

Water Quality Testing

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I. Student knowledge needed to complete lab activity through past labs.

Past experience using a PH probe or paper, and the corresponding implications connected to the PH of a water supply.

Past experience using a nitrogen test kit, and implications related to nitrogen levels in water and soil.

Past experience using a temperature probe or a thermometer, and implications connected to water temperature.

Past experience using a turbidity chart, or judging suspended particles on a scale from high to low.

Past experience using maps, and inferring conditions associated with land use with regard to environmental issues.

Useful web links for materials, and resources.

www.fishersci.com

www.schoolbax.com/science.aspx

www.wardsci.com/categories.asp_Q_c_E_4712

www.vernier.com

www.Earthcomm.net www.agiweb.org/earthcomm/index.html

www.usgs.gov/

<http://mi.water.usgs.gov/>

II. Vocabulary

- PH : logarithmic equation of the hydrogen ion concentration
- Ground water: water supply found under the surface of the ground
- Surface water: water supply found on the surface of the ground
- Turbidity: the amount of visible suspended materials
- Nitrogen content: the amount of dissolved nitrogen in water sample
- Dissolved Oxygen: the amount of oxygen dissolved in a water sample
- Runoff: the amount of liquid surface substances that move dependant on gravity

III. Goal of Lesson

Lesson objective is to evaluate and infer cause and effect relationship with regard to land use and the impact on water supplies.

Curriculum connections:

E4.1C Explain how water quality in both ground water and surface systems are impacted by land use decisions.

E1.1C Conduct scientific investigations using appropriate tools and techniques.

E2.1C Explain using specific examples, how a change in one system affect other Earth systems.

E4.1A Compare/contrast surface water systems (lakes, rivers, streams, wetlands) and ground water in regard to their relative sizes as Earth's fresh water reservoirs and the dynamics of water movement (input and out, residence times, sustainability).

IV. Materials/Technology

PH testers/ paper
Temperature probes/ thermometers
Chart for turbidity/ high, medium, low
Nitrogen test kit/ no alternative
Map of land use/ visual analysis
Test tubes to collect water samples

V. Procedures/ Instructions

Question: What's in the water supply around you? Can you drink it?

- Students will have small group discussion about the question, then reporting out to whole group. Engage
 - Students will start by dividing into eight groups.
 - Students will pick up materials.
 - As a group they will collect water samples at predetermined locations. Explore
 - Each group will return with their water samples.
 - Each group will exchange water samples with the other groups, so they will have one sample of each location.
 - Testing process carried out on all the samples. Record data in a student group created chart.
 - Students exchange of findings with the whole group.
 - Throughout exercise students will determine record keeper, facilitator (reading directions), tester, and material manager.
 - As a group students will discuss process, and findings.
 - Student groups will complete lab questions as a small group.
 - Teacher will circulate and provide guidance.
 - Teacher will direct the whole group discussion, using accountable talk process.
- Explain
- Teacher will also try to get group consensus of lab findings. Expand
 - Student groups will submit chart and short answers for Evaluation.
 - Individually students will complete the essay questions for Evaluation.

VI. Hands-on Connection

Student created chart for small group.

Which test was the easiest to complete?

1. _____

Which test seems to have the most consistent findings?

2. _____

Does the time delay from collection to testing have an impact on your data?

3. _____

Individual response for essay questions

1. Compare and contrast our local water/land use and US/global water/land use.

2. Explain/Infer water test results with current and past land use, and how a change in land uses effect water quality?

VII. Assessment Rubric

	EX	Good	Poor
Data	Organized, clear record of data in table	OK record of testing done in table	Minimal data, not clear, scattered
Inferences	Well thought through and clearly explained	Thought out, and explained	Minimal connections, little thought
Implications	Impact on future resources clearly explained	Some impact with OK explanation	No long term effects listed