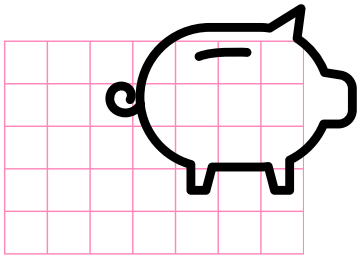
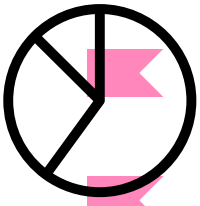
FINANCE CURRICULUM





RACE INTO STEM

Powered by Microsoft

COSTS OF A CAR

ACTIVITY GUIDE
30 MINS

STEM CONCEPTS:

MATHS – Addition, Subtraction, Multiplication, Comparison, Problem Solving

CONTEXT:

Formula 1 is the highest level and most expensive type of motorsport. There are 10 teams on the grid who all have different amounts of money in their bank, depending on their funding from partners and other companies. However, to make sure that the racing is fair, Formula 1 introduced a cost cap. This means each team has the same maximum amount of money that they can spend in a season. If the team goes over that cost cap, they will be fined.

EQUIPMENT NEEDED

- Calculator
- Computer

INSTRUCTIONS

- To have a go at sticking to a set amount of money (budget), your task is to design a car with a maximum budget of £200,000. You need to choose car parts which would be the best parts for the race in Monaco.

- Look at the 'Car parts cost sheet' below which will show you the different car parts that you need to buy to build a car. You will have the choice of buying basic or enhanced car parts, but you need to make sure that you don't spend more than £200,000 on 5 different parts.

- You can work out the calculations on a calculator, on your computer/phone or using long addition/subtraction. Make sure you make some notes of your car part choices so that you can substitute some of the enhanced car parts if you overspend!

- Once you've worked out your total choice of car parts, complete the table on the 'Car parts cost sheet'.

- Try the activity Digitally

TIP: To know which of the enhanced parts might be better to buy than others for this circuit, be sure to read the facts about Monaco below before you make your choices.

Facts about the Monaco circuit:

- It is a race with a track that goes through the streets of Monaco rather than on a circuit,
- The streets are very narrow, so it is difficult for drivers to overtake,
- There are lots of very tight corners,
- Drivers must change gear 54 times per lap,
- There is a tunnel which drivers must drive through as part of one lap.

LET'S DISCUSS!

Did you manage to get the best car made from the best parts for the Monaco circuit within budget?
An example of how you could stay in budget is below, but this isn't the only right answer:

PART CHOSEN	COST	REASON OF CHOICE
Upgraded Front Wing	**£80,000**	With Monaco having a lot of tight corners having the upgraded front wing that gives more downforce, allows the driver to get around the corners more quickly. The fact that the upgraded front wing is narrower than the basic front wing means that the car is thinner and takes up less room on the track. This also allows the car to overtake more easily.
Basic Rear Wing	**£50,000**	With the enhanced rear wing being wider, this would be a disadvantage to the driver as it means the car will take up more room on the track. The advantage of the enhanced rear wing is to allow the car to go faster on the straight parts of the track, but since there are more corners than straights on the Monaco circuit, this isn't really something that's needed so the basic rear wing will be a good choice to have.
Basic Steering Wheel	**£25,000**	As Monaco has a difficult circuit, the driver will need to really concentrate on driving, so the fact that they have extra opportunities to talk to their engineers with the enhanced steering wheel isn't really needed.
4 Upgraded Tyres	**£3,000 x 4 = £12,000**	With so many corners on the Monaco track, the drivers need to break a lot to get around the tight corners. Choosing the more durable tyres means that they will last longer than the basic tyres would, given all the braking that needs to be done.
Upgraded Gear box	**£30,000**	Since Monaco has so many corners, the speed that the drivers execute throughout a race varies a lot as they need to slow down and speed up a lot. Given the fact that the drivers need to change gears 54 times for each lap in this race, it is best to spend more money on the enhanced gear box to make it last the whole the race.
TOTAL	**£197,000**	

BONUS CHALLENGE

- Determine the costs for the Monaco race weekend if one of the drivers crashed and need a new front wing and gear box, using the example above. Would this be over budget? By how much?
  - Answer: 1) £80,000 + £30,000 = £110,000 of additional cost
    2) £110,000 + £197,000 = £307,000 (total spend)
    3) £307,000- £200,000= £107, 000

Therefore, if a driver crashed and needed an additional gear box and front wing, the team would be £107, 000 over the budget.

