



Creating a run chart on MS Excel 2007

Create and save a new Excel worksheet. Some of the details of steps given below may vary slightly depending on how Excel has been used on your computer previously, but the general sequence and things to look out for will be the same.

Section 1: Creating a run chart with a median based on all data

First you need to enter all your data and create your median.

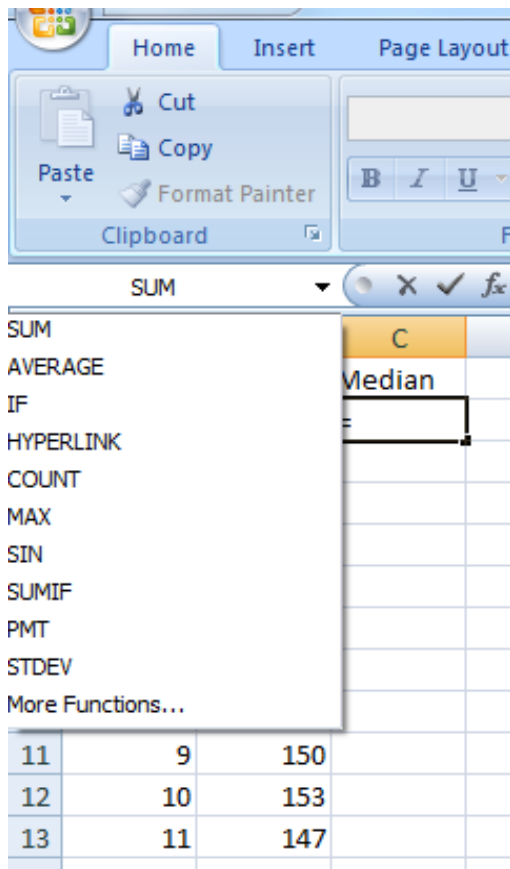
	A	B	C
2	Week	Weight	Median
3	1	149	
4	2	150	
5	3	151	
6	4	149	
7	5	150	
8	6	151	
9	7	149	
10	8	150	
11	9	150	
12	10	153	
13	11	147	
14	12	149	
15	13	150	
16	14	145	
17	15	146	
18	16	145	
19	17	143	
20	18	142	
21	19	144	
22	20		
23	21		
24	22		

Step 1

Enter your data on the worksheet in two columns, one for the horizontal axis (usually time) and one for the vertical axis (your measure), and give each column a heading. In this example, the measure is weight, and data is collected once a week. You would normally label the weeks with a specific date; here they are numbered in sequence from the beginning of data collection.

Remember to include two or three more items in the 'time' column, so this continues into the future, for which no data has been collected yet.

In the next column write the heading 'Median'.



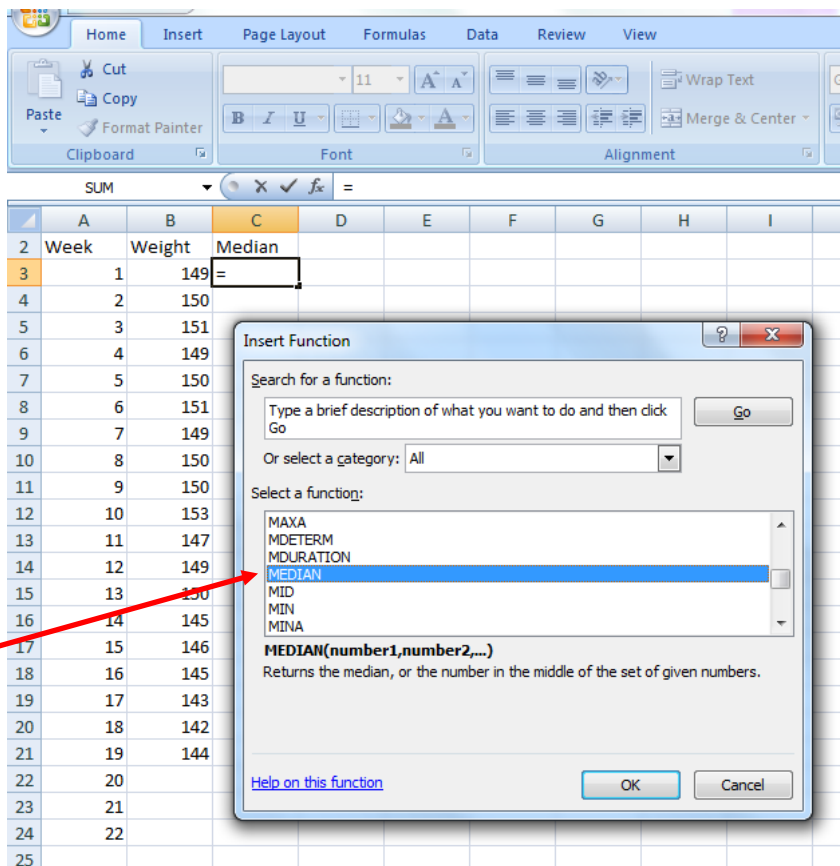
Step 2

Click on the cell below 'Median'

Type '='

Click on the drop down 'functions' menu to the left.

Select: More Functions



Step 3

Scroll down the list of functions

Select: MEDIAN

Click: OK

Step 4

In the Function Arguments dialogue box, find the Number 1 field.

Type in the cell reference for the first data item, then colon, then the cell reference for the last data item.

Click: OK

The screenshot shows the Excel ribbon with the 'Formulas' tab selected. The 'Function Arguments' dialog box for the MEDIAN function is open. The 'Number1' field contains the cell reference 'B3:B21', and the 'Number2' field is empty. The dialog box shows the formula result as 149. A red arrow points from the 'Number1' field to the cell reference 'B3:B21'.

	A	B	C	D	E	F	G	H	I	J	K	L
2	Week	Weight	Median									
3		1	149									
4		2	150									
5		3	151									
6		4	149									
7		5	150									
8		6	151									
9		7	149									
10		8	150									
11		9	150									
12		10	153									
13		11	147									
14		12	149									
15		13	150									
16		14	145									
17		15	146									
18		16	145									
19		17	143									
20		18	142									
21		19	144									
22		20										

Clipboard			
MEDIAN			
	A	B	C
2	Week	Weight	Median
3		1	149
4		2	150
5		3	151
6		4	149
7		5	150
8		6	151
9		7	149
10		8	150

Step 5

In the median column, in the next cell down, type '='

Click on the cell above.

Enter.

	A	B	C	D
2	Week	Weight	Median	
3	1	149	149	
4	2	150	149	
5	3	151	149	
6	4	149	149	
7	5	150	149	
8	6	151	149	
9	7	149	149	
10	8	150	149	
11	9	150	149	
12	10	153	149	
13	11	147	149	
14	12	149	149	
15	13	150	149	
16	14	145	149	
17	15	146	149	
18	16	145	149	
19	17	143	149	
20	18	142	149	
21	19	144	149	
22	20			

Step 6

Click on the same cell as in Step 5
 Hover over the bottom right corner of the cell until you have a + sign
 Drag this down to the bottom of your last data item.

Now you have all the data you need, and can start to create your chart.

