Advanced Excel Topics

Goal: to make a spreadsheet that shows an in inventory, with trends in sales, and reminders of when to order.

You will also test giving all employees a 5% raise, and compare expenses to sales to see if you can afford it.

You will also freeze some items, to allow you to scroll down the page and still see the column headings.

You will also make some areas of the worksheet protected, so entries are not accidentally changed, and finally explore print and sort options.

Creating Sheet 1

Our business is selling computers, monitors, tablets, and something else that you pick.

We'll start with 0 inventory, get various amounts in, and sell various amounts for three months. We'll need to see how many we have sold, and make a quick spark chart to show us a trend.

	A	B	C	D	E	F	G	H	I
1		Starting inventory	January Deliveries	January sales	February sales	March Sales	Sales	Current Inventory	
2	Computer	0	10	2	2	2	=SUM(D2:F2)		
3	Monitors	0	15	3	3	4	SUM(**number1**, [number2], ...)		
4	Tablets	0	20	4	4	3			
5	Batteries	0	200	10	10	15			

Note: I selected Row 1, right clicked, Format cells, Alignment, and chose 45 degrees.
See also Formatting cells https://edu.gcfglobal.org/en/excel/formatting-cells/1/

For the last line, you should use different numbers, and something aside from Batteries.
Autosum **just the sales in each row**, =SUM(D2:F2) to generate a current inventory.

AVERAGE		✗ ✓ fx	=SUM(D2:F2)				
	A	B	C	D	E	F	G
1		Starting inventory	January Deliveries	January sales	February sales	March Sales	Sales	C
2	Computer	0	10	2	2	2	=SUM(D2:F2)

You could autofill this formula down to get the remaining inventory, or do each line individually.

Now, take January Deliveries, and subtract from it the Sales, to get current inventory.
The formula for the first row is =C2-G2

	A	B	C	D	E	F	G	H	I
1		Starting inventory	January Deliveries	January sales	February sales	March Sales	Sales	Current Inventory	
2	Computer	0	10	2	2	2	6	=C2-G2	
3	Monitors	0	15	3	3	4	10		
4	Tablets	0	20	4	4	3	11		
5	Batteries	0	200	10	10	15	35		

You could autofill this formula down to get the remaining inventory, or do each line individually.

See also Intro to Formulas https://edu.gcfglobal.org/en/excel/intro-to-formulas/1/
See also Creating more complex formulas https://edu.gcfglobal.org/en/excel/creating-more-complex-formulas/1/
See also Functions https://edu.gcfglobal.org/en/excel/functions/1/
(Autosum is the most commonly used function)
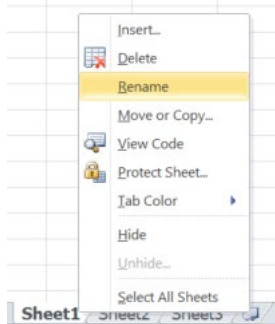See also Groups and subtotals https://edu.gcfglobal.org/en/excel/groups-and-subtotals/1/

You should have something like this:

	Starting inventory	January Deliveries	January sales	February sales	March Sales	Sales	Current Inventory
Computer	0	10	2	2	2	6	4
Monitors	0	15	3	3	4	10	5
Tablets	0	20	4	4	3	11	9
Batteries	0	200	10	10	15	35	165

The green triangles indicate that the formulas nearby are different than this formula.
This can be handy later, when trying to track down a problem… just ignore for now.

Rename the Workbook sheet.

Right click the workbook tab called Sheet1, at the bottom, and select Rename

Insert...
Delete
Rename
Move or Copy...
View Code
Protect Sheet...
Tab Color ▸
Hide
Unhide...
Select All Sheets

Sheet1 Sheet2 Sheet3

Rename Sheet1 to Inventory, and save the file as yourname-business.xlsx

Inventory Sheet2 Sheet3
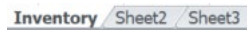
Your screen may differ.
See also Working with Multiple Worksheets https://edu.gcfglobal.org/en/excel/working-with-multiple-worksheets/1/

Charts

In an earlier activity, you added basic charts.
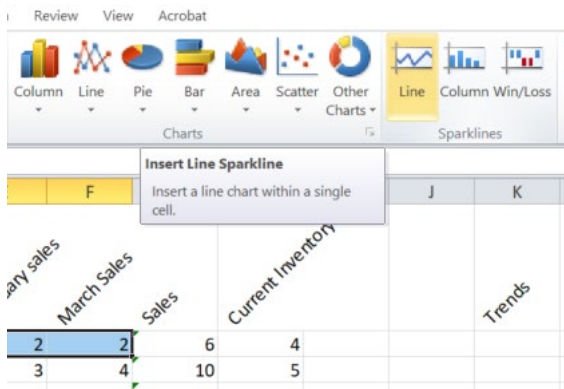See also Charts https://edu.gcfglobal.org/en/excel/charts/1/

Spark charts

To get a small chart (a chart that actually fits IN a cell) that shows a trend, I am going to use a SparkChart.
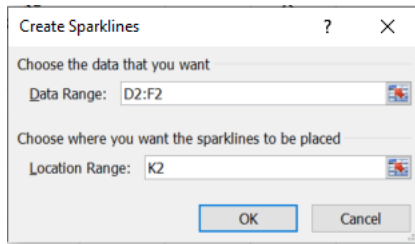
I have skipped over a few columns, and added the label Trends in cell K1.

