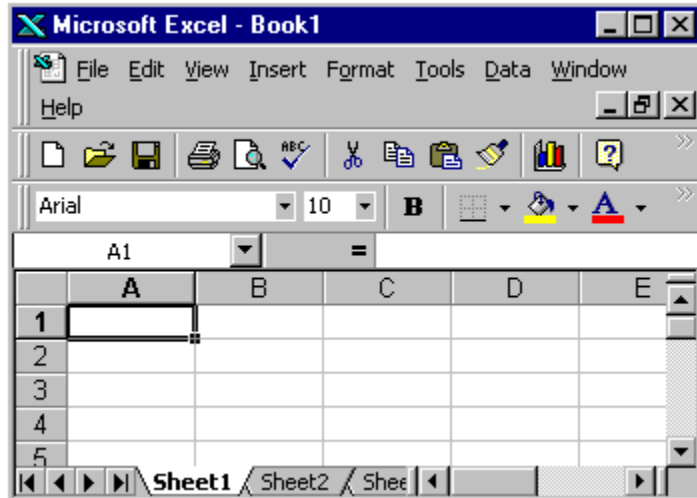


# Making Scientific Graphs with Microsoft Excel

## Understanding the layout of an Excel page:


- The "workbook" (spreadsheet) is divided into columns, labeled with letters, and rows, labeled with numbers.
- The columns and rows divide the page into "cells". Each cell can be identified by its row number and column letter. Example: we will not enter data into cell 1-A.
- Entering data into these cells.
  - Data for the independent variable goes vertically down column A, starting with row 2.
  - The description of the dependent variable goes on row 1, starting with column B. Use additional columns (C, D, etc.) if there is more than one variable.
  - Data for each dependent variable goes vertically down the column under its description.



## Adding cell information:

- Move the cursor to a cell and click. A box forms around the cell and you can now type either letters or numbers in the cell.
- Move the cursor to the next cell and click. Data is accepted by the first cell and the new cell is ready for data.
- Continue until all data is added to the workbook page.
- When finished, click on a cell outside the range of your data. This will enter the data in the last cell.

## Making the "chart":

- Move the cursor to cell 1-A.
- Click and hold the mouse while dragging to highlight the cells to be used to make the graph.
- **Click the chart wizard button on the tool bar.** 
  - Step #1: Pick the appropriate chart type. A single click on a type choice will give you a description of the type. Unless otherwise noted, your graphs will be line graphs. Click "next".
  - Step #2: The source data should be correct. Click "next".
  - Step #3: There are several operations available in this step on the wizard.
    - **Titles** - type a chart title in the space provided.

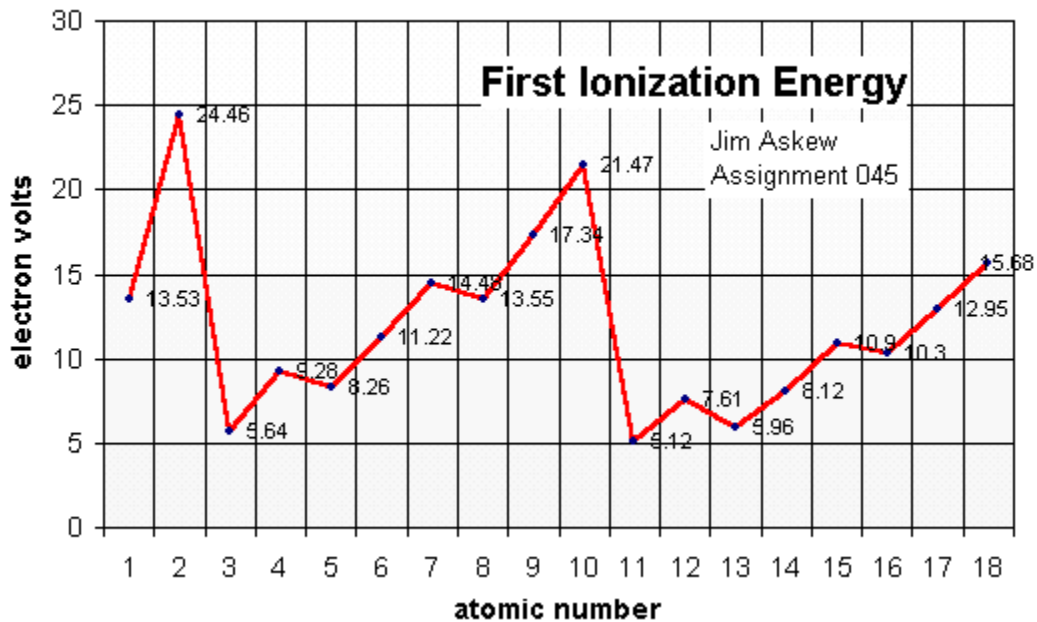
- **Axes** - this should be correct.
- **Gridlines** - for most line graphs, you will want to show the major gridlines for both X and Y axis.
- **Legend** - your choice here depends on the data. Check the Excel graph evaluation rubric for more details.
- **Data labels** - show data labels only if they will not clutter the graph.
- **Data table** - show the data table if there is room. Do not show the data table if it makes your print of the graph take more than one page.
- You can make changes back and forth in the chart wizard without a problem. When you are satisfied with your graph to this point, continue.
  - Step #4: the chart location should be correct. Click "finish" to draw the graph.
- Changes can be made at any time by activating the graph (click just inside the graph page margin), then clicking on the chart wizard button on the toolbar.

