**Graphing**

**Vocabulary**

1. Linear Regression Line- Regression lines can be used as a way of visually depicting the relationship between the independent (x) and dependent (y) variables in the graph. A straight line depicts a linear trendline in the data.

2. Regression Line Equation- y= ax + b. You recognize this as the slope equation. In science the variables are: x is the explanatory or independent variable and y is the dependent variable. The slope of the line is b, and a is the intercept (the value of y when x = 0).

3. Correlation Coefficient, R2 (R-squared). The closer R2 is to 1.00, the better the fit. This too can be calculated and displayed in the graph.

**Exercise**

Let's say that you're doing a graph where you're studying the effect of concentration of a solution on the speed of a reaction. In this reaction, you're changing the concentration to known values. You don't know the speed of the reaction and speed depends on the concentration.

|  |  |
| --- | --- |
| Concentration (M) | Rate (M/sec) |
| 1 | 5 |
| 2 | 10 |
| 3 | 15 |
| 4 | 20 |
| 5 | 26 |
|  |  |
|  | |

EXCEL INSTRUCTIONS FOR EXCEL 2007

1. In order to plot this data in excel, you should enter the data exactly as above in to column A (rows 1-6) and column B (rows 1-6).

2. Highlight the data you entered. To plot the data you will need to go to Insert on the tool bar and then click Scatter. 3. Choose the sub-type that Scatter with Straight Lines and Markers. Choose Layout. Choose Axes Titles. Name Primary Horizontal with independent variable and units. Repeat with Primary Vertical using the dependent variable.

4. Choose Chart Title and label it with Dependent Variable versus Independent Variable.

5. Turn off Legend.

6. Rightclick on line so that data points are highlighted. Choose add trendline from drop down menu.

Choose Linear. Check Display equation on Chart. Check Display R squared value on chart.

7. Note: y= ax + b where b is a negative value is the same as y= ax –b. (HINT)

How to make a graph on the calculator using the data retrieved:

1. Go to the list editor by pressing STAT and 1.
2. Put concentrations into L1 and the absorbance into L2.
3. Turn on the Diagnostics by going to the catalog (2ND and 0) and scrolling to DIAGNOSTICSON. Press ENTER twice.
4. Run a linear regression test. Press STAT, 🡪, 4. Use the following settings:

X list: L1

Y list: L2

Freq List: (Empty)

Store Req EQ: Y1 (get Y1 by clicking VARS, 🡪, 1, 1)

1. Record the r value on the paper. Your a and b values are now imputed into the Y= .
2. Make sure Plot 1 is on by going to 2ND, Y=, ENTER on Plot 1 (make sure it’s on ON!), and selecting the scatter graph option (first option)
3. Zoom to appropriate window by pressing ZOOM and 9.