

Introduction to Household Water Treatment and Safe Storage



2018

Trainer Manual





CAWST, the Centre for Affordable Water and Sanitation Technology, is a nonprofit organization that provides training and consulting to organizations working directly with populations in low and middle income countries who lack access to clean water and basic sanitation.

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TOOLKIT CONTENTS

This trainer manual accompanies the following additional resources:

Reading Materials



Technical Briefs

Short documents that summarize the key concepts covered in this workshop. These are required reading for trainers and recommended reading for participants.



Fact Sheets

1-page documents that highlight important facts about different HWTS options. Required for some of the lessons in this workshop.



Technical Information Sheets

More detailed fact sheets, these provide additional information about selected HWTS options. These are recommended reading for trainers.



Case Studies

Program profiles that summarize the approaches used by different organizations and businesses for their HWTS initiatives. Required for Lesson Plan: HWTS Implementation.

Learning Aids



PowerPoint Presentations

Visual aids for certain lessons.



Participant Workbook

Optional handout to help participants organize ideas, record notes, and answer questions throughout the workshop.



Disease Cards

Small posters summarizing key facts about water-related diseases. Required for some activities throughout this workshop.



Multi-Barrier Approach Sorting Cards

Drawings of approaches for source protection, safe transportation, sedimentation, filtration, disinfection, and safe storage. Required for Lesson Plan: Multi-Barrier Approach.

Logistics



Workshop Agenda

Adaptable schedules for the workshop.



Pre-Workshop Questionnaire

Tool for learning about participants as you plan for the workshop.



Workshop Evaluation

Handouts that can be used to solicit feedback after the workshop.



Workshop Certificate Template



Workshop Outline

Summarizes the content, intended participants, and delivery style of the workshop

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Acronyms

BSF	biosand filter
CAWST	Centre for Affordable Water and Sanitation Technology
HWTs	Household Water Treatment and Safe Storage
MDG	Millennium Development Goal
NGO	nongovernmental organization
NTU	nephelometric turbidity units
POU	point-of-use
SDG	Sustainable Development Goal
SODIS	solar water disinfection
TDS	total dissolved solids
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation, and Hygiene
WHO	World Health Organization

Abbreviations

L	liter
mg	milligram
nm	nanometre
µm	micron or micrometre

Introduction

This Trainer Manual is for people who organize and facilitate workshops about Household Water Treatment and Safe Storage (HWTS). These lesson plans and accompanying materials should be adapted to the needs of the participants you train and the context of the country where you work.

This workshop is based on academic research, practitioner experiences, and lessons learned by staff at CAWST (the Centre for Affordable Water and Sanitation Technology).

Household Water Treatment and Safe Storage Trainer Toolkit

This trainer manual is designed to be used with the following CAWST resources (freely available in the HWTS Trainer Toolkit at www.resources.cawst.org):

- Learning Aids
 - PowerPoint Presentations: slides for certain lessons
 - HWTS Participant Workbook: handout to help participants organize ideas, record notes, and answer questions throughout the workshop
 - Disease Cards: Small posters summarizing key facts about water-related diseases (required for some activities in this workshop)
 - Multi-Barrier Approach Sorting Cards: Drawings of options for source protection, safe transportation, sedimentation, filtration, disinfection, and safe storage (required for “Lesson Plan: Multi-Barrier Approach”)
- Reading Materials
 - Technical Briefs: Short documents that summarize the key concepts covered in this workshop (required reading for trainers and recommended reading for participants)
 - Fact Sheets: 1-page documents that highlight important facts about different HWTS options (Required for some of the lessons in this workshop)
 - Technical Information Sheets: More detailed than the Fact Sheets, these provide additional information about selected HWTS options (recommended reading for trainers)
 - Case Studies: Program profiles that summarize the approaches used by different organizations and businesses for their HWTS initiatives (required for “Lesson Plan: HWTS Implementation”)
- Logistics
 - Workshop Agendas: Adaptable schedules for the workshop
 - Preworkshop Questionnaire: Tool for learning about participants as you plan for the workshop
 - Workshop Evaluation: Handouts that can be used to solicit feedback after the workshop
 - Workshop Certificate Templates
 - Workshop Outline

Each lesson plan within this manual also requires specific materials. These materials are listed on the first page of each lesson and may include PowerPoint files, activity cards, handouts (found at the end of certain lessons), flip chart paper, sticky notes, household water treatment technologies, and markers.

Workshop Overview

Participants

Lessons in this workshop are designed for groups of 10–20 participants who are literate and have prior experience in Water, Sanitation, and Hygiene (WASH).

The ideal participants are people responsible for making decisions about HWTS initiatives. For example, they may be responsible for selecting HWTS options, selling water treatment products, creating policies and regulations related to water treatment, or implementing a household water treatment program.

Goal

After participating in this workshop, participants will be able to select appropriate HWTS solutions for their context. They will have a greater awareness of factors influencing behaviour change and will be better equipped to support correct, consistent, and continued use of HWTS in the communities they serve.

Topics and Flow

This workshop covers four core themes:



Participants will begin the workshop by exploring why safe drinking water matters, how the global community measures access to safe drinking water, and current evidence about the effectiveness of HWTS solutions (**Safe Drinking Water and HWTS**).

Next, participants will draw their water supply systems and identify risks to drinking water safety. They will learn about water-related diseases in their region and will identify barriers (technologies and behaviours) that can be used to protect water from the source to the user's glass (**Water Safety and the Multi-Barrier Approach**).

With this understanding of risks and barriers, participants take a hands-on look at options for sedimentation, filtration, disinfection, and safe storage of drinking water. They evaluate the benefits and limitations of various options, and they describe how appropriate water treatment and safe storage methods can be combined within a Multi-Barrier Approach (**HWTS Options**).

Finally, participants explore what's needed for HWTS initiatives to be successful. With scenarios and case studies to guide them, participants explore best practices for technology selection, behaviour change, and HWTS implementation (**HWTS Implementation**).

Learning Outcomes

Table: Participant Learning Outcomes and Activities

Learning outcomes describe what the participants will be able to do by the end of the workshop to demonstrate increased knowledge, improved skills, or changes in attitude. This table provides a broad overview of the learning outcomes and activities within each lesson plan in this manual. The lesson plans provide detailed instructions and trainer tips.

Theme	LP#	Lesson Plan	Learning Outcomes	Activities
Overview	1	Workshop Introduction	- Describe the work of the host organization - Explain the agenda for the workshop - List the ground rules that will be followed during the workshop - Discuss what they expect to learn from the workshop - Rate their current knowledge of workshop topics	- Welcome & Overview: Introduction - Icebreaker Activity: Getting to Know Each Other - Group Brainstorm: Ground Rules - Self Assessment: Rating - Discussion: Learning Expectations
Safe Drinking Water and HWTS	2	Safe Drinking Water	- Explain why safe drinking water is important - Define safe drinking water - Describe some of the challenges with providing safe drinking water for all - Explain why safe drinking water must be combined with the other pillars of WASH	- Brainstorm: Introduction - Presentation: Importance of Safe Drinking Water - Quiz: Safe Drinking Water Statistics (Optional) - Problem Tree: Challenges - Group Work: WASH for Healthy Homes - Workbook: Review
	3	HWTS: What is it and When is it Effective?	- Define HWTS - Describe the conditions required for HWTS to have the greatest health benefits - List possible barriers to correct, consistent, and continued use of HWTS	- Discussion: Introduction - Presentation: Defining HWTS - Presentation: HWTS and Health, the 3 Cs - Group Discussion: 3 Cs (Optional) - Debate: HWTS vs. Community Water Treatment (Optional) - Workbook: Review

Theme	LP#	Lesson Plan	Learning Outcomes	Activities
	4	Global Agenda for Safe Drinking Water	- Explain how safe drinking water is defined and measured under the MDGs and SDGs - Describe how HWTS contributes to the SDGs - Describe local government standards or regulations relevant to HWTS (Optional)	- Scenario: Introduction - Small Group Discussion: MDGs, SDGs, Human Right to Water - Mapping Activity: HWTS and the SDGs - Presentation: Local Standards and Regulations (Optional) - Role-Play: Review
Water Safety & Multi-Barrier Approach	5	Risks to Water Safety	- Define water supply system - Identify risks to water safety along a water supply system	- Group Discussion: Introduction - Group Discussion: Defining Water Supply System - Drawing: Water Supply System - Group Brainstorm: Risks to Water Safety - Workbook: Review
	6	Drinking Water Quality	- Describe how to prevent common water-related diseases - List and describe the 4 different groups of pathogens - List and describe common chemical contaminants - Discuss factors that affect the acceptability of drinking water	- Brainstorm: Introduction - Presentation: Aspects of Drinking Water Quality - Presentation and Role-Play: Microbiological and Chemical Aspects - Meet & Greet: Disease Profiles (Optional) - Presentation: Acceptability and Radiological Aspects - Paper Cabbage: Review
	7	The Multi-Barrier Approach	- Explain why the Multi-Barrier Approach is important - List and give examples of the 6 barriers in the Multi-Barrier Approach - Identify household-level solutions that fit within the Multi-Barrier Approach	- Visualization & Discussion: Introduction - Small Group Brainstorm: Identifying Barriers - Presentation: Multi-Barrier Approach - Sorting Activity: Barriers - Discussion: Prioritizing Barriers - Workbook: Review
	Optional 1	HWTS and Water Safety Planning	- Define water safety planning - Describe the process of water safety planning for small communities - Explain how HWTS and water safety planning add value to each other	- Discussion: Introduction - Presentation: Stages of Water Safety Planning - Pair Work: Water Safety Planning and HWTS - Personal Reflection: Review

Theme	LP#	Lesson Plan	Learning Outcomes	Activities
HWTS Options	8	Sedimentation Options	- Explain when sedimentation is required in an HWTS system - Demonstrate how to sediment water with and without coagulants - Assess the advantages and disadvantages of selected sedimentation options	- Demonstration: Introduction - Pair-Share: Why Sedimentation? - Discussion: How to Sediment - Station Work: Sedimentation Options - Matrix: Sedimentation Options and Diseases (Optional) - Discussion: Review
	9	Filtration Options	- Describe how filtration removes particles from water - Explain how pore size affects filter performance - Demonstrate water filtration using selected filters - Assess the advantages and disadvantages of selected household water filters	- Demonstration: Introduction - Physical Activity: Pore Size - Station Work: Filter Options - Matrix: Filter Options and Diseases (Optional) - Promotional Advertisement: Review
	10	Disinfection Options	- Describe the role of water disinfection within the Multi-Barrier Approach - Describe how to use common household water disinfection methods - Assess the advantages and disadvantages of selected disinfection methods	- Discussion: Introduction - Station Work: Disinfection Options - Matrix: Disinfection Options and Diseases (Optional) - What I Learned, What I Wonder: Review
	11	Safe Storage & Handling	- Explain the importance of safe water storage - List the characteristics for a safe water storage container - Demonstrate how to clean a storage container - Describe safe water handling practices	- Discussion: Introduction - Ranking & Brainstorm: Criteria for Safe Storage Containers - Brainstorm: Safe Handling Practices - Demonstration: Cleaning Storage Containers - Pair-Share: Review

Theme	LP#	Lesson Plan	Learning Outcomes	Activities
	Optional 2	Chlorine Dosing	- Describe how chlorine disinfects water - Compare different chlorine products - Calculate an appropriate chlorine dose for given scenarios	- Sharing Experience: Introduction - Brainstorm & Presentation: Types of Chlorine Products - Pair Work & Presentation: How Chlorine Works - Practice Scenarios: Determining the Chlorine Dose - Role-Play: Review
	Optional 3	Household Membrane Filters	- Explain what membrane filters are - Describe different membrane filter cartridges and setups - Describe some of the limitations of membrane filters	- Discussion: Introduction - Presentation: Membrane Filters - Presentation: Considerations and Limitations - Group Discussion: Review
HWTs Implementation	12	Selecting HWTs Options	- List criteria to consider when selecting HWTs options - Explain why different user groups prioritize different criteria - Suggest a process for selecting HWTs options for a given scenario	- Scenario: Introduction - Pair-Share & Presentation: Criteria and Process for HWTs selection - Scenarios: HWTs Option Selection - Workbook: Review
	13	Behaviour Change and HWTs	- Describe barriers that affect behaviour change - Create strategies to support households as they adopt correct, consistent, and continued use of HWTs	- Discussion: Introduction - Presentation: What is Behaviour Change? - Categorization: Factors that Influence Behaviour - Group Brainstorm: Supporting Behaviour Change - Individual Reflection: Review
	14	HWTs Implementation	- List the components required for HWTs implementation - Describe why each component is important - Analyze the approach used in a given HWTs implementation case study	- Pair-Share: Introduction - Presentation: Components of Implementation - Case Study Analysis: Implementation Examples - Pass the Ball: Review

Theme	LP#	Lesson Plan	Learning Outcomes	Activities
	15	Water Quality Testing	• Discuss how water quality testing contributes to successful HWTS implementation • Describe how to test for common water quality parameters • Decide which parameters to prioritize for a given scenario	• Discussion: Introduction • Discussion: What to Test? • Presentation & Demonstration: Acceptability Parameters • Presentation & Optional Demonstration: Microbiological Parameters • Presentation: Chemical Parameters • Scenarios: What to Test? (Optional) • Quiz: Review
Overview	16	Workshop Closing	• Assess a change in their knowledge of workshop topics • Map what they learned • Describe where to find additional information • Evaluate the workshop	• Group Discussion: Introduction & Parking Lot Review • Self-Assessment: Rating • Mind Map: Concept Review • Individual / Group Work: Action Plan • Certificates, Group Photo & Activity: Celebrating the Workshop • Individual Reflection: Workshop Evaluation

Behavioural Outcomes

Following the workshop, the participants should be able to:

- Advocate for HWTS as a way of supporting progress towards Sustainable Development Goal (SDG) targets
- Advocate for a Multi-Barrier Approach to keep water safe from the source to the user's glass
- Work with community members to select appropriate HWTS options
- Incorporate appropriate HWTS options into WASH programs and businesses
- Create implementation strategies that consider the 6 components of HWTS initiatives
- Use behaviour change strategies to encourage correct, consistent, and continued use of HWTS

Agendas

The general outline of the workshop is as follows:

- **Workshop introduction:** The initial lesson allows participants and trainers to get to know one another, check their current understanding of topics, and discuss their expectations.
- **Lessons:** Each individual lesson includes a list of materials, required reading, and a series of activities trainers can use to introduce the topic, help participants meet learning outcomes, and review the content.
- **Breaks and lunch:** To keep people working and feeling positive, breaks are needed. Plan for a mid-morning and mid-afternoon break that allows people to use the washroom, have a drink, or eat a snack.
- **Daily opening:** Start the day with a review of the material learned during the previous day. This practice helps focus the participants' attention and allows the trainer to check the participants' understanding of the material. See the review tools and questions at the end of this manual.
- **Daily closing:** End the day by asking the participants for feedback and questions. Suggested daily evaluation activities are included at the end of this manual.
- **Workshop closing:** The final lesson is an opportunity to review content, check understanding, celebrate learning, and create plans for action and learning that participants can follow after the workshop.
- **Workshop evaluation:** The opportunity to provide feedback allows participants to assess the strengths and weaknesses of the workshop so further improvements can be made. See the template in the trainer toolkit.
- **Trainers debrief:** This daily exercise allows the trainers to discuss what went well, what areas of the day could be improved, and what needs to be done for the next day and in the future.

Sample Agendas

The agenda for this workshop will vary according to the training needs of the participants. CAWST recommends that trainers modify the agenda every time they deliver this workshop to make sure it meets the needs of the participants. Sample agendas are provided on the following pages.

Trainers are encouraged to create their own agendas by combining these lessons with relevant lessons from other CAWST workshops (available from www.resources.cawst.org), such as:

- Drinking Water Quality Testing – Use lessons or activities from this workshop to help participants who want to practice testing for different water quality parameters.
- Community WASH Promotion – Use lessons or activities from this workshop to help participants who want to practice conducting household visits to monitor HWTS use and effectiveness.

3-Day Agenda

Standard agenda. Some lessons can be longer or shorter, depending on how many optional activities are included.

	Day 1	Day 2	Day 3
9–10:30	Workshop Introduction (50 min) Safe Drinking Water (55–70 min)	Opening (15 min) Multi-Barrier Approach (70 min)	Opening (15 min) Behaviour Change (55 min)
Break			
10:45–12:00	Safe Drinking Water (continued) HWTS: What and When? (45–70 min)	Sedimentation Options (50–70 min) Filtration Options (70–80 min)	HWTS Implementation (85 min)
Lunch			
13:00–14:30	Global Agenda for Safe Drinking Water (65–75 min) Risks to Water Safety (45 min)	Filtration Options (continued) Disinfection Options (50–60 min)	Water Quality Testing (45–80 min)
Break			
14:45–16:30	Drinking Water Quality (55–80 min) Closing (5 min)	Safe Storage & Handling (35 min) Selecting HWTS Options (50 min) Closing (5 min)	Workshop Closing (85 min)

Optional Lessons to Consider Adding: Water Safety Planning & HWTS, Chlorine Dosing, Membrane Filters

2.5-Day Agenda

Shortened agenda: All optional activities within the lesson plan are omitted. This agenda requires shortening the workshop closing lesson plan.

	Day 1	Day 2	Day 3
9–10:30	Workshop Introduction (50 min) Safe Drinking Water (55 min)	Opening (15 min) Multi-Barrier Approach (continued) Sedimentation Options (50 min)	Opening (15 min) HWTS Implementation (85 min)
Break			
10:45–12:00	Safe Drinking Water (continued) HWTS: What and When? (45 min) Global Agenda for Safe Drinking Water (65 min)	Filtration Options (70 min)	Water Quality Testing (45 min) Workshop Closing (35 min)
Lunch			
13:00–14:30	Global Agenda for Safe Drinking Water (continued) Risks to Water Safety (45 min)	Disinfection Options (50 min) Safe Storage & Handling (35 min)	
Break			
14:45–16:30	Drinking Water Quality (55 min) Multi-Barrier Approach (70 min) Closing (5 min)	Selecting HWTS Options (50 min) Behaviour Change (55 min) Closing (5 min)	

3.5-Day Trainer Agenda

Longer agenda: includes all optional activities and lessons.

	Day 1	Day 2	Day 3	Day 4
9–10:30	Workshop Introduction (50 min) Safe Drinking Water (70 min)	Opening (15 min) Multi-Barrier Approach (70 min)	Opening (15 min) Selecting HWTS Options (50 min) Behaviour Change (55 min)	Opening (15 min) HWTS Implementation (85 min)
Break				
10:45–12:00	Safe Drinking Water (continued) HWTS: What and When? (70 min)	Sedimentation Options (70 min)	Chlorine Dosing (75 min)	Workshop Closing (85 min)
Lunch				
13:00–14:30	Global Agenda for Safe Drinking Water (75 min) Risks to Water Safety (45 min)	Filtration Options (80 min)	Household Membrane Filters (40 min) Water Safety Planning & HWTS (40 min)	
Break				
14:45–16:30	Risks to Water Safety (continued) Drinking Water Quality (80 min) Closing (5 min)	Disinfection Options (60 min) Safe Storage & Handling (35 min) Closing (5 min)	Water Quality Testing (80 min) Closing (5 min)	

2-Day Agenda

Shortened agenda, focusing on HWTS options and omitting in-depth discussions about drinking water quality and HWTS implementation. This agenda requires shortening the workshop opening and closing lesson plans, and omitting all optional activities.

	Day 1	Day 2
9–10:30	Workshop Introduction (30 min) Safe Drinking Water (55 min)	Opening (15 min) Filtration Options (70 min)
Break		
10:45– 12:00	HWTS: What and When? (45 min) Risks to Water Safety (45 min)	Disinfection Options (50 min) Safe Storage & Handling (35 min)
Lunch		
13:00– 14:30	Multi-Barrier Approach (70 min)	Selecting HWTS Options (50 min) Behaviour Change (55 min)
Break		
14:45– 16:30	Sedimentation Options (50 min) Closing (5 min)	Behaviour Change (continued) Workshop Closing (35 min)

Suggested variation: combine the sedimentation, filtration, and disinfection lessons into a single afternoon lesson (have stations for all three within the same lesson). Add Lesson Plan: HWTS Implementation on the second morning.

