Healthy Water
Healthy Habits
Healthy People

Educators Guide on Water, Health, Sanitation and Disease Prevention

Project WET™

UN HABITAT
FOR A BETTER URBAN FUTURE

Educators Guide Development Process

Using a process developed by Project WET, the award-winning non-profit has conducted more than 25 Writing Workshops globally and produced numerous publications customized to the needs of local areas. This process, combined with 25 years of experience in developing hands-on, interactive activities, is what makes Project WET resources effective tools for educators and students throughout the world.

In developing this Educators Guide, Project WET convened educators, experts and government officials to conduct Writing and Materials Development Workshops in five countries in Latin America and the Caribbean. These workshops helped to transform the original version of Healthy Water, Healthy Habits, Healthy People into this customized Educators Guide for use in specific regions of Latin America and the Caribbean.

Award-Winning Publication

The original *Healthy Water, Healthy Habits, Healthy People Educators Guide*, created for sub-Saharan Africa, was named a Distinguished Achievement Award winner by the Association of Educational Publishers (AEP) at AEP's 2009 Summit. *Healthy Water, Healthy Habits, Healthy People Educators Guide* is the 17th Project WET publication to earn AEP recognition. One of the largest and longest-running awards programs for educational products, AEP's Awards aim to give credit and recognition to the organizations that are leading the way in the field of educational products and set benchmarks to which the rest of the industry can aspire.

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Healthy Water, Healthy Habits, Healthy People

An Educators' Guide on Water, Health, Sanitation and Disease Prevention

Table of Contents

Why Human Values-based Education?

Values are the standards, principles and qualities by which humans make decisions or are influenced in their choice of actions. Values are considered desirable qualities such as honesty, integrity, tolerance, diligence, responsibility, compassion, altruism, justice and respect. Values-based Education therefore places emphasis on these qualities that human beings deem desirable and help people make informed decisions given choices and circumstances. Human Values-based Water, Sanitation and Hygiene Education allows individuals to gain awareness of their living environment and become better equipped to solve present and future water, sanitation and hygiene-related problems.

Human Values-based Water, Sanitation and Hygiene Education has various dimensions—environmental, social and economic. Being an innovative approach, Human Values-based Education not only seeks to impart information on water, sanitation and hygiene, but also inspires and motivates learners to change their behavior with a view of promoting wise and sustainable use of water. It has its impacts on conservation of water and saving it from pollution. Furthermore, access to clean water has a direct impact on the health of people, particularly children, due to water-borne diseases. Finally, water, sanitation and hygiene are central to socio-economic development and to poverty alleviation.

Through the approach of Human Values-based Water, Sanitation and Hygiene Education we can promote a better understanding and practice of these concepts as a key social, economic and environmental resource, as well as facilitating the emergence of a new water management ethic. Experience has shown that Human Values-based Education can be used as a strategic entry point for supporting positive attitudinal changes amongst students, teachers and all those involved in the educational process. The implementation of Human Values-based Water, Sanitation and Hygiene Education will help achieve an all-around development of nations. Thus, education has a direct relationship with sustainable development.

In many countries, the broader concept of education for sustainable development is making headway. It aims to shape values, promote responsible behavior and make children aware of their role in preserving the environment. Introducing water education into schools is a complex, long-term endeavor; curricula are all too often plagued by an academic and exam-oriented focus. Thus, the task of mainstreaming water education calls for revising curricula and textbooks, producing teachers' guides and providing adapted in-service training, particularly to promote an active pedagogy based on problem-solving.

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WHY PROJECT WET?

Learning to Succeed in the 21st Century

Global water problems continue to escalate and affect the quality of life for billions of people. The struggle to acquire and maintain clean water supplies saps the energy of communities; children, too ill to attend school because of the effects of waterborne diseases, lose too many precious childhood days. Empowering students through an understanding of the relationship between their health and water resources, teachers can be catalysts in their communities. Project WET materials and training workshops help educators, students and their families understand sustainable water resources management.

Project WET is currently active in over 50 countries on five continents. Its materials have been translated into several languages including Japanese, Hungarian, Spanish, French, Arabic and Kiswahili. Students, teachers and community members of diverse cultures, often with different learning styles, use Project WET. From photographs taken around the world, children and adults participating in Project WET activities and events all have one thing in common—a smile.

So, we have to ask ourselves, why does it work? Project WET materials motivate children and adults to learn. Educational theorists maintain that for people to learn, they must find pleasure and joy in learning. What are the qualities of Project WET materials that appeal to children's natural curiosity and support lifelong learning?

- **Interactive**: Learners participating in Project WET activities are not passive observers. Engaging students through questioning and other inquiry-based strategies, educators become facilitators involving students in hands-on lessons and encouraging them to take responsibility for their own learning. For example, students design investigations to seek answers to real-world problems; play games to explore scientific concepts; reflect; debate; and share learnings by creating songs, stories and dramas.
- **Multi-sensory**: Activities engage as many of the learner's senses as possible. Research has shown that stimulation of multiple senses enhances learning.
- **Adaptable**: While adaptable for any environment, many Project WET activities are ideal for outdoor settings and encourage children to be physically active.
- **Contemporary (21st Century Skills)**: Project WET activities help students develop skills necessary for success in the 21st century. In most activities students work in small, collaborative groups; many activities engage students in higher level thinking skills requiring them to analyze, interpret, apply learned information (including problem-solving, decision-making and planning), evaluate and present. Project WET is aggressively incorporating technology education into its activities and offering cross-cultural materials to prepare learners for participation in a global economy, in which an understanding of water resources will be critical.
- **Relevant:** Information is not delivered in isolation; educators are encouraged to localize activities to give them relevance.
- **Solution-oriented (ActionEducation):** Project WET believes in linking awareness and education to action and solutions. In this context, Project WET and local education and water partners seek to incorporate educational materials and training with on the ground action and solutions.
- **Measurable**: Project WET activities provide simple assessment tools to measure student learning.

And what do learners participating in Project WET activities say? Pausing to catch their breath in a game of tag that demonstrates the relationship between healthy habits and healthy drinking water, students will tell you they like Project WET activities simply because they're fun!

How to Use This Guide

All activities are self-contained. Although the activities in this Guide represent a unit, it is not necessary to teach them in order. Each lesson in the Educators Guide corresponds to a two-page activity in the student booklet of the same title.

Grade Level:
Suggests appropriate learning levels.

Subject Areas:
Project WET activities are designed to satisfy the goals of your educational program by complementing existing curricula. This section suggests subject areas in which you could teach this activity.

Duration:
The approximate time needed to complete each part of the activity.

Skills:
There are eight skill levels in ascending order: gathering, organizing, analyzing and interpreting information; applying, evaluating and presenting learned information. Listed skills are applied in the activity.

Vocabulary:
Words defined in the activity that you may need to highlight for students.

Values:
Values promoted in the activity.

Summary
A brief description of the activity concepts and students skills.

Objectives:
The qualities or skills students should possess after participating in the activity.

Materials:
Supplies needed to conduct the activity.

Making Connections:
Describes the relevance of the activity to students.

Background:
Information needed to understand activity concepts.

Procedure
Warm Up
Prepares everyone for the activity and gives the educator an idea of students' current knowledge about the topic.

The Activity
Provides step-by-step directions for conducting the activity. Some activities are organized into "parts." All, or some, of the parts may be used, depending upon instructional objectives.

Wrap Up
Brings closure to the lesson and includes questions and activities to assess student learning.

Assessment
Presents diverse assessment strategies that relate to the objectives of the activity, noting the part of the activity during which each assessment occurs.

Extensions
Provides additional activities for continued investigation into concepts addressed in the activity. Extensions can be used for further assessment.

Resources
References from the internet that enhance the 'Background' section.

* A note about age and skill level for this Guide: The activities in this Guide will benefit learners of all ages and skill levels.

Healthy Habits .... Healthy People

What you do on the outside (wash hands, cover a cough, purify water) can keep you healthy on the inside.

Grade Level:
Primary,
Lower Secondary

Subject Areas:
Science, Art (drama), Health, Physical Education

Duration:
Preparation Time:
5 minutes
Activity:
Warm Up: 15 minutes
Part I: 30 minutes
Part II: 45 minutes
Wrap Up: 15 minutes

Skills:
Gathering information (observing, listening); Interpreting (relating, summarizing, identifying cause and effect); Applying (planning, designing, composing, proposing solutions); Presenting (demonstrating, performing)

Vocabulary:
cholera, dengue fever, dysentery, epidemic, fecal-oral, germs, hepatitis, immune system, microorganism, symptom, transmission, typhoid fever

Values:
shared responsibility, cooperation, happiness

Summary

Students learn to identify and prevent common water, sanitation and hygiene-related diseases by acting out symptoms, methods of spreading disease and healthy habits to prevent disease transmission.

Objectives

Students will:

- link water, sanitation and hygiene-related diseases to their causes and symptoms.
- describe how some common water, sanitation and hygiene-related diseases are transmitted.
- identify how to prevent disease transmission and infection.

Materials

Part I

- *Chalkboard, whiteboard or flipcharts*
- *Area for 'Healthy Habits' tag game*

Part II

- *Copy or copies of* ***Disease Information – Resource Page*** *(pp. 10 and 51)*

Making Connections

Understanding diseases, their causes, their transmission and their symptoms empowers students to develop healthy habits to help prevent disease transmission and infection.

Background

Germs are infectious agents that can make you sick. You can find them anywhere in the world. Types of infectious agents include: bacteria (tiny single-celled organisms), fungi, viruses and parasites (protozoa and worms). Some of these can be harmful to humans while others are beneficial. For example, some bacteria help our body's immune system fight disease-causing germs.

When disease-causing germs invade your body and your immune system can't fight them, they multiply and gain strength. Germs take nutrients and energy from your body and can produce toxins (chemicals that damage cells). Your body reacts to the toxins, creating symptoms (evidence or signs) of illness.

Different diseases can cause different symptoms. However, different diseases can also share the same symptoms. The best way to diagnose and treat any illness is to consult a doctor or nurse. When you are sick, a doctor or nurse may ask you about your personal habits and the symptoms you are experiencing. In addition, they may conduct laboratory tests to diagnose the illness. This helps them diagnose diseases through a process of elimination.

In order to prevent getting infected by a disease, we must first understand how it is

spread. Common ways diseases are spread include:

- droplet contact – inhaling or other contact with droplets coughed or sneezed by an infected person.
- direct physical contact – touching an infected person or infected bodily fluids.
- indirect contact – touching a contaminated surface.
- airborne transmission – breathing in contaminated dust particles or airborne germs that can remain alive in air for long periods of time.
- fecal-oral transmission – consuming contaminated food or water, and from indirect contact that spreads germs from feces.
- vector transmission – transmission of a disease from an animal, such as from mosquitoes.

Practicing the following healthy habits helps to prevent the spread of diseases:

- wash your hands frequently with soap and clean water, especially before or after certain activities (e.g., before preparing food and after using the bathroom).
- cover your mouth with your elbow when you cough or sneeze.
- purify all your household drinking water.
- remove stagnant water from around your house.

Procedure

Warm Up

- Ask students to name diseases they are familiar with and list them on the board.
- Next ask students what causes diseases (diseases are caused by germs). Emphasize that there are both harmful and beneficial germs. Discuss the fact that one disease-causing germ will probably not make you ill, but once these germs multiply in your body, you can experience symptoms of the disease.
- To get students thinking about how germs are spread, act out each action in the list below and have students guess how the germs are spread.
  - sneezing (droplet contact) – inhaling or other contact with droplets coughed or sneezed by an infected person.
  - shake a student's hand (direct contact)

How to Prevent the Spread of Disease

Wash hands with soap and water

Purify all drinking water

Cover your mouth and nose with your elbow when you sneeze

Remove all stagnant water from around your house

– touching an infected person or infected bodily fluids.
- touch the doorknob or a desk (indirect contact) – touching a contaminated surface.
- breath in air then feign sickness (airborne) – breathing in contaminated dust particles or airborne germs that can remain alive in air for long periods of time.
- eat food and drink water (fecal-oral transmission) – consuming contaminated food or water, and from indirect contact that spreads germs from feces.
- pretend to get bit by a mosquito – transmission of a disease from an animal, such as from mosquitoes.

- After each action, write the method on the board and explain to students the process behind the transmission of germs.

The Activity

Part I

1. **Establish a defined area where your students can play a game of "Healthy Habits" tag to simulate how a disease is transmitted through a community and how using healthy habits can prevent transmission.**
2. **Ask for three volunteers to be "it." Bring these students to the front of the room or game area. Explain that these students will be germs of a disease ready to infect other people.**
3. **Ask for three more volunteers. Bring all of these volunteers to the front of the room or game area, next to the students who have been identified as the "disease-causing germs."**
4. **Explain to the class that the three new volunteers represent healthy habits which prevent becoming infected by a disease.** Each of the three students will be given a different role. Each role represents a healthy habit supporting the body's immune system. Each of these students must be tagged three times before becoming "ill."
5. **Assign roles to the volunteers and answer any questions from the students.** Use the healthy habits listed below to assign roles to the volunteers or create your own healthy habits for this activity.
   - **Role 1:** You washed your hands with soap and water after using the bathroom.
   - **Role 2:** Your family properly stored all the water in clean, covered containers.
   - **Role 3:** Your family purified all the water that they consume in the house.
6. **Explain to the group that if you are tagged by a student who is "it" (a disease-causing germ) before receiving a healthy habit, you must leave the playing area and sit on the sidelines.** Designate an area as "the hospital" and tell students that when they are tagged out they must go to the hospital.
7. **Explain to the class that if a student touches a healthy habit volunteer before getting tagged by a "disease-causing germ," then he or she has immunity for one touch.** If a student has touched all three "healthy habits" then he or she has immunity from the "disease-causing germs" for three tags (the same as the immunity level of the healthy habits themselves). A student can only have immunity for three touches—one for each healthy habit.

   Note: This game may be played with different color stickers. "The disease" caries red stickers and infects students by placing red stickers on them. The "healthy habits" carry yellow, blue and green stickers and give students immunity with their healthy habits stickers. This allows students and diseases to keep track of the number of tags and immunities.
8. **Time the game so that it lasts an appropriate amount of time (approximately five minutes).** After time expires, gather the group.

9. **Ask students to raise their hands if they did not become sick after the first time they were tagged.** Repeat the question asking students to raise their hands if they did not become sick after the second and third times they were tagged. Ask students who went to the hospital how it felt to sit down while their classmates continued to play. (They will likely respond it was not fun. Remind them that being ill is not fun either!)
10. **Have students identify healthy habits that help support the body's immune system.** Write these healthy habits on the board. The habits should include the roles of the volunteers as mentioned in step 5, as well as receiving vaccinations, washing fruits and vegetables before eating them, washing hands before handling food, washing hands after touching animals and keeping garbage in a bin until it is disposed of by either burying it, burning it or the garbage truck takes it to a landfill.
11. **If there is enough time, repeat the game asking for three new volunteers to come up with their own healthy habits.** Students may choose healthy habits from the list on the board.