The screenshot shows the Excel interface with the 'Insert' tab selected. The 'Charts' group is expanded, showing '2-D Line' and '3-D Line' options. The 'Line with markers' option is selected. The background shows the same data table as in Step 6, with columns A (Week), B (Weight), and C (Median).

Step 7

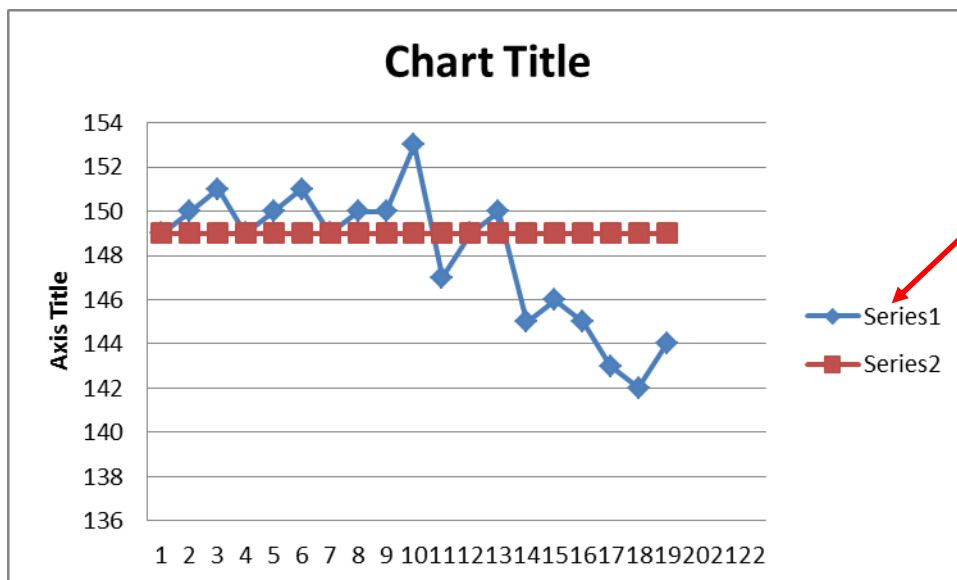
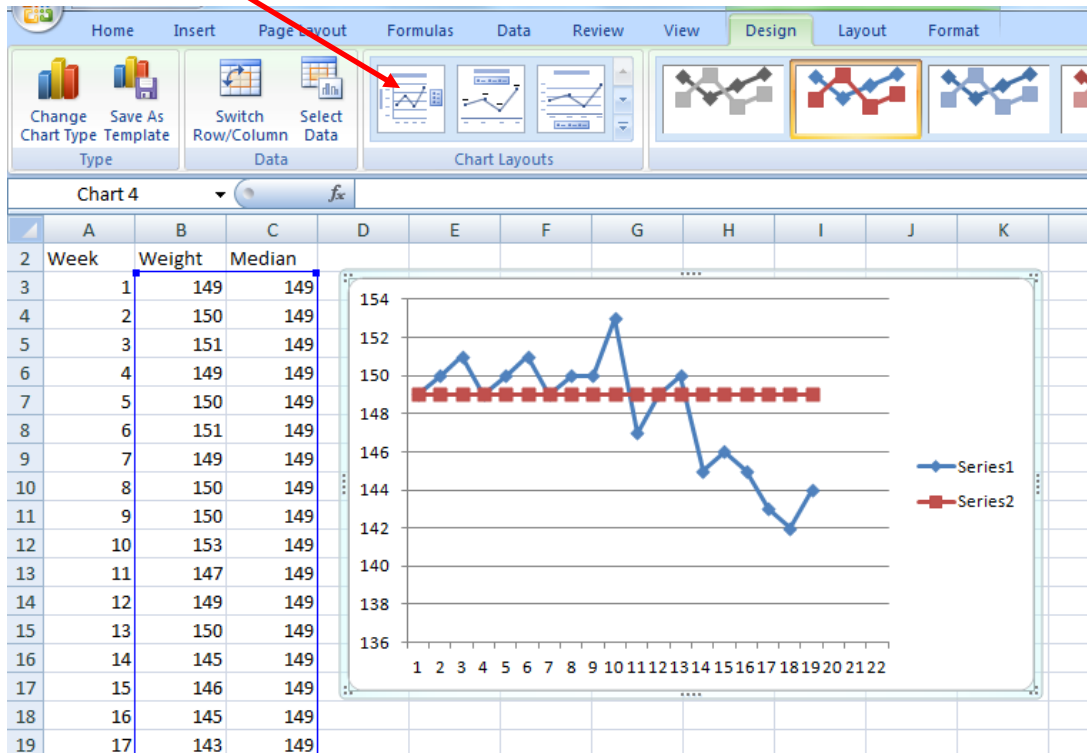
Select all the data in the 'measure' and 'median' columns, including the empty cells for your future dates.

- Select the 'Insert' tab to bring up the chart options.
- Select the 'Line' button on the Insert toolbar.
- Select the 'line with markers' button.

Step 8

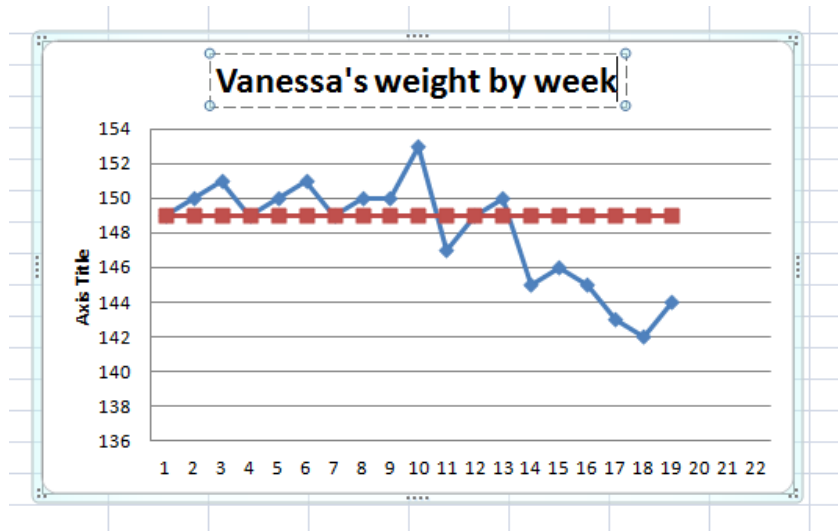
You now have the basic chart. Now you need to make the chart more informative and easy to interpret.

On the 'Design' toolbar, select the first chart layout.



