

GRADES K-2

LESSON PLANS



Use these lesson plans, designed for grades K-2, in the classroom to supplement the *Western Water Quest: Become a Water Hero* chapter book and get your students even more excited about STEM and water conservation topics.

Presented by:



INTRODUCTION:

Thank you for choosing to teach your students about water conservation by sharing the *Western Water Quest: Become a Water Hero* chapter book and the accompanying lesson plans. The book and lesson plans are correlated and meant to be taught in tandem. We suggest reading a chapter and doing the activity the same day. You can start on Monday and finish on Friday. The lesson plans and their related chapter are as follows:

Lesson 1: LET'S BUILD A WATER PIPELINE

The first chapter of the book introduces the characters (and the reader) to the concept of how water is transported from place to place. This lesson walks the students through building a simple pipeline (out of straws) to carry water from one place to another (hopefully without any leaks!). This lesson also includes a fun maze activity that spells out an important message.

Lesson 2: THE WATER CYCLE

Chapter two explores the water cycle and its critical part in how water circulates throughout our planet. The lesson lets students build their own mini-water cycle. They can see how water evaporates, condenses and precipitates in their own creations! The students can enjoy an additional coloring activity with this lesson.

Lesson 3: ROLE OF PLANTS IN WATER FILTRATION

Chapter three sends the characters to a water filtration plant, and the accompanying lesson investigates how plants can play their own part in filtering water and removing impurities. Students will be able to see how impurities are taken up inside plants to assist in filtration. Students will have fun finding hidden objects in the last activity.

Lesson 4: HOW TO SAVE AND PROTECT WATER

Chapter four gives the reader all kinds of great ideas on how to save and protect our water. The lesson plan echoes this idea by allowing students to brainstorm their own ideas as a class. They can come up with ways to save water inside their own homes, outdoors or at school. Students can also show their knowledge by writing out water saving tips and drawing pictures of them.

Lesson 5: HOW TO SAVE WATER VIDEOS

The last chapter of the book sees the characters make their own social media video to spread the word about the importance of water and what we all can do to save and protect it. Likewise, the lesson plan lets students stretch their creativity and make their own water-saving video. There is also a writing activity in which the students can write a short story.

See list of Next Generation Science and AERO Social Studies Standards these lessons align with on the following page.

The following standards align with both the chapter book and the lesson plans:

Next Generation Science Standards	AERO Social Studies Standards
<p>K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.</p> <p>K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.</p> <p>K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air and/or other living things in the local environment.</p> <p>2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.</p> <p>2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.</p> <p>2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.</p>	<p>3.2.a. Describe ways in which people depend on the physical environment.</p> <p>3.2.f. Differentiate between ways in which people from different cultures think about and adapt to the physical environment.</p> <p>4.2.c. Describe how people from different cultures interact with the environment, such as the use of resources, shelter and transportation.</p> <p>7.2.b Describe roles resources play in our daily lives.</p>

LESSON #1:

LET'S BUILD A WATER PIPELINE

Objective:

Understand how pipelines work to bring water to our homes, businesses and schools.

Purpose of Activity:

Apply Skills, Create

Cognitive Level:

Strategic and Extended Thinking

Class Time:

45-60 minutes

Materials Provided:

- Bendy drinking straws (*five per pair of students*)
- Scotch tape
- Plastic cups (*one for each pair of students*)

Materials from Your Supply Closet:

- A couple pitchers of water suitable for drinking

Pre-Lesson Discussion:

(5-10 minutes)

Ask students if they know how water from rivers or lakes gets to their homes. Some students may be familiar with pipes in their homes and others may need to be prompted. Have students describe what the pipes in their homes look like. Have students think about the pipes inside their homes and where they may lead on the outside of their homes. Discuss how pipes carry water to all sorts of places and how most pipes that carry water into their homes are underground.

Drawing Activity:

(10 minutes)

Have each student draw a picture of their home with the pipes that carry water into the home. Once students have a picture of how the pipes in their homes bring in water they can use, let them know that today, they will build their very own pipe to carry water.

