

TEACHER OVERVIEW

Humans and Water

6th — 8th Grade

Nature Vision Student Packet

The materials contained within this packet for students have been created by Nature Vision, an environmental education nonprofit organization that brings programming to schools and local greenspaces for over 70,000 PreK-12th grade students each year in King and Snohomish Counties. This curriculum is designed to foster an understanding of the importance of water and its integral role in supporting life and shaping our planet. Packets can be completed by students either independently from home or with the help of an adult caregiver. Materials for each day of the week build on the previous days' learning by offering a variety of activities that involve art, writing, and safe field exploration.

These materials are provided to you by Cascade Water Alliance (Cascade). Cascade wants everyone to understand the importance of conserving and protecting our limited water resources. Cascade supports Nature Vision in the development and delivery of water education programs and we are happy to offer these materials to our friends in the community. Learn more about Cascade at cascadewater.org.

This unit supports NGSS Performance Expectations across various disciplines, as well as supporting K-12 Integrated Environmental and Sustainability Standards. These are listed at the bottom of this page. Teachers will be supplied with PDF formats of materials to be emailed to families, or teachers may print and send to students to complete at home.

Students begin with an introduction to our region's water supply: surface water- such as rivers and lakes, and groundwater. Students then learn about the difference between natural water and drinking water. Students will also learn ways to save their water by utilizing smart gardening practices. Highlighting the connection to local water conservation, students are made aware of the global water crisis. The unit finishes with a focus on stewardship and what we can do to protect our water supply.

If you have any further questions or concerns regarding this packet, please email our Office Coordinator at info@naturevision.org.

Grades 6-8

Supports NGSS Performance Expectations: MS-ESS3-1, MS-ESS3-3, MS-ESS3-4, MS-ETS1-1, MS-ETS1-2.

Grades 6-8
Day 1 - Water Supply
Day 2 - Drinking Water Treatment
Day 3 - Outdoor Water Conservation
Day 4 - Global Water Crisis
Day 5 - Stewardship

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PARENT/CAREGIVER OVERVIEW

Humans and Water

6th — 8th Grade

Welcome to Nature Vision's student packet for home use. Nature Vision is an environmental education nonprofit organization that brings programming to schools and local greenspaces for over 70,000 PreK-12th grade students each year in King and Snohomish Counties. We are excited to be offering this version of our programming directly to students at home!

This packet is designed to be completed over the course of one week, with each day focusing on a different aspect of environmental science and stewardship. The majority of these materials can be completed independently, but we thought it would be important to provide background information for any adults who may be helping to complete or answer questions. We've included the basic learning objectives for each day along with some vocabulary.

These materials are provided to you by Cascade Water Alliance (Cascade). Cascade wants everyone to understand the importance of conserving and protecting our limited water resources. Cascade supports Nature Vision in the development and delivery of water education programs and we are happy to offer these materials to our friends in the community. Learn more about Cascade at cascadewater.org.

Another great resource to learn about saving water and how to help our salmon and watersheds is weneedwater.org. Check out the We Need Water webpage or on Instagram @WeNeedH2O to see how you can be part of this campaign! Challenge yourself to use #WeNeedWater to post all the things you are doing with your friends and family to conserve and protect water!

*Please contact info@naturevision.org with any questions or concerns
Stay connected with Nature Vision! Follow us for updates @naturevisionorg*



NOTE: Students may require support in reading directions and/or completing some tasks. While many activities in this packet are creatively oriented and open ended, you may consult the answer key located at the back of the packet for additional assistance or guidance.

Unless otherwise noted, images courtesy of freepik.com

PARENT/CAREGIVER OVERVIEW: DAY 1

Water Supply

Background Information: In our area, there are three main sources where we obtain drinking water: the Tolt River Watershed, Cedar River Watershed, and groundwater. Our cities and water districts — member areas of the Cascade Water Alliance — carefully treat and monitor this water to make sure it is safe for human consumption. They send this treated water through a distribution system. For perspective, each American uses an average of 100 gallons of water per day.

Learning Objectives: Students will learn about their water supply and its importance to their community at large. Students will understand that water is a finite resource and be introduced to our local water supply system, including where it is located and where the water flows from source to faucet. Students will also understand the human and natural factors that affect water supply and learn why we need to save water.

Main Activity: Design an Aquifer

- **Overview:** Students design and build a model of an aquifer and a well using household materials
- **Parent/Caregiver Tasks:** Help students acquire necessary materials and provide adequate space

Optional Activity: We Need Water Challenge

- **Overview:** Students complete a daily task related to a water conservation habit and a challenge to spread awareness on the importance of saving water
- **Parent/Caregiver Tasks:** If possible, help the student post their #WeNeedWater challenge on social media

Optional Activity: Additional Resources

- **Overview:** Students check out additional resources to further their understanding of their water supply
- **Parent/Caregiver Tasks:** Visit online resources with students and provide technical support as needed

Optional Activity: Edible Aquifer

- **Overview:** Students build an edible model of an aquifer
- **Parent/Caregiver Tasks:** Help students acquire necessary edible materials and provide adequate space

PARENT/CAREGIVER OVERVIEW: DAY 2

Drinking Water Treatment

Background Information: Our drinking water treatment is a human system that requires multiple steps for proper health and sanitation. This drinking water comes from the Tolt and Cedar River Watersheds, as well as some areas that draw from groundwater through a well system.

Learning Objectives: Students will learn about different water systems. They will understand how water is sourced from watersheds and aquifers. Students will continue their investigation of how water flows and interacts with the human-built environment.

Main Activity: Drinking Water Treatment Model

- **Overview:** Students will replicate the drinking water treatment process using household materials
- **Parent/Caregiver Tasks:** Help students acquire necessary materials and provide adequate space

Optional Activity: We Need Water Challenge

- **Overview:** Students complete a daily task related to a water conservation habit and a challenge to spread awareness on the importance of saving water
- **Parent/Caregiver Tasks:** If possible, help the student post their #WeNeedWater challenge on social media

Optional Activity: Video

- **Overview:** Students create a video to further their understanding of their drinking water treatment
- **Parent/Caregiver Tasks:** Visit online resources with students and provide technical support as needed

PARENT/CAREGIVER OVERVIEW: DAY 3

Outdoor Water Conservation

Background Information: Efficient gardening and natural yard care practices help ensure a reliable water supply. Outdoor water conservation keeps utility operating costs lower. This allows for more water to stay in watershed ecosystems. Practices such as drip irrigation, watering our gardens and yards either during morning or evening hours, and watering our plants close to the roots all positively affect our watershed health and help conserve water.

