Lesson 2:

Get the Lowdown on Your Local Water Quality

Grade Level: 9-12

Time: 180 minutes
(*90 Minutes Field,*
90 Minutes Lab)

Vocabulary:
Sampling, observations, data, data collection, parameter, contaminant.

**Great Lakes
Literacy Principles:**

Principle 6
Concepts E, F

Summary:
Students go on a field trip to a remediated or clean portion of their local water body and take water samples. They then perform a lab test with water test kits to determine water quality.

Objectives:
Students will learn how to perform water sampling and data collection, adequately representing a section of the water body.

Materials:
Lab notes, lab sheets, latex gloves, tape, Sharpies, water test kits (the AM-12 TesTab Water Investigation Kit, LaMotte, was used in the pilot), baby food jars, and two one-quart food storage containers (one empty labeled "dirty" and one full of clean water labeled "clean").

Procedure:
1. Field activity: Walk along the water and point out interesting ecological characteristics of the site. Ask students to make observations in their lab notes. While students are making notes, identify two locations where students will sample. Locations should provide easy access to the water with stable footing for the students. Separate students into teams of four each. Take half the teams to one location and half the teams to the other. Hand out gloves and a baby food jar to each team. Have students label their jar with their team name and location using tape and a Sharpie. Demonstrate how to take a water sample. Ask students to make observations about their water sample in their lab notes. Switch teams to opposite locations and repeat to obtain the second sample. Again, have students label their jar with their team name and location.

2. Classroom lab: Choose six parameters from the kit to test for. Prepare the lab with one test parameter from the water test kit at each table. Place two 1-quart food storage containers (one empty labeled "dirty" and one full of clean water labeled "clean") at each table. Ask students to divide into their field teams and sit at the
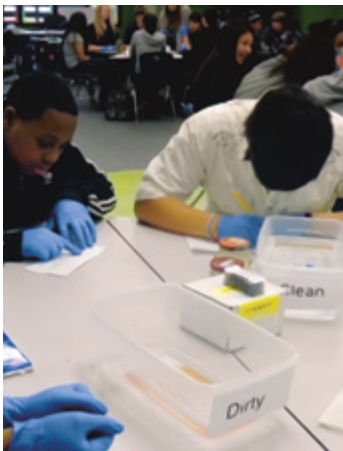
tables in teams. Go over each of the parameters with the students and explain why each is an important indicator of water quality. Remind students to take notes as this information will help them fill out their lab sheets.

Following the water test kit instructions, demonstrate how to perform a parameter test to the students. Show the students how to empty the test into the "dirty" storage container. Use water from the "clean" storage container to rinse the test tube, and dump contents into the "dirty" storage container so that the tube is clean for the next test. Tell the students they will perform one test for each sample at each table (two tests per table). Walk around and help students fill out their lab sheets as they do their tests.

Extension:

Compile the data from each group into the master dataset (template provided in the lesson) for locations one and two. On a separate day, talk to the students about data analysis. Discuss the definitions of mean, median, mode, and outlier statistics with the students. Hand out the master dataset to the students and complete statistic examples on the board. Demonstrate how to solve mean, median, and mode for the first two parameters with the students. Have students perform the data analysis activity. Send the data analysis results to Illinois-Indiana Sea Grant.

Assessment:

Lab sheets and data analysis activity with grading sheets are provided in the lesson.

Name _____ **Date** ____/____/____ **Team** _____

Field Sampling: Location One

Part I: Environment Observations
Make eight observations about the location one environment using your senses (sight, hearing, touch, and smell). Some example observations include: speed of water flow, color of the water, air and water temperature, presence of wildlife, and presence of plants in/near/far from the water.

1)

2)

3)

4)

5)

6)

7)

8)

Part II: Water Sample Observations
Make two observations about the location one water sample.

1)

2)

Name ————————————————— **Date** ——/——/—— **Team** ————

Field Sampling: Location Two

Part I: Environment Observations
Make eight observations about the location two environment using your senses (sight, hearing, touch, and smell). Some example observations include: speed of water flow, color of the water, air and water temperature, presence of wildlife, and presence of plants in/near/far from the water.

1)

2)

3)

4)

5)

6)

7)

8)

Part II: Water Sample Observations
Make two observations about the location two water sample.

1)

2)

Name _____ **Date** ____/____/____ **Team** _____

Data Collection

List each parameter that you are testing the location one water sample for in the Test Name column. Define the parameter, perform any necessary calculations, and list your test result. Describe what this result tells you about the water and implications for the ecosystem.

LOCATION 1

Test Name/Parameter	Parameter Definition	Calculations	Test Result	What does the result tell us?

Name _____ **Date** ___/___/___ **Team** _____

Data Collection

List each parameter that you are testing the location one water sample for in the Test Name column. Define the parameter, perform any necessary calculations, and list your test result. Describe what this result tells you about the water and implications for the ecosystem.

LOCATION 2

Test Name/Parameter	Parameter Definition	Calculations	Test Result	What does the result tell us?

Name _____ **Date** ____ / ____ / ____ **Team** _____

LOCATION 1

Test Name					
Group 1					
Group 2					
Group 3					
Group 4					
Group 5					
Group 6					
Group 7					
Group 8					

LOCATION 2

Test Name	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8

Name ——————————————————————— **Date** ——— / ——— / ———

Part I: Short Answer
Read each question carefully and provide an answer using a complete sentence.

How do we solve for a mean value?

How do we solve for a median value?

How do we solve for a mode value?

What is an outlier? Give two reasons why they occur.

Name ———————————————————————— **Date** ——— / ——— / ———

Part II: Data Tables
Fill in the tables below using the master dataset.

LOCATION 1

Test Name	Outliers	Mean	Median	Mode

LOCATION 2

Test Name	Outliers	Mean	Median	Mode