



Term 3, Lesson 1

# Water Quality Parameters

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## Learning Objectives:

1. Describe water quality parameters and explain how they relate to wetland health;
2. Use applications to plan scientific investigations, through the identification of sites for wetland sampling.



# Why do we test water quality?

Water quality testing can tell us how healthy the water is in our local rivers, creeks and wetlands.

The health of the aquatic habitat can be influenced by:

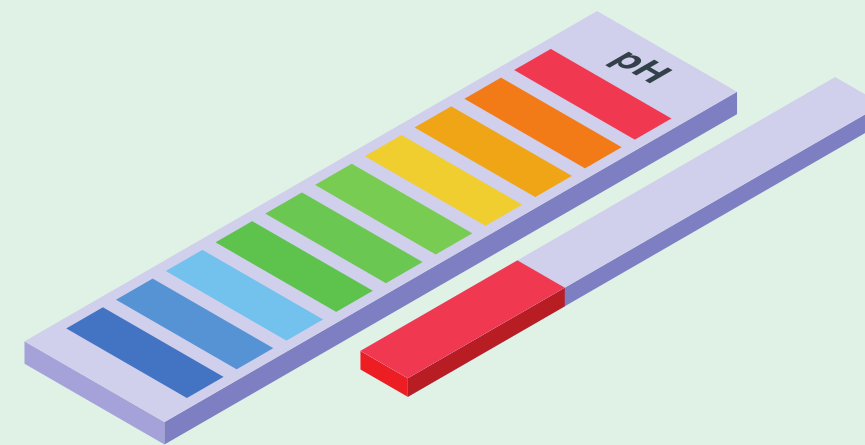
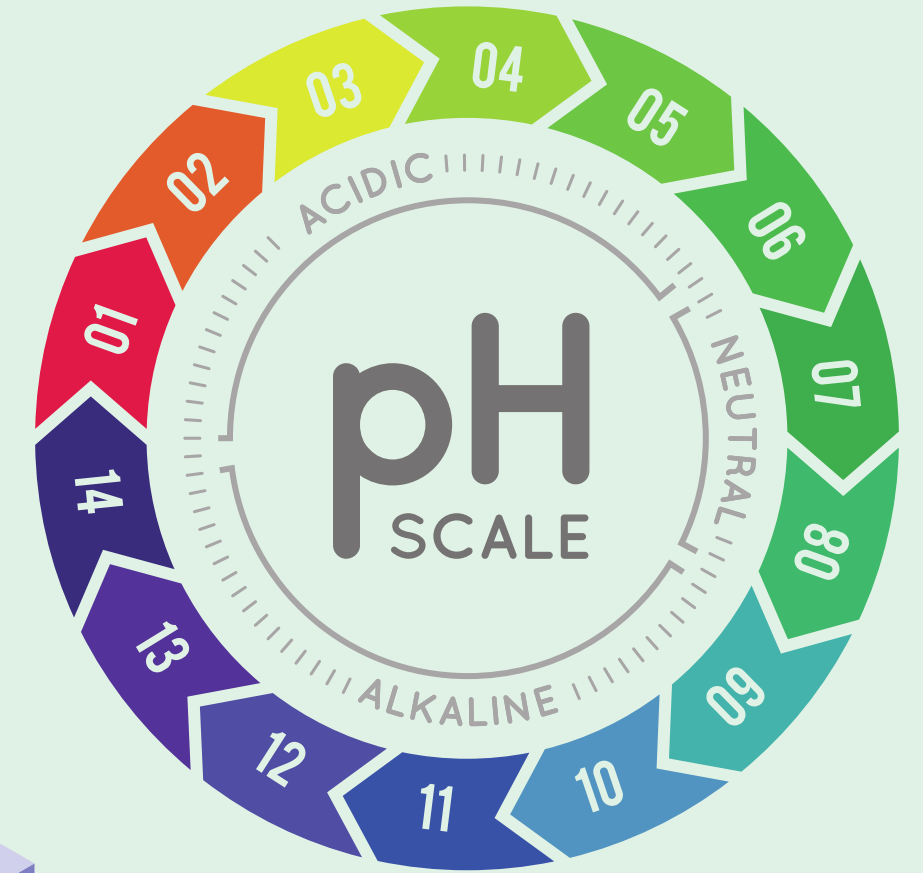
- Land clearing, agriculture, road works and erosion;
- The use of fertilisers and pesticides;
- Pollution;
- Weeds and feral animals.



