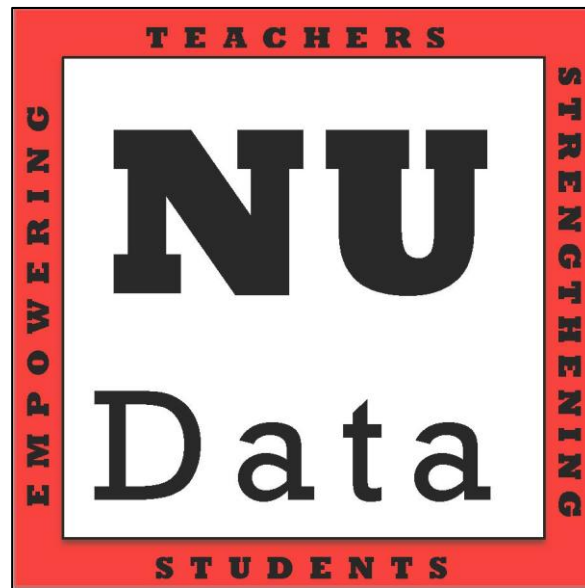# NU Data Excel Workbook
Seminar 1

Introduction to Excel

Excel can be an intimidating program for people to use. But with a little practice and instruction, excel can be a powerful tool in interpreting and tracking behavior.

To begin using Excel simply *click* the Excel icon. This should open Excel. If you are prompted to choose a template, choose *Excel Workbook.*

Components of Excel

Before you being entering data into Excel, it is important to know some of the basic components of what makes up Excel.
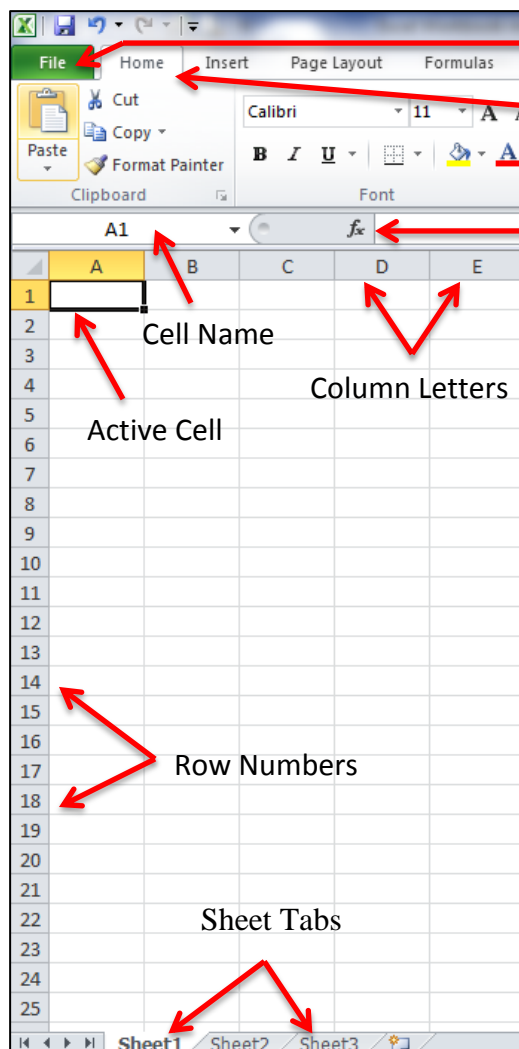
Adapted from spreadsheets.about.com/od/excel101/

File Menu- Located on the top of the screen. Allows you to manage the workbook, save files, and make edits.

Quick access toolbar- *Home, Format, Layout, Etc.* Allows you to edit data in the cells, insert and format graphs, and do functions.

Formula Bar- Allows you to enter equations into Excel to do data analysis.

Cell Name- Shows the name of the current active cell.

Active Cell- Outlined in blue. This is the only cell where data can be entered. You can change the active cell by clicking another cell, hitting enter, or using the arrow keys.

Column Letters- Top of workbook. Allows you to see which column you are in.

Row Numbers- Located on the far left of the screen. Allows to see the number of the row you are on.

Sheet tab- Bottom of worksheet. Allows you to change the active workbook page you are viewing.

Entering Data

Before you begin entering data into Excel, think about what you are wanting to do. The purpose of Excel is to organize data and make it useable. When you are ready to enter data, think about ways you can increase the usability and utility of your data set.

Entering information into Excel is a three-step process.
- *First:* you need to click the cell you want to enter information in (making it the active cell);
- *Second:* You need to enter the number (e.g., number, label, etc.) into the cell; and
- *Third:* Hit 'enter' or 'tab' to complete entering the information.

Labeling Rows and Columns

Often when you are entering data into a graph, adding labels can greatly increase the organization and readability of your data set.

To label a row or column, simply *click* the cell you wish to label and *type* in the label (name) you wish to apply. If the label you entered into the cell does not fit, you can expand the column (i.e., A, B, C) by moving the mouse cursor over the edge of the column you wish to expand. Once you see the icon with the double arrows, and click and drag the edge of the column you wish to expand.
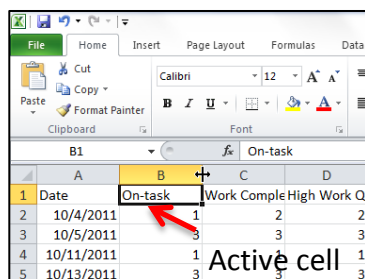
Click and Drag
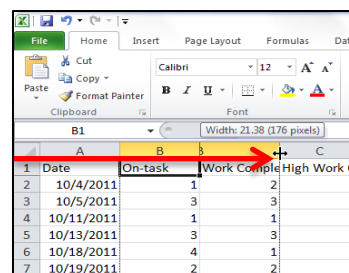
Active cell

Data Entry Shortcuts

There are a few shortcuts you can use when you are entering data. When you have finished entering data into the active cell:
- Press *enter* to move the active cell down to the next row;
- Press *tab* to move the active cell to the right; or
- Use the arrow keys to move the active cell directionally.

Data Entry Practice
(please refer to the Teacher Participation Report Instruction sheet)

Mrs. Jones has been tracking Austin's participation in class twice a week for the last four weeks. She wants to present the information to Austin's parents, but cannot figure out how to make the information she gathered meaningful and easy to understand.

She decided to organize her data by putting it into Excel. She decided to label her rows and columns first to make her data easier to enter. She started by labeling the columns with *Dates* and the behavior she was recording. Since her tracking sheet scored behaviors Rarely (R), Sometimes (S), Often (O), and Almost Always (A); she assigned numbers to each scale. So, (R) became a 1, (S) became a 2, (O) became a 3, and (A) became a 4.

