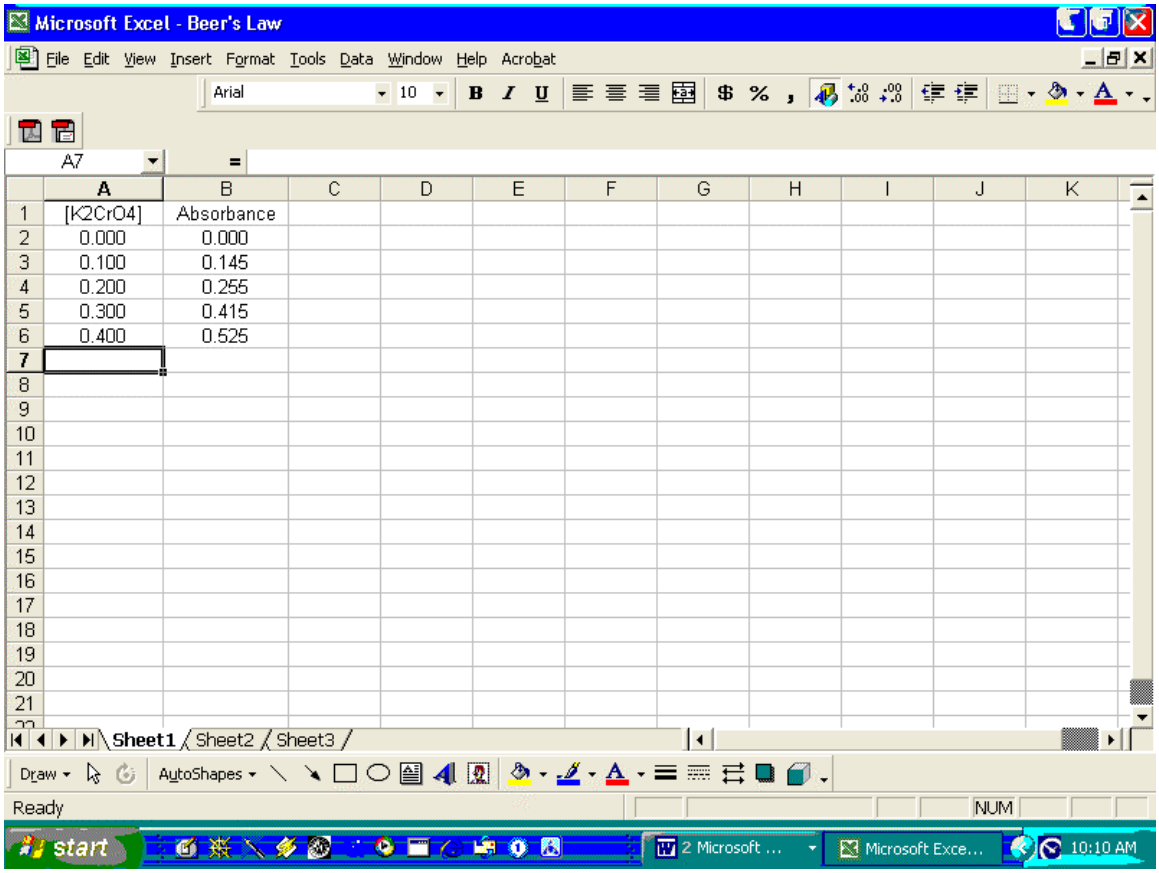
Graphing Using Excel

This exercise shows you how to handle Beer's Law and kinetics data using Excel.

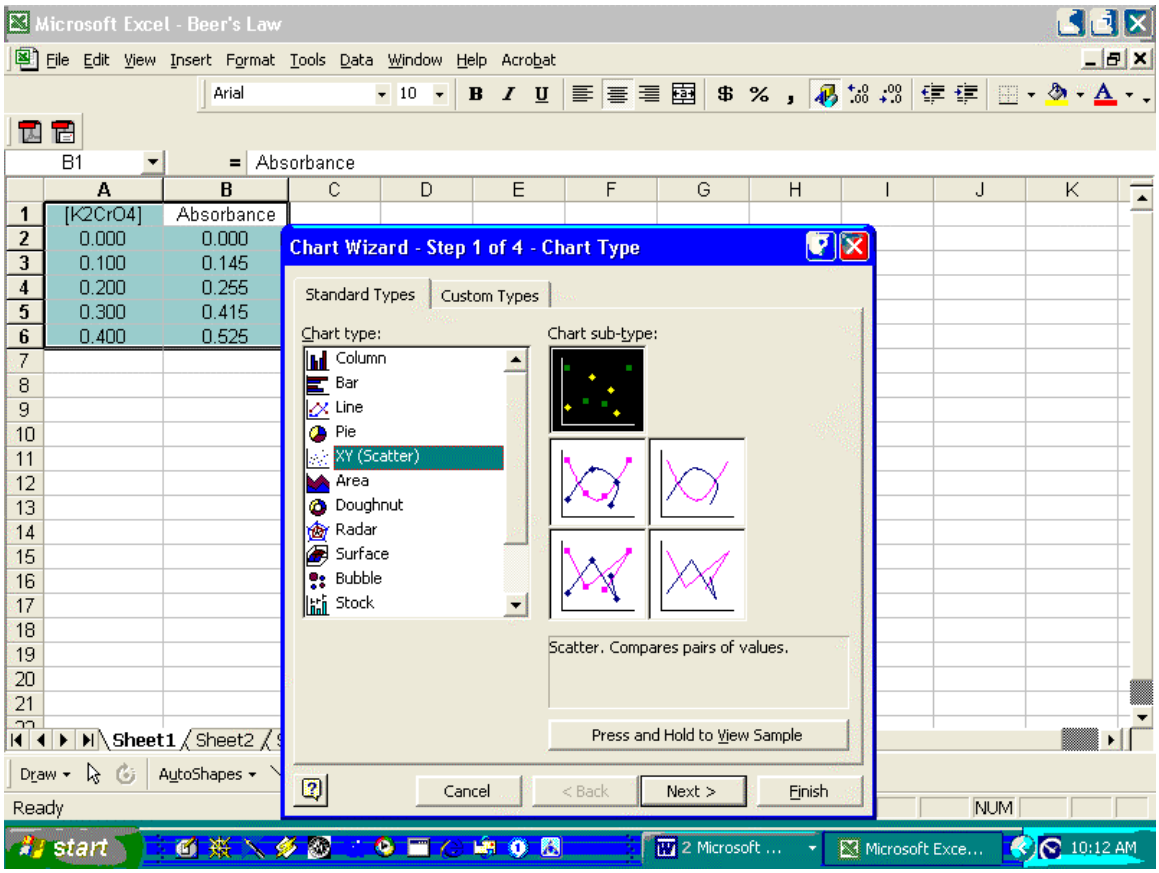
Beer's Law

Type in [K2CrO4] in the A1 cell (x-axis) and Absorbance in the B1 cell (y-axis).
Enter the data for concentration and absorbance.