Lesson Plans



50 minutes total

Lesson Plan Workshop Introduction

Overview of Activities

1. **Welcome & Overview:** Introduction
2. **Icebreaker Activity:** Getting to Know Each Other
3. **Group Brainstorm:** Ground Rules
4. **Self-Assessment:** Rating
5. **Discussion:** Learning Expectations

Learning Outcomes

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

1. Describe the work of the host organization
2. Explain the agenda for the workshop
3. List the ground rules that will be followed during the workshop
4. Discuss what they expect to learn from the workshop
5. Rate their current knowledge of workshop topics

Materials

- ☐ Name tags (optional)
- ☐ Participant workbook (1 per participant)
- ☐ Pens (1 per participant)
- ☐ Coloured pens or pencils (several per participant)
- ☐ Flip chart or handouts with the workshop agenda
- ☐ Flip chart papers with the following titles: "Safe Drinking Water Matters to Me Because...", "Group Agreement," "Parking Lot," and "Learning Expectations"

Recommended Reading

- ☐ Trainer Essential: Qualities of an Effective Workshop

10 minutes



Welcome & Overview: Introduction

1. Introduce yourself, any other trainers, and any special guests.
2. Introduce your organization and CAWST.
3. Introduce the training: provide an overview of what will be covered, the methods you will use, and your expectations of the participants.
4. Review the agenda for the day. Ask the participants if there are any issues regarding the time allocated for the workshop. Make necessary adjustments, if needed, with input and agreement from the participants.
5. Discuss workshop logistics, including the building layout, the location of the bathrooms, and how to access first aid.

Key Points

- This workshop is an introduction to household water treatment and safe storage (HWTS). The basics of the following topics will be covered: drinking water quality, the Multi-Barrier Approach, HWTS options, and HWTS implementation. The workshop will not go into detail.
- This workshop is participatory. There will be lots of small group work. The success of the workshop depends on everyone participating.
- All people in the room, including the facilitator, have things to learn and things to teach.

15 minutes



Icebreaker Activity: Getting to Know Each Other

1. Ask the participants to each find a partner. Explain that they will be introducing their partners to the group by providing 3 pieces of information about them:
 - The name of their partner
 - Why their partner personally cares about safe drinking water
 - A fun fact about their partner
2. Tell the partners they have 5 minutes to get to know each other. *Trainer Tip: Write the 3 pieces of information they must share with the group at the front of the room to remind them what they should talk about.*
3. Ask the participants to introduce their partners to the full and share the 3 pieces of information.
4. As the participants mention the reasons their partners care about safe drinking water, record those reasons on the flip chart under the title **“Safe Drinking Water Matters to Me Because....”** *Trainer Tip: Keep this flip chart for the next lesson.*

5 minutes

Group Brainstorm: Ground Rules



1. Explain: “Now that we know each other, let’s decide how we will work together this week.”
2. Explain that the ground rules form an agreement created by the group that will allow everyone to learn together.
3. Ask the participants to quietly reflect on their past training or learning experiences. Ask: “What made those experiences positive? Negative?”
4. Ask the participants to share ideas of how they can create a positive learning environment for everyone. Record their ideas under the title “**Group Agreement**.” Explain that other ground rules can be added during the workshop.
5. Place the “Group Agreement” in a place where it can be seen for the rest of the workshop.
6. Reveal the “**Parking Lot**” flip chart and explain how the group will use it:
 - The “Parking Lot” is a tool the group can use to document unresolved questions or ideas that are outside the scope of the workshop’s current discussion.
 - The facilitator will come back to the Parking Lot at the end of the workshop (or when appropriate during the workshop) to address the questions or suggest additional resources.

Trainer Tip

Make sure everyone agrees to the ground rules you record. Examples of ground rules are: be on time, silence cell phones, and respect other participants’ time and contributions.

10 minutes

Self-Assessment: Rating



1. Explain: “Each of you bring valuable knowledge and experience to this workshop. We are now going to do a short activity to find out what people already know about the concepts we will discuss.”
2. Ask the participants to look at the list of concepts provided in the first section of their **workbooks**. Ask them to write a number from 1–5 next to each of the concepts based on their level of confidence talking about the subject:
 - 5 means they are very confident talking about the subject and know a lot about it.
 - 1 means they don’t know much about it.
 - If there are any specific things they are hoping to learn about a particular topic, they can write their questions or expectations in the workbook table under the heading “**Personal Learning Goals**” (optional).

Trainer Tip

It’s important for you to see how the participants rate their current knowledge or level of confidence about each subject. This knowledge will help you adjust what you ask and teach in later lessons. On a break later today, ask the participants to leave their workbooks open to the “Self-Assessment” page or to hand their workbooks to you so you can quickly review what they wrote.

3. Ask a few participants to volunteer to share which concepts they know the most about and which ones they know the least about. If they mention specific learning expectations, record these points on the flip chart under the title “**Learning Expectations.**”
4. Explain: “All of these topics are closely related to each other.” Show the participants the next page in their **workbooks**. Explain that at the end of the workshop they will make a mind map showing what these topics mean and how the topics relate to each other. The participants will also go back to their self-assessment to see how their confidence scores (from 1–5) changed.
5. Encourage the participants to begin thinking about how these topics connect to each other in anticipation of the mind map they will make in the last lesson.

10 minutes



Discussion: Learning Expectations

1. Refer to the list of learning expectations recorded. Ask: “Is there anything else you want to learn or accomplish in this workshop?” Add any additional ideas they mention to the “Learning Expectations” flip chart.
2. Go through each learning expectation, clearly explaining which ones will be covered in the workshop and how you will support the participants to learn about topics beyond the scope of this workshop.
3. Refer the participants to the “Overview” pages in their **workbooks**. Show them how the workbook is organized and the basic modules/topics that will be covered.

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55 – 70 minutes total

Lesson Plan Safe Drinking Water

Overview of Activities

1. **Brainstorm:** Introduction
2. **Presentation:** Importance of Safe Drinking Water
3. **Quiz:** Safe Drinking Water Statistics (Optional)
4. **Problem Tree:** Challenges
5. **Group Work:** WASH for Healthy Homes
6. **Workbook:** Review

Learning Outcomes

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

1. Explain why safe drinking water is important
2. Define safe drinking water
3. Describe some of the challenges with providing safe drinking water for all
4. Explain why safe drinking water must be combined with other pillars of WASH

Materials

- ☐ PowerPoint: Safe Drinking Water
- ☐ Markers (1 set per group)
- ☐ Flip chart papers with “problem trees” drawn on them (1 paper per group)
- ☐ WASH for Healthy Homes Icons (6 pages; see end of lesson)

Recommended Reading

- ☐ Technical Brief: Safe Drinking Water and the Global Development Agenda
- ☐ Technical Brief: Introduction to Drinking Water Quality for Household Water Treatment and Safe Storage (HWTS) Implementers



Brainstorm: Introduction

Use “PowerPoint: Safe Drinking Water” for this introduction.

1. Explain: “We’re all here because we care about safe drinking water. In this session, we’re going to talk about why safe drinking water matters.”
2. Present the “Learning Outcomes” slide or provide an overview of the lesson.
3. Refer to the list on the flip chart titled “Safe Drinking Water Matters to Me Because...” and present the corresponding slide. Explain: “When you introduced yourselves in our workshop opening, you already shared reasons why safe drinking water matters to you.”
Trainer Tip: If you did a different opening activity, ask the participants to form small groups and share their reasons why safe drinking water matters to them.
4. Ask: “Is there anything else you would like to add to this list?” Add additional ideas to the flip chart until the participants are satisfied with the list.



Presentation: Importance of Safe Drinking Water

Use “PowerPoint: Safe Drinking Water” for this activity.

1. Explain that there are many reasons why safe drinking water is important, including all the reasons the participants already listed.
2. Summarize the 3 key reasons why safe drinking water is important:
 - Health: about 1,000 children die each day because of unsafe drinking water, inadequate sanitation, and poor hygiene (Pruss-Usten, 2014).
 - Growth and development: frequent infections can damage children’s intestines, making them less able to absorb nutrients and grow.
 - Opportunities: work and school opportunities decrease when people spend more time at home because they or family members are sick.



Presentation: Defining Safe Drinking Water

Use “PowerPoint: Safe Drinking Water” for this activity.

1. Say to the participants: “We’ve been talking about safe drinking water all morning, but we haven’t defined what it is.”
2. Ask: “What is safe drinking water? How do you decide if water is safe or unsafe?” Record some of their ideas and then reveal the World Health Organization (WHO) definition. Explain what the definition means in simple terms.
3. Have the participants imagine that they are visiting a household. Ask: “How would you decide if the household’s drinking water is safe?” Briefly discuss and explain the role of WHO Guidelines and national standards. *Trainer Tip: Refer to key points.*
4. Provide an overview of local standards, if relevant.
5. Explain that this workshop will cover different types of contaminants and how to measure them in later lessons.

Key Points

- For drinking water to be safe, it must have low enough concentrations of chemicals and pathogens that it is unlikely to make people sick or affect their health, even when they drink it for their whole lives, including vulnerable life stages (babies, pregnant women, elderly people).
- Water quality testing, which provides results that can be compared with WHO Guidelines and national standards, can help people decide if contaminants are at low enough concentrations (below WHO guideline values) to be safe.
- If testing is expensive or difficult to do, people can sometimes infer how safe the drinking water is based on the type of source, treatment methods, and how water is handled and stored.

15 minutes

Group Quiz: Safe Drinking Water Statistics (Optional)



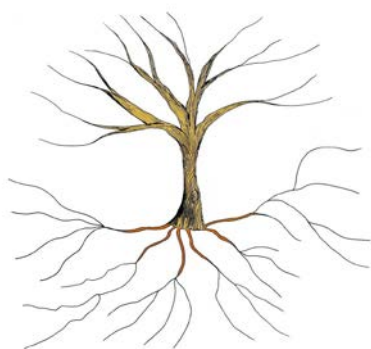
Use “PowerPoint: Safe Drinking Water” for this activity.

1. Explain: “Now that we have a common understanding of why safe drinking water matters, we will look at some statistics.”
2. Divide the participants into groups of 4. Ask each group to come up with a team name. Explain that you will ask a question and they will need to guess the statistic. The team with the answer closest to the actual statistic will win a point.
3. Tell the teams that you will give them 1 minute to discuss and write down an answer for each question. You will then ask each team to say its answer, and then you will tell them the correct answer and give a point to the closest team.
4. Ask the following questions (shown on the PowerPoint slides):
 - Question 1. “How many people in the world rely on a water source that is fecally contaminated?”
Answer: 1.8 billion people (Bain et al, 2014)
 - Question 2. “What percentage of the world’s population uses a safely managed source?” *Trainer Note: This is defined by the WHO/UNICEF as a source that is available on a person’s property when needed and is free of pathogens and priority chemicals.*
Answer: 71 % (WHO/UNICEF 2017)
 - Question 3. “What percentage of people living in rural areas use piped water supplies?”
Answer: 40% (vs. 80% of those in urban settings) (WHO/UNICEF 2017)
 - Question 4. “How many people collect water directly from surface water sources (such as lakes, ponds, and rivers)?
Answer: 159 million people, or about 2% of the world’s population (Note: 6 out of 10 of these people live in sub-Saharan Africa) (WHO/UNICEF 2017)
5. Show the world map with the proportion of the population using at least basic services.
6. Ask: “How do these statistics make you feel?”
7. Explain that although the world has made significant progress in increasing access to safe drinking water, there is a long way to go before everyone has safely managed water sources they can rely on.

Problem Tree: Challenges



1. Explain: “We know the importance of safe water for health and development. And yet, there are still millions of people that lack access to safe water. Now we’re going to explore some of the causes and consequences of this problem.”
2. Optional: If you want to make the exercise locally relevant, share some statistics about the water and sanitation situation in the local context. Ask the participants: “Are these statistics accurate?” Discuss any problems there are with the statistics, if relevant. Ask the participants to share their understanding of the local situation as it relates to safe drinking water access.
3. Divide the participants into groups of 4–6 people. Give each group a piece of flip chart paper with a **problem tree** drawn on it. Ask them to write “limited access to safe drinking water” on the trunk of the tree.



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Trainer Tip

Here are some examples of problems the participants may list:

- Remote communities
- Increased agricultural and industrial activities
- Financing challenges
- Government inaction
- Climate change
- Lack of incentives or training
- Lack of sanitation facilities

4. Ask the participants to brainstorm some of the problems contributing to limited access to safe drinking water in their communities. Ask them to write each problem as one of the “roots” of the tree.
5. Ask the participants to brainstorm some of the consequences of limited access to safe drinking water in their communities. Ask them to write these consequences on the “branches” of the tree.
6. Ask the groups to hang their trees on the wall and to walk around to view the trees made by the other groups.
7. Explain: “In the next lessons, we’ll discuss which of these challenges HWTS can address.”

Group Work: WASH for Healthy Homes



Use “PowerPoint: Safe Drinking Water” and prepared copies of the **Healthy Home Icons** (6 pages; see end of lesson) for this activity.

1. Explain: “This lesson and most of this workshop focuses on safe drinking water. However, safe drinking water is only one component of WASH.”
2. Ask: “What is WASH?” After the participants answer, reveal and describe the first 3 icons on the PowerPoint slide or tape the first 3 icons on the wall (water, sanitation, and hygiene).
3. Ask: “Why do researchers and implementers often focus on these WASH components as a group instead of addressing them individually?”
 - Each one on its own is not enough to prevent disease. For public health, all 3 WASH components are important in combination.
4. Reveal the next 3 icons on the slide. Ask the participants to describe what they show. After the participants answer, describe the next 3 WASH components (clean environment, safe food, shared responsibility).
5. Explain: “These 6 components are all included in what we call ‘WASH for Healthy Homes’.” *Trainer Note: See the Community WASH Promotion Healthy Homes Monitoring Forms for further explanation on the different components.*
6. Divide the participants into 5 groups. Hand out 1 of the icons and a piece of flip chart paper to each group. Do not hand out the safe drinking water icon since that category was already discussed.
7. Ask the groups to write the following 2 questions on their flip chart paper, and to discuss and record their ideas:
 - “Why is this component of WASH for healthy homes important?”
 - “What activities can a household do to address this component?”
8. Give each group 5 minutes to discuss and record their ideas.
9. Ask the groups to share some of the key points of their discussion. Expand on their ideas as needed.

5 minutes

Review: Workbook



1. Ask the participants to record answers to the following questions in their **workbooks**:
 - Why is safe drinking water important?
 - Title and give 1 or 2 examples for each of the components of WASH for Healthy Homes

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Drinking Safe Water



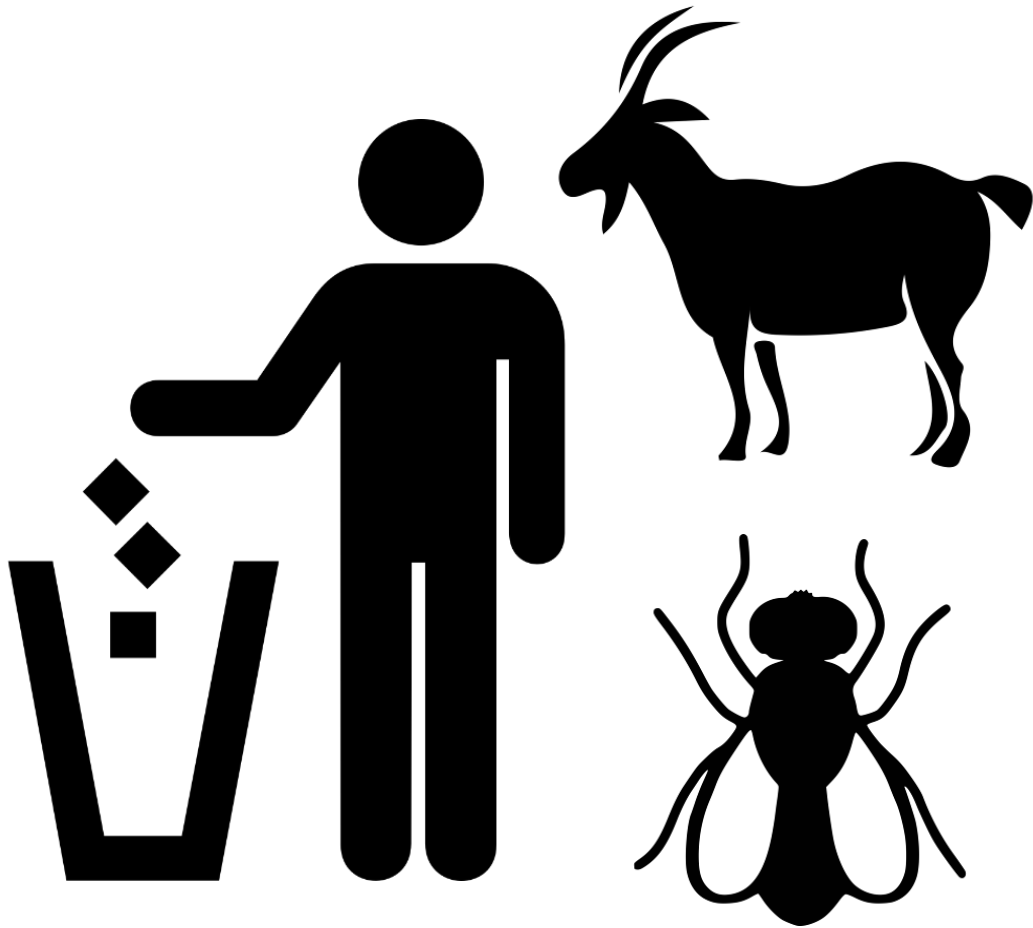
Using Latrines



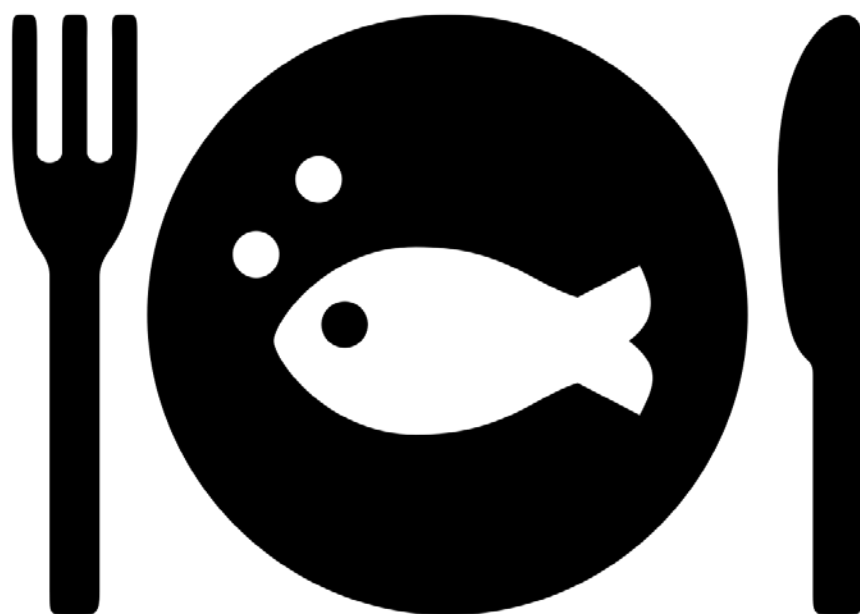
Hygiene



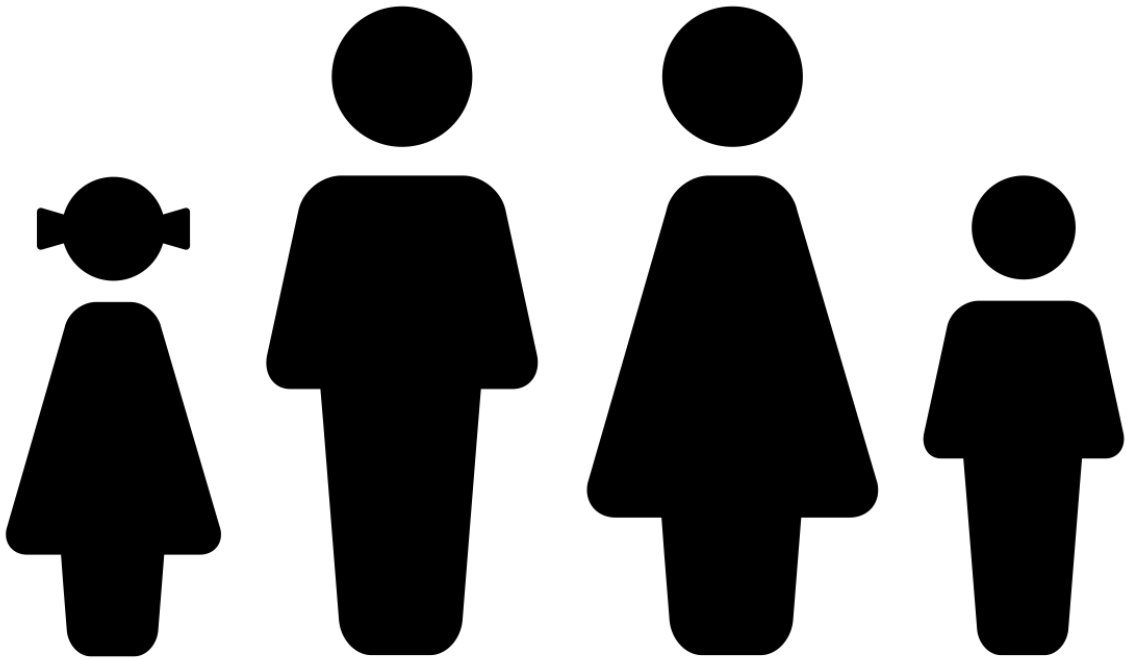
Clean Environment



Safe Food



Shared Responsibility





45–70 minutes total

Lesson Plan

HWTS: What Is It and When Is It Effective?

