Quench

curriculum

grades 3-5

WaterStep

Quench curriculum

WaterStep

Teachers,

WaterStep believes that all people in the world deserve to have access to a safe water supply and that the global water crisis can be solved by people just like you. Our goal is to see the day when no child has to drink unsafe water. Water promotes the ability for more children to attend school worldwide. We train individuals to provide solutions through water treatment, health and hygiene, and sanitation.

What Can You Do To Help?

- Students need to know the facts about water. They need to know the importance of water and how greatly it effects life.
- Use our standards based lessons to teach your students water facts.
- Get your students involved in a community program service project. Help support global water projects by giving and recycling used shoes.
- Demonstrate your enthusiasm by forming your own WaterStepper dance or step team routine.
- Participate in an International Communication Exchange with other students in your classroom via live telecommunications

Our Best,
The WaterStep Team

Teacher's Guide

Curriculum and Web Highlights

- Standards Based/Cross-Curricular
- Differentiated Tasks/ECE/ELL
- Grades: 3-5 Lesson Plans
- Dual-Language
- Extension: Community Connections-Program Service Learning
- Helpful Educational Links
- Lessons Written by Teachers
- Middle and High School Lessons are being developed.

Table of Contents

Hello! My name is Oscar! Let me be your guide on a journey to learn about water and how amazing it truly is. Like millions of others in the world, I live in a water-stressed region. Unsanitary conditions, unsafe drinking water, and limited availability to safe drinking water are just a few of the issues that millions of people struggle with every single day all over the world. When WaterStep came to visit my village, they taught my family and I how to practice healthy habits to prevent disease, and they also provided us with a means of having safe water to drink. Join me so that I may share with you what WaterStep has taught me, and together we can be empowered to help end the world water crisis!

Lesson I: Amazing Water

» Next Generation Science Standards (NGSS): Lessons are based on real life observations of matter and properties. (3-5-PS1-1) The roles of water in earth's surface processes are explored (3-5PS1-1)

Lesson II: Water Problems

» Generate and compare multiple possible solutions to a problem based on how well each meets criteria and constraints of the problem. (5-ESS3-1,3-5;ETS1.1)

Lesson III: Water Solutions

» Science of engineering and development of models are designed and compared to natural cycles of matter. (5-PS1-1)

Lesson IV: We Can Help!

» Communities are doing things to help protect earth's resources and environments. (5-ESS2.C)

Lesson I: Amazing Water

Objective

Students Will:

- Learn that water molecules are made up of three atoms; two-hydrogen and one-oxygen.
- Recall from life experiences water's states of matter.
- Illustrate a molecule.
- Learn that Molecules interact distinctly in each state of matter.
- Understand that the human body is made of about 70% water, and is dependent on water for life

Materials/Resources Needed

- Page 3: Student Reading Text: Http://Youtube.com/Dailc0sjvy0
- Page 4: Molecule Worksheet and Reflection Sheet
- Page 5: Water Percentage in Body/Info
- Page 6: Crossword Puzzle/Vocabulary Sheet
- Anticipatory Set: Molecules Video

Guided Practice: (Large group)

- Page 3: Students will read text as a large group. Choral reading is suggested. Ask a volunteer to point to the words as they read so that all students will see the correlation between the voiced words and those in print. Guide the students through the Student Activity Sheets with a Smart Board. Click on video link for Anticipatory set.
- Page 4: Illustrate the three atoms that make up a water molecule; one-oxygen, two-hydrogen. (Optional: after the short video; students can add positive (+) and negative (-) signs where the atoms join together as a molecule, forming a bond. The bond occurs because of an attraction between the negative and positive charges of the particles.)

Independent Practice

- Students will reflect on learn as they write sentences on the bottom of the molecule worksheet. Each sentence should include at least one vocabulary word (bold in text).
- Page 5: Have students read their sentences to a buddy for oral language practice. Tell students they may called on to read their sentence aloud for the class during closing activity. Fun Activity Sheets Page 3 and Page 4 may be used as support material.
- Page 5: Oscar helps demonstrate the amount of water in the human body. The students will be able to visualize how much the human body relies on water to function properly.
- Page 6: Crossword Puzzle allows students to review vocabulary found in text. Students may want to work in pairs or check their answers with a buddy.

Differentiated Instruction

Students will prepare a personalized list of the vocabulary words with definitions in their science journals to use as a reference and support for reading and writing assignments. Ask students to circle bold vocabulary words as they find them in reading text. In this lesson, the vocabulary words are listed at the bottom of the Crossword Puzzle page.

Closure

Students will check to see that they used at least five vocabulary words of their choice in their writing assignment. Randomly choose several students to read one of the sentences they wrote aloud for the large group.

Lesson I: Amazing Water

Student Reading Text

Water Facts

http://youtube.com/DAilC0sjvy0

» The **particles** in **matter** are far too small for the human eye to see.

» A water molecule is one million times smaller than a human hair.

» There are more water **molecules** in just "one ounce of water" than there are "ounces of water"in the Atlantic Ocean.

» Matter is made up of particles called atoms and molecules. You cannot see particles because they are so tiny. A water molecule is made of three atoms. Two **hydrogen** atoms bond together with one **oxygen** to form a water molecule. Some particles are negative and some particles are positive. Since opposites attract, the atoms bond to form molecules. When many water molecules join together, they form matter. Matter can be seen by the human eye. Temperature transforms matter into three states; **vapor**, **liquid**, and **solid**.

» Molecules in solid water stick close together like gum in a bubble gum machine. Examples of solid water are ice, snow, and sleet. Unlike solids, liquid has space between particles. The particles can dance around each other and move freely. Liquid water takes the shape of the container it is in. Heat transforms liquid into water vapor. Vapor particles move around so fast they can fly!

Liquid Water
33°F - 211°F
1°C - 99°C

Frozen Water (Ice)
≤ 32°F
≤ 0°C

Boiling Water (Steam)
≥ 212°F
≥ 100°C

Student Drawing Activity

Draw some dots with your pencil to symbolize the space and movement of water molecules in each state of matter.

