

Water and Health Lesson Plan

Prepared by A. Reichl, N. Koermer, M. Matlala, and M. Mudau for XXXX Primary School
Grades 4/7

Lesson Duration: 60 minutes

Learning Objectives:

By the end of the lesson, students will be able to...

- Understand how much water they each need to drink each day.
 - Describe how/why untreated water can make them sick.
 - Explain to others at least two methods to treat water and how to prevent recontamination.
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Materials Required: sticky notes, f-diagram posters, chalk/chalkboard, pictures of common microorganisms (E. coli, salmonella, giardia, cholera), glitter, homework assignments, MadiDrop, ceramic filter, buckets

Part I: Introductions (5 minutes)

- Each instructor presents themselves to the students with their name and where they are from.
- One instructor gives a basic description of the lesson plan for the day.
 - *“As you all know, we have been here observing you all for the past couple weeks. We wanted to learn how you all drink water throughout the day. In this lesson, we will be talking about water and how it affects your health. Please feel comfortable asking questions throughout the lesson. We also have some activities included throughout the lesson, and we would like all of you to participate.”*

Part II: Why drink water? (10 minutes)

- Explain importance of staying hydrated and its effects on health.
 - Staying alert and focusing in class.
 - Performing better in school and in athletics.
 - Growing tall and strong.
 - Healthy skin-will not be so dry.
- Explain why water is better to drink than soda.
 - Soda is bad for teeth.
 - Show pictures of bad teeth?
 - Soda contains a lot of sugar (show how much sugar is in a bottle of soda).
 - Water is cheaper.
 - Show price comparison after a year?

- Ask class a simple question and have students raise hands to guess: *“How many liters of water should you drink every single day?”*
 - Answer: 2.0+ liters = 7 cups of water (for 9-12 year olds) [1].
 - Explain how many cups of water that equals.
- Ask students to raise their hands if they think they drink that amount of water every day.
- Explain:
 - *“It is alright if you do not drink 1.5 liters per day. However, we can all try to drink more water, especially when it is clean and healthy. Now, we’re going to talk about how dirty water can make us sick and also how to clean water to make it healthier.”*

Part III: How can water make us sick? (20 minutes)

- *“Do you know what kinds of things contaminate our water? What is a germ?”*
- Activity: Microorganisms and Basic Germ Theory
 - Pass around pictures of microorganisms into groups of 5-8 learners
 - Give one person in each group different color glitter for their hands
 - Make sure that those with glitter on their hands touch the paper, interact with other students, and possibly force them to move groups to show the spread of the glitter.
 - Explain that these are like the germs that stay on our hands when we do not wash after the bathroom. We are going to see how they spread as we do an activity.
 - Discuss the different types of germs for 5-8 minutes
 - Discuss what kind of illnesses each germ can cause
 - Break up the groups and bring learners to their normal seating arrangements and talk about germ theory and microorganisms.
 - *“Did you know that these types of organisms can live in our water? Can you see them in our water?”*
 - *“We usually can’t see these organisms in our water because they are so small.”*
 - Draw horizontal line on board with one end labeled “Big” and one end labeled “Small.”
 - Ask students to say what kinds of organisms/animals are big (e.g. elephants, giraffes, dogs). Draw/place pictures of the animal on the board.
 - Ask students to keep describing smaller types of organisms (e.g. mice, bugs, butterflies).
 - Explain that the germs we find in our water are smaller than all of these other animals and that is why we cannot see them.
 - EXTRA: For 7th graders, explain the different units we can use to describe the different objects.

- Cow = meters, orange/chicken = centimeters
- Ants = millimeters, bacteria = micrometers

