

Plotting Graphs in Excel 2021

For Use with Your Hooke's Law Data

2020

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USE OF EXCEL 2016 PHYSICS- A GRAPH OF HOOKE'S LAW

Hopefully you saved your table properly and even pinned it to the top of the excel page so it can be easily found. You ought to have labelled it something sensible

The screenshot shows the OneDrive web interface. On the left is a green sidebar with navigation options: Home, New, Open, Info, Save a Copy, Print, Share, Export, Close, Account, Feedback, and Options. The main area shows a 'Recent' tab with a list of files. The first file, 'Mrs Physics', is pinned (indicated by a star icon) and is at the top of the list. A text box with a green arrow points to this file, containing the text: 'I pinned my file so it is at the top of the list, but I ought to have named it something more sensible, like Mrs Physics Hookes Law'. Other files in the list include 'excel tables', 'Staff Rota', 'Physics units JCH_JAH', 'Physics units JCH', and 'Needs of Physicists'. The right side of the screen shows a Windows taskbar with various application icons and the system clock displaying 19:46 on 13/05/2020.

| Name | Date modified |
|--|--------------------|
| Mrs Physics OneDrive - Glow Scotland » 2019 | 8h ago |
| excel tables OneDrive - Glow Scotland » 2019 | 8h ago |
| Staff Rota Glow Scotland » personal » gw08asherbrian_glow_sch_uk » Documents » COVID 19 HUB | Yesterday at 16:54 |
| Physics units JCH_JAH OneDrive - Glow Scotland » 2019 | Yesterday at 16:46 |
| Physics units JCH OneDrive - Glow Scotland | Yesterday at 16:38 |
| Physics units JCH Downloads | Yesterday at 16:32 |
| Needs of Physicists OneDrive - Glow Scotland » IoP NLC | Mon at 11:12 |

Plotting Graphs in Excel 2021

Click on Home

Insert data, or open up your existing spreadsheet.

| mass added (grams) | Force (N) | length (cm) | | | | average | extension (cm) |
|--------------------|-----------|-------------|-----|-----|-----|---------|----------------|
| | | 1 | 2 | 3 | 4 | | |
| 0 | 0.0 | 2.1 | 2.1 | 2.0 | 2.0 | 2.1 | 0.0 |
| 10 | 0.1 | 2.2 | 2.3 | 2.1 | 2.1 | 2.2 | 0.1 |
| 20 | 0.2 | 2.5 | 2.5 | 2.6 | 2.5 | 2.5 | 0.5 |
| 30 | 0.3 | 2.7 | 2.9 | 2.9 | 3.0 | 2.9 | 0.8 |
| 40 | 0.4 | 3.0 | 3.2 | 3.4 | 3.5 | 3.3 | 1.2 |
| 50 | 0.5 | 3.6 | 3.6 | 4.4 | 3.8 | 3.9 | 1.8 |
| 60 | 0.6 | 3.9 | 4.0 | 4.5 | 4.1 | 4.1 | 2.1 |
| 70 | 0.7 | 4.4 | 4.5 | 5.0 | 4.5 | 4.6 | 2.6 |
| 80 | 0.8 | 4.8 | 4.8 | 5.3 | 4.9 | 5.0 | 2.9 |
| 90 | 0.9 | 5.0 | 5.6 | 5.6 | 5.1 | 5.3 | 3.3 |
| 100 | 1.0 | 5.5 | 6.0 | 6.0 | 5.7 | 5.8 | 3.8 |

Please note during this document I use various sheets and do flit back and forwards. It is best read with the video file! Each part is given in detail though.

Plotting Graphs in Excel 2021

Insert Scatter (X, Y) or Bubble Chart
Use this chart type to show the relationship between sets of values.

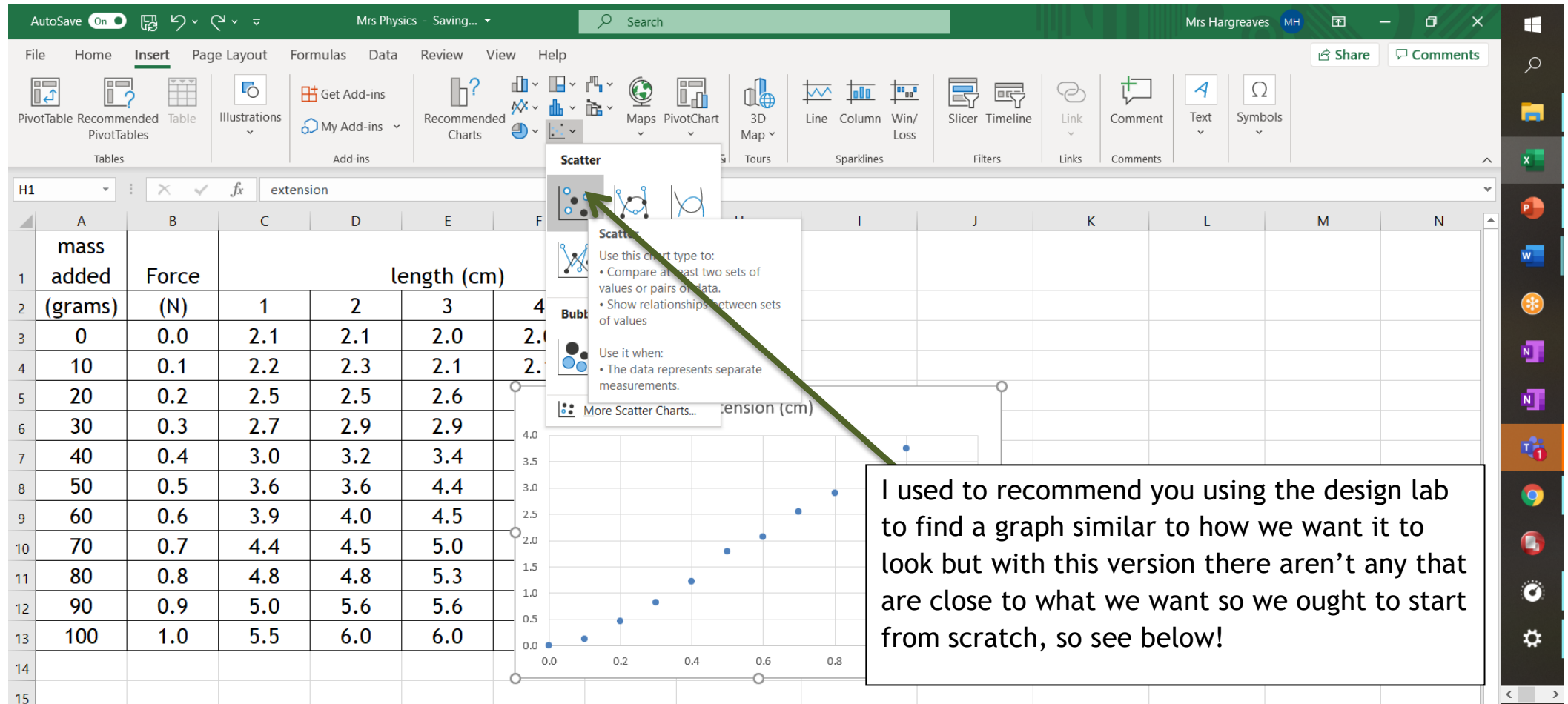
Click the arrow to see the different types of scatter and bubble charts available and pause the pointer on the icons to see a preview in your document.

First highlight the data that you want to plot. As these are not next to each other you should click in the first column and drag down the cells that you want to plot, **then holding down the CONTROL key repeat for the other column**. This involves the left mouse- try it! Once the two columns are highlighted release the control key

Go to INSERT and then in the CHARTS section you need the SCATTER graph. It isn't the one that stands out most!

| | mass added (grams) | Force (N) | length (cm) 1 | length (cm) 2 | length (cm) 3 | length (cm) 4 | length (cm) 5 | length (cm) 6 |
|----|--------------------|-----------|---------------|---------------|---------------|---------------|---------------|---------------|
| 1 | 0 | 0.0 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 0.0 |
| 2 | 10 | 0.1 | 2.2 | 2.3 | 2.1 | 2.1 | 2.2 | 0.1 |
| 3 | 20 | 0.2 | 2.5 | 2.5 | 2.6 | 2.5 | 2.5 | 0.5 |
| 4 | 30 | 0.3 | 2.7 | 2.9 | 2.9 | 3.0 | 2.9 | 0.8 |
| 5 | 40 | 0.4 | 3.0 | 3.2 | 3.4 | 3.5 | 3.3 | 1.2 |
| 6 | 50 | 0.5 | 3.6 | 3.6 | 4.4 | 3.8 | 3.9 | 1.8 |
| 7 | 60 | 0.6 | 3.9 | 4.0 | 4.5 | 4.1 | 4.1 | 2.1 |
| 8 | 70 | 0.7 | 4.4 | 4.5 | 5.0 | 4.5 | 4.6 | 2.6 |
| 9 | 80 | 0.8 | 4.8 | 4.8 | 5.3 | 4.9 | 5.0 | 2.9 |
| 10 | 90 | 0.9 | 5.0 | 5.6 | 5.6 | 5.1 | 5.3 | 3.3 |
| 11 | 100 | 1.0 | 5.5 | 6.0 | 6.0 | 5.7 | 5.8 | 3.8 |

Plotting Graphs in Excel 2021



Do check that your graph looks correct. Sometimes Excel has a huff and produces nonsense. Usually you need to go back start again and only highlight the data and not the headings! **It doesn't like blanks in cells, so don't leave any.** For example if you have a gap under your units with a blank line your results wont plot a scatter graph. Also **do not plot the line graph**, although this is what we would call our graph Excel refers to it as a **scatter graph**.