Overview of Activities

1. **Discussion:** Introduction
2. **Presentation:** Defining HWTS
3. **Presentation:** HWTS and Health, the 3 Cs
4. **Group Discussion:** The 3 Cs (Optional)
5. **Debate:** HWTS vs. Community Water Treatment (Optional)
6. **Workbook:** Review

Learning Outcomes

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

1. Define HWTS
2. Describe the 3 conditions required for HWTS to have the greatest health benefits
3. List possible obstacles to correct, consistent, and continued use of HWTS

Materials

- ☐ Powerpoint: HWTS: What and When?
- ☐ Examples of HWTS to show participants
- ☐ Flip chart paper with “Correct, Consistent, Continued” written in large block letters

Recommended Reading

- ☐ Technical Brief: Introduction to Household Water Treatment and Safe Storage (HWTS)

5 minutes



Discussion: Introduction

1. Optional: Use “PowerPoint: HWTS: What and When” for this introduction. Explain: “Now that we’ve discussed why safe drinking water is important, we’re going to discuss what HWTS is and when it is effective.”
2. Ask: “What does the term HWTS mean to you? What is your past experience with HWTS?” Allow a few participants to respond.
3. Present the “Learning Outcomes” slide or provide an overview of the lesson.

10 minutes



Presentation: Defining Household Water Treatment

Use “PowerPoint: HWTS: What and When” for this activity.

1. Say, “Let’s talk about some definitions.”
2. Ask: “What is water treatment?”
 - Any process used to improve water quality
3. Ask the participants for some examples of water treatment. Then, give some community-level and household-level examples.
4. Refer to the “Problem Trees” from the last lesson. Ask: “Can water treatment address all of these problems?”
 - No. Water treatment only addresses water quality. It cannot fully address issues related to access or reliability. *Trainer Tip: Highlight that water treatment is an important way to improve water quality. Emphasize that other measures are needed to improve policy, regulation, equitable access, and monitoring.*
5. Ask: “What is Household Water Treatment and Safe Storage?”
 - Any form of water treatment and storage that occurs at the household level (also referred to as point-of-use treatment)
6. Give examples of HWTS. If possible, show some physical examples, such as chlorine bottles and filters. Explain that the group will look at HWTS options in detail later.

10–15 minutes



Presentation: HWTS and Health, the 3Cs

Use “PowerPoint: HWTS: What and When” for this activity.

1. Remind the participants that water quality is important for health. Say to them: “Therefore, water quality interventions should lead to health benefits.”
2. Ask: “Is HWTS effective at improving health?” Allow some participants to share their ideas.
3. Present the PowerPoint slide that shows the reduction in diarrhea from HWTS. Tell the participants that each HWTS option will be covered later in the workshop.

4. Present the PowerPoint slide that shows the health impacts of HWTS for different water sources. Define improved and unimproved water, if needed.
5. Explain that studies have found huge variability in how well HWTS protects people from diarrhea. Ask: “Why might this be? What factors are necessary for HWTS to effectively reduce diarrhea?” Record some of their ideas at the front of the room.
6. Present the PowerPoint slide with about what makes HWTS effective. Describe each point:
 - The HWTS method must be effective against pathogens.
 - The HWTS method must be accessible to vulnerable populations (such as young children, pregnant mothers, and other people who are most likely to become very sick from unsafe water).
 - The HWTS method must be used correctly, consistently, and continually.
7. Use the additional PowerPoint slides to highlight the meaning and importance of each of the 3 Cs:
 - **Correct:** The household uses an appropriate HWTS system (for the given water source), following best practices or the manufacturer’s instructions.
 - **Consistent:** All members of the household always use treated water at all times of the day and through all the seasons.
 - **Continued:** All members of the household use treated water for the long-term (they do not discontinue use when something happens).
8. Tape the flip chart paper with the words “**Correct, Consistent, Continued**” on the wall, somewhere it can stay for the rest of the workshop. Explain that this is a core concept.
9. Optional: Use the additional PowerPoint slides to further define correct, consistent, and continued use, and show examples of incorrect, inconsistent, and discontinued use.

Key Point

- If you want to achieve health benefits, the goal of HWTS implementation must be to help people achieve correct, consistent, and continued use of an appropriate and effective technology.

10 minutes

Group Discussion: The 3 Cs (Optional)



Use “PowerPoint: HWTS: When and Where” for this activity.

1. Choose a HWTS method that most participants will know (for example, chlorine tablets, a water filter, or pur sachets). Hold the item up and briefly explain how it works.
2. Tell the participants to imagine they belong to a household and have been given this HWTS option.
3. Place the participants in groups of 2–3. Then, ask participants to define what correct, consistent, and continued use would look like for their household. Ask them to discuss some of the challenges they might face trying to achieve correct, consistent, and continued use.

4. After a few minutes, ask some participants to volunteer to share their group's ideas.
5. Explain to the participants that they will be exploring the 3Cs further in later lessons to answer the following questions:
 - Which options will be easiest for households to use given their specific context and preferences?
 - What are ways to promote lasting behaviour change to achieve the 3 Cs?

20 minutes

Debate: HWTS vs. Community Water Treatment (Optional)



Trainer Note: This activity could also be used as a review activity later in the workshop if not used in this lesson.

1. Explain: “We have discussed safe drinking water, the role of HWTS, and when HWTS is most effective. Now, we will have a chance to debate a key question: Is HWTS a good solution to the problems that lead to poor or unreliable drinking water quality?”
2. Divide the participants into 2 teams and assign each team an opinion:
 - Team 1: HWTS is an effective and important solution for increasing access to safe drinking water.
 - Team 2: HWTS is never the best option for increasing access to safe drinking water.
3. Give each team 5 minutes to create a list of arguments to support its opinion.
4. Ask each team to choose 1 person to make an opening statement (1 minute long).
5. Give the teams 5–10 minutes to debate. *Trainer Tip: You can make the debate an open debate or a structured debate depending on the group.*
6. After the debate, ask the participants how they feel about HWTS in addressing water quality issues and improving health.

10 minutes

Workbook: Review



1. Ask the participants to turn to the page “Household Water Treatment and Safe Storage” in their **workbooks** and to fill in the following sections:
 - What is HWTS?
 - What’s needed for HWTS to have the greatest health impacts?
 - Define correct, consistent, and continued use.
2. Summarize key points.

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65–75 minutes total

Lesson Plan

Global Agenda for Safe Drinking Water



Overview of Activities

1. **Scenario:** Introduction
2. **Small Group Discussion:** MDGs, SDGs, Human Right to Water
3. **Mapping Activity:** HWTS and the SDGs
4. **Presentation:** Local Standards and Regulations (Optional)
5. **Role-Play:** Review

Learning Outcomes

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

1. Explain how safe drinking water is defined and measured under the MDGs and SDGs
2. Describe how HWTS contributes to the SDGs
3. Describe local government standards or regulations relevant to HWTS (Optional)

Materials

- ☐ PowerPoint: Global Agenda for Safe Drinking Water (optional; edit the section on local policies and standards in advance)
- ☐ Handout: Global Agenda for Safe Drinking Water (2 pages; 1 copy per participant)
- ☐ Handout: Sustainable Development Goals (1 page; 2 copies per group)
- ☐ Flip chart paper
- ☐ Markers

Recommended Reading

- ☐ Technical Brief: Safe Drinking Water and the Global Development Agenda
- ☐ Technical Brief: Introduction to Household Water Treatment and Safe Storage (HWTS)



Introduction: Scenario

Optional: Use “PowerPoint: Global Agenda for Safe Drinking Water” for this introduction.

1. Explain: “Now that we’ve discussed why safe drinking water is so important, this next session will explore how the world is doing at addressing this need.”
2. Divide the participants into groups of 3–4 people. Give each group a large piece of paper.
3. Ask the participants to imagine that they have huge global influence and they are responsible for setting goals and targets for safe drinking water. Ask them to discuss in their groups what targets and indicators they would use to track progress
4. Give the groups about 5 minutes to discuss and record their ideas.
5. Ask some groups to share their ideas with the large group. Summarize common themes.
6. Present the “Learning Outcomes” slide or provide an overview of the lesson.

Trainer Tip

Give examples or ask probing questions to help participants think of targets and indicators. For example:

- Would you identify the types of water sources people are using?
- Would you test the quality of water in people’s homes?
- Would you check how close people are to a safe water source?
- What is most important and why?

25 minutes

Small Group Discussion: MDGs, SDGs, Human Right to Water



Optional: Use “PowerPoint: Global Agenda for Safe Drinking Water” for this activity.

1. Explain: “As we just realized in our scenario, ensuring safe drinking water for everyone is a complex problem. We will now discuss how the global community has approached this problem.”
2. Ask the participants to stay in their small groups. Give each participant a copy of “**Handout: Global Agenda for Safe Drinking Water.**”
3. Give each group a piece of flipchart paper and a set of markers.
4. Explain that the handout is divided into 3 sections (MDGs, Human Right to Water, SDGs). After introducing a section of the handout, ask for a participant from the large group to explain what that topic means. Share a few key facts about each topic.
5. Ask the participants to review the handout in their groups and discuss the following question: “How have language, targets, and indicators for safe drinking water changed over time?” Have the groups record their ideas on flip chart paper, along with any questions or points of confusion.
6. Ask each group to share some of its reflections with the full group. Answer any questions and summarize key points.
7. Ask participants to list 1 or 2 key points in their **workbooks** under “Global Agenda for Safe Drinking Water” for each topic: MDGs, Human Right to Water, and SDGs.

Key Points

- The MDGs measured access to improved water sources. People assumed that improved water sources were safe, but this was not always true. The goal of “halving the gap” led to a focus on those easiest to reach (not always the most vulnerable).
- Recognition of the human right to water changed how safe drinking water was viewed. Global responsibility has increased for making water accessible to all.
- The SDGs include both water quality and water availability. As well, the language of “equitable” and “universal” means the global community must focus on the most vulnerable and difficult to reach.

20 minutes

Mapping Activity: HWTS and the SDGs



Optional: Use “PowerPoint: Global Agenda for Safe Drinking Water” for this activity.

1. Explain: “Now we understand the SDG target and indicators for safe drinking water, let’s talk about how the SDGs relate to HWTS.”
2. Ask: “Does HWTS contribute to reaching the SDG target for safe drinking water?” Ask for several participants to share what they think. Use the PowerPoint slide of the SDG ladder to show how HWTS can improve water at the different steps. *Trainer Tip: See the Key Points below.*
3. Explain: “The SDGs cover much more than safe drinking water. These goals relate to many different aspects of development.” Give examples.
4. Give each group flip chart paper, markers, and 2 copies of “**Handout: Sustainable Development Goals.**”
5. Ask each group to draw a circle in the middle of its flip chart paper and label the circle “HWTS”. Ask them to draw a mind map showing how HWTS could contribute to other SDGs.
6. Ask the groups to hang their maps on the wall and then walk around the room to look at the other groups’ maps.
7. Ask the participants to share their reflections or comments about how HWTS contributes to SDGs.
8. Summarize key points.

Trainer Tip

Depending on the group, participants might want to put “safe drinking water” in the centre of their maps instead of “HWTS.”

For the diagram, you may need to show an example: HWTS -> less illness -> more time to work -> no poverty (SDG 1).

Key Points

- HWTS can improve water quality issues at every step of the service ladder except for the “safely managed” level (see PowerPoint slide).
- Contamination between source and home is a major concern. HWTS can help with incremental improvements to water quality (but current monitoring of SDG progress does not always account for improvements made by HWTS).
- HWTS can address water quality issues and help reach vulnerable populations. It does not solve issues related to reliability and access.
- HWTS (and safe drinking water) contributes to multiple development goals.

Presentation: Local Standards and Regulations (Optional)



Optional: Use “PowerPoint: Global Agenda for Safe Drinking Water” for this activity. *Trainer*

Note: You must edit the PowerPoint in advance to show local standards and regulations.

1. Explain: “In addition to global goals and declarations, many countries have local goals, regulations, and standards that apply to water quality.”
2. Ask: “What standards, policies, and regulations are you aware of in this [country/community/province] that relate to drinking water quality?”
3. Use the PowerPoint slides to briefly explain any relevant local policies, regulations, or strategies related to safe drinking water or HWTS.
4. Ask participants to write 1 or 2 key points in their **workbooks** under the topic “My Country’s Policies and Regulations.”

5 minutes

Role-Play: Review



Optional: Use “PowerPoint: Global Agenda for Safe Drinking Water” for this activity.

1. Ask the participants to form pairs to pretend they are an HWTS implementer who must describe their HWTS project to a UN or government official. Ask them to practice explaining how HWTS contributes to the SDGs and to local goals and policies.
2. Summarize and clarify key points as needed.

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Global Agenda for Safe Drinking Water

Handout

Millennium Development Goals (MDGs) (2000 – 2015)

Target for drinking water: “To halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation” (compared to 1990 baseline).

Table 1: Service levels for household access to drinking water under the MDGs

Service Level (highest to lowest)	Definition
Improved: Piped on Premises	Drinking water from a piped household water connection located inside the user’s dwelling, plot, or yard.
Improved: Other Improved Sources	Drinking water from an improved source (piped water, borehole or tubewell, protected dug well, protected spring or rainwater).
Unimproved	Drinking water from an unprotected well or unprotected spring, surface water, or bottled water.

(World Health Organization & UNICEF, n.d.)

Sustainable Development Goals (SDGs) (2015+)

Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

Table 2: Service levels for household access to drinking water under the SDGs

Service Level (highest to lowest)	Definition (households)
Safely Managed	Drinking water from an improved (basic) drinking water source that is: - located on premises, - available when needed, and - free of fecal and priority chemical contamination.
Basic	Drinking water from an improved source (piped water, borehole or tubewell, protected dug well, protected spring, or rainwater). Collection time must be no more than 30 minutes for a round trip, including time spent waiting in line.
Limited	Drinking water from an improved source with a total collection time of more than 30 minutes for a roundtrip including time spent waiting in line.
Unimproved	Drinking water from an unprotected well or unprotected spring.
Surface Water	Drinking water collected directly from rivers, dams, lakes, ponds, streams, canals or irrigation channels.

(World Health Organization, 2017)

Table 3: Service levels for school and health centre access to drinking water under the SDGs

Service Level (highest to lowest)	Definition (Schools)	Definition (Health Centres)
Advanced	To be defined at national level	To be defined at national level
Basic	Drinking water from an improved source is available at the school.	Water from an improved source is available on premises.
Limited	There is an improved source at the school, but water is not available at time of survey.	Water from an improved source is available off premises, or there is an improved source on site but no water available.
No Service	No water source or an unimproved water source at the school.	No water source or an unimproved water source.

(World Health Organization, 2017)

Human Right to Water (2010)

*“The United Nations General Assembly explicitly recognized the human right to water and sanitation and acknowledged that clean drinking water and sanitation are essential to the realisation of all human rights. The Resolution calls upon States and international organisations to provide financial resources, help capacity-building and technology transfer to help countries, in particular developing countries, to provide **safe, clean, accessible and affordable drinking water and sanitation for all.**”* (United Nations Office of the High Commissioner for Human Rights, UN Habitat, & World Health Organization, 2010).

References

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Sustainable Development Goals

Handout

Refer to: <http://www.undp.org/content/undp/en/home/sustainable-development-goals.html>



45 minutes total

Lesson Plan

Risks to Water Safety

Overview of Activities

1. **Group Discussion:** Introduction
2. **Group Discussion:** Defining Water Supply System
3. **Drawing:** Water Supply System
4. **Group Brainstorm:** Risks to Water Safety
5. **Workbook:** Review

Learning Outcomes

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

1. Define water supply system
2. Identify risks to water safety along a water supply system

Materials

- ☐ Glass of water
- ☐ Flip Chart paper with the definition of water supply system (see lesson)
- ☐ Flip chart papers (1 per group)
- ☐ Sticky notes (1 stack per group)

Recommended Reading

- ☐ Technical Brief: The Multi-Barrier Approach to Safe Drinking Water
- ☐ Technical Brief: Introduction to Drinking Water Quality for HWTS Implementers

Group Discussion: Introduction



1. Fill a glass with water from the supply used at your training location (or another nearby source).
2. Hold up the glass of water for the participants to see. Ask: "Where did this water come from?" Then, to help the participants identify the various steps the water went through before arriving in the glass, ask the participants: "Before that?" After that?" Write down their answers at the front of the room to form a diagram or list of steps the water went through before it got to the glass. *Trainer Tip: Here is an example: rain -> river -> water treatment plant -> pipes -> tap at training location.*
3. Ask the participants: "Do you trust that this water is safe?" Ask them why or why not.
4. Present the learning outcomes or an overview of the lesson.

5 minutes

Group Discussion: Defining Water Supply System



1. Explain: "When you were telling me about all the steps water went through before it arrived in my glass, you were describing a water supply system."
2. Write the term "**Water Supply System**" at the front of the room. Ask the participants: "What does this term mean?"
3. Reveal the flipchart paper with the definition of water supply system. Give some examples of different water supply systems.

Water Supply System: "The combination of practices used for collection, transportation, treatment, and storage of drinking water. All the steps water goes through between its original source and a person's drinking glass."

10 minutes

Drawing: Water Supply System



1. Explain: "Now that we've defined water supply system, you're going to draw examples from your own work."
2. Ask the participants to think about a household in a community where they currently implement HWTS or plan to implement HWTS. Then, ask them to think about the water source for that household and how the water got from the source to the household. *Trainer Tip: If they are not HWTS implementers, ask them to think of a household they have visited in the community where they work.*
3. Ask the participants to open their **workbooks** to the "Water Supply System" page.
4. Ask the participants to draw the water source the household uses under the word "Source" on the left side of the page. If the household uses multiple sources, ask the participant to focus on one source.
5. Ask the participants to draw a glass of water under the word "User" on the right side of the page.
6. Ask the participants to draw each step the water goes through to get from the source to the user's glass. *Trainer Tip: Participants can write instead of drawing, if they prefer.*
7. Ask the participants to each find a partner. Then, ask the participants to talk about their drawings with their partners and add any steps they may have missed.
8. Ask a few participants to share examples of their water supply systems with the full group.

15 minutes

Group Brainstorm: Risks to Water Safety



1. Divide the participants into groups of 3–4. Give each group a piece of flip chart paper and a pile of sticky notes.
2. Ask participants to choose the water supply system of 1 person in their group and to copy that system onto the flip chart paper.
3. Ask each group to look carefully at its water supply system and to identify any ways the water could be contaminated. Ask them to write the potential risks on sticky notes (1 risk per note). Then, ask them to stick each note near the step in the water supply system where the risk could cause problems.
4. When groups have finished, hang all the water supply systems on the wall. *Trainer Note: You will need to keep these diagrams for “Lesson Plan: Multi-Barrier Approach.”*
5. Give the participants a few minutes to walk around the room and look at the other groups’ diagrams.
6. Ask: “What are some similarities and differences you notice between other people’s water supply systems and the risks they identified?”
7. Ask: “Why is it important for HWTS implementers to understand the water supply systems of the households they serve?”
 - To know where water is coming from
 - To understand the types of contaminants most likely to affect the water
 - To know what practices people are already using in the community
 - To help identify the strengths and limitations of using HWTS systems to reduce risks to water safety

Trainer Tip

Ask participants to focus on general risks, such as runoff from agriculture or contamination from feces. If they start to ask questions about specific types of contaminants, explain that will be covered in the next lesson.

5 minutes

Workbook: Review



1. Ask participants to return to the water supply systems they drew in their **workbooks**. Ask them to list a few of the most important risks to water safety for their own water supply system under their own diagram.