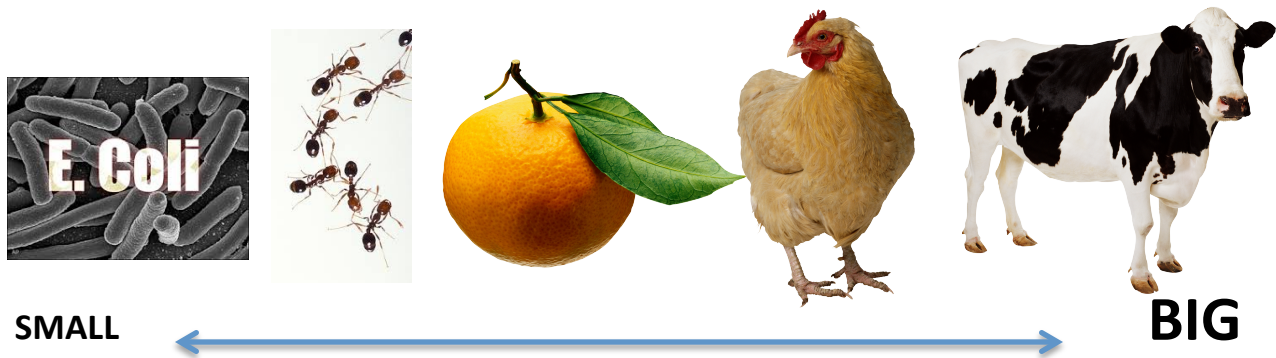


Figure S4-1: Comparing size of locally common animals and plant. Image credits: "Scanning electron micrograph of Escherichia coli, grown in culture and adhered to a cover slip." From: Rocky Mountain Laboratories, NIAID, NIH. Available: http://www.niaid.nih.gov/SiteCollectionImages/topics/biodefenserelated/e_coli.jpg, date accessed: 3 December 2015. "Fire ants." From: S. Ausmus, U.S. Department of Agriculture. <http://www.ars.usda.gov/is/graphics/photos/dec04/k11622-1.htm>, date accessed: 3 December 2015. Other images from royalty-free clip art provided by Microsoft Corporation.

- "What happens when we drink water with these types of organisms?"
 - Get sick with diarrhea.
 - Stunted growth.
 - Miss school and stay at home because sick.
- Place F-diagram on the blackboard. (Recommended only for 7th grade)
 - "We just talked about all of the different microorganisms that can live in our water and make us sick. Oftentimes, these organisms can be found in feces and then end up in our water. This diagram shows the many different ways these germs can end up in our water."
 - Explain the different connections/circles in the F-diagram and what they mean.

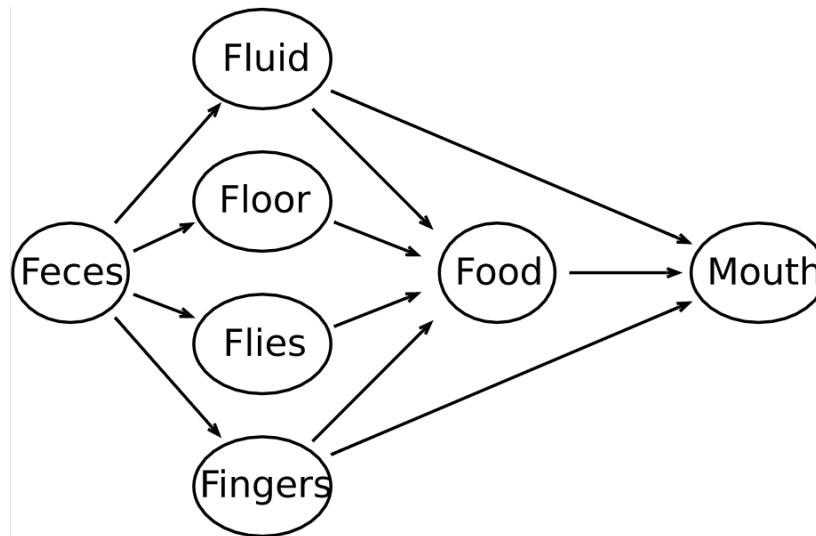


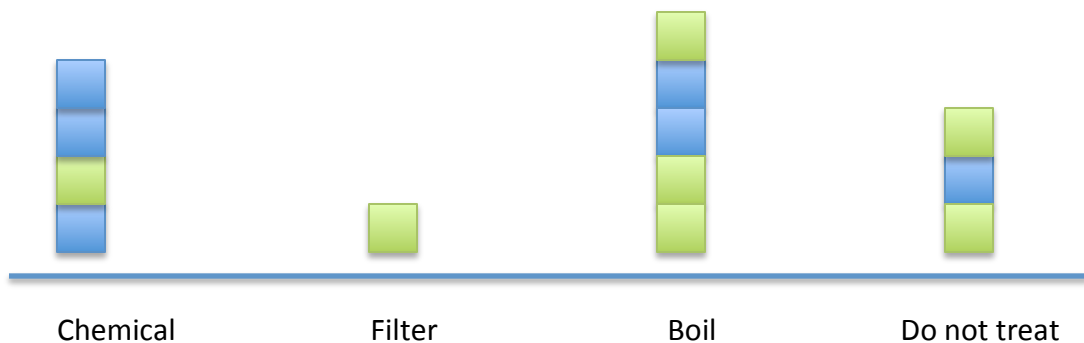
Figure S4-2: Routes of fecal-oral infection adapted from Wagner and Lanoix [2].

