

COMPSCI 111 / 111G

*Mastering Cyberspace:
An introduction to practical computing*

Spreadsheets

Learning Outcomes

Evaluate Boolean expressions

Use IF, VLOOKUP and HLOOKUP functions

IF functions

Makes a decision

- Different values used in the cell depending on the logical test

IF(logical_test , value_if_true, value_if_false)

Must be either true or false

- value
- condition (test)
- boolean function

This value appears
in the cell if the
boolean is true

This value appears
in the cell if the
boolean is false

Example - coffee data

Imagine an experiment where we record the number of cups of coffee that we drink, and whether it was morning or afternoon. The table of data might appear as shown below:

	A	B
1	Cups of Coffee	AM/PM
2	3	am
3	1	pm
4	2	am
5	1	am
6	3	pm
7	5	am
8	1	pm

How can we calculate the average number of coffees that we drink in the morning?

Example - coffee data

Add a new column to store the morning coffee data.

- If the contents of column B is the text "am" then use the value stored in column A. Otherwise, leave it blank.
- =IF(B2="am", A2, "")

	A	B	C
1	Cups of Coffee	AM/PM	Morning
2	3	am	3
3	1	pm	
4	2	am	2
5	1	am	1
6	3	pm	
7	5	am	5
8	1	pm	
9			
10	Total		2.8

Exercise - Simple IF

Given the wind speed as shown in the table below, write the formula that would appear in cell C2. Note that a Gale Warning is issued when the wind speed exceeds 63 km/hr.

	A	B	C
1	Date	Wind Speed	Warning Issued
2	1/01/2007	3	
3	2/01/2007	57	
4	3/01/2007	89	Gale Warning
5	4/01/2007	60	
6	5/01/2007	5	
7	6/01/2007	84	Gale Warning
8	7/01/2007	87	Gale Warning
9	8/01/2007	8	

Example - Boolean conditions

Ticket Sales

- Check if more than 90% of the tickets were sold, or if less than 50% of the tickets were sold. In either case, a new venue is required next time.
- =IF(OR(C9 / B9 > 0.9, C9 / B9 < 0.5), "Yes", "No")

	A	B	C	D	E	F	G	H
1	Tickets sales							
2								
3	Price	\$10.00						
4								
5	Event	Tickets Available	Tickets Sold	Remaining	Sales		Different venue required	
6	Cycling	4000	2000	2000	\$20,000.00		No	
7	Weightlifting	2000	750	1250	\$7,500.00		Yes	
8	Triathlon	1000	100	900	\$1,000.00		Yes	
9	Soccer	3000	3000	0	\$30,000.00		Yes	
10	Badminton	5000	4500	500	\$45,000.00		No	
11		15000	10350	4650	\$103,500.00			

Exercise - Using Boolean conditions

Examine the following spreadsheet that keeps track of beetle races. Each beetle is involved in three races, and the time it took to cross the finish line is recorded. The best time out of the three races is calculated and will be used to determine the overall winner.

Some races are aborted before the beetle finishes, so no time is recorded. Occasionally, a beetle will escape from the track, and is therefore disqualified from the races (recorded as a "D").

Write down the formula used in cell E4

	A	B	C	D	E
1	Beetle racing				
2		Race			
3	Beetle	1	2	3	Best
4	George	12		46	12
5	John		43	35	35
6	Paul		32	33	32
7	Ringo	19	28	D	Disqualified
8	Juice	23	13		13
9	VW	34	D		Disqualified

Looking up values in a table

Often have tables of data

- We want to look up a value
- e.g. given ID number, what is the name?

Student ID	Name	Phone
9100983	Andrew	123-4567
2098382	Albert	234-7654
2289483	Adrienne	321-7839
2109374	Ann	567-8932

Use a lookup formula

- VLOOKUP - looking up values in a vertical table
- HLOOKUP - looking up values in a horizontal table

VLOOKUP

VLOOKUP(value, table, column, [range])

Value.

This is the value we already have written down. We want to use this value to look up a corresponding value in a table.

Range of cells.

This is the table we are using to look up the value in.

Usually we want to use absolute references for the table.

Number.

This specifies which column in the table contains the data we want.

Boolean value.

True if we want to match a range of values

False if we want an exact match.