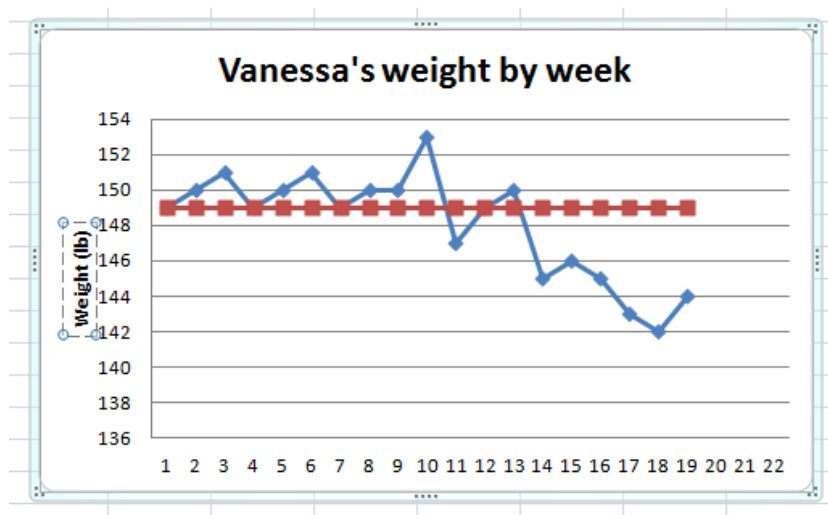
Step 9

Select 'Series 1' so that a box appears around both 'Series 1' and 'Series 2'. Then select 'Delete'.



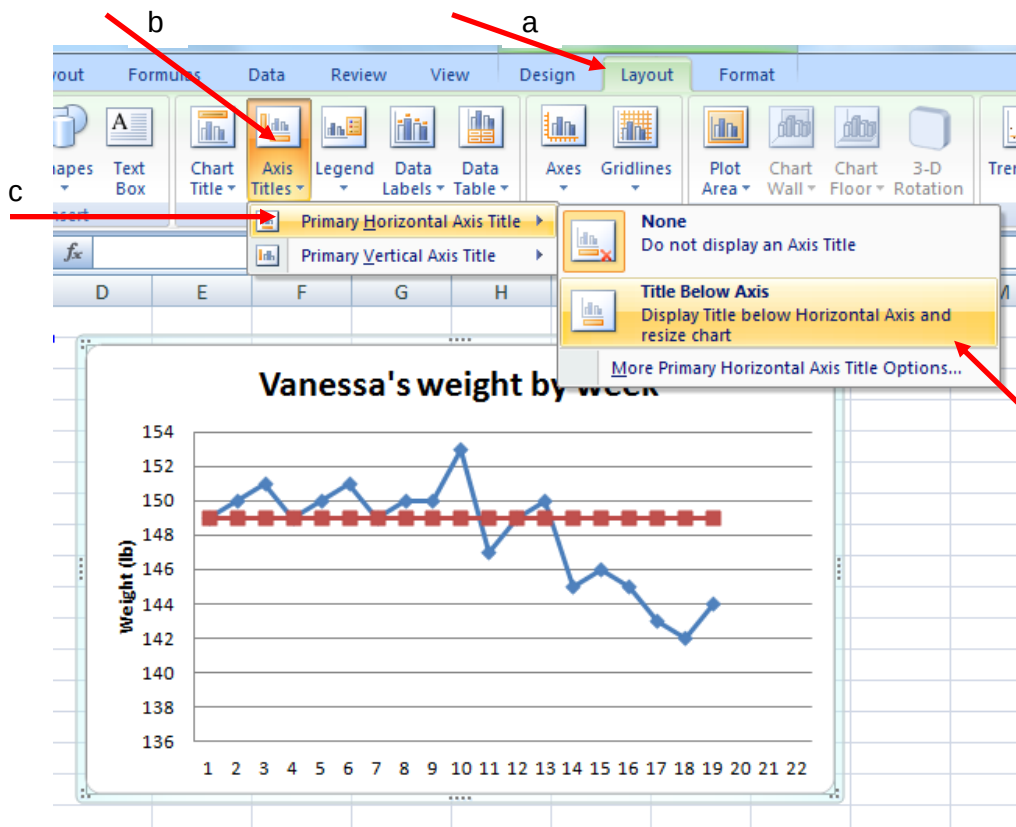
Step 10

Select 'Chart title' and type in the title of your chart.



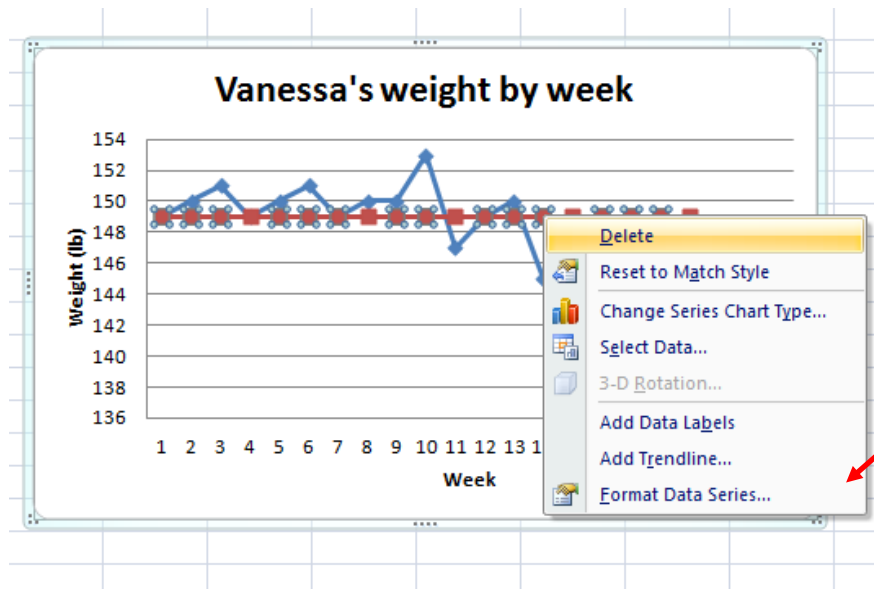
Step 11

Select 'Axis title' and type in your measure.