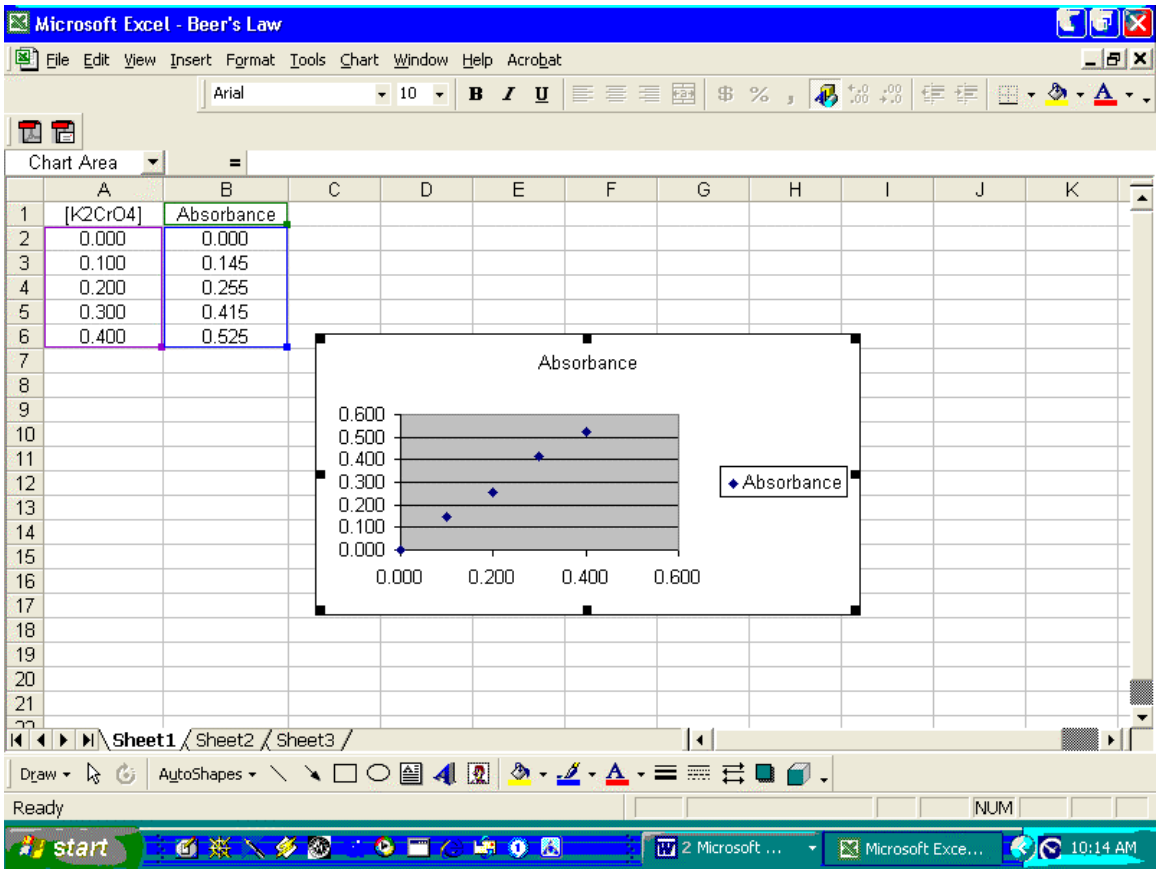


	A	B
1	[K2CrO4]	Absorbance
2	0.000	0.000
3	0.100	0.145
4	0.200	0.255
5	0.300	0.415
6	0.400	0.525

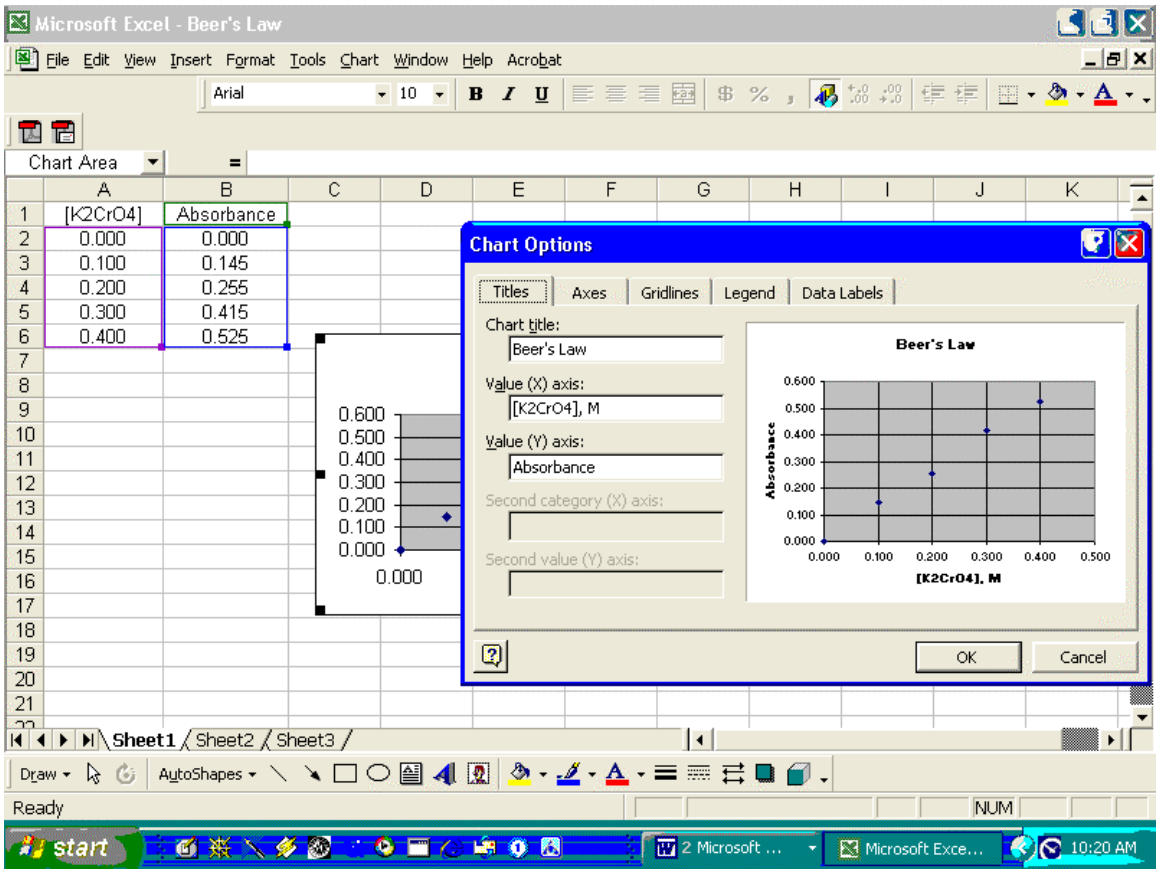
Highlight the concentration and absorbance columns and click on **Insert** on the top menu and click on **Chart** on the drop down menu.



