Script –
Drinking Water Quality Workshop

The script serves as a guideline for the instructor's dialogue, ensuring the workshop runs smoothly for both the instructor and the students. While memorization is not required, it's helpful to be familiar with the workshop's flow.

Before beginning this lesson, please ensure you have all the required materials, including the **Activity Worksheet, PowerPoint** presentation and materials needed for the session.

Introduction

By the Door, At the Entrance of the Room

Once ready, they will likely sit with their friends, which we encourage to foster a sense of comfort and teamwork. Our goal is to promote effective collaboration. After everyone is settled, the introduction will begin.

The accompanying PowerPoint presentation includes animations that require manual advancement. This script will guide you on when and how many times to click to proceed through each slide's sequence. Please follow the prompts carefully to ensure the animations align seamlessly with your narration.

click

"Good morning, everyone! Welcome to the Drinking Water Quality Workshop! Or Drinking WQW (pronounced "wow"). My name is Ms. Navi, and I will be your instructor

for the next hour."

click

"A little bit about myself, I love playing games like *click* *Dota 2,* *click* *Overwatch 2,* *click*, *and Toontown. I know, I have basic taste."*

Ask them for their favorite games (easier if it's something you are familiar with) and/or preferred characters.

click *"I'm a GrizzlyCorps Fellow with a degree in Environmental Engineering from UC Merced.* *click* *And this here is my dog, Mystery!"*

Walk around the room to keep the students' attention engaged, and keep looking at everyone to help with instructor-student engagement. Ask them questions about their possible career interests. Students will either remain silent or may offer some answers. In either case, work towards a smooth transition to elaborate on this next part.

click

"Well! If you consistently drink water in California, this information WILL apply to YOU. Why? A very looooong time ago, in 2012, California passed Assembly Bill 685, which recognized the right to safe and affordable drinking water for all Californians. *click* *Through a collaboration of the California Institute for Water Resources (CIWR) and UC*

Merced's FEWS-US Lab (Food-Energy-Water Systems for and with the Underserved), which I want to give a special thanks!, we are developing extensive resources, knowledge, and technical information for safe and affordable drinking water."

When CIWR and FEWS-US are mentioned, have a form of representation so the students have a face to the name.

Background

"My mission in the workshop is to educate students, you guys, on the extensive resources, knowledge, and technical information of quality drinking water. When I was a kid, I thought they attached a hose to the ocean, and BAM, that's how we got our water. It turns out that it is more complicated than that. Do you guys know where your water comes from?"

Keep in mind that we will be working with middle school students, maybe high school students. It will be necessary to improvise conversation and humor to make the experience fun for everyone and encourage them to speak up. After introductions, start the discussion with some popular water facts.

"Speaking of which *click**, *what are some interesting water facts that you know?"*

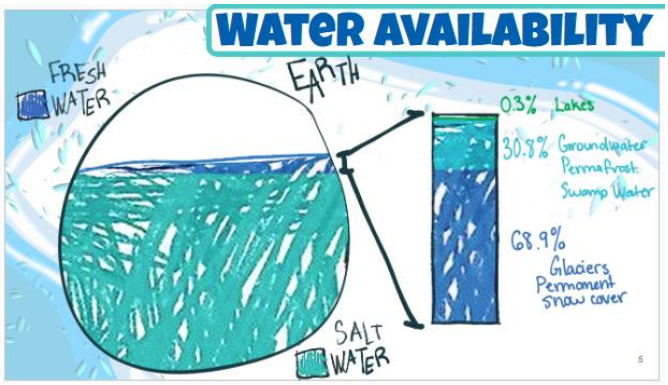
Students will likely share various facts, and whether they bring it up themselves or you introduce the idea, use the opportunity to transition the conversation by asking if they know where their drinking water comes from.