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55–80 minutes total

Lesson Plan Drinking Water Quality

Overview of Activities

1. **Brainstorm:** Introduction
2. **Presentation:** Aspects of Drinking Water Quality
3. **Presentation and Role-Play:** Microbiological and Chemical Aspects
4. **Meet & Greet:** Disease Profiles (Optional)
5. **Presentation:** Acceptability and Radiological Aspects
6. **Paper Cabbage:** Review

Learning Outcomes

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

1. Describe how to prevent common water-related diseases
2. List and describe the 4 different groups of pathogens
3. List and describe common chemical contaminants
4. Discuss factors that affect the acceptability of drinking water

Materials

- ☐ PowerPoint: Drinking Water Quality
- ☐ Disease Cards (choose 6–8 diseases; 1 card per participant)
- ☐ Paper Cabbage (see instructions under “Paper Cabbage: Review” in lesson)
- ☐ Music (on computer or other device) for paper cabbage activity

Recommended Reading

- ☐ Technical Brief: Introduction to Drinking Water Quality for Household Water Treatment Implementers

5 minutes

Brainstorm: Introduction



Optional: Use “PowerPoint: Drinking Water Quality” for this introduction.

1. Say: “Now that we’ve talked about water safety in general, we are going to look more specifically at the types of contaminants that can affect water quality.”
2. Ask: “In your region, what are the common contaminants in drinking water?” Record participants’ answers at the front of the room.
3. Explain: “As HWTS implementers, it’s important for you to understand the basics about different types of contaminants, where they come from, and the health impacts they can have. This knowledge will help you make more informed decisions.”
4. Present the “Learning Outcomes” slide or provide an overview of the lesson.

5 minutes

Presentation: Aspects of Drinking Water Quality



Use “PowerPoint: Drinking Water Quality” for this presentation.

1. Refer to the list of contaminants participants created during the introduction. Explain to the participants: “The World Health Organization (WHO) classifies contaminants like the ones you listed into 4 groups. Do you know what those groups are?”
2. Use the PowerPoint slide to show the 4 aspects of drinking water quality.
3. Refer to the “Drinking Water Quality” page in the participant **workbooks**. Tell the participants they can write examples and additional notes during this lesson if they would like.

20 minutes

Presentation and Role-Play: Microbiological and Chemical Aspects



Use “PowerPoint: Drinking Water Quality” for this presentation.

1. Use the PowerPoint slides to:
 - Show the 4 types of microbiological contaminants and their relative sizes
 - Define pathogen
 - Give some examples and descriptions of the different types of pathogens
2. Say “Time for a stretch break!”
 - Divide the participants into 4 groups.
 - Ask each group to make an action or dance move for one of the pathogen types.
 - Get all groups to share their actions with the other participants.
 - Then, do all the actions as a full group, moving from the smallest to the largest pathogens.

3. Ask: “How do water-related pathogens get into people’s bodies and cause disease?” Continue using the PowerPoint slides to show and explain the different types of water-related diseases.
4. Use the PowerPoint slide to introduce chemical contaminants. Give some examples.

25 minutes

Meet & Greet: Disease Profiles (Optional)



1. Explain: “Now that we’ve learned about biological and chemical contaminants in general, let’s look at some specific contaminants and the diseases they cause.”
2. Divide participants evenly into groups of 6–8 participants.
3. Choose as many **Disease Cards** as the number of participants in each group. *Trainer Note: Select diseases that are common in the region where your participants work. Try to select a mix of disease types (virus, bacteria, protozoa, helminth, and chemical).*
4. Within each group, give each participant a different disease card. Instruct the participants to pretend they are the disease described on their card. They should briefly introduce themselves to the other diseases in their group (playfully—as if they are at a party or networking event). As they learn about other diseases, they should keep track of key information (a few points—nothing detailed) in their **workbooks** on the “Disease Profiles” page.
5. Give the participants 10–15 minutes to “meet” all the diseases within their group.
6. Ask everyone to return to the full group. Give the participants an opportunity to share their thoughts and ask questions.
7. Ask the participants to return their disease cards (they will be needed for a later lesson).

10 minutes

Presentation: Acceptability and Radiological Aspects



Use “PowerPoint: Drinking Water Quality” for this activity.

1. Ask: “Can anyone remember the 4 aspects of drinking water quality?”
2. Use the PowerPoint slides to describe common acceptability aspects:
 - Turbidity
 - Colour
 - Taste and smell
3. Ask the participants: “As HWTS implementers, why should you care about drinking water acceptability?”
 - For long-term behaviour change and use of HWTS, people must like the taste, smell, and appearance of their water.
 - Some acceptability aspects (such as turbidity) may indicate microbiological contamination.

4. Use the PowerPoint slide to describe radiological aspects, and explain to the participants why radiological aspects will not be covered in the training.
5. Summarize the 4 aspects of water quality.
6. Use the PowerPoint slide and ask the participants: “For most water supply systems, which aspects of water quality are most important to monitor and treat?” Give the participants some time to discuss their ideas.
7. Summarize key points. Tell the participants that they will learn how to test for different contaminants in the Lesson: Water Quality Testing.

Key Points

- No one aspect of water quality is always most important.
- Microbiological aspects are usually the most important for public health. They can have immediate and serious health consequences.
- Chemical aspects are sometimes very important (for example, in areas with high contamination). WHO maps show regions where chemical aspects are likely to be an issue. The health effects of chemical aspects in water take much longer to be obvious.
- Acceptability aspects may point to other issues and affect how people feel about drinking the water.
- Turbidity is an important parameter to consider when deciding which treatment options to use and when monitoring treatment.

15 minutes

Paper Cabbage: Review



1. Write the following questions on individual pieces of paper:
 - What are the 4 aspects of drinking water quality?
 - Give 2 examples of chemical contaminants.
 - What are the 4 groups of pathogens?
 - Give an example of a disease caused by a waterborne virus.
 - Give an example of a disease caused by waterborne bacteria.
 - Give an example of a helminth.
 - Which group of pathogens is the smallest?
 - Give some examples of acceptability aspects of drinking water quality.
2. Crumple the pieces of paper one at a time and place around each other to form a layered “paper cabbage.”
3. Ask the participants to stand in a circle and pass the paper cabbage around while you play music. When you stop the music, whoever has the cabbage should peel off a piece of paper, read the question, and give an answer.
4. Continue playing until all the questions have been answered.

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70 minutes total

Lesson Plan

Multi-Barrier Approach

Overview of Activities

1. **Visualization & Discussion:** Introduction
2. **Small Group Brainstorm:** Identifying Barriers
3. **Presentation:** Multi-Barrier Approach
4. **Sorting Activity:** Barriers
5. **Discussion:** Prioritizing Barriers
6. **Workbook:** Review

Learning Outcomes

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

1. Explain why the Multi-Barrier Approach is important
2. List and give examples of the 6 barriers in the Multi-Barrier Approach
3. Identify household-level solutions that fit within the Multi-Barrier Approach

Materials

- ☐ Multi-Barrier Approach Sorting Cards (in Workshop Toolkit)
- ☐ Flip chart papers with water supply systems created by groups in “Lesson Plan: Risks to Water Safety”
- ☐ Sticky notes (one set per group, of different colours)

Recommended Reading

- ☐ Technical Brief: The Multi-Barrier Approach to Safe Drinking Water

10 minutes



Visualization & Discussion: Introduction

1. Ask the participants to close their eyes and imagine this scenario:
 “You have a beautiful home with a lovely kitchen. In the kitchen, you have many grains, fruits and vegetables, and special treats stored in bowls for your family and visitors to enjoy. One morning, you wake up to find your kitchen filled with mice and ants. These pests are everywhere, and have gotten into all of your food.”
2. Have the participants open their eyes. Then, ask: “How do you feel?”
3. Ask: “What will you do to address this problem?” Record their ideas at the front of the room. Possible solutions are:
 - Use mouse traps or chemicals to kill the pests
 - Use sealed containers to store food
 - Find out how the mice and ants are getting into the home and address these problems
4. Ask the participants: “Is there any single action you could take that would solve all your mouse and ant problems?”
 - No. The best way to solve the problem is a mix of actions to kill the pests and to prevent more from getting into the food.
5. Ask: “How is this mouse and ant scenario similar to drinking water contamination?”
 - Like food, drinking water is a precious resource.
 - Drinking water can be affected by multiple types of contaminants—just as the food was affected by both ants and mice.
 - Different methods might be required to control (prevent or remove) each type of contaminant.
 - Multiple steps must be taken to properly protect both the food and water.
6. Explain that this lesson will look at how to combine activities and technologies to protect water from contamination.
7. Present the learning outcomes or an overview of the lesson.

20 minutes



Small Group Brainstorm: Identifying Barriers

1. Refer to the **water supply systems** hanging on the wall from the Lesson: Risks to Water Safety.” Explain: “We are going to identify barriers to controlling (preventing or removing) the possible sources of contamination identified in our former lesson.”
2. Explain that a “**barrier**” refers to any behaviour or technology used to reduce the risks of drinking unsafe water.
3. Ask the participants to return to their groups from the Lesson: Risks to Water Safety.

4. Rotate the groups so that each one is working on another group's water supply system. Give each group a new colour of **sticky notes**.
5. Ask the groups to come up with ideas for barriers they could use to reduce the risks of contamination in the water supply system on the flip chart paper in front of them. Ask them to write each barrier on an individual sticky note. *Trainer Tip: Ask the participants to focus mainly on the risks of microbiological contamination. Go around the room to make sure they are thinking of barriers at all steps from source protection to safe storage. Give some examples if needed.*
6. Ask a few participants to share examples of barriers they identified. Record their answers and group them (without labeling or explaining the categories) into 4 categories:
 - Source protection
 - Safe transportation
 - Treatment
 - Safe storage
7. Ask: "How have I grouped these answers?"
8. Explain that these 4 groupings represent the 4 key barriers to contamination: source protection, safe transportation, treatment, and safe storage. Write the title for each category above the correct grouping of barriers.
9. Explain: "Each of these categories contains multiple barriers. These barriers can be used at multiple points in the water supply system." Give some examples.

10 minutes

Presentation: Multi-Barrier Approach



1. Explain: "We call this combination of categories the **Multi-Barrier Approach to safe drinking water**. The Multi-Barrier Approach is when people combine appropriate behaviours and technologies to protect drinking water from the source to the user's glass.
2. Explain: "In the treatment category, there are 3 sub-categories: sedimentation, filtration, and disinfection. All treatment systems—whether at the household-level or community-level—can use a combination of these 3 treatment barriers to reduce risk." Describe how community-scale treatment systems often use sedimentation, filtration, and disinfection.
3. Tape the titles from the **Multi-Barrier Sorting Activity**, in order, around the room. Explain that these titles represent the 6 steps in CAWST's Multi-Barrier Approach. Define each one as you add it:
 - **Source protection**—barriers that prevent contaminants from getting into water at the source
 - **Safe transportation**—barriers that prevent contaminants from entering water as it is transported from the source to a user's home
 - **Treatment: sedimentation**—methods used to help large particles settle out of the water to reduce turbidity

- **Treatment: filtration**—pouring water through a membrane or filter to take out particles and contaminants bigger than the pores in the membrane or filter
 - **Treatment: disinfection**—killing or inactivating remaining pathogens through methods like heat, UV, or chemicals
 - **Safe storage**—barriers that keep water safe from recontamination
4. Ask the participants to refer to the “Multi-Barrier Approach” page in their **workbooks** and add notes under each step if needed to help remember what each barrier means.

15 minutes

Sorting Activity: Barriers



1. Ask participants to stay in their groups from the previous activity.
2. Divide the **Multi-Barrier Approach Sorting Cards** evenly between the groups. Give the groups a few minutes to discuss what their cards show. Explain to them what is on their cards if needed.
3. Ask them to tape each card under the correct multi-barrier category on the wall. If they are unsure, ask them to guess.
4. In the full group, go over the cards taped around the room. Discuss the option on each card and move any card placed in an incorrect category. Explain that some options (for example, P&G Purifier of Water) belong to multiple categories and can be placed in any category that is correct.
5. Refer to all the cards around the room. Ask: “Which of these barriers are examples of HWTS?”
 - All treatment and storage barriers that can take place within a person’s home
 - *Trainer Note: Because this workshop focuses on HWTS, these cards focus on household-level barriers. However, community-level barriers (for example, treatment or distribution systems) may also be included in a Multi-Barrier Approach.*
6. Explain that the participants will look at each of the HWTS options in more detail in later lessons.

Trainer Tip

Keep your discussion of each option brief. In later lessons, participants will be able to learn about HWTS options in detail.

10 minutes

Group Discussion: Prioritizing Barriers



1. Ask the groups to return to the water supply system they were working on.
2. Ask the participants to consider the different risks and possible barriers in their water supply systems. Then, ask them to imagine that they represent a household or a community water user group. Tell them that they have limited resources and time. Ask the participants: “What 2–3 actions would you prioritize to increase the safety of your water, and why?”
3. Allow a few minutes for small group discussion. Ask some participants to share their ideas with the full group.

4. Explain: “Improving or adding HWTS barriers is often a good starting point for improving water safety.” Explain that HWTS:
 - Gives people ownership and control over the water they drink
 - Is affordable
 - Is able to remove pathogens (other barriers can prevent them from getting into the water but can’t take them out of the water)
5. Explain: “HWTS should always be used within a Multi-Barrier Approach to reduce as many risks as possible along the water supply chain.”
6. Congratulate the participants and explain that they have just undertaken the first steps of a very simplified water safety planning process. They have:
 - Described their water supply system
 - Identified potential risks to water safety along the supply system
 - Prioritized actions to improve the safety of the water
7. Optional, depending on the agenda: Explain that the participants will discuss water safety planning in more detail in the next lesson.

5 minutes

Workbook: Review



1. Ask participants to take a few minutes to record 2–3 examples of each type of barrier in their **workbooks**.
2. Summarize key points.

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50–70 minutes total

Lesson Plan Sedimentation Options

Overview of Activities

1. **Demonstration:** Introduction
2. **Pair-Share:** Why Sedimentation?
3. **Discussion:** How to Sediment
4. **Station Work:** Sedimentation Methods
5. **Matrix:** Sedimentation Options and Diseases (Optional)
6. **Discussion:** Review

Learning Outcomes

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

1. Explain when sedimentation is required in an HWTS system
2. Demonstrate how to sediment water with and without coagulants
3. Assess the advantages and disadvantages of selected sedimentation options

Materials

- ☐ 3 glasses of water, 1 coin, a handful of sand, and some chalk or dust
- ☐ PowerPoint: HWTS Stations (Optional)
- ☐ Fact Sheets: Natural Coagulants, Chemical Coagulants, Settling
- ☐ Supplies (water, buckets, coagulants) for participants to test different settling methods
- ☐ Flip chart paper or tape (to make a matrix)
- ☐ Disease Cards (the same 6–8 diseases used for “Lesson Plan: Drinking Water Quality”; 1 card for each disease)
- ☐ Effectiveness Cards (1 page; 3 copies; see end of lesson)

Recommended Reading

- ☐ Technical Brief: The Multi-Barrier Approach to Safe Drinking Water
- ☐ Technical Brief: Selecting Household Water Treatment and Safe Storage (HWTS) Options
- ☐ Technical Information Sheets: Natural Coagulants, Chemical Coagulants, Settling

5 minutes

Demonstration: Introduction

1. Place 3 glasses of clear water in front of the group.
2. Drop a coin (or other heavy item) into the first water glass. The item should sink quickly to the bottom. Ask the participants to describe what happened.
3. Drop a handful of sand in the second glass. It should sink more slowly. Ask the participants to describe what happened.
4. Drop a handful of dust, dirt, or chalk in the third glass. Swirl, if needed, to get it wet. Some will settle, but it will take longer. Ask the participants to describe what is happening.
5. Ask: "What would happen if I left these 3 glasses sitting for another 2 hours?"
 - Most solids will eventually drop to the bottom, depending on their weight and size.
 - Heavier particles sink quickly because they are heavier. Lighter particles require more time because they are so small and light. Some very fine particles like chalk may never sink.
6. Explain: "These glasses show examples of sedimentation. Sedimentation is the process of allowing particles to settle."
7. Present the learning outcomes or an overview of the lesson.

5 minutes

Pair-Share: Why Sedimentation?

1. In pairs, ask participants to discuss why sedimentation is an important part of household water treatment. Ask: "Why and when would someone use sedimentation?"
2. Ask a few of the pairs to share their ideas with the full group.
3. Summarize key points.

Key Points

- Sedimentation makes the water look clear. It reduces turbidity.
- Some pathogens are stuck to particles in the water. So, by removing particles, you can remove some of the pathogens in the water.
- Many filtration and disinfection methods do not work well with turbid water (filters can clog, and suspended particles make disinfection methods like SODIS and chlorine less effective). Sedimentation reduces turbidity, making the water more suitable for filtration or disinfection.

5 minutes

Discussion: How to Sediment

1. Tell the participants to imagine they have a bucket of cloudy water with lots of particles in it. Ask: "How would you perform sedimentation?"

2. Describe the basic process for sedimentation: allowing the particles to naturally settle and then gently pouring or straining off the liquid.
3. Explain that coagulants are sometimes added to help the particles stick together and sink. Ask: “What does the term ‘coagulant’ mean?”
4. Summarize key points.

Key Points

- Sedimentation can be done with or without coagulants.
- Coagulants are substances added to water that form chemical reactions with the particles, causing them to stick together. This process creates larger clumps of particles that either sink or float and are easier to remove from the water.
- Determining the best dose of coagulant to add to water is not always simple.

30 minutes

Station Work: Sedimentation Methods



Optional: Use “PowerPoint: HWTS Stations” for this activity.

1. Set up 3 **stations** (settling, natural coagulants, chemical coagulants). At each station, put the materials required to practice that sedimentation method along with the CAWST HWTS Fact Sheet for that method.
2. Split the participants into 3 groups. One group will start at each station. At each station, they should:
 - Read through the Fact Sheet for the sedimentation method
 - Practice or discuss how to perform the sedimentation method
 - Discuss and fill in 1–2 advantages or disadvantages for each method (in their **workbooks**)
3. Give the participants 5–10 minutes at each station and then rotate them to the next station.
4. After all the groups have rotated through the stations, ask the participants to return to their original station.
5. Ask each group to summarize 1 key advantage and 1 key disadvantage for the method at their station. Discuss as a full group and correct or add to their points as needed.

Trainer Tip

If you prefer, you can place a piece of flip chart paper next to each station. Ask the participants to record advantages and disadvantages there instead of in their workbooks.

20 minutes

Matrix: Sedimentation Options and Diseases (Optional)



1. Explain: “As we look at different HWTS options, we are going to analyze how well they protect us from some of the common water-related diseases we discussed.
2. Take the 6–8 **Disease Cards** used in Lesson: Water Quality. Hand the cards out at random to individual participants.

3. Create a giant matrix on the wall or an empty section of the floor with tape. The matrix should be 9–12 columns wide (with space for 9–12 Fact Sheets) and 6–8 rows long (with space for the 6–8 Disease Cards used in the earlier lesson). Tape the 3 sedimentation Fact Sheets (Settling, Natural Coagulants, Chemical Coagulants) as headers for the first 3 columns. *Trainer Tip: You will use this matrix in the next 2 lessons. Make sure it is somewhere you can add to and access later.*

	Settling Fact Sheet	Natural Coagulant Fact Sheet	Chemical Coagulant Fact Sheet						
Disease Card									
Disease Card									
Disease Card									
Disease Card									
Disease Card									
Disease Card									

4. Invite the participants one by one (until all 6–8 diseases are on the wall) to tape their Disease Card as a row header. As each participant places their card, ask them to remind the other participants what their disease is and what type of chemical or pathogen causes the disease.
5. Once all the Disease Cards are in the matrix, ask the participants: “How well would these sedimentation methods (if used correctly, consistently, and continuously) prevent this disease?” Decide the effectiveness as a group and tape the **Effectiveness Cards** in the corresponding spaces in the matrix:
- Not effective
 - Somewhat effective
 - Very effective
 - Not sure
6. Remind the participants that sedimentation is usually a first step in water treatment, so it does not need to be 100% effective at removing pathogens. The goal is to reduce turbidity so that later treatment steps (filtration and disinfection) are more effective.

Trainer Tip

To decide which Effectiveness Card to use, see the “performance” information on the fact sheets for each HWTS option. When effectiveness is not clear for a given technology and disease, discuss with the participants and make an educated guess or use the “not sure” card.

5 minutes

Discussion: Review



1. Ask the participants to look at the third glass to see how much of the dust, dirt, or chalk has settled, and how much still needs to settle.

2. Ask the participants which sedimentation method they would most likely use to settle the water, and why.
3. Summarize key points.

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Effectiveness Cards

Cut out these cards for the matrix activity. You will need 9 copies of this page: 3 copies per lesson (sedimentation, filtration, and disinfection).

