom.

a. How can you demonstrate the greenhouse effect in your classroom?
b. What materials will you need?
c. Create a diagram that shows how you will set up your demonstration and label the materials you will need.

5. Share ideas (5 min):

Have learners share ideas with the whole class. Make note of the different ideas for models and let learners briefly debate what they think will work and not work.

6. Watch and respond (10–15 min):

Show the learners a second video clip. In this video, Bill Nye, a well-known scientist creates a model that shows how greenhouse gases impact the Earth's temperature: **https://www.youtube.com/watch?v=3v-w8Cyfoq8**. Have them respond to the following questions:

a. Knowing that there is more than one way to demonstrate the greenhouse effect, after watching this video, how would you alter your demonstration and diagram?
b. Make the changes to your diagram.
c. How is the greenhouse effect connected to climate change?

7. Class discussion (10 min):

Come back together as a class and have a discussion about the video. Use these questions to guide your discussion:

a. What is the greenhouse effect?
b. Why do we need some greenhouse gases?
c. How are humans adding CO2 and other greenhouse gases to the atmosphere?
d. What are some examples of fossil fuels?
e. What are some of the major consequences of warmer temperatures on Earth? How does this impact you and your community?

ACTIVITY CONTINUED...

8. Fossil fuel reliance (10 min):

Working with their same partners from the beginning of the lesson, have learners work together to create two lists. The first list is all of the ways they are reliant on fossil fuels. The second list is ways they can decrease their use and reliance on fossil fuels.

Have learners share with their partner what action they or their family can commit to in order to reduce reliance on fossil fuels. Some examples have to do with energy conservation at home with energy efficient appliances and lighting, driving and flying less, using more public transportation and bikes, reducing buying objects made with fossil fuel energy, reusing objects when possible, educating others about this issue and working for larger systemic and policy change.

9. Journaling: (5-10 min)

Allow learners time to reflect on what they learned today, how it impacted them and what they can commit to do to reduce reliance on fossil fuels. Remind them that human behavior has led to global warming and climate change and it is up to all of us to make positive changes to help, as individuals and helping to change larger systems to become more eco-friendly.

ENRICHMENT ACTIVITY

Review their diagrams. If your class has time and access to the needed materials, learners can build a model that demonstrates the greenhouse effect.

Here's a link to a simple model: https://www.teachengineering.org/activities/view/cub_air_lesson07_activity2

TAKE ACTION

Have learners talk to other classes, their family and friends about what they're learning about the science behind human-induced climate change.

They can share what they've learned and talk about how individuals can make small changes that have a positive impact on the problem.

Educators can help learners prepare for these conversations and the responses to advance the conversations productively. Teachers can also debrief with learners about their conversations.

Ask learners what they hear in these conversations. Help them navigate ways to listen, understand and respond to different perspectives.

Sources:

NASA https://climate.nasa.gov/causes/
PBS www.pbslearningmedia.org/resource/ess05.sci.ess.watcyc.lp_global1/global-cli- mate-change-understanding-the-greenhouse-effect/
Teach Engineering www.teachengineering.org/activities/view/cub_air_lesson07_activity2

NAME: _____ **DATE:** _____

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

Instructions here

1. What's the difference between climate and weather?

2. What did you learn from the 2 minute video "The Greenhouse Effect"?

3. Create a diagram that shows how you would demonstrate the greenhouse effect in your classroom, using materials you could buy at a store. Answer these questions:

   a. How can you demonstrate the greenhouse effect in your classroom, using a variety of materials?

   b. What materials will you need?

   c. On a seperate sheet of paper, create a diagram that shows how you will set up your demonstration and label the materials you will need.

4. After you watch the video "Climate 101 with Bill Nye", answer these questions:

   a. Knowing that there is more than one way to demonstrate the greenhouse effect, after watching this video, how would you alter your demonstration and diagram?

   b. How is the greenhouse effect connected to climate change?

NAME: DATE:

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

5. Summary Discussion:

   a. What is the greenhouse effect?

   b. Why do we need some greenhouse gases?

   c. How are we adding CO2 and other greenhouse gases to the atmosphere?

   d. What are some examples of fossil fuels?

   e. What are some of the major consequences of warmer temperatures on Earth? How does this impact you and your community?

6. Fossil Fuel Reliance and Reduction Commitment

   a. How are you reliant on fossil fuels?

   b. What can you and your family commit to in order to reduce your reliance on fossil fuels?

7. Journaling: On a seperate sheet of paper, spend a few minutes writing about what you learned today and how you can help solve the problem of climate change.

DRINK LOCAL DRINK TAP™

GET THE FACTS:
CLIMATE CRISIS & WATER SECURITY

CLIMATE CHANGE

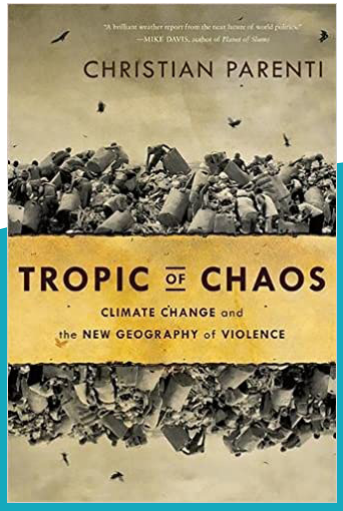
Climate Change is the change in global or regional climate patterns, attributed largely to the increased levels of atmospheric carbon dioxide produced by fossil fuels through human use. The effects of climate change are happening even faster than initially predicted and are considered a global crisis. This "climate crisis" is seen through weather pattern shifts, extreme weather becoming more frequent and severe, and animal and human migrations that are due to these changes.

WATER SECURITY

Water Security is when people have sustainable access to enough good quality water for: livelihoods, human well-being, socio-economic development, protection against water-borne pollution and water-related disasters, and for preserving ecosystems in an environment of peace and political stability. The ability to provide and maintain water security is becoming increasingly more difficult across the globe due to the climate crisis.

CLIMATE CRISIS

The "climate crisis" is a term that describes the threat of global warming and climate change to the planet and urges aggressive solutions and mitigation. Changes in weather patterns and increased frequency of severe weather events affect both the land and the people and wildlife that live on that land. In 2017 alone, over 30 million people were affected by the climate crisis. We are seeing more flooding, larger fires, land loss, emerging disease, changes in migrations, and each of these affect how people live and provide for their families.



A suggestion for adult readers, *Tropic of Chaos*, explains migrations, violence, civil war, famine and hardships due to the climate crisis in hot spots.

THE EASIEST WAY TO OBSERVE THE EFFECTS OF THE CLIMATE CRISIS IS THROUGH WATER.

Too much water.

Larger more severe flooding is being experienced around the globe. This affects crops, causes rises in sea and lake levels and increases water pollution.

Too little water.

Droughts are becoming more severe. This contributes to heat waves, larger and hotter fires, a lack of drinking water, and crop destruction.

Too dirty water.

Water becomes polluted with flooding, algal blooms suffocate water supplies with hotter temperatures and more runoff (see Fact Sheet on algal blooms) and combined sewer overflows systems are overwhelmed (see Fact Sheet on CSO's).

WHAT WE CAN DO

Educate yourself by listening to climate scientists and paying attention to what your elected officials are doing in relation to the environment. Choose to make changes to your habits, such as: refuse plastic bags and straws, reuse materials, limit buying new items, support local organic farmers, walk or ride a bike when possible, and talk to others about how those small acts can contribute to positive change.