She worked a little while entering data until she was interrupted. Being the helpful teammate that you are, you decided to help her out by entering her missing information. Using the example reporting sheet, fill in the missing information.

	A	B	C	D	E	F
1	Date	On-task	Work Completion	High Work Quality	???	???
2	10/4/11	1	2	???	???	???
3	10/5/11	3	3	???	???	???
4	10/11/11	1	1	???	???	???
5	10/13/11	3	3	???	???	???
6	???	4	1	???	???	???
7	???	2	2	???	???	???
8	???	2	1	???	???	???
9	???	1	2	???	???	???

When entering information, be sure you do not leave cells empty (unless directed to do so). Try the shortcuts discussed earlier (e.g., *enter, tab, clicking and arrow keys).*

Feel free to abbreviate labels if you do not want to adjust the cell width.

When you are finished, your workbook should look like this:

	A	B	C	D	E	F
1	Date	On-task	Work Compl	High Work Q	ABP	APA
2	10/4/11	1	2	2	3	2
3	10/5/11	3	3	3	1	2
4	10/11/11	1	1	1	1	1
5	10/13/11	3	3	3	1	2
6	10/18/11	4	1	2	2	3
7	10/19/11	2	2	2	2	1
8	10/27/11	2	1	2	2	4
9	10/28/11	1	2	2	2	1

Notice every cell has number entered.
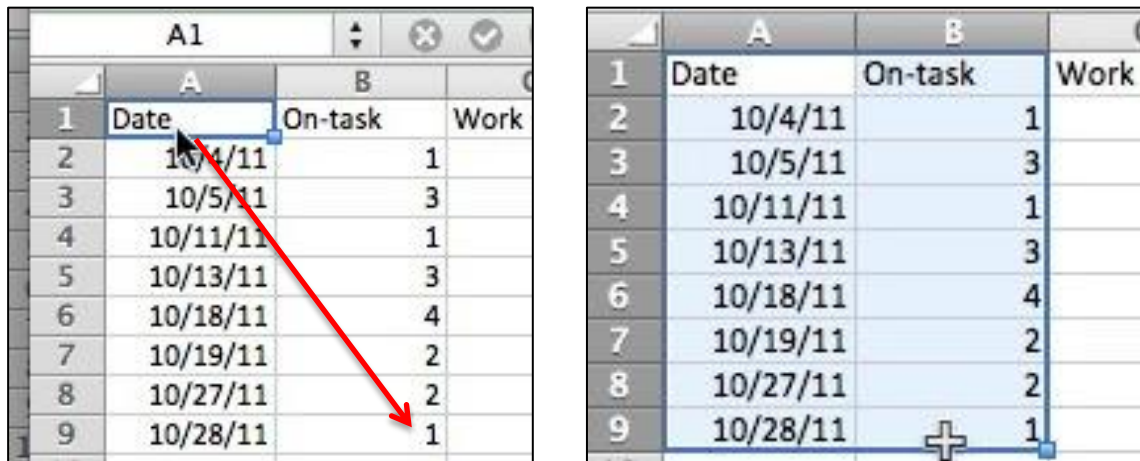
Make sure you save your workbook by clicking *File -> Save.*

We will continue with this data set in a few minutes.

Creating a Graph

Graphing data is one of the easiest ways to make data readable and easy to understand. At times, however, knowing which type of graph to use can be confusing. With the NU Data project, we will primarily use line and bar graphs to present and interpret data. Line and bar graphs make data easier to interpret and discuss with parents and other professionals.

To create a graph from the data we entered from Mrs. Jones's student Austin, click the A1 cell in the workbook. With the mouse button pressed, drag the mouse icon down and over until you have highlighted all of the dates and numbers in the *On-Task* column.

Once you have highlighted all of the cells, *release* the mouse button (make sure not to click anywhere else in the workbook).
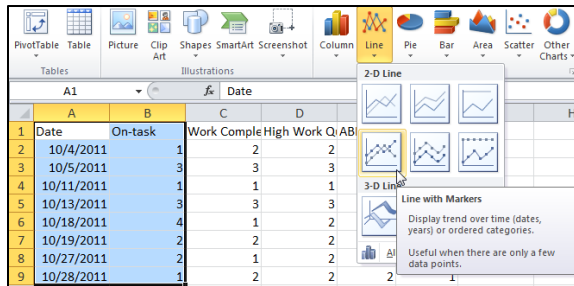
Now you are ready to insert your first graph. With the cells in column A and B highlighted, click on the *Insert* button in the Quick access toolbar.
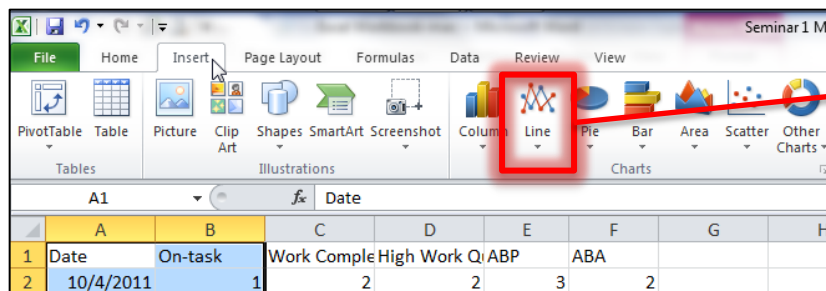
Notice the 'Line' Option

From here, click on the *Line* graph option on the menu bar and select the *Marked Line* option from the menu.

