



## “Walking for Water”

**Objective:** Students will compare their own experiences with the availability of water to those in third world countries.

**Grade Level**

Middle School, High School

**Time Frame**

Approximately 45 minutes

| Learning Objectives  | Vocabulary  | Science TEKS   | Materials  |
|--|---|--|--|
| Students will: <ul style="list-style-type: none"> <li>Investigate and compare water availability in different areas of the world</li> <li>Students will predict how their lives would be affected if the availability of their water source changed</li> </ul> | <ul style="list-style-type: none"> <li>Groundwater</li> <li>Surface water</li> <li>Water stress</li> <li>Infectious disease</li> <li>Waste water</li> <li>Water treatment</li> <li>Point source pollution</li> <li>Nonpoint source pollution</li> </ul> | Aquatic Science:<br>7(A), (C); 12 (A), (B), (C) (D)<br><br>Biology :<br>11(B), (C); 12(D)<br><br>Chemistry:<br>10 (E)<br><br>Environmental Systems:<br>5(B), (C), (D), (F); 9 (A), (D) | <ul style="list-style-type: none"> <li>Water-Aware Fact Sheet (included)</li> <li>Women Bear The Weight of Water Sheet (included)</li> <li>Water information sheets on Ethiopia, Kenya, and Honduras (included)</li> <li>Empty plastic gallon jugs</li> <li>Water</li> </ul> |

**Background**

Water resources are being used faster than they can be recharged leading to several water issues. This lesson leads students to investigate the water availability in different areas of the world and the hardships these populations face due to water resources or lack there-of. Students will carry water over a short distance to understand what some of these populations must endure to secure drinking water for their families. Students will compare their access to clean water to that of third world countries.

Students should experience carrying the water individually. Students can work in groups to answer the questions in the Water-Aware Fact Sheet and the Women Bear the Weight of Water Sheet.

**Engage**

- Start a discussion with the students using the following questions:
  - Where do you get your drinking water from? (answers might include the sink, the store, the water fountain etc.)
  - What would you do if you did not have access to tap water? In other words, if there weren't any water pipes leading to your house, school, etc.?
  - Do you think everyone has the same access to water that you do?
- Students will develop a hypothesis about the difficulty level of carrying a gallon of water ½ mile.

**Explore**

1. Students will fill a gallon jug with water and walk the distance of ½ mile. The walking path should be pre-determined by the instructor.
2. Have students try to lift two or three gallons of water at a time (they do not need to walk ½ mile with this weight as water can get very heavy).
3. Students will discuss their experiences as a group. Use the following questions to lead the discussion:
  - a. Were your predictions about the difficulty level of carrying the water jug accurate?
  - b. Would you be able to carry the water longer distances?
  - c. Could you carry the water for 3 miles?
  - d. Could you do this every day?
  - e. How would your everyday life be affected if you had to do this every day in order to ensure your families survival?
  - f. How would you feel if, after all this work, the water still wasn't safe to drink?

**Explain**

1. Explain to students that many people in other parts of the world do not have access to running tap water or to wells. People (most often women) in other parts of the world carry as much as twelve gallons of water on their heads very long distances to meet the needs of their families.
2. Distribute materials on "Women Bear the Weight of Water" and information sheets on Kenya, Honduras and Ethiopia. Students will answer "Women Bear the Weight of Water" Reading for Comprehension Questions.
3. Students will discuss facts relating to the difficulty and sociological implications of the unavailability of water in each of the above regions as well as discuss the statistical information regarding average distance travelled for water.

**Elaborate**

1. Students should compare their experience of carrying the water jug and walking a 1/2mile to what they think people in the above mentioned countries experience. Are students better able to empathize with third world conditions after the activity? Why or why not?
2. Women in many areas of the world must carry large amounts of water long distances to provide the basic needs of their families. What other tasks might these women be doing if they did not have to spend so many hours (sometimes as much as 20 hours per week) carrying water? What could you do with 20 extra hours per week?

**Evaluate**

Students will read "Water-Aware Fact Sheet" and answer the Reading for Comprehension Questions.