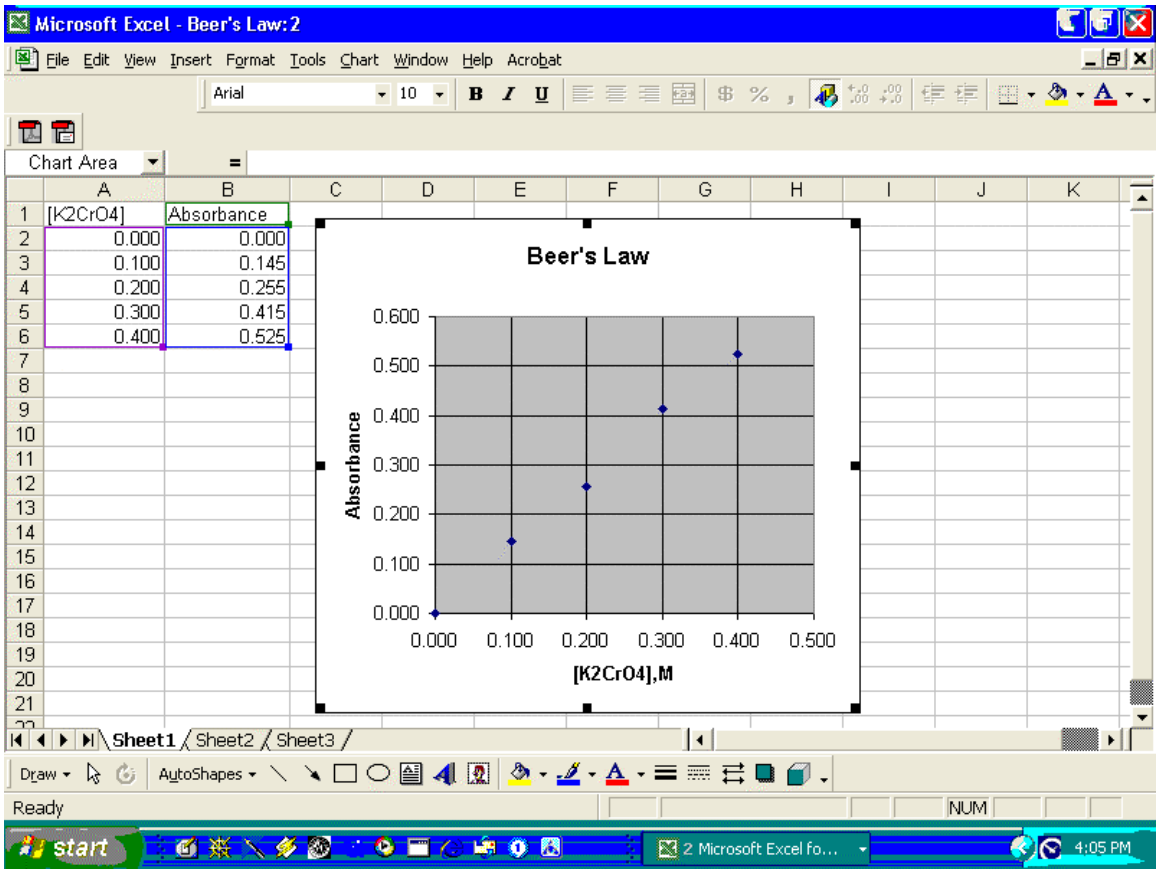
Click on the **xy scatter** option and click **Finish**.



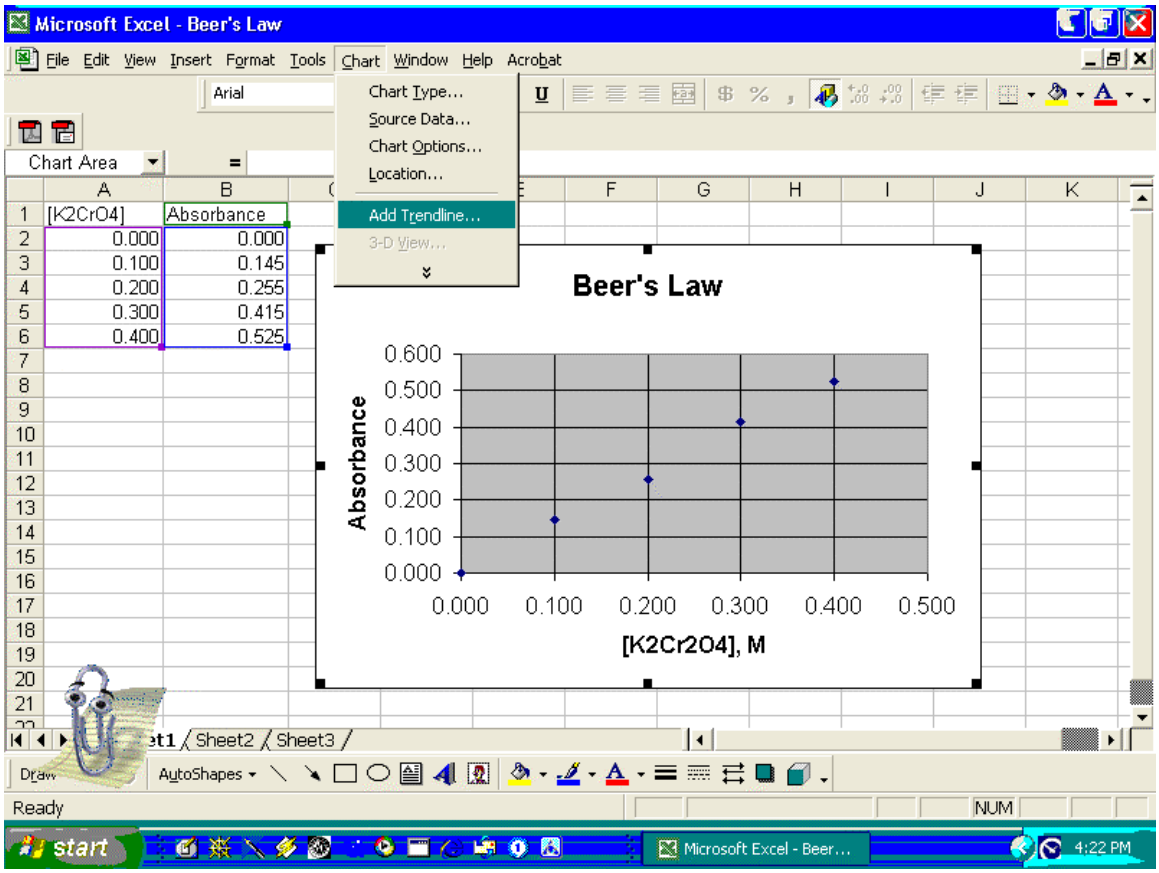
Right click in the graph area and click on **Chart Options**. You can remove the **Legend**, add **gridlines, Graph Title, and labels** for the x and y axes. Then click **OK.**