# Water quality parameters - pH

pH is a measure of how acidic or alkaline the water is.

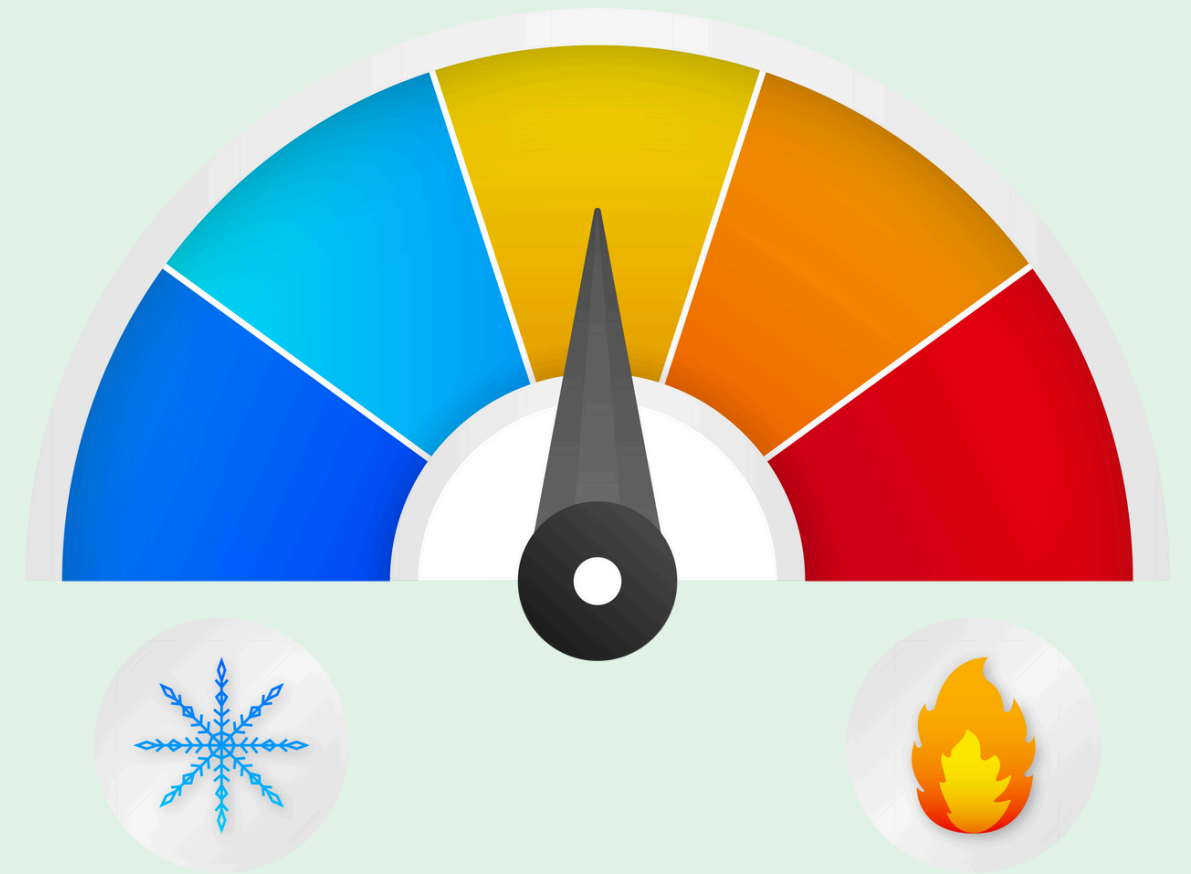
- Different aquatic organisms have specific pH ranges within which they thrive.
- Extreme pH levels (too acidic or too alkaline) can stress or harm aquatic life, affecting their physiology and behaviour.