Setup:

(5 minutes)

Fill cups with water. Split students into pairs. Each pair of students should have five straws and one cup of water. Scotch tape can be shared by different pairs of students.

Designate one student as the water drinker and the other as the water pipelayer. Only the water drinker is allowed to drink from each set of straws. Explain that this is to avoid

spreading germs and keep everyone safe. The water drinker may help the water pipelayer later in the lesson.

Some students may need more hands-on instruction and direct supervision when putting together the lengths of straw to build a pipeline. A demonstration table or example can be useful for reference and modeling.

Procedure:

(20-25 minutes)

1. The water pipelayer puts the first straw in the water and the water drinker takes a sip. Ask students, how easy was that?
2. The water pipelayer attaches some more “pipeline” by slightly squeezing one end of a second straw and inserting it into the first.
3. The water drinker takes a sip of water using this much longer straw (pipe). Was it more difficult?
4. The water pipelayer places a piece of Scotch tape over the seam where the two straws connect. The water drinker sips again. Does this make it easier or harder to drink the water?
5. Have student pairs add a third, fourth and fifth straw working together. Use the bend in the straws to make angles and corners as their pipelines travel across the room.
6. How difficult or easy is it to drink as the straw pipeline grows?

Critical Thinking Questions or Post-Lesson Discussion:

What did you notice as the pipeline became longer?

It took more suction to drink from a longer straw.

What happened if the tape didn't make an airtight seal?

It makes it harder to sip when extra air gets in the straw.

Did any groups have a water leak? How did you fix the problem?

Make sure the tape seals up the gaps between straws.

How would this activity change if the straws were bigger or smaller around?

Narrow straws are easier to drink with, but you get less water. Straws that are bigger in circumference give you more water, but make it harder to create suction, especially over longer distances.

Assessment:

(10 minutes)

Quiz the students on how water travels from rivers, lakes and streams to our homes. You can also gauge their engagement during discussions on the topic as well as their stories and drawings related to pipelines.

FUN EXTENSIONS TO SHARE AND DISCUSS

Fun Water Fact to Share:

Seventy-five percent (75%) of the human brain is water and 75% of a living tree is water.

Source: <https://www3.epa.gov/safewater/kids/waterfactsoflife.html>

Jobs in Water:

Pipelayer

Pipelayers place pipes outdoors. They install large-diameter pipes, such as water mains, or smaller pipes that carry water from the main to houses or buildings. Pipelayers may also install sewage systems that carry waste to treatment plants. The pipes must also be protected and reinforced before the ground covers them.

Annual salary (mean): \$48,510 per year

Engineer

Engineers design, coordinate and manage utility projects. They also gather and compile data and prepare designs, plans, details, estimates and specifications for construction of those projects.