- There are 24 races in an F1 season. If the team chose the upgraded tyres (£12,000 per set of 4), how much would they spend on tyres throughout the whole season?
  - Answer: £12,000 x 24= £288,000

Car part cost sheet

Total spend £200,000

You must have at least one of each of the essential car parts below for your car. The engine is already included in the team's budget so will not need to be budgeted for.

Parts required	Cost of basic part	Cost of upgraded part	Benefit of upgraded part
Front wing	£60,000	£80,000	• A narrower upgraded front wing gives more downforce which means the car can corner at faster speeds
Rear wing	£50,000	£70,000	• Wider rear wing which makes the car faster on the straight parts of the track
Steering wheel	£25,000	£50,000	• Extra buttons to allow the driver to communicate better with their engineer
Tyres (need 4)	£2,000	£3,000	• The upgrade will allow tyres which are more durable when lots of breaking is needed
Gear box	£20,000	£30,000	• A much smoother and more durable gearbox

PARTS CHOSEN

Parts required	Basic or Upgraded	Cost of part	Reason for choosing
Front wing			
Rear wing			
Steering wheel			
Tyres (need 4)			
Gear box			

COST CAP CONSIDERATIONS

ACTIVITY GUIDE
30 MINS

STEM CONCEPTS:

MATHS – Addition, Subtraction, Algorithms, Financial Modelling
TECHNOLOGY – Data Visualization, Analysis

CONTEXT:

A key responsibility of those in finance roles is to monitor the money spent during the season. At each year's end, they must report to the Senior Management Team on the total expenditure and any remaining funds from the cost cap.

EQUIPMENT NEEDED

- Calculator
- Computer (optional)
- Pen and paper
- 'How to guide' for Excel and PowerPoint

INSTRUCTIONS

- Your challenge is to see if you can create a presentation to the Senior Management Team of BWT Alpine F1 Team about the costs that were spent in 2023.

- Look at the 'Costs spent in 2023' table below which has a breakdown of the money that was spent over the course of the season. Your task is to work out how much was spent and to see if there was any money left from the £10,000,000 which was cost cap for 2023.

ITEM	COST
Staffing Costs	£2,500,000
Team Factory utilities costs (lighting, heating etc)	£500,000
Parts Logistics (getting the cars to and from the races)	£1,000,000
Staff travel to and from the races	£1,500,000
Driver Costs	£1,000,000 (for each of the 2 drivers)
Staff Uniform	£500,000
Car Build Costs	£1,000,000
Machinery Maintenance	£500,000
Contingency (extra money which was spent but not budgeted for)	£300,000

- Please note these are not the real costs associated with the 2023 season and are purely for representing data

- You then need to decide how you are going to present those figures. You can do so by creating graphs and pie charts in Microsoft Excel and then putting all your findings into a Microsoft PowerPoint presentation to show the Senior Leadership team.

- Unsure of how to use Excel or PowerPoint? Consult these guides for tips!

TIP 1: Make sure that you double check all your calculations (especially the number of 0s in the costs) to make sure you don't make mistakes.

TIP 2: Think about how you can present your findings in an interesting way that is going to be easy for the viewers to understand.

LET'S DISCUSS!

The total spend for the BWT Alpine F1 Team in 2023 was £9,300,000. This left £700,000 of money under the cost cap which wasn't spent. Were you able to find the answer? If not, go back and look at your work to see where you might have gone wrong.