Part II

1. **Divide the class into groups of four to eight students. Assign each group a disease from the *Disease Information—Resource Page*.** More than one group can represent the same disease.
2. **Write the definition of fecal-oral transmission on the board and explain what it means to the students.** Give copies of the *Disease Information—Resource Page* to students or provide students with all of the information about the diseases caused by fecal-oral transmission by providing students with the *Disease Cards—Resource Page* located at the back of the Guide, copying the information onto the board or flip charts or by having one student per group copy the information out of this book.
3. **Instruct the class that each group will prepare a short performance (possibly a skit, a song or a poem) to teach classmates about the illness described on the card.** Encourage groups to be creative and accurately share as much of the information on the cards as possible. Suggest that students:
   - make their disease-causing germ into a character. Give it a personality and have it interact with the group as they role-play.
   - exaggerate the symptoms.
   - be dramatic about how the disease is spread and how people can avoid the disease.
4. **Each performance should be no more than three minutes. Circulate among the groups to check progress, note missing elements, and offer ideas.** Give students 10 minutes to prepare.
5. **Have groups present their short performances.**
6. **After each performance is completed, have a brief discussion about the disease that was presented.** Ask students to recall the most important details of each presentation, such as the name of the disease, its symptoms, methods of transmission and methods of prevention.

Wrap Up

- As a class, discuss how diseases are transmitted and how they can be avoided. Are there similarities or differences in the methods of transmission and prevention between the diseases?
- Can students identify relationships between disease transmission and prevention?
- List as many healthy habits as the students can offer and discuss why the habits are beneficial.

ActionEducation™
Teach your community about healthy habits by inviting people to create a song about healthy habits. The favorite song can be recorded and played on your local radio station or performed at a community event.

Assessment

- identify healthy habits to prevent disease (***Part I***, step 5 and steps 10-11).
- identify the symptoms of diseases (***Part II***).
- identify transmission paths of diseases **(*Part II*)**.

Extensions

Assign a student in the class to monitor the care of hygiene and water for the class. Duties would include ensuring soap is present in the class, water is available at school to wash hands and that students take the soap with them to the bathroom.

Ask a doctor, nurse, health educator or health volunteer from a nearby clinic to speak to students about preventing, diagnosing and treating common diseases. You may choose to take students to the nearby health clinic to speak with the doctor or nurse there.

Research and create role-plays about other common diseases. Make up songs with actions to demonstrate the best disease-prevention methods.

Resources

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Washing dishes with clean, safe water can prevent the spread of disease.

Disease Information—Resource Page

How are fecal-oral diseases transmitted?

- Germs from infected feces and urine come in contact with food or drinking water. You then eat or drink the contaminated food. This is called fecal-oral (feces to mouth) transmission.
- Fecal-oral transmission can be direct contact (there are feces in water and you drink the water) or indirect contact (contaminated hands touch food which you then eat).

Typhoid Fever

Disease-causing germ: The bacteria, *Salmonella typhi*

How do you get it?
Fecal-oral (feces to mouth) transmission

Symptoms may include:
- High fever for many days
- Heavy sweating
- Mild to severe diarrhea

How do you prevent it?
- Wash hands with soap and water after using the bathroom and before preparing food.
- Purify drinking water, especially after flooding when sewage systems can overflow and mix with drinking water.
- Get a typhoid vaccination to boost your immune system's ability to identify and kill the bacteria that causes typhoid fever.

Dysentery

Disease-causing germ: The bacteria, *Shingella*

How do you get it?
Fecal-oral (feces to mouth) transmission.

Symptoms may include:
- Blood and mucus in feces
- Abdominal pain
- Painful pooping

How do you prevent it?
- Wash hands with soap and water after using the bathroom and before preparing food.
- Purify drinking water.
- Wash uncooked fruits and vegetables with safe water before eating them.

Hepatitis A

Disease-causing germ: The *Hepatitis* virus

How do you get it?
Fecal-oral (feces to mouth) transmission.

Symptoms may include:
- Fever and body aches
- Nausea
- Abdominal pain

How do you prevent it?
- Wash hands with soap and water after using the bathroom and before preparing food.
- Purify drinking water.
- Wash uncooked fruits and vegetables with safe water before eating them.

Cholera

Disease-causing germ: The bacteria, *Vibrio cholerae*

How do you get it?
- Fecal-oral (feces to mouth) transmission.
- Personal contact (touching other infected people).

Symptoms may include:
- Very watery diarrhea
- Vomiting
- Dehydration

How do you prevent it?
- Wash hands with soap and water after using the bathroom and before preparing food.
- Purify drinking water, especially after flooding when sewage systems can overflow and mix with drinking water.
- Pay attention to cholera warnings and make sure to boil water from areas where cholera contamination is known or suspected.

Dengue Fever

Disease-causing germ: A *Dengue* virus

How do you get it?
Viruses enter a human body through mosquito bites by infected female *Aedes* mosquito.

Symptoms may include:
- High fever
- Headache
- Severe eye pain
- Muscle and joint pain
- Rash

How do you prevent it?
- Sleep under an insecticide soaked mosquito net at night.
- Remove stagnant standing water especially from old tires and open containers or jars.
- Wear long sleeves and pants or skirts.
- Use insect repellent.

Do "Knot" Pass It Along

How can healthy habits make for healthy interactions?

Grade Level:
Primary,
Lower Secondary

Subject Areas:
Science, Health

Duration:
Preparation Time:
2 minutes
Activity:
Warm Up: 15 minutes
Activity: 30 minutes
Wrap Up: 10 minutes

Skills:
Gathering information (observing, listening); Analyzing (identifying components and relationships among components, identifying patterns); Applying (planning, designing, problem solving, developing and implementing investigations and action plans)

Vocabulary:
exposure, germs, indirect contact, transmission

Values:
respect for others, integrity, concern for others

Summary

Students learn how illness-causing germs can spread through contact with people, surfaces and objects, and how the use of healthy habits can stop their transmission.

Objectives

Students will:

- develop awareness about the frequency with which they come in contact with people and objects.
- describe how germs may be spread through touch.
- demonstrate how, through both indirect and direct contact, one person can expose many others to germs.
- identify ways to prevent spreading germs.

Materials

Warm Up

- *A ball*

Activity

- *Glitter*
- *A small amount of water (optional)*

Making Connections

Each person touches many things and people throughout a day. Every time we do, whatever is on our hands may be left on these things or people. We are not able to see the germs we left behind on, or that we pick up from, the surfaces we touch. Understanding that germs may be spread through simple contact with other people, surfaces and objects can encourage healthy habits, such as frequent hand washing.

Background

Germs, and associated diseases, can be spread by indirect contact. Indirect contact transmission refers to situations where a person is infected from contact with a contaminated surface. Some germs, including many that cause sanitation and hygiene-related diseases, can survive on everyday objects for a long time.

Frequently touched surfaces are among the most likely places for spreading germs through indirect contact. These include:

- handles of doors and handrails.
- surfaces on any form of public transportation (taxis, buses, etc.).
- furniture including chairs, tables, desks and beds.
- kitchen items such as dishes, cups, forks, spoons, knives or trays.
- public telephones.
- money.
- electronics such as computer equipment and mobile telephones.
- shared school supplies such as pens and pencils.
- playgrounds.

- shared clothing and/or bedding.

Some diseases that can spread through indirect contact also can be transmitted by direct contact. Touching an infected person or touching infected bodily fluids can spread diseases directly from one person to another.

Emphasize that students should not be afraid to touch what others have touched, nor come in contact with other people. Students can use simple methods to stay healthy and prevent spreading illness from germs. These include:

- frequently washing hands with soap and water.
- covering the mouth and nose with an arm instead of a hand when sneezing, coughing or yawning.
- cleaning surfaces that people frequently touch.
- not sharing eating utensils, food or drinks.
- keeping hands away from the mouth, nose and eyes.
- avoiding close contact with sick people.

Procedure

Warm Up

- Ask students to make a circle.
- Tell them you are going to toss a ball, and as each student catches it, he or she must name one object or surface touched today. These surfaces and objects will likely be similar to the list in the **Background** section.
- Ask one student to record responses on the board. The list will likely contain duplicate items, such as benches, books, papers and pencils.
- After everyone has caught the ball ask students to estimate how many objects and people they touch in a day.
- Ask students if it is possible that some of them touched the same benches, books, papers and pencils. How many people do they think have touched common items, such as the bathroom or classroom door?

The Activity

1. **Divide the class into groups of 10-15 students.** There should be no more than 15 students per group. Pull aside three to five students from each group and put a small amount of glitter on one of their hands. Explain that the glitter represents germs from a cough, sneeze or yawn and that the germs are a secret. Instruct them not to tell the other students about the "germs" on their hands.
2. **Instruct the groups of students to stand in a tight circle within their groups.** Tell all students to look up at the ceiling and put their hands straight out in front of them.
3. **Have students cross their arms right over left and grab the hands of another student who is NOT next to them.** Students should grab the hands of two different people. They will likely have to walk into the circle and stand shoulder-to-shoulder in order to reach the hands of another student. Once everyone has grabbed another student's hand, the students should represent a giant human knot in their circles.
4. **Explain that the students must unwind themselves into a circle WITHOUT LETTING GO OF EACHOTHER'S HANDS.** Once the groups have unwound themselves into a circle, instruct students to look at their hands.
5. **How many students have glitter on their hands?** Have all students with glitter on their hands stand on one side of the room and students without glitter stand on the opposite side.
6. **Discuss the fact that the glitter represents germs.** Ask students how many "sneezed" or "coughed" before the activity (had glitter on their hands initially)? How many students now have glitter on their hands? What if illness-causing germs were in the sneezed fluids? How many students now have been exposed to potential illness (how many had glitter on their hands after the knot)?
7. **Explain to the class that sneezing is the**

body's way of relieving an irritation or tickle in the nose. A sneeze is not necessarily a sign of illness, but when a person has a cold or respiratory infection, the effects (swollen and irritated tissues) that the germs create can be the source of irritation that causes you to sneeze.

In this activity, if the sneeze were real and carried germs, those with glitter on their hands would be exposed to the sneezer's illness. Being exposed to germs does not necessarily mean a person will become ill. A person's immune system can keep the body healthy by preventing many types of illness-causing germs from invading and multiplying in the body.

8. **Ask students how else germs can spread from one person to another.** Reflect on the list of items that the students made during the **Warm Up**. How do germs get from their hands to their mouth? Discuss the difference between direct contact (e.g., shaking hands with the sneezer) and indirect contact (e.g., handling a pencil the sneezer touched after sneezing).
9. **Have students with glitter on their hands shake hands with students that do not have glitter on them.** Did the glitter transmit to the "germ-free" students? Have students look at their clothes and body to see if "germs" (glitter) transmitted to their body without their knowledge. What should students do to prevent the spread of germs? (Wash their hands; sneeze, cough and yawn into their elbow or handkerchief and not into their hands).

Wrap Up

- Return to the list of surfaces and objects the class created in the **Warm Up.**
- Do students think these items are likely locations for spreading germs through indirect contact? Why or why not?
- Ask students to suggest ways to prevent spreading germs.

ActionEducation™

- Lead this activity in your community to educate family members and friends about healthy habits.
- Have students put glitter on their hands at a community event and then shake hands with community members. Students can then teach their community about how to avoid spreading germs (wash your hands).

Assessment

Have students:

- describe how germs can be spread through physical contact (steps 5-9).
- differentiate between direct and indirect contact (step 9).
- identify five locations or objects where germs are likely to be found (***Warm Up***).
- identify ways to prevent spreading germs through contact (step 7 and ***Wrap Up***).

Extensions

Have students in your class put glitter on their hands and shake hands with other students during break times. They can then teach other students about how easily germs are spread.

Resources

Mount Sinai Hospital Department of Microbiology. FAQ: Methods of Disease Transmission. Department of Microbiology. Answers to frequently asked questions about disease transmission including descriptions of different types of transmission. http://microbiology.mtsinai.on.ca/faq/transmission.shtml. [English]. Accessed (December 8, 2010).

Mayo Clinic. Germs: Understand and protect against bacteria, viruses and infection. MayoClinic.com. A definition and description of germs including descriptions on bacteria, viruses and fungi. http://www.mayoclinic.com/health/germs/ID00002. [English]. Accessed (December 8, 2010).

Where's the Soap?

What is the simplest way to help stop the spread of disease?

Grade Level:
Primary,
Lower Secondary

Subject Areas:
Science, Art (music)

Duration:
Preparation Time:
10 minutes
Activity:
Warm Up: 15 minutes
Part I: 45 minutes
Part II: 45 minutes
Part III: 45 minutes
Wrap Up: 15 minutes

Skills:
Gathering information(reading, listening, observing); Analyzing (comparing, discussing); Interpreting (defining problems); Applying (experimenting, proposing solutions); Evaluating (assessing); Presenting (demonstrating, describing)

Vocabulary:
germs, molecules

Values:
appropriate conduct, respect for others, shared responsibility

Summary

Students learn a song to help them correctly practice the healthy habit of hand washing with soap and water.

Objectives

Students will:

- identify the benefits of using soap for hand washing.
- learn a song that can serve as a timer for healthy hand washing.
- recognize and perform proper hand washing techniques.
- identify when it is important to wash hands.
- develop and reinforce the healthy habit of frequent hand washing.

Materials

Part I

- ***Soap Story Cards—Resource Page*** *copied onto cards or paper (pp. 20 and 53)*

Part II

- ***Hand Washing—Resource Page*** *(make copies for students if possible) (pg. 21)*
- *Lyrics of the* ***Hand Washing Song*** *written on board (also available in Project WET companion Student Activity Booklet)*

Part III

- *Three soaps or items representing soap*
- *Clean water and soap*

Making Connections

Many students recognize that washing their hands is important. However, some may not know when, how or why to do it. Hands-on practice and a catchy song can help students further develop the healthy habit of frequent hand washing.

Background

Hand washing is the simplest, most effective way of preventing germs from spreading. Proper hand washing helps remove germs that cause disease, and can stop many diseases from spreading through indirect and direct contact.

Washing hands with soap and water for at least 20 seconds removes many germs. Washing with only water provides little benefit.

Soap consists of long molecules that help to remove oil, dirt and germs. One end of the molecule is attracted to water. The other is repelled by water molecules, but attracted to grease and dirt. Soap removes grease and dirt from the hands. Friction from the motion of rubbing hands together pulls more dirt and grease free from the skin. Rinsing washes away the suspended dirt and grease, along with the germs.

If soap is not available, using a different rubbing agent, such as ash, and rinsing thoroughly

may clean as well as soap. Ash works well because it is sterile and coarse; vigorous rubbing creates friction which helps scrub germs away. Many regions have local plants that acts as disinfectants and can be used in place of soap. Some plants known to the Americas that can be used as soap are *Agave americana L.*, whose roots were mashed in water to produce one of the first shampoos; the mashed bark of *Quillaja saponaria*; *Schiekia orinocensis*, whose stem has been used as a soap substitute; and *Phytolacca rivinoides*, also known as "jaboncillo," which has been used in washing clothes. Be sure to identify plants properly and test them before bringing them into a classroom.