# Water quality parameters - Temperature

Temperature is how hot or cold the water is.

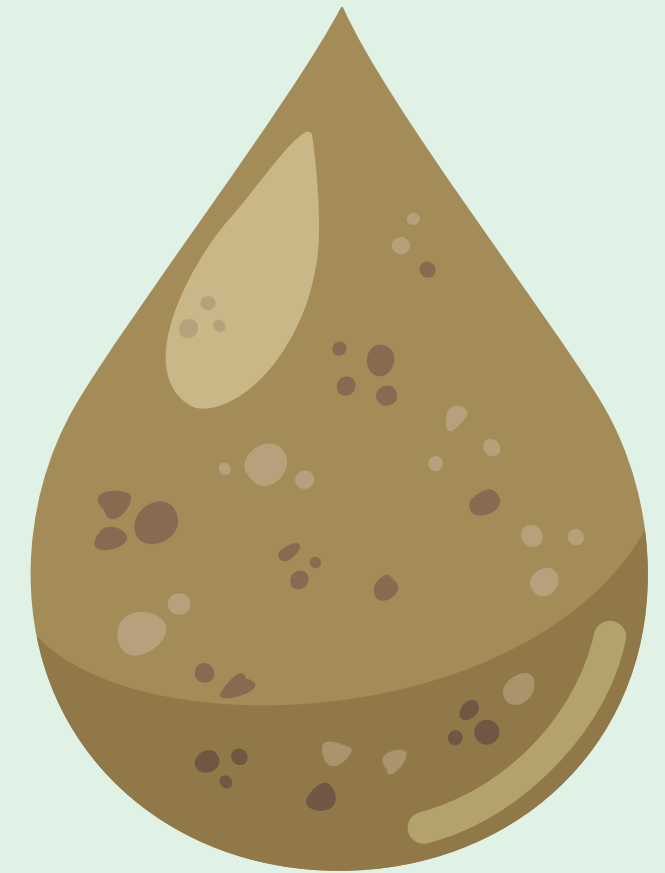
- Temperature affects the metabolic rates of aquatic organisms.
- It affects the solubility of gases in water, such as oxygen. As water temperature increases, the water's capacity to hold dissolved oxygen decreases.
- Some species are adapted to specific temperature ranges and changes in temperature can influence species composition and diversity.



# Water quality parameters - Turbidity

Turbidity is a measure of how murky or cloudy the water is and is usually caused by suspended particles.

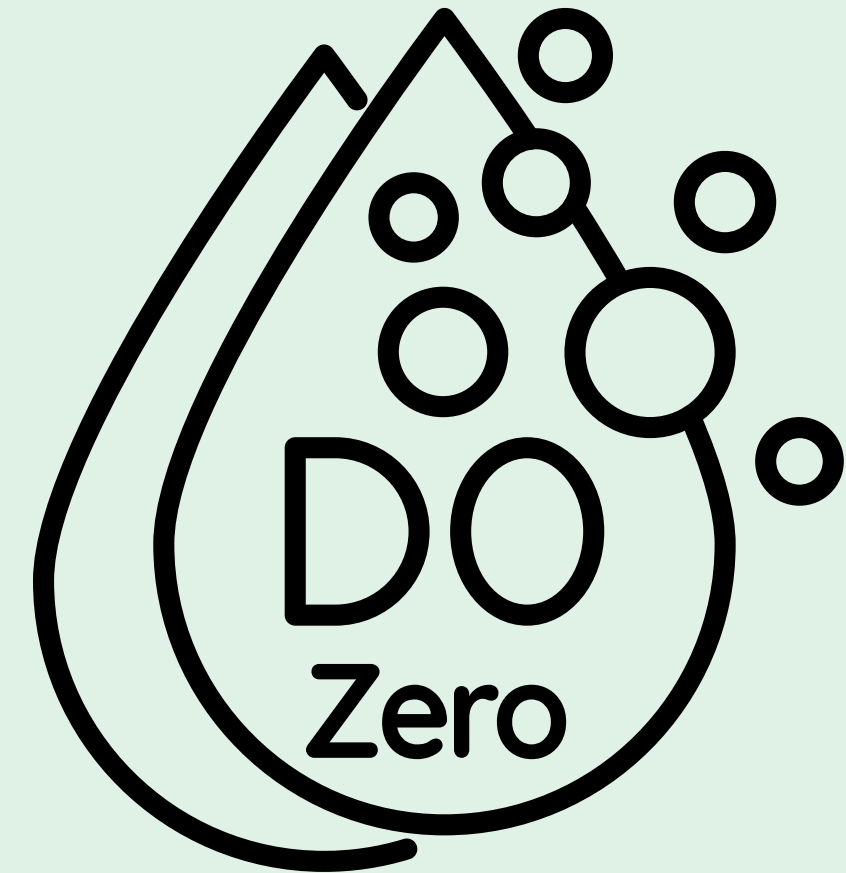
- High turbidity levels can reduce water clarity, potentially impacting light penetration and photosynthesis in aquatic plants.
- Turbidity may also reduce visibility, making it more challenging for predators to locate prey.
- High turbidity can indicate increased erosion and runoff.