Part IV: How can we make our water healthier? (20 minutes)

- Hygiene and hand washing
 - Review spread of glitter.
 - *“Raise your hand if you were one of the first people to receive glitter from us.”*
 - *“Now, raise your hand if you now have glitter on your hands or on your desk.”*
 - Explain that the glitter represents the germs that can stay on our hands after going to the restroom, if we do not wash our hands.
 - Place hand-washing poster on board and describe good hand-washing technique.
 - Use soap, if available
 - Wash for more than 20 seconds
 - Wash hands:
 - Before eating
 - Before cooking
 - Before feeding or caring for small children, babies
 - After using latrine
 - After caring for sick people

Figure S4-3 (see attached page): How to wash your hands. This counseling card was developed by the Hygiene Improvement Project funded by the U.S. Agency for International Development. Available: <http://www.hip.fhi360.org/page/3837.html>, date accessed: 3 December 2015. Please note that the U.S. Centers for Disease Control and Prevention recommend scrubbing hands for at least 20 seconds.

- Water treatment
 - *“Another way that we can stay healthy from germs is to treat our water. Can someone explain what I mean by water treatment?”* Wait for response. If no one responds, explain what water treatment is.
 - Way to clean water and get rid of germs in our water
 - *“What types of water treatment have you heard about?”* Use these answers for the histogram.
 - Activity: Histogram of different types of water treatment
 - Pass sticky notes out to all students in classroom.
 - Write the different types of water treatment on the board and explain what each of them is.
 - Chemical (e.g. Jik)
 - Filter
 - Boil
 - Do not treat water
 - Ask students to come to board (in groups of 5-8) to place their sticky note above the type of water treatment that their parents have at home.
 - Discuss the results.
 - Explain MadiDrops and how they work. Present them as one method of treating water among others.



- Water storage
 - *“Now, we know that treating our water can get rid of some of the unhealthy germs in our water. After treatment, it’s important that we store the water properly so that it remains clean.”*
 - Explain the spigot buckets that come with the MadiDrops and why they are a better method to hold water. Refer to F-Diagram.
 - Hands cannot touch water.
 - Flies stay out of water.

Part V: Review (10 minutes)

- Ask one or two students to give a basic summary of what they learned about water today. If there are any misconceptions, politely correct them.
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Assessment

Evaluation of this lesson plan was performed by continued observation of water drinking behavior. Observations were performed on a regular school day during which students were offered their regular water source and another bucket of water treated with a ceramic technology. The frequency of water drinking from each source was recorded and analyzed.

For Instructors: Additional Resources

UNICEF has multiple lesson plans and activities already established on the topic of water and sanitation. The link for Grades 6 through 8 is below.

http://teachunicef.org/sites/default/files/units/Water_and_Sanitation_Grades_6_to_8_0.pdf

Below are a couple basic outlines for lessons on water and hygiene.

<http://www.childrenforhealth.org/wash-lesson-plans/>

<http://resourcecentre.savethechildren.se/sites/default/files/documents/3848.pdf>

<http://thewaterproject.org/resources/lesson-plans/hand-washing-hangups>

The World Health Organization has an entire webpage dedicated to water, sanitation, and hygiene around the world.

http://www.who.int/water_sanitation_health/en/

References

- (1) Grandjean, A. C. Water Requirements, Impinging Factors, and Recommended Intakes. In *Nutrients in Drinking Water*; World Health Organization, Ed.; World Health Organization: Geneva, Switzerland, 2005; p 196.
- (2) Wagner, E. G.; Lanoix, J. N. *Excreta disposal for rural areas and small communities*, No. 39; World Health Organization: Geneva, 1958.

HOW TO WASH YOUR HANDS

Counselling Card

1

Wet your hands and lather them with soap (or ash).



2

Rub your hands together.



3

Rinse your hands with a stream of water.



4



Shake excess water off your hands and air dry them.



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