You should now have a graph that looks like this:
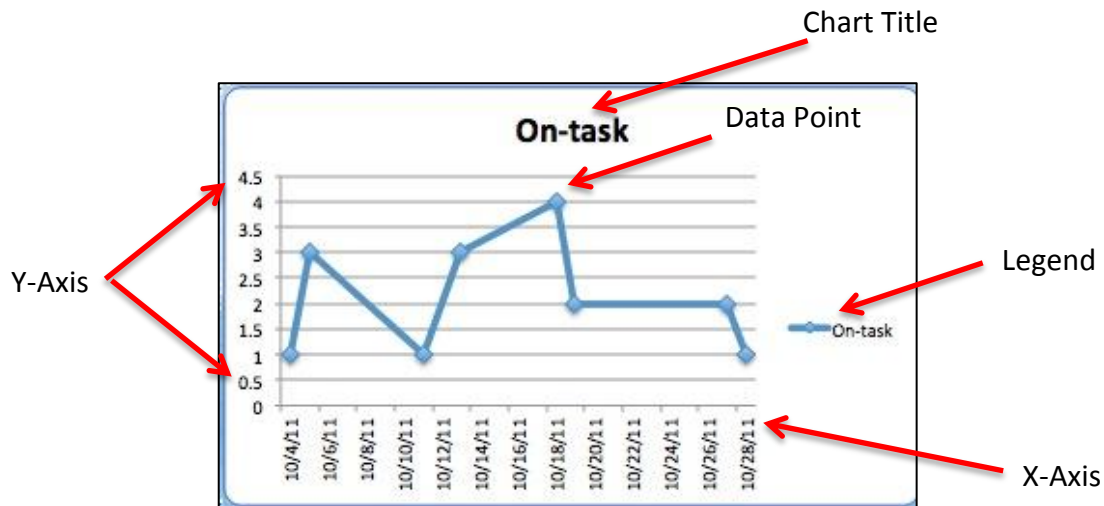
Getting to Know Your Graph

Chart Title- The chart title is the name you give the graph. You can edit this by double-clicking the chart title in the Graph and renaming it.

Legend- The legend is the name of the data series shown on the graph. You can remove the legend by clicking on it once and hitting the *delete* key.

X-Axis- The x-axis is the bottom line on the graph. In line graphs, the x-axis is typically the dates or other unit of time.

Y-Axis- The Y-Axis is on the left side of the graph and usually represents the number of times a behavior occurred (frequency).

Data Point- The data point is the mark on the graph that corresponds with a specific date and frequency of behavior.

Click *File -> Save*

Editing the Graph

You will notice that the graph from our first exercise looks cluttered. The x-axis has too many dates on the bottom that makes it difficult to read, and the y-axis contains numbers that are not represented in our workbook (i.e., 1.5, 2.5, etc.).

To make the graph more user-friendly, we are going to change the number of dates in the x-axis, change the scale of the y-axis, and add labels to both axes.

To do this, you must click on the graph in the workbook (select it). When you click on the graph you will notice a *Chart Tools* option appears on the quick axis toolbar and is highlighted neon-green (design, layout and Format). Click on the *Chart Layout* menu option and you should see several different options of ways you can edit the graph.
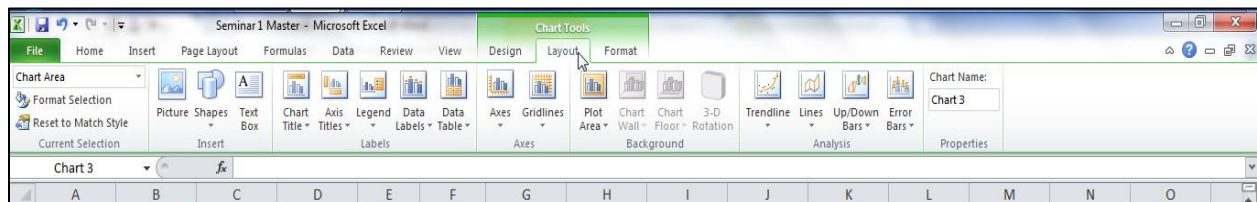

Here you will notice several options you can click to edit different aspects of the graph. For instance, you would click the *Chart Title* option to edit, remove, or format the Title of the graph.

Similarly, you will see the *Axes* option on the menu bar. This is where we will change the spacing and scales of our axes. Click on the *Axes* button and look at the options.
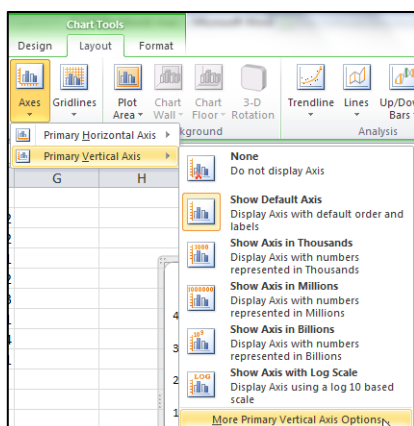
Click on *Axis Options…* from the menu bar and a new window will open. In the new window, click on the *axis options* from the menu on the left hand side. From here we will be able to edit the numbers on the y-axis to make them more readable and user-friendly.

You should see this:
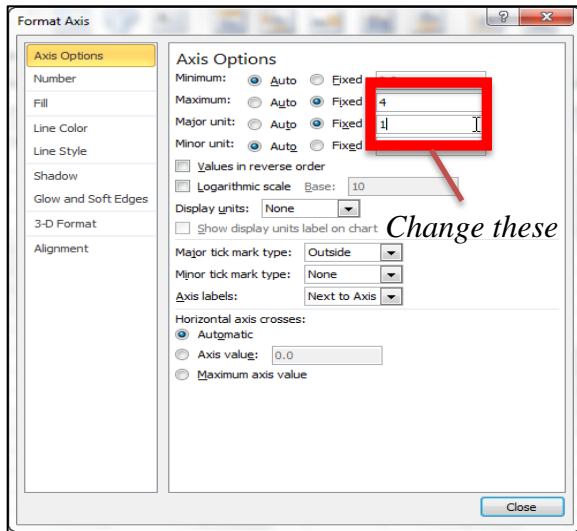
Here you will see the vertical axis (y-axis) scale. Under the *Maximum* option, change the 4.5 into a 4, and the *Major Unit* .5 to a 1. Then click OK. You should see the y-axis numbers have changed.

This time, try changing the numbers for the horizontal axis (x-axis) following the same steps as before, but this time select the axis options under the *primary horizontal axis* menu. Try to change the major unit from 2 to 7 (days).

When you are finished, your chart should look like this:
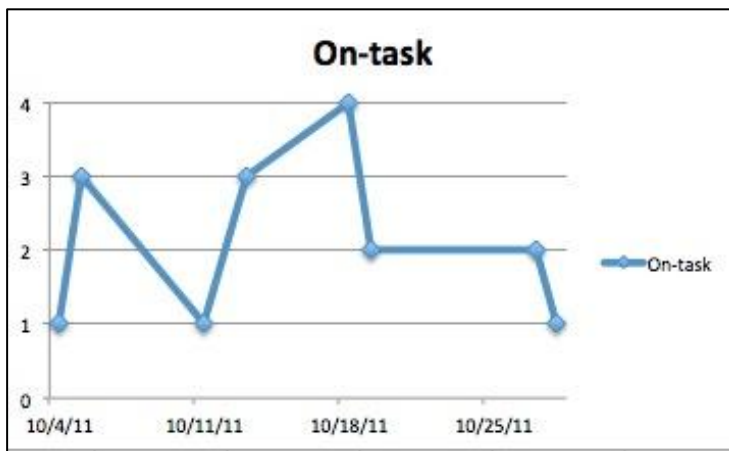
Notice how much easier the chart is to read now that it is less cluttered.