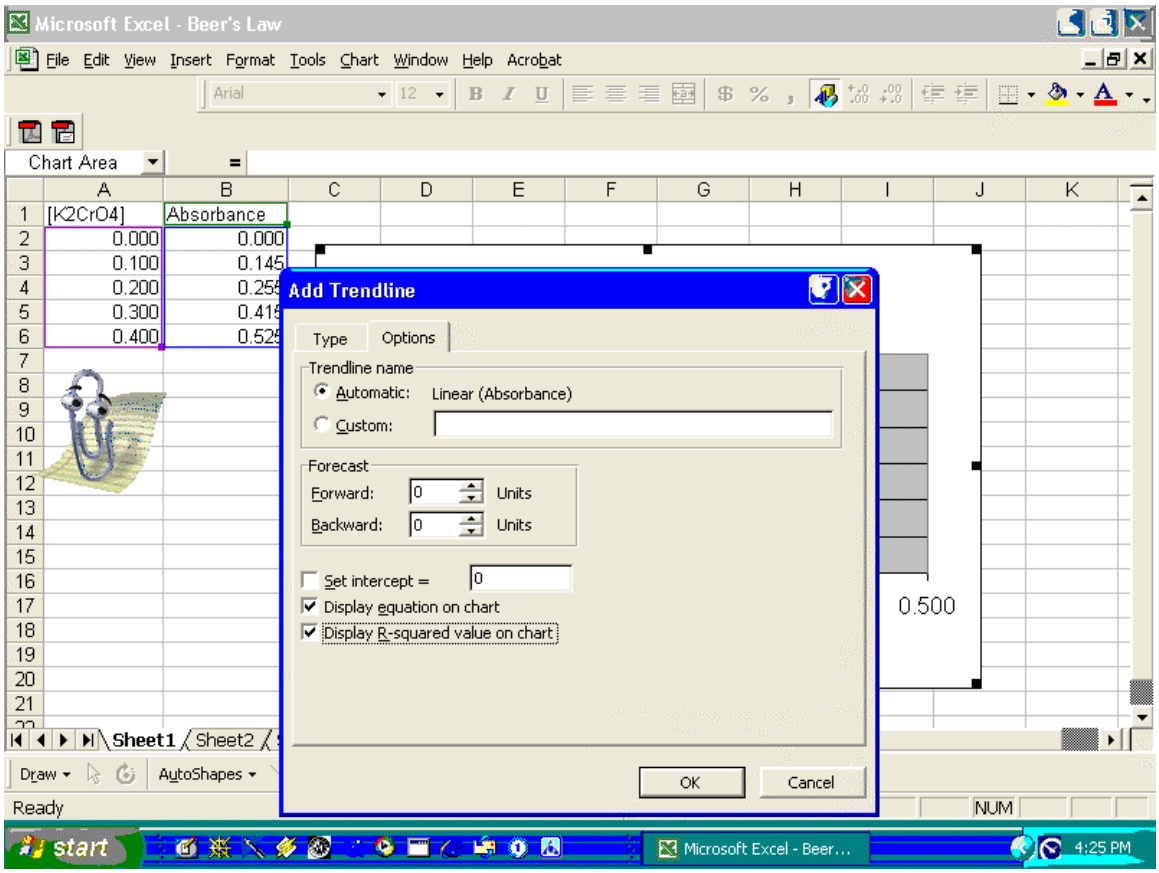


By clicking in the graph area and using the cursor you can enlarge the graph.

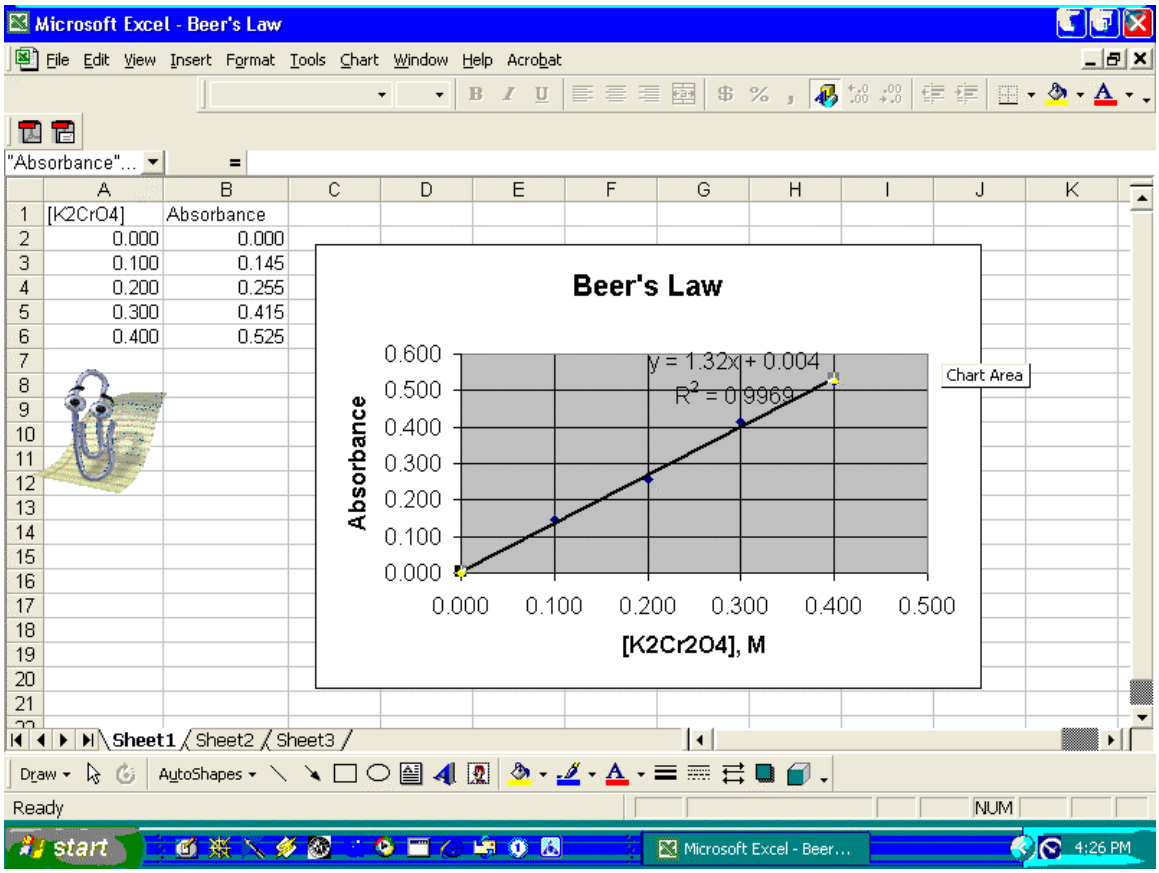


Click on **Chart** in the top menu and click on the **Add Trendline** option. This will put in the linear regression line or best fit straight line through the data points.


Microsoft Excel - Beer's Law
File Edit View Insert Format Tools Chart Window Help Acrobat
Chart Type...
Source Data...
Chart Options...
Location...
Add Trendline...
3-D View...
Chart Area
[K2CrO4]
Absorbance
0.000 0.000
0.100 0.145
0.200 0.255
0.300 0.415
0.400 0.525
Beer's Law
Absorbance
0.600
0.500
0.400
0.300
0.200
0.100
0.000
0.000 0.100 0.200 0.300 0.400 0.500
[K2Cr2O4], M
Sheet2 Sheet3
Ready
NUM
start
Microsoft Excel - Beer...
4:22 PM



Click on **Automatic**, **Display equation on chart**, and **Display R=squared value on chart** (how well the values correlate to a straight line) then click **OK**.