Get involved on a local level with your community and consider taking part in a beach or park cleanup. Donate or fundraise for organizations who are fighting the good fight. Be conscious of who your sources of information are and seek science-based, factual sources. Anytime you see or hear about a climate-related crisis ask yourself -

How will this affect the future? What can we be doing differently?

Dig in and ask the hard questions. The human impact of the climate crisis can often be hard to absorb but if we ignore it we are contributing to the problem.

SOURCES:
https://www.internal-displacement.org/global-report/grid2018/
United Nations
https://www.unwater.org/publications/water-security-infographic/
https://www.un.org/en/un75/climate-crisis-race-we-can-win

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Unit 3, Lesson 2

TOO MUCH, TOO LITTLE, TOO DIRTY

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

Summary: Learners learn about climate change through a brief documentary that focuses on impacts in Tanzania, create a mind map of climate change implications in different parts of the world, and consider positive local actions that can have global results.

Drink Local Drink Tap Connection: DLDT works in east Africa to ensure people have access to clean water. Climate change is creating increased water scarcity due to drought and looding and the erosion from severe storms. This is causing climate migration in East Africa and other parts of the world. DLDT's documentary, "The Last Drop", calls attention to the increasing difficulty that climate change causes and its relation to water conflict's impact on human lives.

Learning Objectives

Learners will:
- Reflect on the connections between climate change and water issues.
- Compare carbon emissions for different countries and continents.
- Discuss climate change implications and solutions in different parts of the world, using information learned from a documentary.
- Consider solutions, including their personal actions, to help address climate change climate change.

Background

This lesson tackles the serious topic of climate change, which has severe and life-threatening consequences for humans, currently and in the future. Climate change and water issues are tightly connected. In this lesson learners learn about the broader implications of climate change and connections to other issues and parts of the world.

Serious environmental issues are not easy to approach with learners, yet our youth will lead the future and need the knowledge to be engaged in shaping it. At DLDT, we believe learners should understand that humans are responsible for causing global warming, which leads us to the climate change impacts we're currently experiencing. Learners should also understand that humans are also problem solvers who can mitigate the effects of climate change and set humanity on a more sustainable course for the future. To do this, we must act quickly with systemic and transformative changes. Achieving a more sustainable future depends on youth engaging in learning experi- ences that help learners understand the full scope of climate change and humans' role in both creating and addressing it.

Climate Change
Climate change affects every country in the world, although its impact is not felt equally across all regions, nor will it be in the future. Developing countries, places with widespread poverty, and countries with ineffective governments often face the gravest risks from climate change, since they are not always well-equipped to prepare for and prevent environmental threats.

In the southern hemisphere, drought is exacerbated because it is already hot, and getting hotter due to climate change. The effects of severe storms and flooding are also increased due to lack of infrastructure and building construction that cannot withstand some of these impacts. These issues are life threatening and life-changing and can be difficult to see and think about. Yet, it's important to understand the global impacts of climate change and how the actions, both positive and negative, of humans around the world are connected and can have an impact on each other.

Climate Change and Water Issues
The world's water problems regularly make the news because the scale of the issues has grown to critical proportions that put many human health and lives at stake. According to the World Bank, the global water crisis is one of "too much, too polluted and too little".
- Too much because the devastating impacts of floods, exacerbated by climate change, is hitting poor people first and worst.
- Too polluted because so much wastewater does not get collected or treated as a result of severe storms and flooding. Also, warmer temperatures cause an increase in the growth of algae in water, which can lead to water quality issues.
- Too little because across the world today 2.1 billion people lack reliable access to safely managed drinking water services and 4.5 billion lack safely managed sanitation services, which means that a majority of the global population go without safe containment, emptying/collection, conveyance, treatment and reuse/ disposal of their waste. Water scarcity can spur migration of people and spark civil conflict.

Taking Action: In this lesson, learners consider actions to take. When discussing issues that can be overwhelming, consider these tips with your learners:
- **Emphasize Actionable Steps**: Have learners think about and take actions that are within their control. For example, at home or in school learners can organize a challenge to increase the number of learners and teachers who bring reusable bottles to school. Remember that: "Action feeds hope, and hope feeds action."
- **Manage What You Can Manage**: We can all make parts of change happen. If each one of us takes some positive action, this adds up into larger changes. One person can make a difference. Join DLDT's #Waves4Change campaign to contribute your actions.
- **Become Larger Than Yourself**: Because we need individual action and large-scale systemic change, it's important to get connected with groups working on this type of change. Consider engaging more deeply with Drink Local Drink Tap or other nonprofit organizations, campaigns or movements.

VOCABULARY

Climate Change: A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.

Climate Migrants: People who leave their place of origin due to sudden or gradual alterations in the natural environment related to at least one of three impacts of climate change: sea-level rise, extreme weather events, and drought and water scarcity.

Drought: A prolonged period of abnormally low rainfall, leading to a shortage of water.

Flooding: A rising and overflowing of a body of water especially onto normally dry land.

Water Security: People have sustainable access to enough good quality water for: livelihoods, human well-being, socio-economic development, protection against water pollution and water-related disasters, and for preserving eco-systems in a climate of peace and political stability.

Wavemaker: A person who works to create positive change in the world.

ACTIVITY

LENGTH OF ACTIVITY: 90 MINUTES

SUPPLIES

- ◯ **"The Last Drop" Documentary (15 minutes): https://www.youtube. com/watch?v=6J7aqaKIKPE**
- ◯ **Climate Reality Solutions website: https://www.climaterealityproject. org/sites/default/files/APR%2018%20 NGK-Climate%20Change% 20tips_0.pdf**
- ◯ **DLDT Fact Sheet: Climate Crisis and Water Security**
- ◯ **CO2 Emissions Graph: https://www.ucsusa.org/resources/each- countrys-share-co2-emissions**

ACTIVITY STEPS

1. Introduction (5 min):

Tell learners that they will be learning about climate change, which is one of the biggest problems humans face, and you will also talk about ways to address this problem. It's important that learners understand this issue and understand how to take action so they can help solve it, since it will impact their future.

Have the following sentence written on a board or projected: "Climate change impacts show up through water as: too much, too little and too dirty." Ask learners to respond to what they think this statement means in the Wavemaker Question Sheets. Briefly discuss learners' responses, what causes climate change and the impacts it has for people and the planet. For more information, learners can read: Climate Crisis and Water Security Fact Sheet.
**For a lesson that focuses more on these climate change basics, see DLDT's lesson in this unit: The Problem with Greenhouse Gases.*

2. Carbon Emissions Graph (10 min):

Tell learners that the most severe impacts of climate change are being felt in developing countries in the southern hemisphere of the Earth. As a class, discuss this graph that shows different country's shares of the total CO2 emission produced: https://www.ucsusa.org/resources/each-countrys-share-co2-emissions. These emissions have a direct impact on increasing the impact of climate change. Ask learners:

a. Which countries are producing the most CO2 emissions?
b. Are these also the countries most impacted by climate change? Developing countries, places with widespread poverty, and countries with ineffective governments often face the gravest risks from climate change, since they are not always well-equipped to prepare for and prevent environmental threats.

Notice that Africa produces a small percentage of carbon emissions. The film the class will watch next focuses on Tanzania, a country in Africa.

3. Documentary and discussion (25 min):

Watch Drink Local Drink Tap's documentary **"The Last Drop"** (15 minutes - Link in 'Supplies'). The documentary features stories told by Tanzanian elders, government leaders and community members from the front lines of climate change and water stress in the Kilimanjaro Region of Tanzania.
***Note**: Pre-watch the film to be sure it's appropriate for your learners. Parts of this film can be difficult to watch because it deals with people who are struggling for survival and come into conflict, as a result. At one point, a woman tells about how her husband died from a water related conflict. In another part, it's discussed that animals were killed as a result of conflict over water.

