

**Lesson Plan 5: Water Quality in Emergencies****1 hour 15 minutes****Lesson Description**

The focus of this lesson is to explore the increased need for household water treatment in emergencies. Participants will practice the correct treatment of water using chlorine, and discuss how to teach people to treat and store their own water in emergency situations.

**Learning Outcomes**

At the end of this session participants will be able to:

1. Describe causes of water quality issues in emergencies
2. Describe the steps of the multi-barrier approach
3. Demonstrate how to properly treat water using chlorine
4. Identify ways of keeping stored water safe from contamination

**Materials**

- Flip chart paper
- Tape
- Markers
- Poster or PowerPoint of the Multi-Barrier Approach
- Poster or PowerPoint of Chlorine Disinfection
- Safe Storage Poster (See end of lesson plan)
- Chlorine Chart* (See Lesson Plan)
- Flex/Fact Sheets of Chlorine and PoU Options (1 each per participant)

**Preparation**

- Write the learning outcomes or lesson description on flip chart paper
- If using the PowerPoint, prepare the files and projector for display
- Prepare poster images or PowerPoint images
- Write the *Chlorine Chart* on the board or flip chart
- Print Flex/Fact Sheets of Chlorine and/or PoU Options (1 each per participant)

**Importance of Water****5 minutes**

1. Ask the participants: “Why do we need to talk about water during emergencies?”
2. Ask 1-2 people to volunteer responses

3. Summarize their ideas and add anything missing. *Be sure to include: During and after emergencies there may not be sufficient amounts of water for people, and the water that is available may be contaminated and unsafe to drink.*
4. Ask the participants: “What might be the effects of drinking unsafe, contaminated water?”
5. Ask 1-2 people to volunteer responses then summarize and add anything missing. *Be sure to include: The spread of diarrheal diseases such as cholera, epidemics, and other water-related diseases spread by contaminated water sources.*

### Water Contamination

5 minutes



1. Ask the participants to discuss with a partner: “Where do you normally get your water supply from?”
2. Ask for a few volunteers to provide their responses to the larger group. *Responses may include: piped water supply, communal taps, bottled water, wells, tankers, etc.*
3. Ask the participants: “Where does this water come from?”
4. Ask for a few volunteers to offer suggestions.
5. Explain to participants all water comes from three major sources – rain water, ground water, and surface water. Rain water is generally pure, but often not reliable or sufficient for large numbers of people. Surface water is easy to collect and often plentiful, but easily contaminated. Groundwater is often safer than surface water but harder to access.
6. Explain to participants that in emergency situations people often retrieve their water from less safe sources than in normal conditions, or from sources which have been damaged and are susceptible to contamination. For this reason it is important for individuals to know how to treat their own water and to store it safely to prevent the spread of disease.

### The Multi-Barrier Approach

15 minutes



1. Ask participants: “Has anyone ever treated their own water before?” “How did you do it?”
2. Ask a few participants to share their responses with the larger group.
3. Summarize their responses and state there are numerous ways we can treat our own water at a household level to ensure it is safe to drink.
4. Display a poster with the 5 steps to the multi-barrier approach or project the PowerPoint “Multi-Barrier Approach”.
5. Using the poster or PowerPoint explain the 5 steps to the multi-barrier approach. Explain that each is a step to ensure water quality, and the more barriers we have the safer our water is to drink.
6. Ask the participants, how people can treat or disinfect their water to ensure it is safe to drink. As WASH volunteers they should be able to communicate to people how to effectively treat their water and storage options.

7. Present the poster with PoU options. Ask the participants to prioritize the PoU options from the poster (at the time of emergency) and discuss the methods as per prioritization.
8. Participants will prioritize chlorination as is the most feasible option.

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### Treating Water with PoU options

**35 minutes**



1. Ask the participants if any of them use chlorination for water disinfection and if anybody says yes then ask them to explain which and how they use it.
2. With the help of poster explain what chlorination is, what types of chlorination are available in the market, how to use it and other important points to remember.
  - There are three forms of chlorine available in the market: liquid (Piyush, Piyush plus, Water guard, etc.), powder (bleaching powder), and tablet (Aqua tab).
  - The chlorine concentration of all of these is different and that's why quantity is also different.
  - Keep chlorine out of reach of children and babies
  - When using chlorine to treat water, always wait 30 minutes after dosing before drinking
  - It is important to use the right amount – do not just guess
  - Emphasize that in order for chlorine to be effective water cannot be turbid (high sediment.) If water is turbid, first settle or strain the water through a filter, then dose with chlorine.
3. Demonstrate use of Piyush, Piyush plus and Aquatab (whichever is available)
4. Ask 2 to 3 participants to demonstrate the methods.
5. After the practice, ask participants what if chlorine solution is not available or is out of stock.
6. Tell participants, that chlorine solution can be prepared with bleaching powder.
7. Present the poster of how to prepare chlorine solution to the participants.
8. Demonstrate the process of preparing solution while describing along with the poster.
  - Take 40 gms of bleaching powder (approximately 5 teaspoon) in a plastic jug and mix it with water to make a thick paste. Once the paste is made, add a liter of water to the paste and mix well. Let the solution settle for 5 minutes. After 5 minutes, pour the clear solution in a jerry can.
9. With the poster also explain the participants how to use thus made chlorine solution.