"Why care about water? Because *click** *water = life! As we mentioned,* *click** *the California Assembly Bill protects your right to drinking water. We need water, especially since* *click** *the human body is 60 - 70 % water, here is a helpful diagram.* *click** *The planet Earth,* *click** *is about 70%* *click**. *Water is an essential source for the planet, for*

life like ours, and for making a bowl of fluffy rice! Now let us take the planet Earth, and…" *click*

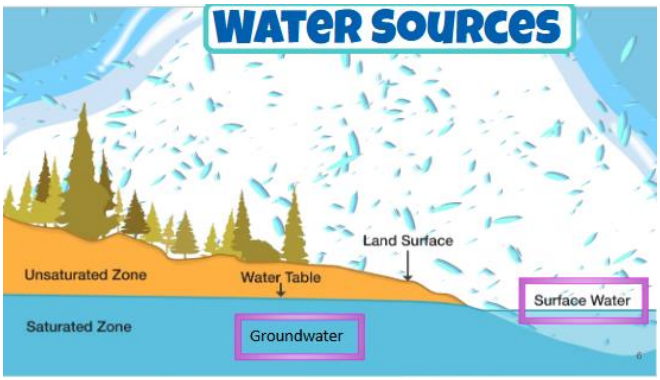
Pause until the Earth image shows up on the next slide.

click



*"*click* ...although water covers 70% of Earth, *click* only about 2.5% is freshwater—found in lakes, groundwater, glaciers, and a few other places. It's surprisingly scarce."*

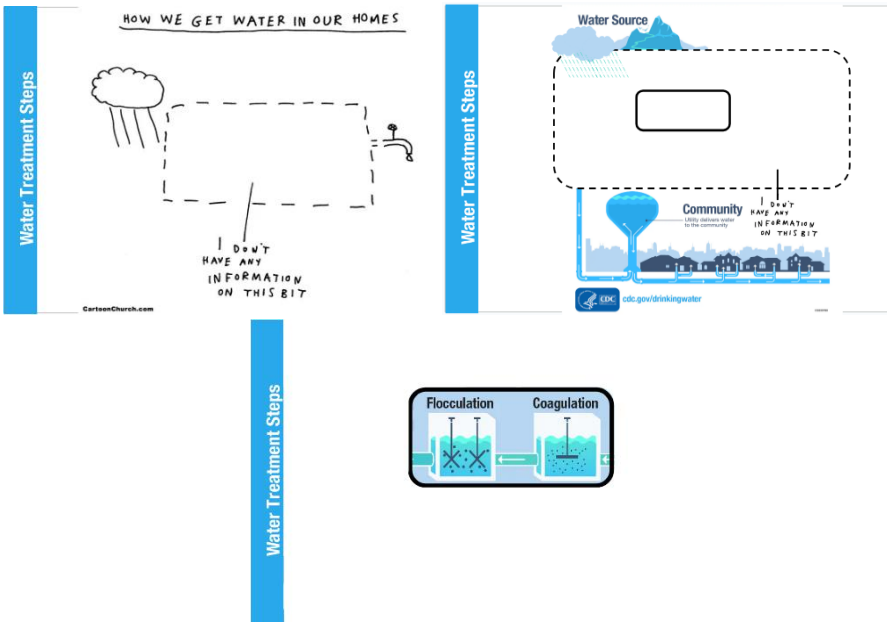
click



*"From the water shown in the last slide, the two main sources we can actually draw from are *click* groundwater and *click* surface water."*

The following 3 slides are meant to go in sequence, to help explain the Water Treatment Steps.

click

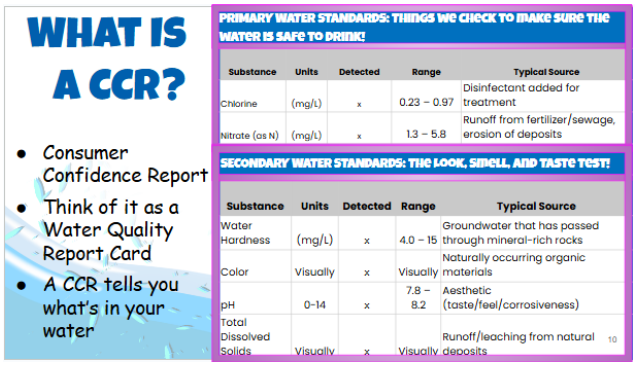


"Here is a simple diagram representing how we get our drinking water. Rainwater, "I don't have any information on this bit", and magically, drinking water!" *click* *"And here is the official CDC document explaining water treatment in more detail. Which I simplified to match the cartoon we just saw!* *click* *So it turns out there is a lot that goes on in this segment, and today we get to see this part* *click* *in a live demonstration!*
click

The presentation will zoom in.