Very Effective (>99%) 	Effective (>90%) 	Somewhat Effective (>80%) 	Not Effective 	Not Sure 
Very Effective (>99%) 	Effective (>90%) 	Somewhat Effective (>80%) 	Not Effective 	Not Sure 
Very Effective (>99%) 	Effective (>90%) 	Somewhat Effective (>80%) 	Not Effective 	Not Sure 



70–80 minutes total

Lesson Plan Filtration Options

Overview of Activities

1. **Demonstration:** Introduction
2. **Physical Activity:** Pore Size
3. **Station Work:** Filter Options
4. **Matrix:** Filter Options and Diseases (Optional)
5. **Promotional Advertisement:** Review

Learning Outcomes

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

1. Describe how filtration removes particles from water
2. Explain how pore size affects filter performance
3. Demonstrate water filtration using selected filters
4. Assess the advantages and disadvantages of selected household water filters

Materials

- ☐ Glass of water with tea leaves in it, tea strainer, and empty glass
- ☐ PowerPoint: HWTS Stations (Optional)
- ☐ 5 chairs
- ☐ Fact Sheets for selected filters
- ☐ Selected water filters
- ☐ Effectiveness matrix (created in sedimentation lesson)
- ☐ Effectiveness Cards (1 page; 3 copies; see end of lesson)

Recommended Reading

- ☐ Technical Brief: The Multi-Barrier Approach to Safe Drinking Water
- ☐ Technical Brief: Selecting Household Water Treatment and Safe Storage (HWTS) Options
- ☐ Technical Information Sheets for selected filters

5 minutes



Demonstration: Introduction

1. Hold up a tea strainer and the glass of water with tea leaves in it. Ask: “What will happen when I pour this water through this strainer?”
2. Pour the water through the strainer into the other glass. Ask the participants to explain what they saw.
3. Ask: “How is a tea strainer similar to a water filter?”
 - A strainer works like a filter to keep larger items (such as particles and pathogens) in the filter and let the smaller items (water) flow through.
4. Present the learning outcomes or an overview of the lesson.

10 minutes



Physical Activity: Pore Size

1. Ask: “Did this strainer remove all of the tea from the water?”
 - No. Tiny leaves and dissolved substances still went through.
 - After going through the strainer, this water still contains chemicals and particles that make it smell and taste like tea.
2. Ask: “What would happen if I made the holes in this tea strainer much, much smaller?”
Give the participants some time to discuss their ideas.
3. Explain: “The size of holes in a water filter (or tea strainer) are called pores. We are going to do an activity to illustrate the importance of pore size.”
4. Arrange 5 chairs in the middle of the room, leaving 1 metre of space between them. Ask the participants to stand up, move to the side of the room, and face the 5 chairs.
5. Explain that the line of chairs represents the pores (holes) in the filter. Explain that this filter is like the tea strainer; it has large spaces for the water to pass through. Then, pretend to pour dirty water containing pathogens into the filter. Ask the participants to play the role of the pathogens. As you pretend to pour the water, have the participants (the pathogens) move towards the filter and try to get to the other side of the room by going between the chairs.
6. Once the participants reach the other side of the room, ask: “What could we do to make this filter work better at blocking the pathogens?”
 - We can use a different filtration material that has smaller pores.
7. Put the line of chairs very close together. Ask the participants to try to get through. They will be blocked. Explain to the participants: “These chairs represent a filter with small pore sizes (spaces) that allows the water to get through but blocks the pathogens.”
8. Ask the participants to return to their seats. Summarize the activity. Explain the importance of pore size in filters.
9. Ask: “What happens if the pores in a filter are really big?”

- The filter will remove larger particles, but many pathogens (especially smaller viruses and bacteria) can still go through.

10. Ask: “What happens as pore sizes get smaller?”

- The filter can remove smaller pathogens and particles. These particles may build up more quickly and clog the filter. It will take more pressure to push water through the pores. The flow rate may be slower.

11. Optional: Use “PowerPoint: HWTS Stations” to show the table with examples of what filters with different pore sizes can remove.

40 minutes

Station Work: Filter Options



Optional: Use “PowerPoint: HWTS Stations” for this activity.

1. Explain that the participants will now have a chance to see and use different household filters.
2. Set up 4 stations (straining, biosand filter, ceramic filters, membrane filters). At each station, put examples of filters that match that method along with the CAWST HWTS Fact Sheets for the selected filters. *Trainer Tip: Change the setup of the stations depending on the number and type of filters that are available for this workshop and common in the region.*
3. Divide the participants into 4 groups. One group will start at each of the 4 stations. At each station, they should:
 - Read through the Fact Sheet for the filter(s)
 - Practice using the filter(s) at their station
 - Discuss and fill in 1–2 advantages or disadvantages for each filter (in their **workbooks**)
4. Give the participants about 5 minutes at each station and then rotate them to the next station.
5. After all the groups have rotated through the stations, ask the participants to return to their original station.
6. Ask each group to summarize 1 key advantage and 1 key disadvantage for the option(s) at their station. Discuss as a full group and correct or add to their points as needed.

Trainer Tip

If you prefer, you can place a piece of flip chart paper next to each station. Ask the participants to record advantages and disadvantages there instead of in their workbooks.

10 minutes

Matrix: HWTS Options and Diseases (Optional)



1. Refer back to the large matrix created in the sedimentation lesson.
2. Ask: “Which of the filters we looked at are most common in your region?” Select 3–4 filters based on the participants’ responses. Add the Fact Sheets for these 3–4 filters as column headers in the large matrix.

	Settling Fact Sheet	Natural Coagulant	Chemical Coagulant	Filter 1 Fact Sheet	Filter 2 Fact Sheet	Filter 3 Fact Sheet			
--	---------------------------	----------------------	-----------------------	---------------------------	---------------------------	---------------------------	--	--	--

		Fact Sheet	Fact Sheet						
Disease Card									
Disease Card									
Disease Card									
Disease Card									
Disease Card									
Disease Card									

3. For each of the filters added, go through each disease on the matrix. Ask: “How well would this filter (if used correctly, consistently, and continuously) prevent this disease?” Decide the effectiveness as a group and tape the **Effectiveness Cards** in the corresponding spaces in the matrix:

- Not effective
- Somewhat effective
- Very effective
- Not sure

4. Remind the participants that they should view HWTS as a system, not individual technologies. Sometimes having a less effective filter may be a better choice. Its flow rate will be faster, and it can be combined with sedimentation or filtration methods, or both, to still achieve high microbial removal.

5. Remind the participants that smaller pore size means higher removal, but also lower flow rates, more frequent maintenance, and more clogging. If appropriate for the group, share some research findings that highlight trade-offs between performance and adherence.

Trainer Tip

To decide which Effectiveness Card to use, see the “performance” information on the fact sheets for each HWTS option. When effectiveness is not clear for a given technology and disease, discuss with the participants and make an educated guess or use the “not sure” card.

15 minutes

Promotional Advertisement: Review



1. Ask participants to return to their original filtration stations. Explain that each group must create a 1-minute promotional advertisement for 1 filter at its station. Give the participants 2 minutes to create the advertisement.
2. Ask each group to present its promotional advertisement to the large group.
3. Summarize the lesson.

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Effectiveness Cards

Cut out these cards for the matrix activity. You will need 9 copies of this page: 3 copies per lesson (sedimentation, filtration, and disinfection).

Very Effective (>99%) 	Effective (>90%) 	Somewhat Effective (>80%) 	Not Effective 	Not Sure 
Very Effective (>99%) 	Effective (>90%) 	Somewhat Effective (>80%) 	Not Effective 	Not Sure 
Very Effective (>99%) 	Effective (>90%) 	Somewhat Effective (>80%) 	Not Effective 	Not Sure 



50–60 minutes total

Lesson Plan Disinfection Options

Overview of Activities

1. **Discussion:** Introduction
2. **Station Work:** Disinfection Options
3. **Matrix:** Disinfection Options and Diseases (Optional)
4. **What I Learned, What I Wonder:** Review

Learning Outcomes

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

1. Describe the role of water disinfection within the Multi-Barrier Approach
2. Describe how to use common household water disinfection methods
3. Assess the advantages and disadvantages of selected disinfection options

Materials

- ☐ Fact Sheets for selected disinfection options
- ☐ Materials for disinfection (such as chlorine solution, aquatabs, materials for SODIS)
- ☐ PowerPoint: HWTS Stations (Optional)
- ☐ Piece of paper (1 per participant for review activity)
- ☐ Effectiveness matrix (created in sedimentation lesson)
- ☐ Effectiveness Cards (1 page; 3 copies; see end of lesson)

Recommended Reading

- ☐ Technical Brief: The Multi-Barrier Approach to Safe Drinking Water
- ☐ Technical Brief: Selecting Household Water Treatment and Safe Storage (HWTS) Options
- ☐ Technical Information Sheets for selected HWTS methods

5 minutes



Discussion: Introduction

1. Optional: Tell a short personal story about a weed or pest that affected your life (for example, bedbugs, cockroaches, or a weed in your garden).
2. Ask the participants: “Can someone give an example of a weed or insect that is a problem in your community?”
3. For the example provided, ask the participants: “What are the different ways you can kill this pest?”
 - Answers may include burn it, use chemicals to kill it, physically remove it, squish it, or destroy it.
4. Explain to the participants: “Water disinfection refers to steps you can take to kill or inactivate pathogens in water. Many disinfection options use similar methods you would use to kill insects or weeds (for example, chemicals or heat). The difference is that you can’t see the organisms you’re trying to kill because they are so tiny.”
5. Ask the participants which disinfection methods they are familiar with for water treatment.
6. Present the learning outcomes or an overview of the lesson.

35 minutes



Station Work: Disinfection Methods

Optional: Use “PowerPoint: HWTS Option Stations” for this activity.

1. Explain to the participants that they will now have a chance to see and use different household disinfection options.
2. Set up 4 stations (chlorine solution, aquatabs, SODIS, and 1 other disinfection option). At each station, put the relevant CAWST HWTS Fact Sheets. Also, provide any materials you have for practicing the disinfection methods (for example, chlorine tablets, and SODIS bottles and platform). *Trainer Tip: Change the setup of the stations depending on the number and type of disinfection options that are available for this workshop and common in the region.*
3. Divide the participants into 4 groups. One group will start at each of the 4 stations. At each station, they should:
 - Read through the Fact Sheet for the option(s)
 - Practice using the option(s) at their station

Trainer Note: For options like SODIS that are difficult to use in a classroom, they can discuss instead of practicing with that option.

 - Discuss and fill in 1–2 advantages or disadvantages for each method (in their **workbooks**)
4. Give the participants about 5 minutes at each station and then rotate them to the next station.

Trainer Tip

If you prefer, you can place a piece of flip chart paper next to each station. Ask the participants to record advantages and disadvantages there instead of in their workbooks.

- After all the groups have rotated through the stations, ask the participants to return to their original station.
- Ask each group to summarize 1 key advantage and 1 key disadvantage for the option(s) at their station. Discuss as a full group and correct or add to their points as needed.

10 minutes

Matrix: Disinfection Options and Diseases (Optional)



- Refer back to the large matrix created in the sedimentation lesson.
- Ask: “Which of the disinfection options we looked at are most common in your region?” Select 2–3 options based on the participants’ responses. Add the Fact Sheets for these options as column headers in the large matrix.

	Settling Fact Sheet	Natural coagulant Fact Sheet	Chemical coagulant Fact Sheet	Filter 1 Fact Sheet	Filter 2 Fact Sheet	Filter 3 Fact Sheet	Disinfection Option 1 Fact Sheet	Disinfection Option 2 Fact Sheet	Disinfection Option 3 Fact Sheet
Disease Card									
Disease Card									
Disease Card									
Disease Card									
Disease Card									
Disease Card									

- For each of the options added, go through each disease on the matrix. Ask: “How well would these disinfection methods (if used correctly, consistently, and continuously) prevent this disease?” Decide the effectiveness as a group and tape the **Effectiveness Cards** in the corresponding spaces in the matrix:
 - Not effective
 - Somewhat effective
 - Very effective
 - Not sure
- Remind the participants that they should view HWTS as a system, not as individual technologies.
- Ask: “Why do we use disinfection as the last step in treatment within the Multi-Barrier Approach?”
 - Disinfection can be used as a final step to inactivate any pathogens that remain after sedimentation and filtration.
 - Most disinfection methods work best when turbidity is low, so sedimentation or filtration is an important first step (before disinfection) for turbid water.

What I Learned, What I Wonder: Review



1. Give each participant a piece of paper. Ask them to think back over the last 3 lessons (sedimentation, filtration, and disinfection) and to write:
 - 1 new thing they learned about HWTS options
 - 1 thing they want to learn more about
2. When everyone has written something, ask the participants to crumple their piece of paper into a small ball.
3. On the count of 3, ask the participants to throw their paper balls up in the air towards another part of the classroom.
4. Ask each participant to pick up a crumpled paper ball and open it. Then, ask them to take turns reading out loud what people learned and what people want to learn more about. Comment on what the participants wrote and respond to their comments and questions as needed. Provide suggestions for where people can find more information about the topics they want to learn more about.

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Effectiveness Cards

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Very Effective (>99%) 	Effective (>90%) 	Somewhat Effective (>80%) 	Not Effective 	Not Sure 
Very Effective (>99%) 	Effective (>90%) 	Somewhat Effective (>80%) 	Not Effective 	Not Sure 
Very Effective (>99%) 	Effective (>90%) 	Somewhat Effective (>80%) 	Not Effective 	Not Sure 

Overview of Activities

1. **Discussion:** Introduction
2. **Ranking & Brainstorm:** Criteria for Safe Storage Containers
3. **Brainstorm:** Safe Handling Practices
4. **Demonstration:** Cleaning Storage Containers
5. **Pair-Share:** Review

Learning Outcomes

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

1. Explain the importance of safe water storage
2. List the characteristics for a safe water storage container
3. Demonstrate how to clean a storage container
4. Describe safe water handling practices

Materials

- ☐ Variety of local storage containers, if available, or, if none available, images of containers (5–10 types, ranging from unsafe to safe)

Recommended Reading

- ☐ Technical Brief: The Multi-Barrier Approach to Safe Drinking Water



Discussion: Introduction

1. Say to the participants: “We have now covered options for 3 out of 4 groups of barriers that are included in HWTS: sedimentation, filtration, and disinfection.”
2. Ask: “What’s the fourth group of HWTS barriers?”
 - Safe storage and handling: refers to activities done in the home to keep water safe from recontamination
3. Present the learning outcomes or an overview of the lesson.



Ranking & Brainstorm: Criteria for Safe Storage Containers

1. Display various examples of local storage containers. *Trainer Tip: You can use images of storage containers if you do not have actual containers or enough containers.*
2. Ask the participants to look closely at the different containers on display.
3. Ask the participants to work together to place the different containers in order from the best (on 1 end of the room) to the worst (on the other side of the room) based on how well the containers will protect drinking water from contamination.
4. After the participants have placed the containers in order, ask them to list the criteria they considered while ranking them. Record their criteria at the front of the room and add any characteristics that are missing. Criteria should include:
 - Tight-fitting lid (to keep water safe)
 - Easy to clean
 - Tap or narrow opening (so water can be poured out instead of users dipping hands or cups into it)
 - Not transparent (to prevent algae growth)
 - Stable base (to prevent tipping)
5. Ask the participants to record a few key points in their **workbooks** under “Characteristics of a Safe Storage Container” on the “Safe Storage” page.
6. Ask the participants to look at the containers again. Ask: “Do you want to reorder any of these now that we’ve discussed the factors that are important?” Provide suggestions if needed. When the containers appear to be in a logical order, move to the next activity.



Brainstorm: Safe Handling Practices

1. Explain: “The Multi-Barrier Approach involves keeping water safe from the source to the user’s glass. Studies have found that in many cases, a lot of recontamination occurs after treatment. Recontamination can reduce the health benefits of HWTS.”

2. Ask: “What are some practices you would recommend for water storage and handling to prevent recontamination?” Record their ideas at the front of the room.
 - Never dip hands or cups into water. Pour water from the container through a tap or narrow opening.
 - Keep the storage container clean.
 - Make sure there is always a lid on the storage container.
 - Use separate containers for source water and treated water.
3. Ask the participants to record a few key points in their **workbooks** under “Safe Water Handling Practices.”

5 minutes

Demonstration: Cleaning Storage Containers



1. Ask for a volunteer. Give the volunteer a safe storage container.
2. Ask the participants to brainstorm the steps to properly clean a storage container. Ask the volunteer to demonstrate the steps participants list. Steps should include:
 - Wash hands with soap and water.
 - Open the container and place the lid in a safe, clean place.
 - Use safe water and a clean cloth or scrub brush to clean the inside and outside of the container.
 - Rinse the container thoroughly with safe water.
 - Dry the inside with a clean cloth.
 - Replace the lid.
 - Wash hands with soap and water.
3. Ask the participants: “What are some common mistakes people in the households you work with make while handling their water or cleaning their safe storage container?”
4. Ask the participants: “How can you help them avoid these mistakes?”

Trainer Tip

If you have cleaning supplies and clean water, ask the volunteer to demonstrate steps in detail. Otherwise, ask them to mime the steps as if they were in a home with the required supplies.

5 minutes

Pair-Share: Review



1. Ask the participants to select partners. Have each pair choose 2 storage containers from the first activity. Then, ask them to discuss how their containers could be improved to better protect treated water.
2. Ask a few participants to volunteer to share their ideas with the full group.
3. Summarize key points from the lesson.

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50 minutes total

Lesson Plan HWTS Option Selection

Overview of Activities

1. **Scenario:** Introduction
2. **Pair-Share & Presentation:** Criteria and Process for HWTS selection
3. **Scenarios:** HWTS Option Selection
4. **Workbook:** Review

Learning Outcomes

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

1. List criteria to consider when selecting HWTS options
2. Explain why different user groups prioritize different criteria
3. Suggest a process for selecting HWTS options for a given scenario

Materials

- ☐ Handout: HWTS Selection Scenarios (12 copies, 1 page each; see end of lesson)
- ☐ Flip chart paper
- ☐ Markers (one set per group)
- ☐ PowerPoint: HWTS Selection

Recommended Reading

- ☐ Technical Brief: Selecting Household Water Treatment and Safe Storage (HWTS) Options

5 minutes

Scenario: Introduction



Use “PowerPoint: HWTS Option Selection” for this introduction.

1. Reveal the PowerPoint slide with the motorbike and tell the participants to imagine they are purchasing a new motorbike. Ask the participants: “What criteria would you use to decide which one to buy?” Record their answers. Possible answers are:
 - Cost, fuel efficiency, how the motorbike looks, the number of people it can seat, and its ability to travel on muddy roads
2. Ask: “Will the same criteria be important to everyone in your community?”
 - No. Some people will care more about certain criteria (cost, size, appearance), and others will care less. Personality and a person’s situation are likely to influence what they value.
3. Explain that HWTS selection is similar to motorbike selection: There are many criteria to consider, and different people value different criteria.
4. Present the “Learning Outcomes” slide or provide an overview of the lesson.

20 minutes

Pair-Share & Presentation: Criteria and Process for HWTS Selection



Use “PowerPoint: HWTS Option Selection” for this activity.

1. Remind the participants that the goal of HWTS implementation is to achieve correct, consistent, and continued use of appropriate systems. Explain that the group will now talk about some of the criteria to consider and processes to use when selecting HWTS options.
2. In pairs, ask the participants to discuss the following questions:
 - What criteria should you consider when selecting HWTS options?
 - What process have you used in the past to select HWTS options?
 - What process would you use in the future to select HWTS options?
 - Would the process differ for personal versus business or program use?
3. Ask some participants to volunteer share what they discussed with their partner.
4. Use the PowerPoint slides to:
 - Present the 4 groups of criteria (performance, ease of use, feasibility, and acceptability). Ask the participants to give examples of criteria that would fit within each of the 4 groups.
 - Explain that there is no best way to select HWTS options, but some general principals and processes can help.
 - Present the overview of the HWTS selection process. Explain this suggested process is one way to do HWTS selection, but not the only way.
 - Describe some activities for each step (understand, select, and test). Provide examples from your own experience or case studies.

25 minutes

Scenarios: HWTS Option Selection



Use “PowerPoint: HWTS Option Selection” for this activity.

1. Remind the participants that the steps you just described are very general and may need to be adapted or changed depending on the specific situation. Explain that they will now look at some specific situations to discuss how they would approach HWTS selection.
2. Explain that 4 diverse scenarios in which HWTS option selection is required will be looked at.
3. Divide the participants into 4 small groups. Give each group a few copies of “**Handout: HWTS Selection Scenarios**,” and assign each group to 1 of the 4 scenarios. Give them flip chart paper and markers to record their ideas.
4. Tell the groups they will have 10–15 minutes to discuss the following questions:

- What steps would you take to select the best HWTS options for this scenario?
- Which criteria do you think may be most important to these users?
- Which HWTS options may be appropriate (consider the Multi-Barrier Approach)?
- What assumptions did you make, or what additional information do you need to answer the above questions?

