



A World of Water

Lesson Summary:

In this lesson, students will learn that there is a lack of safe drinking water around the world. They will also learn the reasons why safe drinking water is not available everywhere and the efforts which exist to improve those conditions.

References:

Lesson adapted with permission from:

1. Louisville Water Company's *Adventures in Water*, "Water for People"

Teacher Resources:

Classroom Activities

- *Finding Safe Water in Bolivia* – page 78
 - Time: Approximately 45 min. (or extended over a few weeks)
 - Materials:
 - ✓ Handout: Bolivia Fact Sheet (included)
 - ✓ Worksheet: Helping Your Village (included)
 - ✓ Worksheet: Learning About Bolivia (included)

Handouts

- *Bolivia Fact Sheet* – pages 79

Worksheets

- *Helping Your Village* – pages 80
- *Learning About Bolivia* – page 82

Supplemental Lesson Resources:

Power Point Presentation

- "A World of Water" part 1 – available at: www.mccrearywater.com/funzone/powerpoint7

Video

- "A World of Water 1" – available at: www.mccrearywater.com/funzone (approximately 4 minutes)

Websites

- www.waterforpeople.org – Site about the organization that works to bring safe drinking and sanitation to underdeveloped countries
- <http://uswaternews.com> – Articles and updates on water supply issues in the United States and the world
- <http://www.state.gov/r/pa/ei/bgn/35751.htm> - U.S. Department of State information on Bolivia
- www.travelvantage.com/bol_inf.html - Additional information on Bolivia
- www.boliviaweb.com – Maps and pictures of historic sites in Bolivia

McCreary County Water District

- MCWD has a video that details the work of Water for People. Call the water office at 606-376-2540 to get a copy on loan.



A World of Water

(Part 1)

Objectives:

Writing:

WR-04-1.2.3

In Transactive Writing,

- Students will communicate relevant information to clarify a specific purpose.
- Students will develop an angle with support (e.g., facts, examples, reasons, comparisons, diagrams, charts, other visuals).
- Students will develop explanations to support the writer's purpose.
- Students will apply research to support ideas with facts and opinions.
- Students will incorporate persuasive techniques when appropriate (e.g., bandwagon, emotional appeal, testimonial, expert opinion).

Social Studies:

SS-EP-3.1.1

Students will define basic economic terms related to scarcity (e.g., opportunity cost, wants and needs, limited productive resources-natural, human, capital) and explain that scarcity requires people to make economic choices and incur opportunity costs.

DOK 2

SS-04-4.1.1

Students will use geographic tools (e.g., maps, charts, graphs) to identify and describe natural resources and other physical characteristics (e.g., major landforms, major bodies of water, weather, climate, roads, bridges) in regions of Kentucky and the United States.

DOK 2

SS-05-4.1.3

Students will describe how different factors (e.g. rivers, mountains) influence where human activities were/are located in the United States.

SS-05-4.1.4

Students explain how factors in one location can impact other locations (e.g., natural disasters, building dams).

SS-04-4.2.1

Students will compare regions in Kentucky and the United States by their human characteristics (e.g., language, settlement patterns, beliefs) and physical characteristics (e.g., climate, landforms, bodies of water).

DOK 2

SS-04-4.4.1

Students will explain and give examples of how people adapted to/modified the physical environment (e.g., natural resources, physical geography, natural disasters) to meet their needs during the history of Kentucky and explain its impact on the environment today.

DOK 3



SS-04-4.4.2

Students will describe how the physical environment (e.g., mountains as barriers for protection, rivers as barriers of transportation) both promoted and restricted human activities during the early settlement of Kentucky.

DOK 2

Practical Living:

PL-05-1.1.7

Students will explain how strategies (e.g., diet exercise, rest, immunizations) and good hygiene practices (e.g., hand washing, brushing teeth, using tissues, not sharing personal items, adequate protection from ultraviolet rays) promote good health and prevent communicable (cold, flu/influenza, measles, strep throat) and non-communicable (heart disease, diabetes, obesity, cancer, asthma) diseases.