10. Tell the participants that different concentration of chlorine should be used in different measurement. Present below chart of chlorine concentration along with the measurement.

Concentration of Chlorine	Amount of Chlorine	Amount of water treated
0.7% of chlorine solution (Piyush plus)	1 ml	5 liters
1% of chlorine solution	1 ml	10 liters
5% of chlorine solution	40 ml	1000 liters
0.5% of chlorine (Piyush)	3 drops	1 liter
Aquatabs (20 mg available chlorine)	1 tablet	4/5 liters

11. For chlorination, the volume of water should be calculated rather than guessing it. For this, we can use a bucket or any container with definite volume to measure or simply calculate the volume.
12. Tell participants that in case of doubt that the water is already treated with chlorine, before chlorination water must be tested for FRC (free residual chlorine).
13. Demonstrate the use of FRC test and ask 2 to 3 participants to practice it.
- Fill the vial (tube) with water up to the neck.
  - Add 3 drops of reagent and shake well to see the color change.
  - No color indication in the water confirms absence of chlorine.
  - On the observation of yellow color, compare the color with the standard solution in the reagent bottle.
  - If the color of water confirms with 0.2- 0.5 mg/ L then the water is recommended for drinking.
14. With the help of poster, explain what boiling is, how much time is required to boil the water and other important points to remember.
- If the water is dirty, sediment it first before boiling or filter water through clean cloth
  - Half boiled water is not good
15. Ask the participants whether they know about SODIS. If yes, ask them to share what they know.

16. Again with the help of poster explain what SODIS is, demonstrate how to do SODIS.

And other points to remember.

- Scratched, blurry, colorful bottles are not suitable for SODIS
- During rainy days, SODIS is not effective

17. Discuss with the participants about filtration method in emergency situation.

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### Safe Storage of Water

**10 minutes**



1. Ask the participants: “After people treat their water with PoU options, what else should they know how to keep it safe?”
2. Ask 1-2 participants to volunteer suggestions. *Responses should include: Store it safely to avoid re-contamination.*
3. Return to the Multi Barrier Approach PowerPoint or poster. Explain the importance of storing water safely to avoid re-contamination, especially for people in temporary housing or camps which have less sanitary conditions.
4. Showing the safe storage slides from the Multi Barrier Approach PowerPoint or poster, ask participants: “What are some features of good and bad safe storage containers?” *Responses should include:*
  - a. *Good: Tightly fitting lid or cover, Tap or narrow opening to prevent hands or dipping into the water, stable, solid, easy to empty and refill, etc.*
  - b. *Bad: No lid or cover, wide opening that is easy to dip hands or objects into, easy to knock over or tip, etc.*

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### Review




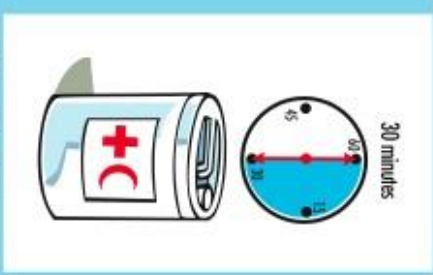

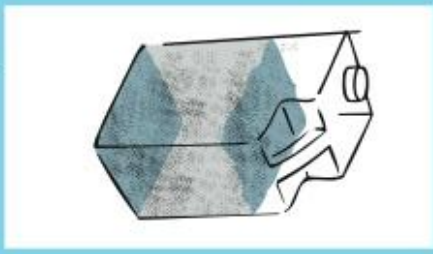


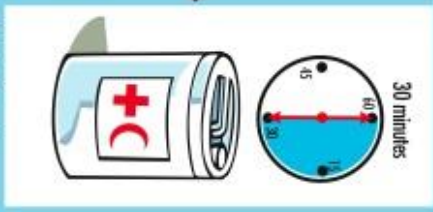

**5 minutes**



1. In pairs ask participants to discuss the 5 barriers of the multi-barrier approach and the role of each.
2. Ask participants to highlight the most important guidelines for the use of chlorine.

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### Reflections on Lesson

 <p>Wash your hands with water and soap or ash.</p>	 <p>Is your water clear?</p>	 <p>Put 1 tablet in the container. Close container.</p>	 <p>Wait 30 minutes.</p>	 <p>Water is now ready.</p>
 <p>Is your water dirty looking?</p>	 <p>Filter the water through cloth.</p>	 <p>Add 2 tablets to the container. Close container.</p>	 <p>Wait 30 minutes.</p>	 <p>Water is now ready.</p>

(IFRC 2008)



