



EDUCATOR'S GUIDE

Student Activities

GRADES 3-5

Please use these activities to reinforce information provided in the **LifeStraw® Educator's Guide**.

- National Science Content Standards and connections to the *Guide* topic areas are identified below each activity.
- The Water Stories Supplement, with Luis and Ajia's "water stories," will make these important topics more personal for students.
We encourage students to share their own water stories with one another and with us.
- Together with the *Guide*, these activities and supplements are designed to introduce water-related topics in depth, through active learning. The materials will encourage students to think about the importance of water in their own lives, and what actions they can take to help protect this vital and precious resource.

We invite you to share your feedback with us at info@celfeducation.org.



Download all activities free at celfeducation.org/waterguide



1. Experiment: Water at the Window

Objective: To promote a better understanding of the water cycle and how pollutants move through the system.

Description: Students will create a simple model to simulate the water cycle and make observations of water under different conditions and temperatures and compare results.

*National Science Content Standard A: Science as Inquiry;
D: Earth Space & Science; C: Life Science*

Guide Connections: H₂O: Earth's Essential Compound

2. Activity: Where's the Water?

Objective: To convey by means of a visual representation how little freshwater is available to everyone in the world. To promote an understanding of the scarcity of freshwater and appreciation of the need to conserve this resource.

Description: Students will recreate the hydrosphere by means of containers and materials that represent various features of the hydrosphere (clouds, glaciers, surface water) and make observations of proportions and locations of freshwater available on Earth.

*National Science Content Standards: A: Science as Inquiry;
D: Earth Space & Science;
F: Science in Personal & Social Perspectives*

Guide Connections: H₂O: Earth's Essential Compound, Water Scarcity

3. Experiment: The Weight of Water

Objective: To develop an understanding of the different weights and measurements of liquid. To familiarize students with calculations of weight, time and distance. To convey the physical challenge of carrying water long distances, and the multiple causes and consequences of such a burdensome task on women and children in a community.

Description: In many parts of the developing world, water is not easily accessible, particularly in Eastern Kenya, Ajia's home. (Reference Water Stories Supplement to read more about Ajia.) The task of fetching water falls mainly on women and children. In fact, it is estimated that in just one day, more than 200 million hours of women's time is consumed collecting water for domestic use.¹ In Sub-Saharan Africa alone, women may spend 40 billion hours a year completing that necessary but difficult task.² Students will experience the actual weight of water, physically and mathematically, and thereby gain appreciation of the freshwater challenges faced by many around the world.

*National Science Content Standards: B: Physical Science;
F: Science in Personal & Social Perspectives*

Guide Connections: Water Scarcity

4. Investigation: What's your "Water Footprint"?

Objective: To measure personal water-usage and calculate an individual "water footprint." To promote an awareness of daily water use. To teach students how to collect quantitative data and calculate finite measurements using estimations. To promote an awareness of water usage around the world and encourage discussion about this comparison. To encourage students to identify daily water conservation strategies.



Description: Most people in the developed world don't think much about freshwater. We turn on the faucet and there it is; clean, drinkable water. But as populations grow and the amount of water on earth stays the same, there is more pressure on rivers, reservoirs and groundwater resources. By examining their own personal water-use, and exploring water use around the world, students will gain an understanding of how vital a resource water truly is, and how—due to natural and human influence—water is distributed and consumed unevenly throughout the world. Students will learn that they can consider food choices and product selections in terms of how much water they require for growing or manufacturing. They can also exert control over personal water use, and maybe even impact the water-use of families and friends.

National Science Content Standards: A: Science as Inquiry; F: Science in Personal & Social Perspectives

Guide Connections: Water Scarcity

5. Connection: Meet the Pathogens

Objective: To explain and explore pathogens and the metrics used to distinguish between their size and scale.

Description: Students will be introduced to the metrics used to measure microscopic organisms. They will use a designated scale to distinguish between the different sizes of pathogens and will gain an understanding of why size matters in relation to filter design. Students will see that contaminated water doesn't always look polluted, and that even the tiniest unseen pathogen can make someone very sick.