I next select JUST the sales numbers for row 2, and go to the Insert Tab, and in the Charts group select Line

Review   View   Acrobat

Column Line Pie Bar Area Scatter Other Charts ▾   Line Column Win/Loss

Charts   Sparklines

Insert Line Sparkline
Insert a line chart within a single cell.

Your screen may vary slightly

When you select Lines, you get this dialog box… we have already selected the range, now just tell it where the chart will go… in our case, I will type in K2

Repeat the process, putting charts into K3, K4, and K5 to get the following

Note: Computer sales are flat, Monitors are trending up, Tablets are trending down, and in my case, the last item is trending up.

Recall, you should have something besides Batteries, and your numbers for the last row should differ.

See also a great video on this subject at
https://support.office.com/en-us/article/use-sparklines-to-show-data-trends-1474e169-008c-4783-926b-5c60e620f5ca

More on Charts

Aside from dragging your mouse to select a range for a chart, you can also hold down the Ctrl key, and add cells to a range that may not touch other cells.

Example, in the earlier Budget activity, instead of just displaying the amount left over each month in the chart, I could have also added month names.
Here is the original chart, based on 42A:42E

Now, I will redo. I'll select the chart and delete, then reselect A42:E42, but then also hold down the control key to include A33:E33

	Jan	Feb	Mar	Apr	Total
33					
34 Income					
35 Wages	$500.00	$450.00	$500.00	$500.00	$1,950
36					
37 Expenses					
38 Rent	$300.00	$300.00	$300.00	$300.00	$1,200
39 Food	$100.00	$80.00	$100.00	$100.00	$380
40 Total Expenses	$400.00	$380.00	$400.00	$400.00	$1,580
41	use Σ above	use Σ above	use Σ above	use Σ above	use Σ abo
42 Income - Expenses	$100.00	$70.00	$100.00	$100.00	$370
43	In B42, type in =B35-B40 (use similar formula for C,				

Now I'll insert a column chart based on both ranges. To include the Month names.

See also

https://support.office.com/en-us/article/create-a-chart-from-start-to-finish-0baf399e-dd61-4e18-8a73-b3fd5d5680c2

Conditional Formatting

Conditional formatting can color code a value based on a logical test. Maybe we would like to see inventory numbers below 6 to show up as red. Select the cells H2:H4, then select Conditional Formatting>Highlight Cell Rules>Less than…
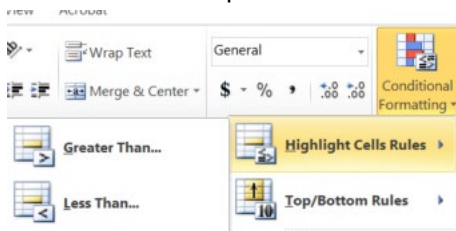
Fill in the value 6
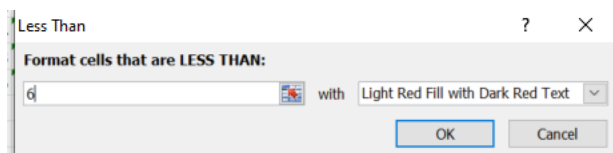
in order to turn cells that are less than 6 Red.

You can now easily see the cells where inventory may be too low, in our case, below 6.

See also Conditional Formatting https://edu.gcfglobal.org/en/excel/conditional-formatting/1/

If

To get a warning when it might be time to order more stock, not just a color coded value, we can use what is called an IF statement. Do not confuse an IF statement, or Function, with "What If" which will be covered shortly.
Based on a logical test, Excel can display a message depending on if the test result is true, or false.

So we could set our reorder threshold to 5 for the computers, monitors, and tablets, and then have Excel display Order More or Inventory OK, depending on if the inventory number is above 5, or below or equal to 5.

The basic lay out in Excel is, logical test, value if true, value if false.
So we would fill out H2>5 for the logical test, "Inventory OK" for the value if true, and "Order More" for value if false.
Then we can also apply some rules to color code it, as well.

To do this we'll add a new label in M1, Inventory Status.
Next, select cell M2, and click the *fx* button, and search for IF.