Vapor

Liquid

Solid

Draw an animal or cartoon face with these circles to help you remember the names of the atoms which join together to form a water molecule. Label the particles of hydrogen and oxygen. Remember: 2 hydrogen + 1 oxygen = H_2O = water!

What role does water have in the human body?

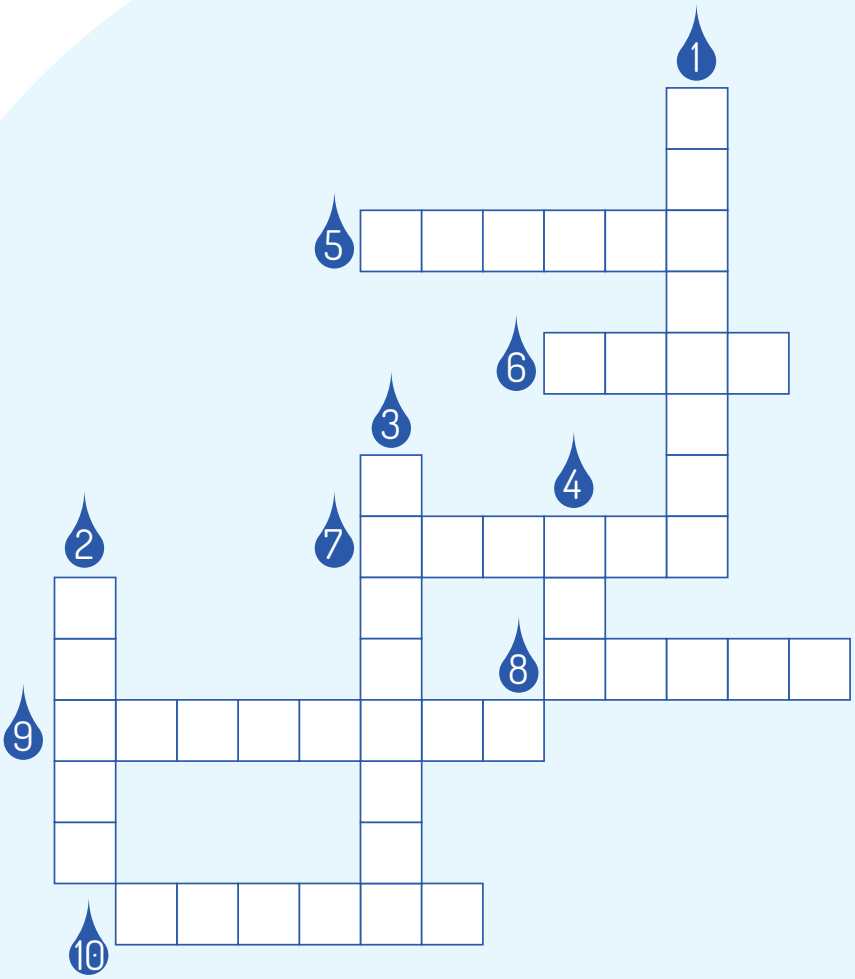
» All living things need water to maintain life.

» Water is a part of all cells, blood, digestion, and waste elimination.

» Water helps bones to function and grow.

What are some facts you have learned about water? Write at least four sentences on a separate sheet of paper.

Water Crossword Puzzle



Down

1. Two of these atoms join with oxygen to form water.
2. Water molecules in this form move fast and freely as a gas.
3. Combination of atoms that join together form a ____.
4. Water in the form of vapor is a ____.

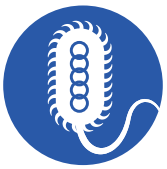
Across

5. A state of matter that moves freely and takes the shape its container is a ____.
6. A small particle that makes up matter.
7. A gas in the air that living things breath to stay alive.
8. This state of matter forms when particles pull close together and do not change places.
9. A ____ is a little piece, or bit.
10. All objects are made of ____.

Include word bank for differentiated instruction:
atom, hydrogen, gas, liquid, matter, molecule, oxygen, particle, solid, vapor

Lesson II: Water Problems

Objective



Students Will:

- Identify the water problems in "water poor" locations.
- Discuss why dehydration and disease occur predominately where water is limited.
- Understand the effects of drinking contaminated water.
- Note symptoms and analyze causes of waterborne diseases.

Materials/Resources Needed

- Pages 8: Anticipatory T/F quiz
- Pages 9-10: Water of Earth Activity Sheet
- Pages 13-14: Infographic design
- Pages 15-17: Activity sheets: Situation stories, Student info, and reflection sheet.

Anticipatory Set

Distribute True/False Pre-Post Assessments page 8. Read statements aloud to students; ask for a quick T/F response. Collect immediately. Students will use the bottom half of the sheet later in the lesson for self evaluation.

Guided Practice (Large group)

- Page 11: Students will read text as a large group. Choral reading is suggested. Ask a volunteer to point to the words as they read so that all students will see the correlation between the voiced words and those in print. Guide the students through the Student Activity Sheets with a Smart Board.
- Show short video with hyperlink on the Student Text page. Distribute Pages 13-14: Infographic.
- Re-distribute the Pre-Test. Students will compare their T/F answers to the information they gather from the Infographic. Then show that they learned the daily recommended amount of water they should drink each day.
- Collect pre/post T/F test, check, and return to students with immediate feedback (Page 8).

Independent Practice

- Distribute Situation Stories (Page 16) after students have read Infographic Sheet (Pages 13-14) and Information/Reflection Sheet (Pages 15-17) about waterborne disease.
- Students will read waterborne illness situation cards and prepare to describe what may have caused the child to become ill. Students will then diagnose which waterborne illness the card may describe and write the answer on the back of the situation cards.

Differentiated Instruction

Optional activity for small group and/or homework assignment: Students gather information from reading and/or the internet to create their infographic design about waterborne disease using Word Publisher, or Power Point. Be prepared to share the infographic with the class and discuss what can be done to decrease the enormity of this problem.

Closure

Students will write a quick reflective thought on #5. Collect the reflections for use in the Anticipatory Set for Lesson 4.

