

Measuring Water Quality: Key

1. Explain in your own words what conductivity can tell us about a water sample.

Conductivity measures how easily an electrical current can pass through a sample. Conductivity tells us how polluted a body of water is by quantifying how much has been added to it. High conductivity values indicate very polluted water which is considered low water quality. Low conductivity values indicate water with very little pollution meaning this water likely has high quality.

2. Form a starting hypothesis: Which water sample do you think has the highest conductivity? Explain your reasoning.

Students may suspect that the water sample with the most color is the most polluted, however color does not indicate low water quality. In some cases, when water has some color it is still safe to drink.

3. Measure the conductivity of the water samples using the instructions below.

Turn on the water quality probe with the ON/OFF button and hit the MODE button until the screen shows “ $\mu\text{s}/\text{cm}$.”

Stir the water sample and remove the cap on the end of the probe. Submerge the end of the probe underwater about 3 centimeters. Record the conductivity number displayed on the screen in next to the corresponding sample number below. Record the color shown on the screen of the probe in the Color Classification box.

Dip the probe in the cup of rinse water and gently pat the probe dry with a tissue being careful not to touch the sensitive metal pieces. Repeat for the remaining samples.

Turn off the probe by holding the ON/OFF button and replace the cap.

Sample Number	Conductivity ($\mu\text{s}/\text{cm}$)	Color Classification	Scenario & Reasoning
1	(middle value)		A – A river near a small farm likely receives some pollution, but not as much as a river that runs through a city. Therefore this sample should have moderate conductivity.
2	(high value)		C – because this river travels through a city, it likely receives the greatest pollution
3	(low value)		B – a lake in a protected national park with little human activity around likely has the highest water quality and the lowest conductivity

Match the water samples above to the three scenarios below. Where do you think the sample could have come from based on their conductivity values? Explain your reasoning.

- A. A large, wide river near a small farm
- B. A lake in a protected national park
- C. A river that runs through a large, busy city

4. Was your hypothesis correct?

If students guessed that Sample 1 had the highest conductivity because it had the most color, these students would be incorrect. Sample 2 had the highest conductivity and lowest overall quality even though it has the correct color because the contaminants were dissolved into the water.

5. Explain how you would design a scientific study to evaluate the stream below. Where would you sample? Would you sample once, or multiple times?



Large buildings represent textile factories and small buildings represent homes.

Students could suggest that water quality be tested in the river and ponds near the large factory buildings because factories often produce pollution.

Students could also suggest that water quality should be monitored near the homes to ensure that the water is safe for drinking, swimming, or fishing.

Students could suggest testing water quality every couple weeks or months to make sure the quality of the water is not declining over time.

It would also be a good idea to test the quality of the river upstream of the factory. This way, we could learn about the pollution that might be occurring further upstream of the factories. If pollution is occurring, it could be occurring further upstream and not be the fault of the factories.