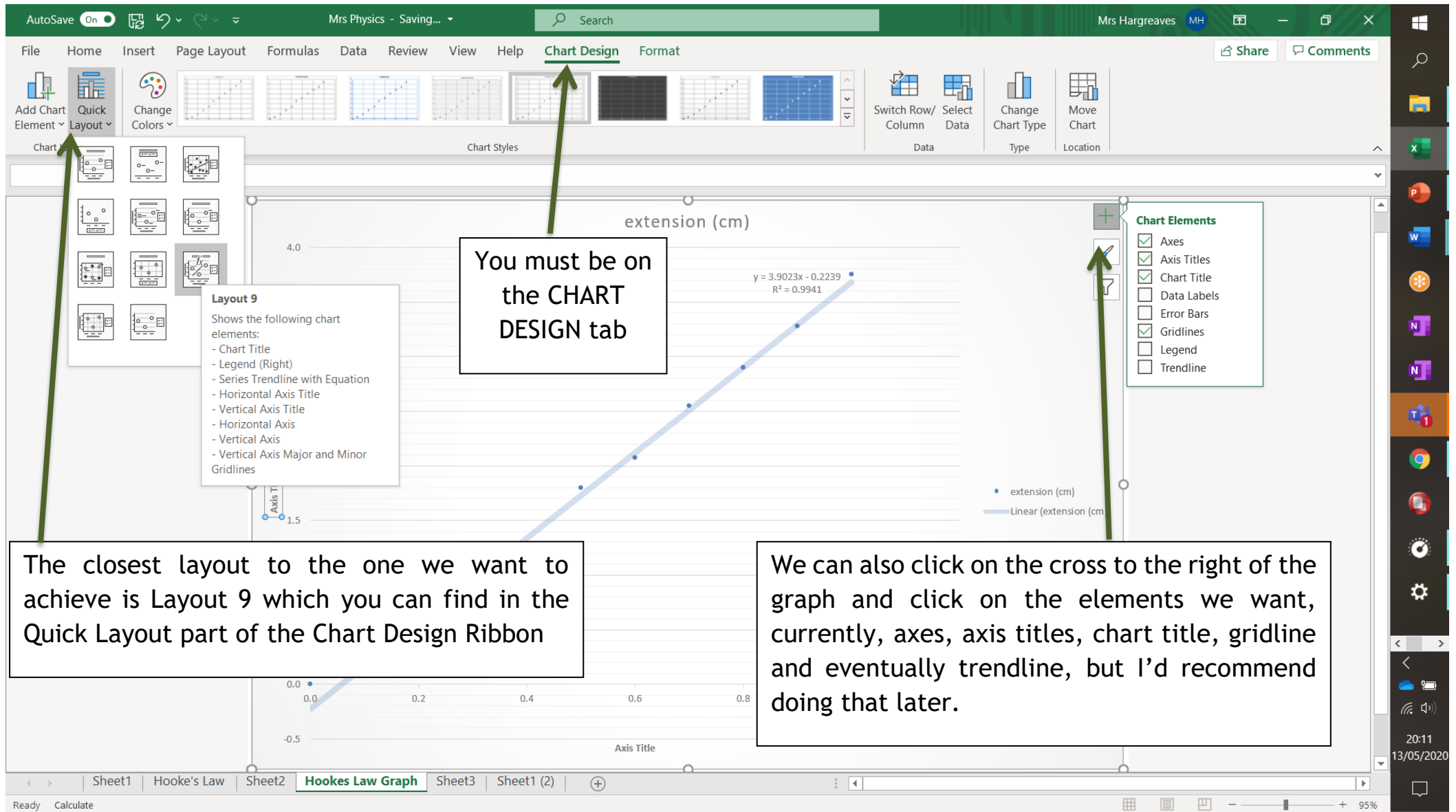
Plotting Graphs in Excel 2021

The screenshot shows an Excel spreadsheet with a table of data for Hooke's Law. The table includes columns for mass added, Force, length (cm), and extension (cm). A scatter plot is visible, showing the relationship between extension and Force. The 'Chart Design' tab is active, and the 'Move Chart' button is highlighted. The 'Move Chart' dialog box is open, showing the option to move the chart to a new sheet named 'Hookes Law Graph'.

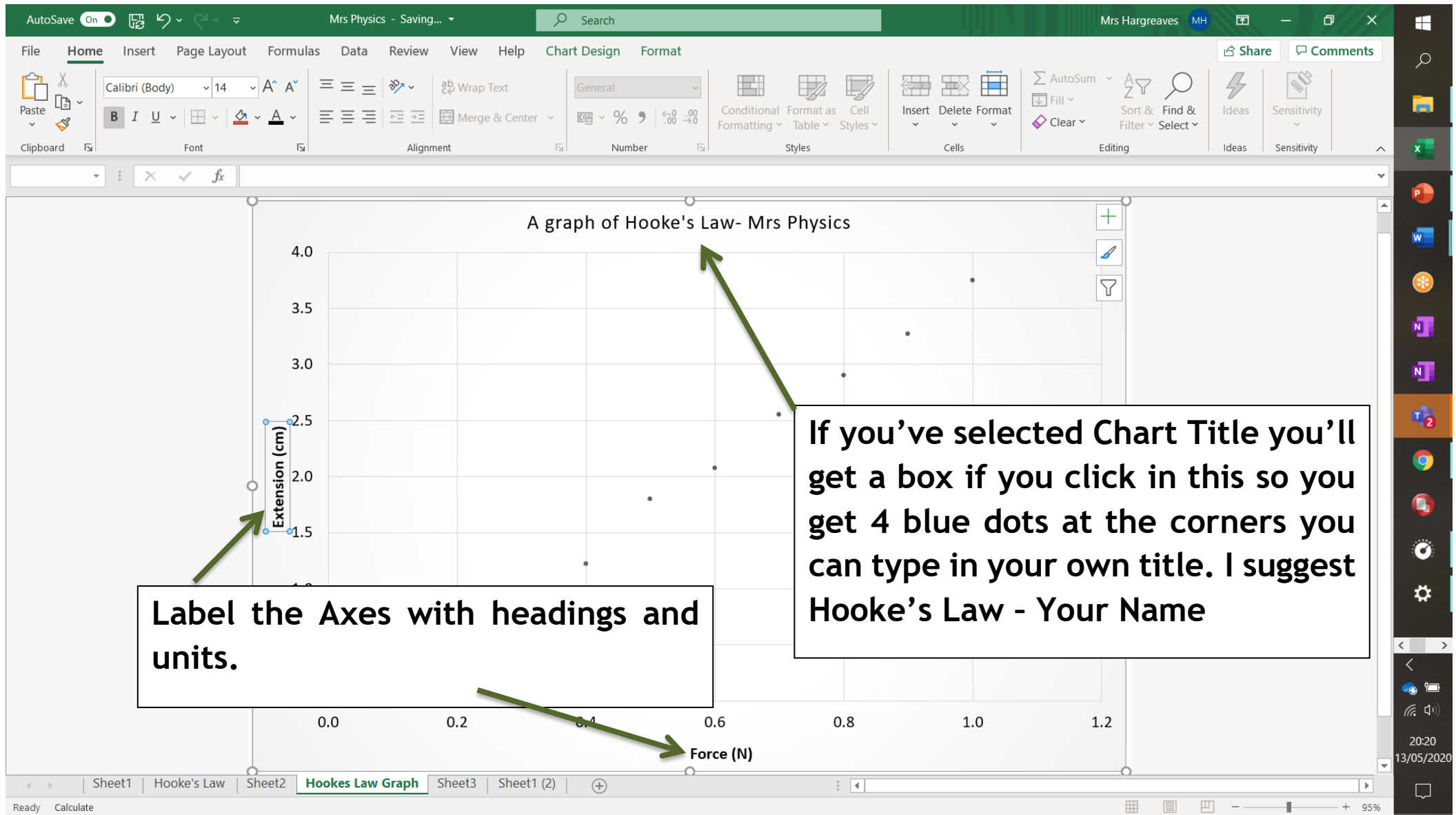
| mass added (grams) | Force (N) | length (cm) | extension (cm) |
|--------------------|-----------|-------------|----------------|
| 0 | 0.0 | 2.1 | 0.0 |
| 10 | 0.1 | 2.2 | 0.1 |
| 20 | 0.2 | 2.5 | 0.2 |
| 30 | 0.3 | 2.7 | 0.3 |
| 40 | 0.4 | 3.0 | 0.4 |
| 50 | 0.5 | 3.6 | 0.5 |
| 60 | 0.6 | 3.9 | 0.6 |
| 70 | 0.7 | 4.4 | 0.7 |

The first thing we should do is move the graph to a new sheet so the table of results doesn't get in the way. For this you need to be in the CHART DESIGN tab, Click on MOVE CHART (on the right) and click NEW SHEET. Name it Hooke's Law