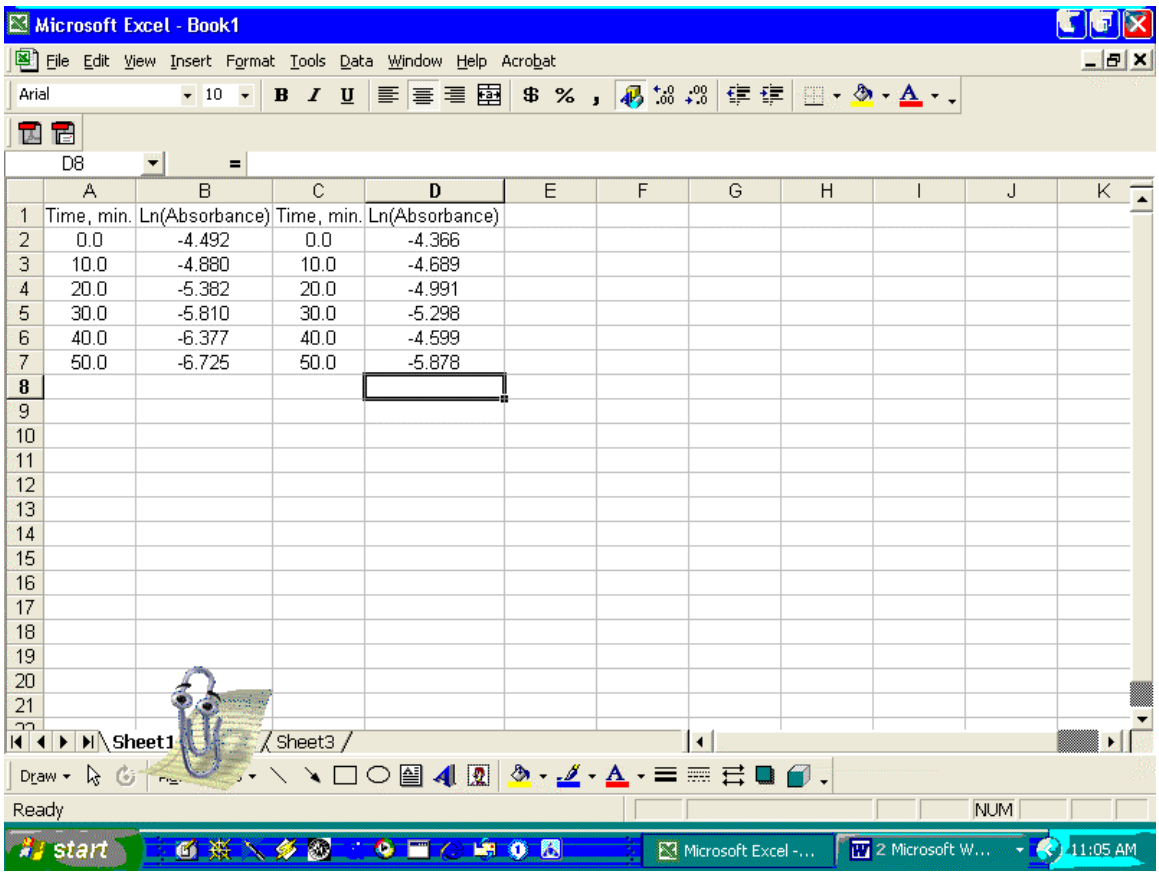

Microsoft Excel - Beer's Law
File Edit View Insert Format Tools Chart Window Help Acrobat
"Absorbance"...
[K2CrO4]
Absorbance
0.000 0.000
0.100 0.145
0.200 0.255
0.300 0.415
0.400 0.525
Beer's Law
y = 1.32x + 0.004
R2 = 0.9969
Chart Area
Absorbance
0.600
0.500
0.400
0.300
0.200
0.100
0.000
0.000 0.100 0.200 0.300 0.400 0.500
[K2Cr2O4], M
Sheet1 Sheet2 Sheet3
Draw AutoShapes
Ready
NUM
start
Microsoft Excel - Beer...
4:26 PM

Kinetics

Two experiments were done to obtain absorbance versus time data for the reaction:

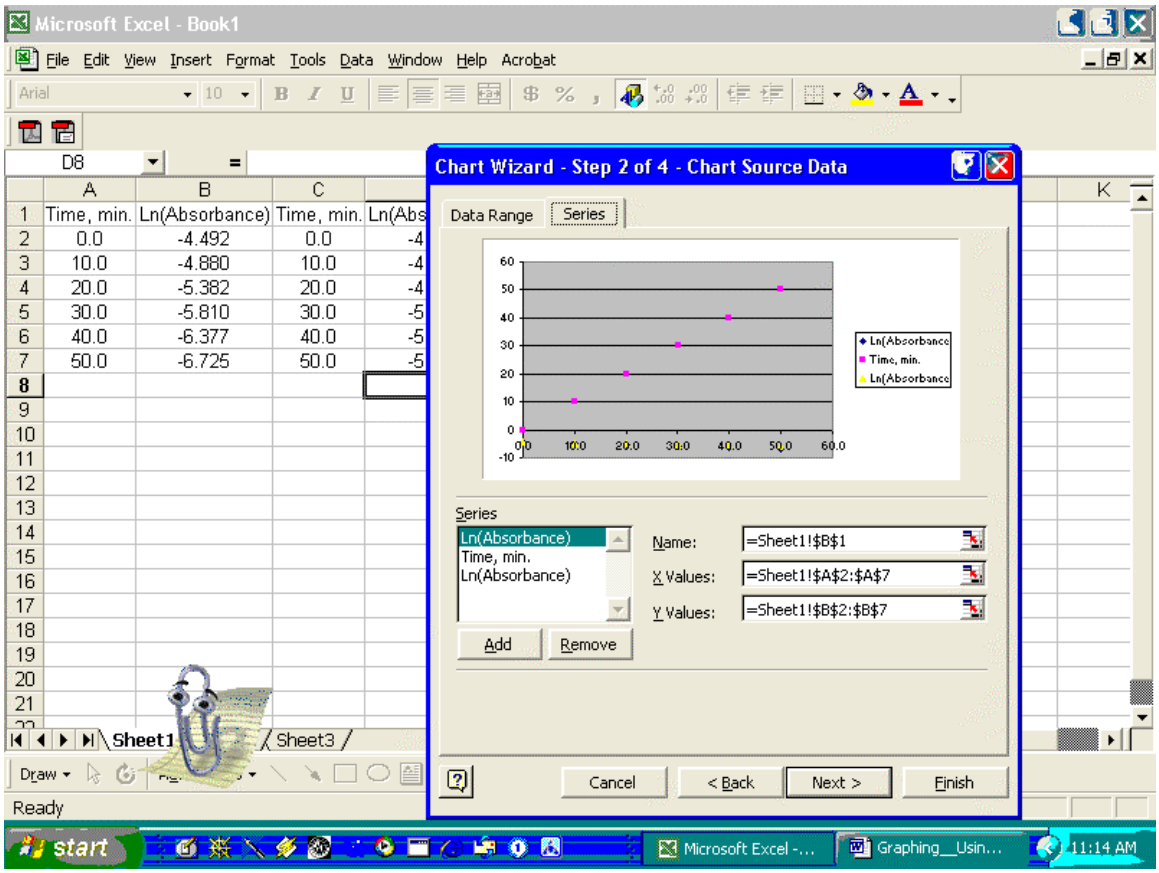
$$2N_2O_5(g) \rightarrow 4NO_2(g) + O_2(g)$$

The data were entered into Excel as shown. Columns A and B are experiment one and columns C and D are experiment two.