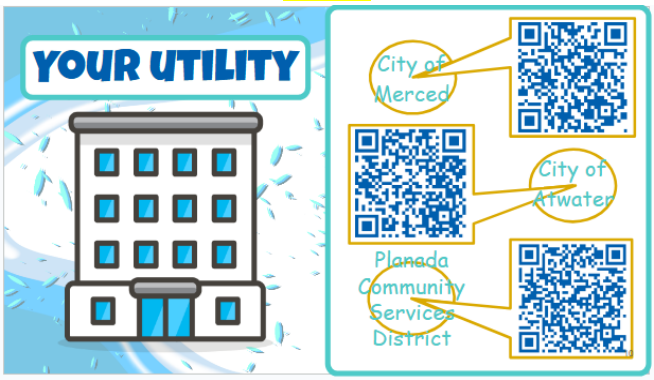
"Flocculation and Coagulation."

click



"Skip forward a little bit. What is a CCR? *click* *It is a Consumer Confidence Report, so try to think of it like a water quality report card. It shows the results of testing done by your local water utility to make sure the water is safe to drink. Every community that receives public water has a utility that handles this testing.* *click* *Primary standards are all about safety. These include things that can make people sick if they're in the water at high levels. We're testing for a few of these today:* *click* *Chlorine, Nitrate/Nitrite, pH.* *click* *Secondary standards focus more on how the water looks, smells, or tastes, not things that usually make you sick, but still matter! These include:* *click* *Water Hardness minerals like calcium or magnesium, Color, TDS (Total Dissolved Solids.)"*
click

click



"Unless your home uses a private well, your water utility's CCR is available online, and I've already looked up the reports for our local areas here in Merced County, highlighting Merced, Atwater, and Planada. *click*

If you're from outside this area, no worries! *click* *You'll just need a little help finding your own water report after the workshop. For now, feel free to follow along or skip this part."*

Note: This page is made for schools in Merced County. If you're outside this area, you might need help finding your local water report (CCR) after the workshop.
If you're in the region, feel free to use the table. If not, just skip this part and move on with the script.

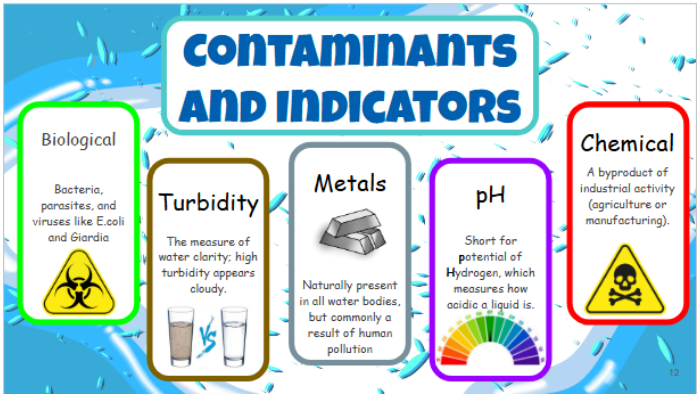
- Merced County, California
  - Atwater
    - Utility, City of Atwater
    - Source, Groundwater
    - CCR, 2023 CCR Atwater
  - Merced

        - Utility, City of Merced
        - Source, Groundwater
        - CCR, [2023 CCR Merced]
    - Planada
        - Utility, Planada Community Services District
        - Source, Groundwater
        - CCR, [2017-2019 CCR Planada]
- [Consumer Confidence Reports (CCR)]
    - The students can look up their consumer confidence report (CCR) through this link. There will be a column titled “CCR Website”, but all three of these.
- [California Water Quality Reports]
    - This is another CCR website, but the period is from 2017 to 2019.
    - We need to go over this link with the supervisors.