Learning Objectives: Students will explore the ways in which water can be used efficiently in gardens and yards. They will discover how their actions at home and school can have a positive impact on the health of their watershed. Students will explore the ways a healthy garden is an example of systems thinking between natural cycles and human-built environments.

Main Activity: Poor Gardening Practices

- **Overview:** Taking on the role of a gardening expert, students analyze images of poor gardening practices and provide advice and suggestions for how to improve them
- **Parent/Caregiver Tasks:** None

Optional Activity: We Need Water Challenge

- **Overview:** Students complete a daily task related to a water conservation habit and a challenge to spread awareness on the importance of saving water
- **Parent/Caregiver Tasks:** If possible, help the student post their #WeNeedWater challenge on social media

Optional Activity: Additional Garden Projects

- **Overview:** Students can look online for more resources about water-wise gardening ideas such as green roofs, rain gardens, and rain barrels
- **Parent/Caregiver Tasks:** Provide supervision and permission for internet access

PARENT/CAREGIVER OVERVIEW: DAY 4

Global Water Crisis

Background Information: In many communities around the world, people do not have access to a water supply in their homes the way we do. Instead of turning on a faucet, women and girls spend many hours each day carrying water containers many miles to and from their local water source. This water, usually about five gallons, is the daily water supply for their entire household- shared with their whole family. This is compared to the average American consumption of 100 gallons of water a day per person. This lack of access to abundant, clean water for these communities has ripple effects that create other issues. The lack of access to clean water results in improper water sanitation, impacting children's health. Girls are more likely to not receive an education or be able to work as they are required to spend hours collecting their household's water. Lastly, the lack of access to abundant clean water can trap people in a cycle of poverty as people spend a high percentage of their household income on medicine and treatment for the frequent illnesses caused by unsanitary water.

Learning Objectives: Students will discover how the amount of water used by the world's poorest communities is small and often insufficient for good health and basic sanitation. They will discuss water conservation methods that can be implemented into their daily lives to ensure they don't take their access to a plentiful water supply for granted. Students will understand the many problems that arise when communities do not have access to clean water.

Main Activity: Water Stories

- **Overview:** Students imagine what it is like for those people who have to travel to gather water for their families by writing a short story detailing their own imaginary water-fetching journey
- **Parent/Caregiver Tasks:** None

Optional Activity: We Need Water Challenge

- **Overview:** Students complete a daily task related to a water conservation habit and a challenge to spread awareness on the importance of saving water
- **Parent/Caregiver Tasks:** If possible, help the student post their #WeNeedWater challenge on social media

Optional Activity: 5-Gallon Challenge

- **Overview:** Students make tough choices about how they would ration their water if they had only 5 gallons to share with their family each day
- **Parent/Caregiver Tasks:** None

PARENT/CAREGIVER OVERVIEW: DAY 5

Stewardship

Background Information: Stewardship is how we care for the natural world. Stewardship includes conserving natural resources (e.g. water) that all living things need to survive, thinking carefully about how we interact with the world around us and doing our best to ensure we positively impact the environment. Stewardship activities center around what students and families can do to save water and keep it clean for everyone.

Learning Objectives: Students will combine their knowledge gained throughout the week to consider ways they can support the environment. They will learn to focus on water conservation by thinking carefully about natural resource use.

Main Activity: How Much Are You Using?

- **Overview:** Students track their water usage throughout the day, calculating the amount they use and discovering ways to save water instead
- **Parent/Caregiver Tasks:** None

Optional Activity: We Need Water Challenge

- **Overview:** Students complete a daily task related to a water conservation habit and a challenge to spread awareness on the importance of saving water
- **Parent/Caregiver Tasks:** If possible, help the student post their #WeNeedWater challenge on social media

PARENT/CAREGIVER OVERVIEW: VOCABULARY

DAY 1

Aquifer: A body of permeable rock underground that can contain groundwater

Groundwater: Water held underground in the soil or in between layers of rock and clay

Precipitation: Falling rain, snow, hail or sleet

Watershed: An area of land that allows water to flow off and drain into rivers, lakes, streams, and oceans

Well: A structure made by digging or drilling into the ground to access groundwater

DAY 2

Reservoir: Storage spaces to hold water

DAY 3

Compost: Soil made from decayed organic material that is added to plants to enrich with additional nutrients, like a plant fertilizer

Irrigation: The process of supplying water to plants to help their growth

Mulch: Organic mixture that can include grass clippings, leaves, shredded bark, and wood chips which is added around or over a plant to insulate it, retain water in the soil, and minimize weed growth

DAY 4

Crisis: A very large and serious problem

DAY 5

Conservation: Protecting the natural world, especially by making smart choices about what humans use and do with things in nature

Stewardship: Taking care of something; being a protector

DAY 1

Water Supply

Regardless of our location we all live in a watershed. A watershed is an area of land with snow and rain melting and draining into rivers, lakes, streams, and oceans. Our drinking water comes from several sources within our local watershed. In our region, the Cedar River, Tolt River, and groundwater supply our cities with water. The Cedar and Tolt Rivers are watersheds, which begin as precipitation flowing down from the Cascade Mountains. This mountain range extends through our entire state and beyond!

The Cedar River is the larger watershed of the two. Starting from the central Cascade Mountains, the Cedar River drains into Lake Washington which then connects to the Puget Sound. This watershed is not only our drinking water supply but also home to a diverse range of plant and animal species. Keep in mind that only 18% of the entire Cedar River watershed's annual water flow is used for our drinking water. The remaining 82% is reserved for other aspects of this natural system, such as necessary water levels for the important species of Pacific salmon.