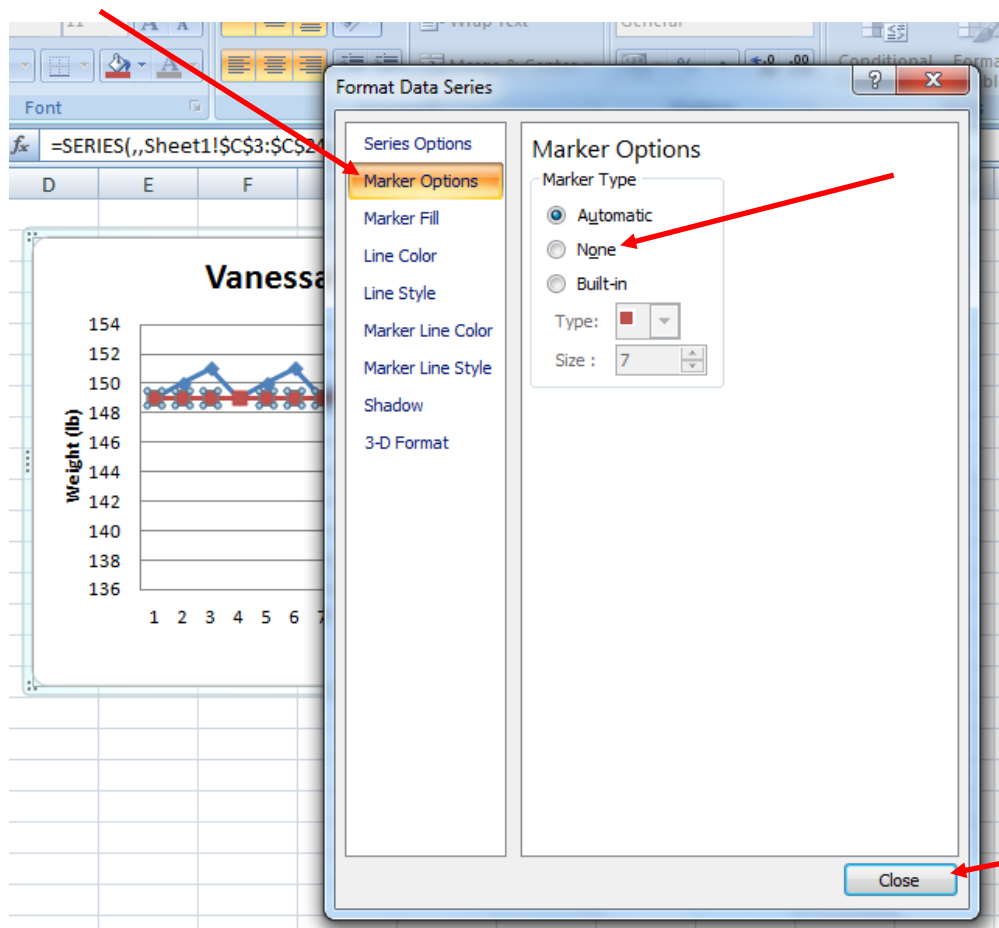
Step 12

- Select the 'Layout' tab to bring up layout options.
- Select the 'Axis titles' button on the Layout toolbar.
- Select 'Primary Horizontal Axis Title'.
- Select 'Title Below Axis'.
- When 'axis title' appears below the chart, select it and type in the time intervals or other appropriate label.



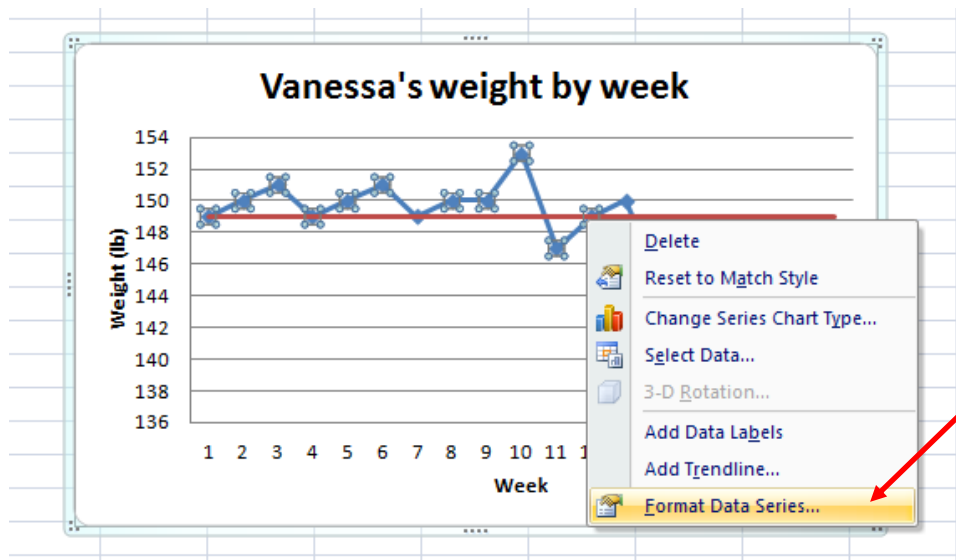
Step 13

Right click on the median line to bring up a dialogue box. Select 'Format data series'.



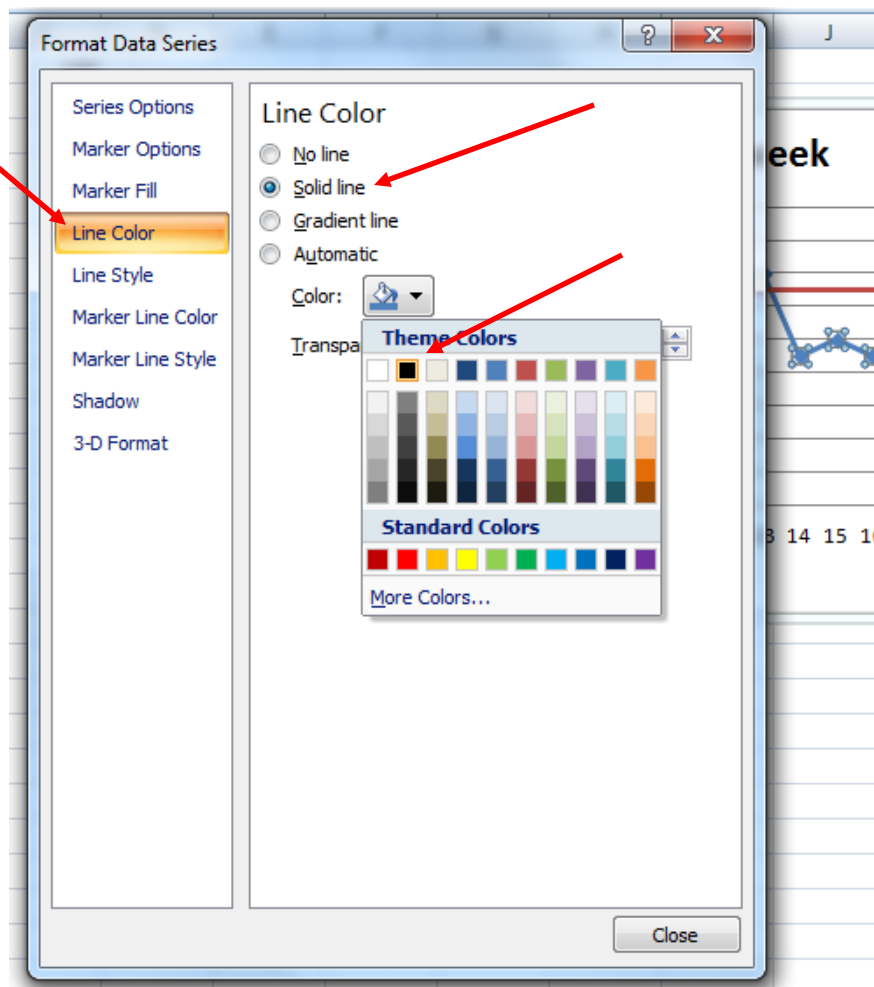
Step 14

Select: Marker options.
Select: None.
Select: Close.