Click Ok and fill out as shown

Then click OK, repeat for M3 and M4, or autofill.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1		Starting inventory	January Deliveries	January sales	February sales	March Sales	Sales	Current Inventory			Trends		Inventory Status	
2	Computer	0	10	2	2	2	6	4					Order More	
3	Monitors	0	15	3	3	4	10	5					Order More	
4	Tablets	0	20	4	4	3	11	9					Inventory OK	
5	Batteries	0	200	10	10	15	35	165						
6														

Now we now have two ways to quickly check the status of our inventory
See also Functions https://edu.gcfglobal.org/en/excel/functions/1/

Starting Workbook Sheet 2, Salaries

We are now going to enter 3 mythical employees, and figure out how much they make.

If needed a new sheet, then add the following information on Sheet2

See https://support.office.com/en-us/article/insert-or-delete-a-worksheet-19d3d21e-a3b3-4e13-a422-d1f43f1faaf2

In A1   Employee Expenses

In A2   Budgeted Salary

In A3   Actual Salary

Then add the following, starting in A5

Employee	Hours worked	Salary	Pay
Fred	40	15	
Wilma	35	20	
Barney	37	18	

It is probably pretty hard to read these column headings, so click on the Gray Column heading on Column A and drag to the right to select columns A:D.

A1				f_x	Employee Expenses	
	A	B	C	D	E	F
1	Employee Expenses					
2	Budgeted Salary					
3	Actual Salary					
4						
5	Employee	Hours W	Salary	Pay		
6	Fred	40	15			
7	Wilma	35	20			
8	Barney	37	18			
9						

Hover above one of the lines seperating the columns until the cursor turns to a double sided arrow.

Double click the line to AutoSize the columns, so the columns now hold the widest item in each column.

	A	B	C	D	E

Double click one of the lines separating the columns to AutoSize the column widths, now each column is big enough to hold the largest item in each column…

	A	B	C	D	E
1	Employee Expenses				
2	Budgeted Salary				
3	Actual Salary				
4					
5	Employee	Hours Worked	Salary	Pay	
6	Fred	40	15		
7	Wilma	35	20		
8	Barney	37	18		
9					
10					

We could also click the line between columns and dragged to manually resize each column, or we could also have right clicked the selected columns, and gone to Column Width, and set each column.

Now select A1:E1, right click the selection, and under Format Cells, go to the Alignment tab, and select Merge Cells.
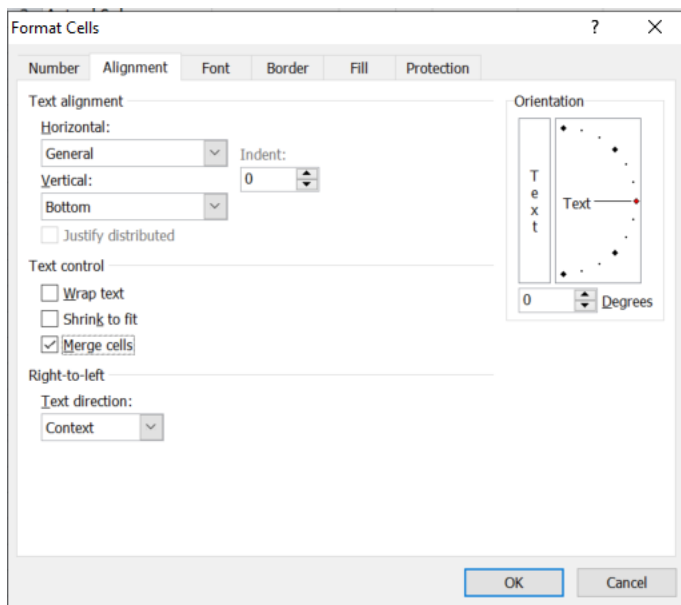
Now you can center the text, change the font face, color, fill color, etc.

Let's get back to work, and calculate our employees salaries, by multiplying hours worked by salary, putting the result under the Pay column. I'll format salary and Pay as Currency, with the $ button on the home tab.

	A	B	C	D	E
1	EMPLOYEE EXPENSES				
2	Budgeted Salary				
3	Actual Salary				
4					
5	Employee	Hours Worked	Salary	Pay	
6	Fred	40	$15.00	$600.00	
7	Wilma	35	$20.00	$700.00	
8	Barney	37	$18.00	$666.00	
9					
10					

Let's also total Salaries using Autosum.

