

WATER QUALITY TEST KIT

collect and analyze water samples for total dissolved solids and pH

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WATER QUALITY BASICS

Water quality is determined by its intended purpose, such as maintaining wildlife habitats or for human drinking water. Water quality is determined by features such as how the water looks, what chemicals are in the water, and what's living in the water.¹

There are many factors that affect the quality of surface water, such as contamination. Contamination can be caused naturally or by human activities. Contaminants can be things such as sediment, nutrients, bacteria, or toxic substances.²

Good water quality is very important to the health of humans, animals, and the environment.

WHAT THIS KIT MEASURES

TOTAL DISSOLVED SOLIDS:

Total dissolved solids (TDS) is the measure of inorganic salts and other small organic matter that are dissolved in water. Higher levels of TDS in surface water may be a sign of natural environmental factors³ or possible contamination. TDS levels in water vary by region and geography.

pH:

pH is a sign of how water is changing chemically. The toxicity levels of things such as nutrients and heavy metals vary at different levels of the pH scale.¹ The pH scale ranges from 0-14, with 7 being the neutral point.



STEP ①: PREPARE TO SAMPLE

GATHER SUPPLIES

WHAT THIS KIT INCLUDES:

- Water collection cups
- Wash bottle
- Data collection sheet
- pH meter and calibration powder
- TDS meter and calibration solution

WHAT YOU NEED TO GET:

- Distilled water
- Tissues (non-lotion)
- Pen
- Method of obtaining sampling coordinates (GPS or phone app)

CALIBRATE METERS

TDS METER:

The TDS meter comes pre-calibrated and will stay calibrated for a very long time. Use the TDS instruction manual and calibration solution included in the kit if you need to calibrate. The calibration solution has a shelf life of 1 year unopened and 6 months once opened.

pH METER:

The pH meter must be calibrated before using for the first time. Use the instruction manual and calibration powders in the kit to calibrate the meter. Ordering of calibration powder and the recalibration of the meter will need to be done when the meter is stored for a long period of time.

STEP 2: COLLECT WATER SAMPLES

DRINKING WATER ⁴

1. On the Data Collection Sheet, note the date, time, address, coordinates, and the faucet used for the sample.
2. Take the water sample from the kitchen sink. Check the faucet to be sure it is clean and doesn't have any screens or purifiers.
3. Run cold water for 2–3 minutes or until the temperature has stabilized. Running the water for 2-3 minutes will flush the water that has been sitting in your home's pipes. By using this method, the sample you collect will represent the water from the main water line. After 2-3 minutes, adjust the water flow so water does not splash against the sides of the sink.
4. Open the collection cup and remove the lid. Avoid touching the inside and edges.
5. Rinse the collection cup and cap three times in the tap water. Then fill the collection cup about 2 inches full of tap water and screw cap on. Analyze the sample directly after collection or refrigerate to analyze later.

SURFACE WATER ⁵

1. On the Data Collection Sheet, note the date, time, coordinates, type, and name of the sampling location. Record the weather conditions from the past 24 hours.
2. Open the collection cup and remove the lid. Avoid touching the inside and edges.
3. Stand on edge of water or rock to avoid stirring up the water. If this is not possible, step into the water but reach as far upstream as possible to avoid collecting the stirred up water.
4. Hold the uncapped collection cup upside down and submerge it.
5. Tip cup upright and allow water to fill the cup.
6. Remove the cup from the water and screw on the cap.

STEP 3: ANALYZE WATER SAMPLES

TOTAL DISSOLVED SOLIDS



1. Pull the grey cap off of the TDS meter (cap may be tightly secured). Ensure the tip of the probe is dry. *If it is wet, gently shake the probe or use a tissue to dry. Do not touch the probe.*
2. Push the 'ON/OFF' button to turn on the meter.
3. Ensure the meter mode is set at 'TDS-ppm (0.5)'. Press and hold the 'HOLD/MODE' button to change modes if needed.
4. Place the probe in the water sample. Swirl and lightly tap the meter on the bottom of the cup to allow trapped air to be released. Keep the meter in the water and wait 30 seconds for the reading to stabilize. Press the 'HOLD/MODE' button to freeze the reading. Remove from water.
5. Record the TDS value from the meter on the Data Collection Sheet. Press the 'HOLD/MODE' button to unfreeze the reading. Press the 'ON/OFF' button to turn off the meter.
6. Rinse off the end of the probe using distilled water. Gently shake or wipe dry with a tissue before replacing the cap.