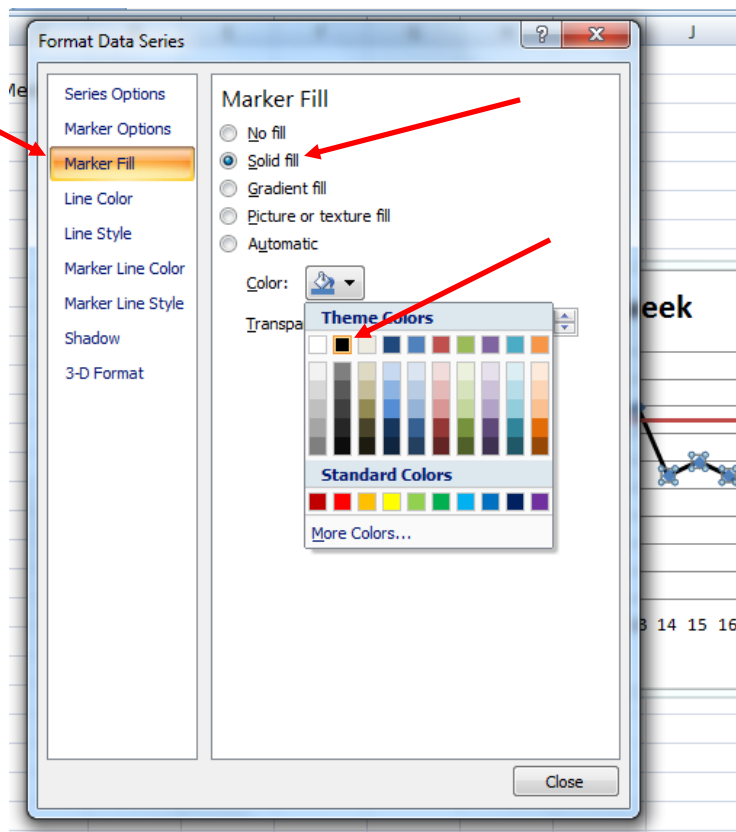
Step 15

Right click on the measure line to bring up a dialogue box.
Select 'Format data series'.



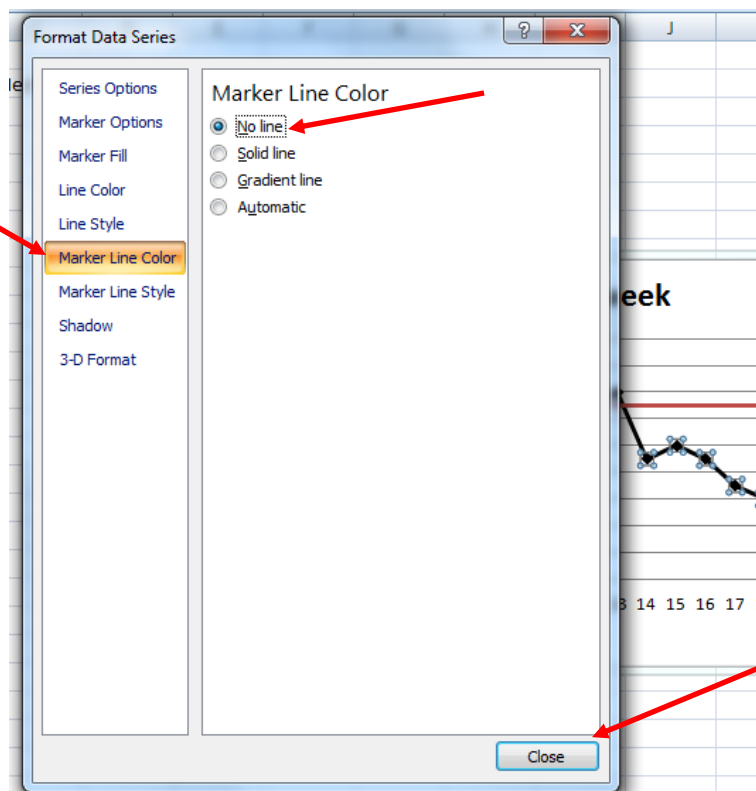
Step 16

Select: Line Color.
Select: Solid line
Change Color to Black.



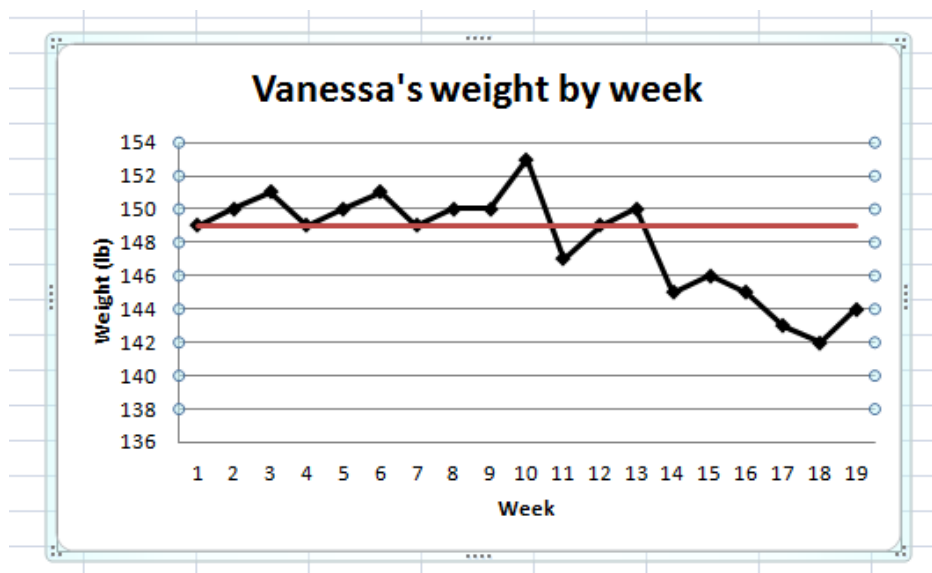
Step 17

Select: Marker Fill
Select: Solid fill
Change Color to Black.



Step 18

Select: Marker Line Color
Select: No line.
Select: Close.



Step 19

Click on horizontal gridlines so that circles appear at each end.

Select Delete.