Wash and rinse hands with clean water. If running water is not available, a barrel with a tap that can be turned on and off, a pitcher and basin, or bottle of water are alternatives that can provide sufficient water flow to rinse thoroughly. Drying hands on dirty towels, clothing, or other objects can quickly re-contaminate freshly washed hands. Shaking hands dry is a better way to avoid picking up new germs.

Procedure

Warm Up

This **Warm Up** will get students thinking about when we should wash our hands.

- Divide the classroom into three sections. Designate the sections as "before," "after" and "both before and after".
- Have students stand outside the sections.
- Explain that you will read a list of scenarios and students should decide if they should wash their hands before, after or both before and after the scenario.
- Students should move to the area they think is the correct answer for each scenario. For example, when you read "preparing food," students will decide to move into one of the three areas. Students in the "before" area are correct. Explain that washing your hands before preparing food will prevent the spread of germs.
- Repeat this process for all the scenarios listed below.
  - Preparing food that does not contain raw meat *(before)*
  - Helping a child on the toilet, or changing a baby *(after)*
  - Taking medication or giving it to someone *(before)*
  - Taking care of a wound *(both)*
  - Caring for someone ill *(both)*
  - Going to bed *(before)*
  - Using the toilet *(after)*
  - Taking care of animals *(both)*
  - Wiping your nose *(after)*
  - Eating *(before)*
  - Handling raw meat *(both)*

How can our school maintain soap at all times?

1. Have parents contribute to a Healthy Hands Fund and buy soap.
2. Have a bake sale and sell pupusas or empanadas to raise money for soap.
3. Keep soap in your classroom where students can access it when they use the bathroom and return it after they are done.
4. Cut the soap with water to make it last longer—it is just as effective at washing hands.
5. Maintain a bottle of soapy water by the school sinks at all times so students can wash their hands even if they don't go to the classroom to get the soap during recess hours.

The Activity

Part I

Before class either photocopy the *Soap Story Cards—Resource Page* or copy the information onto cards or paper for students. You will only need one copy, cut into the four roles. One copy is provided at the back of this Guide.

1. **Ask students when and why they think it is important to make sure their hands are clean.** Remind them that diseases can be transmitted in many ways. Ask them to suggest different ways hands can transmit diseases. These may include direct contact with people, dirty surfaces (such as toilets), feces and animals; sneezing, coughing or yawning into a hand; putting dirty hands in your mouth and eating or preparing food with dirty hands. List student ideas on the board.
2. **Ask students why hand washing with soap and clean water is one of the most effective ways to prevent spreading disease.** Do they know why soap is necessary and why washing with just clean water is not an effective method to wash hands?
3. **Designate a wall in the classroom as a hand.** Tell students they will act out "The Soap Story," a skit about the importance of using both soap and water when washing hands using the "hand" as the setting.
4. **Have the class perform a demonstration using the Soap Story Cards and "the hand" (the designated wall).** Divide the class into four groups and assign each group the following roles:
   - **Group 1:** Dirt
   - **Group 2:** Water
   - **Group 3:** Soap
   - **Group 4:** Rinse water
5. **Hand each group a Soap Story Card and allow all group members to review it.** Designate one student from each group to read the group's "role" to the class.
6. **Ask each group to come to the front of the room in the following order: dirt, water, soap, rinse water.** For example, first the dirt group gets in "position," the "role" is read, and the group performs the "action." Then ask the water group to the front, have them get into "position", read the "role" and perform their "action" by interacting with the dirt group. Repeat this process with the soap group and rinse water group until the full soap story has been acted out.
7. **After all groups have performed their actions, repeat the process moving more quickly the second time through.**
8. **Ask students to review why washing with soap and water is effective.** Be sure that they understand that soap removes dirt and germs more effectively than water alone.

A girl washes her hands at school.

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9. **Ask students where they think the rinse water goes when they are finished with it.** (They will likely answer down the drain or in the street.) Try to get students to think about where the water ends up. Does it go into a river or lake and/or back into their drinking water?
10. **Ask students how they get water to wash their hands. If they use buckets or wash basin at home to wash their hands, review the proper methods of using water to wash their hands:** 1) use a cup to scoop water 2) pour the water over their hands away from the bucket or wash basin in order to maintain clean water in the water source 3) lather with soap and 4) rinse their hands with the cup away from the bucket or wash basin.

Part II

1. **Tell students that in addition to washing with soap and water, the length of time spent washing their hands is critical.**
2. **Teach students the *Hand Washing Song*, sung to the tune of *La Cucaracha*.** This simple song lasts about 20 seconds, so it can be sung during hand washing to remind students to wash each part of their hands and make sure they wash long enough. Sing the song once through to teach the students the words. Students can find the lyrics to the song in the Project WET *Healthy Water, Healthy Habits, Healthy People* Student Activity Booklet.
3. **Demonstrate the gestures from the *Hand Washing Diagram* on the *Hand Washing—Resource Page*, explaining each step of the hand washing process.** Students can also see these methods in the Project WET Student Activity Book.
4. **Sing the *Hand Washing Song* several times with the students using the hand gestures from the Hand Washing Diagram to practice proper hand washing techniques.** This is the amount of time they should spend washing their hands.
5. **If you have musical instruments available students can sing the *Hand Washing Song* while someone plays the tune of *La Cucaracha* on an instrument.** Students may also wish to make up their own song or a dance to accompany the gestures.

Part III

1. **Hide three soaps around the classroom and/or playground.** If soap is un available then hide other objects such as "pretend soap" made out of paper and markers or plastic bottles.
2. **Have students search for the soap.** Once students find all three bars of soap, have students congregate around the hand washing area.
3. **Ask students what objects and surfaces they touched during their search for soap. Do they think these surfaces are clean or dirty? Could the surfaces have germs on them?** Ask students what is the best method to clean their hands? (Wash their hands with soap and water!)
4. **Take students to the school hand washing facilities. Instruct students to wash their**

Hand Washing Song

Sing to the tune of La Cucaracha

Lava tus manos
Moja tus manos
Siempre usa el jabón

Frota tus manos
Por adelante
Por atrás, y los dedos

Y los pulgares
Bajo las uñas
Enjuágate las manos

Lava tus manos
20 segundos
Usa agua y jabón

hands with soap and water while singing the *Hand Washing Song*. You may need to divide the class into groups so that only six students wash their hands at one time, and then rotate through the next six students until all students get a chance to wash their hands with soap and water while singing the *Hand Washing Song*. Students may sing and dance during all of the rotations if they choose.

Wrap Up

Discuss hand washing with the class. Use the following questions as guidelines:

- What are some obstacles we may have to overcome to wash our hands often? (There is no soap available or no water).
- How do we eliminate these obstacles? (Store water in clean containers when water is available to be sure to have enough water when it is temporarily unavailable; have several families pitch in for soap and share the soap—you can mix soap with water in water bottles to make it last longer).
- What are some diseases students see at homes and in their communities because people don't wash their hands, body or living area? (Stomach sickness such as dysentery, etc.)
- What are the benefits of hand washing with soap and clean water? (prevents disease transmission)
- How can we teach others in our community about these benefits? (Share what you learned with your parents and siblings; hold a hand washing demonstration in the community or at school and invite the families to attend; teach your community the soap story skit and the *Hand Washing Song*).

ActionEducation™

- Students can sing the *Hand Washing Song* at their community radio station or at community events to share with the community how to use proper hand washing techniques.
- Students can create Tippy Taps to place around the community in locations where hand washing stations are needed.

Assessment

Have students:

- identify important times for hand washing (***Warm Up***).
- explain why using soap is important (***Part I***).
- practice proper hand washing techniques (***Part II; Part II***, step 4).
- sing the *Hand Washing Song*. (***Part II; Part III***, step 4).

Extensions

Have students create a hand washing educational campaign for the school or community. Use creative approaches like songs, posters, and poems to teach others about proper hand washing.

Older students can teach younger students the *Hand Washing Song*.

Construct a Tippy Tap using the instructions on the *How to Construct A Tippy Tap—Resource Page*. The Tippy Tap should be used in a location where hand washing facilities are needed but unavailable.

Objectives

Students will:

- discuss where hand washing stations are important to have in their community.
- learn how to construct a Tippy Tap to wash hands at using locally available materials.

Warm Up

- Ask students to talk about whether or not there are any hand washing stations at school or in their communities.
- Have the students come up with ideas about where they think it would be important to have a hand washing station. Ask them why they chose these locations.

Activity

1. **Use the *How to Construct A Tippy Tap—Resource Page* to build a simple hand washing station with the class.** You may also construct one ahead of time and use it for demonstration. Using the student's suggestions choose a proper location to hang your Tippy Tap.
2. **After the hand washing station is complete, have the students line up and practice proper hand washing.** Encourage the class to sing the *Hand Washing Song* or count 20 seconds while each student washes their hands.

Wrap Up

- Have the students come up with suggestions on how they could improve the design of the Tippy Tap. They can also suggest other materials that could be used if they do not have access to the materials listed on the resource page.
- Encourage students to have an adult to help them build a hand washing station at home or in their community.

Resources

American Cleaning Institute. Clean Hands are All About Clean Health. Clean Living. A resource for teachers and students on the importance of hand washing including how, when and why to wash your hands. http://www.cleaninginstitute.org. [English]. Accessed (December 8, 2010).

The Global Public Private Partnership for Handwashing. Why handwashing with soap? Handwashing With Soap. Descriptions on why to use soap and water in hand washing including benefits of soap and healthy impacts. http://stage.globalhandwashing.org. [English].Accessed (December 8, 2010).

Banco Mundial; Water and Sanitation Program. Manual de lavado de manos: Guía para desarrollar un programa de promoción de la higiene destinado a extender la práctica del lavado de manos con jabón. The Global Public Private Partnership for Handwashing. www.globalhandwashing.org. Article found at http://www.globalhandwashing.org/resources/multimedia-pdf/4.%20The_Handwashing_Handbook_Spanish.pdf. [Spanish]. Accessed (December 8, 2010).

The World Bank; Water & Sanitation Program. The Handwashing Handbook: A guide for developing a hygiene promotion program to increase handwashing with soap. The Global Public Private Partnership for Handwashing. www.globalhandwashing.org. Article found at http://www.globalhandwashing.org/resources/multimedia-pdf/2.%20The_Handwashing_Handbook_English.pdf. [English]. Accessed (December 8, 2010).

Organización Panamericana de la Salud. Proyectos y programas. Desarrollo sostenible y salud ambiental. Lavado de manos en las escuelas. A compilation of materials about hand washing and hygiene including resources on WASH for distinct countries in the region. http://new.paho.org/hq/. [Spanish]. Accessed (December 8, 2010).

The Mayo Clinic. Hand Washing: Dos and Don'ts. MayoClinic.com. A description of when and how to wash your hands. http://www.mayoclinic.com. [English]. Accessed (December 8, 2010).

Duke, James A., Mary Jo Bogenschutz-Godwin and Andrea R. Ottesen. 2009. *Duke's Handbook of Medicinal Plants of Latin America*. Boca Raton, FL: CRC Press Taylor & Francis Group.

Schultes, Richard E. and Robert F. Raffauf. 1990. *The Healing Forest: Medicinal and Toxic Plants of the Northwest Amazonia*. Portland, OR: Dioscorides Press.

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Children's toilets with a hand washing station at a school on the Alitplano.

Soap Story Cards—Resource Page

Group 1: Germs

Position

Line up along the wall at the front of the classroom.

Action

Pretend you're clinging to the wall.

(As the other groups move in, go wherever one of their members moves you.)

WALL

Role

We are dirt and germs, clinging to your hands. We like it here!

Group 2: Water

Position

Make a line in front of the students in the Dirt Group. Stand parallel to their line, about a meter away.

Action

Two Water Group students each select one of the students from the Dirt Group to join the Water Group.

(As the other groups move in, listen to them and act out what their part of the story tells you to do.)

WALL

Role

We are the water you used to wet your hands. We remove only some of the dirt and germs clinging to your hands.

Group 3: Soap

Position

Line up in front of the students in the Water Group. Stand parallel to their line, about a meter away.

Action

Wiggle between the students in the water group. Take one of the water group members by the hand. Then use your other hand to take one of the Dirt Group members by the hand. Pull the Dirt Group members away from the wall.

(When the Rinse Water Group moves in, allow yourself to be carried along with them.)

WALL

Role

We are soap. Each of us is a long molecule. One end is attracted to the water. The other is attracted to dirt and germs. We pull the dirt and germs from your hands.

Group 4: Rinse Water

Position

Grouped together at one side of the classroom.

Action

In a group, hurry across the front of the classroom from one side to the other, taking all the other groups with you.

WALL

Role

We are the rinse water. We rush over your hands, washing away dirty water, soap, dirt, and germs in a big flood!

Hand Washing—Resource Page

How to wash your hands

1. **Get ready**
   Have soap and clean water ready. Store soap where it can drain, so it does not sit in a pool of water, which can waste soap and encourage germ growth.

   Roll up sleeves to the elbow.

   Wet hands and wrists. Keep your hands lower than your elbows as you wash, so water flows to your fingertips rather than up your arms.

2. **Wash!**
   Apply soap to your hands and lather thoroughly.

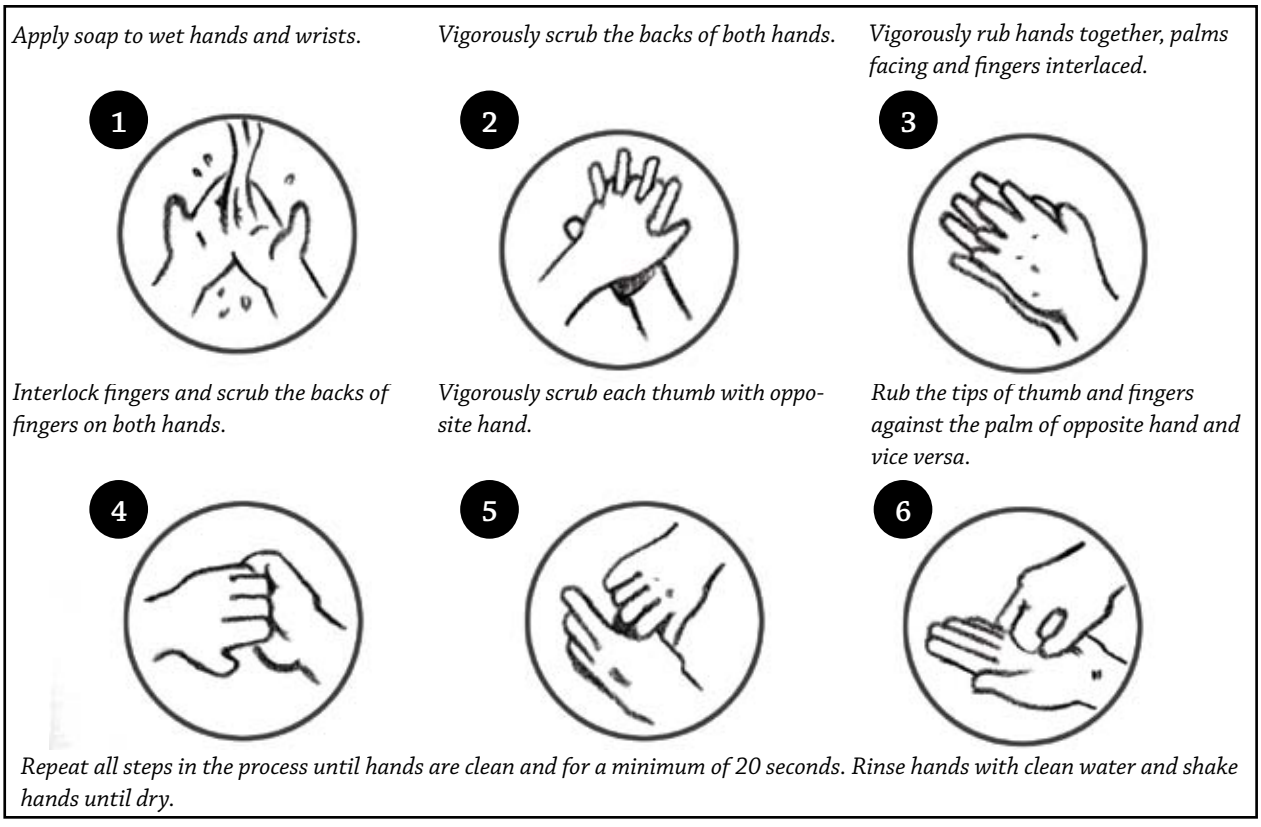
   Use firm, circular motions to wash hands and arms up to the wrists, covering all areas, including palms, back of the hands, fingers, between and sides of fingers, knuckles, and wrists. Wash hands for at least 20 seconds.