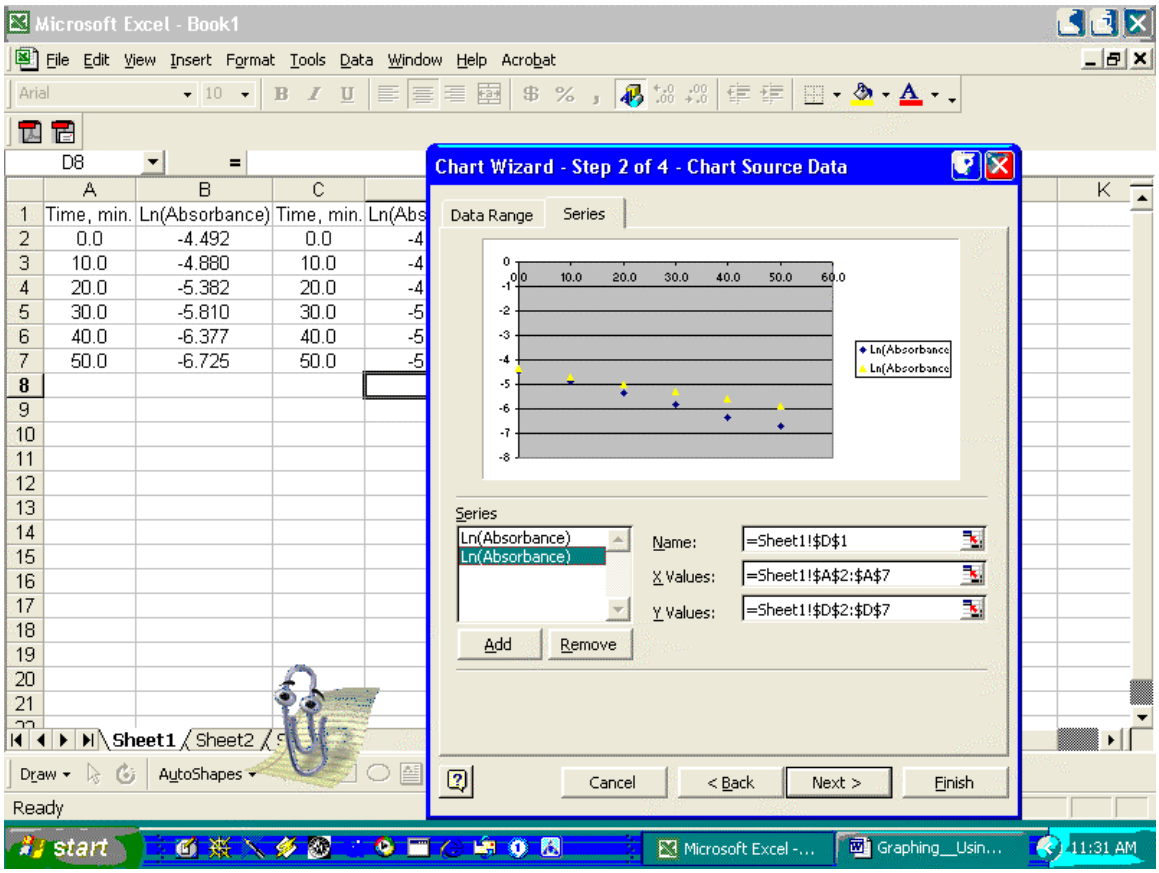


	A	B	C	D
1	Time, min.	Ln(Absorbance)	Time, min.	Ln(Absorbance)
2	0.0	-4.492	0.0	-4.366
3	10.0	-4.880	10.0	-4.689
4	20.0	-5.382	20.0	-4.991
5	30.0	-5.810	30.0	-5.298
6	40.0	-6.377	40.0	-4.599
7	50.0	-6.725	50.0	-5.878

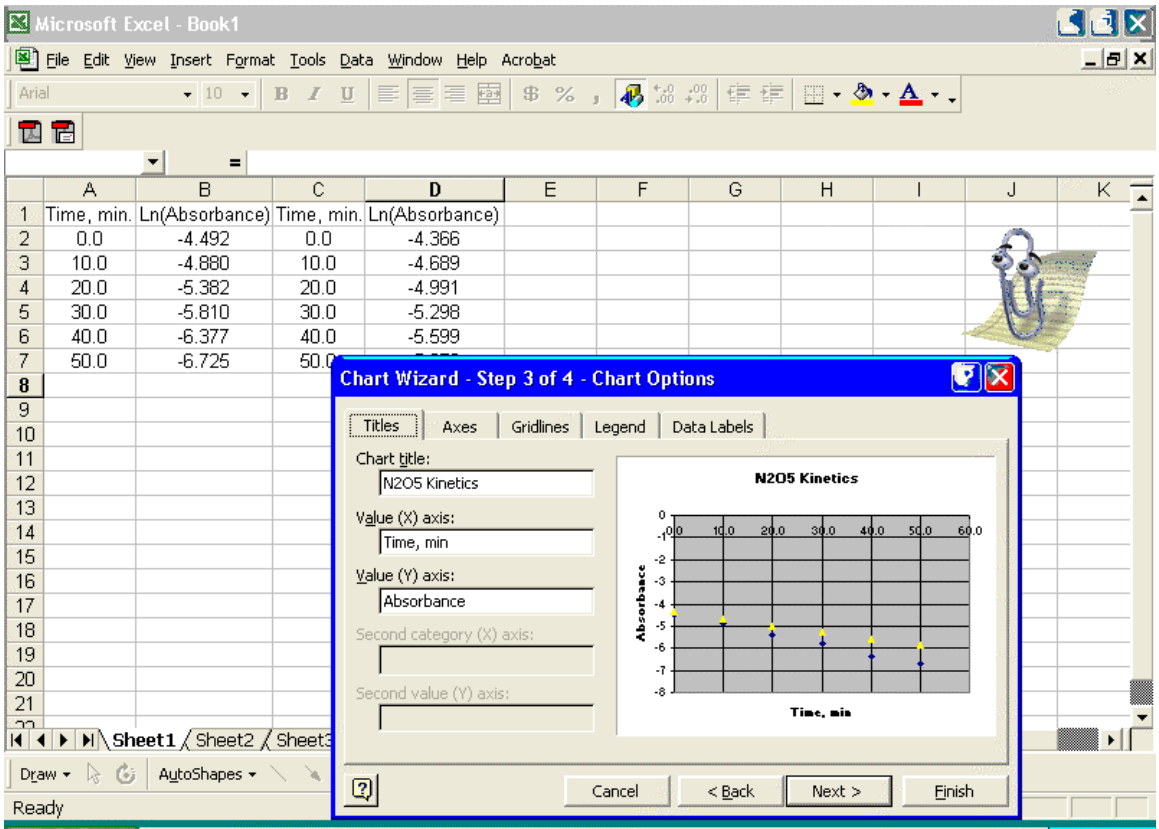
Click on **Insert** then **Chart** on the drop down menu, then **Scatter**, then **Next** and finally **Series** to get the following.