# Water quality parameters - Dissolved Oxygen

Dissolved oxygen is crucial for the survival of aerobic organisms as they rely on oxygen for respiration.

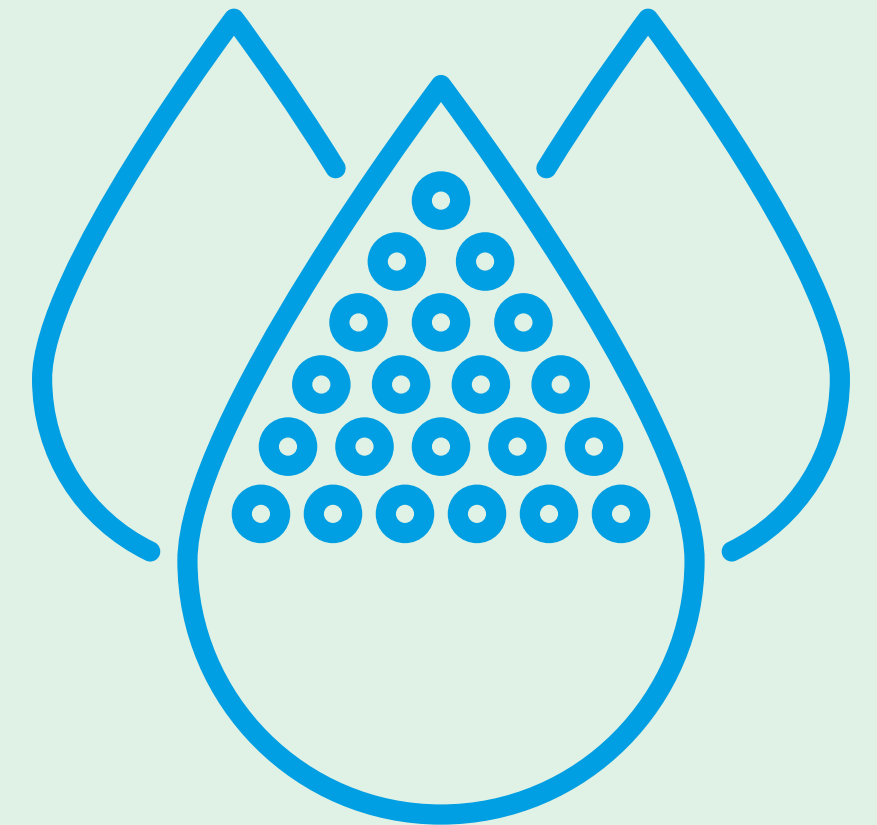
- Low dissolved oxygen levels can be indicative of increased organic matter decomposition.
- Anthropogenic pollutants, such as nutrient runoff or organic pollutants, can lead to oxygen depletion.



# Water quality parameters - Salinity

Salinity refers to the concentration of dissolved salts in water.

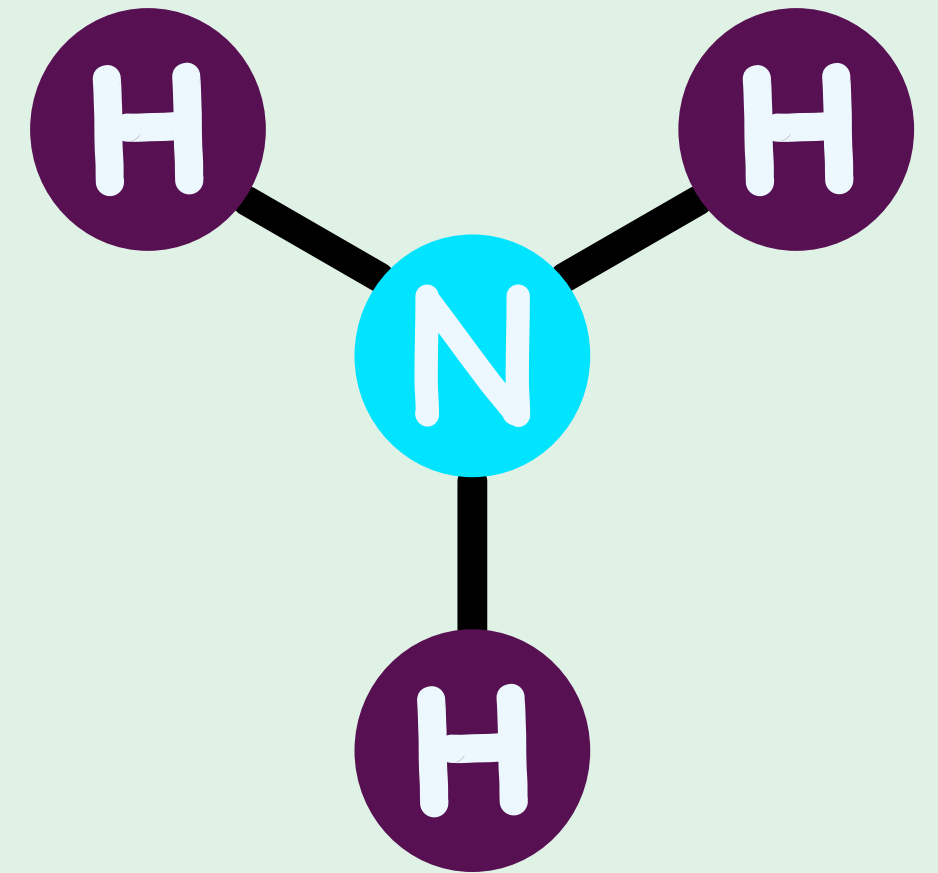
- Species have varying tolerances to salinity levels.
- Salinity influences the osmotic regulation of aquatic organisms. Changes in salinity can affect the balance of water and salts within the cells of organisms.
- Elevated salinity levels can be indicative of human activities.



# Water quality parameters - Ammonia

Ammonia is a nitrogen compound commonly found in aquatic ecosystems, originating from sources such as agricultural runoff, wastewater discharge, and decomposing organic matter.

- Elevated levels of ammonia can be toxic to aquatic organisms, particularly fish and invertebrates.
- Excessive ammonia can lead to algal blooms and eutrophication, causing oxygen depletion and harm to aquatic life.





# Water quality parameters - Nitrate

Nitrate is a form of nitrogen found in water bodies, primarily from agricultural fertilisers, animal waste, and sewage discharges.

High nitrate levels can promote excessive algal growth, leading to algal blooms and oxygen depletion in aquatic ecosystems.



# Water quality parameters - Nitrite

Nitrite is an intermediate compound in the nitrogen cycle and is often found in conjunction with nitrate in aquatic environments.

Elevated nitrite levels can be toxic to aquatic organisms, particularly fish, by interfering with their ability to transport oxygen.



# Water quality parameters - Phosphorus

Phosphorus is a nutrient essential for plant growth.

Sources of phosphorus in water bodies include agricultural runoff, wastewater discharge, and soil erosion.

Elevated phosphorus levels can promote algal blooms, which can deplete oxygen levels, produce toxins harmful to aquatic life, and degrade habitat quality.