Now that you have had some experience navigating the *chart layout* menu, see if you can add an axis title under the horizontal axis (x-axis).

Creating Additional Graphs from the Same Data Set

You may have noticed that we have only created one graph from the five domains that were measured on the Teacher Participation Reporting sheet. If you wanted to create a graph of the data from the other domains, you must first highlight the dates column by clicking and dragging down the cursor, press-and-hold the command button on the keyboard, and click and highlight the another column from the graph. Try selecting the data in the date and work completion columns.

Your screen should look like this:

Remember, you must first highlight the *date column*; then *press* and *hold* the control (Ctrl) key, and highlight the *work completion column.*

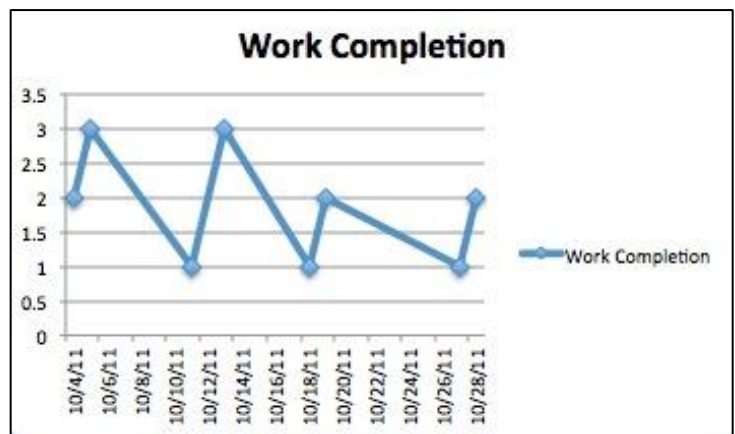Remember you highlight by clicking and dragging the mouse button.

Highlight Date column➔ press and hold Ctrl ➔Highlight Work Completion

Once both set of data are highlighted, you can release the mouse button.

Now like before, click the *Insert* tab on the quick access toolbar and click on the *marked lines* option under line graph.

Another chart should appear that looks like this:

Now take a few minutes and try to change the scales on the x and y axes to look like our other Graph.

Individual Practice

Now that you have been able to experiment with creating graphs with our data, it is time create graphs with data you gathered from your own students.

Click the *Sheet 2* tab at the bottom of your workbook. This should open a blank excel workbook. Enter the data from your own students into the workbook and create a graph.

Remember to:
1. Label columns prior to entering data
2. Use the *tab* and *enter* keys to speed up entering data
3. Click and drag the mouse button to highlight cells
4. After cells are highlighted click the *Insert* button from the menu bar
5. Insert a marked-line graph.

Once you have inserted a graph, try to change he formatting to make it more readable and user friendly by editing the axes and adding axes titles.

Let me know if you have any questions.

Bar Graphs

Though line graphs are useful when you are measuring scales (R, S, O, A), sometimes we are to graph frequencies, or the number of times a behavior occurred on a daily or weekly basis. In these instances, stacked bar graphs can be a great tool for recording and demonstrating how much (or little) a behavior occurred.

Data Entry Review
(*Check Monitoring Sheet Instructions*)

Mrs. Jones was busy again recording behaviors of another student in her classroom, Billy. This time, she used the *Check Monitoring Sheet* to track how many different behavioral instances occurred in four consecutive weeks.

Once again, Mrs. Jones was faithfully entering data into excel when she got called off to an IEP meeting. Being the helpful person that you are, you decide to enter in the missing data. Under *Sheet 3*, you will see Mrs. Jones's incomplete data file. Please take a moment to fill it in.

|	A	B	C	D	E	F	G	H	I
1	Week	Tardy	Skip	???	Behavior Ref	Detention	ISS	???	???
2	Week 1	1	0	0	???	1	2	0	???
3	Week 2	0	0	1	???	0	2	0	???
4	???	???		0	2	???	0	0	0	???
5	???		0	0	0	???	0	0	0	???

When you have completely entered the missing information, you will be ready to create the graph. This time, however, we will be highlighting the entire data series in order to make the stacked-line graph.

Once again, press and hold the mouse button down on the A1 cell and drag it down and over until every number in the data series is highlighted. Once all of the cells have been highlighted, you can *release the mouse button*.

It should look like this:

	A	B	C	D	E	F	G	H	I
1	Week	Tardy	Skip	Absent	Behavior Ref	Detention	ISS	OSS	Failing/Behind
2	Week 1	1	0	0	1	1	2	0	2
3	Week 2	0	0	1	0	0	2	0	0
4	Week 3	1	0	2	0	0	0	0	0
5	Week 4	0	0	0	1	0	0	0	2