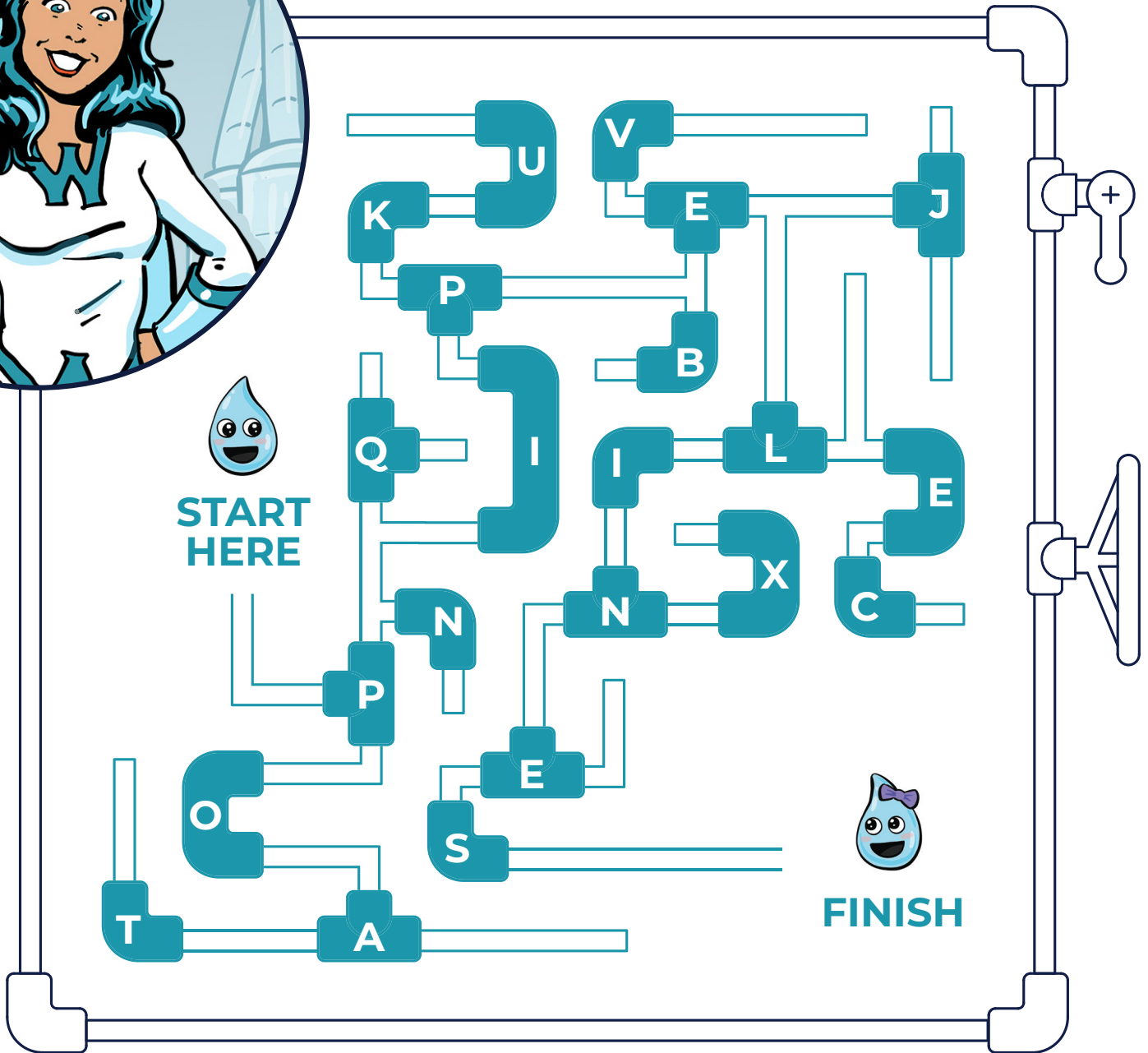
Annual salary (mean): \$140,000 per year

WESTIE'S AMAZING MESSAGE

Find your way through the maze and write the letters in the order they appear on the lines below. Read the sentence out loud once you've completed it.



START
HERE



FINISH

Water travels through

LESSON #2:

THE WATER CYCLE

Objective:

Make a miniature ecosystem to see the water cycle at work.

Purpose of Activity:

Apply Skills, Create

Cognitive Level:

Strategic and Extended Thinking

Class Time:

60 minutes over five days

Day 1 – 30 minutes

Day 2 – 5 minutes

Day 3 – 5 minutes

Day 4 – 5 minutes

Day 5 – 15 minutes

Materials Provided:

- Soil
- Small plastic bowl
- Large, clear plastic container
- Plastic wrap

Materials from Your Supply Closet:

- Tape or a large rubber band
- Water
- Plastic trees, animals, boat, etc.
(optional)
- Bag of ice *(optional)*
- Heat lamp *(optional)*

Water Cycle Pre-Lesson Setup:

(before class, teacher only)

For the water cycle setup you will construct a mini-environment in the clear, large plastic container. Before class, arrange the soil in the small container to make mountains, plateaus, hills and a lake basin. In the lake basin place the smaller plastic bowl. This will be filled later.

Pre-Lesson Discussion:

(10 minutes)

Plants, animals and humans all need water to live. Have students think about all the ways we use water and share everything they can think of. List all the different ways on the board.

