LET'S DO CHEMISTRY

What's in the Water

EXPLORE SCIENCE

Explore the water samples

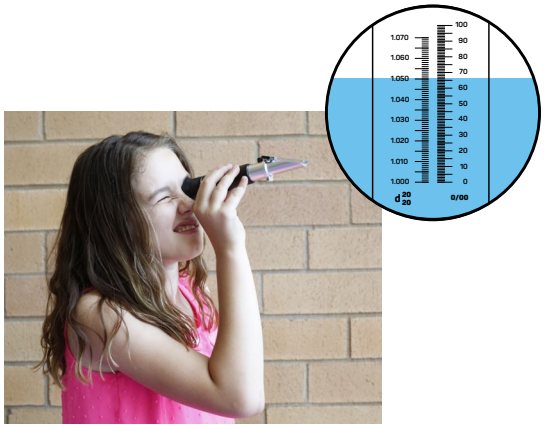
How do sample A and B look the same? How are they different? Observe carefully. What does the liquid look like? What does it smell like?

Test the samples

Measure pH: Use the pipette to add one drop of each sample to a different pH strip.

Watch the color change and mark your results on the data sheet.

Compare your pH strip to the color chart. The number associated with the matching color is the pH of the water sample.



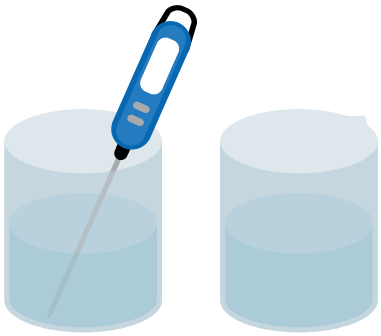
Measure salinity: Lift the clear lid on the end of the *refractometer* and use the pipette to add two drops of one of the samples onto the blue plate, place the lid down, and look through the eyepiece.

Look for the line between the white and blue areas and draw where you see the line on the data sheet. The more white you see, the saltier the water sample.

Wipe off the blue plate and lid with the cloth.

Repeat with the other sample.

You may need to point the tool at a light source while you're looking to get a better read.



Measure temperature: Dip the metal probe into one of the samples and wait for the numbers to stop moving.

Write-in the digital temperature reading. The higher the number the warmer the water sample.

Use the cloth to wipe off the thermometer.

Repeat with the other sample.

Let's keep experimenting! Now, mix the two samples in the Sample C beaker. Use the tools to investigate this sample. What changes? What stays the same? What else did you notice?

Chemists use tools understand our world—and how we change it.

You used chemistry tools to understand how water properties can be different even if the water looks similar!

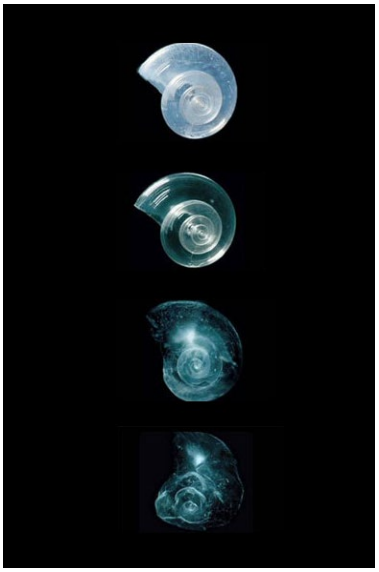
- The pH test measures if the water sample is more *acidic* (more like vinegar or orange juice) or more *basic* (more like baking soda or toothpaste).
- The refractometer uses the way light bends as it moves from the air through the water to measure the *salinity* (how much salt is dissolved in the water) of the sample.
- The digital thermometer senses the temperature of the water sample (how warm or cold the water is).

Nearby farming activity has polluted this rural stream.

We care about whether our water is safe to drink and swim in, and we care about keeping natural bodies of water clean for animals and plants. Any water sample may contain dissolved (possibly harmful) materials that cannot be seen, smelled, or tasted. To better monitor water quality, scientists make observations about chemical and physical characteristics (or *properties*) of the environment to see how it changes over time. Sometimes scientists can quickly monitor water quality based on what it looks like, but often they rely on special tools to measure changes that are less visible.

Chemistry can help us explore, understand, and solve problems.

Understanding and measuring changes in the chemical properties of water is key to learning more about how to address complex and challenging problems. Scientists measure ocean, lake, and river ecosystems to learn about the impact humans have on the environment. For example, some researchers are carefully tracking *ocean acidification*. This change in the ocean worries scientists because some marine life will not be able to survive if the sea water becomes more acidic. If the ocean's pH decreases (even slightly), many animals with hard shells will struggle because their homes will dissolve in the acidic water.



A sea snail shell dissolved in acidic salt water over the course of 45 days during a lab experiment

What challenges do you want to explore and solve with chemistry?