BONUS CHALLENGE

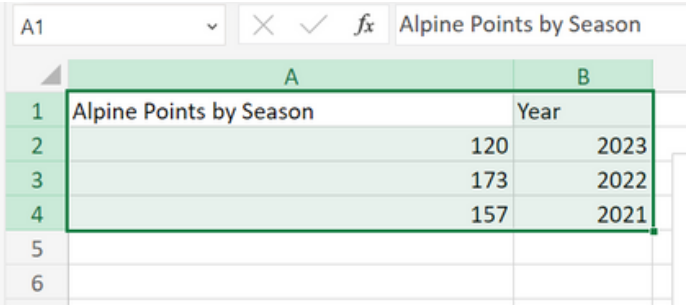
- Think about what might be needed in the contingency pot of £300,000. What could happen in a season for them to need this much money?
- If the team managed to not spend their £300,000 contingency money over the next 5 years, how much would they save in total?
    - Answer: £1,500,000

EXCEL HOW TO GUIDE

- **Rows:** Horizontal sections represented by number (1,2,3, etc.)
- **Columns:** Vertical Sections represented by letters (A, B, C, etc.)
- **Cell:** The intersection of a row and column, represented by a letter followed by a number (ex. A1, B4)
- **Range of Data:** A collection of selected cells.

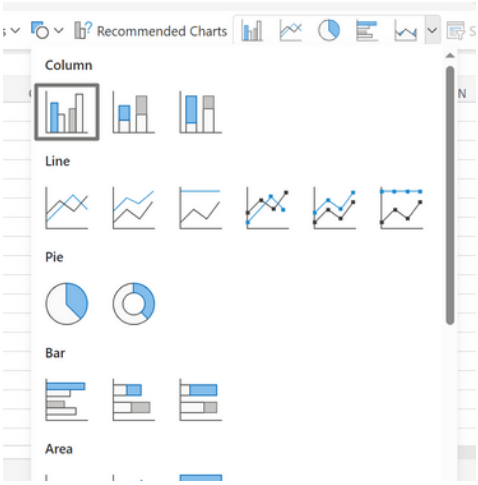
How to create a chart in Excel:

Step 1: Select/highlight the range of data you want to summarize in a chart by clicking in the top left corner of the cells and drag until is all shaded:

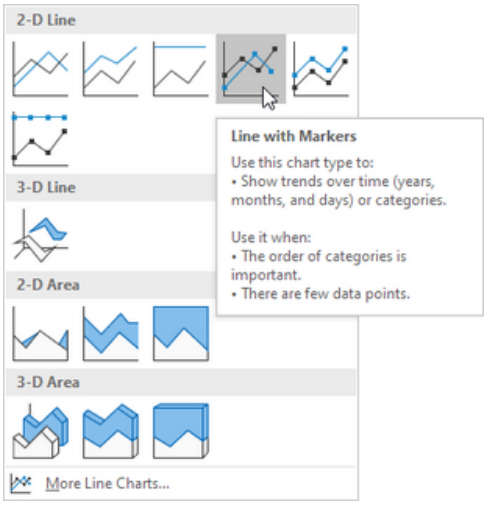


	A	B
1	Alpine Points by Season	Year
2	120	2023
3	173	2022
4	157	2021
5		
6		

Step 2: On the Insert tab, select the type of chart you want to create:

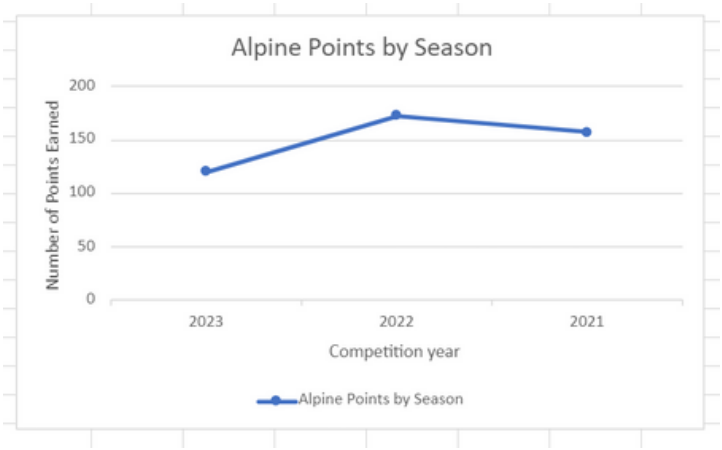


Step 3: Select the type of graph you wish you present your data with.

