



Water Conservation

OVERVIEW

Beginning with an activity that demonstrates how little fresh water is on our blue planet, students will understand how precious water is. Students will learn how water is used around homes, schools, and communities. Learn how simple changes at home and school can impact the community as a whole

OBJECTIVES

1. Understand that there is very little fresh water on Earth.
2. Understand how water is distributed around the world.
3. Discover your water footprint.
4. Explore personal and community conservation solutions.

LENGTH OF LESSON

1 hour

GRADE LEVELS

4th – 6th

MATERIALS

- **A Drop in The Bucket Set: (you'll need one set for every 3-4 students)**

- 1 1000 mL measuring cup
- 1 100 mL measuring cup
- 1 60 mL measuring cups
- 1 Bowl
- 1 Eye dropper

- **PowerPoint presentation**

- **Water footprint paper (one paper per group of 3-4) and markers**

SET-UP

1. Load PowerPoint.
2. Create sets of A Drop in the Bucket and fill the 1,000 ML measuring cups with water only.

Slide 1. Water Conservation

Slide 2. Today we are going to learn about how to save water, also known as water conservation. We'll do an activity to estimate global water availability, observe global water distribution in a video, discover your water footprint with an art activity and discuss personal and community solutions.

Slide 3. Where do we find water on Earth?

We live on the Blue Planet – it's 75% covered by water. *Show inflatable globe.* It seems as if we have a lot of water to go around!

Slide 4. There is a lot of water on our planet, but how much is freshwater. There is a good amount of saltwater, but we can't use saltwater – well we could, but we'd have to remove the salt first and that's very expensive. We depend on fresh water to do all of our daily activities like drink, use the bathroom, clean, grow food, and manufacture items. Turn to someone next to you and come up with an estimate of how much of our water is fresh and how much is salt. Students should estimating percentages for both fresh and salt water.

What did you come up with? Now we are going to do an experiment to see exactly how much water is available for us to use on the planet.

Slide 5. A Drop In The Bucket (Project Wet Pg. 238 ~ 15 minutes you can extend this portion to make it longer, if you want the full lesson plan you can go to

https://www.projectwet.org/sites/default/files/inline-files/a_drop_in_the_bucket_for_students.pdf Abbreviated lesson activity written out below *Do not click through PowerPoint slide until after the activity.*

Students will now use the measuring cups at their tables.

*With your demonstration set of measuring cups, show the class the **1000 ml** measuring cup of water. This represents/is a model of all the water on Earth. Have students tell you what a model is.*

*Where is most of the water on Earth located? (*oceans*) Of your 1000 mL measuring cup how much would you estimate is fresh water? Think about all of the places freshwater can be found. *Have them name as many as they can their list should include rivers, lakes, streams, glaciers, ice caps and groundwater.* Come up with 1 guess per group and pour that amount into the next smallest measuring cup (100 mL). Hold up your cup so that we can compare hypotheses. *Go around the room and compare which team guessed the most amount of water, and which team guessed the least amount of water.**

*With your demonstration set, pour **30 ml** into the 100 mL cup. This represents the amount of fresh water on Earth (**3%**). The rest of the large measuring cup is salt water (**97%**). *Have students make the adjustment with their guesses so they too have 30 mL of water in the 100 mL cup. How close were the students' estimates to the actual percentages?**

*What is at the Earth's poles? (*ice caps*) Nearly 80% of the fresh water is frozen in ice caps and glaciers. Make an estimate of how much non-frozen fresh water there is on Earth from lakes, rivers, and groundwater and pour your water into the smallest (60 mL) measuring cup to match your estimate.*

*Hold up your measuring cup so that we can compare. *Go around the room and compare which team guessed the most amount of water, and which team guessed the least amount of water. With your demonstration set, pour **6 ml** into the smallest measuring cup to represent the unfrozen fresh water. Have students make the adjustment with their guesses so they too have 6 mL of water in the 60 mL cup.**

So, can we use all the unfrozen fresh water? Nope! Some is too deep underground, some is polluted (*ask if they know what polluted means*), some is trapped in soils. How much useable water do we have? Guess how many drops of water should go in your “clean water bowl.” *Then compare estimates by having student teams announce how many drops they guessed. Go around the room and compare which team guessed the most amount of water, and which team guessed the least amount of water. With your demonstration set, use a pipette to remove a single drop of water (0.0003 ml). Drop this into the bucket.* This is the amount of clean fresh water that is not polluted or otherwise unavailable for use.

We need to manage this precious drop very carefully so that there is water for future generations – our kids and grandkids.

Why is fresh water so important? Who needs water? We can live a month without food, but only a few days without water. Every living thing depends on water to live.

Wildlife, fish, plants, and bugs!

We can't drink salt water without processing it first, called desalinization. There are some coastal communities around the world that are using ocean water as their water source. Desalinization is very expensive and uses a lot of energy to do so. It is better for you and the planet to use fresh water.

Slide 6. Water is recycled again and again in the Water Cycle. *This could be a good time to recap the water cycle or do a water cycle activity or water cycle lesson.* Over time, salt water can become fresh water and vice versa. However, fresh water is not distributed equally around the globe.

Slide 7. Let's watch a 3-minute video about how water is distributed around the world.

Slide 8. Water is especially important to us in the Treasure Valley. It helps grow crops and manufacture things. Water is the reason Boise and the surrounding communities were even settled. But we sometimes forget that we live in a desert. Does anyone know how much rain we get on average each year in the Treasure Valley? We only get about 11 inches of rain per year. This rain is not enough to replenish the groundwater supplies that we use. We get our drinking water from the groundwater and the Boise River. In Boise, the ratio is 80% groundwater and 20% Boise River Water. As we use more water in the Treasure Valley, we are going to be depending more on the Boise River for water in the future. In Idaho we use more water per person than most other states, on average every one of us is using 286 gallons per day.

Slide 9. WATER FOOTPRINT ~ 10 minutes

For this next activity, I'm going to give each team of students a piece of paper with a footprint outline on it and a marker. What I want you to do is work as a team at your tables to brainstorm your team's 'water footprint.' Think of activities that you, your family and your friends do each day that use water, and think about it year-round, for example water use in the summer vs. the winter. I'll give you five minutes to complete this.

Use PowerPoint to reveal what a water footprint truly means: the sum of both your direct and indirect or virtual water that you use daily.

Slide 10-11. Here are some examples of the virtual water footprint of some common foods and items. Can you guess how much water it takes to produce these items?

Slide 12. Show the example of a water footprint. *You could edit this to show your own personal water footprint.*

As a team, brainstorm how you can personally save water. Write your team's ideas on the back of your footprint, or around your footprint.

Slide 13. How does the Idaho and the Treasure Valley use water? *Take ideas and reveal the pictures on the slide.*

Slide 14. There are so many water uses in the Treasure Valley that it is important for groups to work together to implement water conserving solutions. *Share a few solutions.*

Agriculture Water Conservation Example: Use efficient irrigation systems, such as center pivots, instead of flood irrigation

Water Storage Example: Boise has 3 major dams upstream that create reservoirs of water for year-round storage.

Industry Example: Simplot potato processing plant in Caldwell: Among the innovative aspects of the Idaho Plant is the facility's zero-liquid discharge system. The plant can reclaim over 1 million gallons of water a day and returns it for reuse in the potato production process. Remaining discharge is used for irrigation of crops or eliminated through spray evaporation technology.

Slide 15. Another important way that we conserve water and keep our water healthy are Water Renewal facilities. They clean our used water (any water that we use and send down a drain into the sewer) and put that cleaned water back into the environment.

Slide 16. Lets look at the water footprints of different places. What do we notice? Water usage varies among different countries. Why do you think that is? As you already might have guessed, in the U.S. we are water hogs - we use more than twice the world average, or 2,500 – 3,000 cubic meters per person. That's equivalent to an [Olympic-sized swimming pool](#) for each and every one of us, or 2.5 million liters each. The Chinese, to compare, use 1,000 cubic meters annually. The countries where water poverty is the worst and water usage are the lowest are Mozambique, Rwanda, Haiti, Ethiopia, and Uganda - these five use 15 liters or less daily.

Some reasons = Amount of available water in varying climate zones, discrepancy in economics and technology, industrialization, and most importantly lifestyle.

Slide 17 (optional) *Talk through ways that we can use less or use our water more efficiently.*

Slide 19. *Recap what we learned today. There is a limited supply of freshwater on Earth. As humans we use a lot of water. We can be a part of the solution and help to conserve water!*

Slide 20. If you want to learn more about water in the Treasure Valley you and your family can visit The WaterShed!