Science:

SC-04-2.3.1

Students will:

- classify earth materials by the ways that they are used;
- explain how their properties make them useful for different purposes.

Earth materials provide many of the resources humans use. The varied materials have different physical properties that can be used to describe, separate, sort and classify them. Inferences about the unique properties of the earth materials yield ideas about their usefulness. For example, some are useful as building materials (e.g., stone, clay, marble), some as sources of fuel (e.g., petroleum, natural gas), or some for growing the plants we use as food.

DOK 2

SC-04-3.4.1

Students will:

- compare the different structures and functions of plants and animals that contribute to the growth, survival and reproduction of the organisms;
- make inferences about the relationship between structure and function in organisms.

Each plant or animal has structures that serve different functions in growth, survival and reproduction. For example, humans have distinct body structures for walking, holding, seeing and talking. Evidence about the relationship between structure and function should be used to make inferences and draw conclusions.

DOK 3

SC-04-4.7.1

Students will make predictions and/or inferences based on patterns of evidence related to the survival and reproductive success of organisms in particular environments.

The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes some plants and animals survive and reproduce and others die or move to new locations. Examples of environmental changes resulting in either increase or decrease in numbers of a particular organism should be explored in order to discover patterns and resulting cause and effect relationships between organisms and their environments (e.g., structures and behaviors that make an organism suited to a particular environment). Connections and conclusions should be made based on the data.

DOK 3



Lesson Plan:

Most of us take water for granted – we turn on the faucet and it’s there. But in many parts of the world that’s not the case. Good safe drinking water is sacred.

In the developing world, over one billion people don’t have access to safe drinking water. And even more people don’t have adequate sanitation services.

As a result, 6,000 people, mostly children, die every day.

What’s the Problem?

In developing countries, a lot of people are poor and often don’t have a good education. In many cases, people don’t have the resources or the money to build water and sanitation services.

The problem is two-fold: poor sanitation practices and the lack of safe water. Often the people don’t understand how sewage can contaminate water. They also don’t practice proper hygiene. For example: hand washing.

Drinking contaminated water often leads to water-related diseases like typhoid and cholera. When there is safe water available, families must walk for miles to get it.

The consequences produce a ripple effect. People are either too sick or don’t have time to complete productive days of work. Hauling water takes hours out of the day, leaving little time for anything else. Children really suffer. School is interrupted when children spend much of their time hauling water or caring for their brothers and sisters while mom hauls the water.

Water for People

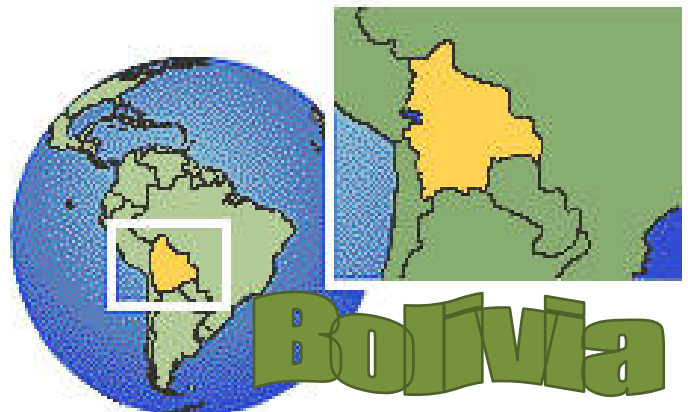
In 1991, the American Water Works Association founded *Water for People*, a nonprofit group that works to help the most impoverished people world-wide improve their quality of life by giving them good drinking water, sanitation and hygiene products.

Water for People adopts countries and provides financial and technical resources to the citizens. *Water for People* will help villagers dig wells, lay pipe, install sewer systems and then teach them proper hygiene. It’s important that the people help to create the water and sanitation systems so that they will take ownership of the facilities.