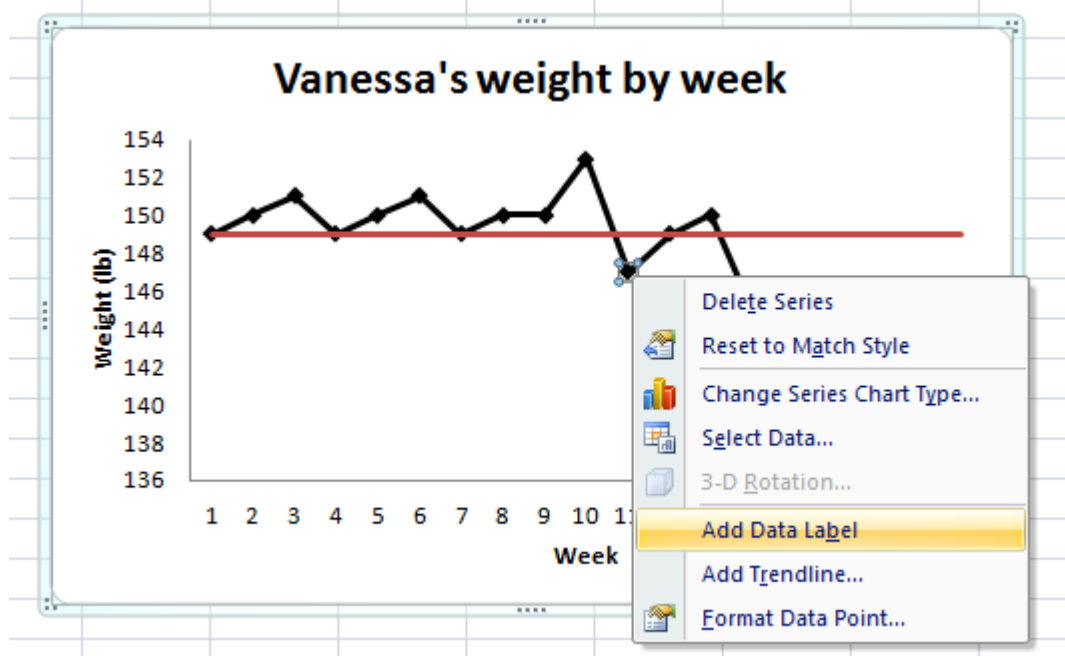
Step 20

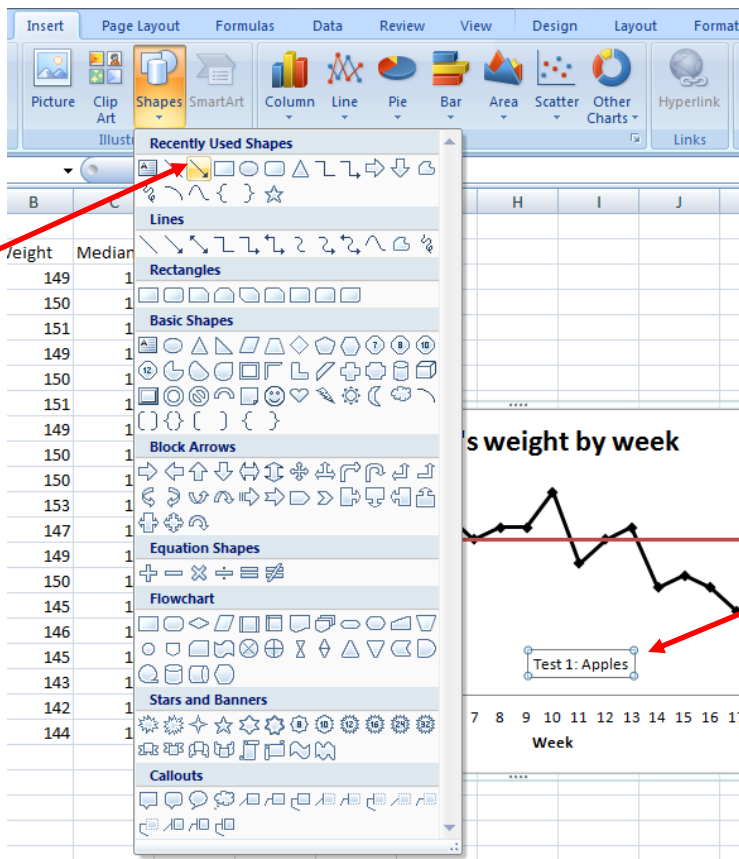
If you add annotations within the chart they will be included when you copy and paste the chart to another document.

Select one data point.

Right click.

Select 'Add Data Label'. This brings up the data value.





Step 21

- Double click the data value to edit and write in your annotation. Select the label and drag it to a suitable location.
- Use Insert/Shapes to add arrows. These will not be copied with the rest of the chart.

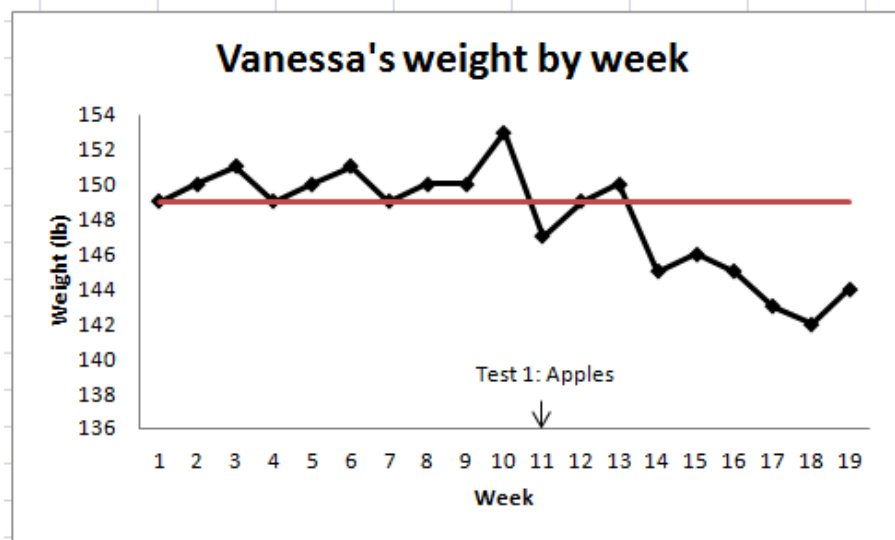
Step 22

Click anywhere on the spreadsheet outside the chart.

Your run chart is now ready to use.

Right click anywhere on the chart to do further formatting e.g. plot area or data series.

Right click near the edge of the chart to copy it, and paste into a Word document or PowerPoint slide.



Section 2: Creating a run chart with a baseline and extended median

Follow the same steps as above, with these differences.

Step 4: Baseline median

Decide which data points you want to include in your baseline median.

In the Function Arguments dialogue box, find the Number 1 field.

Type in the cell reference for the first data item, then colon, then the cell reference for the last data item that was part of your baseline. In this example, baseline data was collected for the first 10 weeks, so look for the data next to Week 10.

Click: OK

The screenshot shows an Excel spreadsheet with columns A (Week), B (Weight), C (Baseline Median), and D (Extended Median). The 'Function Arguments' dialog box for the MEDIAN function is open, showing 'Number1' as B3:B12 and the result as 150. A red arrow points to the 'Baseline period' in the 'Week' column, indicating the range of data used for the median calculation.

	A	B	C	D	E	F	G	H	I	J	K	L
1			Baseline	Extended								
2	Week	Weight	Median	Median								
3	1	149	=MEDIAN(B3:B12)									
4	2	150										
5	3	151										
6	4	149										
7	5	150										
8	6	151										
9	7	149										
10	8	150										
11	9	150										
12	10	153										
13	11	147										
14	12	149										
15	13	150										
16	14	145										
17	15	146										
18	16	145										
19	17	143										
20	18	142										
21	19	144										
22	20											

	A	B	C	D	E
1			Baseline	Extended	
2	Week	Weight	Median	Median	
3	1	149	150		
4	2	150	150		
5	3	151	150		
6	4	149	150		
7	5	150	150		
8	6	151	150		
9	7	149	150		
10	8	150	150		
11	9	150	150		
12	10	153	150		
13	11	147			
14	12	149			
15	13	150			
16	14	145			
17	15	146			
18	16	145			
19	17	143			
20	18	142			
21	19	144			
22	20				

Step 5: As above

Step 6

Drag the + down only as far as the final baseline data point.

In the next column, start with the last data point in the baseline data period. Use the same cell references as for the baseline median.

Function Arguments

MEDIAN

Number1

B3:B12



= {149;150;151;149;150;151;149;150...

Number2



= number

= 150

Returns the median, or the number in the middle of the set of given numbers.

Number1:

number1,number2,... are 1 to 255 numbers or names, arrays, or references that contain numbers for which you want the median.