With the desired cells highlighted, click on the *Chart* menu option in the quick access toolbar, but this time we are going to select the *Column* option and click on the *Stacked Column* option.
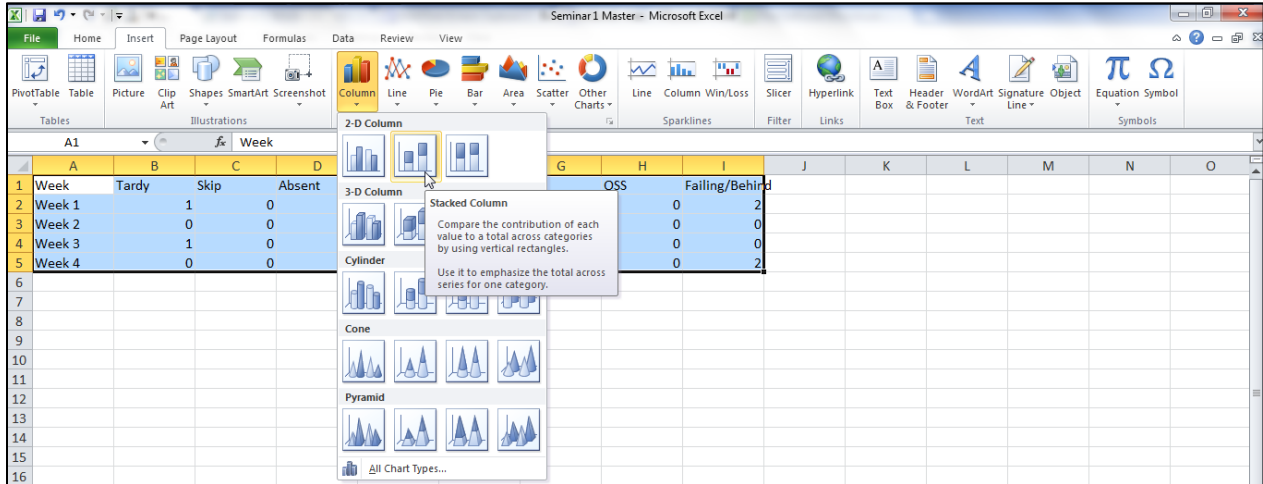
A new stacked bar graph should now appear and look like this:
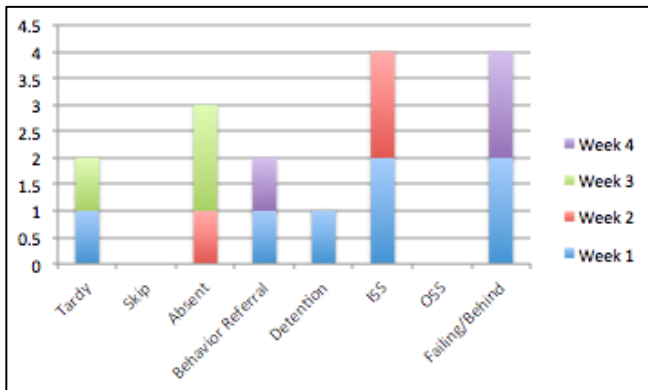

Notice how the graph is arranged differently? In a stacked graph, the total number of occurrences (frequency) of a behavior each week are totaled and stacked on top of each other. This allows us to see which problem behaviors are happening the most frequently.

Once again, Excel defaulted and formatted the vertical (y) axis to be in .5 increments.

Just like with the linear graphs, see if you can change the scales of the vertical axis (*Chart Tools → Layout → Axes → Primary Vertical Axis → More Primary Vertical Axis Options*) so that the maximum number is 5 and that the major unit is 1 by accessing the axes options menu in the quick access toolbar.

Adding Labels to Axes

Often, adding Titles to chart axes will increase readability. To add a title to the x and y axes of your graph, *click* on your graph. Once again, you will notice the *chart layout* option will appear on the quick access toolbar. Under *chart layout, click* on the *axis titles* option and highlight the *vertical axis title*. You will a few options in this menu. For this exercise, *select Rotated Title* from the menu.
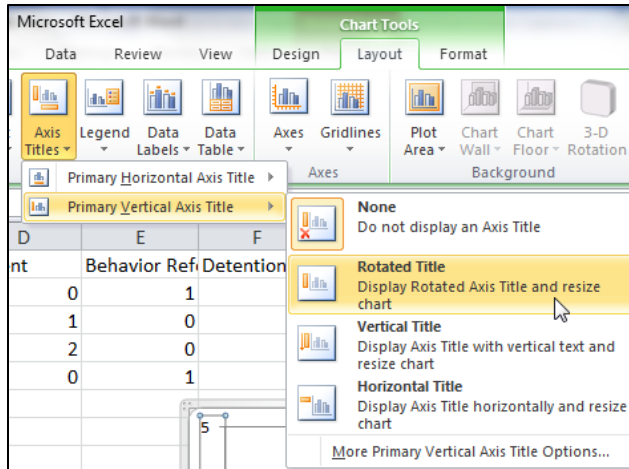
You will notice a textbox appears along the vertical axis. Click on the text box and enter "# of Occurrences." See you if you add a title under the horizontal axis as well. Label the x-axis "Date."

When you have completed formatting the graph it should look like this:
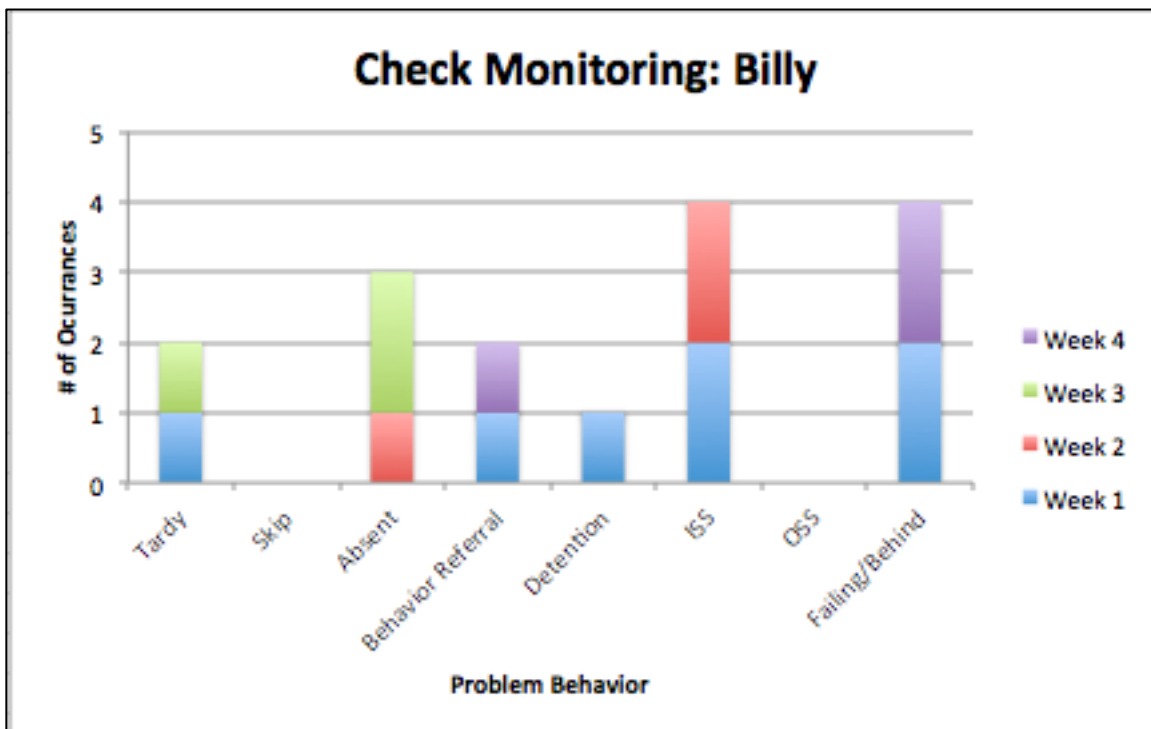
Once again, notice how formatting the graph has made it much easier to read.