See also

Cell Basics https://edu.gcfglobal.org/en/excel/cell-basics/1/

Modifying columns, rows, and cells https://edu.gcfglobal.org/en/excel/modifying-columns-rows-and-cells/1/

Formatting cells https://edu.gcfglobal.org/en/excel/formatting-cells/1/

Understanding number formats https://edu.gcfglobal.org/en/excel/understanding-number-formats/1/

What if

What is, is basically testing a scenario. I would like to see what the result would be if I gave everyone a 5% raise would be. Now I could just change the salary, and then use Ctrl+Z to undo, but I would like to save the results.

First, I have decided my budget for salary is $2500, I'll add that to B2. And I'll add "Proposed Salary" to A4.
I repeat the total calculated in D9 into B4 by simply typing in=D9

 leads to

If I change any salary, the results in column D will be updated, and that will reflect in the Actual Salary line.
Now, let's name this Workbook Actual Employee Expenses. Right click the tab and select Rename.

To create my proposed salary I will copy Workbook Sheet2, and place the copy after Actual Employee Expenses.
Right click the tab, and select Move or Copy.
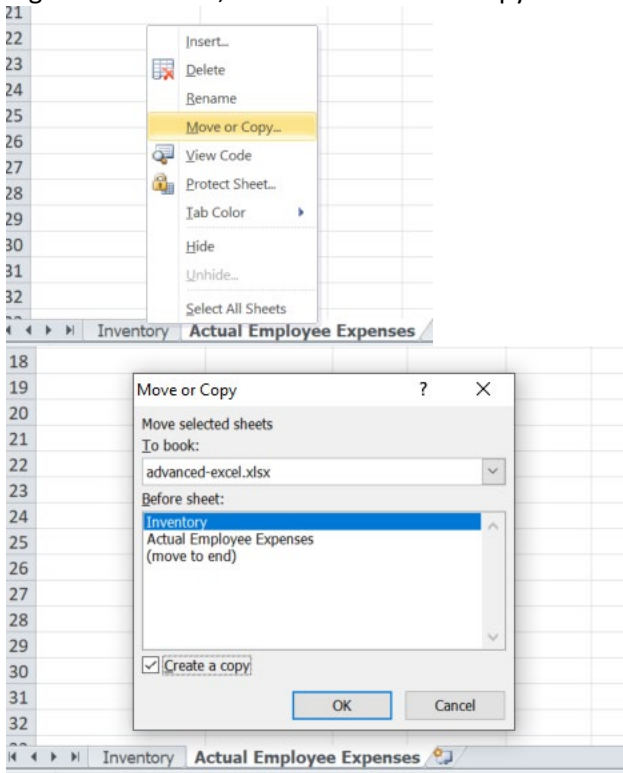
Make sure you select Create a Copy, and place it **after** the current sheet. If the new sheet goes to the wrong place, just drag it to where you want it. Rename this new sheet to Proposed Employee Expenses.
Now let's make a reusable sheet. I don't want to just change the values, I want to be able to test multiple percentages. For this, I'll use an absolute reference. When autofilling, something like =A1*B1 down, the next cell down would be =A2*B2.
But what if I want to keep using A1 and not let that value change? I would change to formula to =$A$1*B1
and when I autofill down, the next row would keep using A1 but increment the other value to B2.

Absolute References

See also

Relative and absolute cell references https://edu.gcfglobal.org/en/excel/relative-and-absolute-cell-references/1/

So if I autofilled =$A$1*B1 down, I would wind up with cells that contained

=$A$1*B1

=$A$1*B2

=$A$1*B3

=$A$1*B4

So I am going to add the following on the Proposed Employee Expenses, in cells A11 and B11

A11 Proposed Raise   B11 .05

10		
11 Proposed raise	0.05	
12		
13		

Now, in F5, I'll add a new label, After raise.

Now I will add the following formula to F6   =(D6*$B$11)+D6

D6 is Fred's current Pay

$B$11 refers to B11, the proposed raise amount, but since I added the $ before the column and $before the row to make it an absolute reference, a cell reference that will not change if I autofill down to quickly build the other formulas. The formula first does the raise amount, then adds the raise amount to the current salary to get the proposed salary/

	A	B	C	D	E	F
1	EMPLOYEE EXPENSES					
2	Budgeted Salary	$ 2,500.00				
3	Actual Salary	$ 1,966.00				
4	Proposed Salary					
5	Employee	Hours Worked	Salary	Pay		After raise
6	Fred		40	$15.00	$ 600.00	=(D6*$B$11)+D6
7	Wilma		35	$20.00	$ 700.00	
8	Barney		37	$18.00	$ 666.00	
9					$1,966.00	
10						
11	Proposed raise	0.05				
12						

Hit enter to see that Fred might get paid $630.

Select F6, and click on the small box to the lower right hand corner, the AutoFill button, and drag the box down to F8 and let go.

In F9 use AutoSum to calculate the proposed total wages.

