

Drinking Water Quality Workshop – Detailed Agenda

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Audience: Middle to High School Students

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Duration: 1.25 Hours (75 Minutes)

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Background: In 2012, California recognized the human right to safe, affordable drinking water through the California Assembly Bill 685. Since then, over \$1 billion has been invested in improving water infrastructure. This workshop, created in partnership with the UC ANR, CIWR, and UC Merced’s FEWS-US Lab, introduces high school students to the science and importance of clean water—empowering them to share what they learn with their families.

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Learning Objectives:

By the end of this lesson, students will be able to:

- Identify common water quality parameters using test strips
- Compare results between contaminated and treated water samples
- Discuss what makes water “unsafe” to drink
- Reflect on the importance of clean water access in their community

More information Below



Agenda (0:00 – 1:15)

Time	Segment Title	Description
0:00-0:05	Activity & Slide Preparation	Time allotted for the instructor to prepare materials, set up slides with animation cues, and ensure all visual and hands-on components are ready for student engagement.
0:05 – 0:08	PowerPoint Presentation Welcome & Introduction	The instructor introduces themselves and the goals of the session. Students are welcomed with an icebreaker, and the importance of clean drinking water is briefly introduced through AB 685.
0:08–0:12	Background & Water Sources	Students learn how much water on Earth is actually drinkable. Concepts like saltwater vs. freshwater, groundwater, and surface water are introduced, along with the idea of public water utilities.
0:12–0:15	Contaminants and Indicators	This section introduces key water quality parameters: pH, chlorine, hardness, nitrate/nitrite, and TDS. Students learn how these indicators reflect both safety and aesthetic qualities of water.
0:15–0:30	Activity Predictions and Sample Testing (Round 1)	Students examine and test a sample of “contaminated” water using test strips. They record visual observations and predict what will happen during the purification step.
0:30–0:40	Water Purification Demonstration	The instructor adds a P&G Purifier packet to the contaminated water, explaining the process of coagulation and flocculation. Students observe the visible changes in real time.
0:40–0:55	Treated Sample Testing (Round 2)	Students test the treated water with the same strips, record results, and compare values with the original sample. This allows them to evaluate the effectiveness of the purification process.
0:55–1:10	Discussion & Wrap-Up	Students reflect on what they learned through guided discussion. The instructor introduces the CCR and shows how to find their family’s water report using QR codes.
1:10–1:15	Clean-Up	Students return all materials, wipe down work areas, and properly discard any waste. The session closes with a thank-you and final thoughts.

Activity (0:15 – 0:55)

There are several parameters that water must meet to be considered safe for drinking. A parameter is like a guideline that helps determine how something should be. It's a factor you measure to ensure whether water meets safety standards.

Setup and Materials (0:00 – 0:05):

Before the presentation begins, the instructor will have all materials set up both at their own table and at each student table. The instructor's station will include a large plastic container filled with a couple gallons of water which is already contaminated safe-to-handle substances. Nearby, they'll also have a packet of P&G Purifier of Water, a ladle for mixing and pouring into individual student cups, and paper towel rolls for managing spills. Each group of student/table will be prepped with two empty plastic cups, paper towels, an activity sheet for recording observations, and a put together complete water quality testing kit.

Activity Flow

1. **Sample Collection – Round 1 (0:15 – 0:16):**

Students will:

- Each table will bring their **first empty cup** to the front of the class.
- Fill it with the **contaminated water** from the large container.
- Return to their desk and begin **testing the sample** using the provided water testing kit.
- The instructor explains how to use the test strips properly:
 - i. Dip and gently swirl each strip in the sample water for about 10 seconds.
 - ii. **DO NOT** shake off the excess water.
 - iii. Lay the strip flat on a paper towel.
 - iv. Read and record results.
- Students take additional time to read and record each parameter. Groups are given up to 5 minutes to finish all measurements.

2. **Live Demonstration – Water Treatment in Action (0:16 – 0:21):**

When the students are done testing:

- The instructor will add a **water purifier solvent** (e.g., ½ a packet of P&G Purifier) into the contaminated water container and explain the stages of the process: coagulation, flocculation, and clarification.
- Students will observe **coagulation and flocculation** in real time as the water begins to clarify and clean itself.

3. **Sample Collection – Round 2 (0:21 – 0:30):**

Once the water has been mostly treated, students will:

- Use their **second cup** to collect a new sample of the **treated water**.
- Return to their desk and begin **testing the sample** using the provided water testing kit.
- They will then properly use the test strips:
 - i. Dip and gently swirl each strip in the sample water for about 10 seconds.

- ii. **DO NOT** shake off the excess water.
 - iii. Lay the strip flat on a paper towel.
 - iv. Read and record results.
- Students take additional time to read and record each parameter. Groups are given up to 5 minutes to finish all measurements.

Materials Checklist

Instructors Table:

- ☐ 1 Clear Plastic Container
- ☐ 2.5 gallons of water
- ☐ Contaminators (Below are some ideas)
 - Soil
 - Potting soil for best/most visible results
 - Turmeric (persistent color/simulates a contaminant)
 - Food Coloring (persistent color/simulates a contaminant)
 - Lemon/Orange Juice (pH alteration)
 - Baking Soda (pH alteration)
- ☐ 1 Packet of P&G Purifier of Water
- ☐ 1 Ladle
- ☐ Paper Towel Rolls (For spills)

Per Table/Group of Students:

- ☐ Activity Worksheet (per student)
- ☐ 2 empty plastic cups
- ☐ 1 Towel Sheet
- ☐ 2 pH Test Strips 0-14
- ☐ 2 Chlorine Test Strip
- ☐ 2 Water Hardness Test Strip
- ☐ 2 Nitrite, Nitrate Test Strip