Guided Practice

Click *Sheet 4* in your workbooks and try to create a graph from one of your student's *Check Monitoring* sheets.
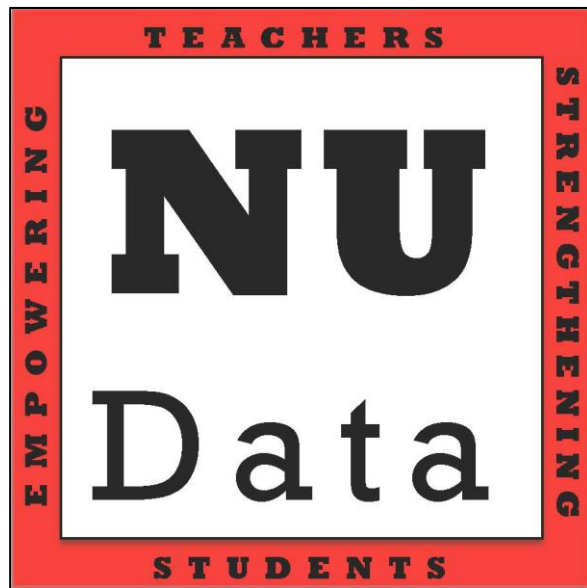
Remember to:
1. Highlight the entire data series (including titles)
2. Adjust the scales in the x and y axes.
3. Give the x and y axes titles.

When you are finished, save your file.

If you get done early, help a friend ☺!

# NU Data Excel Workbook
Seminar 2

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Changing the Graph Type

After creating a graph you may realize that you want to switch the type of graph than you have chosen to display your data. This can be for a number of reasons like: the data set has too many variables, you want more control over your data, or you believe your data would be better reflected in another graph.

To change the type of graph you use, simply click once on the graph to select it. You will notice that the workbook will highlight the cells that the graph is using.
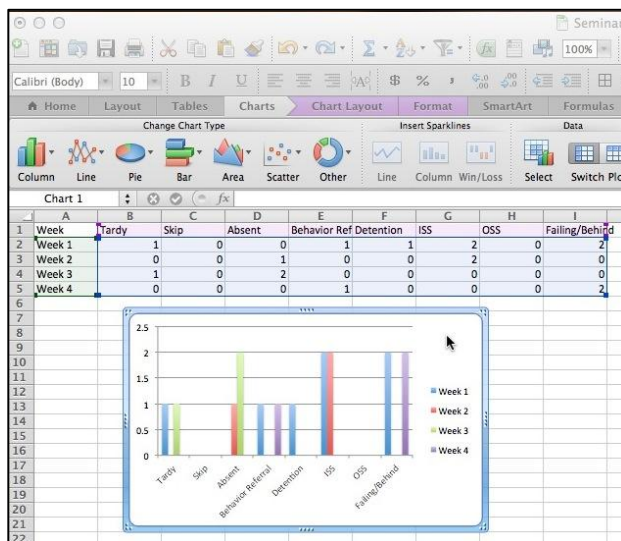
From here, click on the *Charts* menu bar in the Quick Access Ribbon, and select the chart type you would like to use instead.

In our example, the person wanted to switch from a bar graph to a stacked bar. So, once they selected their graph, they clicked on the Column -> Stacked Bar Graph option.

After they did that, it looked like this:
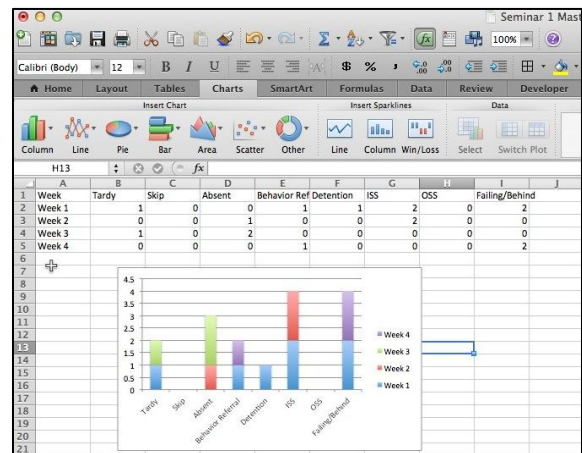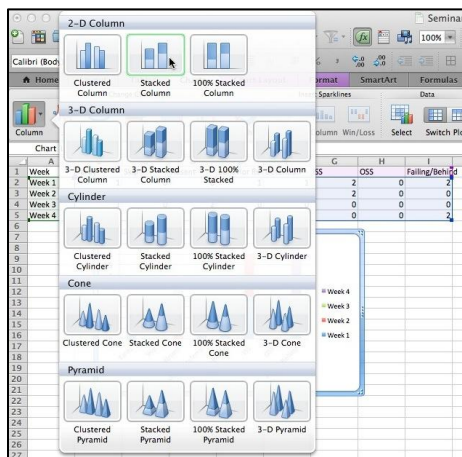
Once you have changed your chart type, be sure to save your file.

How to Delete Columns or Rows

Every now and again, people will want to delete an entire row or column from their workbook. This can be done by clicking on either the *column letter* or the *row number*. You will notice that the entire column or row is highlighted.

