Name:

Period:

LAB 1.2 – DATA COLLECTION: TABLES & GRAPHS

Background

When collecting scientific data it is important to organize the information neatly and correctly. Scientists often use data tables and graphs to display their information in such a way as to make it easier for the reader to understand what the scientist has done.

Data Tables

Tables should clearly indicate what data was collected. This is done with an informative title and correctly labeled columns. Compare the two tables below.

Rice Table

1	1.2
2	2.4
3	3.8

Mass of Various Rice Samples	
Sample #	Mass (g)
1	1.2
2	2.4
3	3.8

Even though the two tables show the same data collected, the table on the right is much easier to use. Note the differences that make the table on the right better.

- First, note the title. The left table says something about "rice", but the table on the right clearly states that the table is measuring the mass of rice samples. *The title should give the reader some information about what the table is showing*.
- Then note that each column of data in the right-hand table is *clearly labeled*. The column labeled "Mass" also shows the *units* "(g)" for grams.

The right-hand table is easily interpreted by any reader and is also much more usable by the scientist when he/she creates a graph.

Graphs

Collected data is often put into a graph as a visual display. Sometimes this is for reporting the results of a scientific experiment, but many times scientists use the graph to help them *understand the relationship* between the different types of data they have collected.

All graphs must have the following:

- ❑ Informative title
- ❑ Your name
- ❑ Colors/textures/labels that make the graph easy to read & understand **(these must not distract from the information being presented)**
- ❑ An appropriate scale on each axis (makes good use of the allotted space)
- ❑ Equal intervals on the axis
- ❑ Labeled axis
- ❑ Units
- ❑ A key/legend*

** A key should be used whenever you are graphing more than one set of data or need to distinguish between different types of data. If you're unsure, include a key.*

Materials

Each lab group should have the following materials

- 1 Triple-beam balance
- 1 Petri dish
- 20 marbles

Procedure

We are going to collect data on the mass of various numbers of marbles. We will then use the data in our table to create a graph that we can use to *analyze the relationship* between the numbers of marbles and the mass.

Procedure Step	Observations
1. Calibrate the triple-beam balance (refer to page R18 in your textbook)	
2. Measure the mass of the Petri dish	_____g
3. Measure the mass of 3 marbles in the cup.	_____g
4. Measure the mass of 5 marbles in the cup.	_____g
5. Measure the mass of 9, 12, 15, & 20 marbles in the cup	____ _, ____ _, ____ _, ____ _
6. Use your data to create a data table in the area below	
7. Graph the data using the grid on the next page.	
8. Use the graph to answer the questions.	

Data Table:_____

Summary

Graphs are used to show **relationships** between the variables.

- If there is a pattern in the plotted points, the variables are probably related. A straight line drawn through points indicates that the ratio between the measurements is about the same for most of the plotted points.
- If there is no pattern in the plotted points, the data are probably not related.

1) Is there a relationship between the observations you made of the marbles and the mass of the marbles? If so, what is it? If not, how can you tell? Try to describe the relationship in terms of a ratio.

- Graphs are powerful tools. They can be used to make predictions about events that were *not* measured.

2) Making a prediction from data on the graph *within* the range of measurements is called **interpolation**. Using the graph you created on Marbles & Mass, interpolate the mass of 10 marbles.

3) Interpolate the mass of 17 marbles.

4) How many marbles would it take to have a mass of 50g?

5) Making predictions from data on the graph beyond the range of measurements is called **extrapolation**. Using the graph you created, extrapolate the mass of 25 marbles.

6) Extrapolate the mass of a single marble.

7) How many marbles would it take to have a mass of 100g?