   Repeat the process if your hands are very soiled. Clean under your fingernails.

3. **Rinse**
   Rinse your hands using running water, if possible. If not available, use a bucket with a tap that can be turned on and off, a pitcher and basin or bucket, or a Tippy Tap.

   Do not dip your hands into a basin of water to rinse them. Your hands contain dirt and germs that could contaminate the water for future use.

4. **Dry**
   Shake your hands dry to avoid picking up new germs from your clothing or towels.



Hand Washing Diagram

How to Construct a Tippy Tap—Resource Page

This activity should be supervised by an adult.

Materials

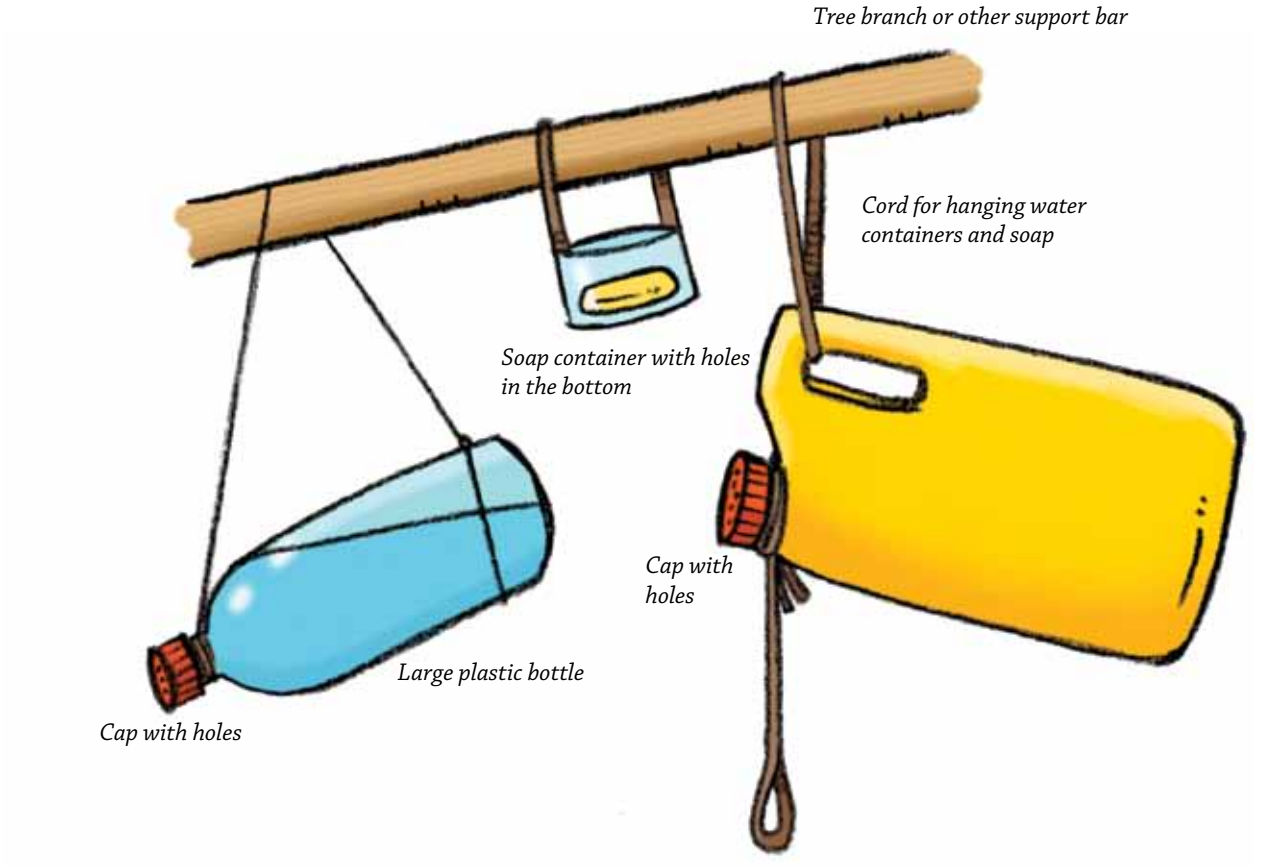
- *One empty bottle*
- *One large bottle with cap or a plastic container with a handle and a cap (one to four liters)*
- *Three pieces of cord, the length of an adult's arm*
- *Knife*
- *Hammer and nail*

Soap Container and Soap Hanger

1. Using the knife, cut off the bottom of an empty bottle.
2. Place two small holes in opposite sides of the cut bottom.
3. Place small holes in the bottom of the container, for water drainage.
4. Tie a piece of cord into the holes making a hanging container for the soap. Set aside.

Tippy Tap

1. Using boiled water, clean the inside of one large water container. Fill the container with clean water.
2. Use a hammer and nail to put holes in the cap of the large water container. Place the cap back on the container.
3. Use one piece of cord for hanging the container. Tie one end of the cord around the base of the container and tie the other end to the handle or front of the container. Hang the Tippy Tap on a branch or location near a latrine.
4. Use a second piece of cord as a pull cord to tip the Tippy Tap. Tie one end of the cord around the nozzle. Tie a loop large enough to be a handle in the other end.
5. Tie the cord with the soap container at a location where the Tippy Tap is hanging.



Breaking the Chains of Transmission

What healthy habits can break the chains of disease transmission?

Grade Level:
Primary,
Lower Secondary

Subject Areas:
Science, Health,
Language Arts

Duration:
Preparation Time:
5 minutes
Activity:
Warm Up: 15 minutes
Part I: 30 minutes
Part II: 45 minutes
Part III: 45 minutes
Wrap Up: 15 minutes

Skills:
Gathering information (reading, listening); Analyzing (identifying components and relationships among components); Interpreting (relating, making models, identifying cause and effect); Presenting (demonstrating, describing, writing)

Vocabulary:
Chagas disease, cholera, dengue fever, dysentery, feces, fecal-oral transmission, hepatitis A, typhoid, vector transmission transmission

Values:
consideration for others, shared responsibility

Summary

Students use problem-solving and writing skills to discover how to break the chains of disease transmission. habits to prevent disease transmission.

Objectives

Students will:

- describe transmission pathways of common water and sanitation-related illnesses (***Part I*** and ***Part II***).
- describe the transmission pathways of common vector-transmitted diseases such as dengue and Chagas (***Part III***).
- identify personal and community actions that can prevent or contribute to the spread of disease.

Materials

Warm Up

- *Chalkboard*

Part I and Part III

- *Markers, crayons or colored pens or pencils*
- *Disease diagrams, copied onto the board*

Part II and Part III

- *Copies of* ***Disease Information—Resource Page 1*** *and* ***Disease Information—Resource Page 2*** *(pp. 31-32; 51)*

Making Connections

Understanding the different transmission pathways of diseases helps students to learn how healthy habits can decrease the possibility of spreading disease.

Background

Diarrheal diseases are among the most common in Latin America. Although these diseases use many pathways to spread, many can be controlled by using healthy habits. Simple individual actions like proper hand washing, water treatment and basic sanitation can make entire communities healthier.

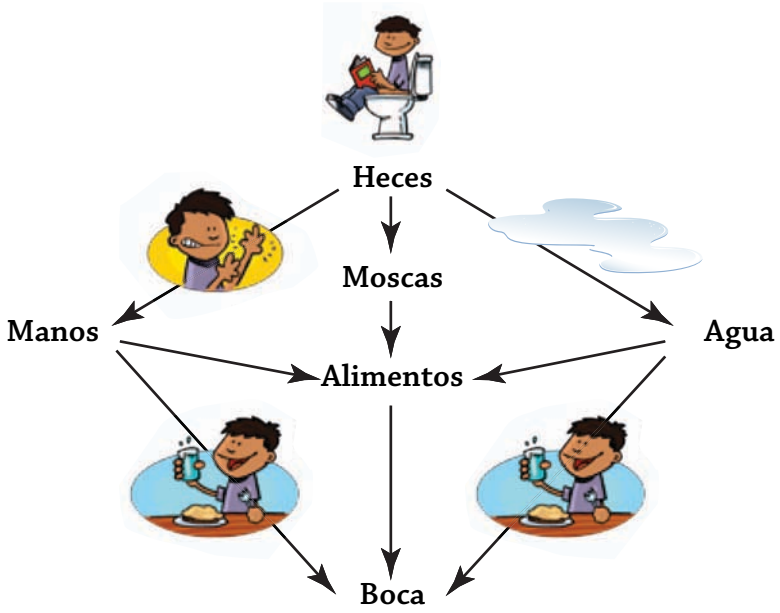
A primary cause of most diarrheal diseases is fecal-oral (feces to mouth) transmission. Fecal-oral transmission occurs when germs enter the body from human or animal feces that have contaminated food, water or hands. These germs, also called microorganisms, multiply in the digestive system and are shed from the body in human and animal feces.

Proper sanitation and hygiene, along with healthy habits, can keep both animal and human feces out of water supplies. Many steps can be taken to prevent diseases from spreading through fecal-oral transmission while also conserving existing water resources. These include the following healthy habits:

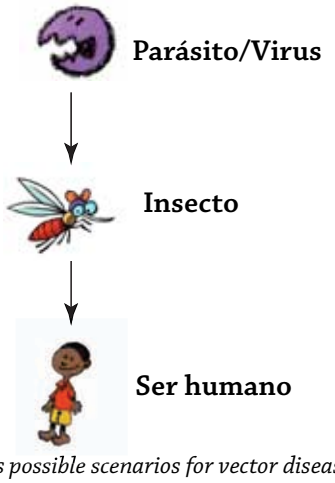
- Frequently wash your hands with soap and clean water, turning off all faucets after each use. (Hand washing is one of the most effective ways to stop the spread of disease.)
- Construct your sewage system to direct sewage away from water sources in order to avoid contamination by human waste.
- Maintain sewage systems properly. (Don't throw garbage, paper or diapers down toilets; be sure latrines are clean with all lids and doors shut.)
- Purify drinking water. (This can kill many germs from fecal and other types of contamination.)
- Get vaccinated. (This can boost natural immune defenses against many diseases, including some fecal-oral diseases, such as typhoid fever.)
- Keep trash in bins and away from water sources so that it does not contaminate water. This is especially important with dirty diapers.
- Wash fruits and vegetables to clean the food of any germs or bacteria from previous handlers.

In addition to fecal-oral diseases, vector transmitted diseases have become a major health concern in many countries in Latin America. Vector transmission occurs from contact with infected insects or other animals that transmit certain diseases. Common examples of vector transmitted diseases are dengue fever, Chagas disease (also known as American trypanosomiasis) and malaria.

Disease Diagrams



This diagram illustrates possible scenarios for fecal-oral disease transmission.



This diagram illustrates possible scenarios for vector disease transmission.

Both malaria and dengue fever are transmitted through mosquitoes. Dengue fever is transmitted to humans from an infected female *Aedes* mosquito. *Aedes* mosquitoes act as vectors, acquiring the virus from an infected person and then transferring it to uninfected people. Malaria is a parasite that is transmitted through the female *Anopheles* mosquito which also transmits the disease from infected people to uninfected people. The *Anopheles* mosquito only feeds at night and thus transmission only occurs in the evening and night times.

Chagas disease, also known as American trypanosomiasis, is another common vector transmitted disease in Latin America. The disease is caused by the *Trypanosoma cruzi* parasite transmitted in the feces of the triatomine bug. Transmission occurs when a triatomine bug bites a person and defecates close to the bite.

The person then instinctively scratches the bite, spreading the parasite into the broken skin. *T. cruzi* can also be spread through food contaminated with triatomine bug feces. Triatomine bugs hide in the cracks of poorly constructed houses and come out at night.

There are methods to prevent vector transmission from mosquitoes and triatomine bugs such as:

- removing stagnant water from around your home (this prevents female mosquitoes from laying their eggs around your home).
- properly disposing of garbage and solid waste in closed containers to prevent female mosquitoes from laying their eggs.
- wearing long protective clothing to prevent insect bites.
- using insect repellents or natural insecticides to prevent the presence of infected insects around you and your home.
- sleeping with a mosquito net at night to prevent parasite transmission from both malaria carrying mosquitoes and triatomine bugs during the night.
- maintaining a clean house including ensuring all food is covered and put away at night.

Procedure

Warm Up

- To explain how germs and disease can spread, copy the two disease diagrams onto the board.
- Discuss with students each transmission pathway on the disease diagram. Ask students how each transmission path occurs, beginning with the fecal-oral diagram.
  - How do feces pass onto flies? (Flies land on open feces.)
  - How do flies transmit feces to food? (Flies with contaminated feces land on food.)
  - How does contaminated food get into humans? (Humans eat contaminated food, potentially getting sick.)
  - How do feces get into water? (Latrines and sewage systems that are not properly maintained can leak human waste into the water system. This is especially a problem during floods when sewage systems often overflow.)
  - How does feces-contaminated water get into a person's body? (People drink the contaminated water. If a person washes food or utensils with contaminated water and then eats the food and uses the utensils, the germs from the contaminated water are transferred to the person from the food or utensils.)
  - How do feces get onto a person's hands? (Germs in a latrine or bathroom can transmit onto a person's hands.)
  - How do the germs from feces on a person's hands get into a person's body? (A person with germs from feces on his or her hands prepares food, which is then eaten. A person may also directly touch his or her mouth transferring the germs directly.)
- Now look at the vector transmission diagram. Ask students if they know what vector transmission is (from contact with infected insects or other animals).
- Can they think of any diseases that are transmitted from animals? (e.g., rabies, malaria, dengue, Chagas, plague.)

