

RESOURCE LIBRARY | ACTIVITY : 1 HR 15 MINS

How We Impact the Water Supply

Students read about how Mount Everest mountaineers are impacting the water supply. Students look at examples of how science can be communicated through a public education campaign. Next, students practice making a scientific argument, and then write a scientific argument that claims that the human population and consumption of resources in one location can impact another location's freshwater supply.

GRADES

6, 7, 8

SUBJECTS

Biology, Ecology, Conservation, Earth Science, Climatology, Geography, Physical Geography

CONTENTS

4 Links, 1 PDF, 1 Resource

OVERVIEW

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For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/how-we-impact-water-supply/>

In collaboration with

DIRECTIONS

This activity is part of the *Peak Water: Mount Everest and Global Water Supply* unit.

1. Ask students to read about how Mount Everest mountaineers are impacting the water supply.

- Direct students to read *Trash and Overcrowding at the Top of the World* to learn how mountaineers on Mount Everest are impacting the water supply, and to better understand how human activity can impact the environment, especially the resource of freshwater.
 - Distribute the *Project Journal: How We Impact the Water Supply* and ask students to read the article in pairs.
 - As they read, direct students to respond to the Question 1 prompts on the Project Journal.
 - Lead a class discussion that highlights the big ideas from the reading (e.g., Mount Everest is growing increasingly polluted as the growing number of visitors puts a strain on the natural environment).
- Cycle through the image slideshow from the *Inside the Everest Expedition that Built the World's Highest Weather Station* article to help students envision the area. Have students read the captions for each image.
 - Ask: *How did these images help you understand the impact that mountaineers are having on Everest?* (Some students may say this helps them see how many people are on Everest at once and that all of that waste has to go somewhere.)
 - Ask: *Based on these images, what evidence do you have or what inferences can you make that humans are impacting Mount Everest's water supply?* (e.g., human waste left behind is by far the biggest problem, which has incredibly negative impacts on the watershed)
 - Have students respond to the Question 2 prompt on the Project Journal.

2. Facilitate students' exploration of examples of how organizations have educated the public about environmental issues, to inspire their public education outreach campaign for the *Peak Water: Mount Everest and Global Water Supply* unit project.

- Remind students about the project for the Peak Water: Mount Everest and Global Water Supply unit: students propose a public education outreach campaign to creatively inform

- their community about human impacts on water security and inspire citizens to take action.
- Introduce one example of how people have created art to respond to environmental issues in their community, by showing the short video, [LA Water Documentary Part 1](#). Lead a quick debrief discussion to elicit students' initial reactions.
 - Tell students that the next video will highlight an outreach team that has worked together to identify a key message and included visual components in their campaign, just as they will do in their project. Show the [Water Tank Project](#) video and use the following questions to debrief:
 - What water-related problem was Mary Jordan trying to solve? (Communicating about how 1 billion people in the world do not have access to clean water, especially in low-income countries.)
 - How did she get the word out about the Water Tank Project? (Parties and events, tours and talks, social media, ad campaigns, tour the campaign around the country)
 - Highlight that students' campaigns should be centered around a key message that is rooted in their scientific argument and should inspire action. Show students the [Sea Walls: Artists for Oceans](#) video and use the following questions to debrief:
 - How did artist James Bullough view the connection between scientific ideas and public art?
 - (He chose to focus on the problem of ocean acidification, and before diving into his artistic plan, he researched the topic.)
 - How did city councilwoman Maxine Boag view the role of citizens, artists, and the government?
 - (Those who are inspired by the art are now responsible for being politically active and helping make changes. It's not just up to those in charge. It should be a grassroots effort.)
 - How did the murals impact the community and the people who viewed them?
 - (It changed peoples' perception about what could be done. It inspired people and helped them see things in a more sustainable way.)
 - Share the following quote from Tré Packard, founder of PangeaSeed Foundation and the person behind the mural initiative in the video, and lead students in a Think-Pair-Share to reflect on if the quote aligns to their own thoughts about public art:

"Not everybody is going to walk in off the streets to go into a gallery. Sometimes that can be polarizing," Packard said. "Public art has been utilized for centuries to lead revolutions, to spread messaging and information – so

we're not necessarily reinventing the wheel. We're just using it in a different context."

- Direct students to share what they have for their final products. Prompt students to record their reflections on the videos and new ideas for their final products in Question 3 of their Project Journal.

3. Assist students as they practice developing a scientific argument after learning about Claim-Evidence-Reasoning.

- Present Claim-Evidence-Reasoning to students by discussing the three main components of C-E-R and what each means.
 1. Claim: a statement you make or an answer to a question
 2. Evidence: facts, details, statistics, sources, and more that support your claim
 3. Reasoning: how your evidence logically supports and connects to your claim
- If needed to support students, share or collaboratively create an example of a scientific argument using these three components. Then have students practice writing a scientific argument on a topic of their choice, using the structure provided in Question 4 of their Project Journal.

4. Assess students' understanding of the A Shift in Supply and Demand lesson of the Peak Water: Mount Everest and Global Water Supply unit through an exit ticket.

- Redistribute students' Project Journals from all prior activities in the Peak Water: Mount Everest and Global Water Supply unit, so that they can use their ideas as evidence to support or refute their claim in the first assessment question below.
- Use the prompt and questions below to assess students' understanding of the main concepts covered in this lesson. Have students respond individually to these questions on an exit ticket:
 - Write a scientific argument that claims that the human population and consumption of resources in one location can impact another location's freshwater supply.
 1. Your claim should answer the question: *Do humans in one location impact the freshwater supply in another area?*

2. Evidence: Use your Project Journals from the *A Shift in Supply and Demand* lesson to provide at least three pieces of evidence that humans impact freshwater resources.
3. Reasoning: Connect your evidence to the claim.