Example

	A	B	C	D	E	F	G	H
1								
2		Students Enrolled			ID	UPI	Name	
3		ID	Name		199444	jhub001	Jacob	
4		800526	Ethan		303114	mkop032	Michael	
5		952348	William		465336	jjs012	Joshua	
6		303114	Michael		769866	mwen003	Matthew	
7		973748			800526	eupt008	Ethan	
8					812069	acut017	Andrew	
9					887268	dden011	Daniel	
10					952348	whur034	William	
11					973748	jfr002	Joseph	
12					997073	ccau005	Christopher	
13								

=VLOOKUP(value, table, column, range)

	A	B	C	D	E	F	G	H
1								
2		Students Enrolled			ID	UPI	Name	
3		ID	Name		199444	jhub001	Jacob	
4		800526	Ethan		303114	mkop032	Michael	
5		952348	William		465336	jjs012	Joshua	
6		303114	Michael		769866	mwen003	Matthew	
7		973748			800526	eupt008	Ethan	
8					812069	acut017	Andrew	
9					887268	dden011	Daniel	
10					952348	whur034	William	
11					973748	jfr002	Joseph	
12					997073	ccau005	Christopher	
13								

1 2 3

False

Example

Use a VLOOKUP to find the description for a recorded wind speed

	A	B	C	D	E	F	G
23					Beaufort Scale		
24					Speed (km/hr)	Beaufort number	Description
25	Day	Wind Spd	Description		0	0	Calm
26	Mon	20	Moderate breeze		1	1	Light air
27	Tues	5	Light air		7	2	Light breeze
28	Wed	0	Calm		12	3	Gentle breeze
29	Thurs	15	Gentle breeze		20	4	Moderate breeze
30	Fri	20	Moderate breeze		30	5	Fresh breeze
31	Sat	40	Strong breeze		40	6	Strong breeze
32	Sun	78	Strong gale		51	7	Near gale
33					63	8	Gale
34					76	9	Strong gale
35					88	10	Storm
36					103	11	Violent storm
37					118	12	Hurricane

=VLOOKUP(value, table, column, range)

=VLOOKUP(B26, \$E\$25:\$G\$37, 3, TRUE)

Graphing data

Start by sorting the data into dependent and independent variables

Independent	Dependant
1	1.5
2	4.9
3	2.4
4	2.6
5	3.3

Enter the data

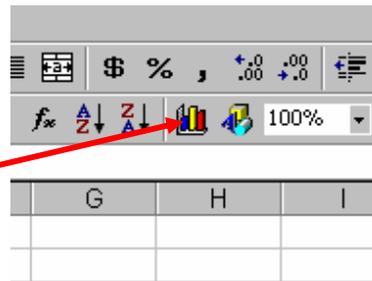
Trial 1:	
Time	Disolved O2
1	1.5
2	3
3	5.5
4	4.4
5	6.8
6	8.8

Highlight the data that you wish to graph by holding down the left mouse button & drag over your numbers, then release.

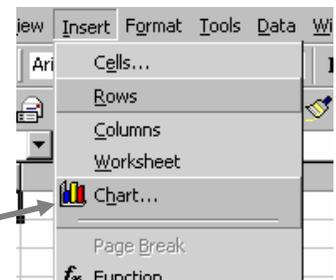
The area highlighted will be graphed. So make sure that you have selected all the data that you want to appear on your graph.

Create a chart

With your data highlighted, left click on the "Chart Wizard" in the toolbar.



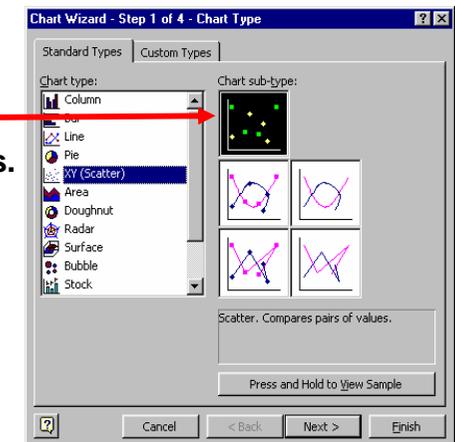
Or select "Insert" from the menu bar. A dropdown box will appear, select "Chart".



Using the Chart Wizard

The Chart Wizard will provide you with a series of steps. Click "Next >" when you have finished each step.

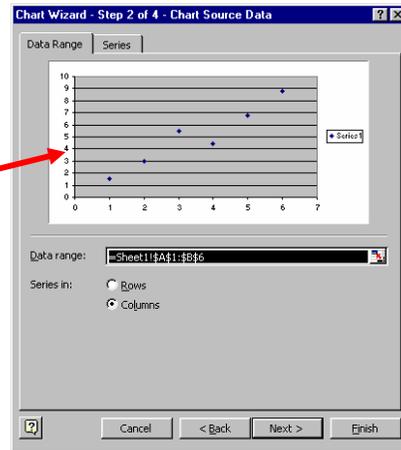
"XY (Scatter)" is a standard choice and will be used in most situations.



Preview

A preview of the graph is displayed

At this point you have a rough view of your graph. If this is the format you want click "Next".



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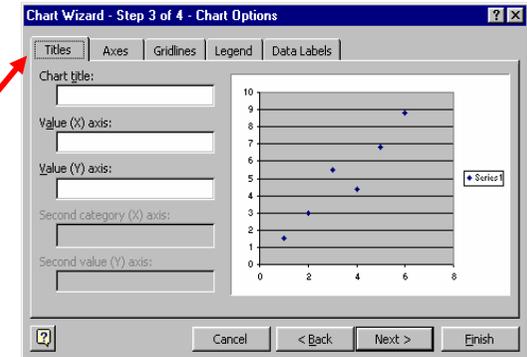
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Enter labels

- Enter a title
- Label the X and Y axes.
- Click "Finish" when complete.