Pre-Lesson Activity:

(10 minutes)

Have students visualize the different ways water is used. Have students draw a picture of one of the ways they use water and share it with the group. Or, while sitting in an activity circle, students can take turns acting out a short demonstration of the different ways we all use water.

Once students are thinking about how water is used, introduce the water cycle. Explain the three main parts of the water cycle: evaporation, condensation and precipitation. Then, let them know that today they are going to build their own mini-water cycle!

Water Cycle Lesson Setup with Students:

Reveal the mini-environment you constructed before class, describing the terrain. Then you can have students add things to the environment to make it look “real” like little plastic animals, trees, etc. This can be a great time to talk to your students about other experiences they have had relating to the water cycle. Maybe they have seen snow or been in a heavy rainfall. Maybe they have seen streams in the mountains. You could even talk about your favorite cloud shapes!

Procedure:

(10 minutes, day one)

1. Fill the small plastic bowl with water. Cover the container tightly with plastic wrap and secure it by means of tape or the rubber band. Place the container near a sunny window.
2. Discuss what is expected to happen in the container.
3. Depending on the amount of sun, the project may take 1-3 days. In order to speed up the process, a bag of ice may be placed on one end of the covered container while a heat lamp is focused on the other.
4. Watch for condensation on the plastic “sky” of the container. When enough moisture collects, it will fall onto the landforms as precipitation.
5. Encourage the students to draw the water cycle using arrows to show the flow.

Critical Thinking Questions:

Where is water collecting?

It is collecting on the inside of the plastic cover.

Why is it collecting there?

The water is evaporating and rising to the underside of the plastic covering.

What happens to the water after it evaporates?

It precipitates and rains back down into the aquarium or large container.

Assessment:

(10 minutes)

Students should know the three parts of the water cycle: evaporation, condensation and precipitation. You can also gauge their understanding and engagement during the discussions about the uses of water, experiences with storms and how the shape of a cloud can tell you how much water is contained in it.

FUN EXTENSIONS TO SHARE AND DISCUSS

Fun Water Fact to Share:

There is the same amount of water on Earth as there was when the Earth was formed. The water from your faucet could contain molecules that dinosaurs drank.

Source: <https://www3.epa.gov/safewater/kids/waterfactsoflife.html>

Jobs in Water:

Environmental Scientist

Environmental scientists protect natural water sources from pollutants and other contamination by studying the sources and effects of pollution. They figure out ways to clean sources up and prevent further pollution.