# Water-Aware Fact Sheet

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In many regions of the world, fresh water, both groundwater and surface water, **is being used faster than it can be replaced**. Already about one-third of the world's population lives in countries suffering from moderate-to-high water stress, according to the most recent Global Environment Outlook (GEO-3) report. Water stress is defined as areas where water consumption is more than 10% of renewable freshwater resources. The GEO-3 scientists project that **more than half the people in the world could be living in severely water-stressed areas by 2032**.

A lack of safe drinking water brings an added burden of illness to families already living in poverty. Infectious **waterborne diseases such as diarrhea, typhoid, and cholera are responsible for 80% of illnesses and deaths in the developing world**, many of them children. Worldwide, approximately 15 million children a year die from a waterborne disease or related illness.

The amount of water a person needs can vary; obviously, a person doing manual labor in the tropics will need more water than someone sitting at a computer in a temperate zone. **The World Health Organization (WHO) suggests 0.5 to 1 gallon a day for drinking, and another 1 gallon for cooking and food preparation as the bare minimum for survival**. However, the minimum quantity of water recommended by the U.S. Agency for International Development for household and urban use is close to **26.4 gallons per person per day**.

**Some two million tons of waste per day are disposed of in open freshwater sources**, including industrial wastes, agricultural wastes, human waste and chemicals. World Watch Institute, for example, estimates that **every minute, 300,000 gallons of raw sewage are dumped into the Ganges River, the primary source of water for many Indians**.

In all of Asia, only about 35 percent of the wastewater is treated, and about 14 percent is treated in Latin America. **A minimal percentage of treatment has been reported to be treated in Africa**. Even in industrialized countries, sewage is not universally treated, according to UNEP (United Nations Environment Program).

**Freshwater resources are being further squandered due to pollution** and the way in which we use water. **Agriculture accounts for an unbelievable 80% of world water consumption**, and an **estimated 60% of the water used for irrigation is wasted**, lost to leaky canals, evaporation, and mismanagement. Fertilizer and pesticide residues from farming also contribute to contamination of fresh water resources. Large cities waste their share of water too due to leaky systems.

**Conserving and managing freshwater resources is politically and socially difficult**; many rivers, lakes, and underground aquifers cross national boundaries and are often be

shared by several countries, all with differing laws and beliefs about rights to use and ownership.

**“This crisis is one of water governance, essentially caused by the ways in which we mismanage water,”** conclude the authors of the UN’s World Water Development Report issued in March of 2007. According to Brian Morris, principal hydro-geologist at the British Geological Survey, “What is needed is pragmatic management such as **increasing public and government awareness**, properly resourcing the agencies that manage groundwater, supporting community management, and encouraging the use of incentives and disincentives particularly in poorer countries and rural areas. **It is vital we give groundwater value like any other scarce resource”**.

Source: UN Highlights World Water Crisis (2007): (<http://news.nationalgeographic.com>)

**“Water-Aware Fact Sheet”**

**Reading for Comprehension Questions**

- 1: According to the most recent Global Environment Outlook report what percent of the world’s population lives in countries suffering from moderate-to-high water stress?**
  
- 2: Which three infectious waterborne diseases are responsible for 80% of illnesses and deaths in the developing world?**
  - a)
  - b)
  - c)
  
- 3: Worldwide, approximately how many tons of waste is deposited into freshwater sources each day?**
  
- 4: What four factors help explain the extensive loss of water in many agricultural practices?**
  - a)
  - b)
  - c)
  - d)
  
- 5: Which two types of agricultural run-off residues contribute to the contamination of freshwater resources?**
  - a)
  - b)
  
- 6: What factors make conserving and managing freshwater resources difficult?**
  
- 7: Develop three recommendations or strategies for private citizens and/or government agencies to better protect freshwater as a scarce resource:**
  - a)
  - b)
  - c)

## Women Bear the Weight of Water

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In the developed world, humans do not have to carry the water we use on a daily basis. If we did, it's safe to assume we'd use a lot less than we do. The **average American individual uses 100 to 176 gallons of water at home each day**. The weight of that water is about 836 to 1400 pounds. Imagine if your family had to work together every day to transport over 800 pounds of water into your home!

