



## How Much Water Do You Use?

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**Subject/Grade:** 8th Grade Science

**What existing course and unit will this enhance?** (e.g., Biology- Ecology Unit)

8th Grade Science - Earth and Human Activity

**Water Science and Infrastructure Industry Connection** (e.g., an industry-related career, skill, or challenge; addresses where water comes from, where it gets treated, how we get power, inspires watershed stewardship, or focuses on impacts on the community)

This lesson should inspire watershed stewardship.

## Learning Goals:

Students will be able to assess human impact on water and construct a CER based on their Water Footprint Calculator results.

## 1-2 Sentence Lesson Summary (Interactive Lesson Ideas)

Students will complete the [Water Footprint Calculator](#) then compare their results with each other to brainstorm ways to reduce their individual impact on the Earth.

## Driving Question that Students Will Explore

What will happen if Earth runs out of clean water?

## Part 1 Above Due Tuesday for Peer Share

**Instructional Outline:** This should be the bulk of your writing. Bullets of what the students will do throughout the lesson to reach the learning goals you have set.

### Day 1: What will happen if Earth runs out of clean water?

**Hook/Intro:** Engage students and introduce the topic of how increases in human population and consumption of water impact Earth.

1. Short video clip - [How We Use Water](#)
2. Pose a thought-provoking question to the class: "Imagine a world where the human population doubles overnight. What do you think would happen to our planet's water resources?"
3. Give students time to pair up and share their thoughts and prior knowledge.

**During:** Construct arguments supported by evidence.

1. Start the Water Footprint Calculator with the students to walk through any new concepts/vocabulary (ex. Greywater system, rain barrels, etc.)
2. When the students are finished with the Water Footprint Calculator, have them review their results

individually.

3. Next, have students fill out this [worksheet](#) to analyze and begin to construct an argument for how increases in human population can impact Earth's systems.
  - a. Students should use specific data from the calculator and use the "Tips" section to further research topics.

**Reflection:** Show understanding by completing the [Water Footprint Calculator](#) then compare their results with each other to brainstorm ways to reduce their individual impact on the Earth.

**Extension/Enrichment:**

1. For students interested in exploring the topic further, assign a research project where they investigate a specific environmental issue related to human population growth and resource consumption. They can share their findings in a format of their choice (essay, infographic, presentation).
2. Students can view the "Tips" sections to see more in depth information about topics they may be interested in.
3. Students can discuss possible short term and long term solutions for the question to the class:  
"Imagine a world where the human population doubles overnight. What do you think would happen to our planet's water resources?"

**Standards:** Common Core, NGSS, CTE, GoalBook or another state or national list.

MS-ESS3 Earth and Human Activity		
MS-ESS3 Earth and Human Activity		
Students who demonstrate understanding can:		
MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. [Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.]		
The performance expectation(s) above were developed using the following elements from the NRC document <i>A Framework for K-12 Science Education</i> :		
Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<b>Engaging in Argument from Evidence</b> Engaging in argument from evidence in 6-8 builds on K-5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). <ul style="list-style-type: none"><li>Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-ESS3-4)</li></ul>	<b>ESS3.C: Human Impacts on Earth Systems</b> <ul style="list-style-type: none"><li>Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3-4)</li></ul>	<b>Cause and Effect</b> <ul style="list-style-type: none"><li>Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS3-4)</li></ul> <hr/> <b>Connections to Engineering, Technology, and Applications of Science</b> <b>Influence of Science, Engineering, and Technology on Society and the Natural World</b> <ul style="list-style-type: none"><li>All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ESS3-4)</li></ul> <hr/> <b>Connections to Nature of Science</b> <b>Science Addresses Questions About the Natural and Material World</b> <ul style="list-style-type: none"><li>Science knowledge can describe consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-ESS3-4)</li></ul>

**Assessment:** How will you check your students' understanding? Consider these [creative assessments](#).

Check students' understanding by comparing the depth of their answers to the [CER rubric](#).

**Materials/Resources**

[Water Footprint Calculator](#)

[Lab Worksheet](#)

[Lab CER Rubric](#)

[Computer](#)

**Field Trip Opportunity (Optional)** -Please include location, reason why you are interested in taking students, how the trip connects to your curriculum.

[Water Filtration Plant](#)

**Sources:**

**Water Footprint Calculator**

<https://watercalculator.org/>

**California Department of Water Resources**

<https://water.ca.gov/about/careers>

**California Water and Wastewater Jobs**

<https://jobs.cwea.org/>

**NGSS CA Standards**

<https://www.cde.ca.gov/ci/pl/ngssstandards.asp>

**Part 2 Above Due The Monday After Externship Week**