

Name:

Period:

LAB 2 - GRAPHING THE SINKING STRAW DATA

BACKGROUND

No measurement is exact. Every measurement contains some *uncertainty*. Uncertainty in measurement is due partly to (1) *instrument error*, because no instrument is perfect, and (2) *human error*, because each person measures a little differently.

We assume that some measurements will be greater and some smaller than a "true" measurement. By making many careful measurements and *averaging* them, we are more likely to be close to the "true" value than we are by making just one measurement.

One of the best ways to show all the measurements is to make a *graph*.

PROBLEM

How can the data on the sinking of a straw be put in the form of a graph?

MATERIALS

- ◆ Lab 1 Data
- ◆ Lab 1.2 Data (for homework)
- ◆ Graph Paper
- ◆ Pencil
- ◆ Colored pencil or pen
- ◆ Ruler

PROCEDURE

1. Graph a single set of data on the sinking of a straw. Refer to the green graphing sheet for instructions if necessary. Use the *horizontal axis* for your *independent (manipulated) variable* and the *vertical axis* for your *dependent (responding) variable*.
2. Look at the points you plotted on your graph. Put a box around any point that seems unreasonable (doesn't fit the pattern). Label it "unreasonable."
3. If there is a pattern, draw a *best-fit line* through or between the points following the pattern.
4. You or your lab partner should enter your group's data on the computer at the back of the classroom.
5. Spend a few minutes organizing the science section of your notebook. Have Mr. Koerger check and stamp your planner.

6. On a *new sheet of graph paper but using a **different color***, graph the data of the whole class the same way you graphed the single set of data. Show any duplicated points on the graph by adding a line that radiates from the point each time it is repeated.
7. If there is a pattern in the data, construct a best-fit line.

SUMMARY

Please type or neatly write your answers, in complete sentences, on a separate piece of paper.

1. Refer to the measurements you made in Lab 1, "Sinking a Straw". Give two examples of **instrument error** that could have affected your data. Give two examples of **human error** that could have affected your data?
2. Refer to the graph of the class data. Extrapolate the quantity of BBs that would sink the straw to 14 cm. What quantity would sink it to 1 cm?
3. What properties of the BBs do you think cause the straw to sink? *Properties* of objects are qualities that we can observe, either with our senses or by measuring.

CHALLENGE

1. On a new piece of graphing paper, graph the # of Marbles vs. Mass of **Petri Dish & Marbles** from Lab 1.2. Note: This is a graph of the mass of *BOTH* the Petri dish and the marbles (before you subtract the Petri Dish out).
 - a. If there is a pattern in the data, construct a best-fit line.
 - b. Where does the best fit line cross the Y-Axis? What information does that give you?