From here right-click (or command + click on a mac) and select delete.
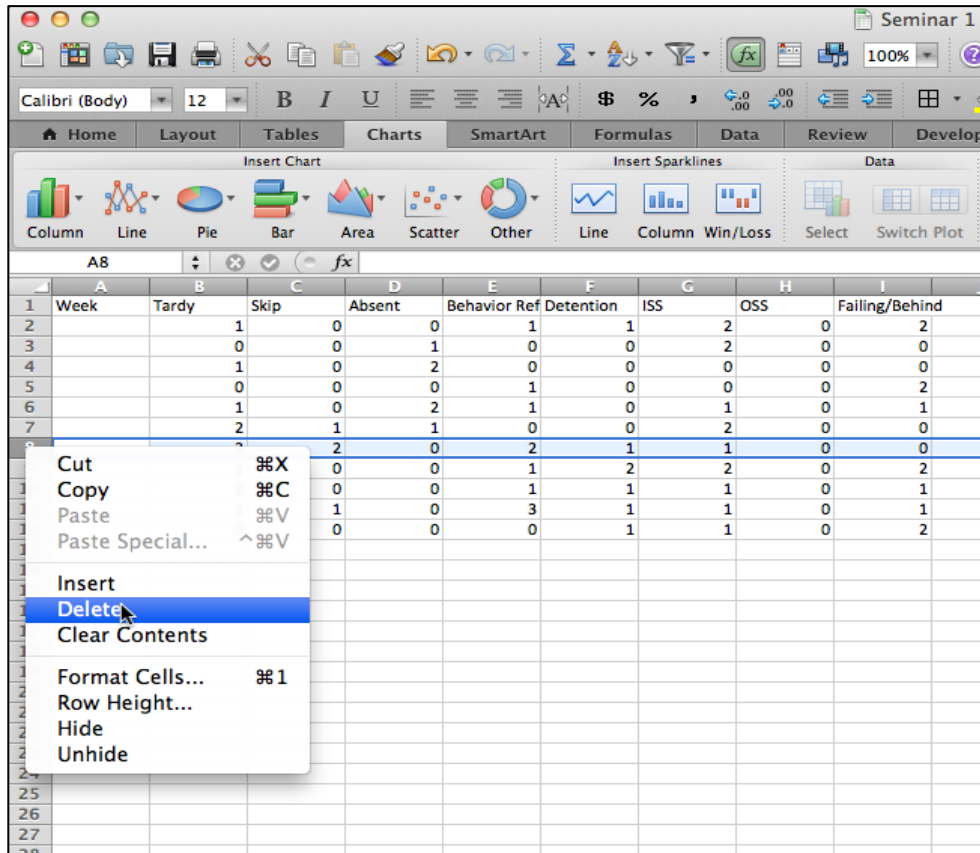
Note: Deleting a row or column will remove *all* of the information you have entered *across* or *down* the entire workbook. Make sure are removing only the data you want removed.

Inserting Formulas into a Workbook

Quite often, people will want to add up the totals for a row or column in their workbook. This can be done easily with a little practice. The most common formulas used are outlined below. *Use this source as a reference in the future*.

Formula	Example
SUM = Total*	=SUM(B2+B3+B4), or =SUM(B5-B3)
AVERAGE = mean	=AVERAGE(B2:B4): add cells B2 to B4 and divide by 3
/ = Divide	=B2/B4:

*SUM is an overall operation formula. It does not always mean to add. It tells excel to show a total or "SUM" of a formula.

Above are the most common formulas used by teachers in Excel. Typically, they will be used with tools like the Check and Connect sheet. In our example, a teacher is collecting data on Stewie's On-task, Work Completion, and Quality Work. The teacher wants to track Stewie's daily total and percentage to see if he is reaching his goal of 80%.

To find Stewie's total points for each day, his teacher created a total column in excel next to the Quality work column. Then, the teacher typed in *=SUM* Once "=SUM" is entered you have the option to manually enter cell names (i.e., A1, B2, C3) into the formula. The ":" symbol tells excel to add all numbers between two numbers. For example: B2:B6= B2+B3+B4+B5+B6. This can save a lot of time when entering data.

Excel also will let you click individual cells to add, or click-and-drag a range of cells to add (see example). In our example, our teacher typed in =SUM(B2:D2) to get Stewie's total points for the day.
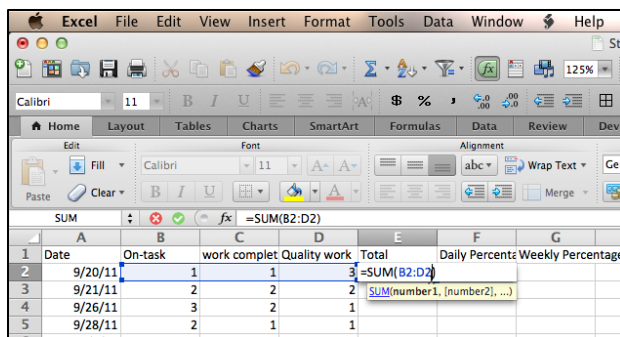
To get Stewie's daily average for the day, his teacher created a "Daily Total" column and typed in =SUM(E2/12). This tells Excel to take his daily total (E2) and divide it by the total possible points for the day (12). When this is done, Excel will give you his daily percentage.

Continued on Next Page With Auto-Formatting

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After you have input a formula, be sure to hit enter. Now that Stewie's teacher has entered the formulas for a daily total and percentage. He wanted to get the daily total and percentage for all of his data.

Auto-Formatting

Luckily, Excel has some unique shortcuts to assist calculating daily totals and percentages automatically. Auto-formatting is when excel automatically fills in cells with the same information, format, or formula as a specific cell. It will automatically adjust the formula to reference the correct cells.

To do this, click on the cell with the formula (E2 in our example) and move the cursor to the bottom-right corner until you see a little black cross (**+**), once you see that symbol, press and hold the mouse button and drag down your data column until every day is highlighted and release the mouse button. Do the same thing with the daily percentage column.

You can also auto-format dates. This can be useful if you want to Excel to show you a series of dates that relevant to your student. For example, you can enter a single date. Click on the date cell, move the cursor to the bottom-right corner until you see the **+** sign, click and drag down the workbook.

From here, Release the mouse button. You will see that Excel automatically entered a lot of dates. There will be a little box on the bottom corner of cell. Click this and select "Workdays." This will then only show you school days in your data series.

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5

Phase Changes

Phase changes are useful tools in allowing us to see when (a) an intervention has been implemented, and (b) whether or not the intervention has had an effect. It can be difficult and confusing to know how to mark your graph when an intervention is implemented. There are a few simple ways this can be done.