5. Ask each group to share their scenario and the key points of their discussion with the large group.
6. Summarize common themes and notable differences between the scenarios. Highlight key differences between the scenarios (business, emergency context, community-based organization, single family).

Alternative Option

Instead of using the 4 scenarios in “Handout: HWTS Selection Scenarios”:

1. Create and present a scenario that includes detailed information (community demographics, current practices, risks, previous HWTS exposure). If possible, base the scenario on an actual local community and use pictures.
2. Ask all 4 groups to answer the discussion questions based on the detailed scenario. Encourage them to consider the Multi-Barrier Approach.
3. Ask all 4 groups to present their answers. Discuss the similarities and differences between their responses to the scenario.

10 minutes

Workbook: Review



Use “PowerPoint: HWTS Option Selection” for this activity.

1. Ask the participants to select partners.
2. Ask them to open their **workbooks** to the “Selecting HWTS Options” page and, with their partners, to:
 - Review the selection criteria and process

- Record any key points or new ideas they learned from the scenarios under “Scenario Notes”
 - Discuss any questions they have about selecting HWTS options
3. After 5 minutes, ask if there are any questions or ideas participants want to share with the full group. If so, take a few minutes to discuss them.
 4. Summarize key points.

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HWTS Selection Scenarios

Handout

Scenario 1

You work for a business that offers many different health and hygiene products in rural districts. You want to start offering household water treatment products because your customers frequently ask if you have any. Here is what you know about your target market:

- Many are farming families (80%) who move twice per year when seasons change.
- Only 10% have experience with chlorine disinfection.
- About 10 households were once part of a ceramic pot filter pilot study, but aside from that, there is little local experience with water filters.
- Most households use surface water during the rainy season and boreholes during the dry season.

Scenario 2

You work for an international nongovernmental organization (iNGO) that distributes humanitarian kits after emergencies. You have been assigned to work in a country where your organization has no previous experience. An earthquake recently affected large regions of the country, and many people have been displaced from their homes.

Your iNGO has good connections with distributors of chlorine tablets and gravity-driven membrane filters. It would take much more work to find and distribute other HWTS options quickly. You do not know whether people in the affected regions have used these water treatment methods in the past.

Scenario 3

You work for a local community-based organization. The community leaders you have been working with for many years requested help finding an appropriate HWTS option. They are concerned because some neighbouring communities have recently had cholera outbreaks.

Some households in the community have biosand filters from an organization that distributed them about 5 years ago. Otherwise, the community has little exposure to HWTS. About 50% of the households work in local garment factories. They have little disposable income. They are close to a large town with a variety of retail outlets.

Scenario 4

You and your family live in an apartment in an urban centre. You have tap water, but it is inconsistent in quality. You want to keep your young children healthy, so you are looking for an additional treatment method you can use in your home to make sure your water is safe. You do not have access to water quality testing equipment.



55 minutes total

Lesson Plan Behaviour Change and HWTS

Overview of Activities

1. **Discussion:** Introduction
2. **Presentation:** What is Behaviour Change?
3. **Categorization:** Factors that Influence Behaviour
4. **Group Brainstorm:** Supporting Behaviour Change
5. **Individual Reflection:** Review

Learning Outcomes

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

1. Describe factors that affect behaviour change
2. Create strategies to support households as they adopt correct, consistent, and continued use of HWTS

Materials

- ☐ Handout: HWTS Behaviour Change Quotes (1 page; 5 copies; see end of lesson)
- ☐ Handout: Behaviour Change Techniques Guide (1 page; 1 copy per participant; see end of lesson)
- ☐ RANAS Titles (5 pages; 1 copy for titles at front of room; see end of lesson)
- ☐ Large pieces of paper for factors influencing behaviour change (20 pieces)
- ☐ Flip chart paper (1 per group)

Recommended Reading

- ☐ RANAS Fact Sheet, available at <https://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/2397>

5 minutes



Discussion: Introduction

Use “PowerPoint: Behaviour Change and HWTS” for this introduction.

1. Ask the participants: “Think of a time when you wanted to change a certain bad habit but found it difficult.”
2. Ask the participants to silently reflect on their experience of attempting to change their habit or behaviour. Ask them: “What made it easy or difficult?” *Trainer Tip: To open discussion, give a personal example, such as stop smoking, exercise more, stop eating bad food, go to bed earlier, get to work on time, stop biting your nails, or floss more often.*
3. Ask a few participants to volunteer to share some experiences.
4. Present the “Learning Outcomes” slide or provide an overview of the lesson.

5 minutes



Presentation: What is Behaviour Change?

Use “PowerPoint: Behaviour Change and HWTS” for this activity.

1. Explain: “As you shared in your examples, behaviour change is difficult. If we want to help people use HWTS correctly, consistently, and continuously, we should be equipped with a basic understanding of behaviour change.”
2. Give each participant a piece of paper. Ask the participants to silently reflect and write down definitions (in their own words) for “behaviour” and “behaviour change.”
3. Use the PowerPoint slide to show the definitions of “behaviour” and “behaviour change.”

20 minutes



Categorization: Factors that Influence Behaviour

Use “PowerPoint: Behaviour Change and HWTS” for this activity.

1. Explain to the participants: “We are going to look at some of the obstacles people face in changing their behaviour to adopt correct, consistent, and continued use of HWTS.”
2. Choose 5 volunteers. From the “**Handout: HWTS Behaviour Change Quotes**,” select a quote to give to each of them. Explain that each quote gives some reasons why a person or household struggled to correctly, consistently, or continuously use HWTS.
3. Ask the volunteers to read their quotes one by one. After each quote has been read, ask the participants: “What factors prevented behaviour change in this situation?” Record each of the factors on a separate piece of paper and stick them on the wall.
4. When all the quotes have been read, explain to the participants: “Researchers (led by Hans Mosler) have organized the factors that affect behaviour change into 5 categories.”
5. Post the 5 titles horizontally on the wall and explain each category (Risk, Attitude, Norms, Ability, Self-Regulation). *Trainer Tip: You can also show these 5 categories on the PowerPoint slide.*
6. Return to the pieces of paper on which you recorded factors from the quotes. Ask the participants, as a large group, to help you decide which category each factor belongs to.

Sort them under the appropriate category. *Trainer Tip: Answers are given in the table below.*

Quote	Risk	Attitude	Norms	Ability	Self-Regulation
1	Always done this way without affecting health		No one in the community treats their water		
2		Smells and tastes bad		Don't know how Don't have instructions they can read	
3		Don't think it's worth waiting for the water to filter			Forget to plan ahead when mother is gone
4		Don't think the time and money are worth it for new pot		Lack of time, money, and nearby replacement parts	
5		Filter is ugly	Other people will think we are poor and have bad water		

7. Ask the participants: "Are the factors or reasons we've recorded here familiar to you from the communities where you work?"
8. Ask: "Are there any other reasons people have given you for why they have not been able to use HWTS correctly, consistently, or continuously?" Add any additional reasons the participants mention and place them under the correct category.
9. Ask each participant to record 1 example for each RANAS category in their **workbooks** under "Example."

20 minutes

Group Brainstorm: Supporting Behaviour Change



1. Say to the participants: "Now that we've looked at reasons why people may not use HWTS correctly, consistently, and continuously, let's talk about how we can support behaviour change."
2. Divide the participants into groups of 3–4 people.
3. Ask each group to choose 2 factors/reasons why someone may not adopt HWTS. For example: "I think chlorine smells and tastes bad" and "I don't know how to use it."
4. Ask the participants: "As an implementing organization, what would you do to support behaviour change for households facing these challenges?" Ask the participants to brainstorm and record their answers on flip chart paper.

Trainer Tip

You can assign each group to 1 of the 5 quotes, or you can allow them to choose any combination of 2 factors.

5. Give each group about 5 minutes to brainstorm ideas. When they have had a few minutes of discussion, give the participants a copy of “**Handout: Behaviour Change Techniques Guide**” and ask them to add ideas from the handout to their flip chart paper.
6. Ask each group to share 1–2 ideas with the full group. Add suggestions as needed. As people share their ideas, ask each participant to record 1–2 ideas in their **workbooks** under “Ways to Support Behaviour Change.”

Key Points

- Behaviour change techniques must match the factors that motivate or prevent people from adopting a behaviour.
- Focusing on health messaging alone usually does not address the underlying reasons why people are not using HWTs.
- It’s important to understand what motivates people and to respond appropriately.

5 minutes

Individual Reflection: Review



Use “PowerPoint: Behaviour Change and HWTs” for this activity.

1. Explain: “This has been a very brief overview of how researchers categorize behavioural determinants and an introduction to some strategies that can be used to support behaviour change.”
2. Ask the participants to think about the habit or behaviour they said they wanted to change (from the introduction). Ask them to take a few minutes to silently reflect on these questions:
 - Which categories of RANAS have the greatest influence on that behaviour for you?
 - What kind of support would be most helpful for you as you seek to change that behaviour?
3. Ask a few participants to volunteer to share their reflections.
4. Summarize key points.

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HWTS Behaviour Change Quotes

Handout

Quote 1

"I am a WASH promoter in a small community. I arrived at a household and asked for a glass of water. I saw the father pour a glass straight from a bucket into my glass. The water was cloudy and brown. I asked why they don't treat their water. He said they have always used this water without treatment, and it doesn't affect their health. He said everyone in the community does the same thing."

Quote 2

"No, I don't treat my water. Someone gave us chlorine, but it smells disgusting and we don't like the taste. We also don't know how to use it, because the instructions are in a language we can't read."

Quote 3

"My mother always uses this water filter to make sure we are drinking safe water. But the flow rate is slow, and it takes a long time to filter the water. When our mother is gone, we usually forget to fill the filter in the morning before we go to school. When we get home, we are thirsty and don't want to wait for the filter to process our water. So, we drink it without filtering."

Quote 4

"I was doing household visits to follow-up on a household water treatment intervention. I arrived at one home where we had provided a ceramic pot filter. The ceramic pot had broken. They said someone dropped it while cleaning the pot, and they did not have enough money or time to walk to the town where replacement pots can be purchased. They think the pot costs a lot of money and is not worth the price."

Quote 5

"You want me to use that ugly filter? That's what they give away to poor people in the town nearby. When my family visits from the city, they see this and they will think we must use really dirty water and that we must be too poor to afford a nice filter."

Behaviour Change Techniques Guide

RISK – A person's understanding and awareness of the risk
1. Present facts and information about the risk to their health, safety, or security.
2. Highlight a fear of the <u>consequences</u> of the risk, what might happen if they do not adopt the behaviour.
3. Present information or stories about the <u>likelihood</u> of something bad happening.
ATTITUDE – Beliefs about the costs and benefits, and emotions related to a behaviour
4. Provide information and advice on the costs and benefits of a behaviour. For example: explain that the cost of chlorine is much less than the cost of the medication needed when you are sick.
5. Describe the <u>positive</u> feelings related to the behaviour (such as safety, respect, dignity, and pride).
6. Describe the <u>negative</u> feelings related to the consequences of performing the behaviour (such as disgust and shame).
7. Provide a reward for adopting the behaviour.
NORMS – What the community does and thinks of the behaviour
8. Discuss how others in the community are already adopting the behaviour and they will be left out if they don't also do it.
9. Discuss how the household can be a leader. For example, ask a household that has already adopted the behaviour to tell others; also, provide certificates or stars to high-performing households.
10. Ask people if other community members would approve or disapprove of their behaviours.
11. Organize support from the community. For example, make a community plan to stop open defecation.
ABILITY – A person's ability, or perception of ability, to adopt the behaviour
12. Teach people how to do something or demonstrate the behaviour yourself.
13. Help people gain access to the things they need to adopt the behaviour. For example, talk to merchants in the market to ensure that required products are available.
14. Give people feedback on their behaviours (whether they are doing it correctly or incorrectly), and give compliments to motivate them.
SELF-REGULATION – Barriers, distractions, or supports to continuing the behaviour
15. Encourage people to plan ahead. For example, they can buy chlorine or soap in bulk.
16. Offer feedback on how well they have done since adopting the behaviour.
17. Help people create reminders to keep doing the behaviour and avoid unwanted behaviour.
18. Help people anticipate and plan for regrets and failures.
19. Discuss how adopting the positive behaviour is now part of their identity and they are role models for other in their community.

Risk

A person's understanding and awareness
of the health risks of the behaviour

*Example: By drinking unsafe water, I could become very sick with
diarrhea.*

Attitude

A person's beliefs and feelings about a behaviour

Example: I love how it feels to pour a cup of clean, tasty water from my filter.

Norm

A person's perceived social pressure about
a behaviour

*Example: My relatives approve when I chlorinate my drinking
water.*

Ability

A person's confidence in their ability to adopt a behaviour

Example: I am confident in my ability to use this water treatment system correctly.

Self-Regulation



A person's efforts to plan and monitor their behaviour, and to manage conflicting behaviours and distractions

Example: I plan to refill the water filter every night before I go to bed.



85 minutes total

Lesson Plan

HWTS Implementation

Overview of Activities

1. **Pair-Share:** Introduction
2. **Presentation:** Components of Implementation
3. **Case Study Analysis:** Implementation Examples
4. **Pass the Ball:** Review

Learning Outcomes

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

1. List the components required for HWTS implementation
2. Describe why each component is important
3. Analyze the approach used in a given HWTS implementation case study

Materials

- ☐ PowerPoint: HWTS Implementation
- ☐ HWTS Implementation Case Studies (select 3–5 different case studies; enough copies for each participant to have 1 case study)
- ☐ Small ball or object

Recommended Reading

- ☐ Technical Brief: Implementation of Household Water Treatment and Safe Storage (HWTS)

5 minutes

Pair-Share: Introduction



Use “PowerPoint: HWTS Implementation” for this introduction.

1. Explain: “We just discussed some of the factors that influence whether an individual or a household will use HWTS correctly, consistently, and continually. With those ideas in mind, we’re now going to look at the components required for your program or project to have a better chance of success in achieving long-term behaviour change.”
2. Ask the participants to select a partner. Say to the participants: “Think about everything we’ve discussed so far this week and your own past experience. If you were to begin a new HWTS project right now, what are some of the things you would include in your project plan?”
3. After a few minutes, ask people to share their ideas. Record their ideas at the front of the room.
4. Present the “Learning Outcomes” slide or provide an overview of the lesson.
5. Emphasize that this is not a comprehensive workshop on program planning. Refer the participants to other relevant resources.

10 minutes

Presentation: Components of Implementation



Use “PowerPoint: HWTS Implementation” for this activity.

1. Refer to the list of ideas recorded from the discussion above.
2. Explain: “CAWST organizes components of implementation into 6 groups. These come from research and from CAWST’s experience supporting hundreds of implementing organizations.”
3. Use the PowerPoint slides to show and describe each of the 6 components. Give examples to show how the ideas listed from the introduction fit within these 6 categories.
4. For each component, ask the participants: “What are some potential problems if this component of implementation is not carefully addressed?” *Trainer Tip: see “Technical Brief: Implementation of Household Water Treatment and Safe Storage.”*
5. Ask the participants: “Does one organization always take care of all 6 components of implementation?”
 - No. Different stakeholders may focus on specific components that align with their experience and interest.

60 minutes

Case Study Analysis: Implementation Examples



Use “PowerPoint: HWTS Implementation” for this activity.

1. Explain: “Now we will look at some real examples of how people have approached these 6 components in different HWTS programs.”
2. Give each participant a copy of 1 case study.

3. Give instructions for Part 1 (individual reflection):
 - Tell the participants they will have 10–15 minutes to read the case study on their own. Ask them to consider:
 - i. What are some strengths of this implementation approach?
 - ii. What are some weaknesses or suggestions you will mention to the implementer?
4. Give instructions for Part 2 (group work):
 - Ask the participants to find everyone else who read the same case study. This should produce groups of 4–8 participants.
 - Ask the participants to imagine their group is a consulting firm that has been asked to evaluate the initiative in the case study. Ask the groups to record in their **workbooks**:
 - i. What questions will you ask to understand this program better?
 - ii. What strengths will you point out in your initial report?
 - iii. What suggestions will you make to improve the sustainability and effectiveness of their implementation?
 - Go around the room and ask questions to help the participants to analyze the case studies.
5. Give Instructions for Part 3 (sharing with the large group):
 - After 10–15 minutes of discussion, ask each group to choose 1 person to represent its group. That person should:
 - i. Briefly summarize the approach or model in their case study
 - ii. Highlight 1 or 2 interesting points their group discussed
6. Summarize common themes from the discussion. Review the 6 components.

10 minutes

Pass the Ball: Review



1. Ask the participants to stand in a circle. Give 1 person a ball (or other small object).
2. Ask the participant with the ball to share 1 new idea or 1 unanswered question they have about HWTS implementation.
3. After that person shares, ask them to toss the ball at random to another participant.
4. Continue until everyone has shared 1 new idea or 1 question they have. Respond as needed to questions and comments.
5. Summarize key points that emerged throughout this lesson.

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45–80 minutes total

Lesson Plan Water Quality Testing

Overview of Activities

1. **Discussion:** Introduction
2. **Discussion:** What to Test?
3. **Presentation & Demonstration:** Acceptability Parameters
4. **Presentation & Optional Demonstration:** Microbiological Parameters
5. **Presentation:** Chemical Parameters
6. **Scenarios:** What to Test? (Optional)
7. **Quiz:** Review

Learning Outcomes

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

1. Discuss how water quality testing contributes to successful HWTS implementation
2. Describe how to test for common water quality parameters
3. Decide which parameters to prioritize for a given scenario

Materials

- ☐ Handout: Water Quality Testing Scenarios (1 page; 2 copies per group; see end of lesson)
- ☐ Powerpoint: Water Quality Testing
- ☐ Three buckets of water with varying turbidity
- ☐ Supplies for demonstrating water quality testing (whatever is available and relevant to the participants)
- ☐ Flipchart paper
- ☐ Markers

Recommended Reading

- ☐ Technical Brief: Introduction to Drinking Water Quality for HWTS Implementers
- ☐ CAWST Drinking Water Quality Testing Manual

5 minutes



Discussion: Introduction

Use “PowerPoint: Drinking Water Quality Testing” for this introduction.

1. Explain to the participants that this lesson focuses on water quality testing. Ask: “Why should you include water quality testing within your HWTS initiative?” Record the participants’ answers at the front of the room. Suggest additional ideas as needed. Reasons for regular random water quality testing may include:
 - Can help you understand how well your HWTS initiative is working
 - Helps you identify possible issues with household behaviours (for example, improper use of technologies and recontamination from unhygienic storage or handling)
 - Gives you assurance that the method you’re promoting and implementing is effective
 - Helps you select appropriate HWTS systems based on water quality
2. Ask the participants to describe any experience they have with water quality testing. *Trainer Tip: The level of detail you use in the next sections will depend on the participants’ prior experience.*
3. Present the “Learning Outcomes” slide or provide an overview of the lesson.

10 minutes



Discussion: What to Test?

Use “PowerPoint: Drinking Water Quality Testing” for this activity.

1. Ask: “Who can remember the 4 aspects of drinking water quality?” After the participants list them, show them the definitions on the PowerPoint slide.
 - Microbiological, chemical, radiological, acceptability
2. Ask the participants: “Which aspects would you want to measure in the communities you serve?” *Trainer Note: Answers may vary. Emphasize that radiological testing is rarely necessary. The other aspects are often helpful to study or measure.*
3. Explain: “We’re going to look at some common parameters for drinking water quality and how you would test them. We will focus on microbiological, chemical, and acceptability parameters.”
4. Ask: “Can someone define ‘parameter’?” Then, show the definition on the PowerPoint slide.
5. Ask: “What are some of the things you would need to consider when you’re deciding what parameters to test, and when?” Record their answers and discuss. Examples include:
 - How the information will be used
 - Cost of tests
 - Human resources and skills (planning, collection, input, analysis, reporting results)

- Equipment required
- Risks identified (common diseases and contaminants in the region, risks identified in the water supply system)
- Which standards or guidelines to use

6. Summarize key points.

7. Explain that deciding which parameters to test, and how often, is a complex decision. Let the participants know that they will now look at how to test for different parameters.

Key Points

- The parameters you measure should be useful. There is no point in measuring parameters you won't be able to use.
- Data collected should support decision-making (helping you choose HWTS systems), accountability (by tracking whether you are meeting the quality you promised funders and community members), and improvement (by helping you identify areas for improvement).

10–15 minutes

Presentation & Demonstration: Acceptability Aspects



Use “PowerPoint: Water Quality Testing” for this activity.

