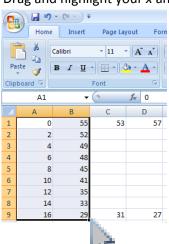
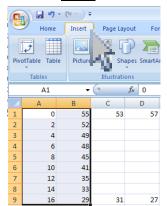
GRAPHING YOUR DATA ON EXCEL

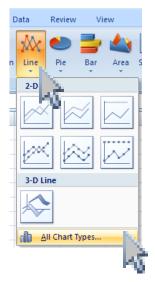
- 1) Enter data in an Excel worksheet.
- 2) Drag and highlight your *x* and *y* columns.



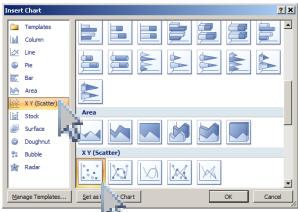
3) Click the <u>Insert</u> tab.



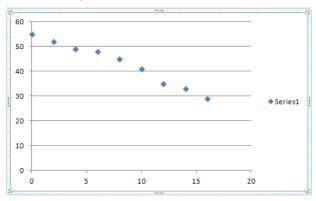
4) From the Insert menu choose <u>Line</u>, and then choose <u>All Chart Types</u>.



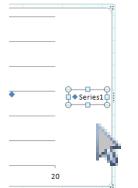
5) Choose X Y (Scatter) and then choose the **non-connected** subset.

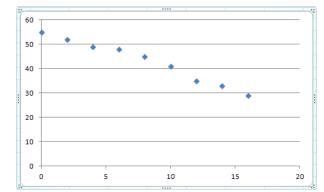


6) This is what you will see...

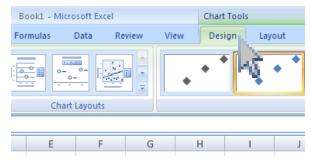


7) Highlight the "Series 1" key by single-clicking it. Then delete it. This action will stretch out your graph so it looks better. This is what you will see...

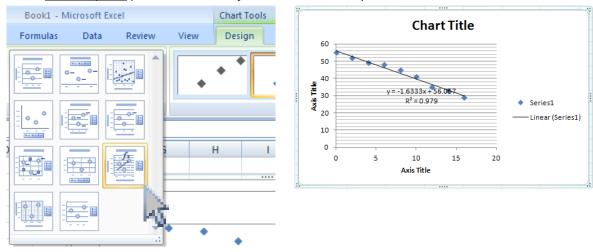




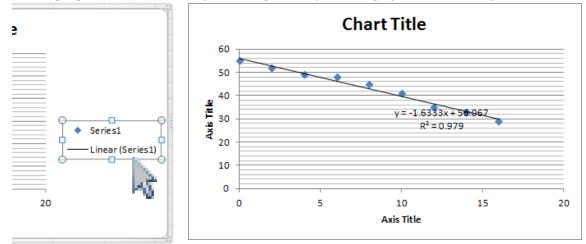
8) Select the <u>Design</u> tab.



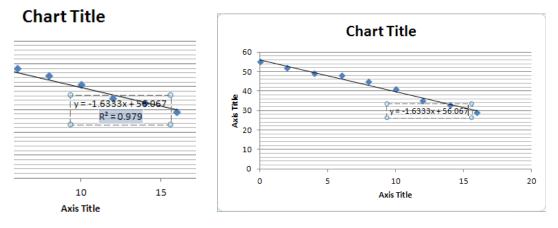
9) In the <u>Chart Layouts</u> portion select the *f*x one. This is what you will see...



12) Now highlight and delete the key on the right to expand the graph. This is what you will see...



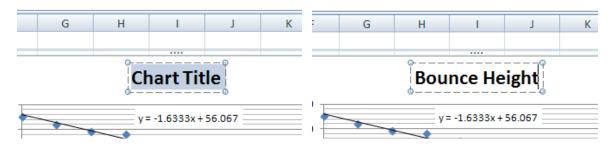
13) Select the " $R^2 = 0.979$ " and delete it. This is what you will see... You can also reposition the textbox by dragging it to a new location.