Prepare the learners for what they will see by explaining that this film brings up important issues related to climate change implications, such as flooding (too much water) drought (too little water) and water quality issues (too dirty), and shows the very real impacts of climate change on people living in rural Tanzania.

After watching the documentary, have learners talk about some of the problems they saw that are related to climate change and water. While this film takes place in Tanzania, learners can also talk about climate change issues that affect them locally. Here are reflection and discussion questions, also in the Wavemaker Question Sheets:

a. What stands out to you from the documentary?
b. What could the future hold for the people in this region? Discuss the ideas of climate migration, water security, conflict resolution, economic investment from governments.
c. Many people are working to address climate change issues. What types of solutions could help address climate change-related issues?

Timing: If you have extended time, continue with the Climate Change Mind Map, which is the next step. If you have 45 minute class periods, start the second day with this step.

ACTIVITY CONTINUED...

4. Climate change mind map (15 min):

Using the graphic organizer in the Wavemaker Question Sheets, have learners create a mind map about the issues related to climate change. Using the diagram provided, have learners fill in issues related to climate change. The changes can be related to the film, and to their own lives. In the center of the diagram is a circle, with the words "Climate Change Leads To..." with 6 lines leading to a box at the end of each line. On three of the lines, there are the words: too much: flooding, too little: drought and too dirty: water quality. The other 3 lines are blank so learners can fill in their own ideas for climate-related impacts. In each box they write the outcomes, such as: food and water shortages, hungry and thirsty people, people must leave their homes to meet their basic needs.

5. Local impacts (10 min):

While climate change disproportionately affects developing communities in the Global South, its effects are felt in all parts of the world. Ask learners to give examples of how climate change impacts their country, region, state and/or community.

6. Taking action (10 min):

Explain that we can change the course of climate change impact, but we must take action quickly and at large scale. While individual actions may seem small, they do make a difference. When discussing issues that can be overwhelming, remember to consider the tips in the last section of the Background Information for your learners. In pairs, have learners look at "13 Ways to Save the Earth from Climate Change": **https://www.climaterealityproject.org/sites/default/files/APR%2018%20NGK-Cli- mate%20Change%20tips_0.pdf**
Learners should each choose 2 actions they can commit to that help alleviate the impacts of climate change. Have them make a commitment to trying these actions, and adding new actions, as they are able to. If there is time, have learners consider actions they can take as a class or a whole school.

7. Whole group (10 min):

Ask learners to share their commitments and ideas for the class and school. Remind learners that individual actions make a difference, and that they and their families can also get involved with groups working for larger scale systemic change.

TAKE ACTION

As a class or individually, learners can participate in DLDT's activities to raise awareness and funds for water and sanitation access work in Uganda. Learners are encouraged to hold a fundraiser to support this work.

Learners can take what they've learned to help friends and family members become a Wavemaker and make positive change in the world. DLDT's website has resources to download and share to achieve this mission, including a full kit on how to become a Wavemaker.

Working with youth 12+? Consider using our book "Make Waves 4 Change" to build specification plans.

Sources:

World Bank https://blogs.worldbank.org/water/tackling-crisis-too-much-too-little-too-polluted
Climate Reality Project www.climaterealityproject.org/sites/default/files/APR%2018%20NGK-Climate%20Change%20tips_0.pdf
UCS www.ucsusa.org/climate/solutions
Time https://time.com/5687470/cities-countries-most-affected-by-climate-change/
Washington Post www.washingtonpost.com/lifestyle/on-parenting/ways-to-help-kids-cope-with--and-help-combat--climate-change/2019/01/21/f7cc6424-180a- 11e9-9ebf-c5fed1b7a081_story.html
UN www.un.org/sustainabledevelopment/blog/2019/06/lets-talk-about-climate-migrants-not-climate-refugees/

NAME: _____ **DATE:** _____

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

Instructions here

1. Read the following statement and write what you think this means?
"Climate change impacts show up through water as: too much, too little and too dirty."

2. Using the Carbon Emissions Graph, answer the following questions.

   a. Which countries are producing the most CO2 emissions?

   b. Are these also the countries most impacted by climate change?

3. "The Last Drop" Documentary

   a. What stands out to you from the documentary?

   b. How are climate change issues similar and different in places like Tanzania vs. North America?

   c. Climate change effects lead to water conflict and climate migration. (Climate migration means more people will migrate in search of better opportunities, as living conditions get worse in their places of origin.) How could this impact the future?

   d. Many people are working to address climate change issues. What types of solutions could help address the climate change-related issues you've seen?

NAME:

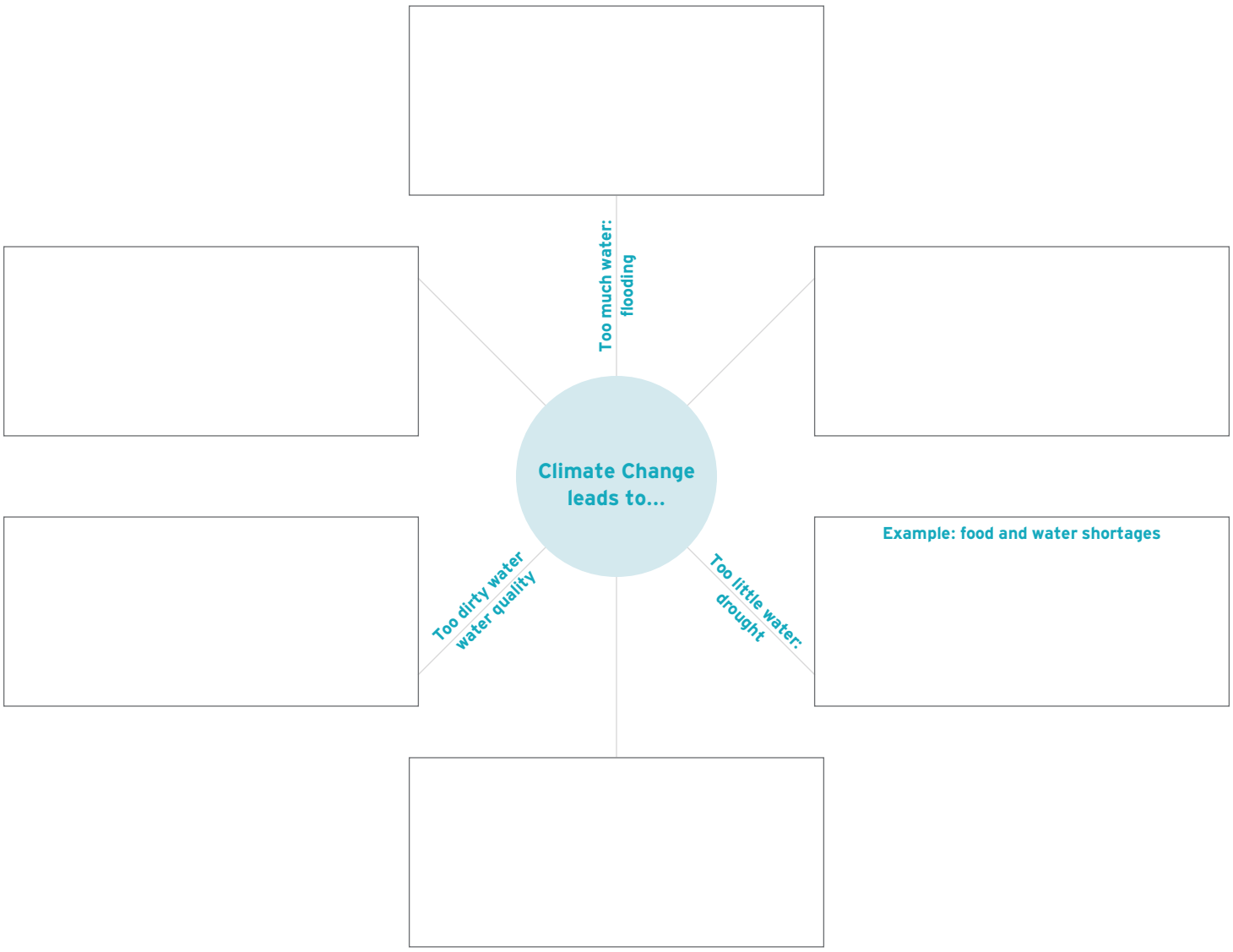
DATE:

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

Instructions here

4. Climate Change Mind Map:

Using the diagram provided, fill in issues related to climate change. The changes can be related to the film, and to your own life. Fill in the pre-labeled sections and add your own words to the other sections. Some lines are blank so you can fill in your own ideas for climate-related impacts. In each box, write the outcomes, such as: food and water shortages, hungry and thirsty people, people must leave their homes to meet their basic needs.



Unit 3, Lesson 3

CLIMATE CHANGE WHERE WE LIVE

GRADE LEVEL: 6-8 | SUBJECT: SCIENCE, SOCIAL STUDIES | LENGTH OF LESSON: 120+ MINUTES

Summary: Learners research and discuss how climate change and related water issues impact their own and other communities, and understand how adaptation and mitigation strategies can reduce this impact.

Drink Local Drink Tap Connection: DLDT is based in Ohio in the United States, and partners with organizations in the Great Lakes region and nationally to educate about climate change.

Learning Objectives

Learners will:

- Discuss how climate change impacts them and their community.
- Clarify the difference between climate adaptation and mitigation strategies.
- Research specific climate change impacts and their connection to water.
- Report out climate change impacts and plans to their classmates, for their own city and other communities.
- Choose actions they can take to help reduce climate change impacts.

Background

Climate change is a shift in global or regional climate patterns, in particular a shift apparent from the mid to late 20th century onwards. It's attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.

Climate change is expected to affect every country in the world, but its impact will not be felt equally across all regions and some will be worse hit than others because of a range of different threats. Climate change results in more severe storms, which leads to flooding and pollution. It can also cause drought, which can lead to water and food shortages, which leads to climate migration. Developing countries, places with widespread poverty, and countries with ineffective governments often face the gravest risks from the changing climate, and are usually poorly equipped to find ways to prepare for and prevent environmental threats.

To help address the impacts of climate change, the Paris Agreement is an agreement within the United Nations Framework Convention on Climate Change (UNFCCC), dealing with greenhouse gas emission mitigation, adaptation, and finance, signed in 2016. As of February 2020, all UNFCCC members have signed the agreement, 189 have become party to it, and the only significant emitters which are not parties are Iran and Turkey.

The Paris Agreement's long-term temperature goal is to keep the increase in global average temperature to well below 2 °C above pre-industrial levels; and to pursue efforts to limit the increase to 1.5 °C, recognizing that this would substantially reduce the risks and impacts of climate change. This should be done by reducing emissions as soon as possible and increasing the ability of communities to adapt to the adverse impacts of climate change. Many communities, as well as businesses, have created and are implementing plans to reduce their climate change impacts in a variety of ways, some of which are highlighted in this lesson.

Remote Learning Lesson

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

1. In a group discussion, review the basics about climate change, how it is impacting your region and introduce the concept of adaptation and mitigation strategies.
2. Independently, have learners write down what they know and want to know about climate change, read 1 or both articles in Step 2 and complete the Adaptation and Mitigation section in the Wavemaker Question Sheets.
3. Either independently or in groups, have learners conduct the climate action research project on what different cities, and their own city, are doing to mitigate the impact of climate change.
4. During or after the project, try to schedule a city official or nonprofit expert to talk to your learners about your city's climate change action plans via video call.
5. After learners have completed their projects, schedule a large group video call for learners to share their results, their own behavior change to reduce climate change impacts, and suggestions about what's needed for their community to be more proactive in addressing climate change.

VOCABULARY

Climate: Average daily weather for an extended period of time, at a certain location.
Climate Adaptation (Adaptation): Protect people and places by reducing their vulnerability to climate impacts.
Climate Change: A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.
Climate Migrants: People who leave their home because of climate stressors.
Climate Mitigation (Mitigation): Slow the process of climate change, usually by lowering the level of greenhouse gases in the atmosphere.
Climate Resilience: A system's ability to absorb climate change stresses and maintain functionality; adapt, reorganize, and evolve to improve the sustainability of the system, leaving it better prepared for future climate change impacts.
Fossil Fuels: A fuel (such as coal, oil, or natural gas) formed in the earth from plant or animal remains.
Resilience: Capacity to respond to change and recover quickly from difficulties.
Weather: Short-term conditions of the atmosphere.

ACTIVITY LENGTH OF ACTIVITY: 120+ MINUTES

SUPPLIES

- Climate Change - Impact on Cities: https://www.climatecentral.org/news/report- american-warming-us-heats-up-earth-day https://www.vox.com/a/weather-climate- change-us-cities-global-warming
- Time Magazine: https://time.com/5687470/ cities-countries-most-affected-by-climate- change/
- Cities Leading the way: 7 climate action plans to deliver on the Paris Agreement: https://resourcecentre.c40.org/resources#ci- ties-leading-the-way
- Additional eco-friendly commitments from other cities: https://www.c40.org/ other/city-commitments
- Top 5 Cities Leading on Climate Discusion: https://www.cdp.net/en/cities/infocus-cities
- Global Covenant of Mayors: https://www. globalcovenantofmayors.org/

ACTIVITY STEPS

1. Climate impact where we live (5 min):

At the outset of this lesson, make sure learners 1) are clear on the difference between climate and weather (see definitions) and 2) know about the human-related causes of climate change. For another lesson on these topics, see the lesson plan in this unit: The Problem with Greenhouse Gases.

Begin by asking learners what they've heard, know and want to know about how climate change is impacting different parts of the world, including where you live. Consider impacts that include: severe storms, flooding, drought and other impacts. Depending on where you live, you may have greater or less severe impacts, but all parts of the world are affected by climate change.

Tell learners that you will be learning about the impact of climate change on different communities and how it's being dealt with and planned for.

2. Climate impacts (10 min):

Have learners read about how climate change is impacting places and then discuss. We have options for this step and have provided an article that focuses on US cities: (**https://www.climatecentral.org/news/report-american-warming-us-heats-up-earth-day**), one to look at YOUR city (**https://www.vox.com/a/weather-climate-change-us-cities-global-warming**) and another that focuses on places outside of the US.: (**https://time.com/5687470/cities-countries-most-affected-by-climate-change/**). Learners can either read one or all three articles.

If you have limited time, assign different articles or sections of the articles to learners or groups of learners, then the groups and class talk about the differences and similarities across cities.

For the Time Magazine article, discuss the idea that many of these cities are in developing countries and have limited money and other resources to deal with these issues. Acknowledge the inequity that developed countries are producing the most greenhouse gases, and yet developing countries are some of the places most heavily impacted by climate change. For a lesson focused on this topic, see the lesson in this unit: Too Much, Too Little, Too Dirty.

3. Climate strategies (15 min):

Explain that communities around the world are putting practices and solutions in place to help reduce climate change impacts and increase climate resiliency, in accordance with the Paris Agreement (see background information).