Anticipatory Set: T/F Pre-Assessment

1. _____ 2.3 million people die every year from a waterborne illness.
2. _____ Unclean water causes 88% of deaths from diarrheal diseases.
3. _____ Eighty percent of all disease in the world is caused by unsafe water.
4. _____ Most "water poor" countries are in Africa.
5. _____ Twenty-five percent of women and children living in "water-poor" countries must carry water to their households.

Read information about problems with water on the Infographic. Make corrections to the T/F quiz based on what you learn.

I am _____ years old.

I learned that there is a daily recommended amount of water I should try to drink.

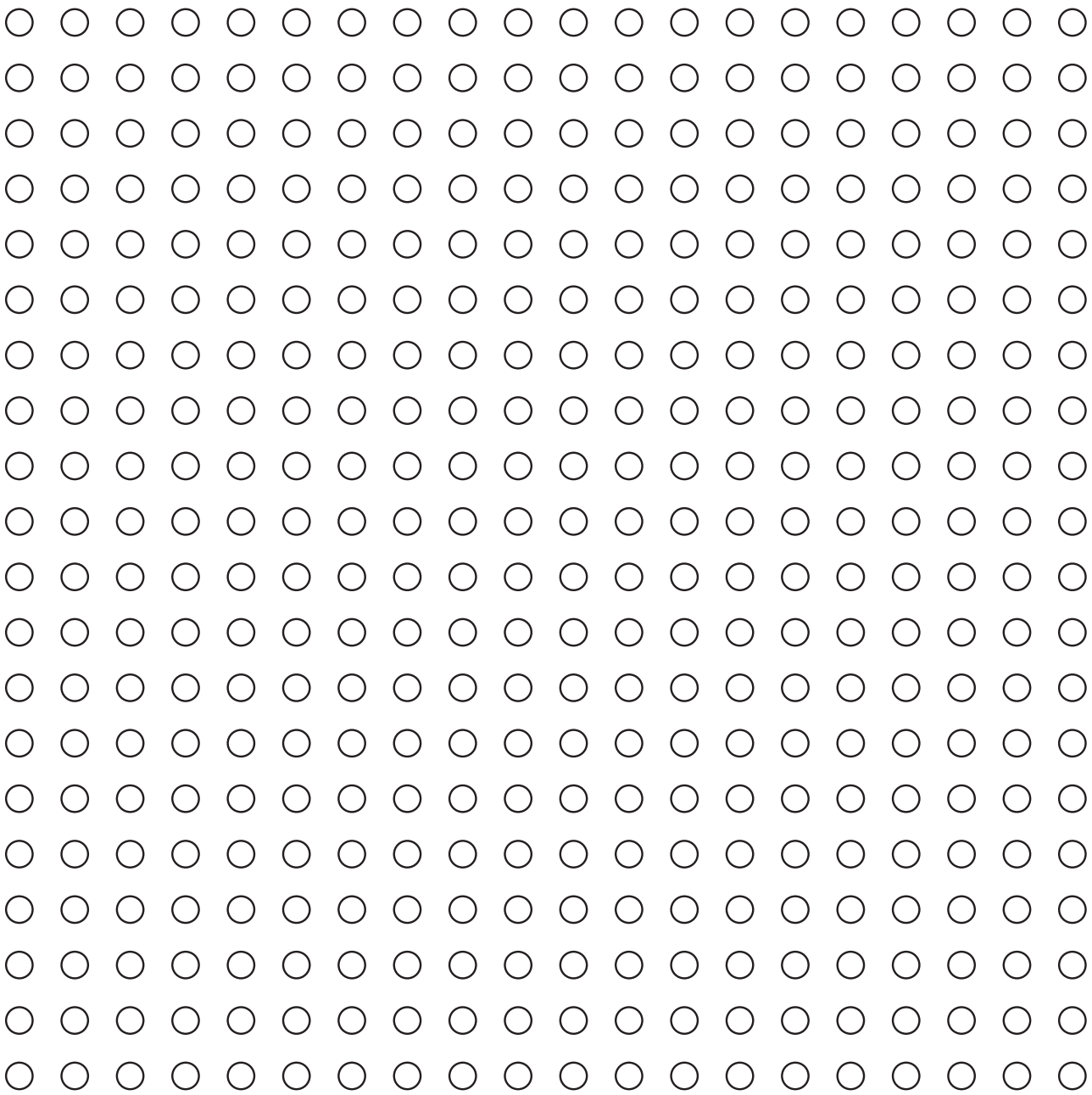
My goal is to drink at least _____ cups , or _____ liters of water a day.

The Water of Earth

There are four-hundred circles on the next page. Each one represents .25% of the water that is on Earth. Of these four-hundred circles, ten of them represent fresh water, which is what humans need to drink to survive, and three-hundred ninety represent the salt water of the oceans, which cannot be consumed by humans.

Out of the ten circles that represent the fresh water on Earth, seven of these circles represent water that is frozen in the polar ice caps, and cannot be accessed for use. That leaves three circles available for human consumption. Out of those three cirlces, two of them are used for agricultural uses (growing fruits, vegetables, and farming etc.), and one circle is actually available for humans to drink. All of the water that is available for humans to drink still needs to be treated for parasites and bacteria before it is safe to drink

Use your colored pencils, crayons, or markers to color in some circles to represent the fresh water on earth.



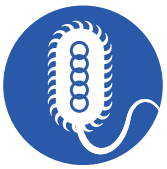
» Color seven circles **gray** to represent the water that is frozen in the polar ice caps.

» Color two circles **green** to represent the water that is used for agriculture.

» Color one circle **blue** to represent the water that humans can drink.

Lesson II: Water Problems

Student Reading Text



There are places in our world that do not have **safe water** for everyone to drink. Places that cannot treat their water are sometimes referred to as **water poor**. In theses areas, illness and disease are common. Thousands of people will die because they drink water that is not safe. Without safe water, disease spreads rapidly. In fact, 80% of all sickness in the world is caused by unsafe water and poor **sanitation**. Worldwide, 748 million people live without safe water. Two and a half billion people live without proper sanitation facilities their whole life.