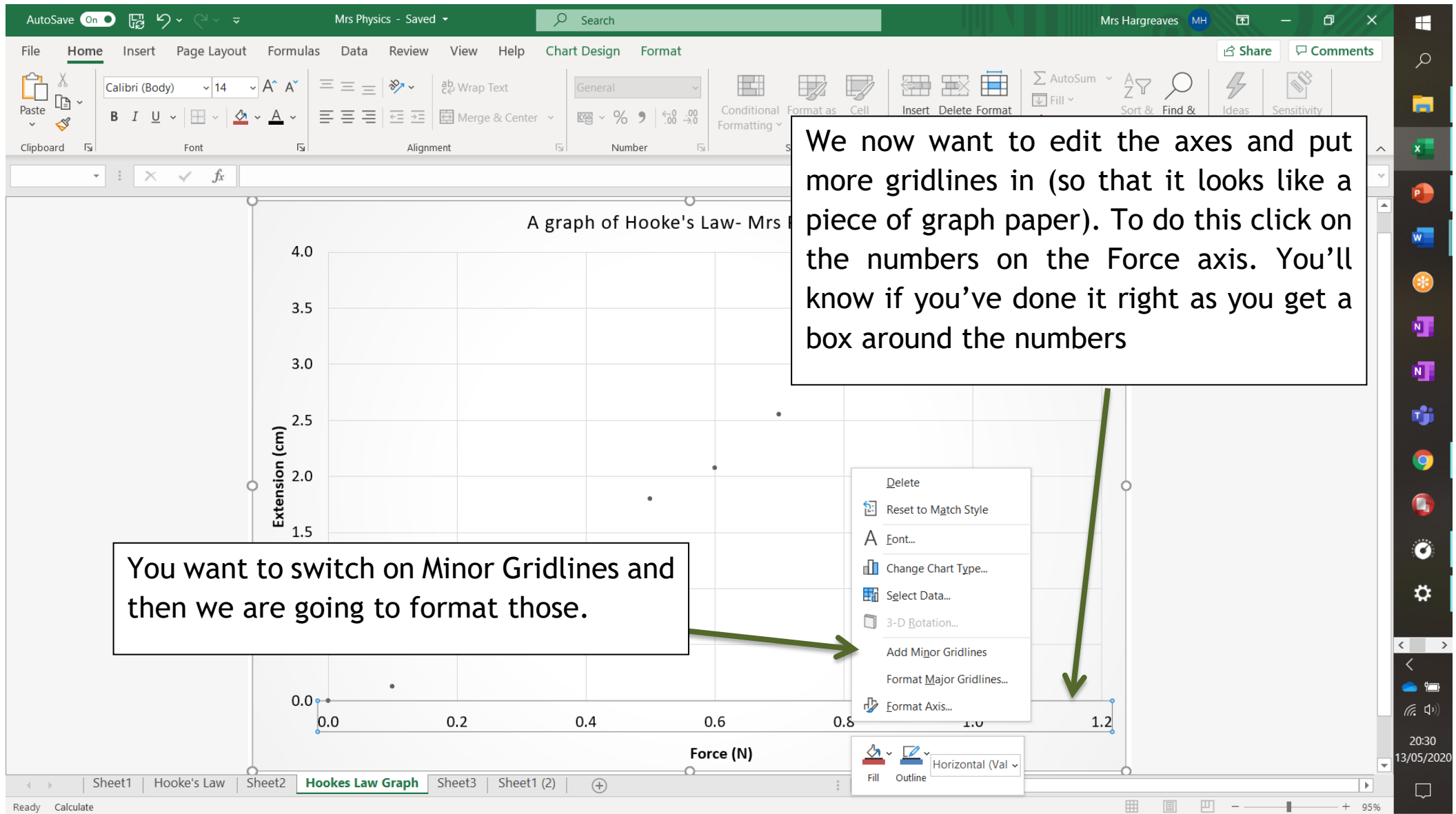
Plotting Graphs in Excel 2021



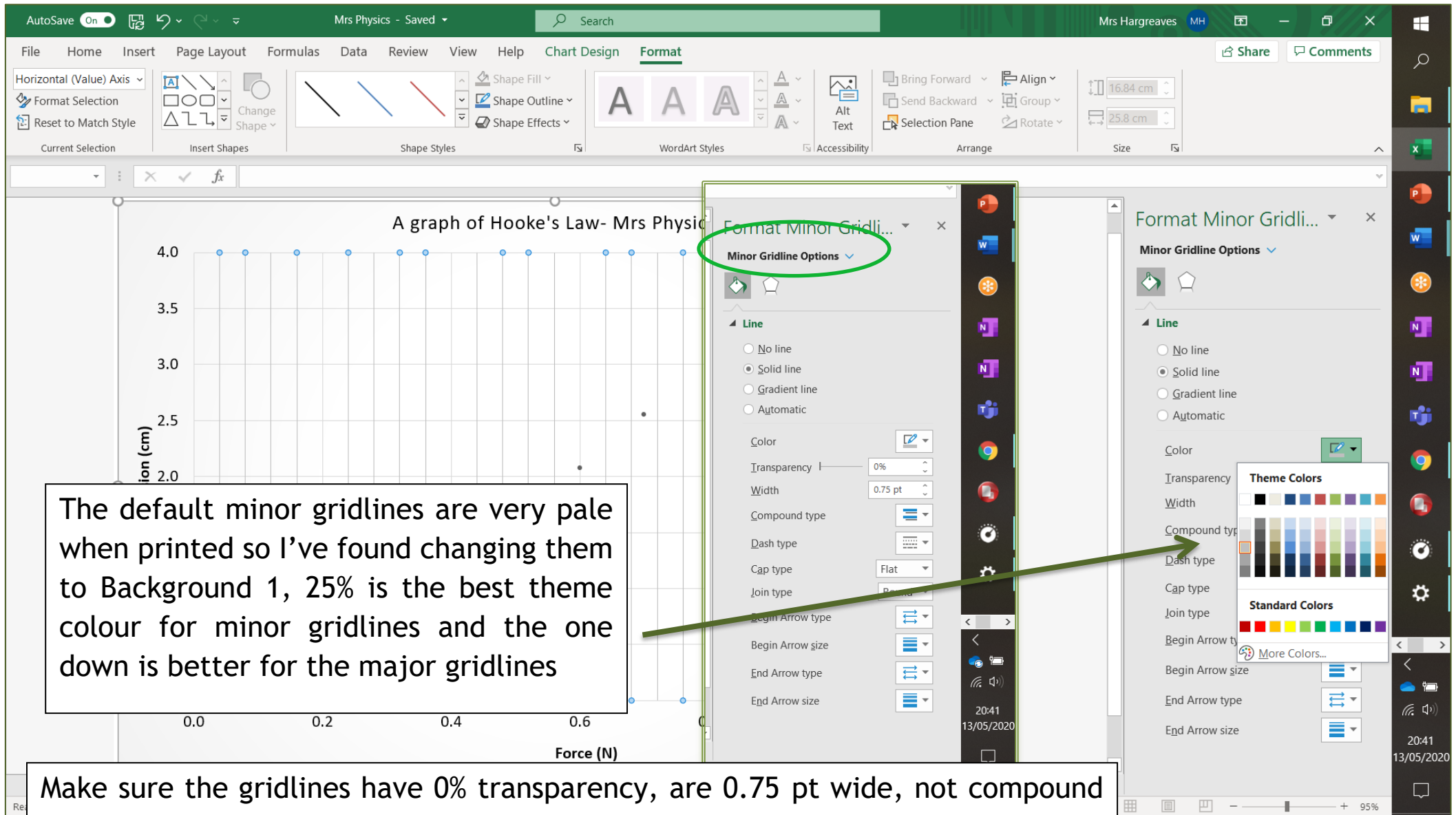
Plotting Graphs in Excel 2021



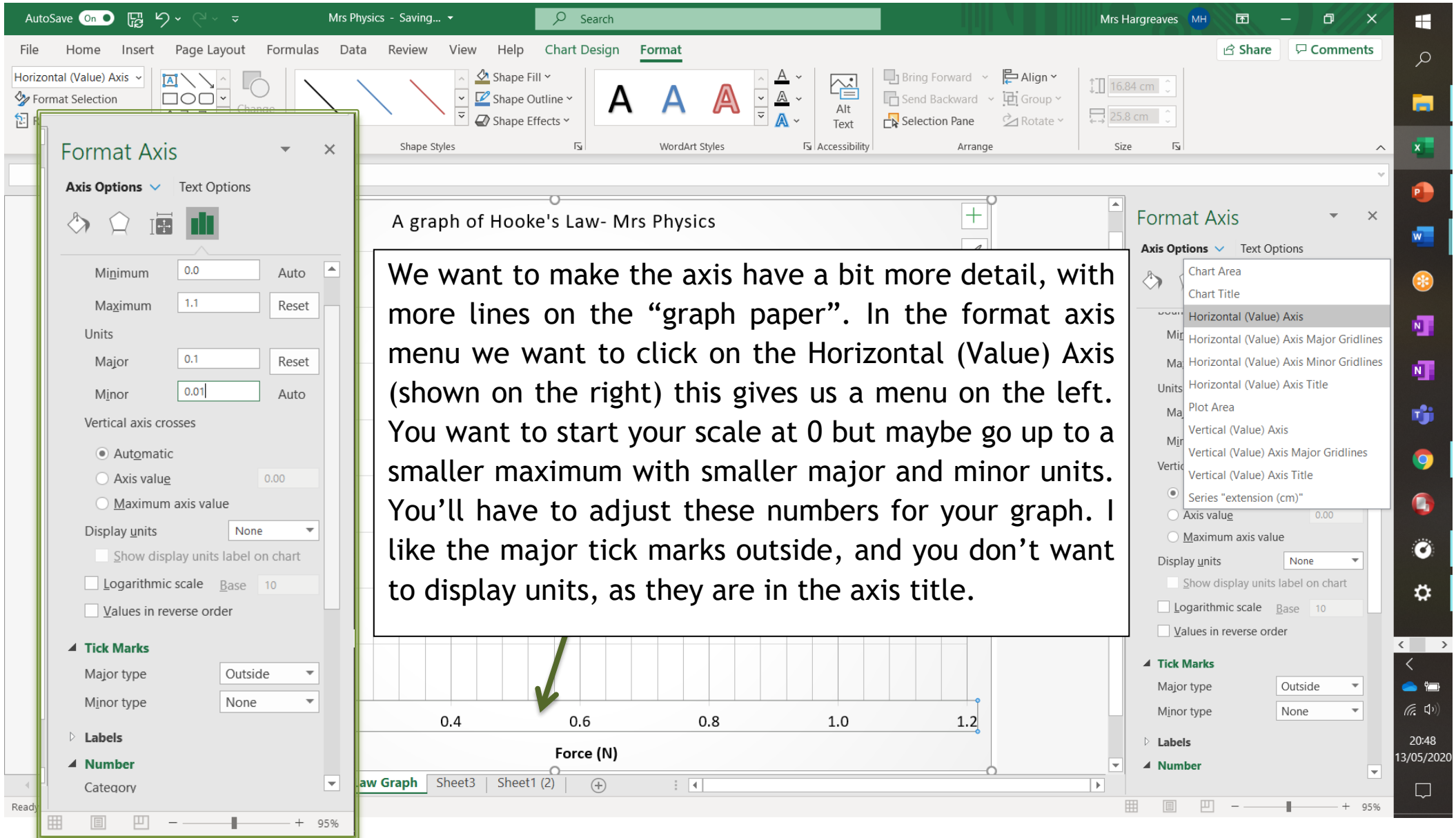
Plotting Graphs in Excel 2021



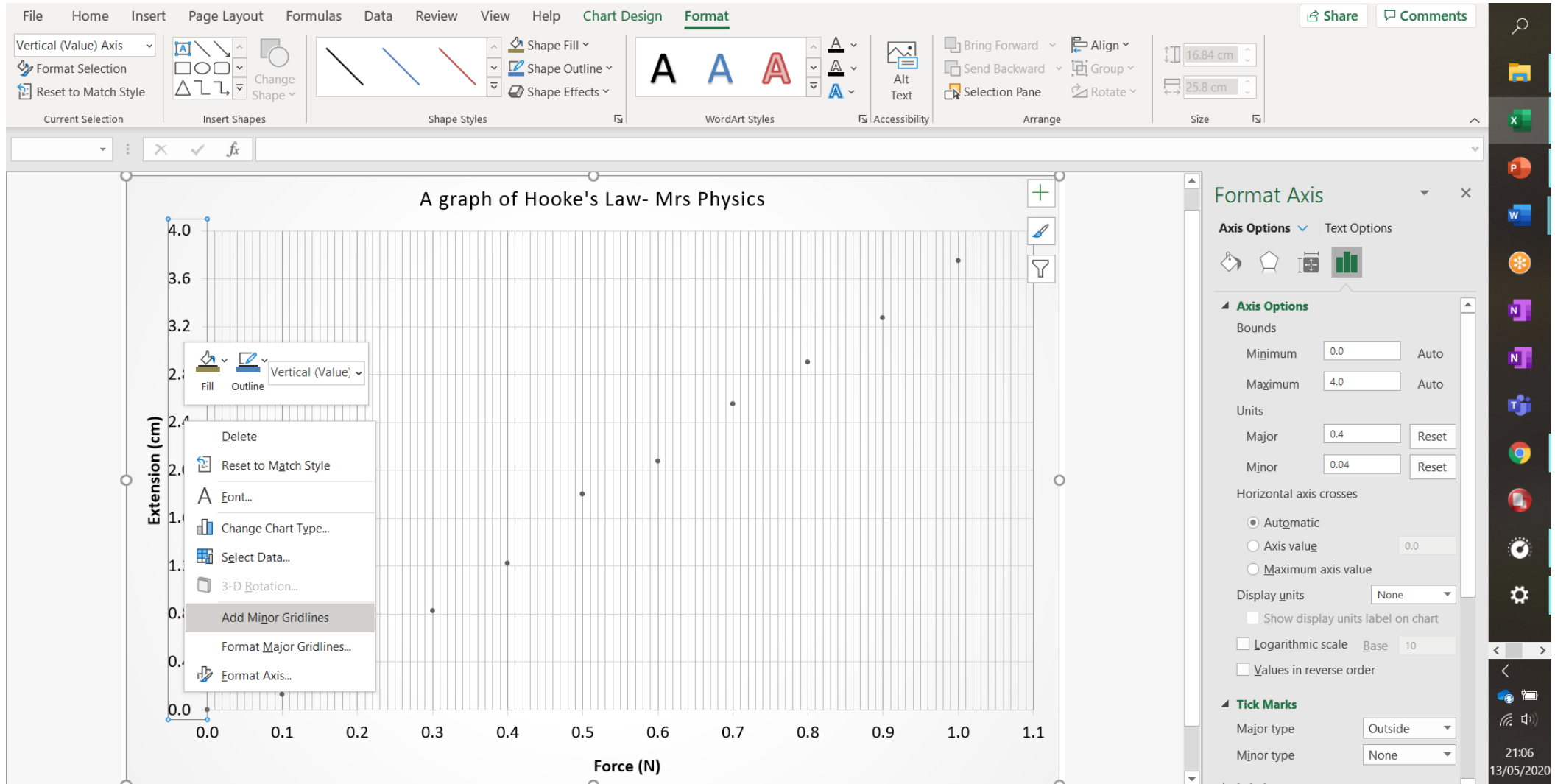
Plotting Graphs in Excel 2021



Plotting Graphs in Excel 2021