Discuss the terms "adaptation" "mitigation" and "climate resilience", as they apply to climate change. Explain that these are different ways that communities plan for climate change and protect people and the planet. Briefly describe the difference between climate change mitigation and adaptation (see definitions). Remember that:

- Mitigation tackles the causes and minimizes possible impacts of climate change.
- Adaptation looks at how to reduce the negative effects already in play, and how to take advantage of any opportunities that arise.

Give learners the Adaptation + Mitigation examples to categorize in the Wavemaker Question Sheets provided at the end of the lesson.

These are the correct responses for the Wavemaker Question Sheets in Adaptation + Mitigation. Those with a star have to do with water:

a. A community replants a nearby forest and repairs damaged wetlands. A*
b. A city promotes public transportation and offers a bicycle lending program to reduce the number of journeys by cars. M
c. A community chooses to improve its energy efficiency by providing the electricity for its inhabitants with renewable energy, instead of fossil fuels. M
d. A farmer plants different and diverse crops. A*
e. A community develops a climate action plan to prepare for emergencies. A*
f. Improved roads, bridges and building designs to resist weather damage are prioritized. A*
g. A company improves industrial processes to use less energy, water and materials. M*
h. A city develops strategies to protect homes and buildings from flooding. A*

4. Planning for climate change: (15 min):

Tell learners they're going to research how communities are addressing climate change issues in real life, including where you live. They can work independently, in partners or in groups. Either assign a city to learner/partners/group, or have the group choose one.

Have learners also research the community, city, state or region you live in to assess the climate-related plans and actions that are in place. Learners should share their findings in a brief written or powerpoint summary that they present to each other.

ACTIVITY CONTINUED...

5. Research project: (30-60 min):

In this section we've provided a list of cities that have climate plans to investigate. For more detail, use the suggested websites here and in the "Supplies" list. Learners can also conduct independent research using other sources.

Before starting this phase, acknowledge that some of the cities that learners will research are in developed countries that have more money and other resources to develop and implement these plans. Have learners research additional cities in developing countries for economic comparisons. Here are some sites to get the research started.

a. Cities Leading the Way:
https://assets.locomotive.works/sites/5ab410c8a2f42204838f797econtententry5ab410fb74c4833febe6c81a/5b97d05514ad66062f99bd66/files/C40_Report_Cities_leading_the_way.pdf?1536675925
Cities highlighted: Barcelona, Copenhagen, London, New York, Oslo, Paris, Stockholm

b. Top 5 Cities Leading on Climate Discussion: **https://www.cdp.net/en/cities/infocus-cities**
Cities highlighted: Cleveland, Durban, Mexico City, Paris, Sydney

c. Global Covenant of Mayors lists many cities around the world and what they are doing related to climate change: **https://www.globalcovenantofmayors.org**

Here are questions for learners to respond to. They use the same questions for their own city as they do for the other city they research.

- What is the city, community or region you're investigating?
- Is the city in a developed or developing country?
- What are the key points of their climate plan?
- How do the plans use resiliency, adaptation and mitigation?
- How does the plan address the unique environmental and cultural characteristics of the city?
- How will the plans address issues related to water?
- How are they measuring success and failure?
- How are the plans working so far?
- For your own city, what improvements do you suggest for the climate plan and progress?

6. Report out (45+ min):

Give learners time limits and allow them to report in a creative fashion. Discuss what learners have found, highlighting mitigation and adaptation efforts. Remind learners that these actions are important to a more livable future for all.

7. Exit slip (5 min):

Have learners commit to their own behavior change to reduce climate change impacts, and suggest what's needed for their community to be more proactive in addressing climate change.

8. Homework:

Have learners describe what the future will look like if cities' climate action plans are successful.

ENRICHMENT ACTIVITY

Invite a member of your city government in to speak to the class about the local climate plan, if possible.

TAKE ACTION

Learners adopt behavior changes needed to help reduce climate change impact and graph/report on progress to classmates.

Learners write a letter to community decision makers to encourage action and momentum on local climate plans. If no plan is in place in their community, learners speak up for the development of a local climate action strategy.

*** Consider using our "Make Waves 4 Change" book for teens to build an action plan.**

Sources:

C40 www.c40.org/other/city-commitments
NASA https://climate.nasa.gov/solutions/adaptation-mitigation/
Global Covenant of Mayors www.globalcovenantofmayors.org/
NY Times www.nytimes.com/paidpost/global-covenant-of-mayors/cities-at-the-forefront-of-tackling-climate-change.html

NAME: _____ **DATE:** _____

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

Instructions here

1. What do you know and what do you want to learn about climate change impacts where you live?

What I Know	What I Want to Know

2. What are 3–5 highlights from the article you read about how climate change is impacting different parts of the world.

3. Adaptation + Mitigation: Read the following and label which actions are climate adaptation (A) or climate mitigation (M) strategies. Put a star next to those that could be connected to water. Some strategies may overlap.

Here are some helpful definitions:

Climate Adaptation: protect people and places by reducing their vulnerability to climate impacts

Climate Change: a change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuel

Climate Mitigation: slow the process of climate change, usually by lowering the level of greenhouse gases in the atmosphere a fuel (such as coal, oil, or natural gas) formed in the earth from plant or animal remains

_____ **a. A community replants a nearby forest and repairs damaged wetlands**

_____ **b. A city promotes public transportation and offers a bicycle lending program to reduce the number of journeys by cars.**

_____ **c. A community chooses to improve its energy efficiency by providing the electricity for its inhabitants with for its inhabitants with renewable energy, instead of fossil fuels.**

_____ **d. A farmer plants different and diverse crops.**

_____ **e. A community develops a climate action plan to prepare for emergencies.**

_____ **f. Improved roads, bridges and building designs to resist weather damage are prioritized.**

_____ **g. A company improves industrial processes to use less energy, water and materials.**

_____ **h. A city develops strategies to protect homes and buildings from flooding.**

NAME: _____ DATE: _____

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

4. Climate Change Where We Live Research Project
You're researching how communities are addressing climate change issues in real life, including where you live. Here are questions to respond to. Use the same questions for both cities you research. Think about how you will report out your information to your classmates. Will it be a Powerpoint, a news brief, an interview, a skit, or a video?

Another City:
What is the city, community or region you're investigating?

Is the city in a developed or developing country? – What are the key points of their climate plan?

How does the plan use resiliency, adaptation and mitigation?

How does the plan address the unique environmental and cultural characteristics of the city?

How will the plans address issues related to water?

How are they measuring success and failure?

How are the plans working so far?

Your City:
What is the city, community or region you're investigating?

Is the city in a developed or developing country? – What are the key points of their climate plan?

How does the plan use resiliency, adaptation and mitigation?

How does the plan address the unique environmental and cultural characteristics of the city?

How will the plans address issues related to water?

How are they measuring success and failure?

How are the plans working so far?

For your own city, what improvements do you suggest for the climate plan and progress?

NAME: _____ DATE: _____

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

5. Reducing the Impacts of Climate Change:

a. Choose the 2+ actions you can do to help reduce global warming. Make a check mark next to them.

- ☐ Buy less stuff, buy only what you need.
- ☐ Switch to more efficient light bulbs.
- ☐ Waste less food and eat less meat.
- ☐ Plant trees.

b. What action is your community taking or should it take to limit the effects of climate change? Make a check mark next to them. Add additional actions that your community may be taking.