A child dies every thirty seconds from **waterborne illness**. Children die every day from **dehydration** because they do not have safe water to drink. When there are no toilets to flush away waste, germs that cause disease spread. Furthermore, human and animal waste may be present in the water and food supplies. When germs are in water, on hands, or in food, people get sick. Unsafe drinking water, lack of water for **hygiene**, and lack of access to sanitation causes death from illnesses that cause **diarrhea**. Diarrhea causes dehydration, and dehydration causes death. Dehydration occurs when the body loses the water it needs to function. Signs of dehydration include tiredness, headache, dry mouth, light-headedness, muscle weakness, and death.

Understanding Proper Hydration

Age Group	Daily Recommended Intake of Water
1-3 years	About 4 cups
4-5 years	About 5 cups
5-13 years	Boys: about 8 cups Girls: about 7 cups
14-18 years	Boys: about 11 cups Girls: about 8 cups

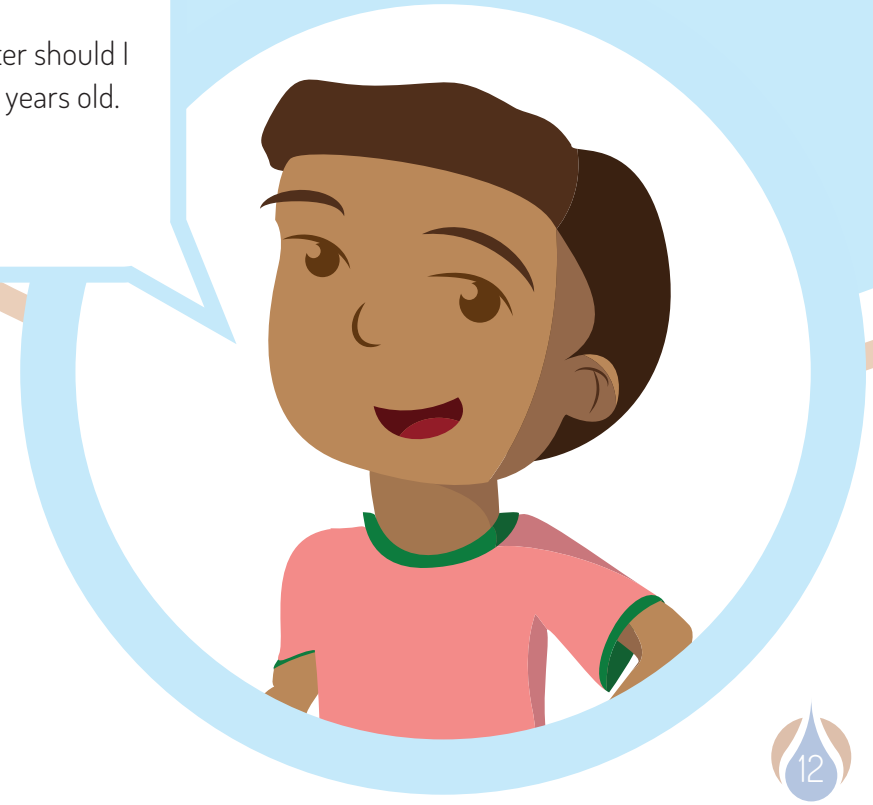
Students need to drink safe water everyday to be able to stay healthy, attend school, and learn important information that will help them live and grow. Students cannot attend school when they are dehydrated.

Metric System:
How many cups are there in 3 liters?

Liters	Cups
1 liter	4.2 cups
2 liters	8.4 cups
3 liters	___ cups

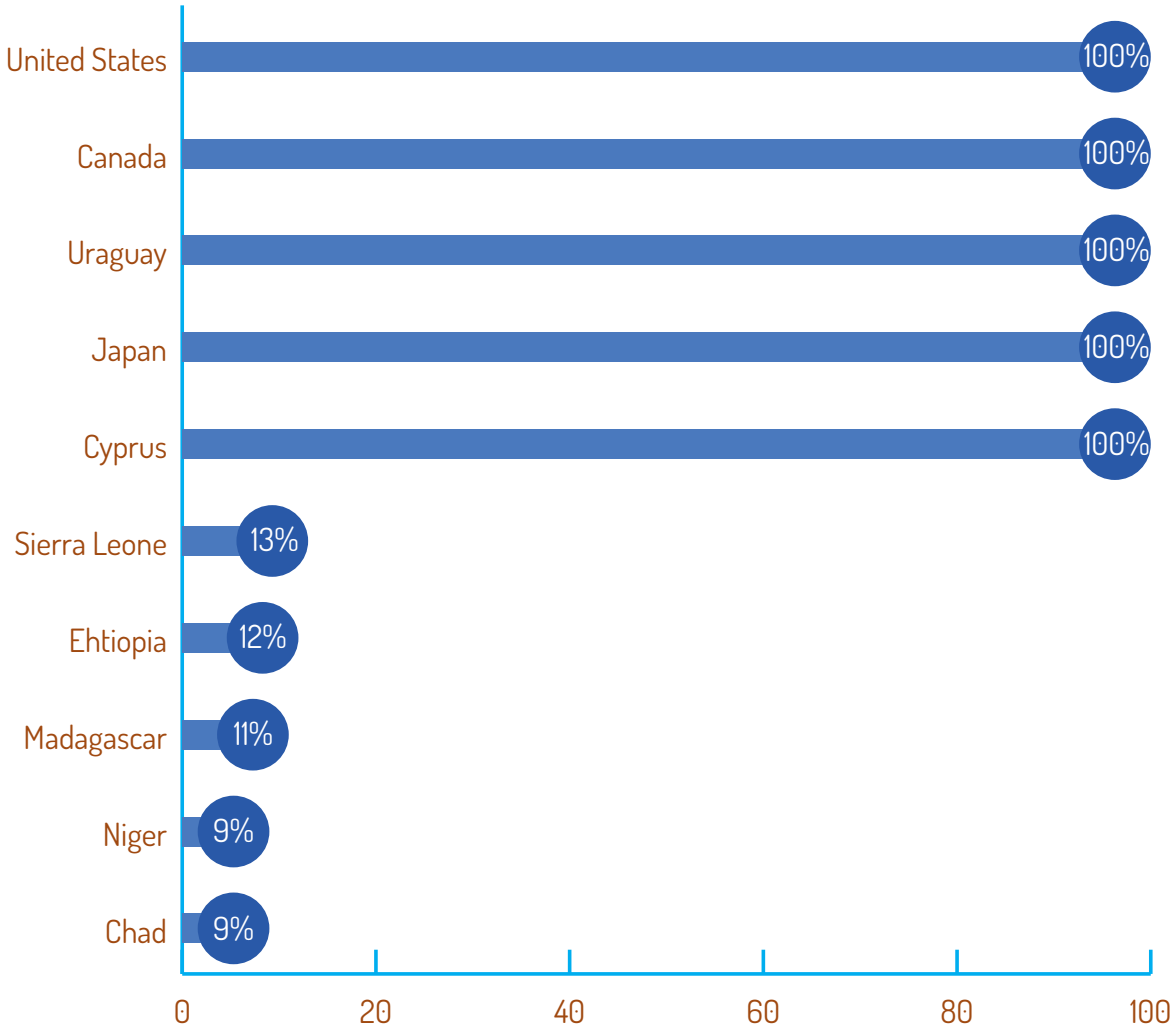
Can you help me solve my problem?