	A	B	C	D	E	F	G
1	EMPLOYEE EXPENSES						
2	Budgeted Salary	$ 2,500.00					
3	Actual Salary	$ 1,966.00					
4	Proposed Salary						
5	Employee	Hours Worked	Salary	Pay		After raise	
6	Fred		40	$15.00	$ 600.00	$ 630.00	
7	Wilma		35	$20.00	$ 700.00	$ 735.00	
8	Barney		37	$18.00	$ 666.00	$ 699.30	
9					$1,966.00	=SUM(F6:F8)	
10						SUM(number1, [number2], ...)	
11	Proposed raise	0.05					
12							
13							

Now, in B4, type in =F9

	A	B	C	D	E	F
1	EMPLOYEE EXPENSES					
2	Budgeted Salary	$ 2,500.00				
3	Actual Salary	$ 1,966.00				
4	Proposed Salary	$ 2,064.30				
5	Employee	Hours Worked	Salary	Pay		After raise
6	Fred	40	$15.00	$ 600.00		$ 630.00
7	Wilma	35	$20.00	$ 700.00		$ 735.00
8	Barney	37	$18.00	$ 666.00		$ 699.30
9				$1,966.00		$ 2,064.30
10						
11	Proposed raise	0.05				
12						

I can see that this is below my Budgeted Salary value.
WHAT IF if given them a 25% raise?
Change B11 to .25
See how all the effected values change?

	A	B	C	D	E	F
1	EMPLOYEE EXPENSES					
2	Budgeted Salary	$ 2,500.00				
3	Actual Salary	$ 1,966.00				
4	Proposed Salary	$ 2,457.50				
5	Employee	Hours Worked	Salary	Pay		After raise
6	Fred	40	$15.00	$ 600.00		$ 750.00
7	Wilma	35	$20.00	$ 700.00		$ 875.00
8	Barney	37	$18.00	$ 666.00		$ 832.50
9				$1,966.00		$ 2,457.50
10						
11	Proposed raise	0.25				
12						
13						

One last trick. select the Inventory sheet, and add the following info
A9 Type in Current Sales
A10 Type in Proposed Salary

In C9 Type in 3000 and make C- and C10 formatted as currency.
Now, select C10 and type an equal sign =
then select the Proposed Employee Expenses tab
then click B4, the Proposed Salary value
now hit enter

C10   fx   ='Proposed Employee Expenses'!B4

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			Starting inventory	January Deliveries	January sales	February sales	March Sales	Sales	Current Inventory			Trends	Inventory Status	
2	Computer	0	10	2	2	2	6	4					Order More	
3	Monitors	0	15	3	3	4	10	5					Order More	
4	Tablets	0	20	4	4	3	11	9					Inventory OK	
5	Batteries	0	200	10	10	15	35	165						
6														
7														
8														
9	Current Sales		$3,000.00											
10	Proposed Salary		$2,457.50											
11														
12														

The proposed Salary value should now display. If you click B10, you should see the full path to the cell reference;
='Proposed Employee Expenses'!B4
sheet name,   then an exclamation mark !   then the cell reference… telling excel where to look for the value.

If you were to change the % raise value on the Proposed Employee Expenses tab, the math is reworked, and the result is then displayed on your Inventory sheet, where you could do the math to see if you can meet expenses.

See also What if https://edu.gcfglobal.org/en/excel/whatif-analysis/1/
Working with Multiple Worksheets https://edu.gcfglobal.org/en/excel/working-with-multiple-worksheets/1/

Freeze

I hate busy work, but imagine you have 300 employees, and 20 months' worth of pay calculations. If you scroll to the right you no longer see the names, if you scroll down, you no longer see the month names.
A solution to this is to freeze the top row and the first column. This is done by select the cell that is below the first row and to the right of the first column: B2
Then on the view tab Select Freeze Panes
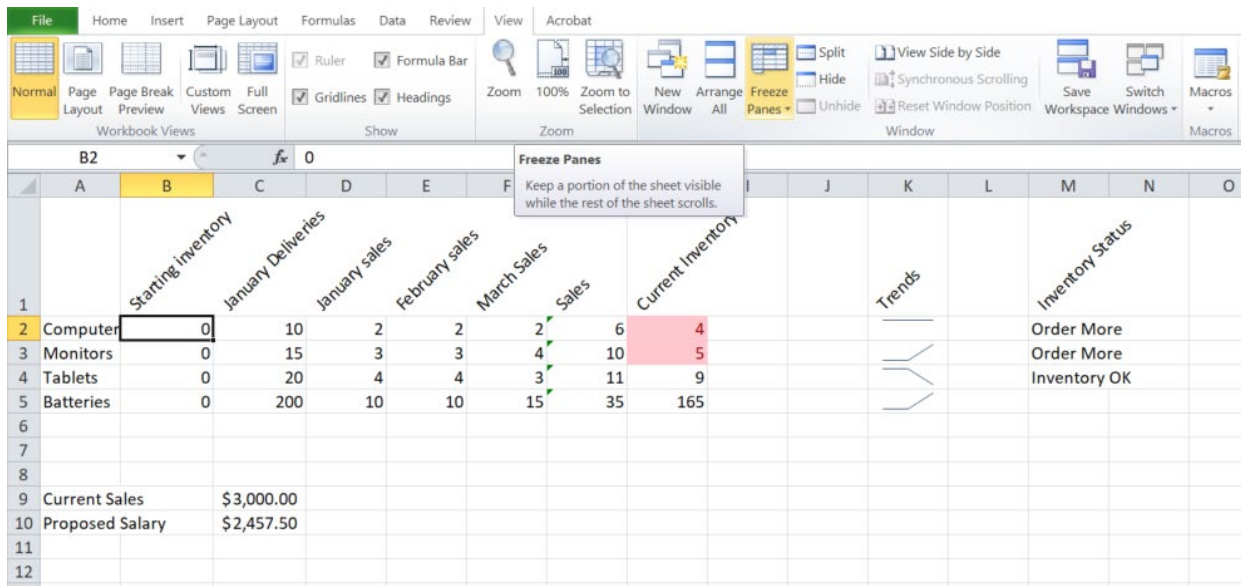
Your screen may vary
Now, if you scroll down the first row is frozen in place.
Now, if you scroll to the right, the first column is frozen in place.

See also Freezing Panes and View options https://edu.gcfglobal.org/en/excel/freezing-panes-and-view-options/1/
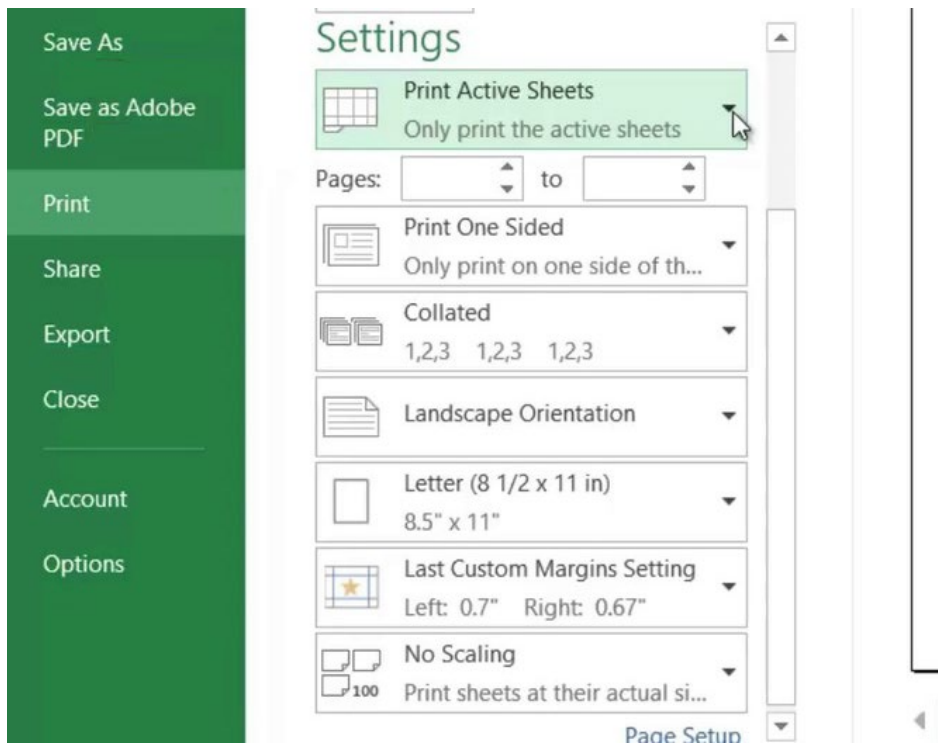
Printing ranges

If you go to File>Print, Excel will try to print everything on the current page.

If you only want to print a portion of the pages, select the portion you want to print, then go to Page layout, and select Print area. You can repeat the steps to change the print area, or add to the print area.
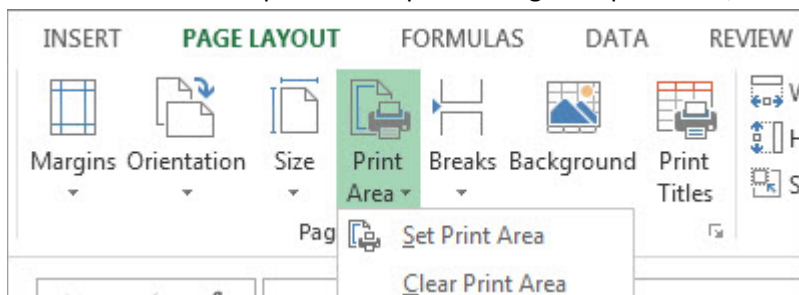
Also, you can control what prints, and even set the print job to fit on one page with scaling.

Page Layout and Printing https://edu.gcfglobal.org/en/excel/page-layout-and-printing/1/

More on Managing Workbook sheets, Protecting workbooks

You can rearrange workbook sheets, copy workbook sheets, color the tabs on workbook sheets, as well as pull results from one sheet to a different workbook sheet.

You can also select cells and protect them to keep from accidentally changing a value
See Also
Inspecting and protecting workbooks https://edu.gcfglobal.org/en/excel/inspecting-and-protecting-workbooks/1/

A bit more on passwords at https://www.microsoftpressstore.com/articles/article.aspx?p=2743760

Deeper Dive in Excel

Linking a Chart into Word or PowerPoint (you can do this in your Research Project)

You can create a chart in Excel, then copy the chart into Word or PowerPoint… but if the data changes, the chart in Word does not, as it was a *picture* of the way the chart used to be. We call this embedding. What we want is to actually create a link to the live, working chart. This is done with what used to be called OLE, Object Linking and Embedding.
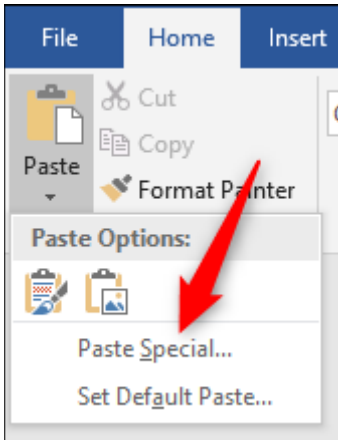
Instead here is how we link rather than embed the chart:
as usual, right click a corner of a chart in Excel and select copy;

Switch to Word or PowerPoint and place your cursor where you want the chart to go. DO NOT RIGHT CLICK.
This is one of the rare times Right Click is not the answer…

Select the ᵥ arrow below Paste on the Home tab, and then select Paste Special...

From here choose to Paste link, and
finally select Microsoft Excel Chart Object.
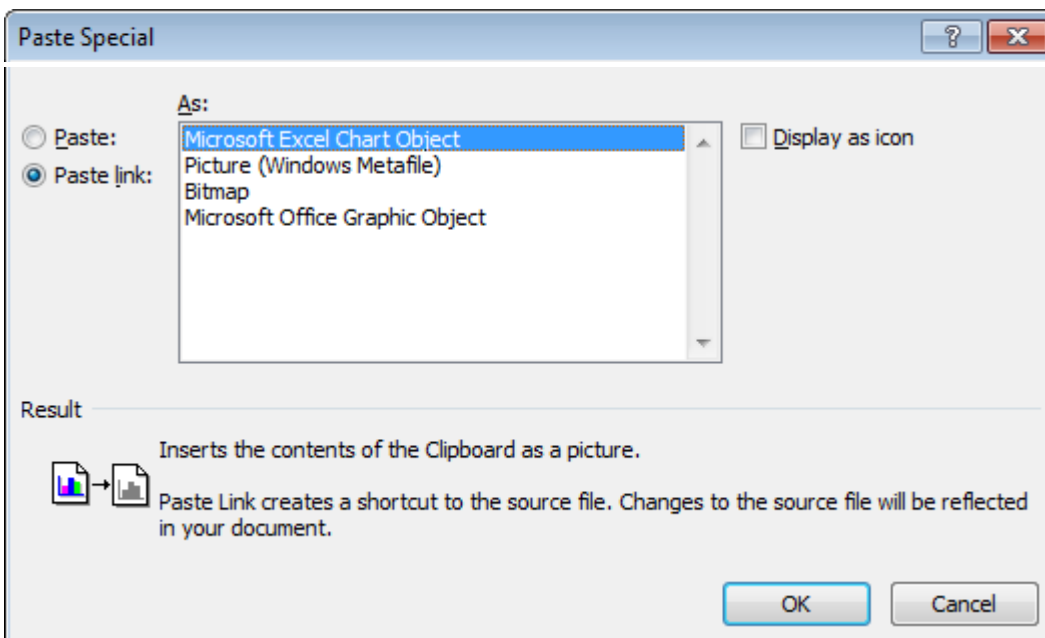
Now, if the chart changes in Excel, it will also change in the other document, as it is not a picture of the chart, but actually the real chart.

Pivot tables (required by the State, at least know the definition)

A pivot table arranges and rearranges (or "pivots") statistics in order to draw attention to useful information.