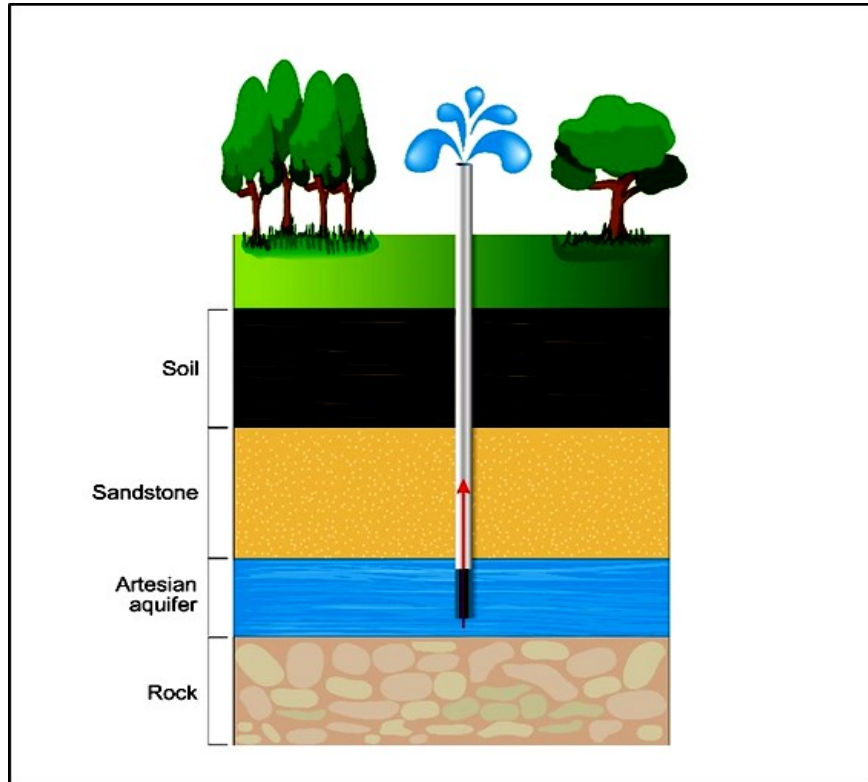
Cedar River Watershed

The Tolt River Watershed is smaller than the Cedar River Watershed, but it is still an essential source in our water supply. The Tolt River Watershed can provide up to 100 million gallons of drinking water per day! The Tolt River flows into the Snoqualmie River that then drains into the Puget Sound.



Tolt River Watershed

Groundwater is water that collects underground. Groundwater fills spaces between layers of rock and soil called **aquifers**. Groundwater is filled from precipitation that seeps underground. **Wells** are holes drilled into aquifers to bring groundwater to the surface for human use. Many people rely on groundwater wells as their drinking water source.



Source: Regenesis

Vocabulary

Aquifer: A body of permeable rock underground that can contain groundwater

Groundwater: Water held underground in the soil or in between layers of rock and clay

Precipitation: Falling rain, snow, hail or sleet

Watershed: An area of land that allows water to flow off and drain into rivers, lakes, streams, and oceans

Well: A structure made by digging or drilling into the ground to access groundwater

Main Activity

Design an Aquifer

Aquifers are layers of underground rock that trap groundwater. Rain, snowmelt, and surface water trickles into the ground and collects in the spaces between the rocks. Wells are drilled into aquifers to bring groundwater to the surface for human use.

Materials: Writing utensil, household items

Household teams for Aquifer/Well Model:

Sponge
Gravel
Clay
Soil
Water
Clear cup
Clear bowl

Clear tub
Large Ziploc bag
Straw
Eyedropper
Turkey baster
Small spoon

Please ask for an adult's permission to gather materials and for an appropriate space to build the model. The activity space needs to allow for potential water, gravel, clay, and soil spillage. Outdoor space would be ideal. Any leftover water can be poured over plants to save water! Do not pour gravel, soil, rocks, and clay down the drain.

Steps:

1. Using the provided list of materials, choose some to design a model of an aquifer and well. *Use the groundwater graphic from previous page as reference.*
2. Draw an example of your aquifer and well model in the space below. Include the following italicized aquifer parts into your drawing and label clearly which materials will be used for each part.
 - *Aquifer base (where you will build your aquifer)* – possible material options: Clear cup, clear bowl, clear tub, or large Ziploc bag
 - *Layer of bottom rock* – possible material options: sponge, gravel, clay, and/or soil
 - *Layer of top rock* – possible material options: sponge, gravel, clay, and/or soil
 - *Groundwater*
 - *Well* – possible material options: straw, eyedropper, turkey baster, or small spoon

Activity continues on next page with Aquifer and Well Design Drawing and steps 3-4 afterwards

Well and Aquifer Design Board

3. Once you are done with the design, build your model based on your drawing and labels.

⇒ Try the following during your build:

- Try bringing up the “groundwater” with your “well” *Don't drink any of the water!*
- After bringing up the “groundwater” replenish your aquifer by adding “rain” to the surface top. *Pour some water over the top of your aquifer model*

4. Answer these questions after you have finished building your model.

⇒ **Which household material did you choose for the layer of rock and well?**

- Aquifer base: _____
- Layer of bottom rock: _____
- Layer of top rock: _____
- Well: _____

⇒ **Did you use other household materials in your model design?**

Circle one: yes no

⇒ **If yes, what did you use and what did it represent?**

⇒ **Did you have distinct layers of rock or was it all just one layer with water seeping in-between the spaces of rock?**

Circle one: distinct layer one layer

⇒ **Did you attempt to draw up the “groundwater” with your “well”?**

Circle one: yes no

⇒ **Were you able to successfully draw up “groundwater” with your “well”?**

Circle one: yes no

⇒ **What did you observe about the water levels as you drew the “groundwater” out of the aquifer through your well?**

⇒ **Were you able to replenish your aquifer with “rain”?**

Circle one: yes no

⇒ **What did you observe about the water you added to the surface top replenish your aquifer?**

Optional Activity

We Need Water Challenge

There are so many ways to save, protect, and care for our water. At the end of every daily lesson, we will be giving a challenge to help you show off what you've learned.