- Option One: Write "Intervention" or "Phase Change" next to the cell the intervention starts.
- Option Two: Highlight the cells of the intervention in a different color.
- Option 3: Shift cells over one space to mark that the intervention was implemented

Option 1

	A	B	C
1	Date	On-task	
2	9/20/11	3	
3	9/21/11	3	
4	9/22/11	1	
5	9/23/11	3	
6	9/26/11	1	
7	9/27/11	2	
8	9/28/11	3	
9	9/29/11	2	
10	9/30/11	1	
11	10/3/11	2	
12	10/4/11	1	
13	10/5/11	1	
14	10/6/11	2	
15	10/7/11	2	
16	10/10/11	1	
17	10/11/11	4	*Intervention
18	10/12/11	3	

Option 2

	A	B	C
1	Date	On-task	Intervention
2	9/20/11	3	
3	9/21/11	3	
4	9/22/11	1	
5	9/23/11	3	
6	9/26/11	1	
7	9/27/11	2	
8	9/28/11	3	
9	9/29/11	2	
10	9/30/11	1	
11	10/3/11	2	
12	10/4/11	1	
13	10/5/11	1	
14	10/6/11	2	
15	10/7/11	2	
16	10/10/11	1	
17	10/11/11	4	
18	10/12/11	3	
19	10/13/11	3	
20	10/14/11	4	
21	10/17/11	2	
22	10/18/11	3	
23	10/19/11	3	
24	10/20/11	2	
25	10/21/11	4	
26	10/24/11	3	
27	10/25/11	4	
28			

Option 3

9	9/29/11	2	
10	9/30/11	1	
11	10/3/11	2	
12	10/4/11	1	
13	10/5/11	1	
14	10/6/11	2	
15	10/7/11	2	
16	10/10/11	1	
17	10/11/11		4
18	10/12/11		3
19	10/13/11		3
20	10/14/11		4
21	10/17/11		2

*Note: When working with a single data series, option 3 is very useful as it will graph the new data in a different line, making it easier to interpret.

*Note: Option 2 uses the color platelet option under the *Home* menu in the quick action toolbar.
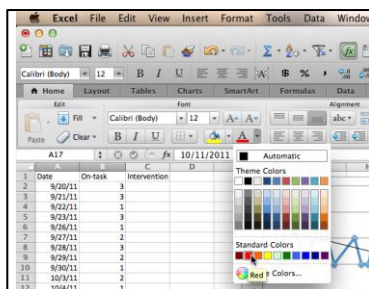
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How to Mark Phase Change on a Graph

Indicating where a phase change occurred on a graph can be very beneficial when trying to interpret whether an intervention was successful or not.

There are a few options to visually show a phase change on the graph. One option is to use the draw tool (Insert -> Shapes -> Line) on either version of Mac or PC.
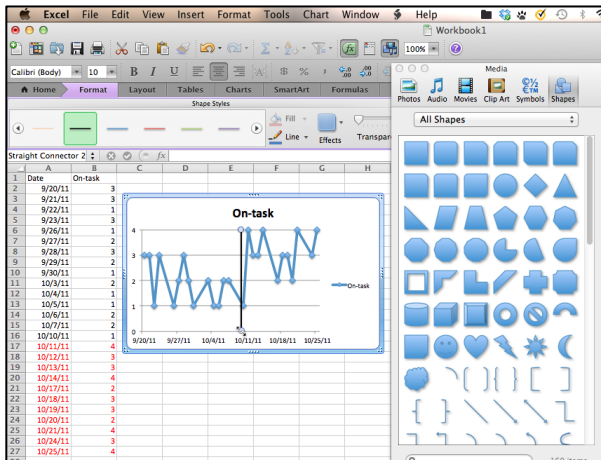
To do this, select the *Line* option on the graph. Click and drag the cursor down until you have drawn the line on you graph where the intervention was implemented.

*Note: the line will not move with your graph and you will have to adjust it accordingly.

Another option for showing a phase change is to shift the cells over (option 3 in previous lesson) so they do not overlap in your workbook. Once they are shifted, simply create a new graph.
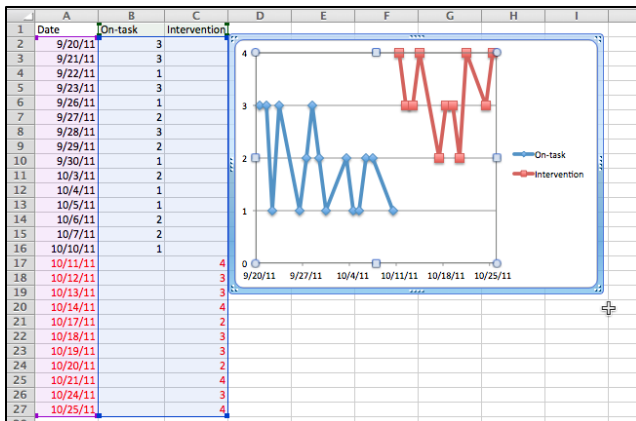
This will allow you to visually see when there intervention took place, and is useful for visually inspecting the graph for change.

*Note: this is useful for smaller data series and is not easy to do with larger data sets.

How to Move a Chart to a Different Sheet in Workbook

After collecting data for a long time, it becomes a nascence to have both the data series and the chart on the same page in the workbook. This can be fixed by moving the chart to a different page in the workbook.

To do this, simply right-click on the graph in the workbook and select "Move Chart" from the menu options. This will open a new window pictured below.
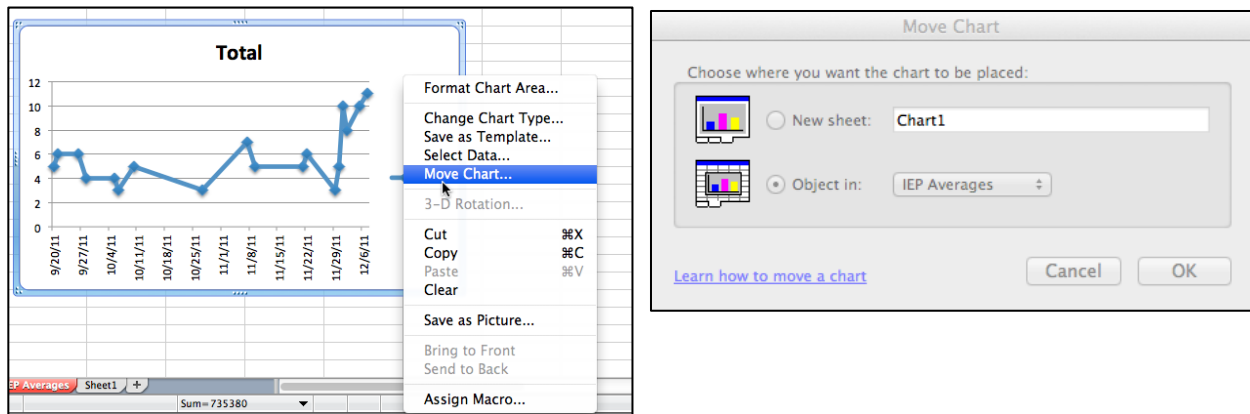
Once the new window appears, click the "objects in" option and move the chart to a different sheet, and click Ok.

Note: It may be beneficial to create the desired sheet in advance.