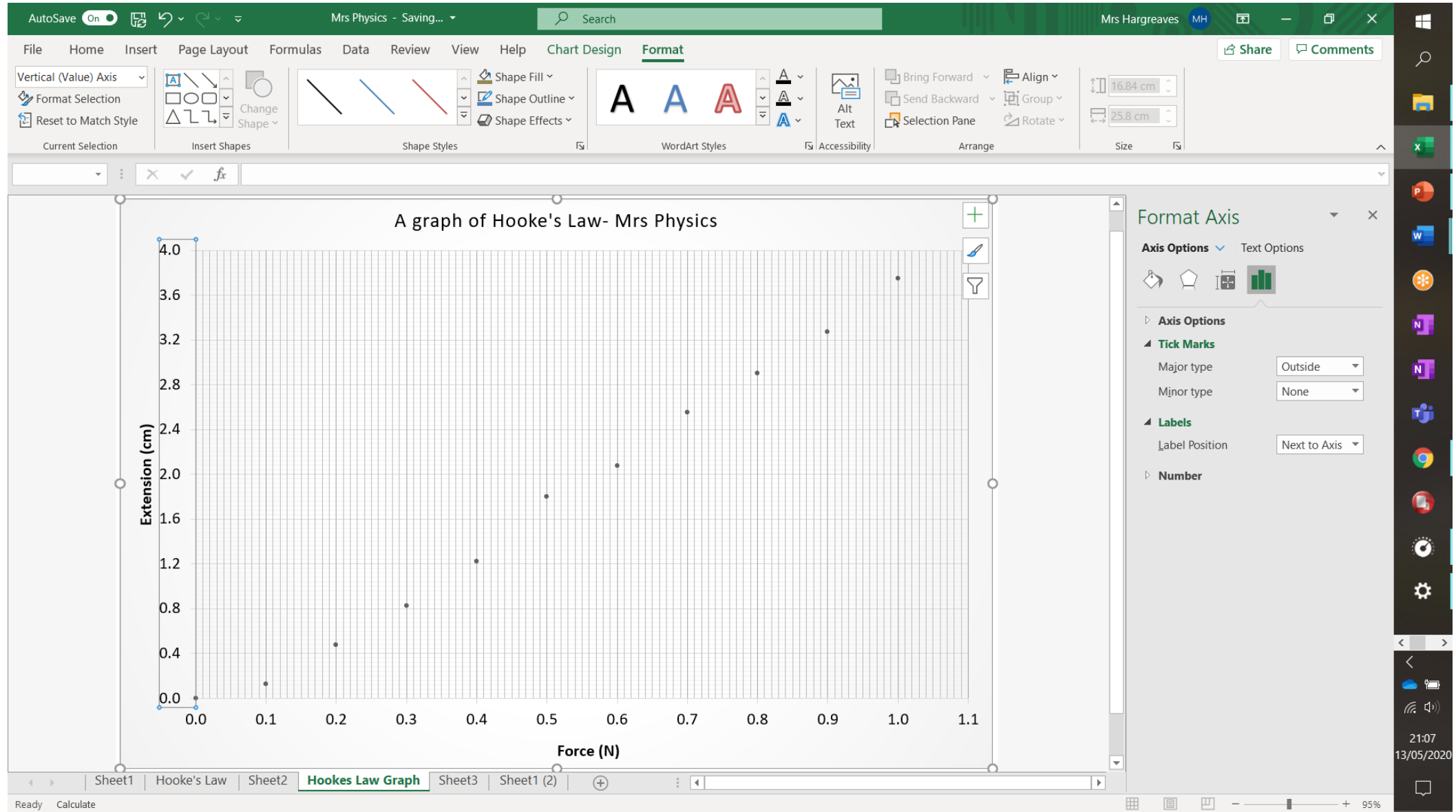


Plotting Graphs in Excel 2021



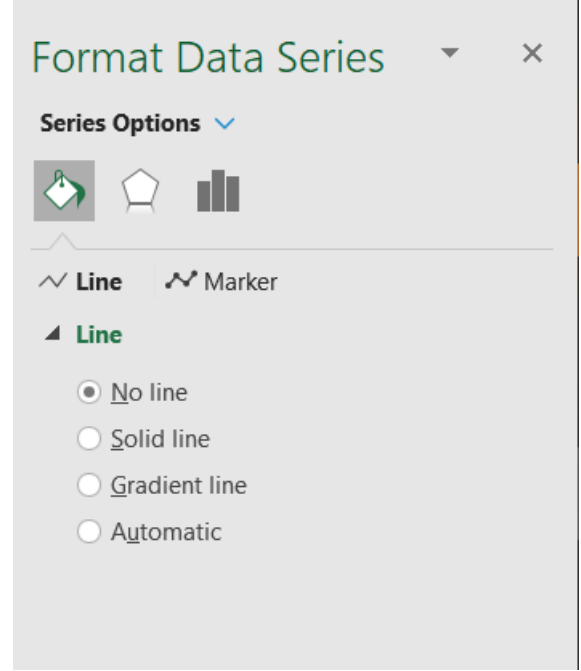
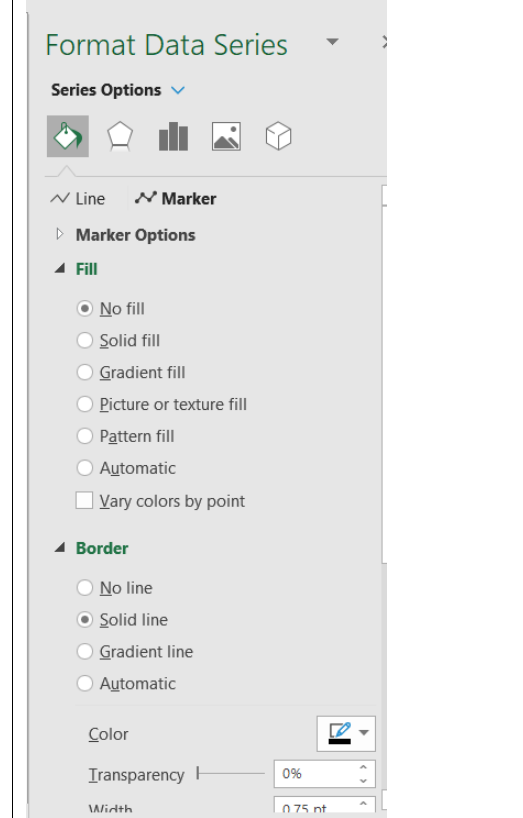
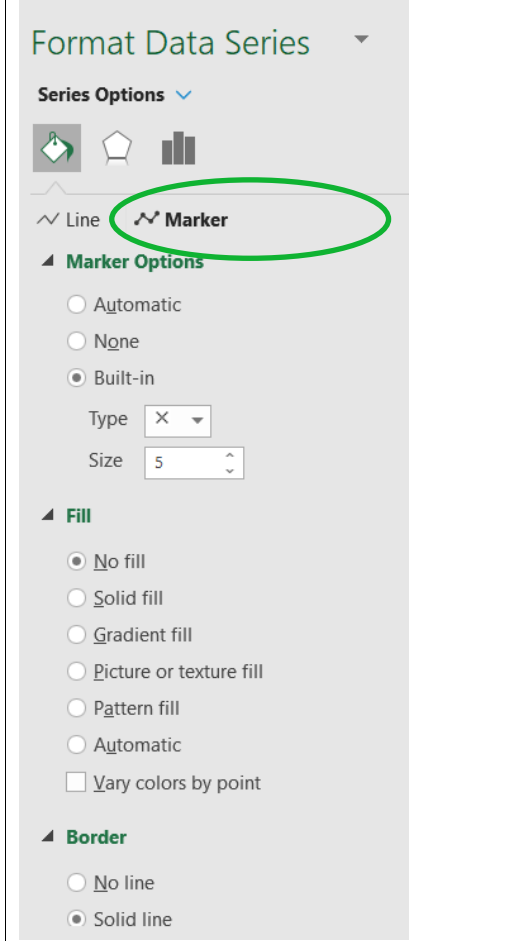
This is what the graph should look like with both the major and minor gridlines checked for the Force (X axis). Now do the same for the extension (Y axis) Click