

# WADING INTO WATER QUALITY

## BACKGROUND

Our planet's freshwater is a limited resource. While nearly 70% of Earth is covered by water, only 3% of that amount is freshwater, and much of that exists as ice caps and glaciers, or is stored as groundwater. While access to our freshwater resources is a basic human right, citizens also share the responsibility for protecting these resources from impacts such as chemical and plastic pollution, erosion and shoreline degradation, thermal pollution, invasive species, and climate change. Monitoring the health of surface waterways is important because these are places where people swim, fish, enjoy paddle sports, observe wildlife, and in many communities provide the source of drinking water. People of all ages can act as citizen scientists by engaging with the EarthEcho Water Challenge to test their local streams, rivers, lakes, estuaries, or bays. By adding their water quality data to EarthEcho's global database at [www.monitorwater.org](http://www.monitorwater.org), participants join over 1.6 million people who have checked the health of their water in 146 countries around the world.

## MATERIALS

- Water sample from a nearby body of surface water (freshwater or saltwater)
- Water quality testing materials, may include:
  - EarthEcho Water Challenge test kit or
  - YSI handheld water quality meter or
  - Aquarium test strips, pH paper or homemade pH indicator, and thermometer
- Tablet or mobile device, or pencil and paper



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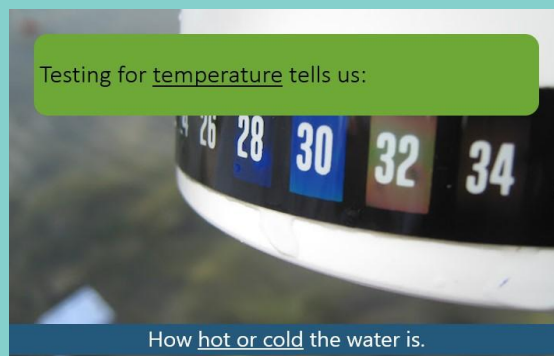
## PROCEDURE (EEWC test kit)

The EarthEcho Water Challenge test kit measures four basic parameters of water quality--temperature, turbidity, pH, and dissolved oxygen. This kit, made by LaMotte, can be purchased at <https://www.monitorwater.org/order-kits>. The instructions for conducting these four tests can be found in more detail in the EEWC kit booklet. Kit instructions are also provided in 17 different languages at <https://www.monitorwater.org/tools/event-resources>.

1. Locate an accessible site for testing at a local body of surface water, which can be freshwater or saltwater. Please follow guidelines for safely accessing water as outlined in the instruction booklet, along with any relevant guidelines for social distancing during the COVID-19 pandemic.

2. Make observations of your site including weather conditions such as air temperature, wind speed, and precipitation, as well as observing site conditions like land use and vegetation. Record these observations directly into the [online database](#), or on a paper data sheet.

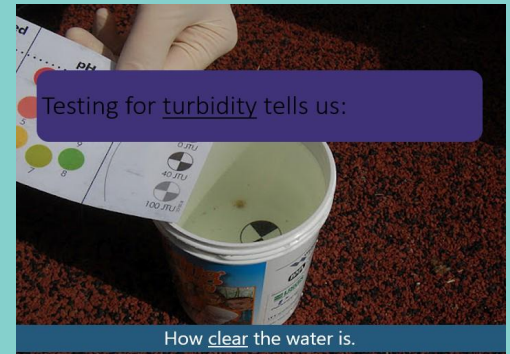
3. To measure water temperature, take the empty, white collection container and hold it underwater with the opening pointing upstream. Cap the full container and then rotate it so that the bottom of the container with the thermometer stickers remains underwater for one minute. Read the temperature that has a greenish background on the thermometer sticker in degrees Celsius. Record online or on your data sheet.



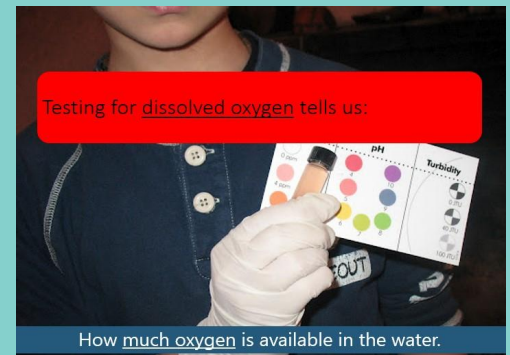
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## PROCEDURE (EEWC test kit)

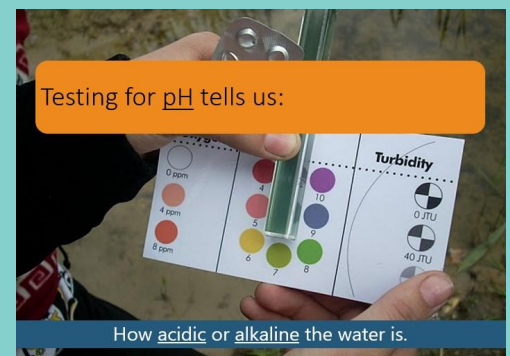
4. To test for turbidity, uncap the white container that is full of water from the temperature test. Pour some water out of the container until the water level is at the “fill line” printed on the outside. Look down through the water in the container to the Secchi disk sticker on the bottom. Compare what you see to the turbidity values on the color comparison chart included in the kit. Record your turbidity in JTUs online or on your data sheet.