# How to test water quality parameters

**pH:** Use pH strips or pH indicator to measure the acidity or alkalinity of the water.

**Temperature:** Use a thermometer.

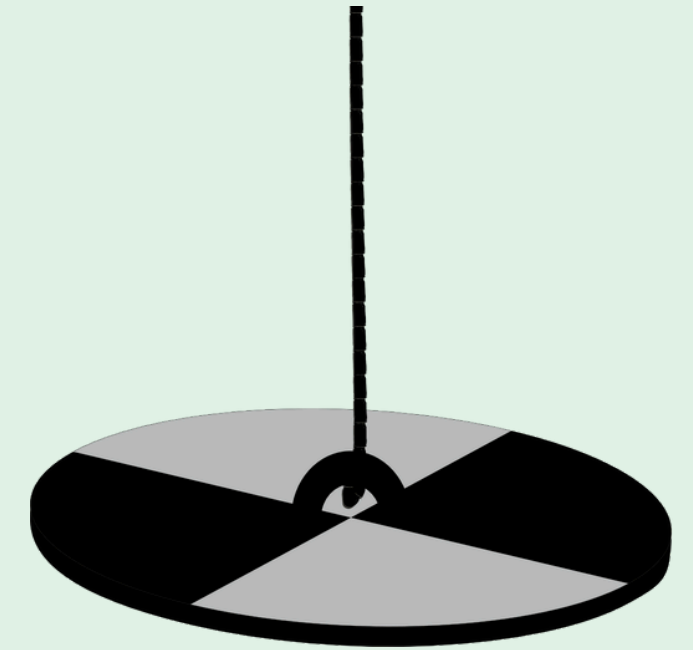
**Turbidity:** Use a Secchi disc.

**Dissolved Oxygen:** Use a dissolved oxygen meter.

**Salinity:** Use a hydrometer to test salinity.

**Ammonia, Nitrate, Nitrite and Phosphorus:**

Testing typically involves using a test kit.



# Experimental Design

Experimental design refers to the process of planning and organising an experiment in order to gather data and draw conclusions to answer a research question.

An experimental design has the following components:

- Research Question
- Hypothesis
- Methods
- Expected Outcomes

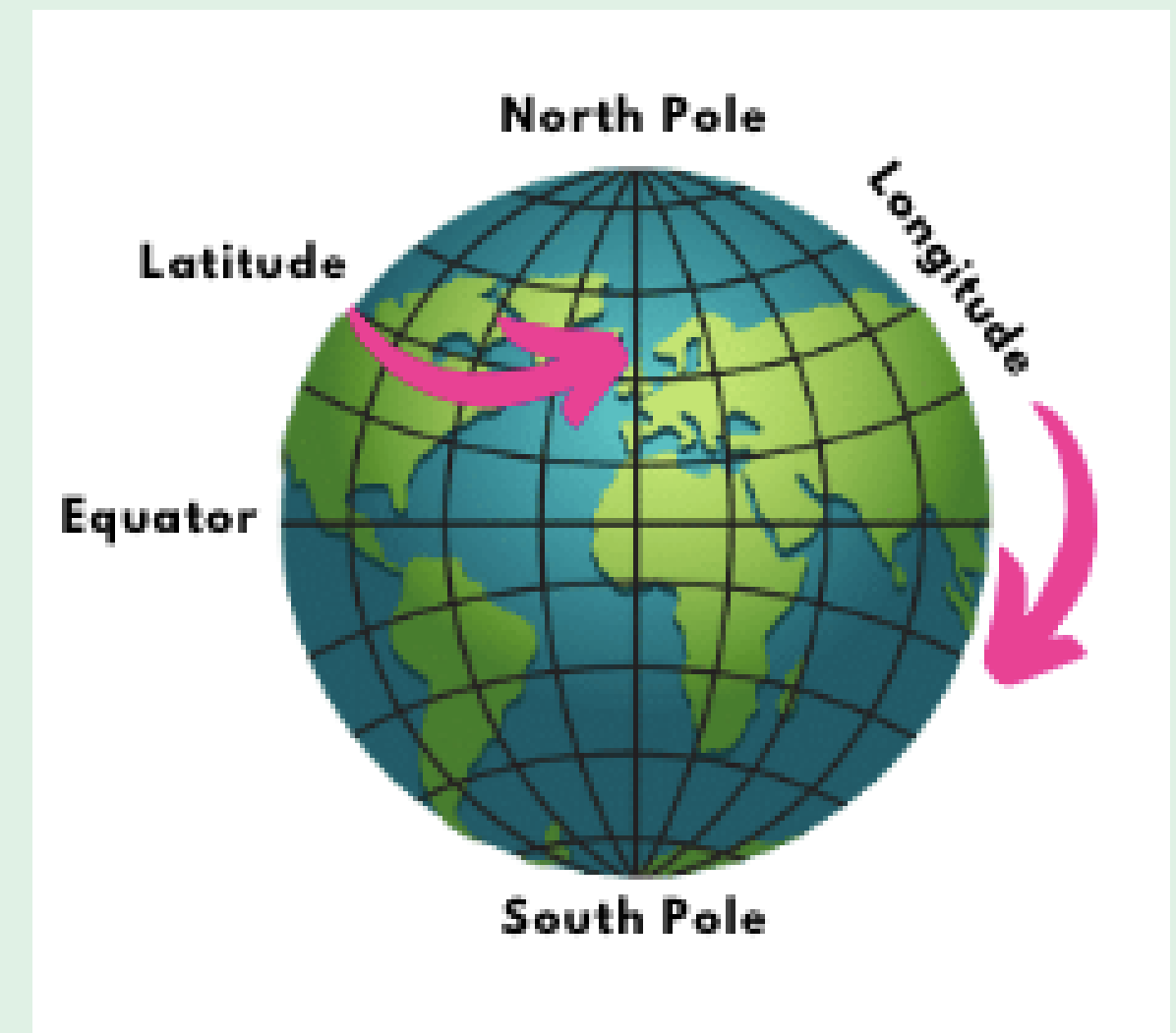


# GPS, Latitude and Longitude

GPS (Global Positioning System) helps us find locations on Earth using latitude and longitude coordinates.

**Latitude:** These lines go sideways, like belts around Earth. The Equator is the main line, dividing Earth into the Northern and Southern Hemispheres.

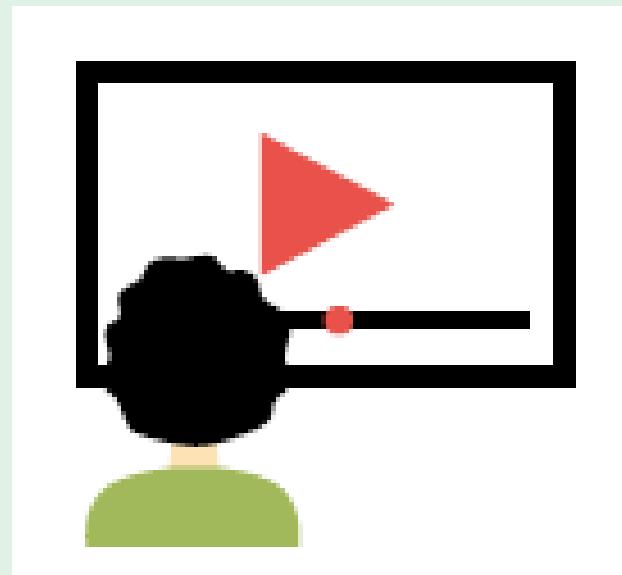
**Longitude:** These lines go up and down from the North Pole to the South Pole.