Materials: Timer, computer/phone/tablet, internet connection

Did you know that your shower uses about 2 gallons of water every minute? Most people shower for about 10 minutes, and use almost 20 gallons of water for every shower. One of the simplest ways to save water is to think about the amount of time that we are in the shower. It's recommended that we take showers that are just 5 minutes long to save water. For today's We Need Water challenge, time how long you are in the shower and figure out how much water you used today. Can you use less tomorrow?

One fun way to keep track of the time is to listen to music, most songs are about 2.5 minutes long, so if you listen to 2 songs while you shower, you'll shower for 5 minutes. What 2 songs will you play to stay on time and save water?

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!

Optional Activity

Additional Resources

Below are some additional online resources to look over that contain information on the Tolt River Watershed, the Cedar River Watershed, and groundwater sources in our region.

Please ask for an adult's permission to check out these additional online resources.

Materials: Computer/phone/tablet, internet access

Cedar River Watershed Biodiversity: <https://www.seattle.gov/utilities/environment-and-conservation/our-watersheds/cedar-river-watershed/biodiversity>

Tolt River Natural Area: <https://www.kingcounty.gov/services/environment/water-and-land/natural-lands/ecological/tolt-river.aspx>

The Groundwater Story: <https://www.kingcounty.gov/services/environment/water-and-land/groundwater/education/animation.aspx>

Groundwater Well Viewer: <https://green2.kingcounty.gov/groundwater/map.aspx>

King County Groundwater related Maps: <https://www.kingcounty.gov/services/environment/water-and-land/groundwater/maps-reports/maps.aspx>

Optional Activity

Edible Aquifer

In this activity, you can build an *edible* aquifer with dessert items representing each part of an aquifer!

Modified from Water Rocks Activity: <https://static1.squarespace.com/static/5a8318548fd4d2229e6b6458/>

Materials: Use whatever you can safely eat (e.g. chocolate chips, clear soda, vanilla ice cream, sprinkles), clear plastic cup, spoons, drinking straw

Please ask for an adult's permission before gathering and consuming edible materials.

Steps to build an edible aquifer:

1. Take one cup and fill $\frac{1}{4}$ of the cup with chocolate chips. *This layer represents the sand, gravel, and rocks in an aquifer.*
2. Then pour soda into the cup to fill in the spaces in the chocolate chips. *The soda serves as the groundwater.*
3. Spread a layer of ice cream over the chocolate chips. *This represents the confining layer of rock.*
4. Add another layer of "rocks" (chocolate chips), and a layer of sprinkles. *The sprinkles represent the holes between the layers of soil above the aquifer.*
5. "Drill a well" in the center of your aquifer, using a straw.
6. Use the straw to suck up the "groundwater" (soda). *Observe the "groundwater" levels lowering.*
7. Add more soda to observe how rainfall recharges aquifers. *Watch the "groundwater" levels rising. Keep in mind, it takes rain a lot longer to refill groundwater!*

DAY 2

Drinking Water Treatment

Yesterday we learned our drinking water supply comes from the Cedar River, the Tolt River, and groundwater. The water from these sources does not immediately become drinking water, it must be filtered to ensure it is clean enough for human consumption. Drinking water from the Cedar River and the Tolt River Watersheds is managed by drinking water treatment plants close to these waterways.

The melting snow and rain from the Cascade Mountains are initially stored in **reservoirs**, spaces designed to hold water. At the Cedar River, the water is stored in two reservoirs – Chester Morse Lake and the Masonry Pool. At the Tolt River, the water is stored in the Tolt Reservoir.

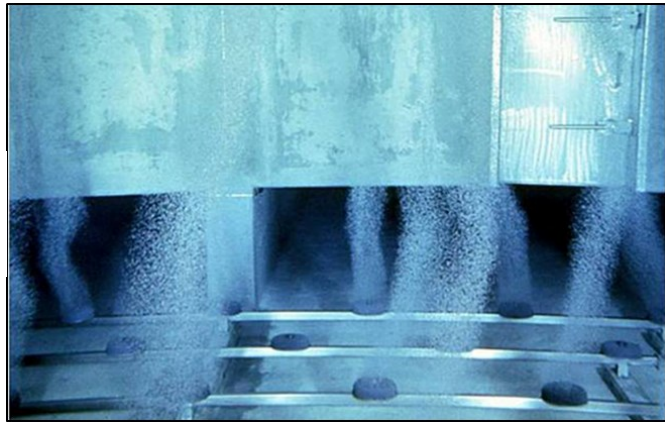
Chester Morse Lake Reservoir



From these reservoirs the water is then fed into drinking water treatment plants to undergo six treatment steps:

1. The water from the river goes through a physical screen to remove debris.
2. The chemical chlorine is added to remove bacteria and viruses from the water.
3. Another chemical fluoride is added to help keep our teeth strong.
4. Ozone is added as a disinfectant for odor and bacteria control.
5. Ultraviolet light is used to further remove bacteria and viruses that might be resistant to the added chemicals.
6. Finally lime is added to the water to help with possible issues with pipes in older homes.

Ozone bubbles being added to drinking water at the Tolt River Treatment Facility



The drinking water goes through many tests to make sure the quality is high and meets all safety rules for human consumption. Great care is put into treating our drinking water for people to use in our cities. Treated water is not only used for drinking or when we turn on the faucet. This same water is used for flushing the toilet, taking a shower, and running the dishwasher and laundry machine. We use a lot of it, too! An average American uses around 100 gallons of water every day. Many of our daily activities requires gallons of water with each use. It is important to have an abundant water source but it is just as important to use it wisely so as not to waste it. Saving water every time we use it will mean there is enough of this shared resource for all in our watersheds.

Vocabulary

Reservoir: Storage spaces to hold water

Main Activity

Drinking Water Treatment Model

Our water treatment plant filters millions of gallons of drinking water every day. These plants utilize multiple steps to ensure high quality standards for human use. We are going to build a model of this treatment process to further our understanding of these steps.

Materials:

Water	Tiny squirt of dish soap
Large cup	Tiny squirt of toothpaste
Small bowl	Spoon
2 clear small cups	Flashlight
Pinch of soil	½ tsp of baking soda
Coffee filter	

Please gain adult permission to gather materials.

DO NOT drink any of these substances!

1. Gather all materials and place them in the order listed. Use on a surface that is alright for potential water spillage.
2. Fill the large cup with water.
⇒ *This represents water that has flowed down the Cascade Mountains and into your watershed.*
3. Pour the water from the large cup into the small bowl. You don't need to pour all of the water from the large cup into the small bowl.
⇒ *This represents the water moving from the larger watershed into a smaller reservoir for storage.*
4. Pour some of the water to fill some of the clear small cup.
⇒ *This represents the water being moved from the reservoir into the drinking water treatment plant.*
5. Place a pinch of soil into the water in the clear small cup and **gently** swirl around for 3 seconds.
⇒ *This represents the natural contaminants found in our un-treated drinking water.*
6. Take the second clear small cup and place the coffee filter over the rim.
7. Take the first clear small cup with soil and **slowly** pour the water over the coffee filter. TIP: Hold the edges of the coffee filter in place with one hand, making sure it's drooping a bit into the cup and not lying flat over the cup –this allows for an easy pour of the water.
⇒ *This represents the physical screening of debris from our water supply at the treatment plant.*
8. Once the water has filtered through the coffee filter, remove the filter and place it inside the first cup without spilling any of the soil.

9. Take the second cup with the filtered water and add the squirt of dish soap.
⇒ *This represents the chlorine added to kill the bacteria.*
10. Add a tiny squirt of toothpaste.
⇒ *This represents the fluoride added for strong teeth.*
11. Take the spoon and mix around to create bubbles.
⇒ *This represents the ozone bubbles added to eliminate odor and other remaining bacteria.*
12. Flash the light from the flashlight onto the water.
⇒ *This represents the ultraviolet light that is added to our drinking water to rid of any residual bacteria or viruses, the final disinfectant!*
13. Add the ½ tsp of baking soda.
⇒ *This represents the Lime (not lime juice but a chemical containing Calcium) added to help with pipes in older homes*
14. Your water now represents “treated” drinking water! **DO NOT drink this water!**

You’ve now taken your water through the water treatment process!

To clean up: ***gain adult permission as cleaning up requires you to step outside.*** Pour this “treated” water over the soil outside to represent how actual treated water is used by humans in their home. *The soil will also help filter the added materials from the water.*

Optional Activity

We Need Water Challenge

Human actions can affect a lot of different things in nature, sometimes in positive ways and sometimes in very negative ways. One of the worst human impacts is climate change. Climate change is the increase of Earth's overall temperature. When humans burn fuel, such as by driving their cars, making goods in factories, or flying planes they release chemicals called greenhouse gasses into the air. These greenhouse gasses create a thick layer around our planet's atmosphere. This increases the Earth's temperature and changes the global climate. A changing climate affects the stability of systems we rely on. The weather, water quality, and all living things are impacted by climate change.

Materials: Writing utensil, markers/colored pencils (optional), computer/phone/tablet, internet connection, paper

For today's We Need Water challenge, you will take on the role of a reporter investigating climate change. Your article is almost ready to publish. The only thing that you're missing is a real-life story from somebody who has seen the effects of climate change in person. Find an older person in your family who you can interview. Ask them about the changes in the environment they have noticed throughout their life. If you're wondering what exactly to ask about, maybe see if they have noticed...

- Changes in normal temperatures throughout the year
- Changes in the amount of rain and snow
- More floods, storms, fires, or other natural disasters

Record your interview, either on paper or film if your storyteller agrees! If you want, you can even try to draw a side-by-side picture showing the differences between the environment today and the one your storyteller is describing.

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!

Optional Activity

Video

Please ask for an adult's permission to check out these additional online resources.

“Seattle: Your Water Treatment”: This video is an additional resource on the treatment process for the water we receive from the Tolt and Cedar Rivers. This video can be found by doing a YouTube search of “Seattle: Your Water Treatment” or by clicking the following link: https://youtu.be/D_MZIW_P86U.

Materials: Computer/phone/tablet, internet access

DAY 3

Outdoor Water Conservation

In addition to using drinking water indoors, we also use drinking water for outdoor purposes. Our gardens and yards require water to keep our plants healthy. Saving water indoors is important to take care of our water supply, but we must also save water outdoors. There are plenty of smart outdoor water use practices that help plants make full use of the water so less is wasted.

Here are four ways to save water outdoors when watering your garden and yard:



Water your plants gently and close to the root. When you water at the base of your plants, the water is able to reach the roots better. The leaves, stems, and flowers are unable to soak up water.

Water your plants in the morning or in the evening. Watering your plants when the sun is high allows for more water to evaporate and less to remain on the ground. Rely on the cooler temperatures of morning or in the evening to efficiently water your plants.





Add mulch or compost on top of your plants. Mulch is a mixture of leaves, sticks, bark, grass, wood chips and other organic material. Compost is decomposed organic material, such as rotted food scraps, leaves, and sticks that have turned into a nutrient rich soil. Adding mulch or compost helps to keep moisture in the soil so less watering is needed overall. The mulch and compost will also introduce additional nutrients into the soil making the plants healthier. Mulch and compost reduces the growth of weeds, too!

Use drip irrigation. Drip irrigation is the process of adding drops of water slowly to plants for effective absorption of water. Many times we overwater our plants and the water remains pooled on top of the soil. Drip irrigation targets the plant's roots. These drip lines can be on the surface or installed below the surface.



Vocabulary

Compost: Soil made from decayed organic material that is added to plants to enrich with additional nutrients, like a plant fertilizer

Irrigation: The process of supplying water to plants to help their growth

Mulch: Organic mixture that can include grass clippings, leaves, shredded bark, and wood chips which is added around or over a plant to insulate it, retain water in the soil, and minimize weed growth

Main Activity

Poor Gardening Practices

Lots of people love to garden, but they don't always know how to garden sustainably. Using your newfound water-wise gardening knowledge, you will now take on the role of a gardening and landscaping expert! Let's help solve some of these water related issues for your customers.

Materials: Writing utensil, markers/colored pencils (optional)

On the following pages you will find a series of images showing common mistakes that gardeners might make when it comes to their water usage. For each picture, you will be asked to identify the problem(s) and offer solutions.

These are the questions you will want to think about:

- *What exactly is this gardener doing wrong?*
- *What is your advice? What can this gardener do instead?*
- *Explain how your new gardening tip will help your customer save water.*
- *(Optional) Draw a picture or design to help your customer understand what they can accomplish.*

If you are stuck on any of the pictures, there are some hints at the end of the activity. Try to do as many as you can without peeking!

Picture 1



What exactly is this gardener doing wrong?

What is your advice? What can this gardener do instead?

Explain how your new gardening tip will help your customer save water.

(Optional) Draw a picture or design to help your customer understand what they can accomplish.

Picture 2



What exactly is this gardener doing wrong?

What is your advice? What can this gardener do instead?

Explain how your new gardening tip will help your customer save water.

(Optional) Draw a picture or design to help your customer understand what they can accomplish.

Picture 3



What exactly is this gardener doing wrong?

What is your advice? What can this gardener do instead?

Explain how your new gardening tip will help your customer save water.

(Optional) Draw a picture or design to help your customer understand what they can accomplish.

Picture 4



What exactly is this gardener doing wrong?

What is your advice? What can this gardener do instead?

Explain how your new gardening tip will help your customer save water.

(Optional) Draw a picture or design to help your customer understand what they can accomplish.

Picture 5



What exactly is this gardener doing wrong?

What is your advice? What can this gardener do instead?

Explain how your new gardening tip will help your customer save water.

(Optional) Draw a picture or design to help your customer understand what they can accomplish.

Hints for Main Activity — Day 3:

- Picture 1
 - Does this soil look dry to you? Is there anything that could prevent this?
- Picture 2
 - What do you see in the sky? What time of day do you think it is?
- Picture 3
 - Where is most of this water going to end up? What would be a better water delivery system?
- Picture 4
 - Where is this hose sending the water?
- Picture 5
 - Is the water going to the part of the plant that really needs it?

Optional Activity

We Need Water Challenge

A lot of what we have been learning about is ways to take care of our world for the years to come.

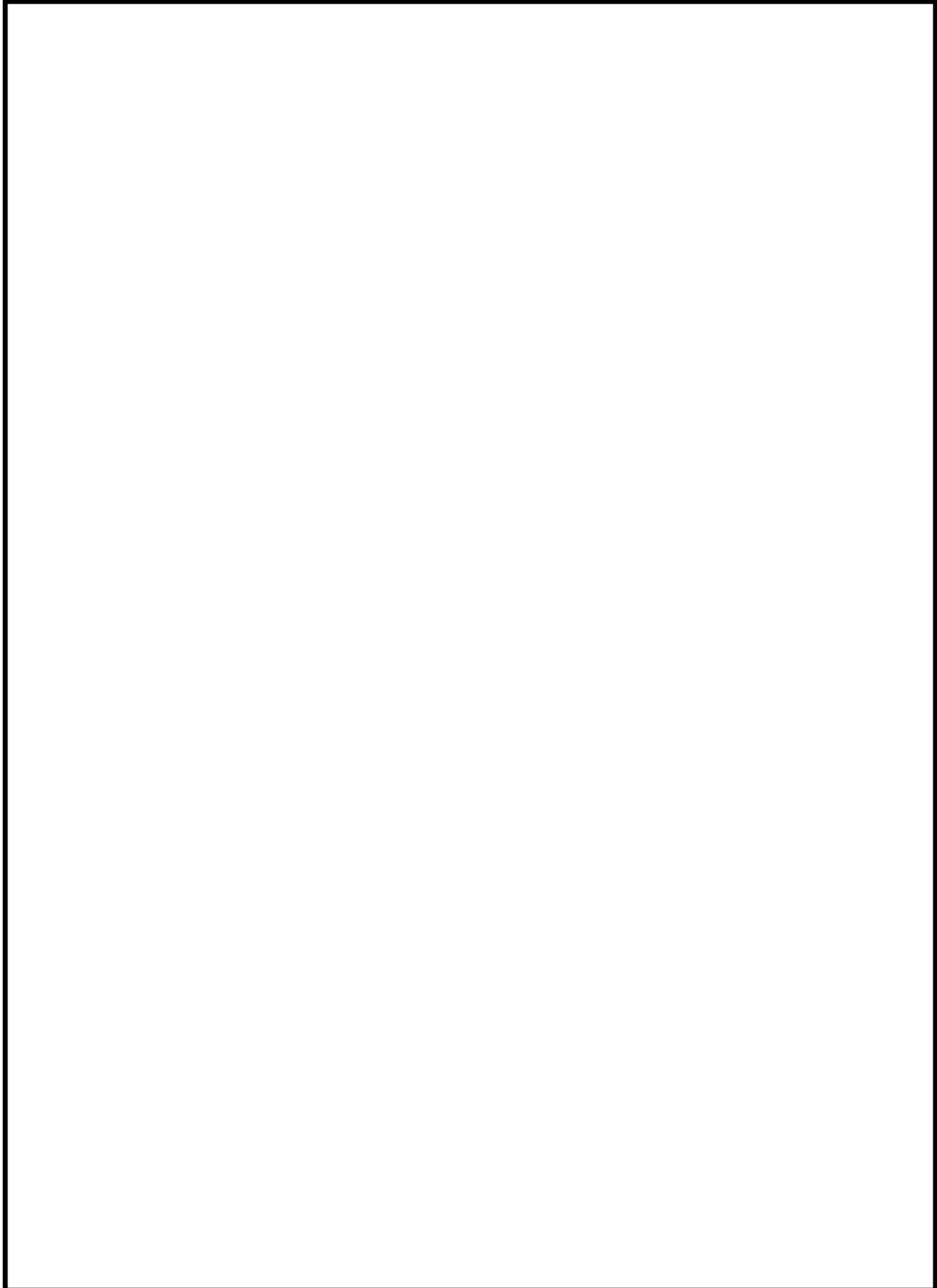
Materials: Writing utensil, markers/colored pencils (optional), computer/phone/tablet, internet connection

For this We Need Water challenge, you are going to write a letter to your future self. In the space on the following page, write about some of the things you've learned about conserving water and protecting our environment.

- What advice would you give yourself in ten years?
- What do you hope the environment will look like by then?
- What are you concerned about and what are you doing or planning on doing to make the world a better place for your future self?

Once you've written this letter, seal it up and write a date on it for some time in the future. Find a safe place to put this letter and don't open it up until that future day arrives. Who knows, maybe when the future you opens this letter the world will be completely different!

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!



Optional Activity

Additional Garden Projects

There are all kinds of creative ways that people are using water and plants to solve problems. Let's check out some of these amazing projects and ideas!

Please ask for an adult's permission to check out these additional online resources

Materials: Computer/tablet/phone, internet connection

Here are some videos and online resources to teach you all about a few more water-wise gardening projects:

Rain Gardens

By designing gardens to act like miniature wetlands, people are able to slow down the flow of and even filter the water around us every day. Take a look at the following video and website that can you more about it:

12000 Rain Gardens for Puget Sound: <https://www.youtube.com/watch?v=kHagAAX1aT8>

Rain Gardens 101: <https://www.12000raingardens.org/about-rain-gardens/>

Green Roofs

All around the world, people are learning to grow gardens on rooftops! This not only provides a new space for more plants, but also has some unexpected benefits as well. Learn about this more by watching the following video:

How Green Roofs Can Help Cities: <https://www.youtube.com/watch?v=FIJoBhLnqko>

Rain Barrels

Tired of wasting water with a regular old hose? Collect the water that pours over your roof (which is a *lot* of water around here), and use that for your garden instead! You can learn more from this video:

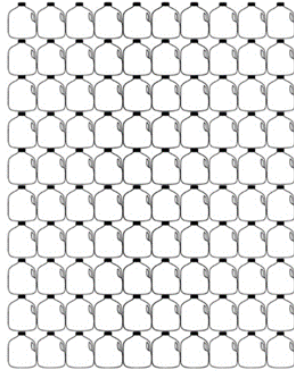
Why Use Rain Barrels?: <https://www.youtube.com/watch?v=2zeXBdmBcJc>

DAY 4

Global Water Crisis

We are fortunate to live in a region with abundant fresh and clean water. All around the world other people have varying access to this kind of resource. Nearly 2.5 billion people are impacted by a global water crisis where they can't reliably obtain clean and plentiful water. Today we will learn more about these issues.

Let's compare our own water usage to other people around the world. As we already know, the average American uses up to 100 gallons of water every day! Between the shower, sink, laundry, dishwasher, hoses, and more — our water usage adds up quickly. It can be hard to comprehend a large amount like 100 gallons. Let's take a look at exactly what that looks like:



100 Gallons

Each American uses this much every day!

That is a lot of water! Most people around the world do not have that much water to spare. Billions of people live on fraction of that amount. Many households survive on only 5 gallons of water every day. That is 5 gallons per *family*, not per person! That amount looks something like this:



5 Gallons

Would you be comfortable sharing just 5 gallons of water each day with your entire family? Most of us use far more water than that in just a single shower. As you can imagine, there are a lot of things that you might have to sacrifice if you didn't have the abundant amount of water currently available to you.

Many of the world's poorest communities are without access to clean water or even a toilet. The five gallons of water a family relies upon must be retrieved daily. The job to retrieve water usually falls on women and girls. This process takes hours as the five gallon container of water is heavy — 40 pounds — and the water source can be miles away.



This leaves these women and girls at a great disadvantage. Most of their time each day is spent retrieving and carrying a heavy container of water. They are unable to find a job to earn income or to go to school and gain an education. The lack of access to clean water impacts children's health as the water is not cleaned or sanitary.

Five gallons per day per household is not enough to sustain our local water needs, yet billions of people around the world survive on five gallons each day. Their lack of access to clean and abundant water creates daily hardships.

Vocabulary:

Crisis: A very large and serious problem

Main Activity

Water Stories

The global water crisis requires people every day to walk for hours and miles to retrieve five gallons of water. Now it's time to put yourself in their shoes and imagine exactly what that water retrieval journey might be like.

Materials: Writing utensil

Write a short story on the following pages that describes what it would be like if you had to walk to gather water for you and your family. Your story can either take place in the location you live, or you could imagine what it would be like in another part of the world.

To help you organize your thoughts for your story, think about some of the following questions:

- *How far do you have to walk to retrieve the water? How long does it take you to walk there?*
- *Are there any obstacles or challenges along the way?*
- *Do you travel with anybody, like friends or siblings? What do you do or talk about while walking?*
- *How do you carry the water? How much are you able to gather in one trip?*
- *Are you missing out on anything because you are spending your time fetching water?*
- *What would you rather be doing?*

Optional Activity

We Need Water Challenge

Water Conservation means saving water. You will learn more about this in tomorrow's lesson! Water is a shared resource, and we share it with all humans, plants, and animals. We learned where the water that comes out of our faucet originates. It is our responsibility to not waste this water and use it wisely.

Materials: Writing utensil, markers/colored pencils (optional), computer/phone/tablet, internet connection

Let's make a pledge to conserve water! A pledge is like a promise. Below is a pledge card that lists several water conservation pledges you could do every day. Read the pledges with an adult and choose the water conservation pledges that you can commit to starting today. Mark the water conservation pledge and sign your name on the bottom. With an adult, post your pledge card on social media to show your friends and family how you are dedicated to water conservation!

I pledge to do the following to help save water every day.

PLEASE CHECK ALL WATER CONSERVATION HABITS BELOW THAT YOU WILL PRACTICE

- Limit my shower time to five minutes.
- Turn off the faucet while I'm brushing my teeth.
- Tell an adult if I see a leaky faucet or a toilet that keeps running.
- Run the dishwasher and clothes washer only when they are full.
- Water plants only near the roots.

Sign here:

WATER CONSERVATION PROMISE CARD

#WENEEDWATER

@WENEEDH20
@NATUREVISIONORG

MAKE A PROMISE TO SAVE WATER!

CASCADE WATER ALLIANCE 

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh20 and @naturevisionorg in your post so we can see your work!

Optional Activity

5-Gallon Challenge

For this activity, you will have 5 gallons of water and must choose how to use it. Remember, you only have a small amount of water to work with, so you might not have enough to do all of the things you want!

Materials: Writing utensil, 20 tokens (e.g. beans, beads, rocks, coins, etc.)

You will be using items to represent water. Each one of these water tokens represents a *quart* of water, or one quarter of a gallon. Four quarts equal one gallon, so 20 quarts equals 5 gallons.

1. Gather 20 other identical items to represent your water — coins, dry beans, or anything else you have lying around will work just fine.
2. Place the water tokens on the “Water Use” pictures to show how you want to use that water.
 - For example: If you put all 20 water tokens on the picture of the bathtub, it means you want to use all of your water (5 gallons) for the bathtub. This means that you have no water left to drink or wash your clothes!
 - If you put 4 tokens on the toilet, it means you want to use 1 gallon to flush the toilet.
3. Be sure to pay attention to the details listed under each picture; this will tell you how much water you might need for each one.
 - For example: You might decide to use some of your water for the shower, but all of that water might result in just one or two minutes of shower time.
4. After assigning all of your water, answer the questions on the last page of this activity.



This shower can use between 2 and 5 gallons of water every minute.



The toilet uses about 1.6 gallons of water per flush.



Most sinks use between 3 and 7 gallons of water every minute.



Washing machines use between 15 and 40 gallons of water per load.

PAGE LEFT BLANK INTENTIONALLY



Most bathtubs take more than 30 gallons of water to fill.



Dishwashers use 3 to 6 gallons of water per load.

PAGE LEFT BLANK INTENTIONALLY

Questions:

Did you have to make any sacrifices? What did you choose to give up, and why?

Which items or water uses did you decide to keep? Why were those the most important for you?

Can you think of any water-friendly alternatives? If you don't have enough water for the toilet, shower, or washing machine...what could you do instead that wouldn't use much water?

Is 5 gallons a day enough for your family?

How much water would you need in order to do all of the things you and your family want? Are there any ways you could make that number smaller?

DAY 5

Stewardship

We have spent a lot of time looking at water this week. You learned about where our water comes from, how we use it, and some of the challenges people around the world face with their water. Now it is time to think carefully about our own lives and try to find some ways to take better care of this precious resource. Today's theme is **stewardship**, which means taking care of something.

When people talk about being stewards of water and nature, they mean protecting and caring for it by making smarter choices. Not only do we need to keep water clean and plentiful for our use, but we also need to make sure that there is enough of it to go around. While we are lucky to have a relatively large water supply available to us, it is still not an infinite resource! This means that natural sources of water could run out if we do not pay attention to how we use it, and when it does we cannot make more. Even here in Washington, summer times are dry and water can run lower, not just for people but for all of the living things in the environment as well.

When we start to use these smart water-saving ideas in our daily lives, we are practicing water **conservation**. It is important that we continue to make improvements and share our knowledge with friends, family, and community members. The more people that save water, the more availability there is for all people, plants, and animals!

Vocabulary

Conservation: Protecting the natural world, especially by making smart choices about what humans use and do with things in nature

Stewardship: Taking care of something; being a protector

Main Activity

How Much Are You Using?

Water is an incredibly vital resource, so we need to make sure we are making good choices about how we use it. In this activity, you will track your family's water usage to see just how much water you are using every day!

Materials: Writing utensil

For an entire day, try to record every single way you use water. Fill in the chart below to help you keep track!

How you used water	Times you did this activity	How much you use each time you do this activity	How much water you use per day
Running the faucet	____ number of minutes the faucet was running	X 3 gallons per minute	
Taking showers	____ number of minutes the shower was running	X 3 gallons per minute	
Filling the bathtub	____ number of times the bathtub was filled	X 30 gallons per bath	
Flushing the toilet	____ number of times you flushed the toilet	X 2 gallons per flush	
Running the laundry machine (anyone in the house)	____ number of loads of laundry	X 45 gallons per load	
Running the dishwasher (anyone in the house)	____ number of loads of dishes	X 5 gallons per load	
Spraying a hose (anyone in the house)	____ number of minutes the hose was running	X 5 gallons per minute	
Total used:			

Optional Activity

We Need Water Challenge

There are many ways to save, protect, and care for our water. At the end of every daily lesson, we will be giving a challenge to help you show off what you've learned.

Materials: Writing utensil, colored pencils/markers, computer/phone/tablet, internet connection

Using what you've learned this week, and the other #WeNeedWater challenges you've done, it's time to be creative! Create a challenge you can pose to those in your household, to your friends, to your community, or to a broader audience on the internet through social media. Think about each topic the packet covered this week and try to incorporate at least one aspect of it in your challenge.

To share your work, post your challenge to Facebook and/or Instagram (with an adult) so other people in your community can learn too! Don't forget to use the hashtag #WeNeedWater and tag @weneedh2o and @naturevisionorg in your post so we can see your work!

Answer Key

Day 3 Main Activity: Poor Gardening Practices

Picture 1

- What's wrong with this picture?
 - The soil is uncovered and unprotected, therefore it dries up very quickly.
- What can we do to fix it?
 - Put a layer of mulch or compost on top to help hold moisture in the soil.

Picture 2

- What's wrong with this picture?
 - They are watering their lawn during the day while the sun is hot and shining.
- What can we do to fix it?
 - Water your lawn in the morning or in the evening instead.

Picture 3

- What's wrong with this picture?
 - The sprinkler is spraying water everywhere. Some water will reach the plants but most will evaporate or end up in the paths of the garden.
- What can we do to fix it?
 - You could set up drip irrigation in the garden beds so the water will drip slowly into the soil and reach the roots of the plants.

Picture 4

- What's wrong with this picture?
 - The hose was left on and is pouring water straight onto the pavement.
- What can we do to fix it?
 - Turn the hose off when you're not using it. You could also use a hose attachment with a nozzle so that water only sprays when you want.

Picture 5

- What's wrong with this picture?
 - They are pouring water all over the whole plant from the top. Much of this water will simply evaporate off of the leaves and not reach the roots.
- What can we do to fix it?
 - Water directly and gently at the base of the plant. This will allow the water to be absorbed by the roots.