on the axis numbers and a box should appear around it. Then when you right click you'll get a menu that allows you to switch on the minor gridlines.

Plotting Graphs in Excel 2021

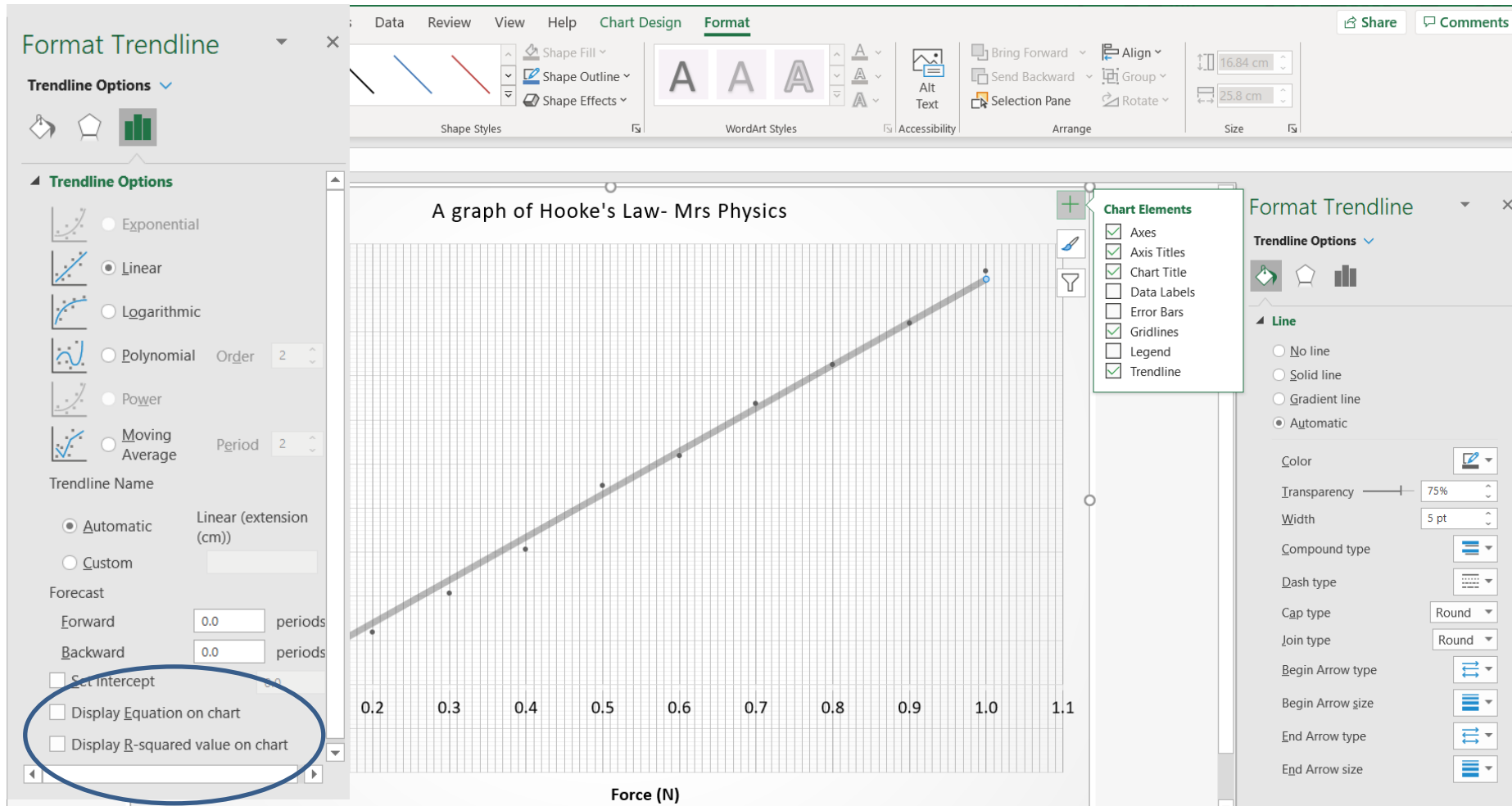


Putting in tick marks makes it easier to read from the graph later, make sure the tick marks are outside the box.