1. Remind the participants that acceptability aspects refer to aspects of water quality that affect how consumers feel about drinking the water.
2. Ask: “What are some acceptability aspects of water that you can measure?”
 - Colour (and chemicals that affect colour, such as iron and manganese)
 - Temperature
 - Turbidity—suspended particles in the water giving it a cloudy appearance
 - Total dissolved solids (TDS)
 - Hardness
3. Explain that turbidity is a commonly-measured parameter. Ask the participants: “Why would I want to measure turbidity as a HWTS implementer?”
 - Higher turbidity could indicate higher microbiological contamination.
 - Turbid water is not appropriate for some HWTS methods, such as SODIS, chlorination, and some filters. Water needs to be prefiltered before using these methods.
 - Testing turbidity before and after filtration can help check if the filter is working.
4. Show the participants 3 buckets of water: 1 with clear water, 1 with slightly cloudy water, and 1 with water with high turbidity. Ask: “How would you measure the turbidity of these samples?”
5. Show the participants several options for turbidity testing:
 - Use a turbidity tube with water of different turbidity

- Use a 2-litre clear plastic bottle filled with the source water (place the bottle on top of this lesson plan, and if the CAWST logo is visible through the top of the bottle, the water probably has a turbidity of less than 50 NTU)
 - Use a digital turbidimeter (if available)
6. Briefly discuss some of the benefits and limitations of the methods you demonstrated (cost, equipment required, and accuracy).
 7. Explain that water quality testing options for most parameters range from cheap and practical to complex and expensive. Choice typically depends on the number of tests required and the available resources.
 8. Optional: If relevant and if you have the equipment available, demonstrate testing for other acceptability aspects, such as temperature, colour, and TDS.

10–30 minutes

Presentation & Optional Demonstration: Microbiological Aspects



Use “PowerPoint: Water Quality Testing” for this activity.

1. Ask: “Do you remember the 4 groups of pathogens?” After the participants list them, show them the images on the PowerPoint slide.
 - Viruses, bacteria, protozoa, helminths
2. Ask: “Given the many different microorganisms that could be in water, what microorganisms would you test for in your water sample?”
3. Explain that testing for every possible pathogen in water is time-consuming, complicated, and expensive. “Indicator bacteria” are usually used to test for fecal contamination. The WHO Guidelines recommend no *E. coli* or thermotolerant coliforms detectable within a 100 mL sample.
4. Explain that water with no indicator bacteria *could* still contain pathogens. Ask: “As HWTS implementers, why is this possibility important for you to consider?”
 - HWTS implementers need to be very careful about how they interpret and communicate results.
 - Some treatment methods may be very effective against bacteria but not against other pathogens. For example, some protozoa are resistant to chlorine and may be in water even after indicator bacteria are inactivated.
 - It might be too late to protect people from pathogens by the time the contamination is detected. Reducing risks through multiple barriers is really important.
5. Demonstrate (or describe) microbiological testing methods using 3 types of microbiological tests:
 - Presence-Absence—shows if there is even 1 bacteria present, but not an actual number represented
 - Most Probable Number—based on presence-absence, tests to a higher level of accuracy

- Membrane Filtration—highest level of accuracy and international standard for water quality testing
6. Discuss the benefits and limitations of each option.
 7. Summarize key points.

Key Points

- Indicator species are microorganisms whose presence in water indicates that fecal contamination is likely. Example indicator bacteria include *E. coli*, thermotolerant coliforms, and H₂S bacteria.
- Different methods are applicable in different situations. For testing performance of HWTS methods (before versus after treatment), MPN or membrane filtration is usually preferred.

10 minutes

Presentation: Chemical Parameters



Use “PowerPoint: Water Quality Testing” for this activity.

1. Ask the participants to think back to the water quality lesson. Ask: “What are some examples of chemicals that you may decide to test for a given water supply?”
 - Arsenic, fluoride, and nitrate and nitrite
 - Chemical parameters that affect acceptability, such as TDS, manganese, iron, and pH
 - Chlorine residual (if using chlorine treatment)
2. Ask the participants: “Where can you get information about chemicals of concern in your region or country?” Explain that government bodies, WHO, the United Nations Environment Programme (UNEP), and other groups maintain data and maps of distribution of arsenic, fluoride, and nitrate and nitrite.
3. Use the visuals in “PowerPoint: Water Quality Testing” to show different options for measuring chemical parameters. If possible, demonstrate them while describing them:
 - Test strips
 - Colour disc comparators
 - Colorimeters and photometers
 - Digital meters
 - Portable test kits

20 minutes

Scenarios: What to Test? (Optional)



Use “PowerPoint: Water Quality Testing” for this activity.

1. Explain: “Now that we’ve discussed different parameters and how to test for them, we’ll look at some scenarios.”

2. Divide the participants into 4 groups. Give each group a piece of flipchart paper, set of markers, and a scenario from “**Handout: Water Quality Testing Scenarios.**”

3. Ask the groups to imagine they have limited resources and want to spend the least amount of time and money possible while ensuring quality in their program. Ask them to discuss and record on flipchart paper:

- Which parameters would you measure? When or how often?
- Who would you communicate the results to, and how?
- What questions or assumptions did your group face when deciding?

4. After 5–10 minutes, ask each group to present their scenario and answers to the other groups. Discuss and challenge some of their assumptions or decisions if necessary.

Trainer Tip

When groups share their scenarios and answers, encourage healthy debate. Emphasize that there is often no single correct answer.

Consider the following topics for discussion:

- If it has not been raised already, ask about the role of local government.
- Ask about possible risks from communicating results poorly, communicating with the wrong people, or failing to communicate results.
- If any groups suggested sending samples to a local lab instead of testing themselves, ask why. Discuss benefits and limitations of doing your own field tests versus sending the samples to a lab.

5 minutes

Quiz: Review



1. Explain that you are going to read out some questions. Ask the participants to reflect and write answers on the “water quality testing” page in their **workbooks**. Tell them that after reading all the questions, you will go through the answers with them.
2. Read the following questions (changing the questions, if necessary, depending on the level of group):
 - What are the 4 aspects of water quality?
 - In water quality testing, what is an indicator species?
 - Name 1 method for testing turbidity.
 - Name the 3 methods we discussed for testing bacteria.
 - Name 1 chemical parameter and 1 method you could use to measure it.
3. After everyone has written answers to the questions, go through them all again. For each question, request a participant to volunteer to share their answer.
4. Emphasize that this was a basic and quick overview. Recommend CAWST’s Water Quality Testing Manual and workshop for more information.

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Water Quality Testing Scenarios

Handout

Scenario 1

You work for a small community-based organization that is planning to distribute water filters. Your baseline data from 3 years ago told you there was high fecal contamination in surface water. People use surface water in the rainy season, and well water in the dry season. Most household education and monitoring is done by community WASH promoter volunteers.

- Which parameters should you measure? When or how often?
- What questions or assumptions did your group face when deciding?

Scenario 2

Your business sells ceramic pot filters. You do extensive water quality testing of untreated and treated water when your filters are first manufactured in your facility. You encourage customers to purchase a new pot every 2 years, but you have done little testing to see how well the filters perform after they leave your production facility. You do not know what types of contaminants are common in the area, or what water sources people use.

- Which parameters should you measure? When or how often?
- What questions or assumptions did your group face when deciding?

Scenario 3

Your organization has been distributing biosand filters for 7 years throughout rural communities in 1 province. You have observed that the water people use is very cloudy before treatment, but you have never done water quality testing because the filters seem to work. The water always looks clearer when it comes out of the filter. Your staff regularly check if households are using the filter and maintaining it properly.

- Which parameters should you measure? When or how often?
- What questions or assumptions did your group face when deciding?

Scenario 4

You are a social business that wants to start a new HWTS program. Published data from the region where you work shows a high incidence of waterborne diarrheal diseases. You need to decide which HWTS products to promote and sell in the region.

- Which parameters should you measure? When or how often?
- What questions or assumptions did your group face when deciding?

Overview of Activities

1. **Discussion:** Introduction
2. **Presentation:** Stages of Water Safety Planning
3. **Pair Work:** Water Safety Planning and HWTS
4. **Personal Reflection:** Review

Learning Outcomes

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

1. Define water safety planning
2. Describe the process of water safety planning for small communities
3. Explain how HWTS and water safety planning add value to each other

Materials

- ☐ Handout: Water Safety Planning and HWTS (3 pages; 1 copy per pair of participants; see end of lesson)
- ☐ PowerPoint: Water Safety Planning and HWTS

Recommended Reading

- ☐ Technical Brief: Water Safety Planning and Household Water Treatment and Safe Storage (HWTS)
- ☐ Latest resources and WSP overview at <http://www.wsportal.org/>

5 minutes



Discussion: Introduction

Optional: Use “PowerPoint: Water Safety Planning and HWTS” for this introduction.

1. Explain that a common approach for protecting water in communities (large or small) is called water safety planning.
2. In pairs, ask participants to discuss and create their own definitions of water safety planning. After a few minutes, ask some volunteers to share their answers.
3. Ask the participants if anyone has experience with water safety planning. If so, ask those participants to briefly share how the process worked.
4. Present the “Learning Outcomes” slide or provide an overview of the lesson. *Trainer Note: Explain that this lesson gives only a brief introduction to water safety planning and how to incorporate HWTS. Multi-day training programs and detailed manuals exist for water safety planning.*

5 minutes



Presentation: Stages of Water Safety Planning

Use “PowerPoint: Water Safety Planning and HWTS” for this presentation.

1. Use the PowerPoint slides to:
 - Define water safety planning and water safety plans (WSPs)
 - Define “preventative” and “risk-based”
 - Outline and briefly describe the stages for water safety planning in small communities

25 minutes



Pair Work: Water Safety Planning and HWTS

Use “PowerPoint: Water Safety Planning and HWTS” for this activity.

1. Explain: “Now you will look more closely at the stages of water safety planning and how they connect to HWTS.”
2. Give the participants a copy of “**Handout: Water Safety Planning and HWTS.**”
 - Explain that the “importance” and “considerations for HWTS” sections are mostly blank.
 - Ask the participants to discuss their ideas with their partners and record their ideas on the handout. Give examples if needed.
 - Go around the room and provide additional information or answer questions as needed.
3. After 10–15 minutes, go through the tasks with the full group and ask some participants to volunteer to share what they wrote. Clarify and add ideas as needed.
4. Explain to the participants: “We talked about how including HWTS can improve a water safety plan.” Ask the participants: “How might a water safety planning approach improve

or strengthen HWTS implementation?” *Trainer Tip: see “Technical Brief: Water Safety Planning and Household Water Treatment and Safe Storage (HWTS).”*

5 minutes

Personal Reflection: Review



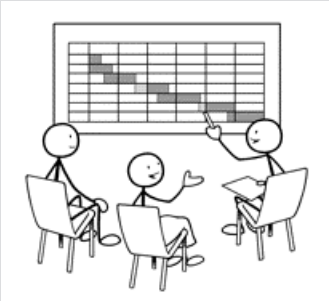
1. Ask participants to silently reflect on the process of water safety planning and consider the following questions:
 - Which tasks would you find most challenging to put into practice?
 - What is 1 thing you or your organization can do differently to consider water safety from the source to the user’s glass?
2. Ask a few of the participants to share their reflections.

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Water Safety Planning and HWTS

Task & Description	Why is this task important?	How could you include household barriers such as HWTS?
Task 1: Engage the Community and Build a Team - Engage the community. - Assemble a team. Include people who: - Have knowledge about local water - Will be affected by the decisions made - Have influence and can encourage others to take action - Have authority to make decisions - Can identify risks and control measures	A water safety plan is more likely to be successful if it is created and used by a team who understands local issues and cares about making change.	On the team, you can include some team members who are familiar with household practices such as HWTS. These people can propose household-level solutions that are easy to manage.
Task 2: Describe the Water System - The team describes the water system: all water sources, transportation practices, treatment systems (community-level or household-level), and storage practices. Often, this involves making a community map. - The team documents local water quality standards, policies, and other relevant rules or regulations. 		

Task & Description	Why is this task important?	How could you include household barriers such as HWTS?
Task 3: Assess Hazards, Risks, and Control Measures 1. The team identifies any potential sources of contamination and events that might increase the likelihood of contamination (for example, runoff from a large storm). 2. The team assesses how much risk there is of these hazards causing contamination and illness. It also identifies existing control measures (practices that protect the water and reduce contamination).		
Task 4: Develop and Implement a Plan The team considers its available time and resources, and develops a plan for implementing barriers to risk (any behaviours or technologies that can make contamination less likely or remove contamination). This plan will start with barriers that are the highest priority or easiest to implement. This approach will allow time to plan, raise funds, and build capacity for more complex improvements. 		

Task & Description	Why is this task important?	How could you include household barriers such as HWTS?
Task 5: Monitor The team does regular monitoring to ensure that barriers are in place and working effectively on a day-to-day basis. Depending on the barriers used, the team may choose to monitor some of the following: • Water quality (for example, residual chlorine) • Sanitary conditions and practices • Performance and use of HWTS 		
Task 6: Document, Review, and Improve 1. The team keeps records and instructions to ensure that everything will continue working well in the future. 2. Supporting activities are carried out, such as: • Training households • Sharing monitoring data and challenges • Training caretakers of infrastructure 3. The team regularly reviews and revises the water safety plan.		



75 minutes total

Lesson Plan Chlorine Dosing

Overview of Activities

1. **Sharing Experience:** Introduction
2. **Brainstorm & Presentation:** Types of Chlorine Products
3. **Pair Work & Presentation:** How Chlorine Works
4. **Practice Scenarios:** Determining the Chlorine Dose
5. **Role-Play:** Review

Learning Outcomes

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

1. Describe how chlorine disinfects water
2. Compare different chlorine products
3. Calculate an appropriate chlorine dose for given scenarios

Materials

- ☐ Handout: Chlorine Dosing (2 pages, 1 copy per participant; see end of lesson)
- ☐ Handout: Practice Questions (1 page; see end of lesson)
- ☐ Powerpoint: Chlorine Dosing

Recommended Reading

- ☐ Technical Brief: Chlorine Disinfection for Household Water Treatment

5 minutes

Sharing Experience: Introduction



Use “PowerPoint: Chlorine Dosing” for this introduction.

1. Ask: “Has anyone used chlorine products for water disinfection before?”
 - If they have, ask a few participants to volunteer to share their experiences.
 - If they haven’t, ask how confident they would be deciding what product to use and how much to add.
2. Present the “Learning Outcomes” slide or provide an overview of the lesson.

10 minutes

Brainstorm & Presentation: Chlorine Products



Use “PowerPoint: Chlorine Dosing” for this activity.

1. Ask the participants: “How many chlorine products can you think of that are available locally or that you have seen elsewhere?” Record their answers at the front of the room. Add any common products they missed.
2. Refer to the PowerPoint slide to show different types of chlorine products that can be used for water treatment.
3. Ask the participants: “Which types would you prefer to use and why?”
4. Briefly explain why the stability of chlorine is important to consider.

20 minutes

Pair Work & Presentation: How Chlorine Works



Use “PowerPoint: Chlorine Dosing” for this activity.

1. Explain: “We’ve looked at types of chlorine products. Now let’s discuss how chlorine works to disinfect water.”
2. Show the participants the PowerPoint slide with this list of words:
 - Consumed chlorine
 - Combined chlorine
 - Free chlorine residual (FCR)
 - Total chlorine
 - Contact time
3. Ask the participants to select a partner and then discuss and define as many of these words as they can. Ask the participants: “How easy or difficult was it to create definitions?”
4. Use the PowerPoint slides to show how chlorine works to inactivate pathogens. Make sure to mention and define each of the terms from the list above.
5. Ask the participants: “How effective is chlorine against pathogens?” Show the statistic on the PowerPoint slide.

Practice Scenarios: Determining the Chlorine Dose



Use “PowerPoint: Chlorine Dosing” for this activity.

1. Give each participant a copy of “**Handout: Chlorine Dosing Instructions.**”
2. Using the PowerPoint and the handout, show the participants the 3 ways to determine how much chlorine to add to water.
3. Divide the participants into groups of 3–4 people. Give each participant a copy of “**Handout: Practice Questions.**” Give each group 5–10 minutes to answer the 4 practice questions.
4. Go over the correct answers for each practice question. Answer the participants’ questions and explain the processes as needed.

Answers to Scenario Questions

1. Scenario 1: Use experimentation and measurement. Add different doses to 5 different buckets with the same volume of the same source water, measure the FCR after 30 minutes, and choose the dose that came closest to reaching the target FCR.
2. Scenario 2: Follow the manufacturer’s instructions. Either filter the water first and then follow the instructions for clear water, or don’t filter the water and follow the instructions for cloudy water.
3. Scenario 3: Multiple answers are possible. Use a standard dosing table. Add 0.80 mL per 20 L. Note: this is a small volume so you may want to use serial dilutions (for example, create a 1% solution and then add a dose that is 5x greater or 4.0 mL).
4. Scenario 4: Multiple answers are possible. Use the standard dosing table. Create a 1% solution. Then, add an appropriate dose, which would be 10 mL of the 1% solution per 20 L (dose for cloudy water). Or, you could pre-filter the water and then use a lower dose (4.0 mL per 20 L).

Role-Play: Review



1. Explain that the participants are going to review how chlorine works by acting out the different processes involved. Show the “How Chlorine Works” slide so participants can briefly review what happens to chlorine as it gets added to water.
2. Select one third of the participants. Tell them they will represent substances already in the water:
 - Pathogens (2–3 people)
 - Ammonia and organic material (2–3 people)
3. Ask the pathogens, ammonia, and organic material to stand in an area that represents the bucket of water. Ask these participants: “What will happen to each of you when the chlorine is added?”
 - Some of the chlorine will react with pathogens (and some organic material) and inactivate them (consumed chlorine).
 - Some chlorine will form new compounds with ammonia and organic material (combined chlorine).

- Any extra chlorine will remain as the FCR.
4. Select 2–3 participants to represent chlorine molecules. Tell them they represent a very small dose of chlorine. Ask these participants: “What will happen to you?”
 - Some will become consumed, and some will be combined. Because the dose is so small, there will be no FCR.
 5. Ask the group to act out the process that will happen as a small dose of chlorine (the participants playing chlorine molecules) gets added to the bucket.
 - Chlorine that becomes combined should hold hands with the ammonia or organic material that it combines with.
 - Chlorine that reacts with pathogens or organic material should first mime a boxing match. Then, they should both sit down to show that the consumed chlorine and the pathogens have reacted and are no longer active in the water.
 6. Ask the participants: “What will happen as more chlorine is added?”
 - Eventually, all the pathogens will be inactivated. Remaining chlorine will stay in the bucket as a mix of FCR and combined chlorine. The more chlorine that is added, the more FCR there will be at the end.
 7. Ask the remaining participants to pretend they are additional chlorine molecules and to enter the bucket and either react or remain as FCR.
 8. Ask the participants if they have any questions. Repeat the role-play if needed for greater clarity.
 9. Summarize key points.

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Chlorine Dosing

This handout is adapted from CAWST Technical Brief: Chlorine Disinfection for Household Water Treatment.

Options for Chlorine Dosing

In order of preference:

1. Follow the manufacturer's dosing instructions, if available.
2. If you have no dosing instructions, use experimentation and measurement.
3. If you have no dosing instructions and you cannot measure the free chlorine residual (FCR), use a standard dosing table.

These 3 options are described below. For options 2 and 3, use 0.5 mg/L as a suggested target FCR concentration. The amount of chlorine you need to add to achieve this FCR depends on the amount of contamination, turbidity, and organic material in the water.

Option 1: Follow the Manufacturer's Dosing Instructions

To use chlorine products that were made specifically for household water treatment, follow the manufacturer's instructions. Add the recommended dose to the contaminated water, shake the container or stir the water, and wait for the specified amount of time. The water is then ready to drink. Remember to sediment or filter cloudy (turbid) water before using chlorine.

Option 2: Determine the Chlorine Dose by Experimentation and Measurement

For this procedure, you must have a method for testing the FCR. The FCR can be measured with swimming pool test kits, chlorine test strips, a colour disc comparator, or a colorimeter.

Example: Chlorine Dosing by Experimentation and Measurement

1. Fill 5 non-metallic containers with a known volume (for example, 20 L) of the water you want to treat.
2. Add a different amount of the chlorine product, bleach, or prepared chlorine stock solution to each container. You can use an eye dropper, pipette, syringe, or other measuring device. Record the amounts you added. For example:
 - Bucket 1: add 0.5 mL of 1% chlorine stock solution
 - Bucket 2: add 0.75 mL of 1% chlorine stock solution
 - Bucket 3: add 1 mL of 1% chlorine stock solution
 - Bucket 4: add 2 mL of 1% chlorine stock solution
 - Bucket 5: add 2.5 mL of 1% chlorine stock solution
3. Wait 30 minutes (the contact time).