Activity

Positioned behind the table with the container of contaminated water

click



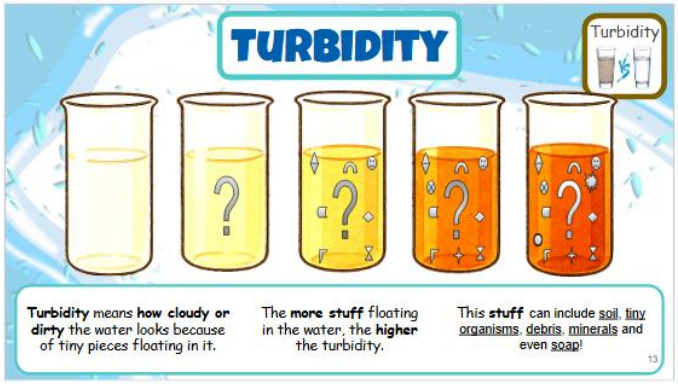
*“Contaminants and Indicators. **Contaminants** are things in water that shouldn’t be there, or only in very tiny amounts; too much can make us sick. **Indicators** are clues that something might be wrong with the water, even if it doesn’t look or taste bad yet.*

*Today, you’re going to use real science tools to test water samples. First, you’ll test **contaminated water.** While you run your tests, I’ll treat the water. Then, you’ll test a second, cleaner sample and compare the two. Here are the types of Contaminants and Indicators:*

click ***Biological contaminants**: Living organisms. *click* **Turbidity**: Water's clarity. *click* **Metals**: Industrial and natural byproducts. *click* **pH**: Acidic to basic scale *click**

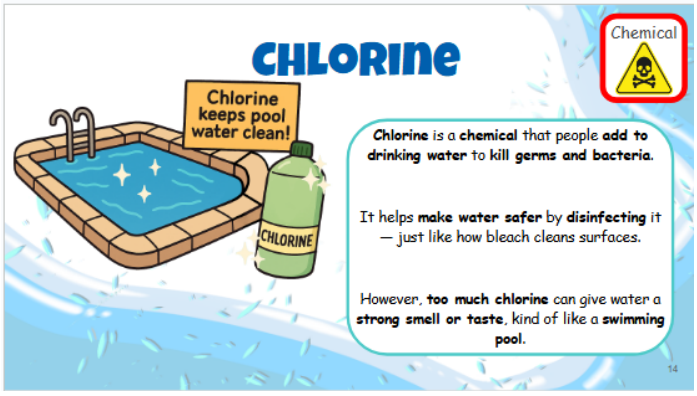
***Chemical contaminants**: Industrial byproduct. After we test both samples, we'll talk about the changes you see—and why it matters for safe drinking water."*

click



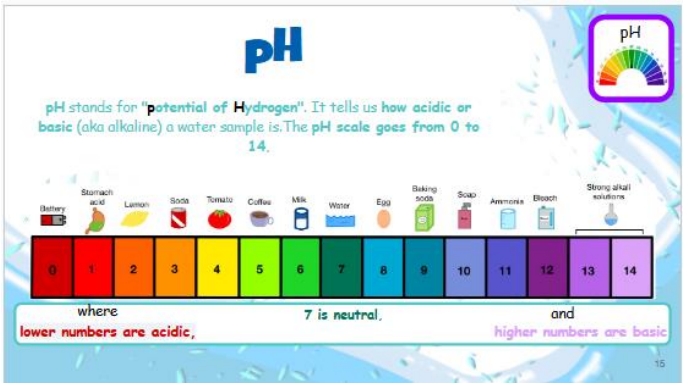
"Turbidity means how cloudy or dirty the water looks because of tiny pieces floating in it. The more stuff floating in the water, the higher the turbidity. This stuff can include soil, tiny organisms, debris, minerals, and even soap!"

