

Save the Water

Student Material



"The cycle of life is intricately tied up with the cycle of water." — Jacques Cousteau

If 70% of Earth is made up of water, then why do we need to save water? Well, only 2.5% of the Earth's water is freshwater that can be used for eating, drinking, watering crops, and manufacturing products. The vast majority of Earth's water is the saltwater in our oceans. Earth's freshwater is stored in rivers and lakes, as well as in underground aquifers, ice caps, and glaciers. Climate change is accelerating the melting of those ice caps and glaciers. This reduces one of our most important freshwater reserves.

Although it may seem like water is plentiful, that's not quite the case. The water on Earth today is the same water that was here when dinosaurs were alive. There's no way to create new water. The rain that falls to the ground began in a body of water. Earth's water is continuously recycled through the water cycle! So, the amount of water on Earth has not changed, but the number of people on Earth has. We recently surpassed 8 billion people on the planet. Growing populations mean growing demand for freshwater. At the same time, climate change is disrupting rainfall patterns. This causes more frequent and severe droughts in many regions, putting even more pressure on the freshwater we have. Unless we find ways to conserve water, there may not be enough in the future.

How can you help solve this problem?

Observe your school and the greater community. Where do you see water being wasted? How could it be conserved? What creative, unique solution could you and your peers design to address the problem, whether through a new technology, a community awareness campaign, a policy proposal, or a smarter system for tracking and reducing water use? How will you advocate for your idea at school or in the community? Let's save the water for ourselves and future generations!

Save the Water Rubric (Individual Design Journal)

Student Material

	Novice	Apprentice	Practitioner	Expert
Formulate	☐ identifies approximate amount of saltwater and freshwater on Earth ☐ describes human need for freshwater	☐ compares amount of saltwater and freshwater on Earth ☐ describes need for freshwater beyond human use	☐ compares amount of saltwater and freshwater on Earth ☐ describes need for freshwater beyond human use ☐ describes local impact if problem is not solved	all of <i>Practitioner</i> plus: describes potential global impact if problem is not solved
Explore: The Water Cycle	☐ defines and identifies features of the geosphere, hydrosphere, atmosphere, and biosphere ☐ identifies where water is found in each system	☐ defines and describes features of the geosphere, hydrosphere, atmosphere, and biosphere ☐ describes how water is exchanged between systems	☐ defines and describes features of the geosphere, hydrosphere, atmosphere, and biosphere ☐ describes how water is exchanged between spheres ☐ explains how interactions among two or more of the systems contributes to the water cycle	all of <i>Practitioner</i> plus: describes humans' role in the biosphere and effects we can have on water supply
Explore: Water Conservation	☐ defines water conservation ☐ summarizes one way water can be conserved	☐ differentiates water conservation and water management ☐ summarizes two or more actions people can take to conserve water	☐ differentiates water conservation and water management and explains need for both ☐ summarizes two or more actions people can take to conserve water ☐ summarizes the use of at least one device or invention used to conserve water	all of <i>Practitioner</i> plus: evaluates the effectiveness of device or invention used to conserve water

Ideate	includes: ☐ two possible solutions to conserve water in school/classroom setting ☐ potential audience ☐ integrates ideas gained from informational texts related to water conservation	includes: ☐ three possible solutions to conserve water in school/classroom setting ☐ one possible solution that could be implemented at community level ☐ potential audiences ☐ integrates ideas gained from informational and fictional texts related to water conservation	includes: ☐ four or more possible solutions to conserve water in school/classroom setting ☐ one possible solution that could be implemented at community level ☐ at least one solution aimed at changing human habits ☐ at least one solution using a device/invention ☐ explanation of why potential audiences were chosen ☐ integrates ideas gained from informational and fictional texts related to water conservation and innovation	all of <i>Practitioner</i> plus: includes one solution that could be implemented nationally or globally
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Save the Water Rubric (Group Design Solution)

	Novice	Apprentice	Practitioner	Expert
Sift	includes: • pros and cons of each group member's proposed solution • identification of water waste to target	includes: • pros and cons of each group member's proposed solution • description of feasibility of each proposed solution • identification of water waste to be targeted	includes: • pros and cons of each group member's proposed solution • description of feasibility of each proposed solution • comparison of unintended consequences of proposed solutions • description of water waste to be targeted	all of <i>Practitioner</i> plus: explanation of why final solution was chosen
Simulate	labeled drawing of proposed solution	labeled model of proposed solution	testable, labeled model of proposed solution	all of <i>Practitioner</i> plus: redesigned model based on feedback from others

Save the Water *Scaffold for Learning*

Teacher Material

Benchmark Video and Discussions

- Unit launch to create felt need for task
- Using the Design Process
- Earth's Spheres



Instructional Activities: Learning

Instructional Activities: Additional

Instructional Texts	Instructional Videos	How-to Sheets	Practice
• A Drop Around the World (I, P) • The Water Cycle from National Geographic Kids (I, P) • Saving Water from Time for Kids (I, P) • Droughts: Science and Stories (I, P) • Newsela articles and texts (I, P)	• Label parts of a globe (P) • Label the Earth's spheres (P) • Learn Earth's spheres (I, P) • Understand the water cycle through the spheres (IV) • Identify landforms in home state (I, P) • Describe the relationship of the hydrosphere and geosphere (IV) • Identify text structure (I, P)	• Set up Design Journal • Conduct an internet search • Identify a reliable internet resource • Write a summary • Read and label a map • Label the Earth's spheres	• Identify interactions of Earth's spheres (P) • Draw/label/describe water cycle (I, P) • Define/label parts of a globe/map (I) • Label map of home state (I, P)
Interactive Websites	Learning Centers	Small-Group Mini-Lessons	Application
• Modeling Earth's Systems • Google Earth • NASA Climate Kids • NOAA • Water.org • iCivics • CommonLit	• Lab: Water cycle in a bottle (SG) • Label the Earth's spheres (I) • Match: Earth's spheres and description (P, SG) • Model the water cycle (I, P) • Label parts of a globe (I, P) • Categorize text structures (P)	• Relationship between two ideas in informational text • Relationship of the hydrosphere and biosphere	• Summarize the water cycle (P) • Community Water Survey (SG) • Water Crisis Research Report (SG) • Water Data Analysis (P, SG)
			Assessment
			• Using rubric, peer edit work (P) • Self-assess understanding of domain/academic vocabulary (I)
			Reflection
			• In the Design Journal, share thoughts on the Design Process. What is challenging/easy? • What area do you wish you had more time for? Why?

Key: Individual (I), Pairs (P), Small Groups (SG), Activities suitable for homework (HW), Insights Video (IV)

Save the Water Content Facilitation Grid (Week 1 Sample)

Teacher Material

[illegible]

Save the Water Facilitation Questions

Teacher Material

COMPREHENSION: <i>Ask questions that ensure students understand content and skills needed to solve the problem.</i>	• What percent of the Earth’s water is freshwater? • Where is Earth’s freshwater located? • What is the atmosphere? • What is the definition of water conservation? • What is evaporation? • What are the characteristics of a high-quality summary? • In which step of the Design Process do you suspend disbelief and generate as many solutions as possible?
APPLICATION: <i>Ask questions that ensure the ability of students to apply learning to new situations.</i>	• How do the Earth’s systems work together in the water cycle? • How does the author use text structure to convey his/her message? • Which key details support your analysis of the main idea?
CONNECTION: <i>Ask questions that ensure the ability of students to apply learning to their lives.</i>	• How do you use water? • What would you do if there were no water to drink? What if there were no water to use for bathing? • Which landforms are in your area of the state? • Which bodies of water are closest to you?
SYNTHESIS: <i>Ask questions that encourage students to create new information from existing data</i>	• How would you modify your writing if asked to <i>inform</i> others about water conservation? • Since it is not possible to create water, what other substances could be used in place of water? How would it impact people and/or the environment?
METACOGNITION: <i>Ask questions that prompt students to think about their own thinking process.</i>	• How would you describe your group’s ability to work as a team? • What was the most challenging part of this task? • What strategies did you use to determine the meaning of academic vocabulary within informational texts?

Save the Water *Transfer Task*

Student Material

NASA scientists have confirmed the existence of a massive underground water reservoir on Mars, enough to cover the entire planet. However, it lies miles beneath the surface and would be extremely difficult and expensive to access. Some world leaders and scientists are now discussing whether nations should invest billions of dollars trying to reach it, rather than focusing those resources on solving Earth's freshwater crisis.

Using your knowledge of Earth's water systems, the water cycle, and freshwater conservation, write a well-argued essay expressing your opinion on where that investment should be directed.

Your essay must include:

- An introduction that provides context for the issue and states a clear claim
- At least two reasons supporting your claim, drawing on what you know about Earth's water systems
- Evidence from at least two sources to support your reasoning
- Acknowledgment and rebuttal of one opposing viewpoint
- Linking words and phrases connecting your claim, reasons, and evidence
- A conclusion that restates your claim and includes a call to action

Unit Overview	
As the global population surpasses 8 billion people, the strain on Earth's limited freshwater supply has never been greater. Climate change is intensifying the challenge by disrupting rainfall patterns, accelerating glacial melt, and increasing the frequency of droughts. In this <i>Authentic Learning Unit</i>, students will use the IDE Design Process to investigate the water cycle, analyze the causes of freshwater scarcity, and develop an original conservation solution. They will then advocate for their idea within their school or broader community.	
Enduring Understandings	Essential Questions
- The Design Process is useful in identifying problems and creating innovative solutions for them. - Our Earth has a variety of systems that work together to sustain life. - Changes in one of Earth's systems impact the other systems as well. - Writers use text structure and other techniques based on their purpose for writing.	- How can the Design Process be used to solve problems? - How do Earth's systems work together? - What impact does the water cycle have on life on Earth? - Why is freshwater important for humans and other living things?
Common Core State Standards Addressed	
RL.5.1; RL.5.3; RI.5.1; RI.5.2; RI.5.3; RI.5.4; RI.5.5; RI.5.7; RI.5.8; RI.5.9; W.5.1; W.5.3; W.5.4; W.5.5; W.5.6; W.5.7; W.5.8; W.5.9 L.5.1; L.5.2	
Other National Standards Addressed	
5-ESS1-1; 5-ESS1-2 NSS-G.K-12.1; NSS-G.K-12.2; NSS-G.K-12.3; NSS-G.K-12.6	
21st Century Skills Addressed	
<i>Core Content and Interdisciplinary Themes</i> - Subject-Area Mastery - Global Awareness - Environmental Literacy	<i>Information and Media Literacy</i> - Information Literacy - Media Literacy - Information and Communication Technology
<i>Learning and Innovation</i> - Critical Thinking and Problem Solving - Creativity and Innovation - Communication and Collaboration	<i>Life and Career</i> - Flexibility and Adaptability - Initiative and Self-Direction - Social and Cross-Cultural Skills - Leadership and Responsibility