Bolivia

The Land and its People

Bolivia is one country where *Water for People* works. Bolivia, located halfway down the continent of South America, is a land of mountains, high plateaus and great natural wealth in the form of mineral deposits and natural gas. The resources are hard to get and even harder to get to world markets. Since Bolivia is landlocked, it doesn’t have a seacoast for shipping. The weather can be tropical in the valleys, but very cold high in the mountains.



Bolivia’s capital is La Paz. The country is about the same size as California and Texas combined.

Bolivia is one of the poorest and least developed countries in Latin America. More than half of the people are Indians. There are three primary languages: Spanish, Quechua and Aymara.

About half of the work force in Bolivia makes their living by farming. It's difficult since much of the farming area lies in extremely high, cold and dry regions of the country.

Community Needs

Bolivia's population is rapidly growing even though about 60 out of every 1,000 babies that are born in the cities die as infants. That rate is even higher in the rural areas (about 100 out of every 1,000). That's one of the highest infant mortality rates in South America. Lack of health services, unsafe drinking water and poor sanitation practices cause outbreaks of infectious diseases.



In the rural villages, women walk miles every day to the nearest water supply – and many times they carry back water that is unsafe to drink.

Water for People's Work

Water for People began working in Bolivia in 1992. The group helps 10 – 15 communities each year. The typical project cost between \$1,000 and \$8,000.



Bolivia Facts

Population:	8,989,046 (2009 Estimate)
Life Expectancy:	66 years
Per Capita Income (overall)	\$4,000 (only \$150 in rural areas)
Access to safe water:	68% (in rural areas)
Access to sanitation:	22% (in rural areas)

*Sources: U.S. State Department and Water for People

Cell phone use is rapidly on the rise in Bolivia. However there are still only about 2.4 million cell phones in the country. That means about 26% of the country has a cell phone. To compare, about 90% of Americans have a cell phone.

There are only about 640,000 telephone lines in the country (land lines).


There are about 900,000 TV's in Bolivia. That means that only 1 out of every 10 people has a TV.





Classroom Activity: Finding Safe Water in Bolivia

In this activity, students will learn about the country of Bolivia, the problems that exist for safe drinking water and the efforts to remedy the situation. This can be done in one class period (about 45 minutes) or extended over several weeks. You'll need copies of the *Handout: Bolivia Fact Sheet*, *Worksheet: Helping Your Village* and *Worksheet: Learning about Bolivia*. These items are all included on the following pages. You'll also need a globe or map of the world (or South America) for students to look at.

 **Teacher Note:** *Water for People* works with communities throughout Central and South America, Asia and Africa. While this activity centers on Bolivia, you can learn more about the other countries *Water for People* works with at: www.waterforpeople.org

Here's what to do...

1. Using a globe or map, have students locate South America. Then locate Bolivia.
2. Ask students to identify which countries surround Bolivia? (Peru, Brazil, Chile, Argentina & Paraguay)
3. Ask students what they notice about Bolivia. (Comments might include its shape, Spanish names of towns or the mountain ranges. Ask them about the country's borders. Students should notice that Bolivia is land-locked.)
4. Go over some of the facts about Bolivia (*Handout: Bolivia Fact Sheet*)
5. Give each student a copy of the *Worksheet: Helping Your Village*. Either alone or in small groups, have students study the problem and then brainstorm about how to fix it.
6. Have students share their ideas about how to fix the problem of widespread illness throughout the village.
7. Then describe the solution *Water for People* provided.
8. Use the accompanying *Worksheet: Learning about Bolivia* to have students write about what they learned.

This is designed for an in-class project. You could also do the above as a research project. Have students learn about the country, its people, the problems they face and possible solutions.

McCreary County Water District has an accompanying video on the work in developing countries. Contact the water office at 606-376-2540 or email us at mcwd@highland.net to get a copy on loan. We can also put you in contact with a *Water for People* coordinator. Students can benefit from hearing from someone who has visited the country.

If you're interested in extending this project, many schools across the U.S. have adopted a country and raised money for a water project. McCreary County Water District can also help you with this.

Handout: Bolivia Fact Sheet



There are **2.4** million cell phones.