Annual salary (mean): \$96,820 per year

Water Resource Specialist

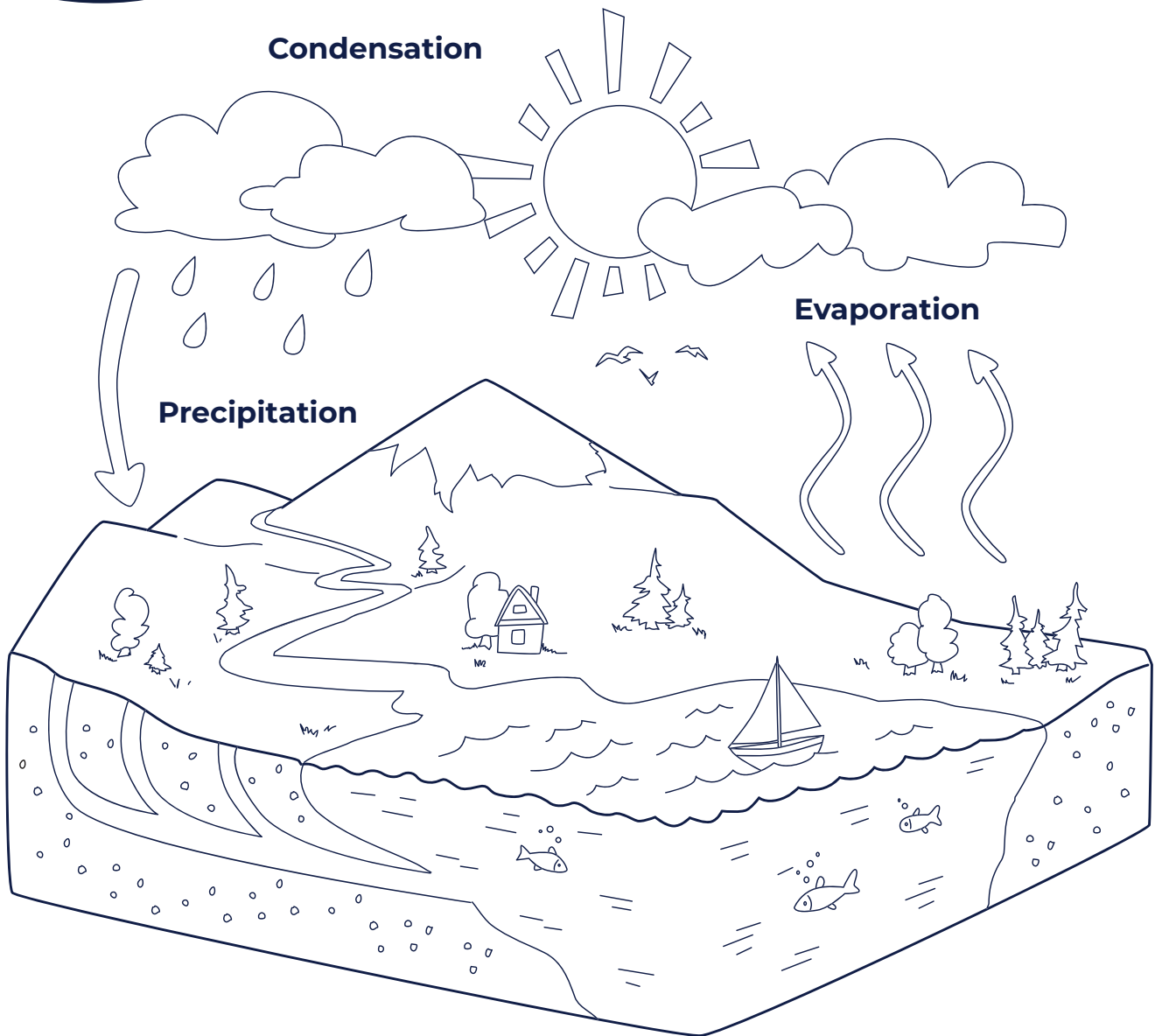
Water resource specialists perform planning and research related to water demand and conservation, groundwater management, water supply planning and other water resources tasks. They also analyze data, conduct grant management and customer support activities, and research and prepare reports.

Annual salary (mean): \$110,000 per year



MOTHER EARTH'S COLOR TIME

Color the picture of the water cycle and hang your work where friends and family will see it.



LESSON #3:

ROLE OF PLANTS IN WATER FILTRATION

Objective:

Understand how plants will take up certain kinds of materials from water moving relatively quickly through their root systems.

Purpose of Activity:

Review, Identify Details, Communicate, Create

Cognitive Level:

Strategic and Extended Thinking

Class Time:

55-70 minutes

Materials Provided:

- Six clear plastic cups, which will support the plants and allow drainage to be viewed
- Potting soil
- Unsweetened powdered drink mix, grape or cherry for color

Materials from Your Supply Closet:

- Six potted plants in 6-8" diameter pots with holes in the bottom (*soil needs to be moderately dry*)
- Vegetable oil
- One liquid household cleaner
- One powder household cleaner

Pre-Lesson Discussion:

(5-10 minutes)

Students love talking about plants and flowers. Discuss what students know about how plants and flowers grow. If needed, review the basics of sunlight and water to talk about how plants grow.

Pre-Lesson Activity:

(10 minutes)

Have students describe their favorite flowers or plants and what they like about them. Have students draw a picture of their favorite plant or flower. Explain that plants also play an important role in keeping water clean. Today's activity will let them see the process of how plants take in water.

Lesson Setup:

(5-10 minutes)

Set each potted plant in its own cup. Slowly pour 6-8 oz. of clean water through the pot. Adjust the soil so that water percolates through at about one ounce per minute.