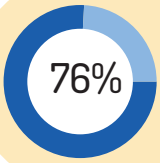
I measure with liters. How many liters of water should I drink in a day to avoid dehydration? I am ten years old.



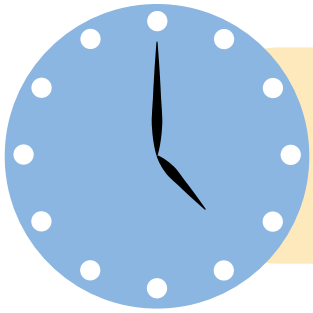
Water Infographics

National Percentages of Populations with Access to Clean Water





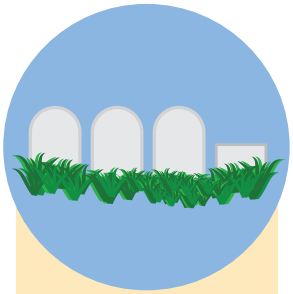
Women and children must carry water to **76%** of households



200 Million work hours are spent on a daily basis by women collecting water for their families

443 Million school days are lost every year due to water related illness

Jan	Feb	Mar	Apr
May	Jun	Jul	Aug
Sep	Oct	Nov	Dec



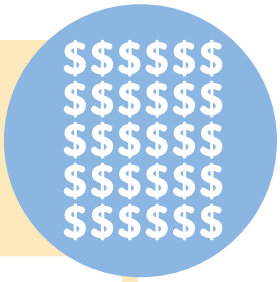
3.58 Million people die each year from water related illness

66% of those who lack safe drinking water live on less than $2 a day

33% of those who lack safe drinking water live on less than $1 a day

The average African uses 2.64 gallons of water a day

The U.N. estimates a cost of **$30 Billion** to provide global access to safe water



Those who live in slums often pay **five to ten times more** than people living in wealthier parts of a city

2.5 Billion gallons of water is needed to support **4.7 Billion** people at the U.N. daily water minimum

Water often costs more than **25%** of their income

Small Group Activity

Jot down the symptoms of these waterborne illnesses.
Read the Situation Stories on the following page and determine the illnesses that the children are suffering from.

Typhoid:

» What is it?- An infectious, often fatal disease characterized by intestinal inflammation and ulceration.

» Cause - Ingestion of contaminated water, milk, or food.

» Symptoms – High fever, rose-colored spots on the stomach and chest, diarrhea, or constipation.

» Treatment - Antibiotics, ORS solution.

Roundworm (Ascariasis):

» What is it? - A long pink worm with pointed ends that lays eggs and lives in the intestines.

» Cause - Ingestion of contaminated food or water.

» Symptoms - Stomach pain, big belly, loss of appetite, weakness, weight loss.

» Treatment - Medication to kill the worms, surgery (when worms are present in the large intestines).

Cholera:

» What is it? - An infection of the intestine caused by the bacterium—Vibrio cholera.

» Cause – Ingestion of contaminated food or water.

» Symptoms – Extreme diarrhea, vomiting, leg cramps, bluish-gray skin from extreme loss of fluids.

» Treatment – Frequent sipping of safe water and eating to recover normal intestinal function and antibiotics.

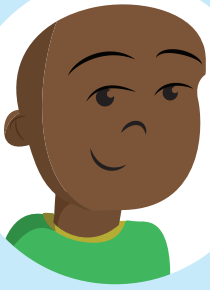
1

My name is Cassandra, I am a nine year old girl and I live in Port au Prince, Haiti. My community lives near the water pump where we get our water. My friends and family have all been feeling sick. I have pain in my abdomen and watery diarrhea. I think I might vomit. The muscles in my legs hurt sometimes. I don't know why, but my skin is turning bluish and almost looks gray. My family and I are going to get in line at the health clinic when the sun comes up. I don't want to have to get up off my mat on the floor to go to the clinic. I'm afraid I will need to stop and find a toilet along the way. What do you think I have? How did I get it?

2

My name is Phirun, and I live on a rice farm in the country of Cambodia. We have lots of water to drink, which comes from a well. Last week, it rained so much that a flood came through our town. Water from the river got into our well. Some people are getting sick. Yesterday I woke up with a high fever and today I found some pinkish - colored spots on my stomach! What do you think I have? How did I get it?

3



My name is Manu. I am a seven year old boy. I have lived in a refugee camp with my family in Kenya since I was born. My mom and sisters walk to the river, about two miles every day, to bring back water. They take big buckets with them to get the water we need to drink, wash, and cook. They carry the heavy buckets on top of their heads. I'm glad I'm not a girl, I don't think I could carry those heavy buckets! My favorite part about living in the camp is playing with other kids. I get sad because I have thin arms and legs and a really big belly. Some of the bigger boys make fun of my big belly. I don't know why it keeps growing bigger. I have not eaten more food than anyone else. What do you think I have? How did I get it?

Student Reflection

Write at least two paragraphs about a water problem that made an impression on you.

