

## Student Investigation – Science



Water testing kit; Carroll, K. Western Sydney University, 2019

**Focus:** This resource develops students' understanding of water testing through a fieldwork investigation. Students are required to research the role of selected water testing variables in aquatic ecosystems and participate in water testing at three sites in the Hawkesbury-Nepean Valley. Discussion questions lead students to draw conclusions about the quality of water at each site and predict how a flooding event might impact water quality and the local ecosystem.

### Stage 4 Science outcomes:

- A student follows a sequence of instructions to safely undertake a range of investigation types, collaboratively and individually (SC4-6WS)
- A student processes and analyses data from a first-hand investigation and secondary sources to identify trends, patterns and relationships, and draw conclusions (SC4-7WS)
- A student explains how new biological evidence changes people's understanding of the world (SC4-15LW).

## Testing the Quality of Water

The quality of water in an environment is critical to the survival of organisms in the ecosystem. Organisms adapt to water conditions and may die if these conditions change significantly. There are a number of variables that are considered when measuring the quality of water, including turbidity, pH, temperature, and the concentration of nutrients in the water.

## Pre-investigation research

Use a variety of sources to complete the following table. The first row has been completed for you.

Variable	Role/Importance in Aquatic Ecosystems
Temperature	Different organisms have adapted to thrive in water of different temperatures. Water temperature can also change the chemical properties of water.
pH	
Turbidity	
Phosphate	
Nitrate	

## Aim

To test the quality of water samples obtained in the Hawkesbury-Nepean Valley.

## Materials

You will need the following equipment to conduct this investigation:

- 3 jars or containers with lids
- Turbidity tube or Secchi disk
- 3 pH test strips
- 3 nitrate test strips
- 3 phosphate test strips
- Thermometer
- Buckets

## Method

1. During your field trip you will visit three sites along the Hawkesbury-Nepean Valley (for example- Boat ramp where South Creek meets Hawkesbury River, Penrith Lakes and Yarramundi Reserve waters).
2. At each site, use a thermometer to test the temperature of the water. Record the temperature in the table below.
3. At each site, use a turbidity tube or Secchi disk to test the turbidity of the water. Record the turbidity in NTUs in the table below.
4. Collect a sample of water from each site in a different container.

- Use the pH, nitrate, and phosphate test strips to measure the pH, nitrate, and phosphate levels in each sample. Record these values in the table below.

## Results

Sample Location	Temperature (°C)	Turbidity (NTUs)*	pH	Nitrate (ppm)**	Phosphate (ppm)**
Sample 1					
Sample 2					
Sample 3					

\* NTUs = Nephelometric Turbidity Units

\* ppm = parts per million

## Discussion Questions

- At which site was the water quality best? Justify your answer.
- At which site was the water quality poorest? Justify your answer.
- Suggest reasons why the water quality at the sites is different.
- In a flooding event, sediment, nutrients, and pollutants can be washed into waterways. How might this affect the ecosystems in the Hawkesbury-Nepean Valley?
- Extension question 1: Research some alternative ways of measuring water quality.
- Extension question 2: Changes in water temperature change the solubility of the substances in the water. Design an experiment to test how temperature affects solubility and use this information to predict how nitrate and phosphate levels might vary in summer and winter.