

Water quality testing

Temperature

Why would you test it?	Water temperature has a direct link with toxic absorption, salinity and dissolved oxygen. Some organisms cannot reproduce if water is not at the correct temperature, for example, coral polyps reproduce well in a narrow temperature range above 26 ° C. Altitude and proximity to coasts will influence natural water temperature eg: water in the Snowy Mountains may be 3 ° C, but this is its natural state, not necessarily poor quality. Keep this in mind when measuring. The ranges provided below are a guide.	
How do I test it?	Use a thermometer to test water in a range of locations. Surface water, shallow water and stagnant water will generally be warmer. Hold the thermometer in the water for at least 10 seconds before recording the reading.	
Unit	Degrees Celsius (° C)	
Quality	0 – 9 ° C	poor
	10 – 14 ° C	fair
	15 – 25 ° C	good
	26 – 36 ° C	fair
	>37 ° C	poor



Thermometer



pH meter

pH

Why would you test it?	pH measures hydrogen ions in the water and indicates if the water is alkaline (>7), neutral (7) or acidic (<7). This level of solubility tells what nutrients are available to aquatic life. Metals tend to become more toxic at a lower pH because they are more soluble.	
How do I test it?	Collect a sample (approx 10 mL) of water from your fieldwork site. Hold the pH meter into your sample and wait until a reading appears. Record the pH and compare it to the pH scale.	
Unit	pH	
Quality	< 5.5	poor
	5.5 – 6.5	average
	6.5 – 8.0	good
	8.1 – 8.5	average
	>8 .6	poor

Phosphate

Why would you test it?	All plants and animals need phosphate but too much can cause eutrophication eg, algal blooms. It occurs naturally in minerals and rocks. The concentration reflects particular land uses and human activities. Soil erosion and fertilisers increase the amount of phosphate in the water.	
How do I test it?	You will need a phosphate test tablet to do this. Collect your sample of water (approx 10mL), add one tablet and swirl until dissolved. Wait 3 minutes and match the colour of the sample to your chart	
Unit	mg/L	
Quality	< 0.15	Poor
	0.05 – 0.15	Fair
	0.02 – 0.05	Good
	< 0.02	Excellent



Phosphate test



Using an electrical conductivity meter

Salinity

Why would you test it?	High levels of salt affect plant growth, water quality and soil quality. Many areas of Australia have natural levels of salinity however an increased reading can mean human activities have negatively impacted the environment.	
How do I test it?	Collect a sample (approx 10 mL) of water from your fieldwork site. Use an electrical conductivity meter. Hold the meter in the sample until a reading appears on the screen. Salty water conducts more electricity than fresh water.	
Unit	Micro siemens (uS) abbreviated to electrical conductivity (EC)	
Quality	0 – 100	Excellent (30 = rainfall)
	500	Fair
	>750	Poor (840 = sewage effluent)
	1600	Upper limit for drinking
	5000	Upper limit for crops
	8000	Upper limit for livestock
	50 000	Seawater

Turbidity

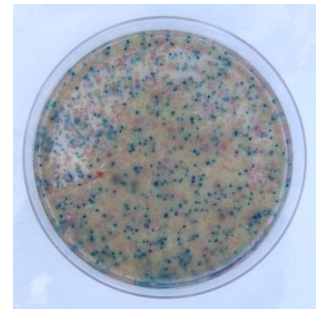
Why would you test it?	Turbidity is the level of suspended solids in the water (murkiness). Turbidity may be a result of erosion, algal growth or sewage. This can affect the reproduction of aquatic life.	
How do I test it?	You will need a clear tube (approx 4.5cm x 120cm) with a painted disk (or wavy lines) at the bottom acting as a cap, a scale marked up the tube in centimetres. Collect a water sample from your fieldwork site. Pour the sample into a turbidity tube, until you can no longer see the disk	
Unit	Nephelometric Turbidity Units (NTU)	
Quality	< 10	good
	11 - 29	fair
	> 30	poor



Nephelometer



Water samples with high and low turbidity



Faecal coliform culture test

Faecal bacteria

Why would you test it?	Faecal coliforms are used to assess the suitability of water for recreational activities. Bacteria comes from the intestines of warm blooded animals and can enter the water in runoff, septic systems, grazing paddocks. This can then cause severe infectious, parasitic and other diseases.	
How do I test it?	Use a <i>Coliscan Easygel Kit</i> . All materials are included. It is a good idea to wear gloves and avoid interfering with the sample. Collect your water sample (20cm below surface) and follow the process back at school to mix with gel as it takes approximately 2–3 days to culture. Full instructions are available Apps Laboratories . You then need to count the number of dots (E.coli colonies are the darkest) according to their colour using a colour guide .	
Unit	Colony forming units (CFU) / 100mL	
Quality	< 1	Very good – ie: for drinking
	1 – 35	Good - Primary contact eg: swimming
	35 – 230	Fair - Secondary contact eg: fishing, boating
	< 700	Poor – no contact

Dissolved Oxygen

Why would you test it?	Aquatic plants and animals need oxygen, except that it is dissolved in water. Fish 'breathe' in dissolved oxygen through their gills. Organic waste and higher water temperatures cause dissolved oxygen levels to fall. High levels of dissolved oxygen mean a greater variety of living things can survive.	
How do I test it?	You will need a dissolved oxygen kit to do this. Collect your sample of water (approx 10mL), add one tablet and swirl until dissolved. Wait 3 minutes and match the colour of the sample to your chart.	
Unit	Parts per million (ppm)	
Quality	0.0 – 4.0	Good
	4.1 – 7.9	Fair
	8.0 – 12.0	Poor
	>12	Check results (too high)



Dissolved oxygen kit



Measuring dissolved oxygen

Nitrogen

Why would you test it?	All living things need nitrogen to build proteins. High levels in water lead to plant growth. Some die and sink to the bottom, decompose and use up oxygen in the process, eventually killing fish and insects. Ammonia is a form of nitrogen, a waste product of humans and other animals, which can be toxic to fish.	
How do I test it?	You will need a nitrate test tablet to do this. Collect your sample of water (approx 10mL), add one tablet and swirl until dissolved. Wait 3 minutes and match the colour of the sample to your chart.	
Unit	mg/L	
Quality	< 0.4	Poor
	< 0.2	Fair
	< 0.1	Good
	< 0.05	Excellent