Lab Framework

Text: CORD Applied Math

Unit number and title: 16 - Solving Problems that Involve Linear Equations

  Short Description: Students will be able to graph a linear equation based on the relationship of number of students and time to do the "wave."

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Lab Title
"The WAVE"

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objectives**
    1. Students will identify what a "wave" is and it's significance.
    2. Students will identify the dependent and independent variable.
    2. Students will collect data on the results of "the wave."
    3. Students will create a graph, and plot the points based on the results.
    4. Students will formulate a linear equation from the graph.
    5. Students will compose a paragraph of their findings.

- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)

    Vocabulary, drawing, graphing data, problem solving, calculator, determining slope

- **Vocabulary**

    equation, independent variable, dependent variable, linear equation, slope, y-intercept
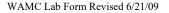
- **Materials List**

    paper, calculator, graphing paper, stopwatch (you can do an online stopwatch), YouTube (optional), projector, computer (optional), Microsoft Excel (optional)

- **State Standards addressed**

    Math:

    A1.1.B - Solve problems that can be represented by linear functions, equations, and inequalities.

    A1.3.A - Determine whether a relationship is a function and identify the domain, range, roots, and independent and dependent variables.

    A1.3.B - Represent a function with a symbolic expression, as a graph, in a table, and using words, and make connections among these representations.

    A1.6.B - Make valid inferences and draw conclusions based on data

    Writing:

    2.2.1 - Demonstrates understanding of different purposes for writing.

    3.2.2 – Analyzes and selects language appropriate for specific audiences and purposes.

    3.3 – Knows and applies writing conventions appropriate for the grade level.

- **Leadership Skills**

  Students will work in groups of 2-3, or the teacher can assign the size of the groups. Within those groups, there will be job responsibilities: a writer/recorder, a graphing artist, and the software expert (for Microsoft Excel).

- **SCAN Skills/Workplace Skills**

  Writing
  - performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques

  Arithmetic
  - performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques

  Interpersonal
  - contributes to group effort

- **Set-up information**

  Pass out the activity sheets before you begin the lesson. Depending on the size of your class, you can choose how many students do the wave for a particular grouping. Before the activity, go over "the wave" (I'd show via YouTube or TeacherTube) and what it's significance is. The students will be responsible for filling out their worksheets while having this discussion.

- **Lab organization** (-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required)**

  Day 1- Review vocabulary, introduce lab, begin data collection, graph data
  Day 2 – Complete the worksheet and final writeup

- **Teacher Assessment of student learning** (scoring guide, rubric)

  See lab

- **Summary of learning** (to be finished after student completes lab)

  -discuss real world application of learning from lab
  -opportunity for students to share/present learning
  See lab worksheet

- **Optional activities**

  Optional activity – if you are in a computer lab or have the technology available at school, have the students go into Microsoft Excel and create the same graph they created on paper.

- **Career Applications**

  Students will use cooperative learning/communication skills in this process.

LAB TITLE: The WAVE
STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**
  Discover the relationship between the number of people and the time it takes to complete a "wave."

- **Grouping instructions and roles**
  Groups of 3 – recorder, graphing artist, software expert

- **Procedures** – steps to follow/instructions
  1. Put your name on the handout
  2. You MUST participate in the class activity or we won't be able to have the correct data!
  3. Gather the data based on the number of people, and time elapsed on your handout.
  4. After data is collected, get with your group and complete the handout.
  5. Participate in the review discussion.

- **Outcome instructions**
  Complete the handout given

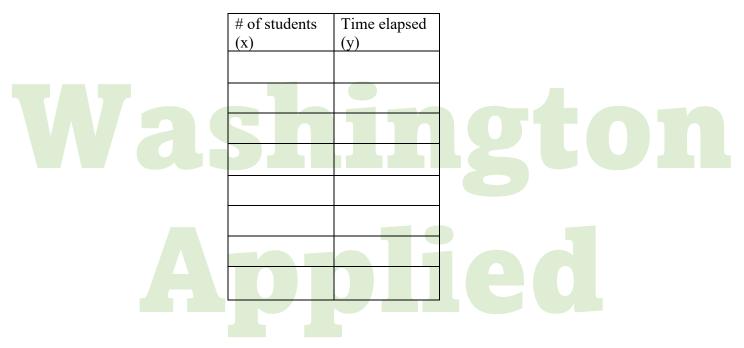- **Assessment instructions** (peer-teacher)
  Assessment is as follows:

	10	5	1	Points
Lab Ethics	Brings materials, takes interest, takes care of property, listens attentively	Some materials, not focused at all times, takes care of school property, listens attentively	No materials, not focused, doesn't take care of property, did not listen to instruction	
Data	All data is clear and easy to read, everything is labeled	Most data is there, not labeled	Data has not been collected	
Graph	Graph is clear to understand, all data included, all axis' and information labeled	Graph is finished, some data included, labels not included	Graph is not completed	
Performance	Able to explain concepts in depth, and explain understanding. Completes the task.	Able to give answers, but not explain learning in depth. Completes the task.	Not able to explain learning, does not complete the task.	
			Total Pts. (out of 40)	

Lab Data Collection

Student: _____ Date: _____

Unit 16: Solving problems that involve linear equations

Lab Title: **"THE WAVE"**

What is the "WAVE?" Answer the following questions in complete sentences. (IQIA please!)

Where was it said the WAVE originated?

Using the number of students versus the time elapsed doing the WAVE, which is the dependent variable and which is the independent variable? Explain why.

Exit questions (do not answer these until the project is completed!)

Compare your graph to Microsoft Excel's… were they similar?

Did you recognize any patterns in the data? If so, what?

Based on your data, how long would a WAVE of 30 people in a single file line take?

Extra credit: **If we had student in the school do a WAVE in a single file line, how long would it take?**

Data Collection: Record the collected/given data

# of students (x)	Time elapsed (y)

Graph it! On your graph paper, plot the data we found above.
Next, using Microsoft Excel, type in the data and create a graph.

Summary Statement:
In closing, what relationship did you find? Explain/defend your answer in paragraph format. Did you discover any patterns? Explain.