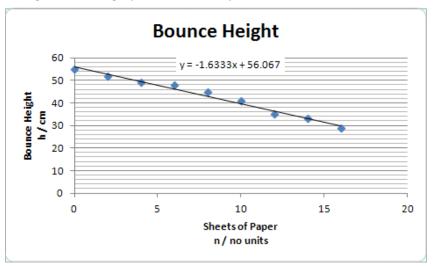
14) Reposition the equation in the textbox so it is not so close to the best fit line. Then fill it with an opaque color, such as white.



15) Highlight "Chart Title" and enter "Bounce Height".



16) Change the other graph labels to suit your needs.



17) With your graph highlighted, choose the <u>Layout</u> tab. Note that it won't show up unless you have a graph highlighted...



18) Next select Error Bars and More Error Bar Options....

				۲	_ = x
ne	Lines	Up/Down Bars *	타 Error Bars *	Chart Name: Chart 1	
	None Removes the Error Bars for the selected series or all Error Bars in none is selected Error Bars with Standard Error Displays Error Bars for the selected chart series using Standard Error Error Bars with Percentage Displays Error Bars for the selected chart series with 5% value				
	Error Bars with Standard Deviation Displays Error Bars for the selected chart series with 1 standard deviation More Error Bars Options				
-			bars Op		-3

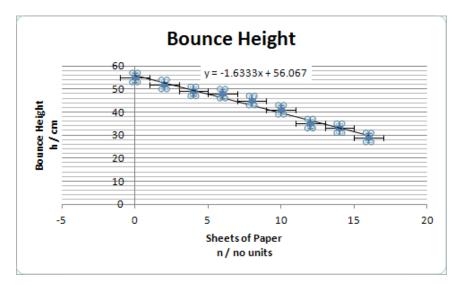
19) You will see this Format error Bars box. Click the <u>Both</u> and the <u>Fixed value</u> radio buttons.

Vertical Error Bars Line Color Line Style Shadow Vertical Error Bars Display Direction E Both C Minus	Format Error Bars	? X
I ○ Plus I ○ Plus End Style ○ No Cap I ○ No Cap I ○ Cap Error Amount ○ Eixed value: ○ Eixed value: 1.0 ○ Eixed value: 5.0 % ○ Standard deviation 1.0 % ○ Standard geror ○ Qustom: Specify Value	Line Color Line Style	Display Direction Direction Both Minus Display Direction Minus Display Direction Minus Display Direction Minus Display Direction Minus Display Direction Minus Display Direction Display Direction Display Display Direction Display

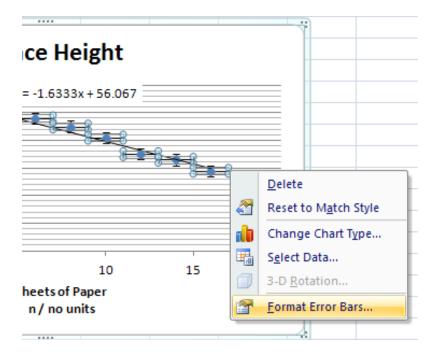
20) Since your height uncertainty was 2, enter this as your fixed value.

Error Amount				
• Eixed value:	2.0			
C Percentage:	5.0	%		
© <u>S</u> tandard deviation(s):	1.0			

21) Select the <u>Close</u> button and this is what you will see... Note that both vertical and horizontal error bars show up.



22) <u>Right-click</u> one of the horizontal error bars then select the <u>Format Error Bars...</u>.



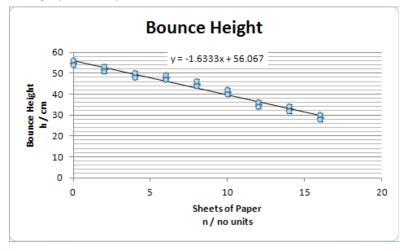
23) The <u>Format Error Bars</u> box for the horizontal error bars will show up.