Microsoft says "A PivotTable is a powerful tool to calculate, summarize, and analyze data that lets you see comparisons, patterns, and trends in your data."

See
https://support.office.com/en-us/article/create-a-pivottable-to-analyze-worksheet-data-a9a84538-bfe9-40a9-a8e9-f99134456576
See also Pivot tables https://edu.gcfglobal.org/en/excel/intro-to-pivottables/1/
See also Doing more with Pivot Tables https://edu.gcfglobal.org/en/excel/doing-more-with-pivottables/1/

A quick note on Time and Date

If you wish to add the time and/or date to a spreadsheet, check out:

https://support.office.com/en-us/article/insert-the-current-date-and-time-in-a-cell-b5663451-10b0-40ab-9e71-6b0ce5768138

For information about how Excel stores dates back to 1900, check out
https://www.myonlinetraininghub.com/excel-date-and-time

Sorting Data

Basic tips for working with data https://edu.gcfglobal.org/en/excel/basic-tips-for-working-with-data/1/
Sorting data https://edu.gcfglobal.org/en/excel/sorting-data/1/
Filtering Data https://edu.gcfglobal.org/en/excel/filtering-data/1/

R. Craig Collins ©2020

Resources in One Place

Excel Resources from GFCglobal https://edu.gcfglobal.org/en/excel/
Introduction https://edu.gcfglobal.org/en/excel/getting-started-with-excel/1/
Creating and opening Workbooks https://edu.gcfglobal.org/en/excel/creating-and-opening-workbooks/1/
Saving and sharing Workbooks https://edu.gcfglobal.org/en/excel/saving-and-sharing-workbooks/1/
Cell Basics https://edu.gcfglobal.org/en/excel/cell-basics/1/
Modifying columns, rows, and cells https://edu.gcfglobal.org/en/excel/modifying-columns-rows-and-cells/1/
Formatting cells https://edu.gcfglobal.org/en/excel/formatting-cells/1/
Understanding number formats https://edu.gcfglobal.org/en/excel/understanding-number-formats/1/
Working with Multiple Worksheets https://edu.gcfglobal.org/en/excel/working-with-multiple-worksheets/1/
Using Find and Replace https://edu.gcfglobal.org/en/excel/using-find-replace/1/
Checking Spelling https://edu.gcfglobal.org/en/excel/checking-spelling/1/
Page Layout and Printing https://edu.gcfglobal.org/en/excel/page-layout-and-printing/1/
Formulas and Functions
Intro to Formulas https://edu.gcfglobal.org/en/excel/intro-to-formulas/1/
Creating more complex formulas https://edu.gcfglobal.org/en/excel/creating-more-complex-formulas/1/
Relative and absolute cell references https://edu.gcfglobal.org/en/excel/relative-and-absolute-cell-references/1/
Functions https://edu.gcfglobal.org/en/excel/functions/1/
Working with Data
Basic tips for working with data https://edu.gcfglobal.org/en/excel/basic-tips-for-working-with-data/1/
Freezing Panes and View options https://edu.gcfglobal.org/en/excel/freezing-panes-and-view-options/1/
Sorting data https://edu.gcfglobal.org/en/excel/sorting-data/1/
Filtering Data https://edu.gcfglobal.org/en/excel/filtering-data/1/
Groups and subtotals https://edu.gcfglobal.org/en/excel/groups-and-subtotals/1/
Table Styles https://edu.gcfglobal.org/en/excel/tables/1/
Charts https://edu.gcfglobal.org/en/excel/charts/1/
Conditional Formatting https://edu.gcfglobal.org/en/excel/conditional-formatting/1/
Doing More with Excel
Comments and Co-authoring https://edu.gcfglobal.org/en/excel/comments-and-coauthoring/1/
Inspecting and protecting workbooks https://edu.gcfglobal.org/en/excel/inspecting-and-protecting-workbooks/1/
Pivot tables https://edu.gcfglobal.org/en/excel/intro-to-pivottables/1/
Doing more with Pivot Tables https://edu.gcfglobal.org/en/excel/doing-more-with-pivottables/1/
What if https://edu.gcfglobal.org/en/excel/whatif-analysis/1/

Evaluation

20 items, 5 points each

Format 1st row to 45 degrees

Column widths adjusted

Added proper labels for Inventory

Added approriate values for Inventory

Added correct Autosum values for Sales

Correctly created formulas for remaining inventory

Renamed the worksheet

Added proper splark line charts

Added correct conditional formating

Correctly added If function

Correctly added Salary labels

Correctly added Salary values

Column widths adjusted

First row merged and formatted

Salary calculations complete

Worksheet renamed

Proposed Employee expenses copied and renamed

Formula uses absolute references

All formulas and cell references created correctly

Proposed value transfered to Inventory sheet