# Classroom Activities

## Activity 1 - Video: Water Quality Testing (Victorian Environmental Protection Authority)

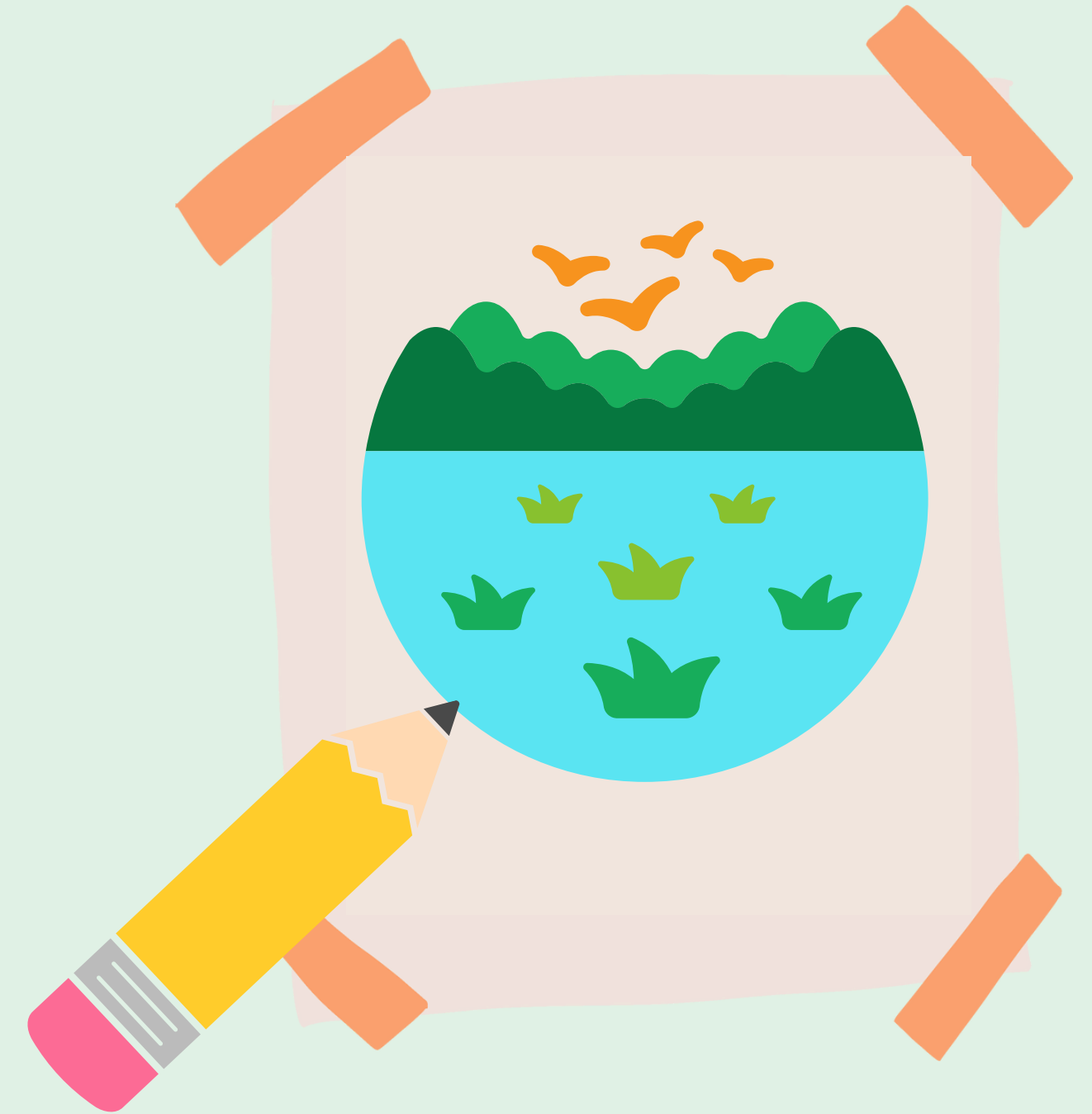
<https://www.youtube.com/watch?v=94YcjbYBchc>



# Classroom Activities

## Activity 2 - Worksheet

Define the water quality parameters in the worksheet.





# Classroom Activities

## Activity 3 -

- Collect information about local organisations and how they are engaged in water quality testing.
- Compose a letter to one of the groups asking them if your class can be involved in their next water quality testing day.



# Classroom Activities

## Activity 4 -

- Use Google Earth to view your local wetland.
- Brainstorm potential research questions related to water quality at the wetland.



# Classroom Activities

## Activity 4 -

- Select one of the research questions and develop a hypothesis and experimental design.