Procedure:

(25-30 minutes)

1. Place the potted plants into the top of their cups. Pour clean water slowly through one of the pots and watch it percolate through the bottom of the pot. The water should look as clean as what was poured.
2. Add a gram or so of soil to 6-8 oz. of water and stir. Pour slowly into the second flower pot. The “dirty” water should look much cleaner once poured.
3. Add about 1 oz. of vegetable oil to 6-8 oz. of water, stir (they won’t mix completely) and pour into a third pot. See if the vegetable oil percolates through.
4. Add some powdered drink mix to 6-8 oz. of water and pour through a fourth pot. See if the water retains the color.
5. Add some powdered cleanser to 6-8 oz. of water and pour through a fifth pot. Is the cleanser retained in the soil?
6. Add some liquid soap to 6-8 oz. of water. Does the soap percolate through the soil?
7. Using the “contaminated” plants, pour some clean water at the same rate through each one. Is more of the “pollutant” rinsed away from the soil by the clean water?

Critical Thinking Questions:

In what ways can plants and soil benefit drinking water quality?

They filter out some pollutants.

Can plants and soil remove all types of impurities from water?

No.

What is the role of rainwater moving through contaminated soil?

It washes the pollutants through the root system as well as deep underground.

Assessment:

(10 minutes)

Assess whether younger students know how plants take in sunlight and water to grow. You can also gauge their participation in discussions and engagement when drawing pictures.

FUN EXTENSIONS TO SHARE AND DISCUSS

Fun Water Fact to Share:

Nearly 97% of the world's water is salty or otherwise undrinkable. Another 2% is locked in ice caps and glaciers. That leaves just 1% for all of humanity's agricultural, residential, manufacturing, community and personal needs.

Source: <https://www3.epa.gov/safewater/kids/waterfactsoflife.html>

Jobs in Water:

Farmer

Farmers oversee the growing of crops. They supervise all steps of crop production, including planting, fertilizing, watering and harvesting. They determine how to raise crops, including the amount of water needed and the most efficient way to deliver crops to the communities who use them.

Annual salary (mean): \$73,060 per year

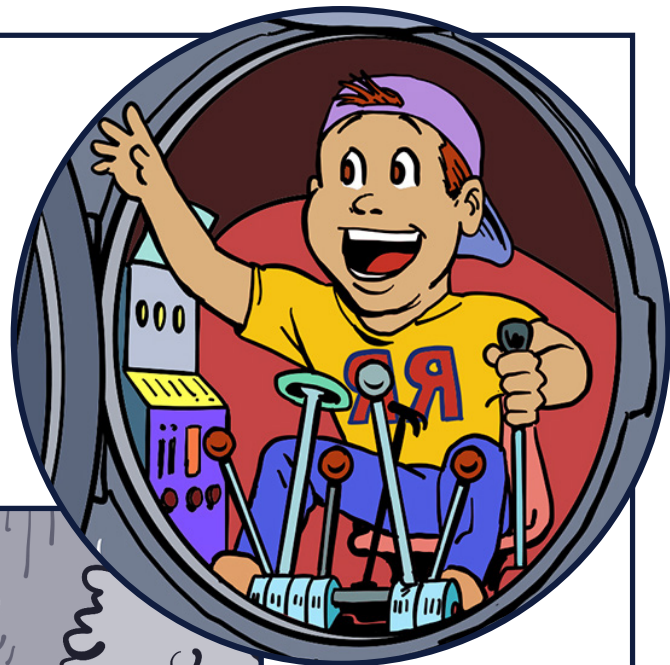
Water Treatment Operator

Water treatment operators add chemicals, such as ammonia or chlorine, to disinfect water or other liquids. They also inspect equipment on a regular basis, operate equipment to purify water and ensure safety standards are met.

Annual salary (mean): \$47,880 per year

CIRCLE WITH SAL AND OZZY

Circle the plants and animals in the ecosystem.