Format Error Bars		? ×
Horizontal Error Bars Line Color Line Style Shadow	Horizontal Error Bars Display Direction Both O Both O Plus End Style O Plus End Style Cap Error Amount Error Amount Error Amount O Eixed value: Display Direction O Plus End Style Standard deviation(s): 1.0 O Standard error O Qustom: Specify Value	%
		se

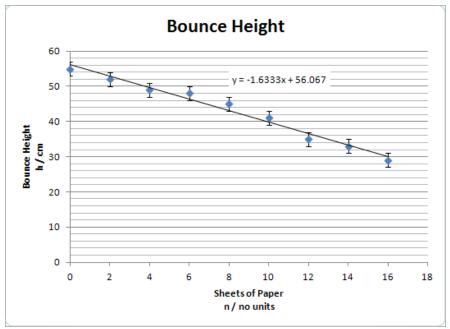
24) Set the <u>Fixed Value</u> to 0.

Error Amount				
• Eixed value:	0.0			
C Percentage:	5.0	%		
\bigcirc Standard deviation(s):	1.0			

25) Your graph is complete!



26) Stretch it out so you can look at it in detail. The graph can now be copied and pasted into your Word document.

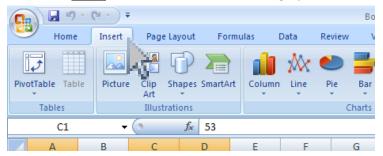


MAKING YOUR SLOPE-UNCERTAINTY GRAPHS

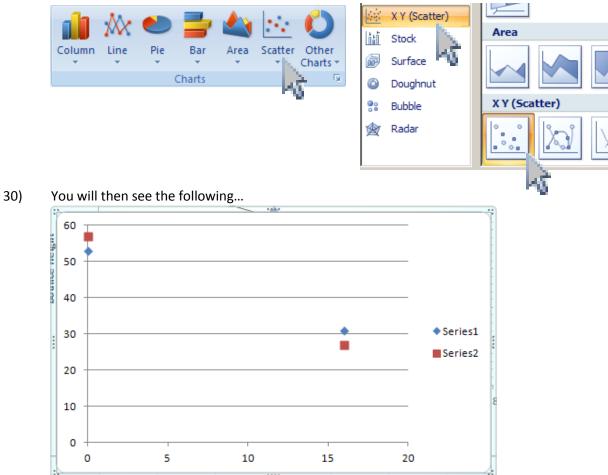
27) It is recommended that your **slope uncertainty graph** be separate from your main graph. To this end, select the first, third and fourth columns using the <u>Ctrl</u> key and dragging the mouse...

	А	В	С	D	E
1	0	55	53	57	
2	2	52			
3	4	49			
4	6	48			
5	8	45			
6	10	41			
7	12	35			
8	14	33			
9	16	29	31	27	
10					
11					5

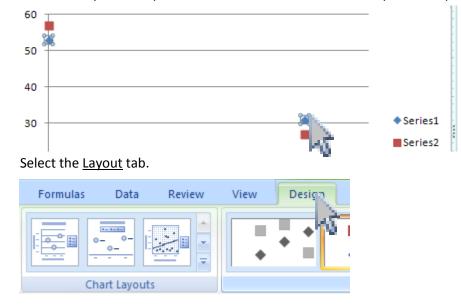
28) Select the Insert tab so that we can choose a graph...



29) Select <u>Scatter</u> and then <u>X Y (Scatter)</u> and *then* the <u>X Y (Scatter)</u> unconnected icon.



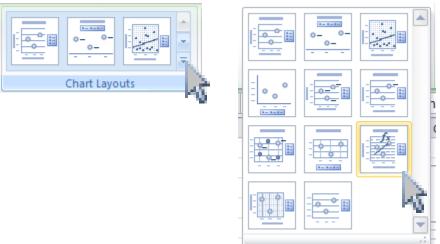
31) Click one of your data points so that the correct tools show up at the top of your worksheet.



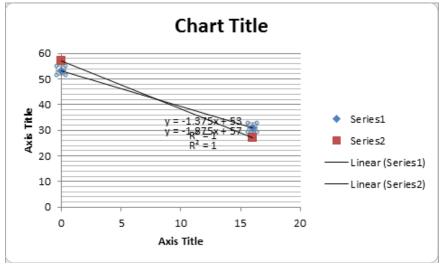
32)

33) Choose <u>Chart Layouts</u>.

You will see this:



34) As before, select the *f*x choice (shown above) so that the line equations show up...



35) Clean it up so it looks like this. Use skills that you learned above. Your final graph should look like this:

