

Lab Framework

Text: Bridges to Algebra and Geometry

Unit number and title: Chapter 2 graphing data or 3 Graphing Integers

Short Description: Collecting data to graph

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Date: 6/23/10

Lab Title Flight Graphing Lab

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**

To give students a visual understanding of how to add and subtract positive and negative integers and enter data in to various graphs.

- **Statement of pre-requisite skills needed**

(Basic understanding of what a positive number is (more than zero) and a negative number is (less than zero))

- **Vocabulary**

Positive Integer Negative Integer
Opposites Absolute Value

- **Materials List**

1 sheet of 8 ½ x 11 paper (for students)
20' tape measure
Role of masking tape
1 sharpie felt pen
Color pens or pencils (optional)

- **State Standards addressed**

Math: Math

- **Leadership Skills**

Students may demonstrate prior knowledge and assist others in the making of a paper airplane.

- **SCAN Skills/Workplace Skills**

Students will develop a product and use that product to perform measurable outcomes that will that will be visually displayed in graph form to demonstrate competency.

- **Set-up information**

Preferred lab environment would be a room or hallway that is at least 10ft wide and 30ft long that has a concrete floor (outside with no wind or rain is an option). Set up involves placing pieces of masking tape on the floor at certain intervals. Start with one line of tape about 6" long on the floor with a number 0 on it. Next in a linear fashion measure 6" on both sides of the line and place a piece of tape with +.5 as you go away and

- .5 as you get closer to your starting point. Next place pieces of tape at 1' intervals from the 0 point going in opposite directions going away is positive and going to the starting point is negative. You may stop when you get about 7 to 8 feet in each direction. Next place a 2' wide piece of tape on the negative side about 12 ft from the 0 point.

- **Lab organization**

Students may perform as individuals or compete as teams. Students will make an airplane and make 10 flights each and recording data after each flight. The airplane building and flights with data collection may be completed in one 50 minutes class period.

- **Teacher Assessment of student learning**

The teacher will position themselves at the 0 line and off to the side and will call off positive or negative numbers after each flight (makes for consistency). The student then records that number in one of the 10 blank spaces on their data collection sheets. Students then will be graded on 4 items. #1 Data collection, #2 Data calculations, #3 Data graphing, #4 Summary statement

- **Summary of learning**

Students completed the airplane and made 10 successful flight (make adjustment to airplane as needed). Record the data, transfer the data, make calculations, and make graphs that represent the data. Good opportunity to have students present to the class any problems or adjustment that where needed to help perfect the flight of their airplane.

- **Optional activities**

Can change the types of graphs students generate with the data collected.

- **Career Applications**

Most any career that requires product development and testing then displaying the data collect from their product.

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LAB TITLE: Flight Graphing Lab

STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**
How hard is it to build and fly a paper airplane and have it consistently fly where you want it to go?
- **Grouping instructions and roles**
Students may compete as groups or teams if desired of 3 to 4 person teams and use the data from all the group participants to complete their lab sheets. Student may assist others in the construction of their airplanes.
- **Procedures – steps to follow/instructions**
Each student will take their 1 sheet of paper and construct a paper airplane and place their name on it (colored decorations are optional). Then each student will stand behind the starting line and aim their plane toward the center of the taped lines on the floor. After a flight is completed your teacher will give you a number, record that number in one of the 10 spaces provided. Then proceed to the back of the line and take another flight until you have completed all 10 flights. After all 10 flights have been completed then go back to the classroom and start entering the data in to your calculations sheet.
- **Outcome instructions**
To complete a flight worthy airplane that can be consistently flown to a predetermined destination and record the data accurately.
- **Assessment instructions**
Students may judge other students planes for the most unusual, colorful, best looking, etc, if desired. Your teacher will give you a measurement after each flight that you will record on your data collection sheet.

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Lab Data Collection

Student: _____ **Date:** _____

Unit: Chapter 2 or Chapter 3 in Bridges to Algebra and Geometry

Lab Title: Flight Graphing Lab

Criteria: Write the problem/objective in statement form

To successfully construct a paper airplane and complete 10 data gathering flights that will be used to determine overall distance flown, then present the data in graph form.

Data Collection:

Flight #1 _____ #2 _____ #3 _____ #4 _____ #5 _____
#6 _____ #7 _____ #8 _____ #9 _____ #10 _____

Calculations:

All 10 flights must be accounted for in your calculations

How many positive numbered flights flown _____

How many negative numbered flights flown _____

How many flight landed on zero _____

Total flights _____

Calculate overall distance flown

Total distance of positive flights _____

Total distance of negative flights _____

Over all distance traveled _____

Calculate the measures of central tendency (show your work)

Mean: average flight distance

Mean Score _____

Median: the middle value of the data set

Median Score _____

Mode: the distance that occurred the most often

Mode Score _____

Graphing:

Complete a bar graph:



Summary Statement:

Students must describe the following

Any problems associated with the construction or flight of the airplane:

Any adjustments made during the flights:

Describe what you learned while performing this lab:

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Was this lab helpful in your understanding of graphing of data?