Lab Framework

Text: CORD Applied Math

Unit number and title: 24 – Patterns and Functions

Short Description: Students will be able to graph a linear equation, create a function, and find a pattern based on the relationship of distance to the basketball hoop and made shots.

Developed by: David Jones

Contact Information: djones1@tacoma.k12.wa.us

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Lab Title
"HotSHOT!!"

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objectives**
  1. Students will identify the dependent and independent variable.
  2. Students will collect data on the results of shooting hoops.
  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.
  6. Students will find a pattern based on the data of the entire class.
- **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**

  gym, writing utensil, calculator, graphing paper, 5-7 basketballs, 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 2-5 depending on class size, and how many hoops you have available. The students will need to help each other with their data, within the group. In the groups, there will be job responsibilities: a writer/recorder, a graphing artist, the software expert (for Microsoft Excel), and the ball boy/rebounder (there can be two of these).
- **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 shooting a freethrow, (I'd show via YouTube or TeacherTube) and it's role in a basketball game. 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, hit the gym to begin data collection!
  Day 2 – Review data, graph data, complete the worksheet, summarize learning

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: HotSHOT!!
STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**
  Discover the relationship between the distance of a shot at the basket, and the number of made baskets.

- **Grouping instructions and roles**
  Groups of 2-5 – recorder, graphing artist, software expert, ballboy

- **Procedures** – steps to follow/instructions
  1. Put your name on the handout
  2. You MUST participate in the class activity or you won't have any data to work with!
  3. Each student will shoot 5-10 shots from 3 ft, 15 ft (FT line), and 19.9ft (3 pt line).
  4. Gather the data based on how many shots you made, and the distance the made shots came from.
  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 24: Patterns and Functions

Lab Title: "HotSHOTS!!"

Q&A: Answer the following questions in complete sentences. (IQIA please!)

Who invented the game of basketball? Where was it invented?

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

Compare the slope on 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 many shots would you make if you shot the ball 20 times from the free throw line?

Extra credit: Matt Bonner lead the NBA in 3pt shooting last year at 45%, based on the data and patterns you found, what would you guess his free throw percentage is?

Data Collection: **Record the collected/given data**

Distance from hoop (x)	Shots made (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 find any patterns? Explain.