Chapter 1 Lesson 5 Notes: Graphs in Science

1. **Graph**: a picture format of your data.
    a. Graphs and tables organize your data and allow you to see any patterns, anomalies in your investigation, and how they are related or not.
    b. Types of graphs scientists commonly use are bar, circle, and line graphs.
    c. **Line Graphs**: used to display data to show how one variable (responding) changes in response to another variable (manipulated). It should be used in the case of continuous manipulated variable data.
        - Draw the Axes – horizontal is the X and the vertical is the Y
        - Label the axes – the horizontal axes are the manipulated variable and the vertical axes are the responding variable. Be sure to include the proper units of measurement.
        - Create a Scale – create an appropriate scale by marking off equally spaced intervals that cover the range of values you will show.
            1. Origin should have the coordinates (0,0).
        - Plot the data – the location of the intersecting lines is called the data point.
        - Draw a "line of best fit" – is a smooth line that reflects the general pattern of a graph.
            2. Connecting each dot may be misleading.
            3. The resulting line of best fit is called a **linear graph**.
        - Add a title – the title should identify the variables or relationship shown in the graph.

2. Slope: the steepness of the line on a graph.
    a. The slope tells you how much Y changes for every change in X.
    b. **Slope** = $\frac{\text{Rise}}{\text{Run}} = \frac{y2-y1}{x2-x1}$

3. Using Graphs to Identify Trends
    a. Nonlinear Graph: a line graph in which the data points do not fall along a straight line.
    b. Line graphs are powerful tools because they allow you to ***identify trends*** and ***make predictions***.
    c. Linear trends – show how two variables are related.
    d. Nonlinear trends – may show a repeating pattern or different trends all together.

        - A curve, rise and fall, rise and levels off are all the different patterns possible.
e. No trend – data points may be scattered about with no recognizable pattern.
        - This would most likely indicate that there's no relationship between the two variables.