Lesson III: Water Solutions

Objective

Students Will:

- Explain that technology was developed long ago that saved lives in our own community.
- Analyze a community and synthesize what changes need to be made so that all members can avoid waterborne illness.
- Analyze and explain how communities facing waterborne illness can reduce deaths with technology.

Materials/Resources Needed

- Pages 19-20: 1874 New York Times: Article Clips/Student Reading Text: Lesson 3.
- Page 21: Before and After Community/Education/ Technology/Worksheet
- Page 22: Waterstep M-100 Water Chlorinator Benefits Worksheet and Video: Hyperlinked

Anticipatory Set

Use the Smart Board to display Worksheet # 1. Ask students to draw a T chart on a plain sheet of paper with "Before" written above the left column and "After" written in the right column. Have students come to the board to circle the illustrations that demonstrate problems or health concerns they noted in the "Before" illustration. Ask students to discuss with a buddy how these changes will help Oscar's community.

Guided Practice (Large group)

- Students will read text as a large group. Choral reading is suggested
- Ask a volunteer to point to the words as they read so that all students will see the correlation between the voiced words and those in print.
- Guide the students through the Student Activity Sheets with a Smart Board.
- Show video with hyperlink on the Student Reading Text page III. Watch YouTube video: v=kvXv9BbyE0Q

Independent Practice

- Students will draw and label a diagram of the M-100 Water Chlorinator to gain a basic understanding of the water purification process.
- Ask students to label all the parts using the worksheet as a guide.

Differentiated Instruction

Some students may want to draw a model of the M-100 using colored pencils, markers, crayons, etc. Others may prefer to create a model using Power Point or another graphic software.

Closure

Students explain the process of the water purification system and why it is important to have this technology. Use the model and printed material and/or videos to explain a basic process and technology of electrolysis.

1. When electricity passes through salt water it breaks the negative and positive bonds of the oxygen and hydrogen atoms in the water molecule.
2. The salt water helps the water become a better conductor of electricity. The electricity breaks the bond of the water molecules and the chlorine purifies the water.

Lesson III: Water Solutions

Student Reading Text

Native Americans casually deposited their waste in streams and rivers, shrubs, or behind trees. New World settlers copied the Native people. As more Europeans populated cities, like they did back home, they tossed garbage and human waste out the front doors and windows into the streets below. Many people died from waterborne illnesses. Cholera and **typhoid** took many lives.

In American homes in the late 1800's and early 1900's, families still did not have running water inside the house. People in the city had to get their water from water-hauling tank wagons, street hydrants, and public water wells. Many people who lived outside the city had underground wells with pumps powered by windmills. Because of the lack of running water in the homes, most people had an "outhouse" apart from the house to collect human waste. During times of heavy rain, human waste could contaminate well water.

Today, communities experience natural disasters such as floods, earthquakes, hurricanes, typhoons, and tsunamis. Many times the water becomes contaminated by damage to water systems and sewers. Humans need to know how to get water safe, and how to keep it safe in order to survive. Scientists have discovered several ways to get contaminated water safe enough to drink.

Read the partial clip from an article written in 1874 in the New York Times:

1873 Cholera Epidemic Began in Paducah

New York Times 1874

Dr. Ely McClellan, United States Army, read a paper presenting an outline of the course pursued by the epidemic of **cholera** during the year 1873 in 21 counties of the state of Kentucky. The facts upon which the report is based, said Dr. McClellan, had been obtained by the narrative of, and correspondence with, some 50 medical gentleman in the portions of the state which was infected.

The cholera broke out in Louisville, Jefferson County, Kentucky on the 8th of June. From June 12th to August 16th, 21 fatal cases occurred in Louisville. Several cases occurred later, the epidemic dying out on September 8th.

Elizabethtown, Hardin County, Kentucky, located on the line of the Louisville and Nashville Railroad, is in hourly communication with Bowling Green, Paducah, and Louisville. The first case of cholera occurred there July 8th. From July 10th to September 2nd, 41 cases of cholera occurred, of which 22 were fatal. Some residents near the town were fatally affected by the disease.

Maysville, the county seat of Mason County, situated on the Ohio River, suffered greatly in 1849 from cholera. But 17 cases were reported in the town this season; 11 were fatal.

In La Grange, Oldham County, Kentucky, cholera was an epidemic from the 17th to the 29th of July. Of 31 cases reported, 15 were fatal. The sanitary condition of the town was bad.

Safe Water History in Louisville, KY and Its Impact on the United States Expansion

Louisville Water Company and WaterStep share a common mission to provide safe drinking water. The public health crisis that exists today in developing countries was very real in Louisville 200 years ago.

As early as 1819, a local physician wrote of how Louisville was coined the "Graveyard of the West." The placement of wells and outhouses had created epidemics of cholera and typhoid, though it would take years to understand that contaminated well water was killing people. When Louisville Water Company began operations in 1860, there was plenty to drink, but it wasn't safe.

Louisville Water Company found a way to use filtration and electrolysis to purify water. In 1896, Louisville Water Company pioneered using filtration to remove sediment and germs from water. The research occurred at the original site of Louisville Water Company in wooden buildings filled with lab equipment. Four companies were testing their filter devices to determine the best medium to clean the Ohio River water.

Scientist William Jewell, conducted an additional experiment using electrolysis to produce chlorine gas from a salt solution. Jewell's experiments led to the advancement of chlorine as a disinfectant. When Louisville began adding chlorine in 1913, the combination of disinfection and filtration dropped the cases of typhoid and cholera by 80 percent and cholera is almost unheard in the United States today.