5. To test for dissolved oxygen (DO), submerge the small vial into your water in the collection container until it is full. Lift it out carefully. Drop two DO reagent tabs into the vial and cap it. Make sure there are no air bubbles in the vial. Mix by inverting until the tablets dissolve (4-5 minutes), and then wait 5 minutes for color to develop. Compare the color in the test vial with the color comparison chart. Record your value in parts per million (ppm) online or on your data sheet. Additionally, there is a chart in the instruction booklet to calculate % saturation for DO.



6. To test for pH, fill the long plastic test tube with 10 mL of water from the collection container. Add one pH reagent tab and cap the test tube. Mix by inverting until the tablet is dissolved. Compare the color in the test tube to the color comparison chart. Record your value online or on your data sheet



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## PROCEDURE (EEWC test kit)

After monitoring:

1. **Clean up.** All reacted samples can be disposed of by flushing down the drain with excess water. In the field, reacted samples can be poured together in a waste container for later disposal. Rinse and dry all testing hardware before putting it away. Be sure to wash your hands with soap and water after water testing. Always leave your study site in the same or better condition than you found it.
2. **Submit your data.** If you didn't enter your data while in the field, go to <https://www.monitorwater.org/> and select "Add Results". Create or log into your EarthEcho Water Challenge account to add your data.
3. **Share your story.** Share your monitoring story and photos with us on the EEWC database or on social media by tagging @EarthEcho and using #MonitorWater.
4. **Determine next steps.** Armed with your test results and site observations, use the information and resources in the "Tools" section of the EarthEcho Water Challenge website to take action and protect the vital water resources in your community!



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## Additional Water Quality Resources

### EarthEcho Expedition: Water by Design

This expedition is an exploration of the diverse engineering solutions that California's resource managers are implementing in response to a recent multi-year drought. Explore the connection between the Sierra snowpack and the people of Los Angeles. Understand how NASA's satellite technology is used to help water resource managers on Earth. Investigate how seawater and groundwater play a role in satisfying this thirsty urban region. Discover solutions and actions you can take in your own home or community to conserve water resources.

*Resources:* Video resources exploring the business of water, water careers, youth-in-action stories, project guides to take action, lesson plans, STEM design challenges

<https://www.earthecho.org/expeditions/water-by-design>

### EarthEcho Expedition: Shell Shocked

The EarthEcho Expedition team travels to the Pacific Northwest to explore how the continued absorption of carbon dioxide by our oceans is changing the fundamental chemistry that marine organisms depend on to operate. Learn about the causes of ocean acidification and how it is affecting native communities along Washington's Olympic Coast.

*Resources:* Video resources exploring the ocean acidification, water careers, and youth-in-action stories

<https://www.earthecho.org/expeditions/shell-shocked>

### EarthEcho Expedition: Into the Dead Zone

Journey through the Chesapeake Bay watershed to investigate the impacts causing a dead zone in the world's largest estuary, including urbanization, agriculture, wastewater, and airborne pollution.

*Resources:* Video resources exploring dead zones, stories of youth-in-action, project guides to take action, and lesson plans

<https://www.earthecho.org/expeditions/into-the-dead-zone>

### EarthEcho Expedition: Beyond the Dead Zone

Travel to South Florida to explore how development and agriculture have impacted this region's natural ecosystems.

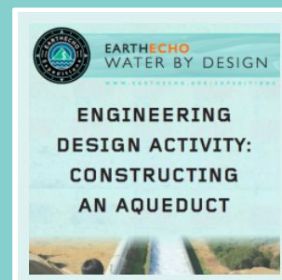
*Resources:* Video resources exploring the link between dead zones and ocean acidification, stories of youth-in-action, and videos exploring careers in water health

<https://www.earthecho.org/expeditions/beyond-the-dead-zone>

*This EarthEcho Water Challenge Resource was created through the generous support of Xylem Watermark.*



Water by Design: Water Underground



STEM Career Closeup: Water Quality Specialist



Into the Dead Zone: What Happens When We Flush?

[WWW.YOUTUBE.COM/EARTHECHO](http://WWW.YOUTUBE.COM/EARTHECHO)