National Science Content Standards: A: Science as Inquiry; B: Physical Science; C: Life Science; E: Science & Technology

Guide Connections: Water Pollution, Filtration

6. Activity: Disease Transmission Tag

Objective: To foster an understanding of the different ways that diseases are transmitted from person to person throughout a population to create an epidemic

Description: Students will engage in a game of tag in which one player is designated as the disease source and will "contaminate" others by tagging them. "Infected" players work together with the tagger until the disease is spread throughout the population. A variation is included to integrate an understanding of different immune responses to exposures. Water-borne diseases such as cholera are no longer as deadly or as common as they were many years ago, thanks to scientists' and public health workers' understanding of disease transmission and the danger of contamination.

National Science Content Standards: A: Science as Inquiry; C: Life Science; F: Science in Personal & Social Perspectives

Guide Connections: Water Pollution, Filtration

7. Activity: Down the River

Objective: To foster an understanding of how human activities and land use affect water quality. To help students identify sources of pollution and how they contaminate water sources.

Description: Students will learn about sources of human-generated pollution by assuming roles of property-users along the Bronx River in New York. Students will connect certain activities associated with their roles and identify the waste they create and the pollutants they discharge into or near the water. Students will consider methods of pollution prevention and will better understand the environmental circumstances affecting Luis's neighborhood of Hunts Point, in the South Bronx. (See Water Stories Supplement to meet Luis.)

National Science Content Standards: A: Science as Inquiry; C: Life Science; F: Science in Personal & Social Perspectives; G: History & Nature of Science

Guide Connections: Water Pollution

Down the River

7a. Connection (refer to Water Stories Supplement)

Although the river water in Luis's neighborhood is highly polluted, he is fortunate to drink from and bathe in treated, piped water. In cities around the world, especially in emerging economies, citizens have no choice but to bathe in and drink from dirty rivers, such as the Ganges in India. Although urban dwellers are far more likely to have access to piped water than those who live in rural areas, in many parts of the world, particularly in Sub Saharan Africa, the richest citizens are more than twice as likely to have access to clean water than the poor.³ Have students observe photos of the Ganges River, and discuss how the experience of those living near the Ganges might differ from those living by the Bronx River. Students should conduct research and create their own Ganges map, similar to the Bronx map in Activity #7, with labels for various activities and the impact on people living and working near the river. Finally, students should review the Water Stories Supplement and complete their own story.

8. Experiment: Make your own Water Filter

Objective: To explore the mechanics of filtration and its importance as a health intervention to remove contaminants from drinking water.

Description: Students will work together as a research team of hydro engineers to design their own water filters. The team will use a variety of materials and different types of water to test and compare the effectiveness of the filters they have developed.

*National Science Content Standards: A: Science as Inquiry;
C: Life Science; E: Science and Technology;
F: Personal and Social Perspectives*

Guide Connections: Filtration, Humanitarian Design

9. Activity: Design a Solution

Objective: To introduce students to the concept of humanitarian design as a means of producing innovative and effective solutions to community needs, whether they be social, physical, health-related, safety, or educational. To enable students to think of their own creativity as a tool for good. To demonstrate how successful products for the developing world are collaborative efforts between communities and designers. To encourage cooperative problem-solving.

Description: After reading the background information on "their" village in Eastern Kenya, students will read about several actual inventions or designs. They will form community councils and decide which design would best alleviate their community's most pressing problems, which they will identify based upon the background reading. Students will present their chosen design and an argument on its behalf to the class. Students will also identify a community need that they believe is NOT met by the listed products/systems, or could be better solved with another product or system. They will then cooperatively design a solution, preferably using local materials and labor.

*National Science Content Standards: E: Science & Technology;
F: Science in Personal & Social Perspectives*

Guide Connections: Humanitarian Design

SOURCES

¹ Water.org (<http://water.org/water-crisis/water-facts/women/>)

² UN Human Development Report, 2006. (<http://hdr.undp.org/en/media/HDR06-complete.pdf>)

³ WHO and Unicef "Progress on Sanitation and Drinking Water; 2010 update." p 30. http://whqlibdoc.who.int/publications/2010/9789241563956_eng_full_text.pdf



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