click



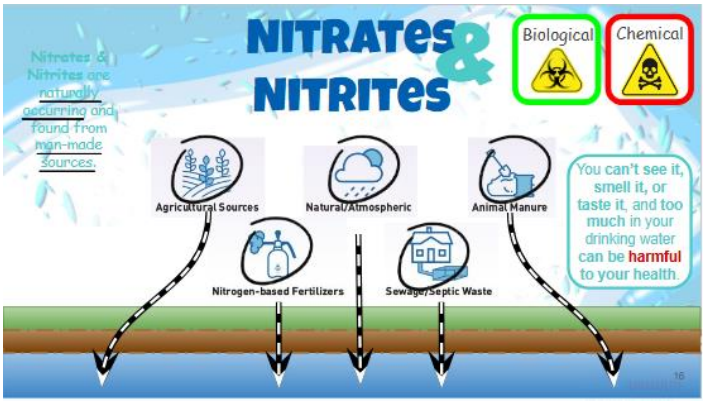
"Chlorine is a chemical that people add to drinking water to kill germs and bacteria. It helps make water safer by disinfecting it, just like how bleach cleans surfaces. However, too much chlorine can give water a strong smell or taste, kind of like a swimming pool."

click



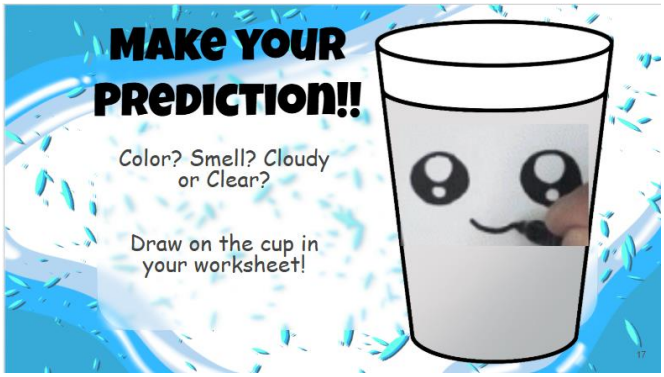
*"**pH** stands for '**p**otential of **H**ydrogen'. It tells us how acidic or basic (aka alkaline) a water sample is. The pH scale goes from 0 to 14, where lower numbers are acidic, 7 is neutral, and higher numbers are basic."*

click



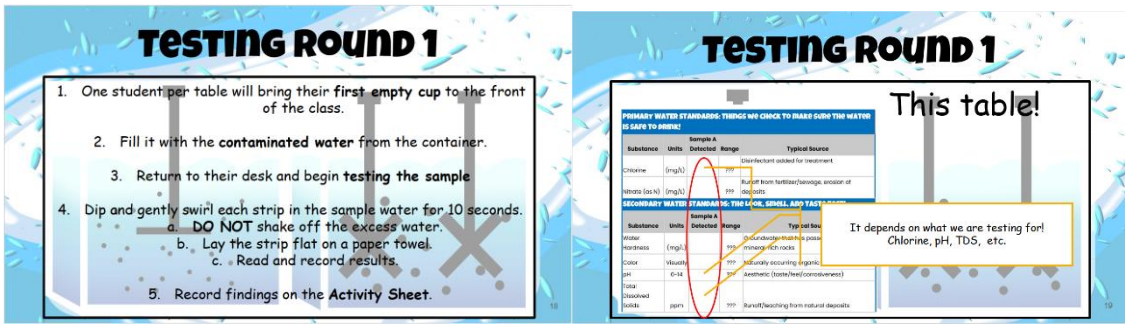
"Nitrates & Nitrites are *click* *naturally occurring and* *click* *found from man-made sources.* *click* *These contaminants can seep into the ground and end up in our groundwater, especially in farming areas.* *click* *You can't see it, smell it, or taste it, and too much in your drinking water can be harmful to your health."*

click



"Now for the fun part! On your activity sheet, you'll see a drawing of an empty cup. Before we begin, I want you to make a prediction about the water sample you'll be testing and treating. What do you think it will look like? What color might it be? Will it have a smell—or could it be totally clear?"

click *click*



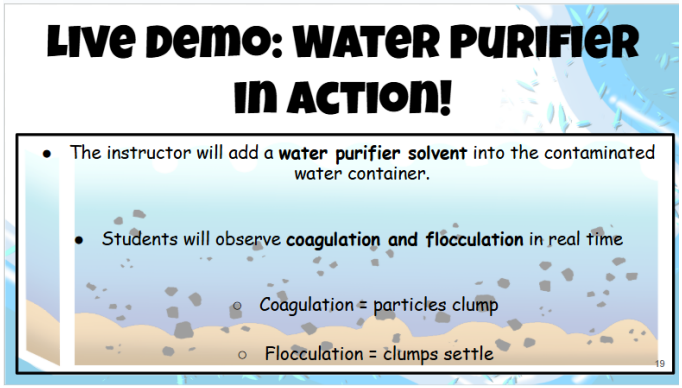
Switch between slides if needed. While students work on their predictions, the instructor will begin setting up the activity. These final slides are designed to be simple and easy to follow. This slide should remain displayed throughout the entire first testing round—approximately 5 minutes, or until all students have completed their initial tests.