### Prepare the graph for printing:

- Click just inside the graph page margin to activate the graph.
- Click and hold on one of the corner boxes, drag to enlarge the chart.
- Double click inside the colored graph area.
  - All printed graphs in this class **must** have a white background.
    - Click "fill effects".
    - Click "one color". Make the color white in the drop-down menu.
    - Adjust to no shade.
    - Click "ok" and "ok".
  - The default data lines can be changed.
    - Double click with the cursor exactly on a data line.
    - Make the line weight appropriate.
    - Make the line color appropriate.
    - If appropriate, click "smoothed line".
    - "Marker" adds a dot at each data point.
    - "Data labels": show "value" if it doesn't clutter the graph.
  - Resize the graph plot area by clicking inside the plot area, then click, hold, and drag the plot area to cover most of the page.
- Click on the graph title to activate it.
  - Make the font appropriately large and move the title to an open area **inside** the plot area. Remember, this is a "scientific" graph. Only standard font types are appropriate.
- Check the graph legend. Be sure it is an appropriate position that does not clutter the graph. If needed, click and hold on the legend and move it.
- Add your personal information to the graph.
  - Use the "text box" to place the following personal information on the page.
    - Your name
    - Assignment number. (example: Assignment 022)

### Printing your graph:

- Click just inside the page margin to activate it.
- Go to "file", then "print preview".
- Look carefully at your graph. Be sure everything is the way it should be.
- If you see a problem, click "close" print preview and fix the problem.
- If everything is ok, click "print".
- Save the file in science directory on your computer hard drive with the appropriate file name.



**Science Line Graph Evaluation Rubric - "Excel" assignment # \_\_\_\_\_**

**Name & class period:** \_\_\_\_\_ **Score:** \_\_\_\_\_

This rubric is used to verify specific tasks performed when constructing a line graph. If the task has been completed accurately all points are awarded. Reduced points for each task may be awarded if necessary. No points are awarded if the task is not complete.

Category	Scoring Criteria	Points	Student Evaluation	Teacher Evaluation
<b>Variables</b> <i>10 points</i>	The independent variable is drawn on the X axis.	<b>5</b>		
	The dependent variable is drawn on the Y axis.	<b>5</b>		
<b>Plot Area</b> <i>10 points</i>	The plot area of the graph covers most of the printed page.	<b>5</b>		
	The plot area is printed with a white background. (White is not Excel's default color.)	<b>5</b>		
<b>Axis Identification</b> <i>6 points</i>	Major grid lines for both the X and Y axis are shown. (Excel does not do this automatically.)	<b>2</b>		
	Grid lines on each axis have the appropriate data numbers.	<b>2</b>		
	Each axis is labeled, including the measurement units for each variable.	<b>2</b>		

<b>Graph Data</b> <i>12 points</i>	Each data point is indicated with an appropriate "marker".	<b>2</b>		
	The "value" of the dependent variable is shown at each data point. <i>(These numbers must not clutter the graph.)</i>	<b>2</b>		
	Data line or lines are appropriate in width and color. <i>(Most graphs should be drawn as "smoothed line".)</i>	<b>2</b>		
	The data table is printed on the graph page. <i>(The data table is not included if it will make the graph print on more than one page.)</i>	<b>2</b>		
	If more than one data line is drawn on a single graph, a "legend" is provided to identify the lines. <i>(This is only done if there is more than one line on a graph.)</i> <i>(These 4 points are automatic for single-line graphs.)</i>	<b>4</b>		
<b>Graph Title</b> <i>4 points</i>	A descriptive title is printed in an open area inside the graph. <i>(Graph titles are not in the margin of the paper.)</i>	<b>4</b>		
<b>Personal Information</b> <i>4 points</i>	Student name, date, class period and assignment name & number are included. <i>(This information must be printed in the upper left-hand margin of the paper, not inside the graph plot.)</i>	<b>4</b>		
<b>Score</b>	<b>Total Points</b>	<b>46</b>		
<b>Self-evaluation</b>	Students are expected to honestly evaluate their own work. If the difference between the student evaluation and the teacher evaluation is more than 10 points, 5 points will be deducted from the teacher's score when the grade is recorded.			

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