4. Measure and record the FCR in each container. Example results might be:
 - Bucket 1: 0 mg/L FCR
 - Bucket 2: 0.1 mg/L FCR
 - Bucket 3: 0.4 mg/L FCR
 - Bucket 4: 0.8 mg/L FCR
 - Bucket 5: 1.5 mg/L FCR
5. The correct dose is the container with the FCR concentration closest to 0.5 mg/L. In this case, Bucket 3 has 0.4 mg/L FCR. So, the correct dose for this water is about 1 mL of your 1% stock solution per 20 L of water.
6. If you want more precise dosing, repeat the above steps using a smaller range of doses.

Note: If the required dose is very small (less than 1 mL), it is difficult to measure accurately. First, dilute the chlorine product with distilled water (for example, by mixing 1 part bleach with 1 part water). Creating a dilution makes the volume of chlorine you need to add to the source water larger and easier to measure.

Option 3: Determine the Chlorine Dose Using Standard Dosing Tables

If there is no way for you to measure the FCR concentration, you can use a standard calculated dose. This method will provide you with approximate results. To use this method, you will have to know the chlorine concentration of your product. If you're using a powder or granular product, first create a 1% liquid chlorine solution.

The following initial chlorine concentrations are recommended when you cannot measure the FCR:

- 2.0 mg/L for water with low turbidity (below 10 NTU, or very clear water)
- 4.0–5.0 mg/L for water that has higher turbidity (10–100 NTU, or slightly cloudy water).

The following table shows how much product you should add to 20 L of water to achieve initial concentrations of 2.0 or 5.0 mg/L given the % chlorine concentration of your chlorine product.

Table: Standard Chlorine Doses

% Chlorine Concentration of Product	Product dose (mL) per 20 L of water	
	<i>For initial concentration of 2.0 mg/L</i>	<i>For initial concentration of 5.0 mg/L</i>
1%	4.0	10
2%	2.0	5.0
5%	0.80	2.0
10%	0.40	1.0
15%	0.26	0.66

Table values are calculated based on dose recommendations from Branz et al. (2017). Products that are more concentrated should be diluted before dosing.

Practice Questions

Question 1 You have a solution of bleach with 4.25% chlorine content. Your water has been prefiltered through a cloth and has low turbidity. You have access to a swimming pool test kit that can be used to measure free chlorine residual. What dose will you use, or how will you determine an appropriate dose?	Question 3 Your water is slightly cloudy. You have Aquatabs with these instructions: • Clear water: Add 1 tablet to a 20 L bucket of water. Stir the water well with a clean utensil and then cover with a lid. Wait for 30 minutes. • Cloudy water: Prefilter the water through a cloth and then add 2 tablets to a 20 L bucket of the water. Stir the water well with a clean utensil and then cover with a lid. Wait for 30 minutes. What dose will you use, or how will you determine an appropriate dose?
Question 2 You have a solution of bleach with 5% chlorine content. Your water has been prefiltered and has low turbidity. You have no way of measuring the free chlorine residual. What dose will you use, or how will you determine an appropriate dose?	Question 4 You have a bleaching powder with 30% chlorine content. Your water is slightly cloudy. You have no way of measuring the free chlorine residual. What dose will you use, or how will you determine an appropriate dose?



40 minutes total

Lesson Plan

Household Membrane Filters

Overview of Activities

1. **Sharing Experience:** Introduction
2. **Presentation:** Membrane Filters
3. **Presentation:** Considerations and Limitations
4. **Group Discussion:** Review

Learning Outcomes

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

1. Explain what membrane filters are
2. Describe different membrane filter cartridges and setups
3. Describe some of the limitations of membrane filters

Materials

- ☐ Fact Sheets: 4–8 fact sheets for different membrane filters (2 copies of each; select membrane filters that can be found locally)
- ☐ Examples of membrane filters
- ☐ PowerPoint: Membrane Filters

Recommended Reading

- ☐ Technical Brief: Membrane Filters for Household Water Treatment

5 minutes



Sharing Experience: Introduction

Optional: Use “PowerPoint: Membrane Filters” for this introduction.

1. Explain: “Many of you mentioned an interest in membrane filters, so we will take this session to look more closely at the many different membrane filters available.” *Trainer Tip: This optional lesson is only intended for those with interest in membrane filters.*
2. Ask: “Have you used membrane filters before? If so, which ones? What did you think of them?”
3. Present the “Learning Outcomes” slide or provide an overview of the lesson.

15 minutes



Presentation: Membrane Filters

Use “PowerPoint: Membrane Filters” for this activity.

1. Ask the participants: “What are membrane filters?”
2. Show the PowerPoint slide with the definitions of “membrane” and “membrane filter.”
3. Show the PowerPoint visual of how membrane filters allow smaller particles to go through but trap larger particles.
4. Ask the participants to think back to the earlier lesson about household filters. Ask the participants: “Can someone summarize how pore size affects the performance of a filter?” Record their ideas at the front of the room. Explain how pore size influences microbiological removal, flow rate, and filter clogging.
5. Use the PowerPoint slides and actual filters (if available) to show different types of membrane filters:
 - By pore size
 - By cartridge configuration
 - By container setup

Trainer Tip: see “Technical Brief: Membrane Filters for Household Water Treatment.”

6. Pass around the filters you have and allow the participants to spend a few minutes trying them out.

Key Points

- Most membrane filters for household water treatment use ultrafiltration or microfiltration membranes.
- Most membrane filters have hollow fibre membrane cartridges.
- The cartridges of membrane filters are not accessible to users.

10 minutes

Presentation: Considerations and Limitations



Use “PowerPoint: Membrane Filters” for this activity.

1. Ask the participants to select partners and to briefly discuss what they would want to know about a membrane filter before they decide to use it.
2. Use the PowerPoint slide to show and discuss some of the important criteria to consider and to highlight some of the limitations of membrane filters. *Trainer Tip: See “Technical Brief: Membrane Filters for Household Water Treatment.” If you want to go into more detail, add specific information about criteria for selection.*

Key Points

- Backwashing requirements are an important consideration.
- In hollow fibre membrane filters, there is potential for membrane rupture to occur due to membrane fouling and repeated backwashing. Rupture can affect performance, but might not be noticed by users.

10 minutes

Group Discussion: Review



Use “PowerPoint: Membrane Filters” for this activity.

1. Explain to the participants: “Now, we’ll review the ideas we covered by looking at specific membrane filters.”
2. Divide the participants into 4–8 groups (equal to the number of different membrane filter fact sheets you have). Give each group two copies of a fact sheet for a membrane filter.
3. Ask the participants: “Given what you learned in this lesson, how would you categorize each of these filters?” Have them consider:
 - Pore size (ultrafiltration or microfiltration):
 - Membrane configuration (a best guess)
 - Filter setup
4. Ask the participants: “Would you use this filter? Why or why not?” Ask a few groups to share their ideas. Correct or add to their points as needed.
5. Summarize key points.

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85 minutes total

Lesson Plan Workshop Closing

Overview of Activities

1. **Group Discussion:** Introduction & Parking Lot Review
2. **Self-Assessment:** Rating
3. **Mind Map:** Concept Review
4. **Individual/Group Work:** Action Plan
5. **Certificates, Group Photo, & Activity:** Celebrating the Workshop
6. **Individual Reflection:** Workshop Evaluation

Learning Outcomes

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

1. Assess the change in their knowledge of workshop topics
2. Map what they learned
3. Describe where to find additional information
4. Evaluate the workshop

Materials

- ☐ Certificates (1 per participant)
- ☐ Ball of string
- ☐ Action plan templates on flip chart paper (optional)
- ☐ Workshop Evaluation (1 copy per participant, or link to an online version)

Recommended Reading

- ☐ Trainer Essential: Qualities of an Effective Workshop

10 minutes



Group Discussion: Introduction & Parking Lot Review

1. Say to the participants: “We have reached the last session of the workshop. How do you feel?”
2. Give an overview of the closing session.
3. One by one, go through the topics listed on the “**Parking Lot**” flip chart. For each topic, ask the participants if their questions have been addressed or they still want more information. Provide suggested resources or agree upon how you will answer the remaining questions.
4. If relevant, also go through the “**Learning Expectations**” flip chart and decide together if expectations have been met or if the participants will require additional resources or activities after the workshop.

10 minutes



Self-Assessment: Rating

1. Ask the participants to open to the “Self-Assessment” page in their **workbooks**. In the last column, ask them to write a number from 1–5 to indicate their level of confidence in the subject now (at the end of the workshop):
 - 5 means they are very confident talking about the subject and know a lot about it.
 - 1 means they don’t know much about it.
2. Ask the participants: “Which topics do you feel more knowledgeable about and more confident in now compared to before the workshop?”
3. Ask: “Which topics are you feeling less knowledgeable about or no change?”
4. Provide additional suggestions or comments about the participants’ learning and progress, as appropriate.

Trainer Tip

It’s important for you to see how participants rank their current knowledge/confidence. Ask them to leave their workbooks open to the “Self-Assessment” page and walk around the room to observe how their rankings have changed from the beginning to the end of the workshop.

15 minutes



Mind Map: Concept Review

1. Ask the participants to open their **workbooks** to the “Mind Map” page.
2. Ask them to create a map or diagram showing how the concepts written on the page relate to each other. Give some examples of mind maps if needed. Tell the participants they can add pictures, and additional concepts and terms. Provide them with 10 minutes for this exercise.
3. Ask the participants to leave their workbooks open at their desks to their mind maps. Then, ask the participants to walk around the room and look at other people’s mind maps.

4. Ask the participants: “What stood out to you when you did this activity?” Allow a few minutes for discussion.

20 minutes

Individual/Group Work: Action Plan



1. Explain to the participants: “I want to make sure you leave this workshop feeling prepared and supported as you apply what you have learned to your work.”
2. Ask the participants to create a simple action plan, either individually, or with others if they work with others, as is appropriate. These plans should include 2–3 things that participants plan to do to continue learning or applying what they learned. Ask them to fill in the Action Plan table in their **workbooks**. *Trainer Tip: If they are working in groups, you can instead give them a piece of flip chart paper with an action plan template on it.*

Planned Action	Why?	Who’s Responsible?	When?	Support Required from CAWST or Others?

3. Ask the participants, as individuals or in groups, to share their action plans with the full group. Take note of their planned actions and commit to how you will support them after the workshop.

20 minutes

Certificates, Group Photo, & Activity: Celebrating the Workshop



1. Hand out the **certificates**.
2. Arrange to have a group photo taken.
3. Facilitate a short “network and learning” activity:
 - Take a ball of string. Explain that you will be creating a physical network map of how people have learned from and gotten to know each other.
 - Ask the participants to stand in a circle.
 - Hold onto the end of the string. Throw the ball to another participant so that you are now connected and both holding onto the string. Explain something you learned from or appreciated about that participant during the week.
 - Ask that participant to hold onto the string while throwing the ball to another person. They should say something they appreciated about or learned from that person.

Trainer Tip

Decide on an appropriate way to hand out the certificates based on the group. For example, you may choose to call each person individually and hand them their certificate and note something you appreciated about their contributions. Or, for less formal groups, you can hand out the certificates at random to different participants and ask them to present certificates to each other.

- Ask the participants to continue throwing the ball to each other while holding onto the string until the group has created a “spider web” structure with each participant connected.
- Explain that you hope this network and mutual learning will continue after the workshop. Explain any steps you will take to create space for sharing and learning after the workshop.

10 minutes



Individual Reflection: Workshop Evaluation

1. Give each participant a copy of the “**Workshop Evaluation**” or provide them a link to the online evaluation survey.
2. Ask the participants to silently reflect and provide feedback by answering the questions.
3. Thank them for their participation. Let them know that they are free to go or welcome to stay and visit.

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Daily Opening and Closing Activities

Review Activities

You can use these activities to review topics at the end of a session or the end of a day. You can also use these tools first thing in the morning as a fun way to review the previous days' material. Choose activities that are appropriate for your participants.

A Tell B

This activity helps participants explain what they learned and check whether their partner has the same understanding.

1. Tell participants to turn to their neighbour and decide who will be Person A and who will be Person B.
2. Give the participants a review question.
3. Ask Person A to answer the question to Person B, and then get Person B to answer the question to Person A. This gives each person a chance to speak to a partner while their partner listens.
4. You can extend this activity by calling upon some pairs to share their ideas with the whole class OR get the participants to swap partners and exchange their ideas again.

Big Mouth

This is a quick and fun way for participants to individually (and loudly) review what they learned about a topic.

1. Divide the participants into pairs.
2. Ask a question about one of the topics recently covered in the workshop.
3. Every person begins to talk at once answering the question. The participants must talk continuously without pausing - trying to talk the longest.
4. As soon as one of the participants takes a pause they must stop talking and see how long their partner can continue for.

Charades

This is an energetic activity that can help participants remember key terms while having fun. Often good for a morning review.

1. Write words or phrases that have to do with workshop topic on small pieces of paper. Make sure the terms have already been covered in the course.
2. Ask a participant to come up and randomly choose one piece of paper. Ask them to read the word or phrase on their paper, and then act out their phrase without talking or writing.
3. The other participants guess out loud what the person is acting.
4. Whoever guesses correctly will be the next person to act out a word. Make sure that each participant has a turn to act.

Finger Review

This activity allows you to easily and quickly assess how well the participants understand the material. This activity allows participants to keep their answers confidential.

1. Come up with a few true or false review questions.
2. Pose each question to the group, asking them to answer by raising their fingers in front of their chest. They should raise one finger for true and all five fingers for false.

Flashcards

This review activity is best for complex topics or terms that require definitions.

Option 1:

1. Create a set of flashcards that list a topic or definition on one card with the corresponding characteristics or definition written on another card.
2. Give each participant one card and have them find the person holding the corresponding card.

Option 2:

1. Create 10 sets of flashcards that list a question or key term on one side, with the corresponding answer or definition written on the other side.
2. Ask participants to find a partner.
3. Give each pair a set of flashcards. Ask them to hold up the side with the question or key term. Their partner must define the term or answer the question. Part-way through the cards, they should switch so that each person has an opportunity to answer questions.

Graffiti Wall

This activity is helpful near the end of a workshop, for participants to summarize what they learned and see what their peers learned.

1. Write different review topics on separate pieces of flipchart paper.
 2. Tape the pages on the walls around the room where they can be written on.
 3. Divide the participants into groups of 2 or 3 and start each group at a different topic. Give them about one minute per topic to write as much as they can think about and then tell them to move onto the next one. They should read what is there and only write new things down. As the pages fill up you may have to give them more time at each sheet.
 4. Once participants return to the sheet they started at, get them to walk around the room and read the sheets to see what they forgot, remembered or are surprised about.
-

Learning Ball Game

This is a quick and easy review activity for the end of a day.

1. Ask the participants to stand in a circle.
2. Ask a participant to throw a ball to another participant. That person must say something new that they learned that day.
3. Continue until all participants have shared something.

Mime (Silent Role Play)

This activity takes only one minute, and can help you (the trainer) observe what participants learned. Best for processes or physical tasks.

1. After a practical session, ask participants to turn to a partner and silently explain the concept or the steps of the session using actions.

Paper Airplane Quiz Game

This is a fun, energizing activity in which participants also review what they learned.

1. Write a series of questions related to the workshop content that has already been covered.
2. Divide the participants into small groups.
3. Give each group a piece of paper, and ask them to make a paper airplane.
4. Arrange a hoop or finish line out of wire, tape, rope or two chairs.
5. Explain that when you ask a question, the first group to throw their airplane through the hoop (or over the finish line / between the chairs) gets to answer the question. If they answer incorrectly, the other groups may discuss and come to consensus on an answer.

Quiz Game

This is a fun and active review game.

1. Write a series of questions related to the workshop content that has already been covered.
2. Divide the participants into two groups.
3. Each group sends one person up to the front to answer a question. The first person to hit the 'buzzer' (the buzzer can just be a sticky note, or an object they can grab) gets to answer the question. If they answer incorrectly, the entire other team gets to discuss and come to consensus on an answer. If the other team answers incorrectly, the first person gets to consult his/her entire team to try again.
4. Each team sends up a different person for the second question, and so on.

What am I?

This is an interactive and energizing activity, which often works well at the start of a day.

1. On pieces of paper, write down key terms or phrases that participants have learned.
2. Stick one word or phrase on each participant's back, so that they cannot see it.
3. Ask participants to walk around the room, asking each other questions to try to figure out what is on their back. The questions they ask can only be answered by "yes" or "no". The game continues until everyone has figured out what they are.

Review Questions

These questions can be used with the review activities provided above. Select appropriate questions that match the content covered in the sessions you are reviewing.

Topic	Suggested Questions
Safe Drinking Water	• Give three reasons why safe drinking water is important • Define safe drinking water • What are the six pillars of WASH for healthy homes?
HWTS: What and When	• Define HWTS • What are the three conditions required for HWTS to have the greatest health benefits? • What is one potential obstacle to correct, consistent, and continued use of HWTS?
Global Agenda for Safe Drinking Water	• What are two ways in which the SDG targets for drinking water differ from the MDG targets? • What is one way in which HWTS can contribute to the SDGs? • What are some local policies or regulations related to HWTS in your country?
Risks to Water Safety	• Define water supply system • What are the greatest risks to water safety you identified in your water supply system?
Drinking Water Quality	• Please give an example of a common water-related disease and how to prevent it. • What are the four groups of pathogens? • What are some chemical contaminants that could be present in the drinking water where you work? • Please give an example of an acceptability aspect of water quality
Multi-Barrier Approach	• Why is the Multi-Barrier Approach important? • What are the 6 barriers in the Multi-Barrier Approach?
Sedimentation	• When and why should you do sedimentation for water treatment? • What is a coagulant? • Describe one sedimentation method. What do you like or dislike about it?

Topic	Suggested Questions
Filtration	• How does pore size affect filter performance? • Describe one household filter option. What do you like or dislike about it?
Disinfection	• Why is disinfection the final step in water treatment? • Describe one household-level disinfection option. What do you like or dislike about it?
Safe Storage	• Why is safe storage and handling important? • What are the characteristics of a safe storage container? • How do you clean a safe storage container?
Selecting HWTS Options	• What are some criteria to consider when selecting HWTS options? Why do the criteria differ between people and communities? • What is one thing you learned about HWTS selection?
Behaviour Change	• What do the letters in RANAS stand for? • Give an example of a reason why someone may not be using HWTS, and how you could support them to change this behaviour.
HWTS Implementation	• What are the 6 components required for HWTS implementation? • Describe how “demand creation” was done in the case study you read
Water Quality Testing	• Why would you want to use water quality testing in your program? • Give an example of a chemical water quality parameter. How would you measure it? • Give an example of one way you could measure microbiological contamination of water
Water Safety Planning and HWTS	• What is water safety planning? • Describe the process of water safety planning • How does HWTS relate to water safety planning?
Chlorine Dosing	• What is free chlorine residual (FCR)? • What happens to chlorine after you add it to water? • Describe one way of finding an appropriate chlorine dose for water treatment.
Membrane Filters	• What is a membrane filter? • What are the different types of membrane filters by pore size? • What are some limitations of membrane filters?

End of Day Evaluation Activities

You can use these activities to get participants to share their reactions at the end of a day or the end of a session.

Alligator Arms

Ask participants to stand with their arms sticking out in front of them, palms touching like an alligator's mouth. One topic at a time, ask participants how valuable each topic covered in the workshop that day was. Arms wide apart (one arm up and one arm down) means it was very valuable, arms closed together in front means it wasn't at all valuable, plus anywhere in between.

Similarly, a scale can be used by sitting, standing, and standing with arms raised in the air.

Apples and Onions

Hold up an apple and an onion. Explain that the apple represents something positive about the day; it could be something new they learned or something they enjoyed. The onion represents something they wish to change about the day: it could be something they found confusing or difficult to do, or it could be something they want to change or learn more about. Sitting in the circle, give a participant an apple and an onion and have them say something about the day for each.

The apple and onion is then passed along the circle until everyone has had a chance to express themselves

Plus/Change

Ask each participant to say one positive (plus) thing about the day, and one thing they would change. This can also be done on paper – give each participant a small piece of paper; on one side they write something positive, on the other side something that could be changed in future.

Scales

Write the numbers 1, 5, 10 on a piece of paper and post them along the wall as a continuum. Inform the participants that a 1 is low, a 5 is medium, and a 10 is high.

Ask questions about the sessions that were conducted such as:

- How valuable did you find the disease transmission lesson?
- How useful was the latrine technology activity?
- Did you enjoy the menstrual hygiene role play?

After each question have participants stand along the scale to indicate how they felt about each topic.

End of Day Evaluation Form

Name (optional): _____

1. The most important or useful thing that I learned today was:

2. A question that I have from today is:

3. The part of the day that I liked best was:

4. The part of the day that I liked the least or didn't find useful was: