Communicating Scientifically Using Data Tables and Graphs

Data Tables

Definition: A way to organize data (information) in columns so that the information is neat and readable.

Columns go up and down (VERTICAL) and rows go across (HORIZONTAL).

Guidelines for constructing a proper data table:

1. a DESCRIPTIVE title (include both variables)
2. VARIABLES describing what information has been collected
3. UNITS telling how those variables were measured
4. DATA collected in ordered pairs showing how they are related (the pairs are either side by side or on top of one another)
5. ALL work done with a pencil and a RULER.

EXAMPLE of a proper data table:

The Height of Corn Plants over a Period of Five Weeks

Time (weeks)	Height (cm)
1	5
2	25
3	70
4	82
5	120

Graphs

Definition: a picture of the information in a data table.

A graph has a horizontal axis, a vertical axis, and data points (one for each ordered pair). Materials needed for plotting a line graph:

- Graph Paper
- Ruler
- Pencil and an eraser (NO PENS)

Guidelines for constructing a proper graph:

- Use graph paper when possible to construct a graph.
- Draw **ALL** lines with a ruler. This includes the axes.
- Start the vertical and horizontal axis NO LESS than 3 squares from the left side and bottom. (This allows for proper and neat labeling of the axes.)
- Do ALL work in pencil.
- The graph must have a DESCRIPTIVE title, axes labeled with variables and units, data points plotted neatly and a line connecting the data points drawn with a ruler.
- Use the whole piece of graph paper. Do NOT draw a tiny graph in a corner.
- Do NOT connect the zero, zero point (0,0) unless it is part of the data.

Labeling the Axes

- Horizontal Axis = Independent Variable (the variable that you change or manipulate) – what we know
- Vertical Axis= Dependent Variable (responding variable) – what we are measuring
- Evenly space the intervals along both axes of the graph, starting with zero. Make sure you leave space at the top for a TITLE.

Types of Graphs

- Line Graph
  - Shows how ONE variable changes in response to another variable
  - Connect the data points using a RULER
- Multiple Line Graph - A single graph with two or more lines of plotted data
  - Compares similar data
  - Use COLORED pencils and a ruler
  - Plot one line at a time. Use a different COLORED PENCIL for each line.
  - Provide a key for the lines
- Best Fit Line – a graph with a smooth and continuous line passing through many but not all plotted points.
  - Best fit graphs allow scientists to *predict* data that they did not collect because the graph shows a representative curve of the collected data.
  - Allows for predictions to be made and allows scientists to see overall trends in data
  - To draw a best fit line (or curve), imagine what the line should look like and then do NOT pick up your pencil as you create that image with a smooth sweep of your hand.

PRACTICE

Create a proper data table and line graph for the information below.

In lab today, I watched this thing called Substance Z cool. My lab group collected some temperatures in Celsius at different times. We took temperature readings every minute for ten minutes.

Our data:
At the start, it was 90 degrees.
After the first minute, the temperature was 82 degrees
It was 70 degrees at minute 2 and minute 3
It dropped to 50 degrees at minute 4
At minute 5, it was 50 degrees.
50 degrees at minute 6 and minute 7.
Time: 8 minutes, the temperature was 30 degrees
At minute 9, the reading was 20 degrees.
Minute 10 was at 20 degrees also.