For people living in many third world countries, distance from a clean water source is a critical factor. In particular, it affects the lives of women. Collecting water in third world countries is rarely a family activity. It is

A task largely designated to women and young girls. **Because women are also responsible for the care of young infants and children, girls begin carrying a small version of a water jug as early as 2 years old.**

In some places in sub-Saharan Africa, for instance, **women can spend between 15 and 17 hours each week collecting water**. In times of drought, it can sometimes take even longer. Adequate water supply and good health are tightly linked, and the need to carry water long distances limits the amount women can bring to their families.

The dangers are not over even once water has been brought back home to the family. **Water is often contaminated with microorganisms that cause diarrhea, typhoid, and cholera.** These diseases are responsible for **approximately 80 percent of all illnesses and deaths in the developing world**, many of them children. In fact, **one child dies every eight seconds from a waterborne disease; approximately 15 million children a year.**

Women and female children who have to travel to collect water pay a high cost. **Less time is available for caring for children, preparing food, or pursuing income-generating activities.** In some regions women and girls must travel through unsafe areas and are vulnerable to attack. Families, in many cases, must forego sending their daughters to school, perpetuating the vicious cycle of illiteracy and poverty.

## **“Women Bear the Weight of Water”**

### **Reading for Comprehension Questions**

- 1: Why do people in developed countries not have to worry about collecting their own water for daily use?**
- 2: Approximately how much water does the average North American family use per day?**
- 3: What is the most likely explanation for why women and girls in third world settings are disproportionately burdened with the task of finding and collecting water for their families?**
- 4: In what ways are adequate water supply and good health likely to be linked?**
- 5: What are the “costs” associated with women and girls collecting water as a daily ritual.**

### **Possible answers:**

- 1: Infrastructures such as water treatment systems, pipelines and taps have been put into place to create safe and accessible water.**
- 2: Between 100 to 176 gallons of water**
- 3: Answers will vary. (Men may have other jobs to support the family. It is a tradition... [It has always been done that way]. Women and girls are the only family members available to do the work, etc.)**
- 4: Humans need safe drinking water to survive. Many diseases are linked to polluted and otherwise contaminated water sources.**
- 5: Less time is available for other activities necessary for survival or generating additional income. The personal safety of the women and children who travel may be at risk. Girls are not available to attend school, perpetuating a cycle of illiteracy and poverty**

# Ethiopia

Ethiopia is a landlocked country in the eastern Horn of Africa. It is slightly less than twice the size of Texas. The average temperature throughout much of the country is about 60° Fahrenheit. However, the northern part of the country along the Sudanese border can be much hotter. There are nearly 80 languages spoken in Ethiopia, but the most common are Amharic, Tigrinya, and Oromigna.

The need for water and sanitation in Ethiopia is severe. Only 22% of the population has access to an improved water supply, and only 13% of the population has access to adequate sanitation services. In rural areas, these numbers drop even further.

## **Water Crisis in Ethiopia**

In rural areas, women and children walk up to six hours to collect water. Most people collect water from shallow, unprotected ponds which they share with animals. Other people collect water from shallow wells. Both these sources are subject to contamination as rain water washes waste from surrounding areas into the source. They then carry the large clay jugs of water back to their villages. These jugs can weigh up to 40 pounds! Often, young children are left home by themselves or with a slightly older sibling while their mother and older siblings collect water and their father works tends to animals or tries to earn money at a job outside the house.

