Lesson Title	Water Quality
Length of Lesson	50 min class period
Created By	Kendra Wright
Subject	Science
Grade Level	7th grade
State Standards	7th grade Inquiry: 1c, 1d, 1h, 2b, 3a, 4d 7th grade Life Science: 3b
DOK Level	DOK 1, DOK 2, DOK 3
DOK Application	Recall, Skill/Concept, Strategic Thinking
National Standards	5-8th grade: A (Inquiry), B (Physical Science)
Graduate Research Element	In Poland, most of my research involved water quality testing. Students will also get to test local water sources. Also, the goal of my research with Hg remediating bacteria is to improve water quality.

Student Learning Goal

MS 7th grade

1c. Collect and display data using simple tools and resources to compare information (using standard, metric, and non-standard measurement). (DOK 2)
1d. Organize data in tables and graphs and analyze data to construct explanations and draw conclusions. (DOK 3)
1h. Make relationships between evidence and explanations. (DOK 2)
2b. Categorize types of chemical changes, including synthesis and decomposition reactions, and classify acids and bases using the pH scale and indicators. (DOK 2)
3a. Assess how an organism's chances for survival are influenced by adaptations to its environment. (DOK 2)
4d. Conclude why factors, such as lack of resources and climate can limit the growth of populations in specific niches in the ecosystem. (DOK 2)

National Science Education Standards 5-8th grade

Content Standard A: Use appropriate tools and techniques
Content Standard B: Properties and changes in matter

Materials Needed (supplies, hand-outs, resources):

Hach surface water testing kits (all vials and pH meter included), 3 water sources: (Columbus drinking water, Ridge Lake water, and MSU's North Farm water (water collected in 3 large plastic tubs), Eutrophication Powerpoint (Eutrophication.pptx), Water quality worksheet (Water quality worksheet.xlsx)

Lesson Performance Task/Assessment:
Water quality is a serious issue of our time. Not only does water quality effect human health but also the health of ecosystems. Students will learn the dangers of eutrophication from a Powerpoint. Then, the students will collect and compare water quality data on 3 different water sources: Columbus drinking water, Ridge Lake water, and MSU North Farm Water. The students will complete the assigned worksheet and have a class discussion concerning the data.

Lesson Relevance to Performance Task and Students:
Students will collect data using Hach surface water kits. They will use real life water quality assessments and critically analyze the results.

Anticipatory Set/Capture Interest:
Power point will be used to grab the students' attention.

Guided Practice:
The use of Hach Surface Water Kits will be demonstrated.

Independent Practice:
After demonstration, student will be allowed to work through the water samples and kits in groups of 2. Students will measure dissolved oxygen, nitrates, ammonia, phosphorus, temperature, and pH using the kits. The worksheet and class discussion on the differences in the water sources will provide critical thinking on water quality.

Remediation and/or Enrichment:
Remediation will follow IEP. For enrichment, students will research an area of known water pollution or eutrophication.

Check(s) for Understanding:
Completion of the worksheet and class discussion will check for understanding.

1. What are sources such as industry, recreation, agriculture which can pollute water?
2. Is eutrophication the introduction or depletion of water source nutrients?
3. Which water sample is the cleanest? Which water sample is the dirtest?

Closure:
I will finish the lab by emphasizing any interesting information uncovered by the Hach kit data. I will explain some ways that water quality is tested within my research.

Possible Alternate Subject Integrations:
Role of single-celled organisms (e.g., algae) in the carbon and oxygen cycles.

Teacher Notes: Lesson is to be fun and interactive. “Hach Kits”
http://www.hach.com/surface-water-test-kit/product?id=7640218498&callback=bc