The Activity

Part I

Fecal-Oral Disease Transmission

1. **Have students copy the fecal-oral disease diagram on the board into a notebook or onto a piece of paper three times.**
2. **Divide students into groups of two to three students.** Give each group of students three colors of crayons, pens or markers.
3. **Tell students you are going to read three short stories and as you read the stories students should look at the disease diagram and determine the pathway of fecal-oral transmission (the pathway of germs from**

feces to humans). Tell them to trace the pathway of transmission on one of the diagrams in their notebooks, using one diagram per story. Ask them to think about where and how they can "break the chains" of disease transmission in each story

4. **Read all of the stories on the *Stories—Resource Page 1: Fecal-Oral Diseases* once, pausing in between stories to allow students time to think about disease transmission and draw the pathways with their colors.**
5. **Tell them that you will read the stories again and after you read each story, each group should write down a healthy habit that would prevent the transmission of germs in the story.**
6. **Read the stories again.** After each story call on one group to explain the transmission route using the diagram on the board and tell the class the healthy habit they recommend for preventing the transmission of disease-causing germs. Have the group draw an "X" on, or erase, the line(s) in the diagram that the healthy habit breaks. Ask the class if there are groups with different answers (such as different transmission pathways or other healthy habits to prevent the spread of germs.) Discuss any different answers.
7. **Keep a list on the board of all the healthy habits students recommend for breaking the chains of disease transmission.** Review the healthy habits after all the stories are read. Healthy habits can break the transmission chains and stop the spread of germs and disease. Treating water before drinking, frequent hand washing with soap, washing food from the market and keeping trash contained in garbage bins are some of the most effective ways to break the transmission chains. Be sure all of these healthy habits are on the list.

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To prevent disease, wash your hands before eating and after using the toilet.

Part II

*Note: If time allows, you may want to continue to **Part III** and go over the vector transmission diagram with your class before having students write the stories about diseases in **Part II**.*

1. **Explain to students that there are several serious diseases spread through fecal-oral transmission.** Direct students to look at the diseases on the *Disease Cards—Resource Page 1* (either provide students with the *Disease Cards—Resource Page* located in the back of the Guide, make copies of the page for students, allow students to look at the page in your book or copy the information on the board or flip charts).
2. **Divide students into groups of two to three**

students per group. Instruct students to write their own short stories about preventing the spread of disease within their groups. Tell them to use the disease diagram and one of the diseases from the *Disease Cards—Resource Page 1* as guides in writing their stories. Be sure they include healthy habits from the list on the board. The stories should be approximately 5-10 sentences long.

3. **Either read the stories aloud or have each group read their story.** Students may want to act out their story as they read it. Discuss how the healthy habits in each story prevent the spread of disease.

Part III

Vector Disease Transmission

1. **Tell students you are going to discuss diseases transmitted through insects.** Ask students what diseases in your region are transmitted through insects (for example, dengue, Chagas and malaria)? List these diseases on the board.
2. **Have students copy the diagram of vector transmission into their notebooks or onto a piece of paper.** Tell students you will read them two stories about vector transmission and they should decide how they can break the chains of disease transmission in the story, as they did in ***Part I***.
3. **Read the stories of vector disease transmission located on *Stories—Resource Page 2: Vector Diseases*.** After each story, instruct the students to mark where they would break the chains of transmission with and "X" on their diagram and to write a healthy habit that breaks this chain.
4. **Ask students where they broke the chains in the diagram and what healthy habits they used to break these chains.** They will likely all reply that they broke the transmission chain of insect to human. This is because although we can't always control the infection of the insect with the disease, we can prevent it from biting us.
5. **Keep a list on the board of all the healthy habits students recommend for breaking the chains of disease transmission.** Healthy habits can break the transmission chains and stop the infection of dangerous diseases such as dengue and Chagas. Removing stagnant water from around the house, wearing protecting clothing or repellent, making sure all trash is in covered receptacles, food is covered at night and sleeping under insect nets are all habits that break the chains of insect-related vector diseases. Be sure all of these healthy habits are on the list.
6. **Have students create their own stories about vector diseases in your region.** Tell them to use the disease diagram and one of the diseases from the *Disease Cards—Resource Page 2* as guides in writing their stories. Be sure they include healthy habits from the list on the board. The stories should be approximately 5-10 sentences long. You may want to make copies of the *Disease Cards—Resource Page 2* or hand out the *Disease Cards* from the back of this Guide for students to look at.
7. **If there is time, read the students' stories aloud.** Students may want to act out their story as they read it. Discuss how the healthy habits in each story prevent the spread of disease.

Wrap Up

- Discuss habits that can help the class stay healthy. Reflect back on both disease diagrams.
- Can students think of healthy habits besides those listed on the board to break the chains in the diagrams?
- Emphasize that students can do a lot to stay healthy and help their schoolmates, families and communities break disease transmission chains.

Assessment

Have students:

- diagram how disease-causing germs can spread from feces to people (***Warm Up***; ***Part I***, steps 4-6).

- identify actions that spread germs and disease and how they relate to a specific part of the disease transmission paths (***Part I***, steps 4-6).
- identify healthy habits that can stop the spread of germs and disease (***Part I***, steps 5-8; ***Part II***, steps 2-3; ***Wrap Up***).
- diagram how certain diseases are transmitted from insects to people (***Part III***, steps 1-5).
- identify healthy habits that can prevent the transmission of disease from insects to people ***(Part III***, step 6-8).

Extensions

Have students write their commitment to avoiding diseases on cards. Keep these cards and read them in a few weeks to remind students of their commitment to keeping the community healthy.

Create a "Break the Chains" campaign to promote sanitation and hygiene. Have students make posters and display them around their school and community.

Visit your community health center to discuss disease transmission in your area with the doctors and nurses there. How do they recommend breaking the chains of disease transmission?

Have students dramatize their stories and perform it for others, emphasizing healthy habits.

Resources

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Stories—Resource Page 1

Fecal-Oral Diseases

Story 1

José and Maria are siblings and walk home from school together every day. As they arrive home, José notices a pile of trash on the corner near their house. The trash has been torn open by dogs and there are flies all around it. They can see old diapers in the trash. Maria says it smells terrible. Maria and José go inside to say hi to their mother before going back outside to play. During all the excitement a fly enters the house and remains there while their mother cooks. Unfortunately, nobody noticed the fly until it landed on the freshly cooked fish. A few days later both Maria and José have to stay at home and miss school because they are sick with diarrhea and vomiting.

Disease transmission: FECES to FLIES to FOOD to MOUTH

Healthy Habits: Keep trash in bins until collection; cover food with clean cloths or plates so that flies do not land on it; be sure all feces are contained in sewage systems (down flushed toilets or in latrines with lids and doors properly shut).

Story 2

Sofia and her brother attend primary school. On Monday Sofia's mom does all the food shopping and prepares dinner for the family. While at the market Sofia's mom uses a shop toilet. There is no place to wash her hands so she decides to wait until she gets back home. She buys the food and goes home. She washes her hands but not the food from the market. Sofia's father returns from work and help her mom with the cooking but he forgets to wash his hands. When the children come home, their parents serve them a delicious meal of chicken and rice and fresh salsa with tomatoes from the market. Several days later everyone is home with stomach sickness.

Disease transmission: FECES to HANDS to FOOD to MOUTH

Healthy Habits: Wash hands immediately after using the latrine or bathroom; wash all fruits and vegetables.

Story 3

Jorge walks along the river every day on his way to and from school. He recently noticed that someone had starting dumping trash along the river. One day at school it rained heavily for three hours. As he walked home that afternoon Jorge noticed much of the trash had slid into the riverand that water in the street was flowing heavily into the river. The water from the street smelled like sewage and he figured (correctly) that somebody's sewage system overflowed during the rains. Jorge continued home to his family's house along the river. When he arrived home he drank water straight from the faucet before going outside to play with his friends. Less than two weeks later Jorge and his neighbors started experiencing severe diarrhea and fevers.

Disease transmission: FECES to WATER to MOUTH

Healthy Habits: Keep trash in bins until collection; treat all water before using it to drink; clean food or utensils; maintain clean sewage systems by not throwing trash and diapers into toilets.

Stories—Resource Page 2

Vector Diseases

Story 1

Mateo's Aunt Cecilia came to visit his family for a month over the holidays. Aunt Cecilia lives in the mountains and does not visit Mateo's family in the lowlands often because of the long commute. The recent months had been very rainy and the areas surround Mateo's house and neighborhood were full of puddles. The old tires in people's yards had collected lots of water inside of them as well. The combination of lots of heavy rain and warm temperatures provides the perfect condition for mosquitoes to breed and hatch. Although Mateo wore protective clothing, his Aunt Cecilia said it was too hot and only wore minimal clothing at home. After returning to her home in the mountains, Aunt Cecilia called to say she had come down with dengue fever and was recovering in the hospital from a severe fever.

Disease transmission: INSECT to PERSON

Healthy Habits: Wear protective long clothing; sleep under a mosquito net at night; drain stagnant water from around the house (especially from old tires or buckets); use insect repellent.

Story 2

Carmen and her family live on the outskirts of the city in an old home. Both Carmen's mother and father work away from the home and don't have much time to clean. Sometimes they are so tired at night that they all forget to put the food away after dinner. Both Carmen and her brother, David, are sometimes bitten by insects during the night. One time, one of Carmen's bites became swollen and she soon came down with a fever, headache and difficulty breathing. Carmen's mom took her to the doctor who diagnosed her with Chagas disease—most likely from the bite of a triatomine bug. Triatomine bugs come out at night and bite people. Chagas disease is in the feces of the bugs. When a bug defecates next to a bite a person may wipe the feces into the bite. The doctor also explained that she could also contract the disease from food containing triatomine bug feces (due to being left out over night).

Disease transmission: INSECT to PERSON

Healthy Habits: Keep a clean house; put away all food at night or cover food to prevent triatomine bugs from crawling on it; sleep in long pants and shirts or sleep with a net to prevent bugs from biting you.

Disease Cards—Resource Page 1

Fecal-Oral Diseases

Typhoid Fever

Disease-causing germ: The bacteria, *Salmonella typhi*

How do you get it?
Fecal-oral (feces to mouth) transmission.

Symptoms may include:
- High fever for many days
- Heavy sweating
- Mild to severe diarrhea

How do you prevent it?
- Wash hands with soap and water after using the bathroom and before preparing food.
- Purify drinking water, especially after flooding when sewage systems can overflow and mix with drinking water.
- Get a typhoid vaccination to boost your immune system's ability to identify and kill the bacteria that causes typhoid fever.

Dysentery

Disease-causing germ: The bacteria, *Shingella*

How do you get it?
Fecal-oral (feces to mouth) transmission.

Symptoms may include:
- Blood and mucus in feces
- Abdominal pain
- Painful pooping

How do you prevent it?
- Wash hands with soap and water after using the bathroom and before preparing food.
- Purify drinking water.
- Wash uncooked fruits and vegetables with safe water before eating them.

Hepatitis A

Disease-causing germ: The *Hepatitis* virus

How do you get it?
Fecal-oral (feces to mouth) transmission.

Symptoms may include:
- Fever and body aches
- Nausea
- Abdominal pain

How do you prevent it?
- Wash hands with soap and water after using the bathroom and before preparing food.
- Purify drinking water.
- Wash uncooked fruits and vegetables with safe water before eating them.

Cholera

Disease-causing germ: The bacteria, *Vibrio cholerae*

How do you get it?
- Fecal-oral (feces to mouth) transmission.
- Personal contact (touching other infected people).

Symptoms may include:
- Very watery diarrhea
- Vomiting
- Dehydration

How do you prevent it?
- Wash hands with soap and water after using the bathroom and before preparing food.
- Purify drinking water, especially after flooding when sewage systems can overflow and mix with drinking water.
- Pay attention to cholera warnings and make sure to boil water from areas where cholera contamination is known or suspected.

Disease Cards—Resource Page 2

Vector Diseases

Chagas Disease

Disease-causing germ: The parasite *Trypanosoma cruzi*

How do you get it?
From feces of a triatomine bug. At night the bug bites a human and poops next to the bite. Bugs also poop on food left out over night. Feces enter the body by touching bites, eyes or eating infected food.

Symptoms may include:
- Fever
- Headache
- Difficulty breathing
- Muscle pain
- Purplish swelling in the lid of one eye

How do you avoid it?
- Protection against bites from triatomine bugs—wearing long clothing to bed.
- Sleep under an insect net.
- Put away all food at night.
- Use insect repellent.

Dengue Fever

Disease-causing germ: A *Dengue* virus

How do you get it?
Viruses enter a human body through mosquito bites by infected female *Aedes* mosquito.

Symptoms may include:
- High fever
- Headache
- Severe eye pain
- Muscle and joint pain
- Rash

How do you avoid it?
- Sleep under an insecticide soaked mosquito net at night.
- Remove stagnant standing water especially from old tires and open containers or jars.
- Wear long sleeves and pants or skirts.
- Use insect repellent.
- Wash uncooked fruits and vegetables with safe water before eating them.

Malaria

Disease-causing germ: The parasite *Plasmodium*

How do you get it?
An infected female *Anopheles* mosquito bites a human at night, transmitting the parasite.

Symptoms may include:
- High fever that disappears and comes back over several days
- Headache
- Difficulty breathing
- Body aches
- Chills, shivering

How do you avoid it?
- Sleep under an insecticide soaked mosquito net at night.
- Remove stagnant standing water around homes, especially from old tires and open containers or jars.
- Wear long sleeves and pants or skirts in the evenings and night times.
- Clear thick vegetation from around your house.

Protecting the Source

The quality of your water starts with the cleanliness of the source!

Grade Level:
Primary,
Lower Secondary

Subject Areas:
Science, Health, Art (drawing and drama)

Duration:
Preparation Time:
10 minutes
Activity:
Warm Up: 25 minutes
Part I: 45 minutes
Part II: 45 minutes
Wrap Up: 10 minutes

Skills:
Gathering information (observing, researching, recording); Organizing (arranging, drawing, mapping); Analyzing (identifying components and relationships,identifying patterns, comp-aring); Interpreting (drawing conclusions); Applying (developing and implementing action plans);Presenting (drawing, describing, public speaking)

Vocabulary:
borehole, ground water, rain water catchment, spring, surface water, water source

Values:
resepect for natural resources, appropriate conduct, shared responsibility

Summary

Students map water sources in their community, identify signs of healthy water sources and learn how to protect them.

Objectives

Students will:

- locate community water sources.
- recognize healthy water sources.
- consider where disposed water ends up.
- connect their water source with their personal drinking water.
- identify ways to protect and conserve community water sources.