The window also provides a number of tabs labeled, "Axes, Gridlines, Legend, and Data Labels" used for advanced formatting

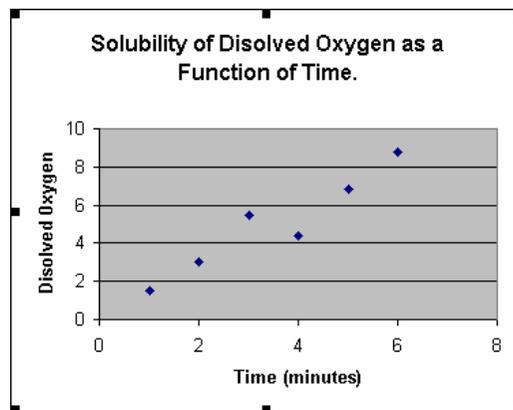


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A completed graph



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Simple data analysis

- Congratulations you have made a graph, but you still have to draw a line or curve to relate the data.
- Rarely in science do we "connect the dots" in a graph. Rather, we would like to show the trend of our data in the form of a *best fit* line.
- How do we do this in Excel?

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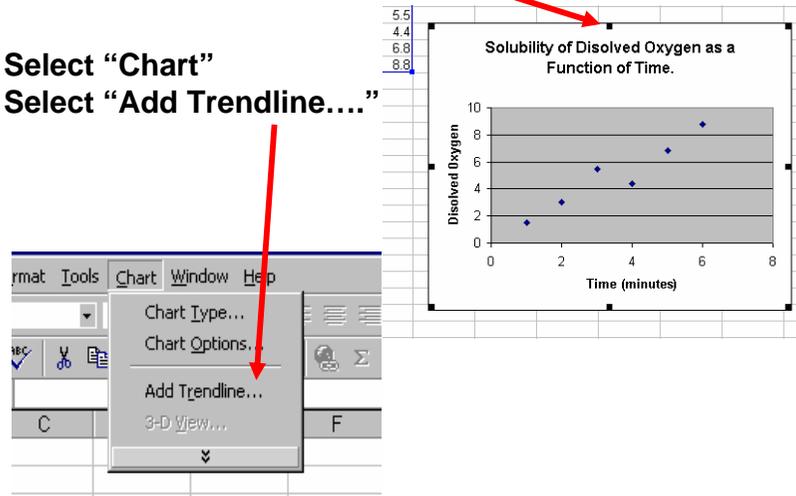
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Adding a Trendline

Make sure the chart is selected

Select "Chart"
Select "Add Trendline...."



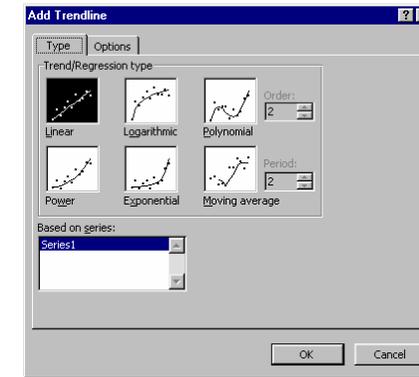
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Graphing – Adding a Trendline

Choose the trend that you wish to show with your data.



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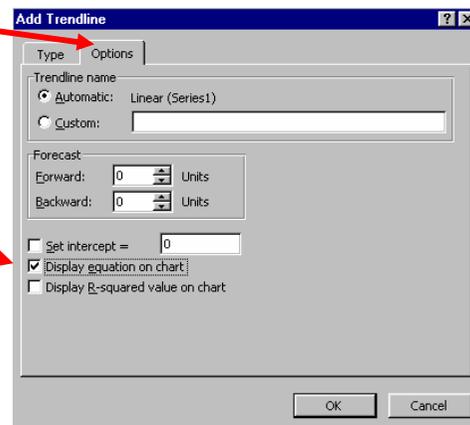
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Adding equation

To add the equation of the line, choose the tab entitled "Options"

Select "Display equation on chart".

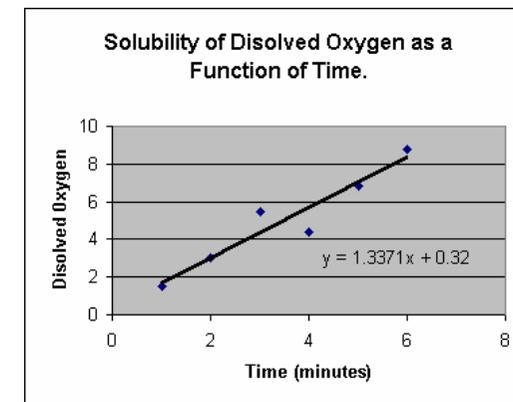


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The completed graph



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