pH

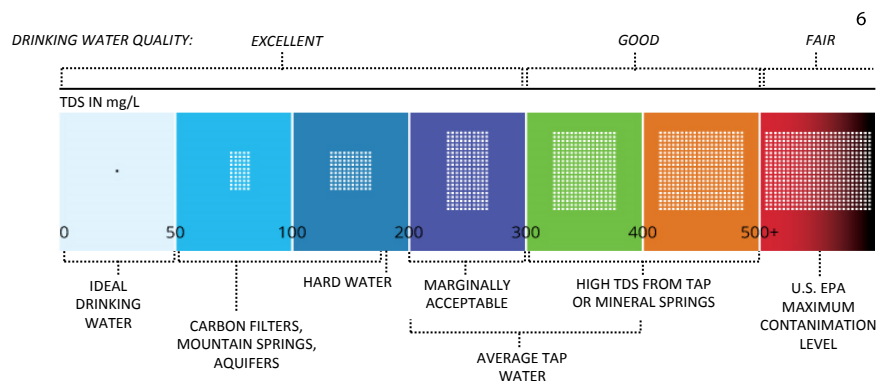


1. The pH meter must be cleaned before each use. To clean, pull off the black cap from the pH meter. Place the electrode cap-level deep in distilled water for 5 minutes. *Do not touch the metal probe. Do not drop meter in water or dip beyond the capped area.*
2. Remove the probe from the distilled water and dry with a tissue.
3. Turn on the pH meter by moving the black square on the top of the meter to the left.
4. With the cap off, place the meter in the water sample to be tested. Hold the meter cap-level deep in the sample. Wait 10-30 seconds for the reading to stabilize.
5. While the meter is still in the water, record the value from the meter on your Data Collection Sheet.
6. Remove the meter and rinse off the end using distilled water. Gently shake and wipe with a tissue until the probe dry. Once dry, place the cap on the meter.

STEP 4: EVALUATE WATER SAMPLES

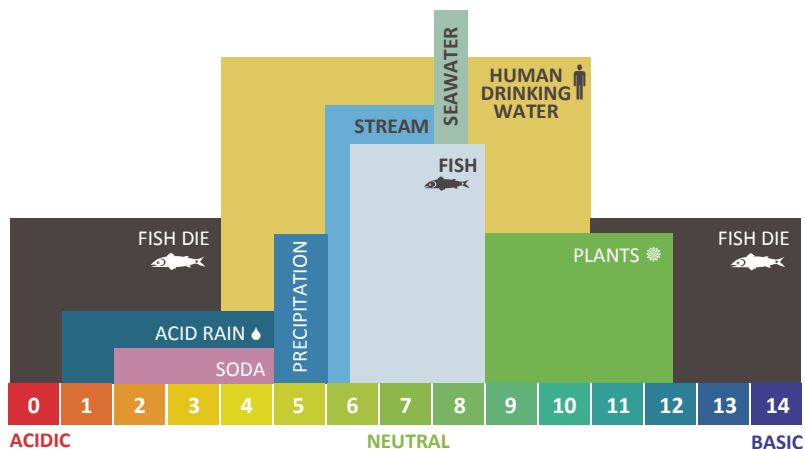
Use the graphs below to evaluate the quality of your water samples.

TOTAL DISSOLVED SOLIDS



pH

Humans and animals can tolerate fairly large extremes of pH. In fact, most soft drinks have a pH between 2 and 4. The acceptable pH range for drinking water set by the Public Health Service Act is 6.5-8.5. ⁴



LOCAL RESOURCES

If you find water with high levels of TDS or pH, first calibrate the meters to ensure accurate readings.

Many communities have different local agencies who address tap and surface water issues. If high levels are present after recalibrating the meters, contact your local water authority.

REFERENCES

¹ **United States Geological Survey (USGS)**

<https://water.usgs.gov/edu/waterquality.html>

<https://water.usgs.gov/edu/ph.html>

² **American Geosciences Institute (AGI)**

<https://www.americangeosciences.org/critical-issues/faq/what-affects-quality-surface-and-groundwater>

³ **Water Research Center**

<http://www.water-research.net/index.php/water-treatment/tools/total-dissolved-solids>

⁴ **United States Environmental Protection Agency**

<https://www.epa.gov/dwregdev/drinking-water-regulations-and-contaminants>

https://www.epa.gov/sites/production/files/2015-11/documents/drinking_water_sample_collection.pdf

⁵ **State of Maine, Department of Environmental Protection**

http://www.maine.gov/dep/water/monitoring/biomonitoring/materials/sop_watergrab.pdf

⁶ **Fundamentals of Environmental Measurements**

<http://www.fondriest.com/environmental-measurements/parameters/water-quality/conductivity-salinity-tds/>

<http://www.fondriest.com/environmental-measurements/parameters/water-quality/ph/>