Bolivia has extremely **cold and dry** regions

South America



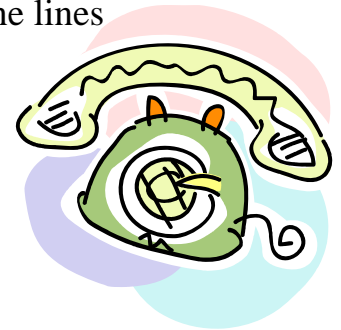
Bolivia is about the size of California and Texas combined

Bolivia's capital is



About **1** out of every **10** people has a TV set

There are **640,000** telephone lines



Half of the work force is **farmers**



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*Sources: U.S. State Department and Water for People

Bolivia is a land of **Mountains**





Worksheet: *Helping your Village*

The Village

Machaja Marca is a small village located in the Arque Municipality, outside of Cochabamba.

Fifty-two families live in the village. They are poor and don't have many opportunities to make money.

The people depend on farming for food and money. They grow potatoes and grains to sell and eat.

The Water Source

The women and children of the village use buckets to draw water from a natural spring. The pools are not protected – animals, wildlife and rodents also use this as their source of water.

The Problem

The local health clinic has found 60% of the children in the village suffer from diarrhea and scabies. A smaller percentage of the adults have the same illnesses.

Lab tests show the spring water is safe to drink, but health officials are pretty certain it's the water that's making people sick.

The Question

If the spring water is safe, how is the water getting contaminated? Think about some possible ways the water could be contaminated.

What could the villagers do to reduce the number of people getting sick?





Worksheet: Helping your Village (Answer Sheet)

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The Question

If the spring water is safe, how is the water getting contaminated? Think about some possible ways the water could be contaminated.

The health officials in Bolivia believe that most of the contamination happens by how the people collect the water, carry it and then store it at their homes.

What could the villagers do to reduce the number of people getting sick?

To make the drinking water safe, the village needs a good storage system and a way to distribute the water to its people - rather than women and children carrying it.



What's Happening?

Water for People is working with the villagers to construct a 2,000 liter water tank to store the water and a distribution network. The distribution system will carry the water to seven private tap-stands and two public tap-stands for the local school and orphanage.

Once the system is installed, Water for People will teach village people about good hygiene. It's not enough to install a water system – the people must understand the importance of good sanitation and hand washing.

The total cost of this project is \$4,834.



Worksheet: Learning about Bolivia

On what continent is Bolivia located? _____

Name three things you learned about the country of Bolivia.

1. _____
2. _____
3. _____

What is different about the villages of Bolivia and the community where you live? _____

Open Response Question

Many villages in Bolivia have no bathrooms so people must use a nearby field. Often there are no water services so people get drinking water by collecting rain in jars.

A. List two problems that might develop because of these conditions.

B. Explain how you might solve each problem.



Worksheet: Learning about Bolivia (Answer Sheet)

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Name three things you learned about the country of Bolivia.

1. _____
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What is different about the villages of Bolivia and the community where you live? _____

Open Response Question

Many villages in Bolivia have no bathrooms so people must use a nearby field. Often there are no water services so people get drinking water by collecting rain in jars.

- A. List two problems that might develop because of these conditions.**
- B. Explain how you might solve each problem.**

Scoring Guide

- ✓ **4** – Student correctly lists two problems. (Disease from not washing hands after using the bathroom or from children playing in the field, contaminated water if the rain jar is dirty, lack of water to drink if there’s no rain, children and families don’t go to school or work because they get sick). Student shows an in-depth understanding of the solution (You not only install sanitation and water service; you let the people help so they have ownership of the system. You also teach them proper hygiene, like hand washing.).
- ✓ **3** – Student correctly identifies one problem that might develop and offers a solution.
- ✓ **2** – Student correctly identifies one problem but doesn’t understand how to fix it.
- ✓ **1** – Student attempts to identify problems and solutions, but offers incorrect answers.
- ✓ **0** – Student makes no attempt to answer questions or provides irrelevant answers.