We now need to make your points little x- this is quite tricky so look in the instructions below

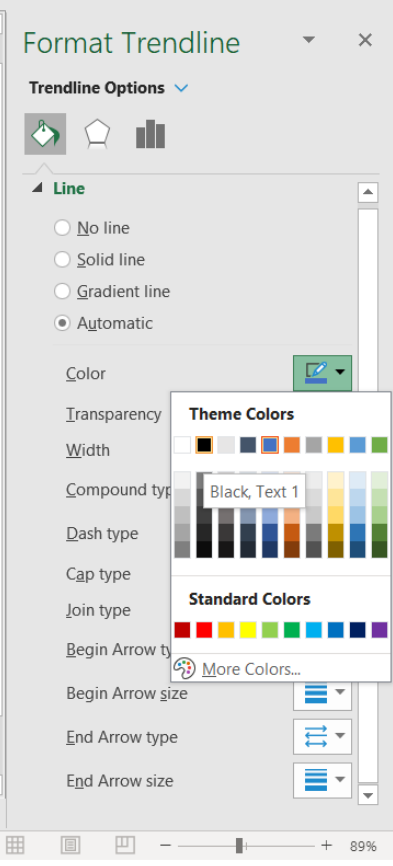
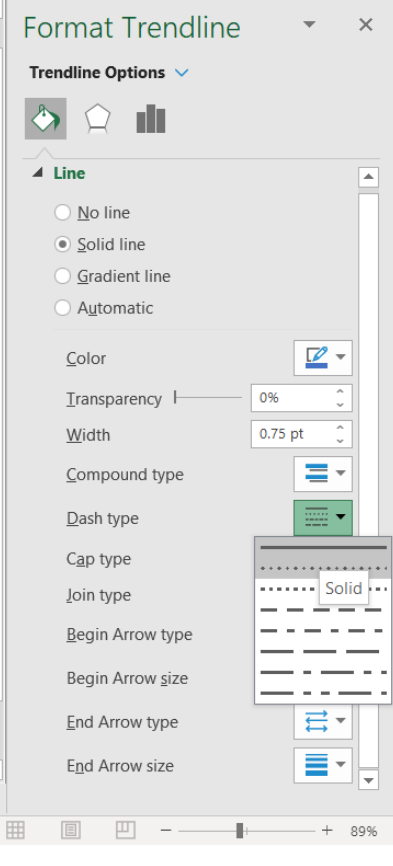
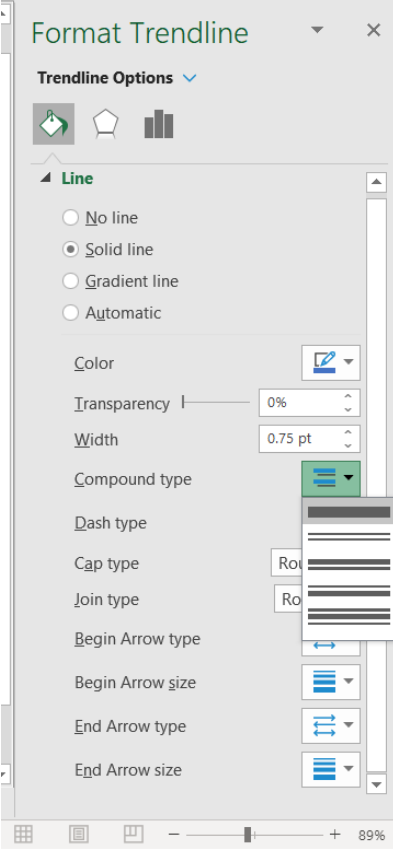
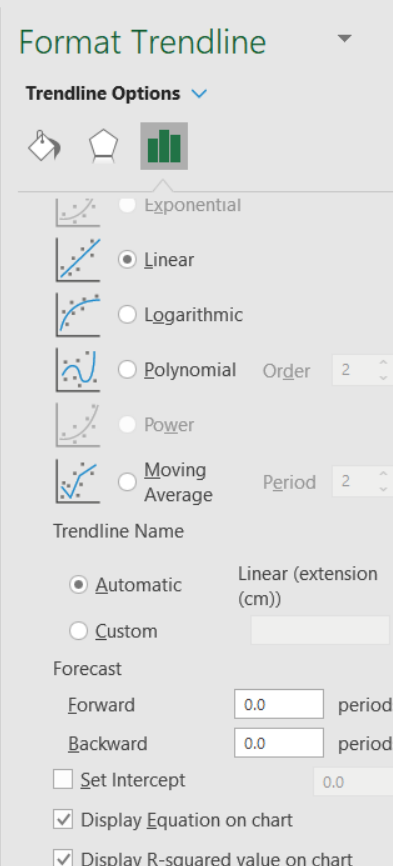
| | | |
|---|---|--|
|  |  |  |
| <p>You need to click on the points so that you get the FORMAT DATA SERIES MENU.</p> | <p>The marker options should be FILL - NO FILL BORDER, SOLID LINE Colour- Black</p> | <p>Then select the crosses from the Marker options and make them 5 pt.</p> |

Plotting Graphs in Excel 2021

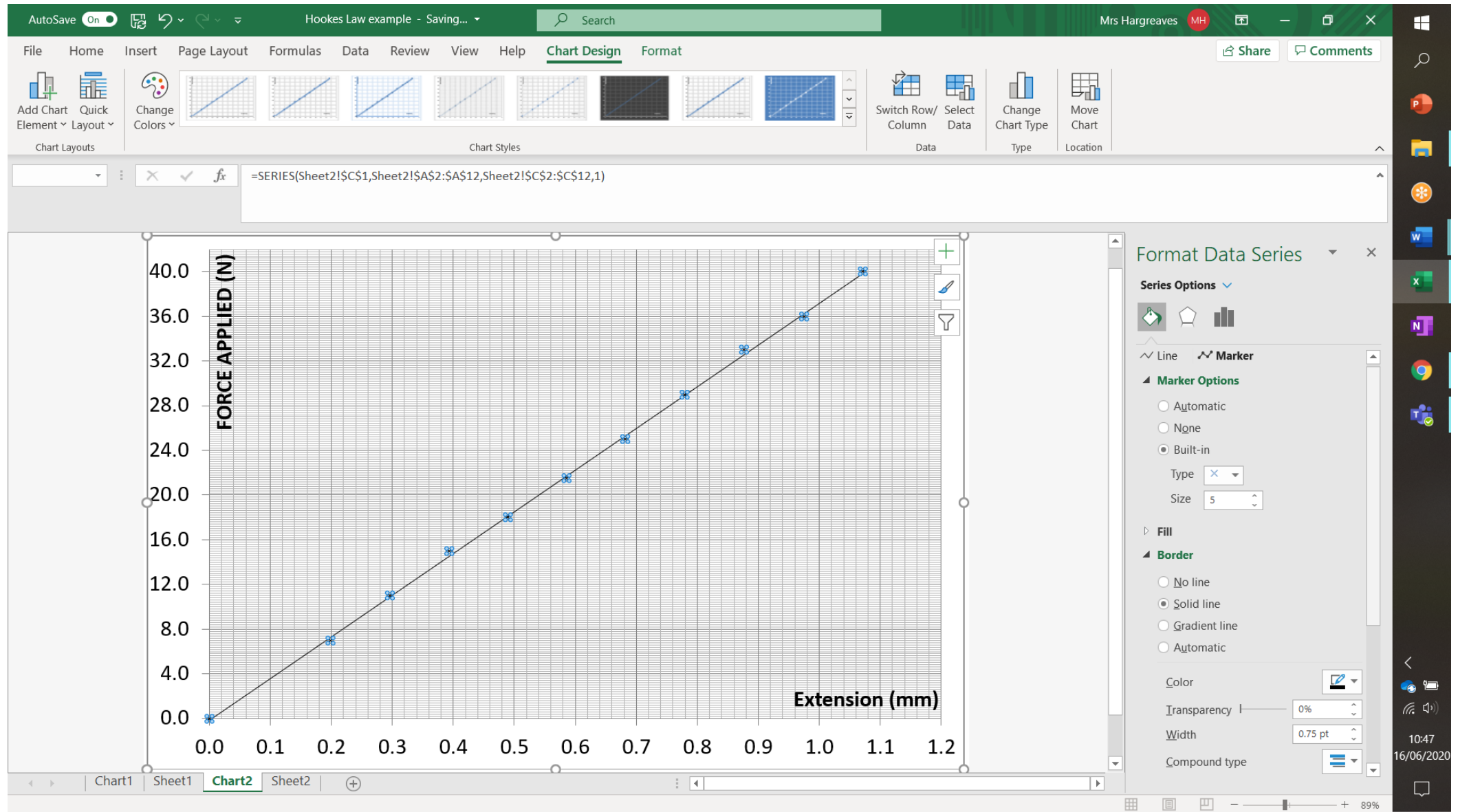


Now we need to add the trendline. You can switch this on by clicking on the + sign at the corner and checking the trendline, or you can click on the points and then when they are highlighted you can right click and the menu for the trendline comes up. You want to click on the linear trendline and if you scroll down check the box for display equation on the chart and R^2 value You can do this when the bar chart symbol is highlighted. When the paintpot is highlighted you can change the other menus