- How does the claim presented in your argument affect water security for people around the world?
- Draw a diagram to show the connections between humans, freshwater, snowpack, glaciers, and water security. Use arrows, words, and short descriptions of the relationships between each term.

Tip

Step 2: Review the details of the components of the *Peak Water* unit project (listed in the *A Day Without Water Activity*) to anticipate students' questions.

Tip

Step 3: Read more about helping students develop evidence-based arguments from [ReadWriteThink](#).

Tip

Step 3: You can watch a [C-E-R framework](#) video before helping students write their scientific argument using the framework. You can also use the [Claims, Evidence, Reasoning](#) video from Teaching Channel to support your implementation of this step.

Modification

Step 4: As time allows, have students swap their C-E-R arguments and provide each other with feedback.

Informal Assessment

Use the exit ticket in Step 4 to assess students' understanding of the [A Shift in Supply and Demand](#) lesson of the [Peak Water: Mount Everest and Global Water Supply](#) unit. Students also add to their Project Journal, which will be submitted at the end of the activity and can be used to assess their understanding and ideas related to their project for the unit.

Extending the Learning

Students could continue researching ideas for their final product using the following sources:

- Arizona Community Foundation: [The New Arizona Prize: Water Public Art Challenge](#)
- American Public Health Association: [Hard-hitting Public Health Ad Campaign Sparking Awareness: New Tactics Gaining Results](#)
- Centers for Disease Control and Prevention: [Gateway to Health Communication—Featured Campaigns](#)

OBJECTIVES

Subjects & Disciplines

Biology

- [Ecology](#)
- Conservation

Earth Science

- Climatology

Geography

- [Physical Geography](#)

Learning Objectives

Students will:

- Understand how waste can impact watersheds.
- Brainstorm ways science can be communicated through a public outreach campaign.
- Write a scientific argument that claims that human population and consumption of resources in one location can impact another location's fresh water supply.

Teaching Approach

- Project-based learning

Teaching Methods

- Discussions
- Reading
- Writing

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Learning and Innovation Skills
 - Communication and Collaboration
 - Creativity and Innovation
 - Critical Thinking and Problem Solving
- 21st Century Themes
 - Environmental Literacy
 - Global Awareness
- Critical Thinking Skills
 - Applying
- Science and Engineering Practices
 - Constructing explanations (for science) and designing solutions (for engineering)
 - Developing and using models
 - Engaging in argument from evidence
 - Obtaining, evaluating, and communicating information

National Standards, Principles, and Practices

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- **CCSS.ELA-LITERACY.WHST.6-8.1.B:**

Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

NEXT GENERATION SCIENCE STANDARDS

- **Crosscutting Concept 2:**

Cause and Effect

- **MS. Earth and Human Activity:**

MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

- **MS-ESS3-4:**

Construct an argument supported by evidence for how increases in human and natural resources impact Earth's systems.

- **Science and Engineering Practice 2:**

Developing and using models

- **Science and Engineering Practice 7:**

Engaging in argument from evidence

- **Science and Engineering Practice 8:**

Obtaining, evaluating, and communicating information

Preparation

What You'll Need

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per pair, Monitor/screen, Projector, Speakers

PHYSICAL SPACE

- Classroom

GROUPING

- Heterogeneous grouping
- Large-group instruction
- Large-group learning
- Small-group instruction
- Small-group learning
- Small-group work

RESOURCES PROVIDED: UNDEFINED

- Bloomberg Philanthropies: CURRENT: LA Water

- The Water Tank Project: About the Water Tank Project
- PangeaSeed Foundation: Sea Walls: Artists for Oceans - Napier, New Zealand Edition 2017

RESOURCES PROVIDED: HANDOUTS & WORKSHEETS

- [Project Journal: How We Impact the Water Supply](#)

RESOURCES PROVIDED: ARTICLES & PROFILES

- Trash and Overcrowding at the Top of the World
- National Geographic: Inside the Everest expedition that built the world's highest weather station

BACKGROUND & VOCABULARY

Background Information

Humans are responsible for polluting water, and this can come in the form of plastic, toxic waste, sewage, fertilizer, or other pollutants. Plastic pollution, in particular, can be pervasive in ecosystems. Fortunately, we can communicate scientific ideas to the public to improve education, health, and many other aspects of human livelihood. The successful uptake of new information and practices hinges on a well-crafted and effective communication strategy to translate scientific learning into civic understanding and action.

Prior Knowledge

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Recommended Prior Activities

- [A Day Without Water](#)
- [How We Use Water](#)
- [Precious Freshwater](#)
- [Watersheds](#)
- [Water Towers and Shrinking Glaciers](#)

Vocabulary

Term	Part of Speech	Definition
argument	<i>noun</i>	reason or set of reasons given with the aim of persuading others that an action or idea is right or wrong.
claim	<i>verb</i>	to state as the truth.
evidence	<i>noun</i>	data that can be measured, observed, examined, and analyzed to support a conclusion.
reasoning	<i>noun</i>	process of using evidence to make inferences or conclusions using logic.
upcycle	<i>verb</i>	to recycle one or more items to create an object that is worth more than the original product.



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