Animals

Plants

Mushrooms
(Fungi)

Sun

Water

Air

Rocks

LESSON #4:

HOW TO SAVE AND PROTECT WATER

Objective:

Understand that we use a lot of water throughout the day and identify ways to save and protect water.

Purpose of Activity:

Review, Identify Details, Communicate, Create

Cognitive Level:

Strategic and Extended Thinking

Class Time:

30-45 minutes (*day one*)
5-minute check-in daily for one-month challenge

Materials Provided:

- One month of a blank calendar

Materials from Your Supply Closet:

- Pencils/markers

Pre-Lesson Discussion & Activity:

(20-25 minutes)

Let students know that as a class they are going to brainstorm ways to save water.

1. Ask students all the different ways they use water in the home or at school. Discuss ways that might not be so obvious too, such as brushing teeth, growing food, washing the car, etc.
2. In an activity circle, have students mime a demonstration of one way they use water. Students could take turns in the middle of the circle demonstrating one at a time or they could do it together as a group.
3. Discuss all the ways students could save water by changing something about how they use water. For example: Turn water off when you brush teeth or take shorter showers.
4. Have students then mime a demonstration of how they save water this way.
5. Write these ways to save water on the board.

Let students know that the class is going to take a water saving challenge for one month.

Procedure:

(20-25 minutes)

1. Break students into small groups so there are four groups altogether. Each group will take one week of the month-long challenge.
2. From the ways to save water listed during the brainstorm, have each group choose one water saving act for each day of their assigned week.
3. Come back as a full class and have each group share their water saving idea for each day of their week with the class.
4. Fill in the calendar according to what the students decided.
5. Display the calendar for all to see. Refer to the water saving act each day, encouraging participation.
6. Make copies of the calendar and have students take home and share with their families.
7. Check in each day for students to share how often they saved water that day.
8. Did they share these water saving ideas with their families? Did their families participate?

Water Saving Suggestions:

- Don't leave the water running while brushing teeth.
- When washing your bike or the family car outdoors, make sure to use a hose equipped with a shut-off nozzle.
- Recycle or reuse as much as possible before throwing items away.
- Only do full loads in a dishwasher or clothes washer.
- Have a pitcher or bottle of water in the refrigerator for drinking.
- Sweep your driveway instead of using the hose.
- Use a bucket of soapy water when washing the car.
- Take showers instead of baths.
- Water the grass, not the sidewalk
- Have your family fix leaky faucets.
- If you are watering a tree or washing a car, don't leave the hose running.
- When washing dishes, don't leave the faucet running the whole time.

Critical Thinking Questions:

How can our class save water around the school?

Turn off water when washing your hands, don't let the water run when you want a drink, look for leaky faucets and ask to have them fixed, etc.

What items in the school can be recycled?

Paper, plastic, cardboard, aluminum, glass, etc.

Assessment:

(10 minutes)

You can assess students by the number of ways they can think of that water is used and ways to save it.

FUN EXTENSIONS TO SHARE AND DISCUSS

Fun Water Fact to Share:

Water is part of a deeply interconnected system. What we pour on the ground ends up in our water, and what we spew into the sky ends up in our water.

Source: <https://www3.epa.gov/safewater/kids/waterfactsoflife.html>

Jobs in Water:

Industrial Engineer

Industrial engineers are involved with improving industrial practices and increasing efficiency. They devise ways to use less water more efficiently. They may design systems that contain or cleanse water that has become contaminated through industrial processes.

Annual salary (mean): \$95,300 per year

Water Conservation Specialist

Water conservation specialists assist in the development, implementation and monitoring of conservation programs, serve as technical experts on water efficiency issues, evaluate opportunities for public involvement and community networks, research water conservation programs and techniques, and prepare recommendations for overall program objectives and goals.

Annual salary (mean): \$58,000 per year

SAVE WATER WITH ANNA ROBIC

Name one way to save water indoors and one way outdoors. Draw a picture of each.

I SAVE WATER INDOORS BY _____.



I SAVE WATER OUTDOORS BY _____.

LESSON #5:

HOW TO SAVE WATER COMMERCIALS

Objective:

Produce a short persuasive commercial on water use.