- ☐ Measure our climate impact.
- ☐ Set targets to reduce our greenhouse gas emissions and adapt to climate change effects.
- ☐ Develop a plan to meet those targets.
- ☐ Track and share your progress through the Global Covenant of Mayors.
- ☐ Climate Action Plan
- ☐ Commit to reducing fossil fuels
- ☐ Support Environmental Protection, like protecting wetlands and forests.
- ☐
- ☐
- ☐

6. Describe what the future could look like if cities' climate action plans are successful.

Unit 3, Lesson 4

IT'S INTERSECTIONAL

GRADE LEVEL: 6-8 | SUBJECT: SCIENCE, SOCIAL STUDIES | LENGTH OF LESSON: 120+ MINUTES

Summary: Learners learn about the equity and justice issues connected to climate change and water, research related issues and plan for a transformed future.

Drink Local Drink Tap Connection: Drink Local Drink Tap improves water equity locally and globally. We work as part of a Cleveland-based task force to enhance water equity regionally. We also focus on water equity in east Africa, and do this through: creative education, community engagement, and providing safe water and sanitation access to people in need.

Learning Objectives

Learners will:
- Discuss examples of injustice related to water and climate change issues.
- Define vocabulary related institutional and environmental racism.
- Diagram connections and intersections between social, economic and scientific issues.
- Develop a project inspired by a vision for a better future.

Background

Teaching about hard topics like environmental racism and inequity is critical and challenging. Engaging learners in these topics helps our society build understanding and work toward solutions for climate and water injustices that put many, including our most vulnerable populations, at serious risk. While these topics are challenging to discuss, working towards solutions is action-oriented and can be uplifting. In addition to the hard topics covered in this lesson, we include a component that asks learners to envision the future they want and determine steps to get there.

Across the US, communities face mounting threats to their water quality and availability. Increased climate-change related flooding, sea level rise, and drought threaten people's homes, lives and the ecosystems they rely upon. Millions of Americans live in communities that do not have access to reliable safe drinking water. Many live in areas where the cost of water is unaffordable, and children across the country attend schools where their drinking water is contaminated with lead.

How did we get here? According to a recent report by the Kresge Foundation: "A complicated constellation of inequitable decisions, policies, and investment over many decades has left countless low-income communities and communities of color in cities across the United States highly vulnerable to the impacts of extreme rainfall and urban flooding." Climate change impacts increase these risks due to more severe storms currently happening and predicted in the future. This, combined with a long history of discriminatory housing practices and a lack of investment in water infrastructure in poor communities, who are disproportionately. people of color, are often "first and worst" hit by climate impacts and struggle hardest to recover.

The US has begun to more broadly and openly discuss the connections and "intersectionality" between climate change, water issues, race and poverty. These conversations cracked open with the public drinking water crisis in Flint, Michigan, which highlighted the intersection of water, poverty, and race, and created an entry point to turn attention toward a wider range of water justice issues.

Intersectionality is used as a framework to describe how power structures emerge and interact. The concept of intersectionality came from legal scholar Kimberlé Crenshaw, an African-American feminist, in 1989, who explained how different forms of power and systematic oppression interact on multiple and often simultaneous levels. **Intersectional environmentalism**, a term referenced in this lesson, advocates for the protection of people and the planet. It identifies injustices happening to marginalized communities and the earth by showing how they are interconnected and advocates for justice for people and the planet. Intersectionality can help us to see how many different struggles for justice are interconnected and require solidarity between movements.

Teaching about these issues means facing hard truths about US history and current practices and policies. There is no getting around this. There is only learning and taking action if we want to right these wrongs and injustices.

For other lessons on climate change and water issues, and how to make a difference in the world, see DLDT's other lesson plans in this unit: 1. The Problem with Greenhouse Gases, 2. Climate Change Where we Live, 3. Too Much, Too Little, Too Dirty and 4. Water Security and Climate Change Wavemakers.

Remote Learning Lesson

This lesson can be done as a remote learning activity. Here are the steps:
1. Have a class discussion focused on the section titled Injustice Examples, using the suggested Ground Rules.
2. Learners watch the 3 short videos, read the article, and reflect on them in writing, using the Wavemaker Question Sheets.
3. Give learners the Vocabulary Words and Definitions handout and ask them to use it to create the Connection Diagram.
4. Convene learners to discuss reflections on the videos, article and share a highlight from their Connection Diagram.
5. Learners can work individually OR in small groups remotely to plan their Better Future projects. Set up a remote meeting for each group and have them work on their project.
6. Learners present their project/event plans to each other.

VOCABULARY

Climate Change	A change in global or regional climate patterns, particularly apparent from the mid to late 20th century onwards, and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels. Its impacts disproportionately affect communities of color and low-income communities.
Climate Justice	This form of environmental justice responds to the fact that not all people are impacted equally by the impacts of climate change. It is the fair treatment of all people and the freedom from discrimination in the creation of a) policies and projects that address climate change, and b) systems that create climate change and perpetuate discrimination.
Environmental Justice	This movement grew out of a response to the system of environmental racism. It is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. This goal will be achieved when everyone enjoys: • The same degree of protection from environmental and health hazards, and • Equal access to the decision-making process to have a healthy environment in which to live, learn, and work. (US EPA)
Environmental Racism	Communities of color and low-income communities have been, and continue to be, disproportionately exposed to and negatively impacted by environmental degradation, hazardous pollution and industrial practices.
Intersectional Environmentalism	An inclusive movement that advocates for justice and the protection of both people and the planet. It identifies the ways in which injustices happening to marginalized communities and the earth are interconnected. It brings injustices done to the most vulnerable communities, and the earth, to the forefront and does not minimize or silence social inequality.
Racial Justice	The systematic, fair treatment of people of all races, resulting in equitable opportunities and outcomes for all.
Racial Equity	The condition that would be achieved if one's racial identity no longer predicted, in a statistical sense, how one fares.
Structural Racism	A system in which public policies, institutional practices, cultural representations, and other norms perpetuate racial group inequity. It identifies dimensions of history and culture that allow privileges associated with "whiteness" and disadvantages associated with "color" to endure and adapt over time. It is a feature of the social, economic and political systems in which we all exist. This is also called systemic or institutional racism. (Aspen Institute)
Water Equity	This 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." (US Water Alliance)

ACTIVITY LENGTH OF ACTIVITY: 120+ MINUTES

SUPPLIES

- ◯ **#KeepWaterOn In the US (3 minute video):** https://www.youtube.com/watch?v=X6slIHVlaNA
- ◯ **Our Climate Our Future (3 minute video):** https://ourclimateourfuture.org/video/youth-climate-climate-justice-and-air-pollution-in-illinois/
- ◯ **United Nations: Water and Climate (2 minute video):** https://www.youtube.com/watch?v=WOjJtD6H8EI
- ◯ **Unequal Impact: The Deep Links Between Inequality and Climate Change (article):** https://e360.yale.edu/features/unequal-impact-the-deep-links-between-inequality-and-climate-change

ACTIVITY STEPS

1. Discussion guidelines (5 min):

Tell learners you're going to be discussing issues that are sensitive and that people may feel strongly about. Lay out ground rules for discussion and ask if learners would like to contribute any others.

Ground Rules

a. One person talks at a time
b. Listen with an open mind.
c. Listen respectfully, without interrupting.
d. Respect one another's views.
e. Criticize ideas, not individuals.
f. Commit to learning, not debating.
g. Avoid blame and speculation.
h. Avoid inflammatory language.
i. Reflect on what you're learning.

2. Injustice examples (5 min):

Ask learners to raise their hands if they have an example of a historical and/or current situation in which people or groups of people have been treated unfairly. Make a list of learners' ideas. You can focus on the US and/or expand globally. Historical examples of injustice that learners may bring up include: slavery and segregation in the US, the treatment of indigenous and First Nations people in the US and Canada, Jewish people during the Holocaust, women's right to vote, and gay and transgender rights, among others. Acknowledge that in the US there is a long history of racism and systems that have oppressed the poor.