"Testing Round 1!

1. *One student per table will bring their **first empty cup** to the front of the class.*
2. *Fill it with the **contaminated water** from the container.*
3. *Return to their desk and begin **testing the sample***
4. *Dip and gently swirl each strip in the sample water for 10 seconds.*
   a. ***DO NOT** shake off the excess water.*
   b. *Lay the strip flat on a paper towel.*
   c. *Read and record results.*
5. *Record findings on the **Activity Sheet**."*

The instructor should be offering guidance and answering any questions.

click

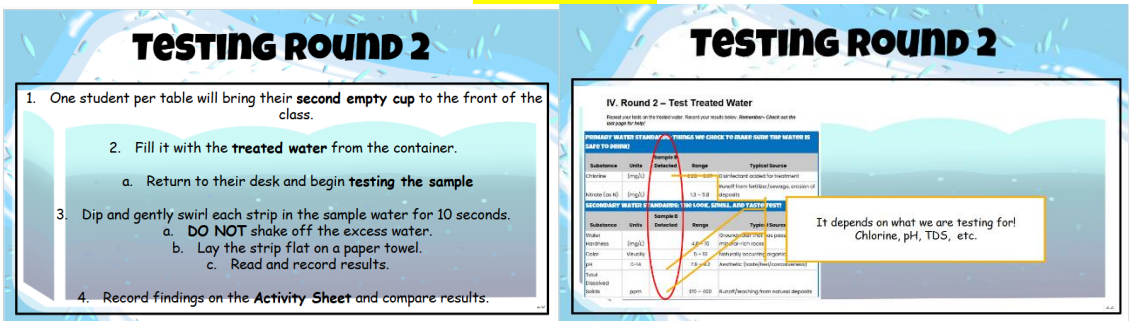


When the students are done testing, the instructor will add a water purifier solvent (e.g., ½ a packet of P&G Purifier) into the contaminated water container and explain the stages of the process. Students will observe coagulation and flocculation in real time as the water begins to clarify and clean itself. Stir the solution in one direction at a slow, consistent pace. The live demonstration is scheduled to take about 5 minutes, but if that isn't enough time, then mix till there is a notable difference.

"Now watch closely, we're about to purify this water in real time. First comes coagulation: that's when we add a special powder that makes all the tiny particles in the water start sticking together. Think of it like magnets pulling in dust. Then comes flocculation: we stir slowly to help those clumps, called floc, get bigger and heavier. Eventually, they settle to the bottom. So just remember:

Coagulation = particles clump; Flocculation = clumps settle"

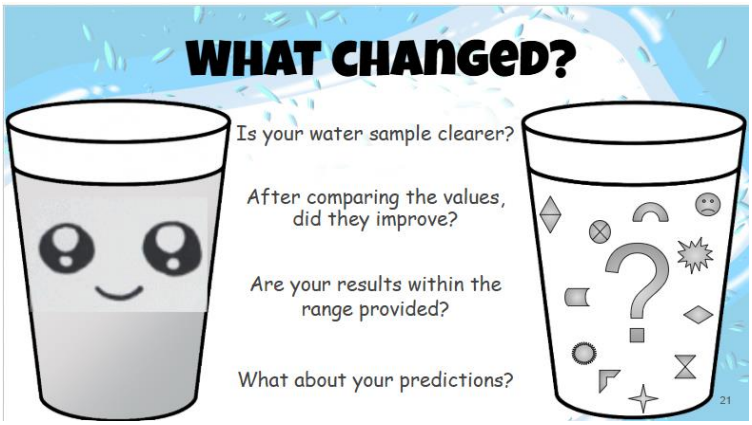
click *click*



Switch between slides if needed.

"Alright, scientists, now that the water has been treated, it's time for round two! Go ahead and grab your second empty cup and collect a new sample from the container. This time, look closely—can you already see a difference in how the water looks? Back at your tables, you'll test the new sample just like before. Use the same test strips and follow the same steps: dip, swirl, place it flat, and match the colors. Be sure to record your results on your worksheet. Once you're done, compare them to your first sample. What changed? Did anything improve? Let's find out."

click

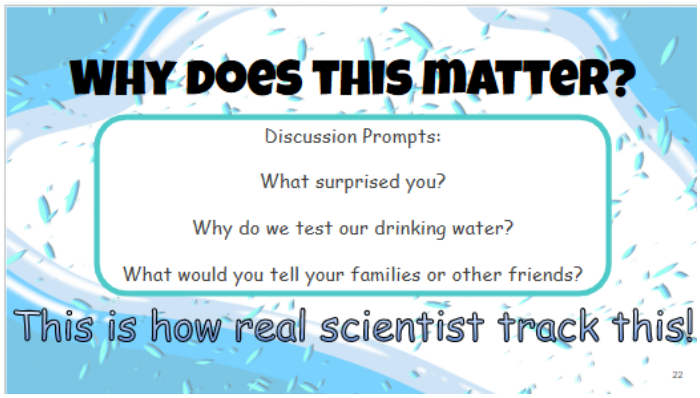


"Alright, scientists—take a close look at your two samples. Is your treated water clearer? Did your values get closer to the safe range? These questions aren't just about right or wrong—they're about observation, prediction, and learning from what happened.

Even if your guess was way off, that's a good thing in science. It means you're thinking, testing, and learning—just like real scientists do. So, take a moment to compare your notes, talk about what changed, and figure out who had the wildest results. That might be the most interesting one!"

If a group seems unsure about how to match the colors or complete their worksheet, the instructor can assist by modeling how to read one of the parameters. This part of the activity is meant to be collaborative and exploratory, so students should be encouraged to share their observations and think critically about what their results might mean. This is a key moment in the lesson. To spark engagement, consider passing around a plush toy or object of interest that they can toss to a student, then let them pass it around to others. Prompt students to closely compare their two sets of results and discuss what changed. They are welcome to ask questions during this time, and the instructor should help clarify anything that's confusing. The goal here is to reinforce that water treatment leads to measurable changes and to help students begin connecting those changes to what makes water safe or unsafe to drink..

click



"Everything we just tested and observed, this is the kind of work people do every day to make sure water is safe to drink. Here are some prompts to help you think: What surprised you today? Why do you think we test drinking water in the first place? What would you want your family to know about this? This isn't just science for the classroom—it's science that affects your home, your health, and your community. And this is how real scientists track water safety—by testing, recording, and comparing data just like you did."

Clean-Up & Thank You

click

click *"Alright, fellow scientists, —before we wrap things up, let's take a few minutes to clean up our workspaces. Please start by carefully pouring any leftover water from both samples into the designated bin at the front of the room. Make sure not to dump anything into the sink or trash just yet unless I've said it's okay. Once your cups are empty, gather them, your used napkins, and test strips throw them in the trash. Bring any unused materials back to the supply table."* *click*

Pause to let students begin cleaning; walk around to help guide and organize.

"Check your tables and make sure there's nothing left behind. If anything spilled during the activity, now's a good time to wipe it up with a paper towel. Let's try to leave the room as clean as we found it—or cleaner!"

Once clean-up is nearly done, return attention to the class.

click

"Thank you all so much for being part of today's workshop. Big thanks to Professor Naughton and her team, to Erik and his organization, and—well—yours truly! And of course, thank you. You did an amazing job testing, analyzing, and thinking critically about the water we all depend on.

I hope this activity helped you see how science shows up in everyday life—even in something as simple as turning on the tap.

Stay curious. Ask questions. And maybe tonight, ask your family where your water comes from. You might be surprised by what you learn.

Thanks again, and I hope you all have a great rest of your day!"