

Water Audit

Key Topics: Audit, Graphing, Adding, Multiplying, Conservation, Low Flow, Minutes, Gallons

Grade Levels: 5-8

Inside

Lesson Overview:

In this lesson students will quantify their water use at home, predicting the amount used in a 24-hour period. Understanding water conservation strategies indoors and outdoors will be discussed and students will recommend and take challenges to explore these strategies at home and at school!

Suggested Time Allowance:

Part 1: 15 minutes to engage audience and explore ways they use water

Part 2: 45 minutes to understand audits and conduct their own water audit by filling out a template



Suggested Activities and Learning Objectives by

Grade Level:

- 5:
 - 5-ESS3-1 What ways can we save water at home and school?
- MS:
 - MS-ESS3-3 Make a plan to reduce water at home and estimate how much water you can save.
 - MS-ESS-4 Use evidence from your water audit to predict how increased human population and/or per-capita water consumption will impact water resources.

Essential Question(s) that Connect CCCs and SEPs:

- How can we use math to describe and measure our water use? How can we use math to help us understand if this gets bigger or smaller? ([Scale](#); [Using Mathematics and Computational Thinking](#))
- Is this way of using water a problem? Can I improve it? ([Energy & Matter](#); [Construct Explanations and Design Solutions](#))
- Is there a pattern amongst the data my fellow students and I are getting? How can we use this pattern to support an argument? ([Patterns](#); [Engage in Argument from Evidence](#))

Materials:

- [Home Water Audit Handout](#)
- Low Flow Fixtures including: Shower Heads, Sink Aerator, Toilet Tabs for Leaks (1 per student)
- Permission slips for parent consent in order to give away low flow fixtures

EG Team Support Needed:

- None

Prep:

Every part of this lesson can be done either inside or outside. If doing the activity outside, please have clipboards ready for students to use for filling out their water audit sheets.

- Print out [Home Water Audit Handout](#)
- If you are going to give away low flow fixtures as a part of your lesson after class, work with teacher on this before the lesson or offer as an extension after the fact. Use the [Water Fixtures Permission Slip Template](#) and any of the extension activities to address that.
- Have a collection of items with you to make the lesson as tangible as possible (example, a toothbrush, a 5 gallon bucket, an empty gallon container)
- Have one of each of the three low flow fixtures on display with you including: shower head, toilet tab, and sink aerator
- Low flow shower heads, sink aerators, and toilet leak tabs are “low flow items” that we can assist you in getting delivered to classes but they are not to be passed out to every student for free. A permission slip needs to be signed by parents and an extension water conservation template must be taken in order to prove if the student is serious about installing their low flow fixtures in their home and have the proper support of parents to do so (See permission slip and home water audit in extensions section)
- Talk with teacher about student’s capabilities to do this lesson and any tips from them in advance to work better together on their ability to do the math and any extensions the teacher may be interested in you pitching to them at the end of your lesson (For example, will this become something that they work on next week without your help? Are there any questions for you that you want to make yourself available for during this lesson or after? Will you follow up on their extension project and use for display somewhere?)

Activity Procedure:**Engage: Part 1**

Begin with a show and tell about different ways you use water. You can display on a table or in a bag items you use typically with water in your own life like: toothbrush, shampoo, tshirt, picture of your dog because you wash him, veggies that you water to grow in the garden, etc. Ask students, “What ways do you use water everyday? Is there things I did not mention?” Ask them to share with an “elbow partner” first and then call on a few students to share as a group.

Explore: Part 2

Write the following underlined question on your board and record student answers: Do you have a prediction of how much water you use in one whole day? (24 hour period) Encourage students to think about a specific way they use water and try to get them to make an educated guess... Some may be silly and say “1 trillion billion gallons!”

What's one way you use water every day. How did you figure out how much you use of it? Get students to think about a math problem... For example, "I brush my teeth 2 times a day. I probably use a glass of water each time so I use 2 pints of water to brush my teeth every day."

Action:

- 1) We are going to be doing something called a "water audit" today. Does anyone know what the word audit means? Call on some students who may say things like "counting, measuring, documenting"... *An audit is a calculation of an item, for us today it is water, and determining the total by estimating the usage from records.*
- 2) Tell students you will be passing out sheets of paper to them and a clipboard if you are outside and they are to write their names on it first and not filling it out yet. Hand them the [Home Water Audit Handout](#).

Explain:

Action: Walk through the template with students and get teacher to help you check on students' papers and make sure they are filling it out correctly. Do one use of water all together as a class and then have them work in teams.

Elaborate: By now, students are filling out most of their sheet and completing total water usage for a day.



Action:

Start to break down what they are getting as individuals and compare and contrast. Use the essential question to guide you. Is there a pattern amongst the data my fellow students and I are getting? How can we use this pattern to support an argument? ([Patterns](#); [Engage in Argument from Evidence](#))

Have students get into pairs or groups and look at each other's water audits. What is similar? What is different? Can they elaborate on their numbers and findings?

NOTE and reminder before you ask them to compare/contrast: We are not bullying each other or judging each other based on our responses (ex. Wow dude, you use the bathroom a lot... or Hey, that's stupid you shouldn't be wasting that much)

Evaluation:



Is this way of using water a problem? Can I improve it? ([Energy & Matter](#); [Construct Explanations and Design Solutions](#))

You will find on the second page of the [Home Water Audit Handout](#) that the students will see suggestions on water conservation. Have them pair up and come up with specific things they think could be done at their homes or the school and pitch it to the rest of the class. This will serve as their "ticket out the door" to end the lesson for the day.

Also, refer back to the Learning Objectives for your grade level and ensure that they have been met by asking the given learning objective question.

Extension Activities:

- Have students develop letters in class with their teachers that make a constructive argument or inquire about water conservation and have them suggest better practices to their principal on their campus. You could also have them make a brochure or flyer on water conservation tips for both indoor and outdoor. These letters or PSAs could be shown at Open Houses, in the library or cafeteria on exhibit, Science Weeks, or any event that families and other classes would be exposed to them.
- [Personal Water Use Estimate](#) is a good take-home or extra math extension for students to be challenged with in class
- The [Water Conservation Checklist](#) is a good take-home sheet too. It digs deeper into what families can do and how students can lead efforts in checking on operations at home that could save them resources!
- [Water Fixtures Permission Slip Template](#)
- [Water Audit Footprint Handout](#) can be used to color in their totals now and/or what their goals are to reduce and by how much... This could be a window hanging in their classroom perhaps to share with passer bys being water conscious about personal consumption.

Tips and Caveats:

- Talk to the teacher about their preferred method of addressing the water audit with the youth, their math skills and preparedness or capabilities, and how you will address giving away low-flow fixtures in advance

Adaptations for K-3rd grade

Begin by reading *I Know the River Loves Me* by Maya Christina Gonzalez (present in the OCE library!).

Have a classroom discussion: “How does the little girl appreciate the river?”, “How do you appreciate water?”, “How can you show appreciation to the water through your actions?”

Test how much water we waste by brushing our teeth. Have every child pretend to brush their teeth while you turn on a timer for 60 seconds. Have a hose or sink run into a bucket. Test how much water fills the bucket if we let the water run the whole time, let the water run just while rinsing, or only turned on the water to rinse the toothbrush.

Play drip, drip, drench! This is a game of duck, duck, goose, except you have a bowl of water that you submerge a sponge inside of. Let a water drop fall onto each kids head, and yell “DRENCH” while squeezing the sponge on their head in place of “goose”.

Adaptations for 4-5th grade

You will need to walk each grade through the water audit sheet and make sure to do a first calculation with them so they understand how to do it and are confident in helping each other with the other parts

Take your time with the class on filling it out. Pace the class by having them work in teams and only allow them to do sections of it at a time so you can check in with each other to see if the class is understanding it. You can call on students to ask them how they did their calculation. Some students may do their calculations differently and that is okay!

Make this lesson about mastering math and using it practically together and be patient with them.

Cited Curriculum:

- [Project WET Water Audit](#)
- [Project WET My Water Footprint](#)