



WATER QUALITY INDOOR LAB LESSON PLAN

Subject Area: Water Quality

Grade Level: Middle School

Seasonal timing: Fall before the field trip

Instruction Time: 45 minutes

A. Learning Goal: Understand the importance of water quality and human impact, including personal behaviors, on our water resources.

B. Objectives:

- Conduct various water quality tests and record data on a water sample.
- Determine water quality based on chemical and physical factors.
- Relate water quality parameters to the health of the lake, including the impact on organisms.
- Discuss how personal behaviors and choices impact water quality in local water systems.

C. State Standards:

- SCI.CC7.m – Students explain stability and change in natural or designed systems by examining changes over time and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
- SCI.SEP3.m – Planning and conducting investigations.
- SCI.SEP4.m – Analyzing and interpreting data.
- SCI.LS2.A.m – Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared.
- SCI.LS2.C.m – Ecosystem characteristics vary over time. Disruptions to any part of an ecosystem can lead to shifts in all of its populations. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health.
- SCI.LS2.D.m – Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on — for example, water purification and recycling.

D. Setting/Area: Indoor classroom with a lab.

E. Materials/Resources: Students divided into small groups.

- Water quality lab packets, writing utensils.
- Safety glasses.
- Liter/quart container of water for each group to analyze. Each container altered using baking soda, vinegar, food coloring, etc. to obtain a variety of water characteristics to sample.
- pH paper.
- Thermometer and Chemette kits or temperature and oxygen meter (e.g., YSI).
- Mini Secchi disk tube and bucket (to prevent spills).
- Glass disposal container for Chemette vials.

F. Delivery:

- Review safety issues; handling instruments, chemicals, safety glasses, glass from Chemette kits.
- Review water quality characteristics and how the factors affect aquatic life.
- Review lab protocol and demonstrate cooperative learning.
- Distribute water containers to group with cautions and directions. Some containers will have vinegar in them and some baking soda to alter pH.

G. Assessment:

Have an informal discussion regarding the differences in samples within the classroom and how the quality of water would affect the organisms living there. Use the table describing the tolerances of organisms to assess the values and observations about water quality.