Purpose of Activity:

Review, Identify Details, Communicate, Create

Cognitive Level:

Strategic and Extended Thinking

Class Time:

60 minutes

Materials from Your Supply Closet:

- Paper for storyboarding
- Pencils/markers/crayons for storyboarding

Pre-Lesson Discussion:

(15 minutes)

Ask students if they have ever seen commercials on TV. Ask them to describe their favorite ones and tell the class why they like them. It might be helpful to show students four or five different commercials via YouTube for further discussion. Have students name what products or activities are advertised or promoted in the commercials. What was it about the commercials that made them know what the product was? How did the commercial make them want to use the product or do the activity? Introduce the word “persuade.” Define it for the students and discuss some ways we persuade people.

Ask the students if they have ever thought about making their own commercial and, if so, what would it be for? Then inform the students that they will get to make and act out their own TV commercial!

Procedure:

(30-45 minutes, can be spread throughout the day)

Use the list of water saving actions from previous lessons.

- Break students into groups of three or four. Each group will create their own commercial.
- Assign or have each group choose one water saving action from the list. This is the subject of their commercial. It is what they are advertising and trying to persuade others to do.
- Have each group draw three pictures to tell the story of their commercial (with a beginning, middle and end). For example: If they want to persuade others to turn the water off while brushing their teeth, the first picture might be someone brushing their teeth with the water running (beginning). The second picture might be someone shocked at such behavior and shaking their head (middle). The third picture might be the whole group turning the water off while brushing their teeth (end).
- Then, as a group, have the students act out each picture. They can add dialogue to make the pictures come to life. Remind them that they are trying to persuade their audience to do the water saving activity.
- Have the groups practice their commercial.
- Perform the commercials for each other.
- Record the performance of each commercial and share with families and/or the school community (optional).

Assessment:

(10 minutes)

Students can be assessed by their engagement in the discussion about commercials they have seen. They can also be assessed on how persuasive they were in helping others learn to save water.

FUN EXTENSIONS TO SHARE AND DISCUSS

Fun Water Fact to Share:

The average total home water use for each person in the U.S. is about 50 gallons a day.

Source: <https://www3.epa.gov/safewater/kids/waterfactsoflife.html>

Jobs in Water:

Landscape Architect

Landscape architects plan and design land areas for parks, recreational areas, highways and other properties. They may practice xeriscaping to choose the type and quantity of plants for a landscaped area. Part of their job is to determine how much water their landscapes require and to plan ways to ensure that the land is properly watered and drained.

Annual salary (mean): \$67,950 per year

Communication Specialist

Communication specialists perform customer outreach, oversee district and community events, manage stakeholder databases and serve as liaisons with external and internal groups.

Annual salary (mean): \$74,000 per year

SPREAD THE WORD

Fill in this story and read to your friends.

WESTIE, DRIPPY AND DEWEY WENT FOR A WALK IN
THE PARK. THEY SAW MOTHER EARTH AND A(N)

_____. "HELLO," SAID MOTHER EARTH, "I

ANIMAL

AM FEELING VERY _____ BECAUSE SO MANY

EMOTION

PEOPLE WASTE WATER." THIS MADE WESTIE FEEL

_____ . "MAYBE WE CAN HELP

EMOTION

SPREAD THE WORD ABOUT SAVING

WATER," WESTIE SAID. "WE'LL

GO TO _____ AND

PLACE

TELL EVERYONE TO SAVE WATER."

"THANK YOU," SAID MOTHER

EARTH, "I ALWAYS KNEW YOU

WERE A GOOD _____."

NOUN



FURTHER EXTENSION ACTIVITY: FUN WITH WATER JOBS

Procedure:

(Time varies)

At the end of each lesson, students have been learning about different water jobs. Go back and review the different jobs.

Then, have students choose which job they think is their favorite and draw what they imagine the person may look like performing that job. Students can use the blank activity sheet on the next page for drawing.

WATER JOBS

Think about all of the water jobs you learned about this week. Choose which water job is your favorite and draw what you imagine a person may look like performing that job.