

## Science Lesson 7: Collecting Water Quality Data

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**Hawaii DOE Content Standards:** Science standards: 1, 2, 6, 8

**Key concept:** Water quality determines how life is sustained.

**Performance indicators:** After completing this lesson, students will . . .

- operate water quality meters
- take environmental readings and samples
- record water quality data
- anticipate certain trends in various parameters based on an understanding of environmental ranges

**Note to the Student:**

“When you have completed this lesson, you will be able to use water quality meters to measure environmental parameters in the environment.”

**Activity at a glance:**

Students will be introduced to the water quality meters and the parameters they measure. They will learn to take a measurement and record it on a data sheet. They will also take water samples, and measure nutrient levels with a colorimeter.

**Time:** One two-hour lab

**Prerequisite skills:** None

**Skills to be introduced:**

Water quality measurement, environmental sampling, laboratory techniques, data collection and presentation

**Assessment:**

Students will create data notebooks, tables and interpretive graphs, and also be able to discuss and describe different environmental parameters and their ranges.

**Vocabulary:**

Water quality, pH, dissolved oxygen, turbidity temperature, colorimeter, salinity, environmental range

**Materials:**

- Dissolved oxygen meter, pH meter, thermometer, colorimeter, nitrogen, phosphorus, and silicon test kits
- *Hawaiian Coral Reef Ecology* by Gulko, pp. 2, 31, 35, 128-129, 182, 196-200, 206, 215





## Activity Overview:

1. Introduce students to the water quality meters, and the environmental parameters they measure.
2. Demonstrate appropriate sampling procedure and calibration of the meter.
3. Allow students to collect data from samples with a range of qualities. For example:  
**Temperature:** ice water and warm water.  
**pH:** acid solution- 50% vinegar or citrus juice, neutral-fresh water, basic solution-baking soda dissolved in water, soapy water, or salt water  
**Dissolved Oxygen (DO):** clean water freshly aerated will have a high DO level and nutrient rich water (from aquarium), or standing water will have low DO level  
**Turbidity:** clear water and murky water (can also use standards with known turbidity)  
**Nutrients:** use standards and blanks, or blanks and nutrient rich water
4. Next, take several samples in the ocean or stream, and discuss the similarity or differences of their measured values. This is where the students will be introduced to the concept of environmental ranges, which is a very important ecological concept. For example, temperature will not vary by much more than a few degrees in the ocean, and pH should be constant within a narrow range around neutral (6 to 8) for animals to live.
5. Finally, organize the data collected by site, date, and parameter in a data table, and use the data table to graph the parameters in a line graph. What does the trend of the line tell you about the parameter? Does the graph help explain your observations of the different habitats and animals at the sample points?

## Cultural Values

### **Kokua**

Taking initiative, service, clean up, maintenance, stewardship

### **Lokahi**

Unity, harmony, leadership skills

## Adaptations/ Extensions

- Use 5 senses to make water quality observations.
- Discuss difference between percent saturation and milligrams per liter measurement of dissolved oxygen.
- Math Lessons 1 and 2

## Safety

Do not ingest the chemicals, wear eye protection when using chemical reagents, and have an eye flush ready for emergency first aid.