Read the following excerpt from Charles Fishman's Book,"The Big Thirst," published in 2011:

The Big Thirst

Charles Fishman 2011

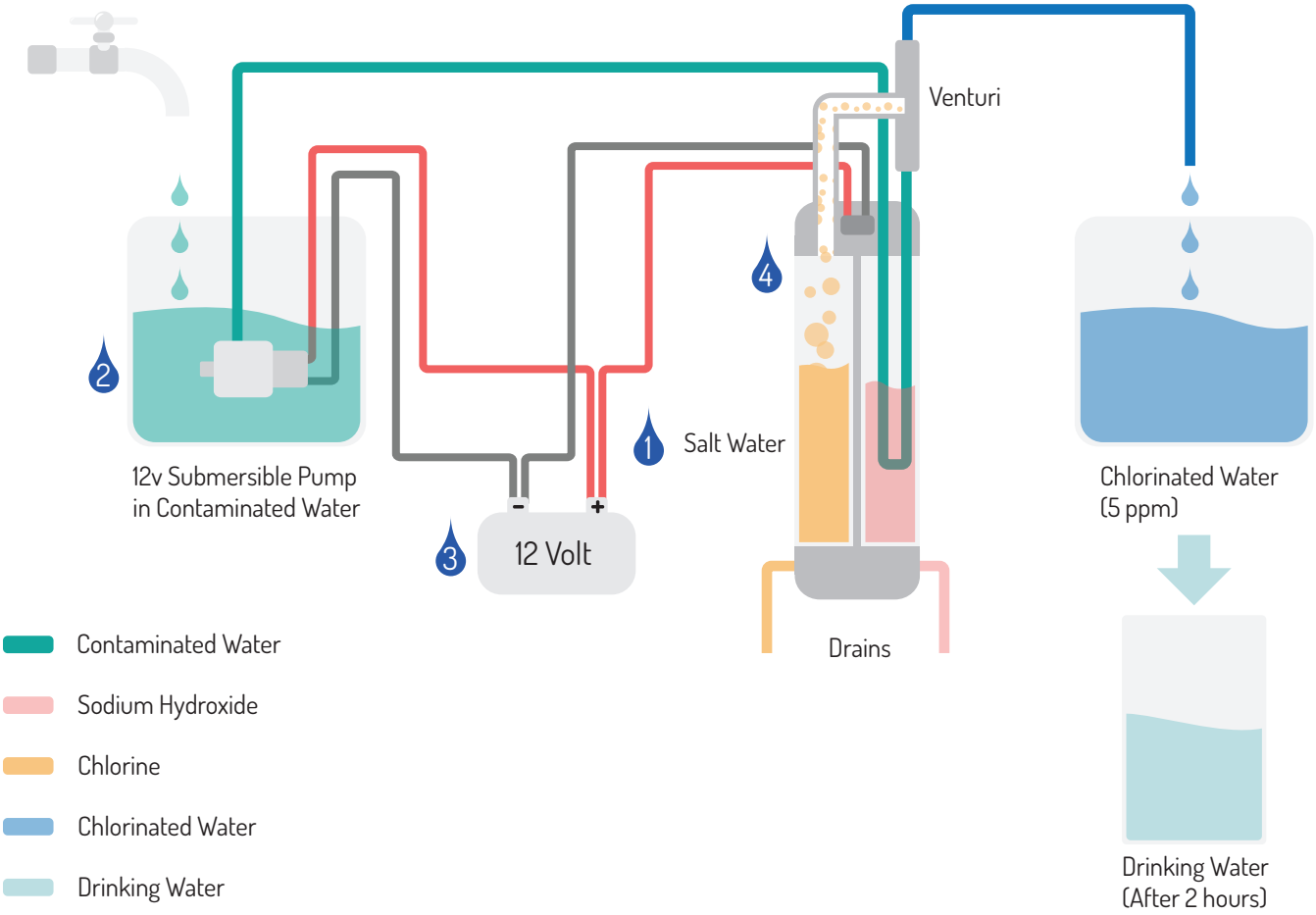
In the decades from 1905 to 1915, as dozens of water systems around the country installed filters and chlorination systems, we went through a water revolution that profoundly improved human life forever. Between 1900 and 1940, mortality rates in the United States fell forty percent.

From 1900 to 1940, U.S. life expectancy at birth went from forty-seven years to sixty-three years. In just forty years, the life span of the average American was extended sixteen years.

Anticipatory Set: Before and After

Oscar illustrates the changes he has seen in his community since WaterStep visited his town. Write at least five sentences telling the changes his community made to improve their sanitation and hygiene habits. Do you think these changes will help reduce the spread of disease? How?

WaterStep M-100 Water Purifier



How The M-100 Works

1. A handful of salt is mixed into the water and poured into the left side of the M-100. Regular water is poured into the right side.
2. A pump is placed into the dirty water and pumps this water through the M-100 and into a drinkable water container.
3. A 12 volt battery is attached to the pump and the M-100. The water purification process now begins.
4. The M-100 turns salt water into chlorine gas, which is mixed into the dirty water. This process kills 99.99% of contaminates and makes the water safe to drink.

Benefits of Our Water Chlorinator

» Operational in only five minutes.

» Chlorinates more than 10,000 gallons of water per day.

» Weighs less than 15 lbs and fits into most carry-on bags.

» Purifies drinking water at a cost of less than $1 per person annually.

» Produces virtually no waste.

» By-products form a cleaning solution which can be used to sterilize medical equipment and disinfect latrines.

Accessories are available to build a complete mini-water treatment plant. This includes pumps, filters, solar panels, tanks, and more. Visit WaterStep.Org for all of our safe water solutions!

Lesson IV: We Can Help!

Objective

Students Will:

» Understand how WaterStep completes its mission to save the world through safe water.

» Understand how to properly wash their hands.

» Demonstrate what they can do to help solve the global water crisis.

Materials/Resources Needed:

» YouTube hyperlinks: YouTube video Goodwall 2014

» Pages 25-27: Healthy Hygiene Habits Infographic

» Page 24 Anticipatory Set: Click on video link: Goodwall 2014

» Guided Practice: (Large Group)

» Guide students through the proper hand washing procedures.

» Have students sing "Happy Birthday" twice while demonstrating hand washing.

Independent Practice

» Students will write a list of ways they can help solve the global water crisis and explain how each action will make a positive impact.

Differentiated Instructions

» Encourage students to use vocabulary words, reading texts, and other materials from Lessons 1-4 as a reference for completing their list.

Closure

» Students will read their lists to a buddy as a peer review and compare ideas.

Lesson IV: We Can Help!

Student Reading Text

We Can Step Up and Save Lives!

