

# NGCSU Lesson Plan

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## Standards

### State-Based Standards:

**From GPS:**

**Topic:** Data Analysis and Probability

**MM2D1:** Using sample data, students will make informal inferences about population means and standard deviations.

**MM2D2:** Students will determine an algebraic model.

**Topic:** Process Standards

**MM2P1:** Students will solve problems (using appropriate technology).

**MM2P3:** Students will communicate mathematically.

**MM2P4:** Students will make connections among mathematical ideas and to other disciplines.

**Looking ahead (foundation for future courses):**

**Topic:** Data Analysis and Probability

**MM3D3:** Students will demonstrate understanding of the differences between experimental and observational studies by posing questions and collecting, analyzing, and interpreting data.

## Lesson Plan

### Unit/Lesson Topic:

Topic Name: collecting data  
Grade Level: Math 2  
Content Area: Mathematics  
Type of Lesson: Lab

### Understandings:

Students will understand that when using math to answer questions about the "real-world" it is usually necessary to collect data, often through experiment and measurement.

### Essential Questions:

What do we want to measure?

Can we measure directly? If not, is there an "indirect measurement" that can be used?

### Knowledge/Skills:

Students will know . . .

- "pH level" (measure of acidity in the water)
- "silt level" (relates to amount of food that might be available in the water; measured by how much light passes through the water)
- "oxygen level" (measure of amount of oxygen in the water)

Students will be able to . . .

- use a TI calculator and sensor attachments to measure physical properties and record the result
- identify trends in the collected and communicate this to others

**Assessment Evidence:**

Performance Tasks

- students will perform the lab measurements and record the results on their data sheets

**Learning Plan:**

**Time Allotted**  
10 min

**Teaching and Learning Strategies**

As we discussed yesterday, we can use sampling techniques to count the number of fish in a pond. Once we know how many fish there are, what else might we want to know? Can we make any conclusions based on the counts that we get?

I'm passing out some data sheets marked Group A, Group B, and Group C (can be handed out randomly, or specific group assignments can be arranged by who the data sheets are handed to). There is a column on the sheet for a population estimate for each of 8 years. Looking at the data, what can you tell me? [ Group A – the "silt" group, will have a decreasing population; Group B – the "pH" group, will have a decreasing population; Group C – the "oxygen" group will have an increasing population ]

30 min

Just having the population data doesn't tell us anything. What else do you think we might need to know, or want to find out?

We have 3 stations set up (for Groups A, B, and C) with water samples from each of the 8 years that the population estimates were made.

Group A is going to test the water for "silt content" by testing how much light passes through the water

Group B is going to test the water for "pH level" (acidity) using a pH meter

Group C is going to test the water for "oxygen level" using an oxygen sensor

I'll show each group how to use the sensors and record the results. We need to at least get each sample tested, and if there's time we can do additional tests to check for accuracy, and to give everyone in each group a chance to perform the tests.

[ one thing I haven't figured out yet is what to do with Groups B & C while I'm showing Group A how to perform their tests; one thing I thought of was to ask three students, one for each group, to come to my classroom at some time before the lesson to be trained on the test

procedure, then those three students could start teaching the rest of their group how to do it, while I move between the groups to help out]

The water samples will be rigged ahead of time so that the results will be predictable, and I check for correct performance of the test procedure by seeing if the results are close to the rigged values.

10 min Discuss the results

Did anyone see anything in the collected data that looks interesting? What was it?

Transition

Tomorrow we'll be looking at the topic "linear regression" again (remember, we introduced it a couple of days ago), where we will plot the data points we collected today, and see if the regression line tells us anything about our pond.

10 min Clean up and put away

**Lesson Modifications:**

This section should include how you will modify the lesson to meet individual student needs.

**Resources**

**Resources:**

- 1) three TI-84 Plus calculators with probe attachments, cables, etc
- 2) three sets of 8 water samples, one set for measuring pH level, one set for measuring oxygen content, and one set for measuring silt content; each of the 8 samples will be labeled "year 1", "year 2", . . . , "year 8"; the samples will need to be prepared ahead of time to produce specific values and checked right before the class starts to make sure their values are still close to the desired values
- 3) data sheet for recording the measurement results (students will be working in groups, but they will each need their own data sheet)

## Lesson Reflection

### Analysis of Lesson:

Use this area to reflect on:

- What worked or didn't work
- Why it worked or didn't work
- Which students learned or didn't learn
- Why did they learn or not learn
- What assessment data lead to your conclusions
- If I were to teach this lesson again, what would I do differently