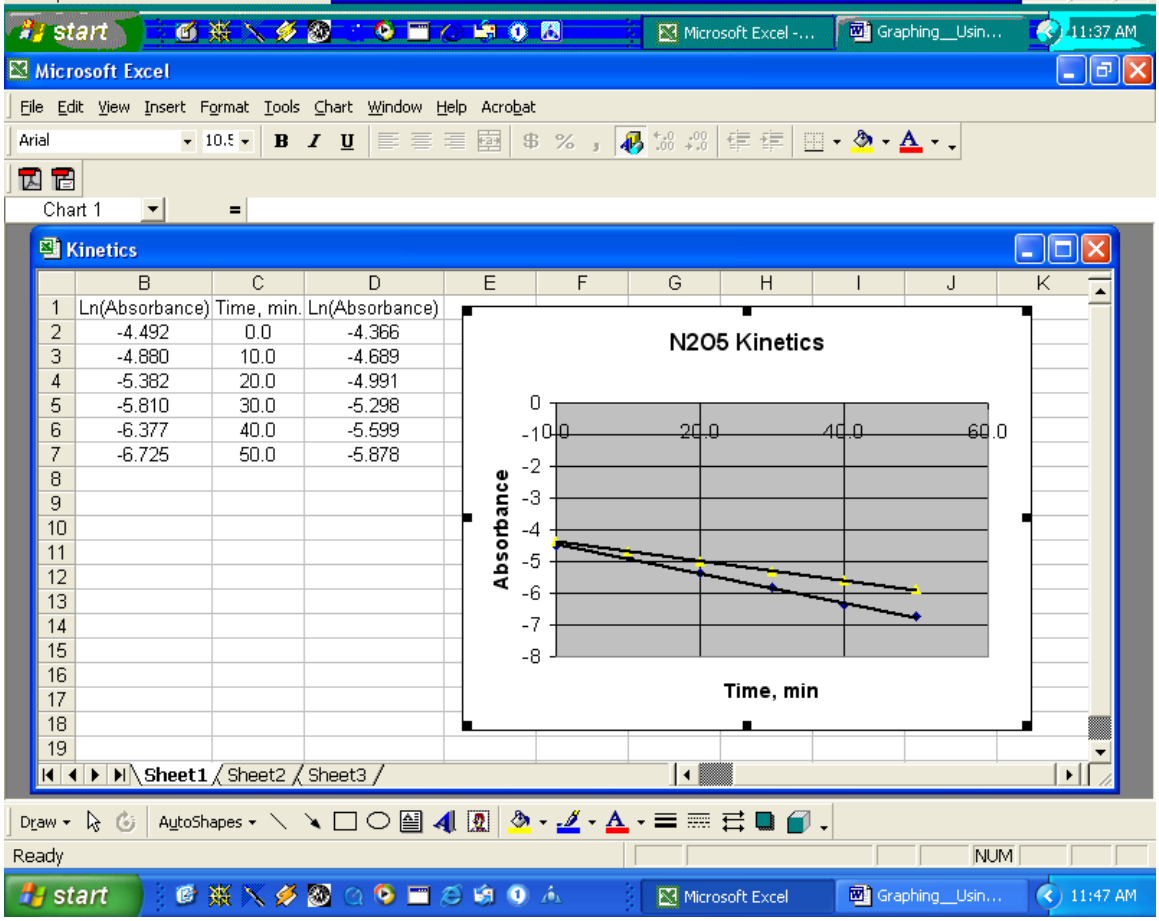


Click on **Time, min** in the **series** box to highlight it and click **Remove**.

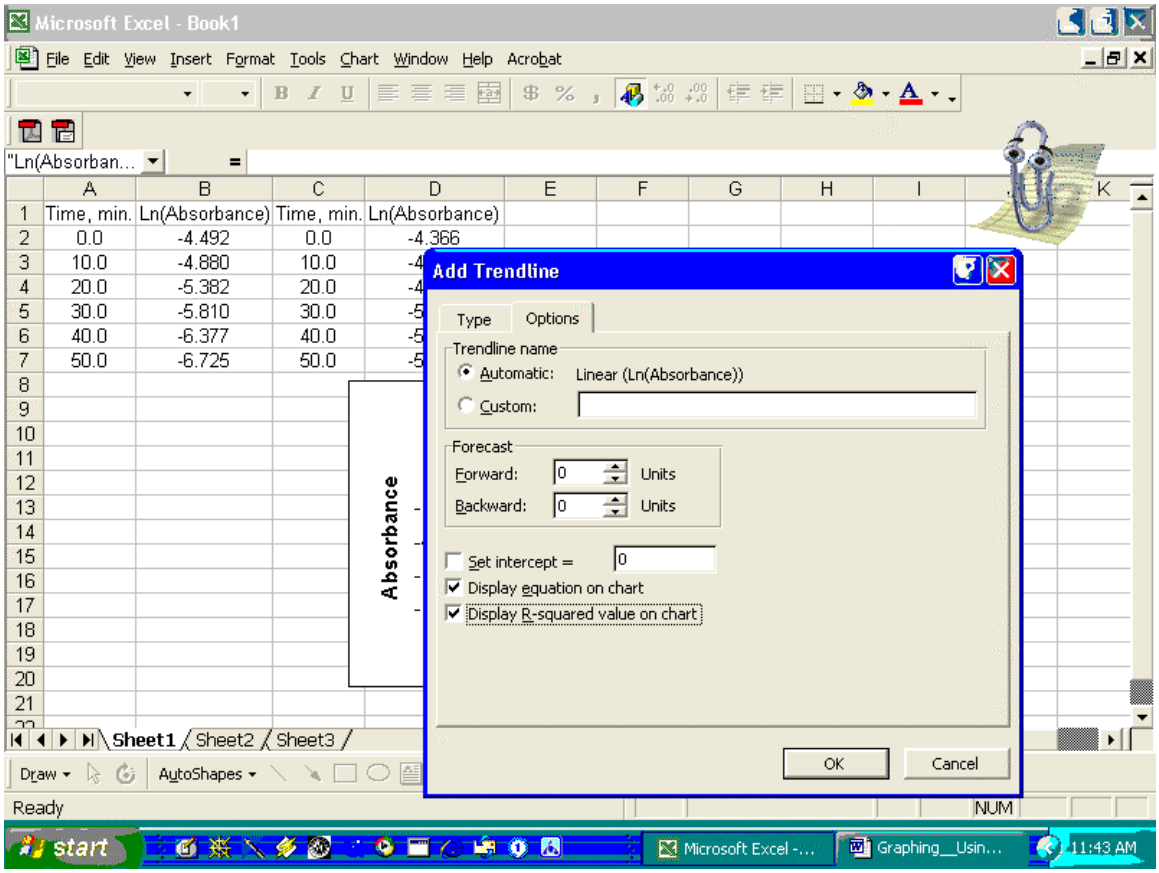


With the **lower Ln(Absorbance)** highlighted the Y Values should read D2 to D7 and if the **top Ln(Absorbance)** is highlighted the Y Values should read B2 to B7. Now click **Next**. Type in the **Chart title**, **X and Y Axis values**, add **Gridlines**, and then click **Next**.