Materials

Warm Up

- *Lyrics to* Canción al agüita *written on the board or on a poster*

Part I

- *Large sheets of paper*
- *Colored pencils, markers or crayons*
- ***Healthy Water Checklist*** *(write this information on the board for students to reference)*

Part II

- ***Healthy Water Checklist —Resource Page*** *(taken from the back of the guide, written on the board or copied on separate pieces of paper to put at stations) (pp.38 and 55)*

Making Connections

Water, both for drinking and household activities, is part of every person's daily life. This activity helps students to understand the source of their school, household and community drinking water and has students consider how and why to protect these sources.

Background

Water used in homes comes from one of three sources. These are:

- surface water (lakes, rivers, streams, reservoirs)
- ground water (boreholes, wells, springs)
- water-catchment or rain-water harvesting systems (roof-top collection systems)

Whether water is collected by hand or piped into a home from a municipal supply, these sources can provide safe drinking water if they are properly developed, maintained, used and protected. Surface water is most easily contaminated. Ground water usually is much cleaner, but can be contaminated by people or natural causes.

Ground water can be tapped by a borehole or well, or it may flow naturally to the surface as a spring. Rain water captured from metal or tile roofs

is relatively pure, especially if water from the first rain is used to flush the system before filling storage tanks. Many cities in the world treat their municipal water to make it safe for people to drink. Unfortunately in many places in Latin America, municipal water remains unsafe to drink. Is there a water treatment plant in your city? Is your water safe to drink?

The *Healthy Water Checklist* on page 36 describes how to determine if a water source is healthy, though it does not guarantee water is safe to drink without additional purification.

Procedure

Warm Up

- Write the lyrics to *Canción al agüita* on the board.
- Have students form a circle. Tell them they are going to learn a song and play a game.
- Ask students if they know the song *Juguemos en el bosque*. Tell them they are going to sing the lyrics of *Canción al agüita*, which is written on the board, to the tune of *Juguemos en el bosque*.
- Students can stand in a circle, or hold hands and rotate in the circle during the song.
- When the song asks "¿Me van a cuidar?" students should stop. One student will then respond with "Voy a cuidar…[he or she should name one feature of water]." If necessary, call on students to respond. Students should answer: lake, river, pond, reservoir, stream, puddle, ocean, etc.
- Record the various water source responses on the board.
- Repeat the song several times until students can not think of any more water sources.
- Remind students of any water sources they may have missed, such as ground water or rain water.
- Water found under the ground is called ground water and can be accessed for use. Ask them how to access ground water. They may answer "well" or "borehole." Remind them that "springs" are places where ground water flows naturally to the surface of the earth.
- Rain water can also be harvested through the use of water catchments such as systems that siphon rain water from roofs.
- Be sure to distinguish between fresh water sources for drinking water and salt water, which requires special treatment before drinking it.
- Continue to play the game using these newly mentioned water sources. Be sure all responses are written on the board.

The Activity

Part I

1. **Ask students where the water in the school and their homes comes from.** They will likely answer that it comes from the faucet or from a water truck or from a tank. Where does the water in the faucet come from? What are some of the major water features in the area? Get them to think about the source of their water. Look at the list on the board to help determine possible water sources.
2. **Next ask students if their water is safe to drink.** Is the local water treated by a water treatment plant? You may need to do some research before class to find out the source of your school and community water. Talk to the local water company before class to gather information on your water systems.
3. **Divide the class into groups of three to four students.** Give each group a large piece of paper and markers or crayons.
4. **Tell each group to fold their paper in half and then reopen it so that they have two sections of their paper.** On one half

Canción al agüita

My llaman agüita, también me dicen vida

Soy hija del nevado, del lago y del río

¿Me van a cuidar?

[Voy a cuidar…]

Estoy en la cocina, la terma y el caño

Si no me cuidar bien, me voy a terminar

¿Me van a cuidar?

[Voy a cuidar…]

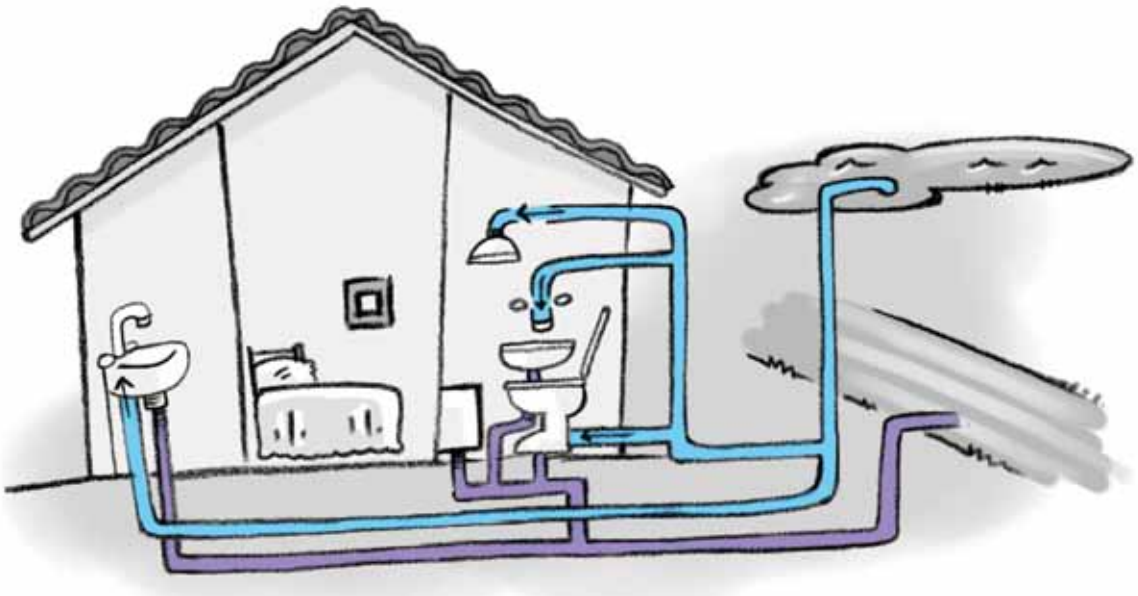
of the paper, tell them to draw the inside of one of their houses (they may also draw the school building, if they prefer). They need to draw the houses so that they can see into the house. You can draw an example of an open-walled house on the board to show them how to draw their houses (see the example below). Write the following features on the board and tell them they must include these features in or around their houses.

- toilet
- faucet/sink
- clothes washing area
- spigots, faucets or hose connections
- drains or waste water dump sites

5. **Now have students draw the source of their water on the other half of the page (you may have to tell them what their source of water is in your city).** Have them include all major water sources and geographical features in the areas on their drawings (such as rivers or mountains). If there is a water or sewage treatment plant in the area, have them draw the treatment plant on the map, as well.
6. **Now tell students to connect their household (or school) water to the water source using one color.** How is the water connected? You may need to remind them that water may come from pipes underground or from tanks overhead or both.
7. **Using a different color, have students draw the path of disposed (used) water.** Ask students where the water goes when they are finished with it. They will likely answer "down the drain" or "in the street." Get them to think about where the water ends up. What happens after it goes down the drain or into the street (is there a river or lake it flows into)?
8. **Ask students to compare the *Healthy Water Checklist* to their drawing and evaluate their water source.** Ask students the following questions:
   - Is their water source healthy?
   - Do they think their water is safe to drink?
   - Does their disposed water affect the environment and/or water features in the area?
   - Does their disposed water affect their drinking water?
9. **Display the drawings in the classroom.** If there is time, have each group explain their drawings to the class.

Part II

Prior to this activity copy the ***Healthy Household Water***



Example drawing of a house with open walls and connected to the water source.

Healthy Water Checklist

- ☐ People do not bathe, wash cars, laundry or pour waste water in the water source.
- ☐ There is neither litter nor trash floating in the water nor trash piles next to the water source.
- ☐ Pipes, plumbing and water tanks are in clean and good condition.
- ☐ Sewage (urine and feces) is contained in latrines and sewage lines and is not near or in water.
- ☐ Water tanks and storage containers are clean and closed so as not to contaminate water.

Checklist—Resource Page. *Cut the list according to the different locations in the house. If a photo copier is unavailable write the information on separate cards or sheets of paper. One copy is provided at the back of the Guide.*

1. **Set up six stations in the classroom and label these stations "toilet", "sink", "hose", "trash", "drinking water" and "washing area".** Place a card containing the information from the ***Healthy Household Water Checklist—Resource Page*** at each station.
2. **Divide students into six groups and assign each group a station.** Explain that the classroom represents a home and each station is a place where water is used at home.
3. **Tell each group they will create a short performance (a song, poem, dance or scenario) to teach the class about how to conserve water and/or maintain a healthy house and healthy water system using their assigned station.** Try to have students think up their own ways to conserve water, but they may use the information from the *Healthy Household Water Checklist*. Give the groups 10 minutes to create their performance.
4. **Go around the "house" and have each group perform for the class.** After each performance, ask the class to summarize some of the methods for conserving water and maintaining a healthy household water system. Be sure to address all points on the *Healthy Household Water Checklist*.

Wrap Up

- Discuss the quality of your community water sources and whether or not this water is healthy to drink.
- If drinking water sources have been tested and are clean and safe, discuss how school and community members can maintain them.
- Remind students to ensure that their water remains safe, it must be transported, stored and retrieved with care.
- Ask students, "Who is responsible for clean drinking water?" Remind them, we are all responsible for conserving and maintaining clean water systems!

ActionEducation™

- Organize a cleanup day and speak with the school administration or community leaders about how the community could help improve the quality of drinking water sources.
- Create a rain water catchment for your school or community.

Assessment

Have students:

- identify and evaluate the community drinking water source (***Part I***, steps 1-10).
- map and evaluate community drinking water sources (***Part I***, steps 4-10).
- identify ideas for cleaning and maintaining healthy drinking water sources (***Part II***, steps 1-4; ***Wrap Up***).
- identify methods to conserve water and maintain healthy household and water systems (***Part II***, steps 1-4).

Extensions

Visit the water treatment plant or water company

to learn about where your water comes from.

Have students organize a classroom event (Celebrating Clean Drinking Water). Students can make posters and create short role-plays to present to other classes, parents and community members. Have them share the message, "We are all responsible for clean drinking water!"

Resources

Water and Environmental Health at London and Loughborough (WELL). Household Water Treatment, Storage and Handling. Water Supply. A document containing instructions o various water treatment methods. http://www.lboro.ac.uk/well. [English]. Accessed (December 10, 2010).

Skinner, Brian and Shaw, Rod (no date). Household water treatment 1. Technical Brief No.58, Loughborough, UK: WEDC. Water and Environmental Health at London and Loughborough (WELL).http://www.lboro.ac.uk/well. Article found at http://www.lboro.ac.uk/well/resources/technical-briefs/58-household-water-treatment-1.pdf. [English]. Accessed (December 10, 2010).

Safe Water International. Resources. Documents. A list of resources including Safe Water International's Household Technology Survey and Household Water Treatment Options. http://www.safewaterintl.org. [English]. Accessed (December 8, 2010).

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A child turns off the faucet after she collects water.

Healthy Household Water Checklist—Resource Page

Toilet
Fix any leaks or constant running water.
Maintain a healthy sewage system by only allowing human waste down the toilet. Do not throw paper, trash or diapers down the toilet.
Build latrines at least 30m away from water source (for outdoor latrines not connected to a sewage system).
Be sure the lids and doors to all latrines are shut when not in use.

Faucet
Fix all leaky faucets and pipes.
Turn off water in between filling buckets or while soaping hands.
Turn off water when you are finished with it.

Hose
Turn off the hose when not in use.
Fix any leaks in the hose or faucet.
Turn off the hose between washing and watering so as not to waste water.
Use buckets to wash cars and patios instead of letting the hose run.

Trash
Place all trash in trash bins. DO NOT ALLOW TRASH TO ENTER ANY WATER SOURCES!
Keep trash contained in bins until the garbage truck can collect it or you can dispose of trash through burying or burning it.
Separate trashing into organic, inorganic, and toxic. Compost organic trash, dispose of inorganic trash in bin and take toxic trash to facilities that dispose of toxic items.
Clean any litter or trash from around the house to avoid unwanted animals and parasites.

Drinking Water
Purify all drinking water in the house.
Use clean cups to handle and gather drinking water from containers.
Store water in clean and covered containers.
Wash hands before taking drinking water from its container.

Washing Area
Use buckets and containers to wash clothes and dishes to conserve water.
Dispose of waste water away from water sources.
Strain all buckets before dumping water down drains to keep sewage lines clean and functional.
Conserve water by using rinse water from washing clothes to wash patios and front porches.

The Path to Healthy Water

If you doubt that your water is clean – purify it!

Grade Level:
Primary,
Lower Secondary

Subject Areas:
Science, Health, Art (drawing)

Duration:
Preparation Time:
15 minutes
Activity:
Warm Up: 20 minutes
Part I: 30 minutes
Part II: 30 minutes
Wrap Up: 30 minutes

Skills:
Gathering information (observing, listening, measuring, recording); Organizing (estimating, drawing, manipulating materials); Analyzing (discussing); Applying (planning, constructing); Evaluating (assessing), Presenting (demonstrating, reporting, drawing, public speaking)

Vocabulary:
microorganism, sediment, filtration, purification, recontamination, SODIS

Values:
appropriate conduct, love, responsibility

Summary

By understanding how to treat water in their own homes, students contribute to their health, their families' health and their communities' health.

Objectives

Students will:

- recognize that certain personal and household activities require clean water.
- explain why their senses are not sufficient to test whether water is safe to drink.
- explain the best ways to purify drinking water.
- analyze home, school and community water systems and identify potential improvements.
- learn proper water collection, purification, storage and handling to ensure healthy drinking water.

Materials

Warm Up

- *Four clear plastic bottles filled with clean water that have caps with holes in the lids*
- *A marker to label bottles*
- *Small amount of salt*
- *Small amount of white vinegar or clear soda with an odor*
- *Small amount of dirt (or coffee grinds or tea)*

Part I and Part III

Copies of ***Steps Along the Path to Healthy Water—Resource Page*** (or one large version to post for the class) (pp. 44-45; 57; 59)

Part II

- *Colored sidewalk chalk*
- *Colored pencils or other writing implements and sheets of paper (optional)*

Making Connections

Many students do not know the source of their household, school and community water. While some activities such as drinking, food preparation and hand washing require clean water, others do not. Learning the steps toward obtaining healthy drinking water can help students, their families and their communities stay healthy.

Background

Many households and communities lack healthy drinking water. People use contaminated drinking water for many reasons, including:

- limited or no access to water.
- inability to pay for water fees or tariffs.
- lack of information to determine if their water supply is safe.
- lack of knowledge of water treatment and storage methods.

Contaminated water and food cause significant health problems across Latin America and around the world.

According to the World Health Organization: "Worldwide, contaminated water helps make more than three billion people sick and contributes to five million deaths annually. The estimated death rate for children from these diseases is one every eight seconds." Common illnesses from the consumption of contaminated water include diarrhea, dysentery, Hepatitis A, Typhoid Fever and intestinal parasitic worms such as hookworms.

Having a water source or supply near home does not guarantee it's safe to drink. Clean water sources may become contaminated periodically by natural events, such as flooding or drought. Cholera is a dangerous disease that occurs from ingesting contaminated water, usually after natural disasters such as floods.

Apart from natural disasters, water treatment may be unavailable or poorly managed in general. Even water from a well can be contaminated, depending on the quality of ground water. When the water source is clean, water can still become contaminated during collection, transportation, storage or use.

Many methods of water purification exist and all have advantages and disadvantages including cost, availability, effectiveness, etc. Vigorously boiling your drinking water for at least three/ten minutes kills bacteria, parasites and viruses and is the most effective way to make drinking water safe. This process can significantly reduce diarrheal and waterborne diseases and improve family and community health. Other methods, such as filtration with chlorination and solar disinfection (SODIS), are also effective treatment methods when done properly.

Procedure

Before the ***Warm Up***

Pour equal amounts of clean water into four clear bottles. Number each bottle. This activity works best if holes are made in the bottle lids to allow students to use their sense of smell (holes can be made prior to the activity using a hammer and nail).

Add a small amount of salt to bottle N°1 and shake to dissolve (be sure to cover the holes in the lid when shaking). Add a small amount of white vinegar or clear soda (enough so that you can smell the vinegar or soda) to bottle N°2 and add a small handful of dirt or coffee grinds to bottle N°3. Do not add anything to the water in bottle N°4. Line the bottles up on a table at the front of the room.

Warm Up

****Do not taste or have students taste any water in this investigation.****

- To begin the **Warm Up**, ask students how they can tell if their drinking water is healthy. Without using water testing equipment, what do we have available to us to determine if drinking water is clean? List student answers on the board.
- Ask students to identify their five senses (sight, smell, taste, touch and hearing). Can they use any of their senses to help them decide if water is healthy to drink?
- Tell students they are going to conduct tests to see if their senses are adequate water testing tools.
- Show the class the four bottles of water. Ask the students if, through observation, they can determine if this water is healthy to drink?
- Explain to the students that only one of the four bottles contains clean drinking water. Ask them to use their senses (**except for taste)** to try to determine which bottle contains clean drinking water.
- After everyone has had a look at the bottles, have students put their heads down and raise their hands to vote for the bottle they believe is clean water. Announce each bottle, one at a time—bottle one, bottle two, etc.—having students raise their hands at their bottle of choice. Write the number of students who guess each bottle on the board.
- Announce the contents of each bottle after the total tally and the number of students who guessed correctly.

Note: You may also provide students with slips of paper and ask the students to write down the number of the bottle that they think is clean water. Students should turn the slip of paper with their answer on it into you. After everyone has had a chance to guess, look at the slips of paper and determine how many students guessed correctly.

- Explain to students that just because water appears clear and clean, it is not necessarily healthy to drink.

For example, you cannot see the salt in the water of bottle N°1. Why? (Salt dissolves in water.)

- Ask students if it is possible there are other things in the water they cannot see. (Germs and microorganisms can be present in water, but they can only be seen with a microscope.)
- Ask students if observing (without special tools) is sufficient to determine if water is healthy to drink.
- What can students do to ensure their drinking water is healthy? Is the water in thier city treated? Is the water in the school and in their homes treated?
- Remind students the most effective way to ensure water is healthy to drink, is to purify it.

The Activity

Part I

1. **Copy the *Steps Along the Path to Healthy Water—Resource Page* for students to see.** One copy of each step is provided at the back on this Guide. If you have access to a photocopier, you may wish to make copies of the *Steps Along the Path to Healthy Water—Resource Page* for the students to have or to share. You may also have students look at the pages in this guide and copy the information.
2. **Divide the class into groups of six students.** Ask each group to form three pairs of two students. Instruct the groups to have each pair focus on a different water purification method from Step 2 in the ***Steps Along the Path to Healthy Water—Resource Page.***
3. **Have all of the pairs of students focusing on the boiling method, copy the boiling information in their notebooks; the pairs of students focusing on SODIS, copy the SODIS information; and the pairs of students focusing on chemical treatment, copy the chemical treatment information into their notebooks.**
4. **Have each pair present the purification method they studied to their group through a demonstration or a performance, explaining how and why the methods work.** Encourage pairs to use songs, charades and props to teach the other members of their group about water purification. Walk around to each group to make sure they understand the methods they are being taught.
5. **After students have finished teaching each other about water purification, have each group of six students decide which method of purification they would prefer to use in their homes to ensure their drinking water is healthy.** Each group should discuss and debate the advantages and disadvantages of each method. Go around the class and ask each group to name their purification method of choice and why they chose it.

Part II

1. **Divide students into six groups**. Assign each group one step along the path to healthy drinking water. The groups should be as follows: 1) Water Source, 2) Boiling, 3) Chemical Treatment, 4) SODIS, 5) Safe Storage of Clean Water and 6) Safe Handling of Clean Water. Have each group read the information about their step.
2. **Draw a long line (at least 30m) in the school yard.** This line will represent the path to healthy drinking water. If there is a large school yard area of cement, draw the line in chalk. If your school yard does not have a cement area, you can also do this activity in a classroom using an imaginary line, or a line made from tape around the walls. If possible start this line at the sinks (the water source). Alternatively, you may also choose to make the drawings in the classrooms and then draw an imaginary line in the school yard or a line around the school building to lay out the student drawings.
3. **Make four stations along the line, allowing extra room at the second station.** Write in chalk (or make a sign on paper) at the start of the line, "Step 1: Water Source." At the second station write, "Step 2: Water Purification

(Boiling, SODIS and Chemical Treatment)", at the third station write, "Step 3: Safe Storage of Clean Water" and at the end of the line write, "Step 4: Safe Handling of Clean Water."

4. **Have students make drawings representing their step along the path to healthy water.** If you have a large cement area, have students draw their pictures in colored chalk at their respective stations. If you are in a classroom, have students draw on paper and then place their drawings at the appropriate station. Give students at least 20 minutes to make their healthy water drawings.
5. **Gather the students at the start of the line.** Explain to the class that they are about to follow the path to healthy drinking water. Explain that this point represents the place where they collect water—their water source.
6. **Have students who drew pictures of the Water Source explain their drawings.** Ask the class to think about whether or not the water collected here is clean. Ask them to reflect on the **Warm Up**—is it possible to tell if the water is clean by observing it? What should everyone do when they finish collecting water? (Turn off the faucets!)
7. **Move the group along the line.** Explain that this movement represents transporting the water from the source to its use at home. Stop at the second station. This point represents the part of the path to healthy drinking water where the water is purified. Tell the students that there are many options for purifying water. This activity focuses on three common and relatively inexpensive options—boiling, chemical treatment and solar water disinfection. Have students recall their discussions about different methods of water purifications from part one.
8. **Have students from each of the purification groups explain their drawings (first Chemical Treatment, then SODIS, then Boiling).** Be sure all of the points of Step 2 on the *Steps Along the Path to Healthy Water—Resource Page* are covered. Which methods would they use at home?
9. **Now move the group along the line again—purifying their water has moved them further down the path towards healthy drinking water.** Stop the group at the next station, Step 3: Safe Storage of Clean Water. Explain to students that if they don't store their purified water in clean and secure containers, they can recontaminate the water and get sick.
10. **Have students explain their drawings from Step 3.** Be sure all of the points of Step 3 on the *Steps Along the Path to Healthy Water—Resource Page* are covered.
11. **Move the class to the end of the line.** At this point the water is clean, healthy and ready to drink. However, if the water is now poured into a dirty glass, all the work they have just done to keep their water clean is wasted. This is the final step, Step 4: Handling of Clean Drinking Water.
12. **Have students explain their drawings on how to correctly handle clean water.** Be sure all of the points of Step 4 on the *Steps Along the Path to Healthy Water—Resource Page* are covered.

Wrap Up

- Discuss whether students' families use purified water at home. If so, which methods do they use?
- If students do not purify water at home, do they think some of the methods demonstrated would work at home? Why or why not?
- How will students put all of the steps from the Path to Healthy Water into practice?

Assessment

Have students:

- explain why observation may not be a sufficient tool to judge the safety of drinking water (***Warm Up***).
- explain different methods of water purification (***Part I***, steps 4-5; ***Part II***, step 8).
- identify the steps along the

path to healthy water (***Part II***).
- identify how water is purified and stored at home and suggest ways to improve these methods (***Wrap Up***).

Extensions

Make a mural at your school that demonstrates the *Steps Along the Path to Healthy Water*.

Using the ideas addressed in Part II of this activity, students should create a "Path to Healthy Water" poster illustrating their own personal path to healthy drinking water. They should be sure to include the source where their water comes from, how they choose to purify their water, how they safely store their water, and how they safely serve the clean water. Have students take this poster home to share with their families to encourage following the path to healthy drinking water in their homes.

Have students bring in clear plastic or glass bottles from home and perform SODIS at school. Drink the water once purified.

Research other filtration methods (e.g., slow sand filters and silver impregnated filters). Explain how and why they work. If possible, construct a model.

If you have microscopes, look at water under a microscope to see the microorganisms. Remind students that there are both healthy and unhealthy microorganisms.

Resources

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Steps Along the Path to Healthy Water

Step 1: Water Source

- Collect water in a clean container.
- Turn off faucets in between filling buckets.
- Turn off ALL faucets when finished.
- Fix any leaky pipes or faucets.

Step 2: Water Purification

Boiling

How it works

- Heat water in a pot until it boils vigorously (big bubbles surface).
- Boil water for at least three minutes.
- Cover the pot and let the water cool.
- Pour water into clean containers with lids.

Why it works

The high temperature of boiling water kills bacteria, parasites and viruses.

Advantages

- Kills disease-causing germs
- Simple
- Easy to use

Limitations

- Requires fuel for stoves
- Takes time to boil water and time to cool.

Chemical Treatment

How it works

- Purchase a small bottle of water treatment product (e.g., cloro).
- Ask an adult to help you follow the directions to add chemical for a measured volume of water.
- Stir and let stand according to directions.

What it does

The chemical kills many of the bacteria and parasites which can cause diarrhea.

Advantages

- Inexpensive
- Easy to use

Limitations

- Taste of water
- Does not kill some parasites

Solar Water Disinfection

How it works

- Place water in clean, clear, non-scratched plastic or glass bottles with closed lids.
- Hold the bottle so that four fingers are behind the bottle. If you can see all four fingers through the bottle then the water is clear enough to use SODIS.
- Set in direct sunlight for one day. If cloudy set in sun for two full days.
- Bottles used for solar water disinfection must be clear (not brown or green) with labels removed.
- Use bottles that are 1-2 liters.
- Bottles must be placed on their sides in the sun.

What it does

UV-A rays from the sun kill bacteria and parasites in the water making it safer for consumption.

Advantages

- Inexpensive
- Materials available
- Easy

Limitations

- Does not work well when cloudy (water must be set in sun for two full days when cloudy).
- Does not work well with visibly dirty water (water with sediment). If you can see all four fingers through the bottle then the water is clear enough to use SODIS.

Step 3: Safe Storage of Clean Water

Clean water must be stored safely to prevent recontamination.

- Clean the storage container with clean (purified) water.
- Use different types of containers for treated and untreated water.
- Use a clean lid that does not fall off easily (you can use brick or rock for weight).
- If possible, use a container with a tap at the bottom. This prevents any recontamination due to opening the container.

Step 4: Safe Handling of Clean Water

Water that has been purified and stored safely can be recontaminated when you go to drink the water.

- Wash your hands first.
- Do not dip a communal drinking cup or fingers into the water.
- Use a long-handled ladle or directly pour the water into your drinking cup.
- Touch only the handle of the ladle.
- If possible, use a container with a tap at the bottom. This prevents any recontamination due to opening the container.

Words of Wisdom

""If a child washes his hands, he could eat with kings." Our ancestors speak to us through their proverbs and stories.

Grade Level:
Upper Primary,
Lower Secondary

Subject Areas:
Language Arts, Art (creative project)

Duration:
Preparation Time:
5 minutes
Activity:
Warm Up: 15 minutes
Part I: 30 minutes
Part II: 30 minutes
Wrap Up: 30 minutes

Skills:
Gathering information (reading, listening); Organizing (drawing, constructing); Analyzing (identifying patterns, comparing, discussing); Interpreting (translating, relating); Presenting (speaking, drawing, describing, writing)

Vocabulary:
comparison, interpretation, literal, proverb

Values:
appropriate conduct, love, responsibility

Summary

Generations hand down wisdom through stories and proverbs. Students use them as a guide to create their own wise sayings about water.

Objectives

Students will:

- examine and interpret the meaning of traditional proverbs.
- understand the difference between literal meaning and interpretation.
- create new proverbs to teach others about water and health.

Materials

Warm Up and Part I

- *Copies of* ***Proverbs–Resource Page*** *for students or one large version copied onto flip chart paper or the chalkboard (pg. 49)*

Part I

- *Cards or paper with the proverbs from the* ***Proverbs–Resource Page*** *(pg. 49)*
- *Chalkboard*

Part II

- *Materials for making mobiles in class (scissors, paper, colored makers, magazines to cut out pictures, string, glue, wooden sticks)*

Making Connections

Students can often connect with elders who use proverbs to educate family and community members. In this activity, students examine the value of proverbs and create their own proverb to teach others about water and health.

Background

Passed from generation to generation, proverbs are short sayings that reflect the values and beliefs of a culture. Across Latin America, as in many other places around the world, proverbs are used to teach a lesson or a moral, warn against foolish acts, guide conduct, help solve problems and bring special meaning to situations.

Proverbs are used not only to instruct, but also to debate, tell stories and spice up daily conversation.

Proverbs have at least two, and sometimes more, meanings. One is the literal meaning. The other is a figurative interpretation, in which the real teaching or truth is contained. The figurative interpretation is the symbolic meaning of the proverb. Consider the following proverb: "A watched pot never boils." Literally interpreted, this is a statement about a pot of water set out to boil. Figuratively and more broadly, it can mean that with patience one's desires will come to pass on their own time; impatience often seems to make one's desires take a long time.

Formulating proverbs is an art form and understanding proverbs is often challenging. In this activity, students will interpret some well-known proverbs and create art projects which depict their meaning.

Procedure

Warm Up

- To get your students started, ask students if they know what a proverb is (a sentence or saying that teaches a human value).
- Discuss some common proverbs and their broad interpretation. You may choose to use the *Proverbs—Resource Page* as a guide.
- Ask students if these sayings should be taken literally. Proverbs are not meant to be interpreted literally.
- Ask students what "interpretation" means. (To provide a meaning of or explanation for something.)
- Be sure to emphasize to students that proverbs have an important message in their interpretation.

