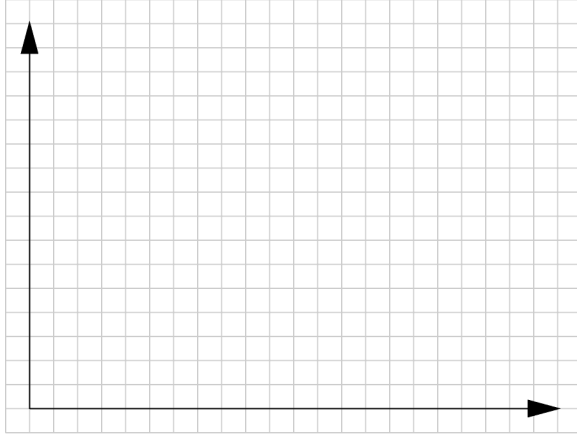# Counting by Mass--Paperclips   Prediction Page

We predict how the mass of a group of paperclips depends on how many there are.

You will be weighing various numbers of paperclips (or some other object if your instructor tells you).

1. The question is, how does the mass depend on the number? Make your prediction on the graph below. If you can figure out a formula for it, please do. Also, put labels on your axes:

2. Explain why you think the data will have the *shape* you predict:

3. Collecting Data:

Number of Paperclips	Mass (grams)

Counting by Mass--Paperclips   In the Lab

Instructions and objectives for this lab.

How Do You Know When You're Done?

- ❑ You have a graph that shows masses for at least 10, 20, 30, and 50 paperclips.

- ❑ You have a line that comes close to the points.

- ❑ You can explain clearly how to predict the mass of a given number of paperclips, and can demonstrate that your procedure works.

- ❑ You can explain clearly how to find the number of paperclips, given the mass, and can demonstrate that your procedure works.

Setup

- ❖ Assemble your materials. You should have a scale, and a lot of nearly identical objects for weighing. You may need to share these with another group.

- ❖ Practice weighing things on the scale so you're sure you know how it works.

Collecting and Entering Data

- ❖ On the computer, *make columns* ⓘ for **number** and **mass**.

- ❖ Count out 10 objects and weigh them. Record the number and the mass on the computer.

- ❖ Count out ten more for a total of 20 objects; weigh all 20 and record the data.

- ❖ Do the same for 30 objects, then add 20 more to get 50 objects.

Data Analysis

- ❖ *Graph your data* ⓘ. (What goes on which axis?)

- ❖ Follow guidelines on "Graphing Data in Science" for how to make a proper graph.

- ❖ *Put a line on your graph* ⓘ and make it fit your data.

- ❖ Consider whether the line should go through $(0, 0)$.

- ❖ Answer the questions and do the tasks in "Tasks, Questions, and Exploration"

Tasks, Questions, and Exploration

Questions to answer during and after the lab.

1. What was your specific equation for the line? (Include relevant numbers and units of measurement, as well as an explanation of what any symbols represent.)

2. Sketch your graph here. Be sure your axes are labeled and scaled. Alternatively, attach a copy of your printed graph

3. Why should this graph be linear (as opposed to curved)?

4. What is the slope of your line? (include units) What does the slope represent?

5. Predict the mass of 80 paperclips. Write down your prediction and how you got it:

6. Now check with your teacher to see what they measured for the mass of 80 clips. What could explain any difference between your prediction and the actual mass?

7. How would you figure out the number of paperclips if you knew the mass?