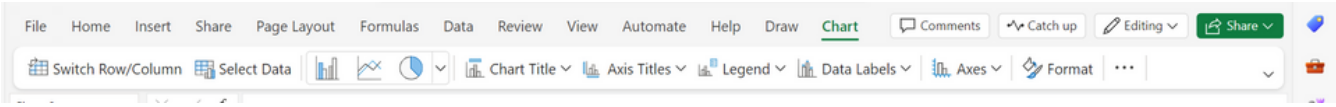


EXCEL HOW TO GUIDE

From there, excel will generate a chart of your data!



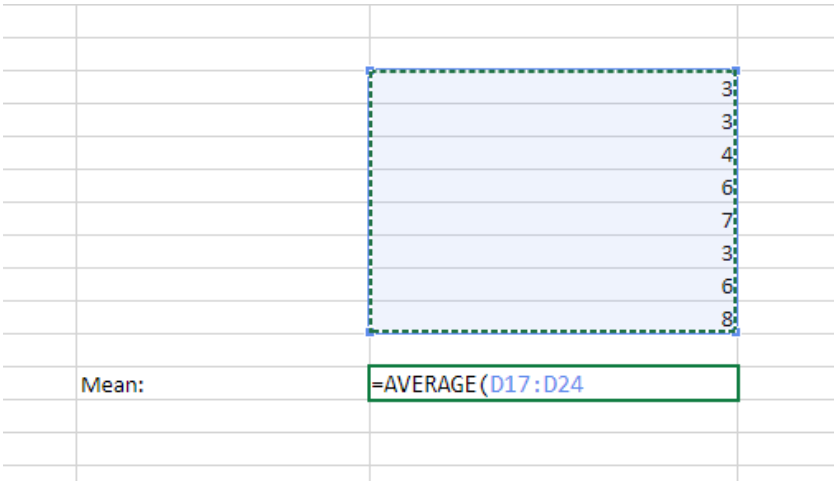
You can add in axis titles, a title for your chart, switch the axis's for different information, and even create a legend! All of this is available for you in the Chart menu.



How to find the mean in Excel:

There is no formula called MEAN in excel, so we use the average formula.

1. Type the '=' sign into a cell, then type "AVERAGE" after the '=' sign
2. select the cells that you wish to find the mean of.
3. Once they are selected, hit enter and you will have the mean (or average) of the numbers!



POWER POINT HOW TO GUIDE

Let's create a presentation on PowerPoint together:

1. Open PowerPoint.
2. In the left pane, select New.
3. Select an option:
    a. To create a presentation from scratch, select Blank Presentation.
    b. To use a prepared design, select one of the templates.

Add a slide

1. In the thumbnails on the left pane, select the slide you want your new slide to follow.
2. In the Home tab, in the Slides section, select New Slide.
3. In the Slides section, select Layout, and then select the layout you want from the menu.

Add and format text

1. Place the cursor inside a text box, and then type something.
2. Select the text, and then select one or more options from the Font section of the Home tab, such as Font, Increase Font Size, Decrease Font Size, Bold, Italic, Underline, etc.
3. To create bulleted or numbered lists, select the text, and then select Bullets or Numbering.

Add a picture, shape, and more

1. Go to the Insert tab.
    a. To add a picture:
    b. In the Images section, select Pictures.
    c. In the Insert Picture From menu, select the source you want.
    d. Browse for the picture you want, select it, and then select Insert.
2. To add illustrations:
    a. In the Illustrations section, select Shapes, Icons, 3D Models, SmartArt, or Chart.
    b. In the dialog box that opens when you click one of the illustration types, select the item you want and follow the prompts to insert it.

RACE INTO STEM Powered by Microsoft

KITTING OUT THE CREW

ACTIVITY GUIDE
30 MINS

STEM CONCEPTS:

MATHS – Addition, Subtraction, Algorithms, Multiplication

CONTEXT:

Whenever there is a Grand Prix weekend, each F1 team needs to send a team of around 50 staff members who will ensure that the 2 cars and drivers can race. These people range from the mechanics who build/fix the car, the engineers who work out the best way for the drivers to win the race (strategy), to the hospitality team who look after the team and guests plus many more.
Each of these team members needs to wear team uniform at each race weekend, throughout the year, to make sure that it's obvious which team they are part of. Some of these races are in very hot locations and some in colder places in the world, so they need to make sure they have uniform for all types of weather.