The Activity

Part I

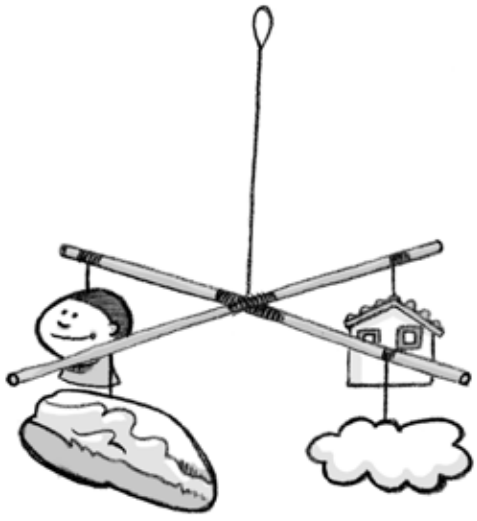
For younger students you may want to skip to **Part II**.

*Before class write the proverbs from the **Proverbs—Resource Page** on the board or on a flip chart. Do not write the meanings, only the proverbs. Write each proverb from the **Proverbs—Resource Page** on slips of paper or cards.*

1. **Divide the class in half and tell students they are going to play a game.**
2. **Ask for a volunteer to draw on the board.** Give the volunteer one of the cards with a proverb meaning on it.
3. **Have the volunteer draw a picture of the proverb from his or her card on the board while the class tries to guess what the proverb is.** Tell students to use the list of proverbs as answers.
4. **Discuss the meaning of the proverb.** What is the literal meaning and what is the interpretation?
5. **Repeat the game, using the proverbs from the *Proverbs—Resource Page*.** Be sure to discuss the literal meaning and interpretation of each proverb after each round.

Part II

1. **Have students create their own proverbs about one of the following topics: protecting existing water resources (keeping community water clean), washing hands (stopping the spread of disease), conserving water and keeping trash contained in trash bins.**
2. **Ask students to write their proverbs in their notebooks or on a piece of paper.** Walk around the room and help students, asking students to share their proverbs with you. If this activity is too difficult for younger students, you may have them choose one of the proverbs from ***Part I*** to complete this activity.
3. **Tell students they will now create an art project interpreting their proverb.** Have students create mobiles by drawing pictures, cutting out magazine pictures and cutting out shapes in paper, then string their pictures to the ends of the mobile (see drawing). Encourage students to be creative in their mobiles. Display mobiles in the room.



Example of a mobile.

Wrap Up

- At the end of class go around the room and ask students which of the proverbs mentioned during the activity is their favorite proverb and have them explain why.

Assessment

Have students:

- explain how proverbs communicate meaning (***Warm Up***).
- draw and explain the meaning of different proverbs (***Part I***, steps 3-5; ***Part II***).
- create their own proverb (***Part II***, steps 1-2).
- state their favorite proverb of the activity and explain why it is their favorite (***Wrap Up***).

Extensions

Have students take their mobiles home and explain their proverb to their family. Have students ask their parents and families about proverbs on water and bring these proverbs into class the next day. Discuss the proverbs and their meanings as a class.

Have a discussion about the language used in proverbs during language class. Discuss the different types of stylist devices on the *Language Discussion—Resource Page* using the proverbs from the activity or other well known proverbs.

Resources

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Project WET Foundation

Navigating a river in the Pacific Region of Colombia.

Proverbs—Resource Page

Proverbs	Interpretation
Just a drop in the bucket.	Something is only a small part of a bigger situation.
You don't miss the water until the well has run dry.	People don't appreciate what they have until it is gone.
Keep your head above water.	Don't give up during tough times; keep trying you best.
You can lead a horse to water but you can't make it drink.	People can only teach others—they cannot control others' actions.
It's water under the bridge.	Do not dwell on past situations.
Sink or swim.	A person must figure out how to succeed in order to survive.
A jug carries water until its handle breaks off.	Nothing lasts forever.
A watched pot never boils.	Be patient. Desires will come to pass on their own time.
April showers bring May flowers.	Tough situations bring positive results.
Like a fish out of water.	Feeling or looking out of place in a situation.

Language Discussion—Resource Page

Simile – two unlike things are compared.
The pen is mightier than the sword.

Rhyme – repetition of identical or similar sounds.
April showers bring May flowers.

Ellipsis – the omission of words.
Better late than never.
First things first.

Hyperbole – exaggeration.
A watched pot never boils.

Parallelism – balance among clauses, phrases, or words.
Easy come, easy go.

Paradox – contradiction.
Change is the only constant in life.

Personification – giving an object or idea human qualities.
Actions speak louder than words.
Hope springs eternal.

Disease Cards—Resource Page

Typhoid Fever

Disease-causing germ: The bacteria, *Salmonella typhi*

How do you get it?
Fecal-oral (feces to mouth) transmission

Symptoms may include:
- High fever for many days
- Heavy sweating
- Mild to severe diarrhea

How do you prevent it?
- Wash hands with soap and water after using the bathroom and before preparing food.
- Purify drinking water, especially after flooding when sewage systems can overflow and mix with drinking water.
- Get a typhoid vaccination to boost your immune system's ability to identify and kill the bacteria that causes typhoid fever.

Dysentry

Disease-causing germ: The bacteria, *Shingella*

How do you get it?
Fecal-oral (feces to mouth) transmission.

Symptoms may include:
- Blood and mucus in feces
- Abdominal pain
- Painful pooping

How do you prevent it?
- Wash hands with soap and water after using the bathroom and before preparing food.
- Purify drinking water.
- Wash uncooked fruits and vegetables with safe water before eating them.

Hepatitis A

Disease-causing germ: The *Hepatitis* virus

How do you get it?
Fecal-oral (feces to mouth) transmission.

Symptoms may include:
- Fever and body aches
- Nausea
- Abdominal pain

How do you prevent it?
- Wash hands with soap and water after using the bathroom and before preparing food.
- Purify drinking water.
- Wash uncooked fruits and vegetables with safe water before eating them.

Cholera

Disease-causing germ: The bacteria, *Vibrio cholerae*

- **How do you get it?**
  Fecal-oral (feces to mouth) transmission.
  Personal contact (touching other infected people)

Symptoms may include:
- Very watery diarrhea
- Vomiting
- Dehydration

How do you prevent it?
- Wash hands with soap and water after using the bathroom and before preparing food.
- Purify drinking water, especially after flooding when sewage systems can overflow and mix with drinking water.
- Pay attention to cholera warnings and make sure to boil water from areas where cholera contamination is known or suspected.

Dengue Fever

Disease-causing germ: A *Dengue* virus

How do you get it?
Viruses enter a human body through mosquito bites by infected female *Aedes* mosquito.

Symptoms may include:
- High fever
- Headache
- Severe eye pain
- Muscle and joint pain
- Rash

How do you avoid it?
- Sleep under an insecticide soaked mosquito net at night.
- Remove stagnant standing water especially from old tires and open containers or jars.
- Wear long sleeves and pants or skirts.
- Use insect repellent.

Chagas Disease

Disease-causing germ: The parasite, *Trypanosoma cruzi*

How do you get it?
From feces of a triatomine bug. At night the bug bites a human and poops next to the bite. Bugs also poop on food left out over night. Feces enter the body by touching bites, eyes or eating infected food.

Symptoms may include:
- Fever
- Headache
- Difficulty breathing
- Muscle pain
- Purplish swelling in the lid of one eye

How do you avoid it?
- Protection against bites from triatomine bugs—wearing long clothing to bed.
- Sleep under an insect net.
- Put away all food at night.
- Use insect repellent.

Malaria

Disease-causing germ: The parasite, *Plasmodium*

How do you get it?
An infected female *Anopheles* mosquito bites a human at night, transmitting the parasite.

Symptoms may include:
- High fever that disappears and comes back over several days
- Headache
- Difficulty breathing
- Body aches
- Chills, shivering

How do you avoid it?
- Sleep under an insecticide soaked mosquito net at night.
- Remove stagnant standing water around homes, especially from old tires and open containers or jars.
- Wear long sleeves and pants or skirts in the evenings and night times.
- Clear thick vegetation from around your house.

Soap Story Cards—Resource Page

Group 1: Germs

Position

Line up along the wall at the front of the classroom.

Action

Pretend you're clinging to the wall.

(As the other groups move in, go wherever one of their members moves you.)

WALL

Role

We are dirt and germs, clinging to your hands. We like it here!

Group 2: Water

Position

Make a line in front of the students in the Dirt Group. Stand parallel to their line, about a meter away.

Action

Two Water Group students each select one of the students from the Dirt Group to join the Water Group.

(As the other groups move in, listen to them and act out what their part of the story tells you to do.)

WALL

Role

We are the water you used to wet your hands. We remove only some of the dirt and germs clinging to your hands.

Group 3: Soap

Position

Line up in front of the students in the Water Group. Stand parallel to their line, about a meter away.

Action

Wiggle between the students in the water group. Take one of the water group members by the hand. Then use your other hand to take one of the Dirt Group members by the hand. Pull the Dirt Group members away from the wall.

(When the Rinse Water Group moves in, allow yourself to be carried along with them.)

WALL

Role

We are soap. Each of us is a long molecule. One end is attracted to the water. The other is attracted to dirt and germs. We pull the dirt and germs from your hands.

Group 4: Rinse Water

Position

Grouped together at one side of the classroom.

Action

In a group, hurry across the front of the classroom from one side to the other, taking all the other groups with you.

WALL

Role

We are the rinse water. We rush over your hands, washing away dirty water, soap, dirt, and germs in a big flood!

Healthy Household Water Checklist—Resource Page

Toilet
Fix any leaks or constant running water.
Maintain a healthy sewage system by only allowing human waste down the toilet. Do not throw paper, trash or diapers down the toilet.
Build latrines at least 30m away from water source (for outdoor latrines not connected to a sewage system).
Be sure the lids and doors to all latrines are shut when not in use.

Faucet
Fix all leaky faucets and pipes.
Turn off water in between filling buckets or while soaping hands.
Turn off water when you are finished with it.

Hose
Turn off the hose when not in use.
Fix any leaks in the hose or faucet.
Turn off the hose between washing and watering so as not to waste water.
Use buckets to wash cars and patios instead of letting the hose run.

Trash
Place all trash in trash bins. DO NOT ALLOW TRASH TO ENTER ANY WATER SOURCES!
Keep trash contained in bins until the garbage truck can collect it or you can dispose of trash through burying or burning it.
Separate trashing into organic, inorganic, and toxic. Compost organic trash, dispose of inorganic trash in bin and take toxic trash to facilities that dispose of toxic items.
Clean any litter or trash from around the house to avoid unwanted animals and parasites.

Drinking Water
Purify all drinking water in the house.
Use clean cups to handle and gather drinking water from containers.
Store water in clean and covered containers.
Wash hands before taking drinking water from its container.

Washing Area
Use buckets and containers to wash clothes and dishes to conserve water.
Dispose of waste water away from water sources.
Strain all buckets before dumping water down drains to keep sewage lines clean and functional.
Conserve water by using rinse water from washing clothes to wash patios and front porches.

Step 1: Water Source	
• Collect water in a clean container. • Turn off faucets in between filling buckets. • Turn off ALL faucets when finished. • Fix any leaky pipes or faucets.	

Step 3: Safe Storage of Clean Water	
Clean water must be stored safely to prevent recontamination. • Clean the storage container with clean (purified) water. • Use different types of containers for treated and untreated water. • Use a clean lid that does not fall off easily (you can use a brick or rock for weight). • If possible, use a container with a tap at the bottom. This prevents any recontamination due to opening the container.	

Step 4: Safe Handling of Clean Water	
Water that has been purified and stored safely can be recontaminated when you go to drink the water. • Wash your hands first. • Do not dip a communal drinking cup or fingers into the water. • Use a long-handled ladle or directly pour the water into your drinking cup. • Touch only the handle of the ladle. • If possible, use a container with a tap at the bottom. This prevents any recontamination due to opening the container.	

Steps Along the Path to Healthy Water—Resource Page
Step 2: Water Purification

Method 1: Boiling

How it works
- Heat water in a pot until it boils vigorously (big bubbles surface)
- Boil water for at least three minutes.
- Cover the pot and let the water cool.
- Pour water into clean containers with lids.

Why it works
- The high temperature of boiling water kills bacteria, parasites and viruses.

Advantages
- Kills disease-causing germs
- Simple
- Easy to use

Limitations
- Requires fuel for stoves.
- Takes time to boil water and time to cool.

Method 2: Chemical Treatment

How it works
- Purchase a small bottle of water treatment product (e.g., cloro).
- Ask an adult to help you follow the directions to add chemical for a measured volume of water.
- Stir and let stand according to directions.

What it does
- The chemical kills many of the bacteria and parasites which can cause diarrhea.

Advantages
- Inexpensive
- Easy to use

Limitations
- Taste of water.
- Does not kill some parasites.

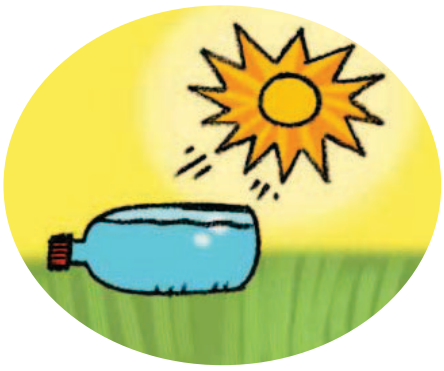
Method 3: Solar Water Disinfection

How it works
- Place water in clean, clear, non-scratched plastic or glass bottles with closed lids.
- Hold the bottle so that four fingers are behind the bottle. If you can see all four fingers through the bottle then the water is clear enough to use SODIS.
- Set in direct sunlight for one day. If cloudy set in sun for two full days.
- Bottles used for solar water disinfection must be clear (not brown or green) with labels removed.
- Use bottles that are 1-2 liters.
- Bottles must be placed on their sides in the sun.

What it does
- UV-A rays from the sun kill bacteria and parasites in the water making it safer for consumption.

Advantages
- Inexpensive
- Materials available
- Easy

Limitations
- Does not work well when cloudy (water must be set in sun for two full days when cloudy).
- Does not work well with visibly dirty water (water with sediment). If you can see all four fingers through the bottle then the water is clear enough to use SODIS.



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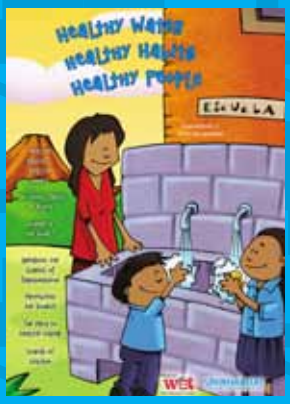
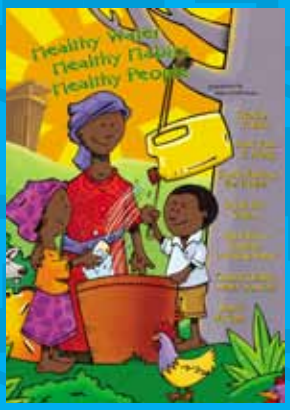
Companion Publications



Healthy Water, Healthy Habits, Healthy People Student Activity Booklets for Latin America and the Caribbean Region— customized booklets for specific regions in Latin America.

Healthy Water, Healthy Habits, Healthy People Educators Guide for sub-Saharan Africa.



Healthy Water, Healthy Habits, Healthy People Student Activity Booklet for sub-Saharan Africa—Companion to the Educators Guide with the same title.

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