3. Video clips (10+ min):

Tell learners they will be learning about environmentally-related injustices and how they are connected and intersectional with some of the injustice examples the learners have listed, and what can be done about them. Show the 3 video clips in the Supplies section. Pause between each, and ask for a few reflections, connections and what justice issues are highlighted.

4. Vocabulary pairs (15 min):

Tell learners they will be building onto their vocabulary to discuss these issues. Write the words below on the board or project them and tell learners they will start with getting on the same page about the definitions for the words below. The words and definitions are listed on a separate sheet for you to copy and cut apart before you give them to learners. When you do this, give one word to a learner and the definition for the word to another learner randomly.

Vocabulary Words: Climate Change, Climate Justice, Environmental Justice, Environmental Racism, Intersectional Environmentalism, Racial Equity, Racial Justice, Structural Racism, Water Equity

Have learners find the person who has the match to their definition or word. For example, the learner with "Environmental Racism" looks for the learner who has "Communities of color and low-income communities have been, and continue to be, disproportionately exposed to and negatively impacted by environmental degradation, hazardous pollution and industrial practices." Have learners check to make sure they have the right match by having volunteer pairs read out the word and the definition, until you have covered all of the words and definitions. If learners have the "wrong" match, have them switch.

5. Discuss (10 min):

Talk about the fact that these issues are all happening in the US and in other parts of the world, and that it's very sad and heavy to know that these issues impact millions of people. Recognize that in order to solve these kinds of problems, we must first know that they exist, discuss them and talk about possible solutions. Acknowledge that some of these words are causes and others are effects. For example, environmental racism, which causes health and safety issues for millions of people, requires solutions focused on environmental justice, water equity and climate justice. Tell learners they will next be looking at connections between these concepts and thinking about solutions for the problems they are discussing.

6. Connection Diagram (10 – 20 min):

This can either be done in class or for homework. Give each learner the full list of vocabulary words and definitions in the Wavemaker Question Sheets. Have them work with their partner, or on their own, to come up with a diagram that shows their initial ideas for how these ideas are connected. A circle template is provided in the Wavemaker Question Sheets. Learners put key vocabulary words in the circles and add arrows with words that explain the connection. For example, "water equity" could be connected by an arrow to "systemic racism". The arrow could start at systemic racism" and point towards "water equity" with the words along the arrow stating "leads to people not having clean drinking water."

ACTIVITY CONTINUED...

7. Unequal impact (20 min):

Either in class or for homework, have learners read the article: Unequal Impact: **The Deep Links Between Inequality and Climate Change** (in Supplies) and reflect on the main points. If learners have difficulty with the Connection Diagram, reading this article first may help them.

8. A Better Future project (45+ min):

Have learners get into pairs or small groups and tell them they will create a Better Future project. Their project needs to:
- Identify the scientific, economic and social components of the problem(s).
- Envision a solution and show the steps to achieving the solution.
- Show the improvements that result from the solution in a skit, song, collage, drawing, slide show, or other format.

9. Exit slip (5 min):

Write down 2 things you plan to do to help achieve the steps to the Better Future project in real life.

ENRICHMENT ACTIVITY

- **As a class or individually, consider how you can support DLDT's water equity work in Uganda. https://www.drinklocaldrinktap.org/projects/**
- **Coming Soon: For educators, take a look at Drink Local Drink Tap's Educator Wavemaker Kit that has ideas for fostering environmental change in the classroom, school and community.**
- **Coming Soon: For youth, check out Drink Local Drink Tap's Wavemaker Kit that walks youth through the process of becoming a Wavemaker (changemaker) in the community and beyond.**

TAKE ACTION

Learners work within their own community to find out the status of water quality issues and/or climate action planning and how they connect and integrate with water equity and climate justice. Help learners prepare for and attend a community meeting to encourage action and momentum on plans for climate action and water equity.

ADDITIONAL RESOURCES:

If you or your learners want additional articles and reports, here are a few:

Building a Community of Practice at the Intersection of Water, Climate Resilience and Equity: https://kresge.org/sites/default/files/library/crews_program_assement_public_report_hi_res.pdf

Water, Health and Equity: https://www.policylink.org/sites/default/files/CWC_Report_Full_report_lowres.pdf

Sources:

http://www.foeeurope.org/sites/default/files/young_foee/toolkit_for_intersectional_movement_building.pdf
https://bento.cdn.pbs.org/hostedbento-prod/filer_public/SBAN/Images/Classrooms/Ten%20Tips%20for%20Facilitating%20Classroom%20Discussions%20on%20Sensitive%20Topics_Final.pdf
https://www.intersectionalenvironmentalist.com/
https://www.learningtogive.org/resources/environmental-justice-toolkit
https://www.tolerance.org/classroom-resources/tolerance-lessons/what-is-environmental-justice
http://protectcleanwater.org/blog/
https://kids.niehs.nih.gov/topics/environment-health/environmental-justice/index.htm

NAME: _____ DATE: _____

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

Instructions here

1. What made an impression on you from the videos you saw, and why?

2. New Vocabulary

   a. What's the word and definition combination you and your partner were given?

   b. What are 2 other words/phrases you learned and what do they mean?

   c. Why are these concepts important to understand?

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

3. Connection Diagram

Put at least 5 vocabulary words in the circles and add arrows with words that explain the connection. For example, an arrow could start at "systemic racism" and point towards "water equity" with the words along the arrow stating "leads to people not having clean drinking water."

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

4. Summarize 4 highlights from the article, 'Unequal Impact'

1.

2.

3.

4.

5. A Better Future Project

a. Who are you working with?

b. Describe 1–2 problems that have water and climate change connections.

c. Write about the components of the problem(s). For example, describe the following:

What are the social issues?

What science is related to the problems?

What are the economic or financial aspects of the problem?

d. What is the solution you envision? Describe the steps to achieving the solution.

e. What does the better future you envision look like? Show the improvements that result from the solution in a skit, song, collage, drawing, slide show, or video.

6. Exit Slip: Write down 2 things you plan to do to help achieve the steps to the Better Future Project in real life.

Unit 3, Lesson 5

WATER SECURITY + CLIMATE CHANGE WAVEMAKERS

GRADE LEVEL: 5-8 | SUBJECT: SOCIAL STUDIES, ENGLISH, LANGUAGE ARTS | LENGTH OF LESSON: 90+ MINUTES

Summary: Learners investigate how to make positive change in the world through brainstorming, examples, and reflecting on their own strengths. They use climate change and water security issues as a base to design a real-world project that they present to their classmates.

Drink Local Drink Tap Connection: DLDT was founded by Erin Huber who believes that everyone holds power to make a positive change. DLDT supports the idea that everyone can be changemakers, also known as Wavemakers. The documentary in this lesson is the story of how DLDT started, what it takes to make change happen, and how each of us can help make the world a better place.

DLDT has two Waves4Change Action Kits with information for how to be a Wavemaker, as an educator and as a learner. Some of the material in this lesson comes from our Educator Kit. We encourage you to refer to these kits for more materials and information.

Learning Objectives

Learners will:
- Brainstorm ways to make positive change in the world
- Reflect on their own changemaker strengths
- Develop and present a changemaking plan that is related to climate change

Background

Part of a learner's educational journey can be learning how to create positive change in the world, and the skills it takes to do this. This lesson walks through steps for how to reflect and take action as a positive changemaker, or Wavemaker. For your discussion with learners, here are some strengths that will be helpful for them as Wavemakers: idea generation, researching, planning, networking, relationship building, mentoring, communicating.