## **Drought**

In the last 20 years, Ethiopia has experienced recurring droughts followed by food shortages and famines. Poverty is accentuated during the droughts. Staple foods, like cabbage, experience sharp increases in prices, while families find that they must sell their cattle for half what they would get in a non-drought year. Along with limited food supply, during times of drought, water-related diseases are rampant. Surface water sources such as springs and ponds dry up. What limited water sources remain become heavily contaminated by environmental waste, such as human and animal excreta which is washed in when the limited rains do come. The stagnant water serves as a breeding place for mosquitoes. In addition to being at risk for contracting diseases through drinking water, there is another risk. In times of drought, it is common for there not to be enough water available to bathe regularly. As a result, community members, especially children, suffer from scabies and eye infections. During these times, in an effort to conserve water, hand washing after defecation or before eating is rarely practiced.

Poverty continues to affect the child mortality rate in Ethiopia. There are many factors that contribute to the high child mortality rate. Diarrheal and water-related diseases are among the principle causes of death in young children. Pneumonia, vaccine-preventable diseases (especially measles), malaria, tuberculosis, and malnutrition are also among the top killers of this age group.



# Kenya

## Country Facts

Capital: Nairobi

Population: 36,913,721

Median age: 18.6 years

Infant mortality: 57.44 deaths/1,000 live births

Access to improved water source: 61%

Access to improved sanitation: 43%

Below poverty line: 50%

Adult literacy: 85.1%

Kenya is located in East Africa. It borders the Indian Ocean and Somalia on the east, Ethiopia and Sudan on the north, Uganda and Lake Victoria on the west, and Tanzania to the south. Kenya's eastern low plains rise to central highlands bisected by the Great Rift Valley in the west.

Over 50 percent of Kenyans are living below the poverty line. The HIV/AIDS pandemic has compounded the deteriorating health standards and resulted in growing destitution, and unprecedented levels of poverty.

## Water Crisis in Kenya

The water crisis in Kenya is disrupting social and economic activities throughout the country. Unfortunately, the current wave of droughts and water shortages in Kenya and the rest of East Africa is only expected to continue.

The water crisis is due not only to the wave of droughts, but also to poor management of the water supply, under-investment, unfair allocation of water, rampant deforestation, pollution of water supplies by untreated sewage, and a huge population explosion (thirty-fold increase since 1900).

Kenya is limited by an annual renewable fresh water supply of only 647 cubic meters per capita, and is classified as a water scarce country. Only 61 percent of the rural population has access to an improved drinking water source, and the time-intensive pursuit of water collection often prevents women from taking up income generating activities, or in the case of girls, prevents them from attending school.

## Nyanza Province

Much of Nyanza Province, where Water.org is working, is semi-arid and is subject to severe drought. Most people obtain their drinking water from Lake Victoria, seasonal rivers and streams, and hand-dug wells, all of which are contaminated sources. Women and children walk up to six kilometers each day to haul water, a task that takes up to three hours. Water is not only contaminated at its source but also from the way it is transported and stored. Few households boil their water.

# Honduras

## Country Facts

Capital: Tegucigalpa

Population: 7,483,763

Median age: 19.7 years

Infant mortality: 25.21 deaths/1,000 live births

Access to improved water source: 87%

Access to improved sanitation: 69% below poverty line: 53%

Adult literacy: 80%

Honduras is the knee of Central America, bordered to the south by Nicaragua and El Salvador and to the west by Guatemala. In the rural regions, nearly 63% of the population is considered extremely poor, living on less than a dollar a day.

Families often work as subsistence farmers—growing only what they can use to feed their own families, and leaving very little money for other purchases.

## Water Crisis in Honduras

In 1998 Honduras was devastated by Hurricane Mitch. The tiny country was the hardest hit by Mitch's rampage. Mitch was followed by three days of rain that caused landslides and floods, burying towns and killing thousands of people. Many of the rural communities were devastated. The hurricane caused \$58 million in damages and left 75% of the country without safe drinking water.

Reconstruction efforts are continuing. However, until they are complete, in these areas families are forced to rely on contaminated water supplies, and the prevalence of waterborne diseases like cholera is increasing. Mosquitoes that carry malaria and dengue fever are also a problem.

Beyond the issues of health, poor access to water supplies causes overall development to stagnate. Many women and children in the rural areas of Honduras spend up to six hours each day simply fetching water and carrying it home on their heads.