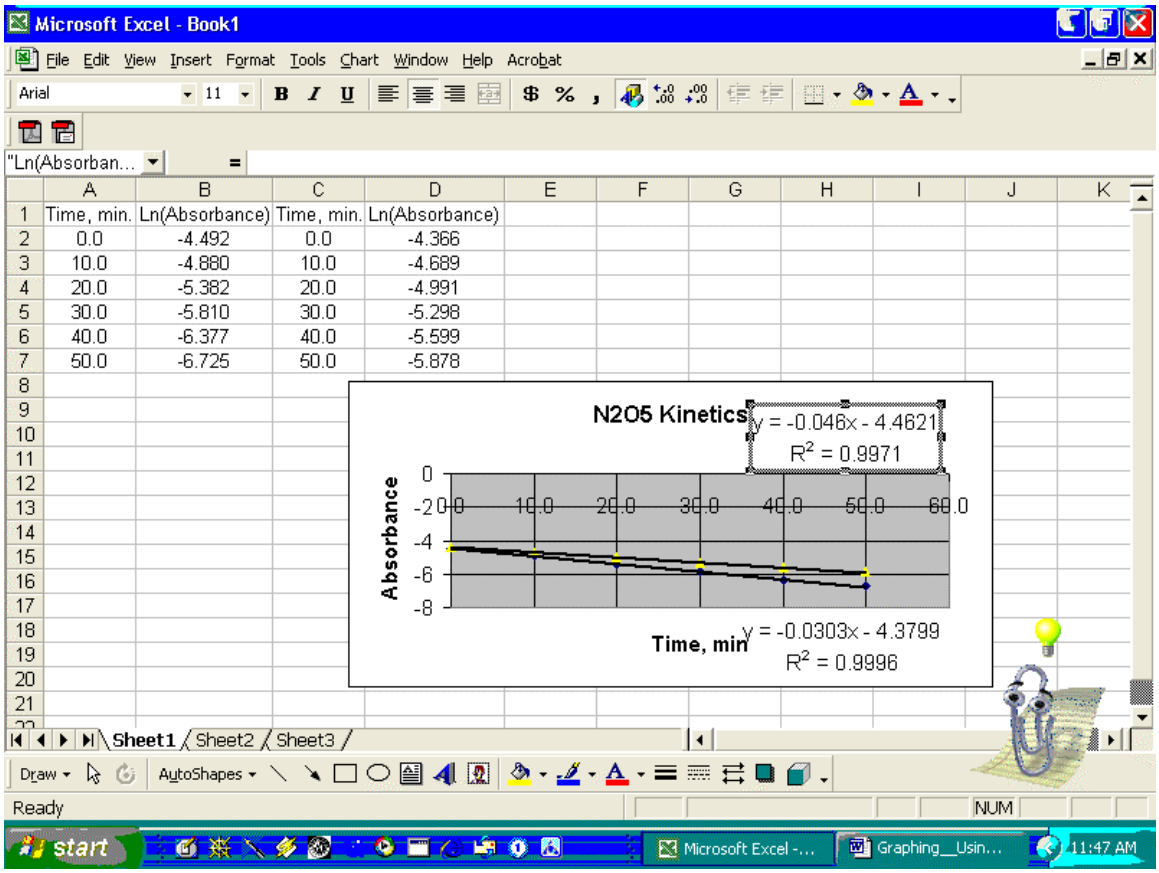

Microsoft Excel - Book1
File Edit View Insert Format Tools Data Window Help Acrobat
Time, min. Ln(Absorbance) Time, min. Ln(Absorbance)
0.0 -4.492 0.0 -4.366
10.0 -4.880 10.0 -4.689
20.0 -5.382 20.0 -4.991
30.0 -5.810 30.0 -5.298
40.0 -6.377 40.0 -5.599
50.0 -6.725
Chart Wizard - Step 3 of 4 - Chart Options
Titles Axes Gridlines Legend Data Labels
Chart title:
N2O5 Kinetics
Value (X) axis:
Time, min
Value (Y) axis:
Absorbance
Second category (X) axis:
Second value (Y) axis:
N2O5 Kinetics
Absorbance
Time, min
Cancel < Back Next > Finish
Sheet1 Sheet2 Sheet3
Ready


Microsoft Excel
File Edit View Insert Format Tools Chart Window Help Acrobat
Chart 1
Kinetics
Ln(Absorbance) Time, min. Ln(Absorbance)
-4.492 0.0 -4.366
-4.880 10.0 -4.689
-5.382 20.0 -4.991
-5.810 30.0 -5.298
-6.377 40.0 -5.599
-6.725 50.0 -5.878
N2O5 Kinetics
Absorbance
Time, min
Sheet1 Sheet2 Sheet3
Ready
NUM

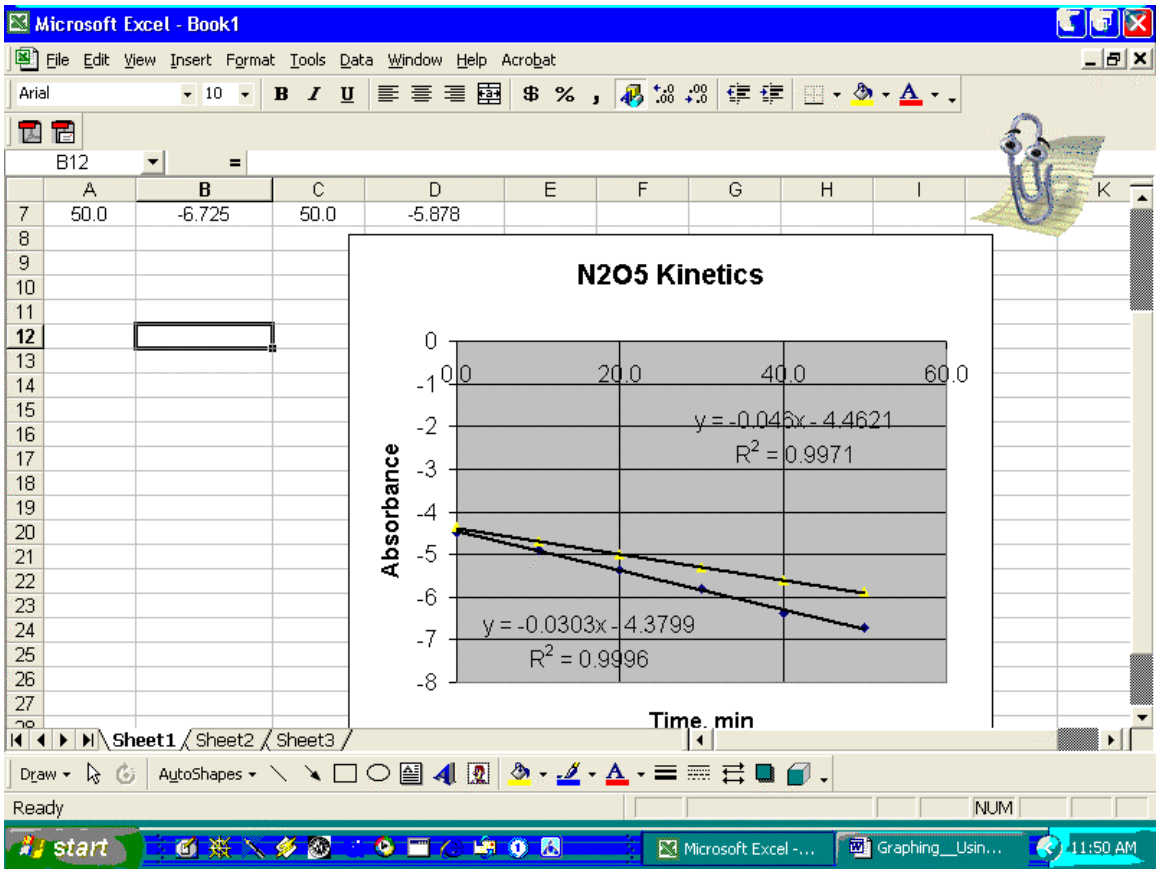
Now click on **Chart** in the top menu bar and click on **Add Trend line**. Highlight the top Ln(Absorbance and click **Options** and select **Display equation** and **Display R=** then click **OK.**



Select **Chart** and **Add Trend line** again. Highlight the bottom Ln(Absorbance and repeat the above process and click **OK**.



You can left click in the chart area to increase the size of the chart and move the statistics to convenient places.


Microsoft Excel - Book1
File Edit View Insert Format Tools Data Window Help Acrobat
Arial
10
B12
=
A B C D E F G H I K
7 50.0 -6.725 50.0 -5.878
N2O5 Kinetics
Absorbance
Time, min
0
-1
-2
-3
-4
-5
-6
-7
-8
0.0
20.0
40.0
60.0
y = -0.046x - 4.4621
R2 = 0.9971
y = -0.0303x - 4.3799
R2 = 0.9996
Sheet1 Sheet2 Sheet3
Draw
AutoShapes
Ready
NUM
start
Microsoft Excel -...
Graphing_Usin...
11:50 AM