Understanding how Wavemakers make change happen is a starting point for this lesson. Below is a helpful list to support your discussions with learners:

How People Make Positive Change Happen:

Educate Others: Teach friends, family and neighbors about an issue.
Advocate for Policy/Legislation related to issues you care about.
Run for Office or look for ways to step into leadership in a club, school or government.
Demonstrate by organizing or joining an event, march, rally or demonstration about a cause you care about.
Create a Public Awareness Campaign to inspire change in school, in your community or online.
Create a Survey and Share the Results: Create a paper or an online survey using a Google form or other tool to gather information about an issue.
Raise Money: Organize a bake sale, ask for birthday donations instead of gifts or hold a fundraiser for an organization that supports an issue you care about.
Write a Letter to an Entity: Reach out to companies or organizations that you feel have done something unfair or biased.
Volunteer: Donate your time to events, organizations, shelter or community groups that focus on issues you care about.
Get Media Involved: Bring publicity to your issue to amplify the message.
Actions sourced from Anti-Defamation League

Remote Learning Lesson

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

1. Have learners make a brief list about how people make change happen in the world and list examples of changemakers they know.
2. Send learners the DLDT Fact Sheet: Climate Crisis and Water Security. Have them read it and summarize main points.
3. Independently, learners watch the 26 minute 'Making Waves' documentary. This film touches on heavy topics, including water scarcity and poverty, and learners will discuss this with their teacher and classmates.
4. Have learners respond to questions about the documentary and about the strengths they see in themselves that they could use to be changemakers (aka Wavemakers), what project or event they can plan that relates to water security and/or decreasing the impact of climate change.
5. Learners can work individually OR in small groups remotely to plan their projects. Set up a remote meeting for each group and have them spend time researching their issue, and planning their event.
6. Learners present their project/event plans to each other.
7. If possible, have learners host the events or create the projects in real life.

VOCABULARY

Climate Change: A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.

WASH: Acronym for Water, Sanitation and Hygiene. Due to their interdepend-ence, these issues are grouped together. While each can be a separate field of work, they are dependent on the presence of the other. For example, without toilets, water sources become contaminated; without clean water, basic hygiene practices are not possible.

Water Security: People have sustainable access to enough good quality water for: livelihoods, human well-being, and socio-economic development, protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.

Wavemaker: A person who works to create positive change in the world.

ACTIVITY

LENGTH OF ACTIVITY: 90+ MINUTES

SUPPLIES

- ◯ **'Making Waves from Cleveland to Uganda' documentary (26 min): https://www.youtube.com/watch? v=Z6H7_ u0_gKM**
- ◯ **Climate Crisis and Water Security Fact Sheet**
- ◯ **Make Waves 4 Change**

ACTIVITY STEPS

1. Brainstorm (10 min):

Tell learners they will be discussing how to make positive change in the world and the leadership skills needed to do this. They will then use this information to design a project focused on water issues and/or climate change. Ask learners to make a list of responses to the questions:

a. How do people change the world for the better?
b. Who are changemakers or “wavemakers” that you know about, either personally or from the media?

2. Documentary prep (10 min):

To prepare for the documentary 'Making Waves', tell the learners you will be learning about how to make positive change related to environmental issues, particularly water, sanitation and hygiene (WASH) access issues and climate change. Discuss what these mean (see definitions) and have learners read the DLDT Fact Sheet Climate Crisis and Water Security. Have learners summarize the main points in the Wavemaker Question Sheets provided below.

3. Watch Making Waves (25 min):

As a class, learners watch Drink Local Drink Tap’s 'Making Waves' documentary (Link found in ‘Supplies’). Ask learners for their takeaways from what they watched. Here are some questions: Why did Erin Huber choose to get involved in the ways she did with clean water for all? What actions did she take? What qualities, strengths and skills does she show in the documentary?

4. Wavemaker strengths (10 min):

Have learners work individually or with a partner to discuss and list their own strengths and skills as it relates to being a Wavemaker. Have them follow the prompts in the Wavemaker Question Sheets.

5. Project plan (35+ min):

Have learners get into groups (or work individually). They can first review the strengths and skills of their group members. Then have learners use the information from this lesson to plan a Wavemaker project that addresses issues related to climate change, water security, or another critical issue for your community. Learners can use:

- The initial list they generated about how change happens.
- The Climate Crisis and Water Security Fact Sheet.

Projects could be a cleanup, an educational event, an exhibit, starting a club, holding a fundraiser, or something else. If projects are viable, learners can actually see them through to completion.

ACTIVITY CONTINUED...

6. Report out (10 min):

Have learner groups report out on to each other on the project they are planning. Then, have the groups ask each other questions and make helpful suggestions. Decide which projects the learners want to make happen and take next steps.

7.Exit slip:

Use the Wavemaker Action Plan template to document what next steps your group could take to make your project a reality.

ENRICHMENT ACTIVITY

Have learners engage in DLDT's #Waves4Change social media campaign for Wavemaker actions. When someone takes environmental action to make the world a better place, we encourage you to take a photo or describe the action and post it on social media with the hashtag: #Waves4Change.

TAKE ACTION

Learners are encouraged to make their projects a reality. They can also take what they've learned to help friends and family members become Wavemakers and make positive change in the world. We have a tool that can help! Buy our 'Make Waves 4 Change' action planning book for 12 years +. We also have a Teacher's Guide to support you.

Sources:

Drink Local Drink Tap's Waves4Change Youth Action Kit
https://www.washingtonpost.com/lifestyle/on-parenting/ways-to-help-kids-cope-with--and-help-combat--climate-change/2019/01/21/f7cc6424-180a-11e9-9ebf-c5fed1b7a081_story.html
https://www.ucsusa.org/resources/each-countrys-share-co2-emissions

NAME: _____ **DATE:** _____

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

Instructions here

1. How do people change the world for the better? Make a list or 5–8 responses to the question:

2. List changemakers or "wavemakers" that you know about, either personally or from the media. What change are they working toward?

3. Climate Change and Water Security Fact Sheet: Summarize the 3–5 main points from the Fact Sheet.

Making Waves Documentary

4. What are highlights from the 'Making Waves' documentary?

5. Wavemaker Strengths and Skills: Get to Know Yourself as a Wavemaker by reflecting on who you are and how you can use and develop your strengths to make change in the world. As you think about your own strengths, remember that you may want to team up with others who have different strengths than you. Some strengths that will be helpful as a Wavemeaker: idea generation, researching, planning, networking, relationship building, mentoring, communicating.

   a. What are your strengths? They could be in the list above, or you may have other key strengths.

   b. Which strengths will help you as a Wavemaker?

   c. What strengths do you want to develop? Consider things you like and are interested in.

   d. Describe your vision for yourself as a Wavemaker and leader. Include the change you want to make happen, and your role in it.

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

Instructions here

6. Project Plan: At this stage, you're developing a plan that you will present to the class. The plan should focus on an issue related to climate change and/or water issues. If the plan seems viable and your teacher has time in the curriculum, there may be an opportunity to bring your plan to life. If not in your class, consider how you can make it happen outside of class. Start with these questions:

a. What kind of change do you want to help make happen in the world, related to water security and climate change? Conduct additional research as needed to develop your plan.

b. What type of project will you plan to help make positive change happen? Will you plan an educational event, start a club, host a fundraiser, hold a cleanup, or something else?

c. Develop Your Wavemaker Action Plan

LIST STEPS	BY WHEN?	WHAT HAPPENS?	WHO WILL DO THIS?
1.			
2.			
3.			
4.			
5.			