WaterStep, headquartered in Louisville, Kentucky, is an organization that works to fight the global water crisis by addressing root causes of waterborne illnesses. We do this through a variety of education and training programs that educate people in water purification, well repair, and proper sanitation. We also collect shoe donations that help fund our efforts and improve the economies of developing communities. There are a number of steps that YOU can take to help preserve water resources and promote healthy life styles!

YouTube:
https://www.youtube.com/watch?v=mt6qrfvGiNU

Contact WaterStep

- Contact WaterStep at (502) 568-6342 to see how you can help save the world through safe water.
- Write a persuasive letter to a principal, coach, or teacher requesting assistance in organizing fund raising events or educational plays and presentations.
- Write a letter from the perspective of someone lacking access to safe water requesting assistance. Include what safe water means to you and how you would like to use it.

Become a WaterStepper

WaterStep is positively impacting lives in over thirty countries. However, we cannot do it alone, we need your help!

Ways that you can become a WaterStepper include:

- Bake sales, car washes, and lemonade stands: Volunteers donate time every year to fund raise for us. Funds raised go directly into acquiring the parts needed to manufacture our M-100 chlorinator and spread our technologies and training around the world.
- Become safe water advocates: Tell your friends and parents about the global water crisis and brainstorm ways that you can make a difference. You could also write a letter to your grandparents telling them about what you've learned and how they can help.
- Approach your student council, principal, coaches, or teachers: Organize groups to fund raise or create educational plays or presentations discussing what you have learned in Quench.

Healthy Hygiene Habits!

Hand washing

Did you know that simply washing your hands is one of the most effective means of avoiding the spread of dangerous disease? It's very important to get inside all your fingers, the back of your hands, and your thumbs. To ensure you have washed long enough, sing "Happy Birthday" to yourself twice.

1

Put Soap in Palms

2

Clean Palms

3

Clean Back of Hands

4

Clean Thumbs

5

Clean Between Fingers

6

Repeat until you have sung "Happy Birthday" twice

Don't leave water running

While you're brushing your teeth or washing dishes, don't leave the faucet on. Use only the necessary amount of water.

Don't sneeze everywhere

Cover your mouth by sneezing into your elbow or into your shirt. Don't cover your mouth with your hand because you'll spread germs onto everything you touch, YUCK!

Master Vocabulary List

Lesson 1: Amazing Water

Particle
Very small piece of something; a very small amount of something.

Physics: any one of the very small parts of matter (such as a molecule, atom, or electron).

Molecule
The smallest particle of a substance that retains all the properties of the substance and is composed of one or more atoms.

Matter
The substance of which a physical object is composed.

Material substance that occupies space, has mass, and is composed predominantly of atoms consisting of protons, neutrons, and electrons, that constitutes the observable universe, and that is interconvertible with energy.

Hydrogen
Chemical element that has no color or smell and that is the simplest, lightest, and most common element.

Oxygen
Chemical found in the air, that has no color, taste, or smell, and that is necessary for life.

Solid
Firm or hard: not having the form of a gas or liquid.

Liquid
Capable of flowing freely like water: not a solid or a gas.

Vapor
Substance that is in the form of a gas or that consists of very small drops or particles mixed with the air.

Lesson 2: Water Problems

Water Poverty (Water Poor)
The condition of not having access to sufficient water, or water of an adequate quality, to meet one's basic needs.

Safe Water (Potable Water)
Water rendered safe for human consumption through purification.

Clean Water
Water free of particulates, but not necessarily potable.

Sanitation
The process of keeping places free from dirt, infection, and disease.

Waterborne Illness
A disease transmitted via contaminated water sources.

Dehydration
An abnormal depletion of body fluids.

Hygiene
The things that you do to keep yourself and your surroundings clean in order to maintain good health.

Diarrhea
Abnormally frequent intestinal evacuations with more or less fluid stools.

Cholera
A serious disease that causes severe vomiting and diarrhea and that often results in death.

Typhoid
A serious disease that is passed from one person to another in dirty food or water.

Roundworm
A small worm with a long, round body that lives inside the bodies of people and animals.

Educational Standards

Lesson I: Amazing Water

» (5-PS1-1): Lessons are based on real life observations of matter and its properties.

» (3-5-ETS1.1.2): Lessons include analyzing changes, graphing quantities, and measurements of substances.

» MP.4 (3-L5 2-1): The roles of water in earth's surface processes are explored.

Lesson II: Water Problems

» Using Models: Make observations (firsthand or from media) to collect data, which can be used to make comparisons.

» (2-LS2-1) LS4.D: Biodiversity and humans-There are many different kinds of living things in any area, and they exist in different places on land and in water.

» (2-LS4-1): 3-5 Cross Cutting Concept of Cause and Effect: 4-ESS3-2 Cause and effect relationships are routinely identified, tested, and used to explain change. CCSS/ELA/Literacy: W2.8, SL2.5; Math: MP.2.4.5.

Lesson III: Water Solutions

» RI.3.3: Describe the relationship between a series of historical events, scientific ideas, or concepts, and steps of technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

» (3-LS2-1) ETS1-2: Generate and compare multiple solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

» CCSS connections: ELA/Literacy-R1.5.1: Quote accurately from a text (3-5-ETS1-2). Draw on information from multiple print or digital sources, demonstrating ability to locate an answer to a question or to solve a problem efficiently. (3-5-ETS1-2)

Lesson IV: We Can Help!

» (5-ESS2.C): Communities are doing things to help protect earth's resources and environments.

» (4-Ess3-2): Students who demonstrate understanding can generate and compare multiple solutions to reduce impact of natural Earth processes on humans.

» W.3.1: Write an opinion piece on topics or texts suggesting a point of view with reasons.

Sources

» WaterStep.org/Quench/Original version

» Center for Disease Control www.cdc.gov

» Kenmar Foundation: Solar Water Disinfection www.solarwaterdisinfection.ca

» Lenntech: Water Treatment and Purification www.lenntech.com

» Louisville Water Company www.louisvillewater.com

» UNICEF www.unicef.org

» United Nations www.un.org

» The University of Waikato: Science Learning Hub www.sciencelearn.org/nz

» World Bank www.worldbank.org

» World Health Organization www.who.int

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