Formula result = 150

[Help on this function](#)

OK

Cancel

Drag the + down to the final data point.

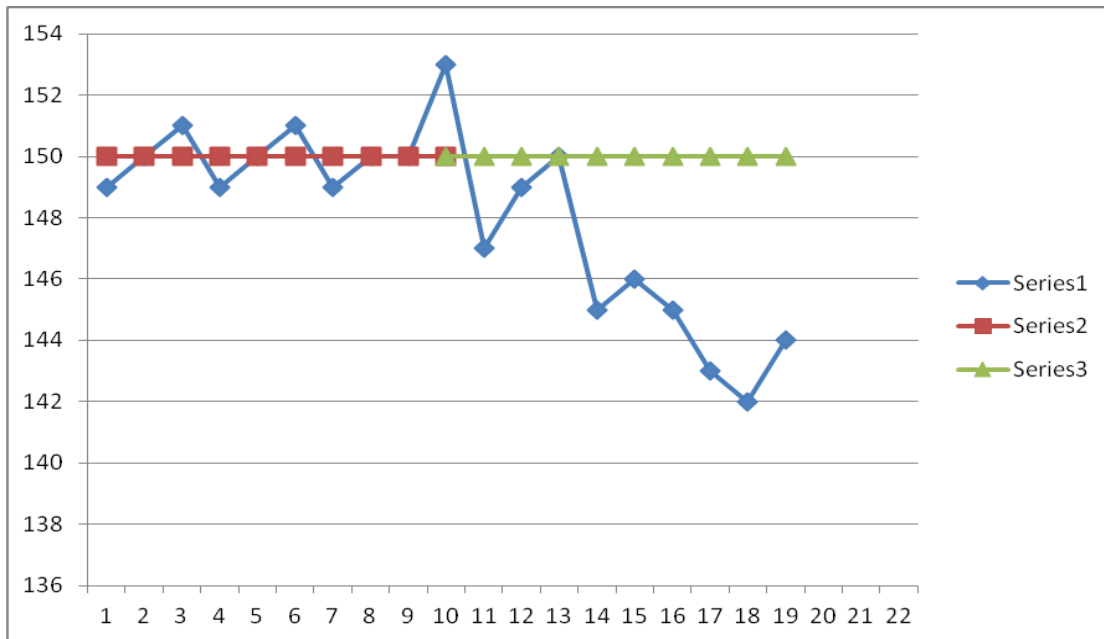
[illegible]

Select all three columns of data for your chart, including empty cells for future dates.

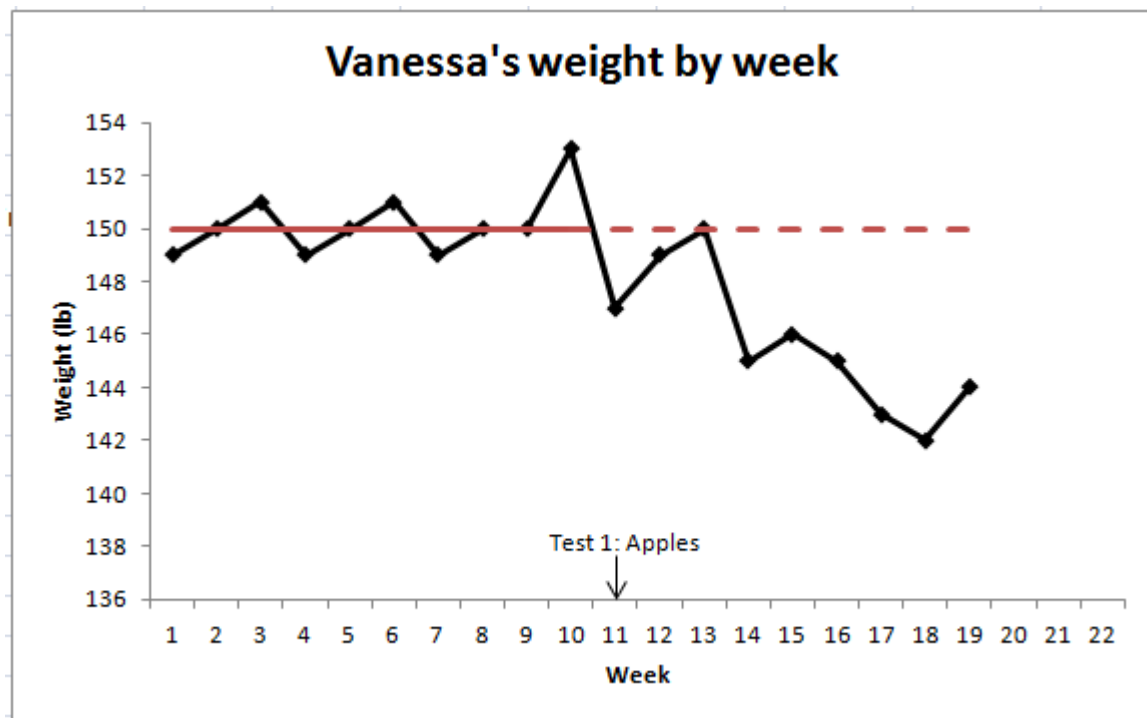
	A	B	C	D	E
1			Baseline	Extended	
2	Week	Weight	Median	Median	
3	1	149	150		
4	2	150	150		
5	3	151	150		
6	4	149	150		
7	5	150	150		
8	6	151	150		
9	7	149	150		
10	8	150	150		
11	9	150	150		
12	10	153	150	150	
13	11	147		150	
14	12	149		150	
15	13	150		150	
16	14	145		150	
17	15	146		150	
18	16	145		150	
19	17	143		150	
20	18	142		150	
21	19	144		150	
22	20				
23	21				
24	22				
25					

Step 8 and beyond

Your median line is in two parts, with different colours, so you can format them differently. Keep the baseline median solid, and make the extended median dotted.



Compare the run chart below with the final run chart at Step 22 above. Here, applying standard run chart rules provides you with useful information sooner.



Section 3: Phasing - creating a new median

From the run chart with extended median above, we can see that a shift could be identified from Week 17. This shift includes the data points at weeks 11, 12, 14, 15, 16, and 17. So at that point, you may decide to create a new median starting from Week 11.

	A	B	C	D
1				
2	Week	Weight	Median 1	Median 2
3	1	149	150	
4	2	150	150	
5	3	151	150	
6	4	149	150	
7	5	150	150	
8	6	151	150	
9	7	149	150	
10	8	150	150	
11	9	150	150	
12	10	153	150	
13	11	147		

Median 1

Steps 1 – 6

As for 'baseline median' above. Drag the bottom corner of the cell only to the bottom of the final data item before the shift began.

Median 2

Steps 2, 3, and 4

Start the new median in the Median 2 column, the cell below the final baseline data point. In the Function Arguments box, type in the cell references starting with the data point where the shift began.

The screenshot shows an Excel spreadsheet with the following data:

Week	Weight	Median 1	Median 2
1	149	150	
2	150	150	
3	151	150	
4	149	150	
5	150	150	
6	151	150	
7	149	150	
8	150	150	
9	150	150	
10	153	150	
11	147		
12	149		
13	150		
14	145		
15	146		
16	145		
17	143		
18	142		
19	144		
20			
21			
22			

The 'Function Arguments' dialog box for the MEDIAN function is open, showing the formula result as 145.