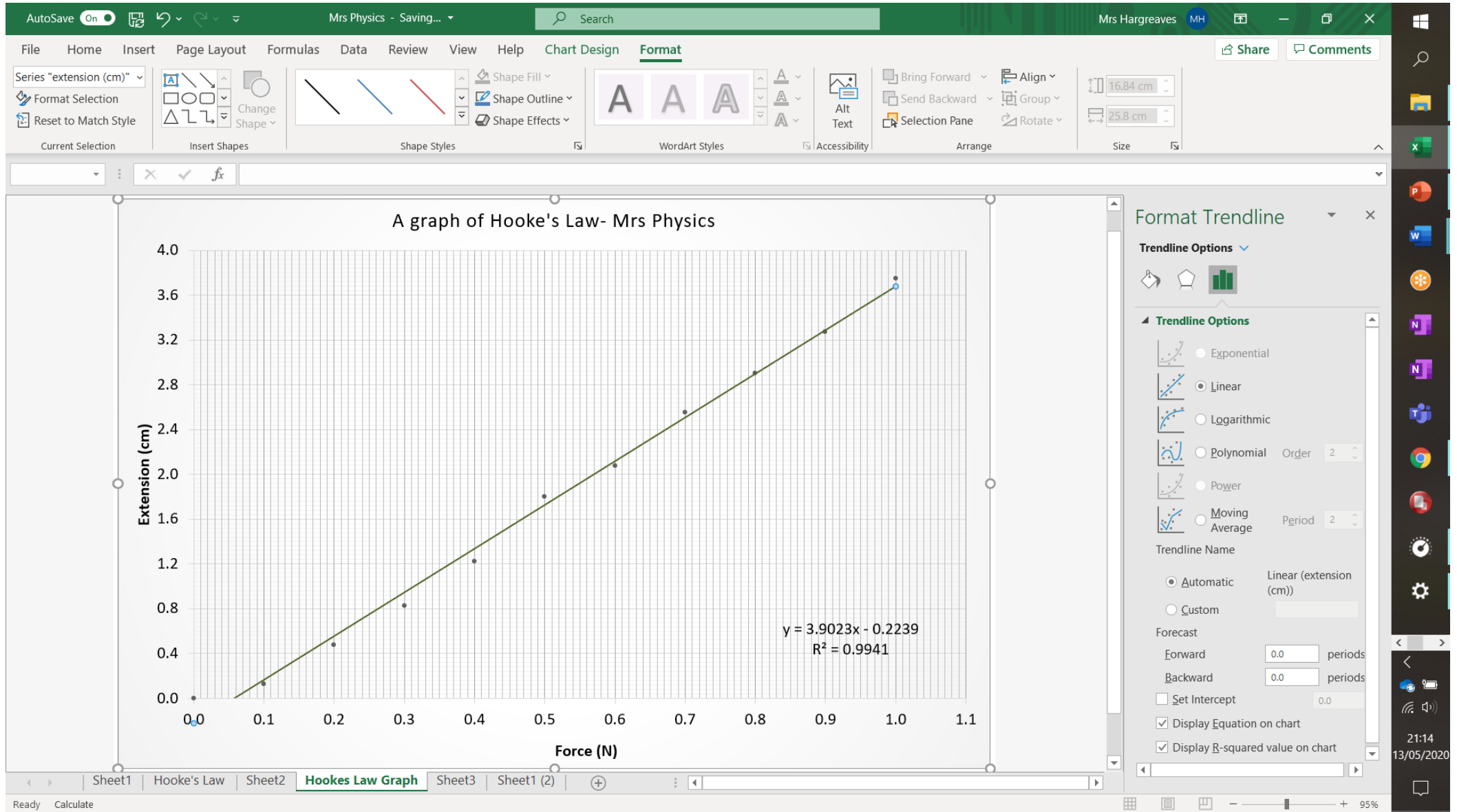
Plotting Graphs in Excel 2021

| | | | |
|---|--|--|---|
|  |  |  |  |
| <p>Make the trendline BLACK</p> | <p>Switch the transparency to 0% The width 0.75 pt The dash should be changed to solid</p> | <p>The compound type should be plain There should be no caps or arrows</p> | <p>The display equation on chart and Display R-squared value on the chart should be checked (notice this is when the bar chart at the top is checked)</p> |

