



EDUCATOR'S GUIDE

Student Activities GRADES 6-8

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 Cycle Bag

Used with permission from The Arctic Climate Modeling Program, National Science Foundation and the University of Alaska Fairbanks Geophysical Institute, www.arcticclimatemodeling.org

Objective: To familiarize students with stages of the water cycle by means of scientific experimentation. To encourage active inquiry by having students construct a model water cycle, make observations and record data.

Description: During this activity, students will observe evaporation, condensation and precipitation by enclosing water in an airtight bag and exposing it to heat.

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

Guide Connections: H₂O: Earth's Essential Compound

2. Connections: Traveling Through the Water Cycle

Objective: To enable students to demonstrate and reinforce their knowledge of the water cycle, as well as employ map-reading skills and creative writing ability.

Description: Students will imagine a water molecule's trip from Kenya to the Bronx, traveling across the geographic land and waterscape as they simultaneously journey through the water cycle.

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

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

3. Activity: Where's the Water?

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

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

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

Guide Connections:

H₂O: Earth's Essential Compound; Water Scarcity

4. Experiment: The Weight of Water

Objective: To develop an understanding of liquid measurement. 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.

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 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 and Social Perspectives

Guide Connections: Water Scarcity

5. Investigation: Carrying Water

Used with permission from Earth Day Network

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, calculate finite measurements using estimations. To introduce the

concept of unequal distribution of water and volume of water consumed around the world, and encourage a relevant discussion about this comparison. To encourage students to identify daily water conservation strategies.

Description: Students will measure and analyze their personal daily water usage for a better understanding of how water is used and wasted on a daily basis. They will learn about life in Kapsasian, Kenya, and will examine struggles faced by many who lack access to healthy, freshwater. Through math calculations and problem-solving, students will be exposed to real-life situations and challenges around the world.

National Science Content Standards: B: Science in Personal and Social Perspectives; NSS-G.K-12.2 Places and Regions; NSS-G.K-12.5 Environment and Society

National Mathematics Content Standard: NM-NUM.6-8.1; NM-NUM.6-8.3

Guide Connections: Water Scarcity

6. Investigation: Water Laws

Objective: To familiarize students with ways in which freshwater is regulated, protected and conserved—both officially and unofficially—across time, cultures and countries. To enhance students' critical and collaborative thinking skills as they navigate the complex and often conflicted world of competing water rights claims and traditions.

Description: Students will learn about traditional systems and strategies for freshwater regulation and conservation throughout the ages and across cultures. They will study water issues of two communities—one in rural Kenya, one in urban New York—and craft regulations which ensure sustainable solutions. Students will learn how different attitudes toward water rights and regulations evolved in the United States. Specifically, students will examine how mining practices in the California Gold Mines of the 1800s influenced western water rights legislation.

National Science Content Standards A: Science as Inquiry; G: History and Nature of Science

Guide Connections: Pollution; Water Scarcity

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. To enable students to distinguish between point and non-point source pollution.

Description: Students will learn about sources of pollution by assuming roles of property-users along the Bronx River in New York. Students will connect certain activities/behaviors with the waste created and the pollutants discharged. Students will connect the hypothetical game to "real life" environmental circumstances affecting downstream communities all over the world; in particular, Luis's neighborhood of Hunts Point, in the South Bronx. (Meet Luis in Water Stories Supplement.) Students will explore and discuss pollution prevention, and why it matters.

National Science Content Standards: A: Science as Inquiry; C: Life Science

Guide Connections:

H₂O: Earth's Essential Compound; Pollution

7a. Connection:

Although the river water in Luis's neighborhood is highly polluted, he is fortunate to drink from and bathe in filtered, piped water. In cities around the world, particularly in Asia, citizens have no choice but to bathe in and drink from foul rivers, such as the Ganges in India. 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.

8. Connections: Potable Poison (1832 Cholera epidemic in NYC)

Objective: To conduct an epidemiological investigation and use hypothetical victim case studies and evidence to determine the source of cholera in the Five Point's neighborhood of New York City. To understand the science and methods of epidemiology by analyzing disease data and by developing hypotheses.

Description: Students will act as disease detectives as they investigate the 1832 Cholera epidemic that swept through New York City, most acutely in the Five Points neighborhood. Students will use victim biographies and other specific relevant details to analyze patterns of disease, human behavior, and contaminant exposure in order to hypothesize the cause(s) of the epidemic. As an extension, students will consider the economic and social aspects and impact of the Cholera epidemic, and extrapolate from that understanding as they look at other more recent disease outbreaks.

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

Guide Connections: Water Pollution, Filtration

9. Experiment: Make Your Own Water Filter

Objective: To explore the mechanics of filtration and its importance as a health intervention to remove contaminants and pollutants 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 samples to test and compare the effectiveness of the filters they have developed. They will repeat the process, comparing the second design results to their first attempts.

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

Guide Connections: Filtration, Pollution

10. Experiment: What's in Your Water?

Objective: To develop an understanding of water quality monitoring and measuring. To appreciate the methods and procedures utilized to keep water safe and healthy. To learn and demonstrate knowledge of the chemical and physical properties of water, and methods and terminology related to filtration and water purification.

Description: Students will learn to perform some of the essential tests required for drinking water analysis. In small groups, students will collect water and analyze its pH, chlorine, nitrates and dissolved oxygen levels. They will share and compare data and respond to questions that encourage them to apply their knowledge to a wider context.

National Science Content Standards: A: Science as Inquiry; B: Physical Science; E: Science and Technology; F: Personal and Social Perspectives

Guide Connections: H₂O: Earth's Essential Compound, Water Pollution, Filtration

11. Activity: Design a Solution

Objective: To introduce students to the concept of humanitarian design as a means of producing innovative and effective solutions to a variety of community needs. To enable students to think of their own creativity as a tool for good. To demonstrate how designing successful products for the developing world requires collaborative efforts between communities and designers. To encourage cooperative problem-solving.

Description: After reading the background information provided, 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. In the optional Extension Activity, students will identify a community need that they believe is NOT met by the listed products/systems. They will then cooperatively design a solution, preferably using local materials and labor.

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

Guide Connections: Humanitarian Design

SOURCES

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