Function Arguments

MEDIAN

Number1: B13:B21 = {147;149;150;145;146;145;143;142...}

Number2: = number

= 145

Returns the median, or the number in the middle of the set of given numbers.

Number1: number1,number2,... are 1 to 255 numbers or names, arrays, or references that contain numbers for which you want the median.

Formula result = 145

[Help on this function](#) OK Cancel

	A	B	C	D
1				
2	Week	Weight	Median 1	Median 2
3	1	149	150	
4	2	150	150	
5	3	151	150	
6	4	149	150	
7	5	150	150	
8	6	151	150	
9	7	149	150	
10	8	150	150	
11	9	150	150	
12	10	153	150	
13	11	147		145
14	12	149		145
15	13	150		145
16	14	145		145
17	15	146		145
18	16	145		145
19	17	143		145
20	18	142		145
21	19	144		145
22	20			
23	21			

Median 2

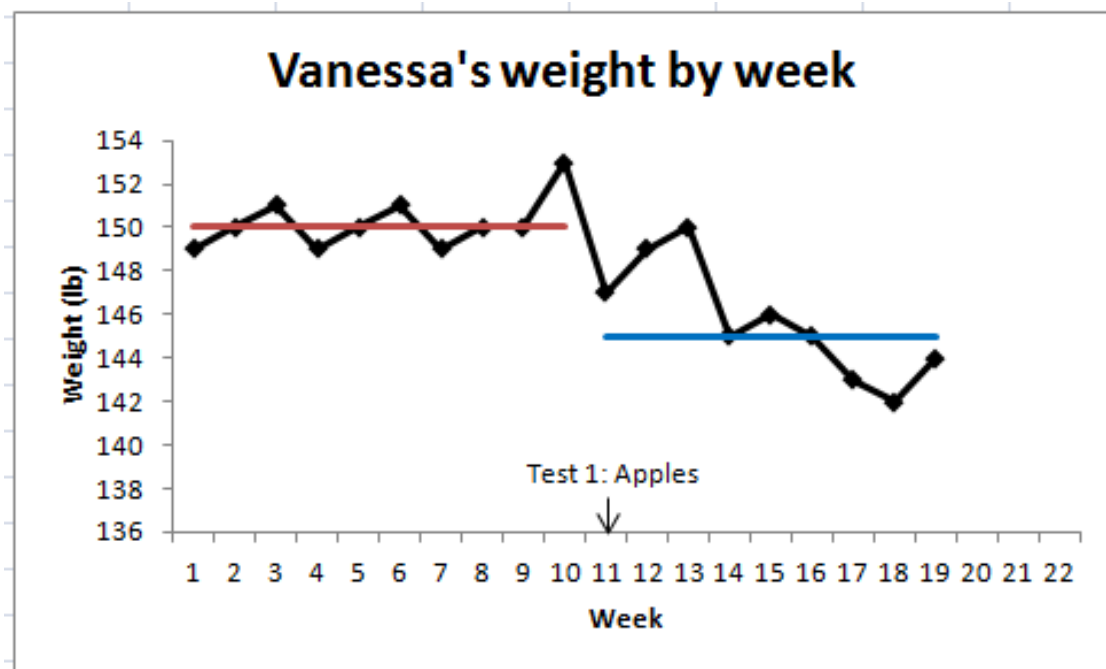
Step 5: As above

Step 6

Drag the bottom corner of the cell to the bottom of your last data item.

Then continue with the rest of the steps to complete the run chart.

The second median helps to highlight that over this period Vanessa has achieved a change in weight from 150lb to 145lb. However, in this example there are not yet enough data points to apply the run chart rules to the second phase.

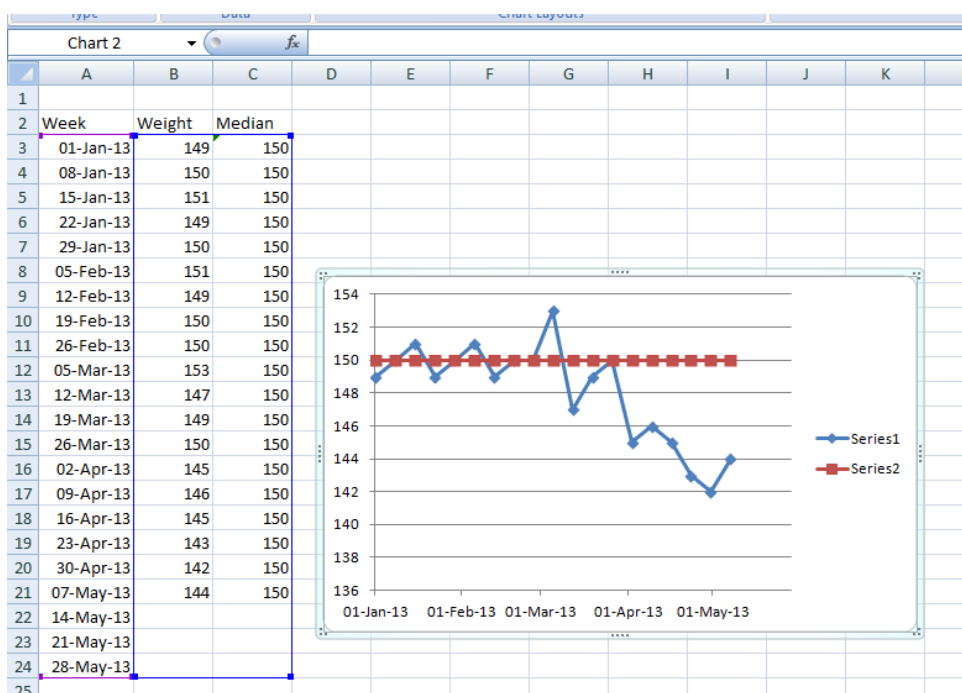


Section 4: Labelling the horizontal axis with dates

For many measures, you will need to label the horizontal axis with dates or times.

	A	B	C
1			
2	Week	Weight	Median
3	01-Jan-13	149	
4	08-Jan-13	150	
5	15-Jan-13	151	
6	22-Jan-13	149	
7	29-Jan-13	150	
8	05-Feb-13	151	
9	12-Feb-13	149	
10	19-Feb-13	150	
11	26-Feb-13	150	
12	05-Mar-13	153	
13	12-Mar-13	147	
14	19-Mar-13	149	
15	26-Mar-13	150	
16	02-Apr-13	145	
17	09-Apr-13	146	
18	16-Apr-13	145	
19	23-Apr-13	143	
20	30-Apr-13	142	
21	07-May-13	144	
22	14-May-13		
23	21-May-13		
24	28-May-13		
25			
26			

Start by entering the data in your spreadsheet, using the dates you want on your horizontal axis. Then create your median data, as above.



At Step 7 above, include the dates column in your selection.

If Excel doesn't seem to want to accept the date format that you enter, you may need to revise the format to create a pattern that Excel will recognise. On the Formatting tool bar, select 'Number', then choose the category and type that you need.