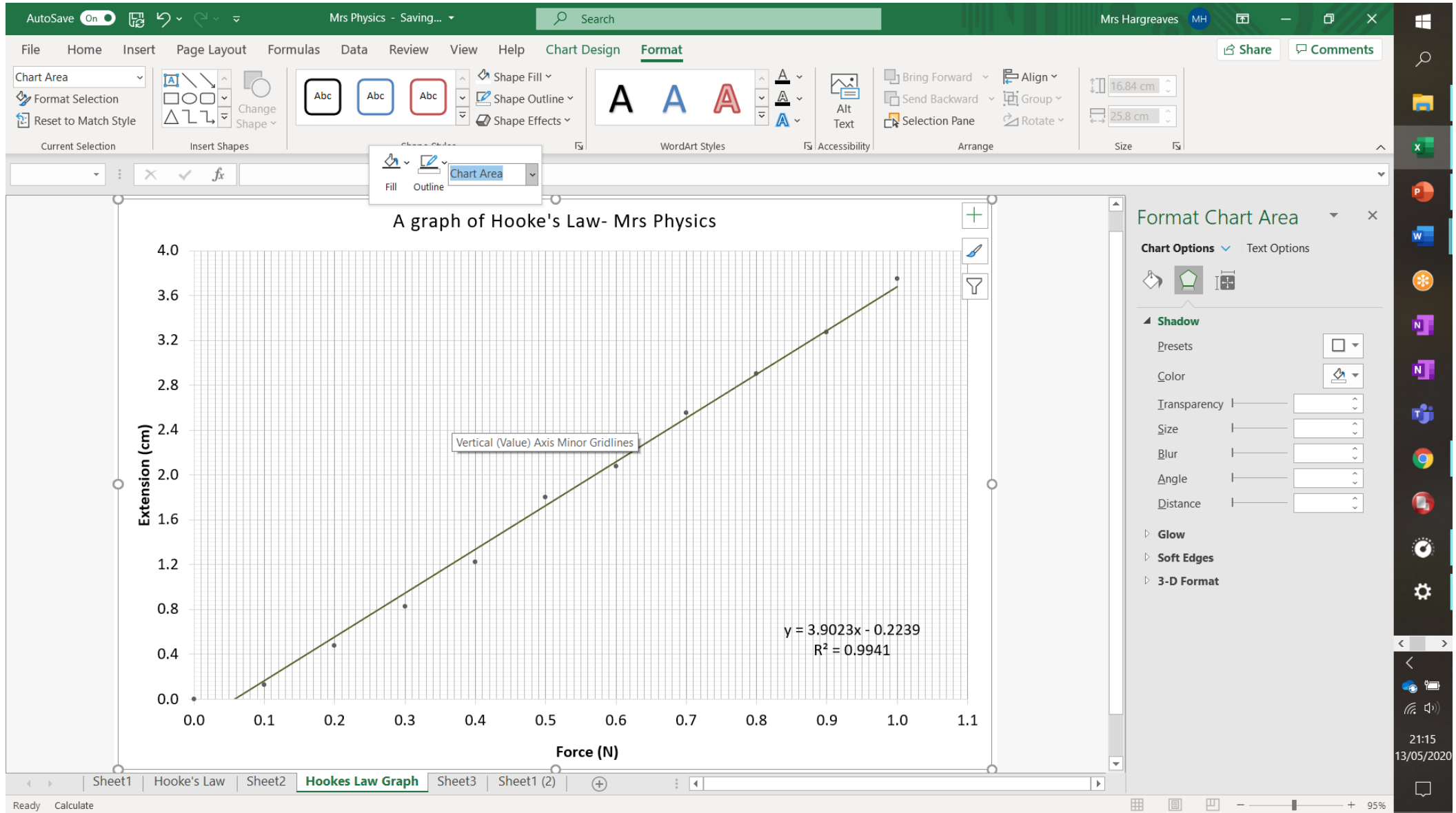
Plotting Graphs in Excel 2021



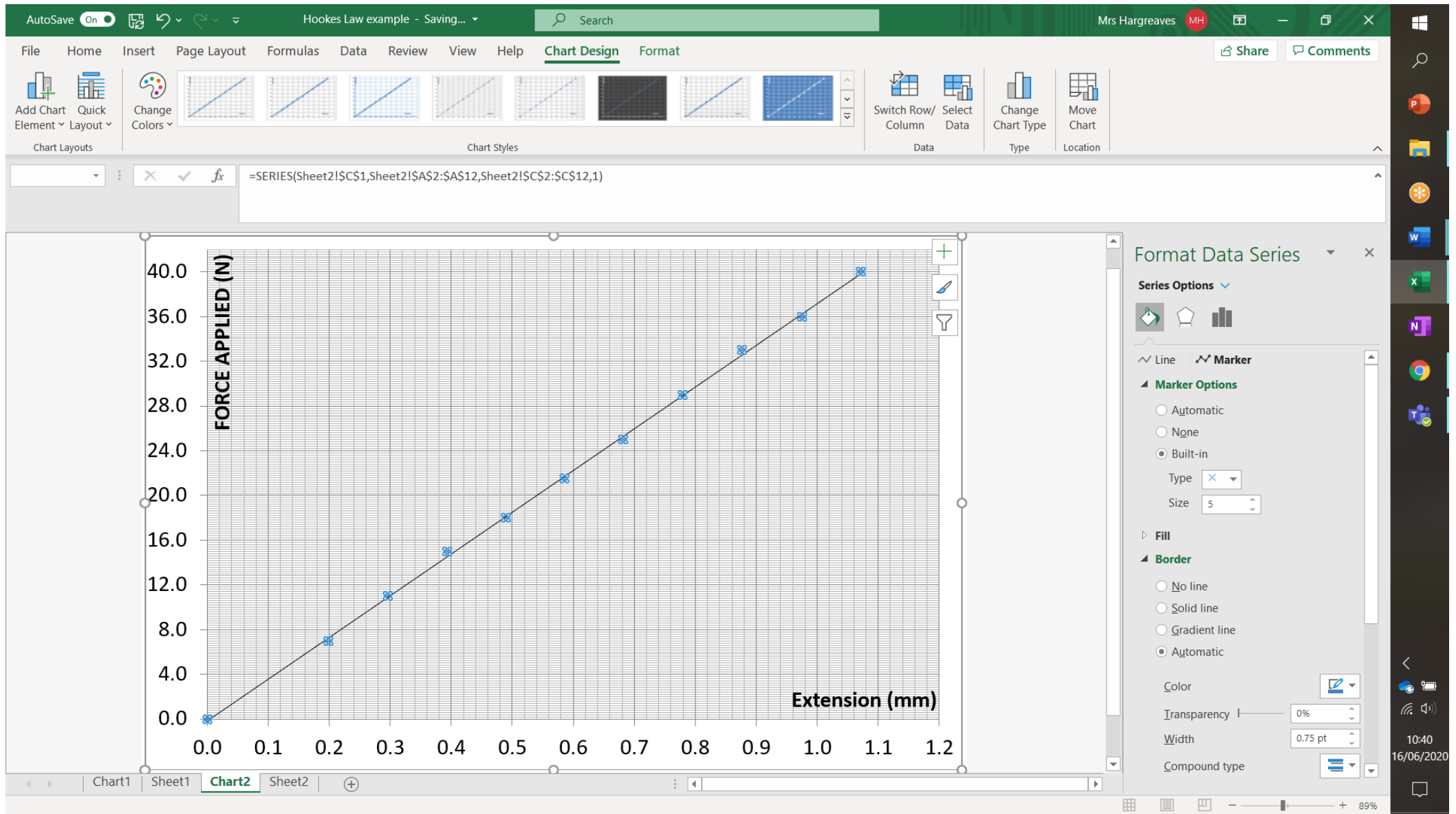
Plotting Graphs in Excel 2021



Plotting Graphs in Excel 2021



Plotting Graphs in Excel 2021



Plotting Graphs in Excel 2021

Mrs Physics - Saved

Mrs Hargreaves MH

Print

Copies: 1

Print

Printer

hp LaserJet 1320 PCL 5
Offline: 1 document waiting
[Printer Properties](#)

Settings

Print Active Sheets
Only print the active sheets

Pages: to

Print One Sided
Only print on one side of the...

Collated
1,2,3 1,2,3 1,2,3

Landscape Orientation

A4
21 cm x 29.7 cm

Normal Margins
Top: 1.91 cm Bottom: 1.91 c...

[Page Setup](#)

A graph of Hooke's Law- Mrs Physics

Extension (cm)

Force (N)

$y = 3.9023x - 0.2239$
 $R^2 = 0.9941$

1 of 1

A good graph but your name isn't on it or other details so we will put a header and footer on the graph.

Plotting Graphs in Excel 2021

The screenshot displays the Microsoft Excel 2021 interface. The **Page Layout** ribbon is active, with its icon circled in red. Below the ribbon, the extension box at the bottom of the ribbon is also circled in red. The **Page Setup** dialog box is open, showing the **Page** tab. Within this tab, the **Header/Footer** sub-tab is selected, which is circled in red. The dialog box shows the following settings:

- Orientation:** Landscape (selected)
- Scaling:** Adjust to: 100 % normal size
- Paper size:** A4
- Print quality:** 600 dpi
- First page number:** Auto

The background shows a scatter plot with a linear regression line. The equation of the line is $y = 3.9023x - 0.2239$ with $R^2 = 0.9941$. The x-axis ranges from 0.00 to 1.20, and the y-axis ranges from -0.50 to 0.00.

Click on the page layout, then the extension box at the bottom and then when the menu come up click on the header and footer.

Plotting Graphs in Excel 2021

The screenshot displays the Microsoft Excel 2021 interface. The main window shows a worksheet titled "Hooke's Law Graph" with a scatter plot of Force (N) versus displacement. The plot includes a linear trendline with the equation $y = 3.9023x - 0.2239$ and $R^2 = 0.9941$. The x-axis ranges from 0.0 to 1.1, and the y-axis ranges from 0.0 to 0.8. Two dialog boxes are open: the "Header" dialog box on the left and the "Page Setup" dialog box on the right. The "Header" dialog box shows the "Header" tab with three sections: "Left section" containing "Mrs Physics", "Center section" containing "HOOKE'S LAW GRAPH", and "Right section" containing "&[Date] &[Time]". The "Page Setup" dialog box shows the "Header/Footer" tab with "Header" and "Footer" sections, both set to "(none)". The "Page Setup" dialog box also has checkboxes for "Different odd and even pages", "Different first page", "Scale with document", and "Align with page margins". The "Page Setup" dialog box has buttons for "Print...", "Print Preview", "Options...", "OK", and "Cancel".

Header

Header

To format text: select the text, then choose the Format Text button.
To insert a page number, date, time, file path, filename, or tab name: position the insertion point in the edit box, then choose the appropriate button.
To insert picture: press the Insert Picture button. To format your picture, place the cursor in the edit box and press the Format Picture button.

Left section: Mrs Physics

Center section: HOOKE'S LAW GRAPH

Right section: &[Date] &[Time]

OK Cancel

Page Setup

Page Margins Header/Footer Chart

Header: (none)

Footer: (none)

Custom Header... Custom Footer...

Different odd and even pages
Different first page
☒ Scale with document
☒ Align with page margins

Print... Print Preview Options...

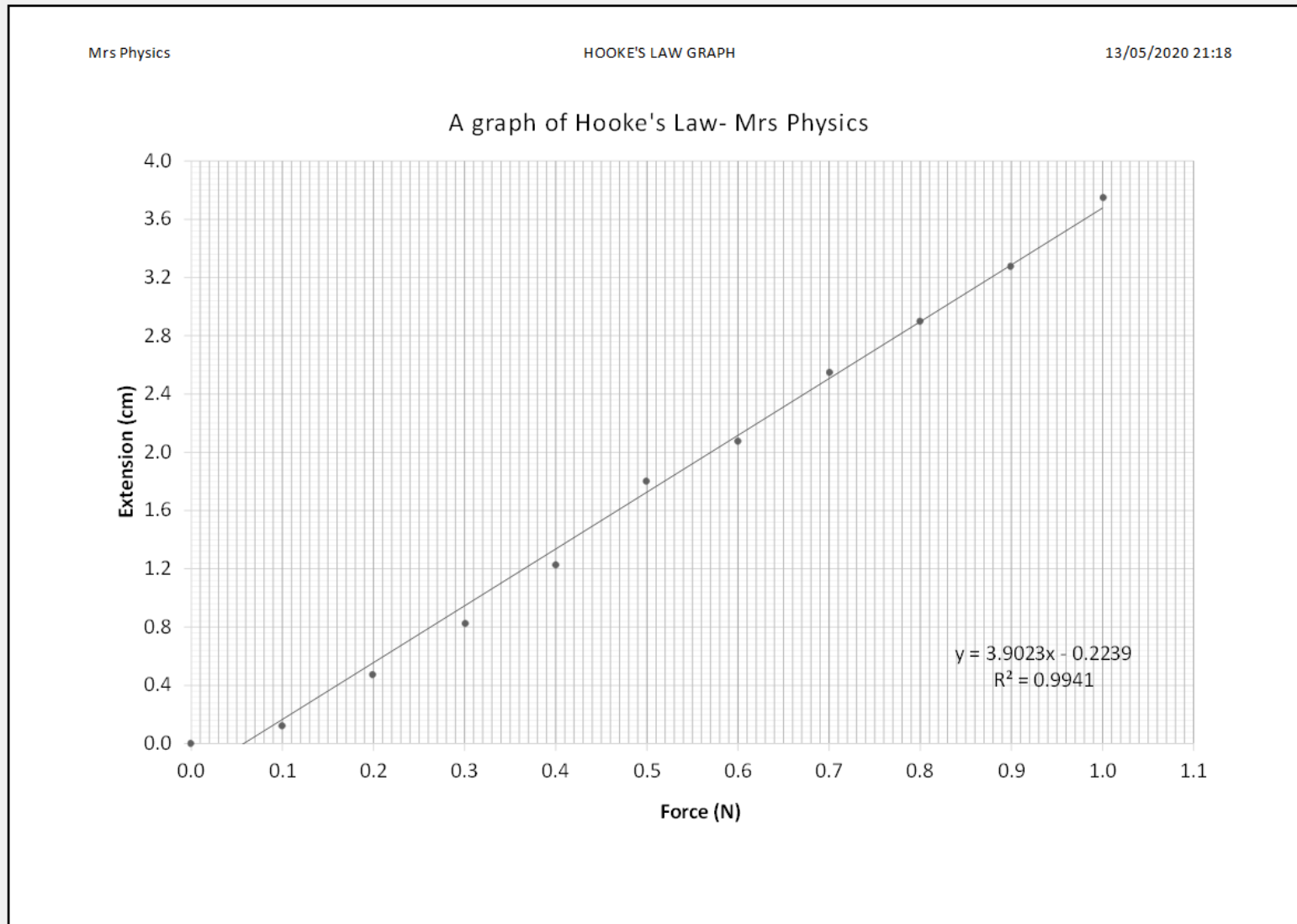
OK Cancel

Soft Edges
3-D Format

Ready Calculate

In the header and footer you want CUSTOM HEADER. Type in your Name, the title and Register class and maybe the date and time (that comes up by clicking on the calendar and clock)

J A Hargreaves



You can check if you are right when you go to print preview as that is where you'll see what your graph will look like when it is printed off.

**NOW SUBMIT YOUR
GRAPH TO YOUR
TEACHER**