EQUIPMENT NEEDED

- 'Team kit costs sheet'
- 'Team Kit Options sheet'
- Calculator
- Computer (optional)

INSTRUCTIONS

- Your challenge is to work out how much budget would be needed from the BWT Alpine F1 team for the 2024 season in terms of the amount of team kit that's needed.

- Look at the 'Team kit costs sheet' which shows which items of clothing are on offer for the team to order. You have a choice of footwear to choose from and 3 different layers of clothing to pick – a base, mid and top layer.

- You will need to stay below £7000 for the entire group of 50 people attending the races.

- Try out the activity digitally: Here

LET'S DISCUSS!

Look at some of the suggested options on the 'Team Kit Options sheet' which considers the need of a mixture of thin and thick clothing to cover all weathers.

BONUS CHALLENGE

- Why don't you have a go at budgeting for option B for the team kit – still ensuring that you have an item of clothing for the different layers and a pair of trainers – and see which one costs more money.
- Present the two budget options in a way that would be suitable for a meeting with the BWT Alpine F1 Senior Management team. This could be done by using Microsoft PowerPoint or Excel.
- If the team needed 3 sets of your chosen uniform for one season, how much would that cost?
    - The answer dependents on their solution. It should be their total multiplied by 3.

TIP 1:
Make sure that you double check all your calculations, especially when multiplying them by 50 for the number of team members in the team.

TIP 2:
Think carefully about making sure that the team will have a suitable item of clothing for warmer days and colder days.

Team kit choice options

Below are a few examples of how the team kit could be chosen which takes into account needing a mixture of thin and thick clothing to cover all weathers.
Please note that this is isn't every possibility, just a few.

Final Team Kit choice 1:
Total spend = £5750

Layers	Clothing choice	Cost per item	Total cost for 50
Base layer	Thin round neck	£5	£250
Mid-layer	Thick hoody	£30	£1,500
Top layer	Thin rain jacket	£50	£2,500
Footwear	Lightweight trainers	£30	£1,500

Final Team Kit choice 2:
Total spend = £6,500

Layers	Clothing choice	Cost per item	Total cost for 50
Base layer	Thick polo shirt	£10	£500
Mid-layer	Thin ¾ zip jumper	£20	£1,000
Top layer	Thick puffer jacket	£60	£3,000
Footwear	Heavyweight trainers	£40	£2,000

Final Team Kit choice 3:
Total spend = £7,000

Layers	Clothing choice	Cost per item	Total cost for 50
Base layer	Thin round neck	£5	£250
Mid-layer	Thick body warmer	£45	£2,250
Top layer	Thin rain jacket	£50	£2,500
Footwear	Heavyweight trainers	£40	£2,000

TEAM KIT COSTS:

Each of the 50 members of the team needs to have one T-shirt (base layer), one type of long sleeved jumper (mid-layer), one type of coat (top layer) and a pair of trainers.
Since the F1 races take place over 10 different months of the year, and all over the world, the weather and temperatures at the different circuits can vary hugely. For example, Bahrain is one of the hottest locations and can reach high temperatures of around 40C, but in Montreal it can be as low as 5C.
See if you can come up with a team kit option which includes a base, mid and top layer as well as a pair of trainers. Think carefully about making sure that they will have the option of keeping cool and warm with the choices you make.
Once you have tried out some different options, put your final choices in the table below. If you can, fill in the 'reason' box underneath to explain why you've made those choices.

Item	Cost Per Item
Base Layer Items	
Thin round neck T-shirt	£5
Thick polo shirt	£10
Mid Layer Items	
Thin ¾ zip jumper	£20
Thick hoody	£30
Top Layer Items	
Thin body warmer	£35
Thick body warmer	£45
Thick puffer jacket	£60
Thin rain jacket	£50
Footwear	
Lightweight trainers	£30
Heavyweight trainers	£40

Final Team Kit choice:

Layers	Clothing choice	Cost per item	Total cost for 50
Example Base layer	*Thick polo shirt*	*£10*	*£500*
Base layer			
Mid-layer			
Top Layer			
Footwear			

Total cost for all 4 items of team kit for 50 members of staff: _____

Reasoning:
I chose the combination of clothing and footwear because
_____
_____
_____