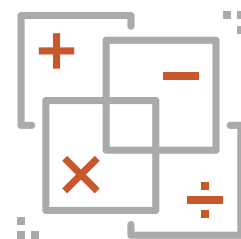


6
weekSTEM
clubs

MATHS

WHAT IS
MATHS?*Mathematics is the science that deals with the logic of shape, quantity, and arrangement*

BUT WHAT DOES THAT MEAN?

Almost all of us will have studied mathematics to some level at school and so we probably believe we have a good understanding of what mathematics is. However, many of us will use fairly low-level mathematical skills in our everyday life. These simple mathematics perhaps underplay the fundamental role that mathematics play in our wider life. Mathematics is fundamental to our understanding of all the sciences. It underpins everything from the functioning of our phones to the architecture of the buildings we live in. Mathematics has been central in developing the world we know by solving complex problems and developing new technologies.

BECOME A MATHEMATICIAN



Mathematics is often used as a tool to calculate solutions to problems. Mathematicians look for solutions that not only solve a problem but do so in an efficient way, for the benefit of all.



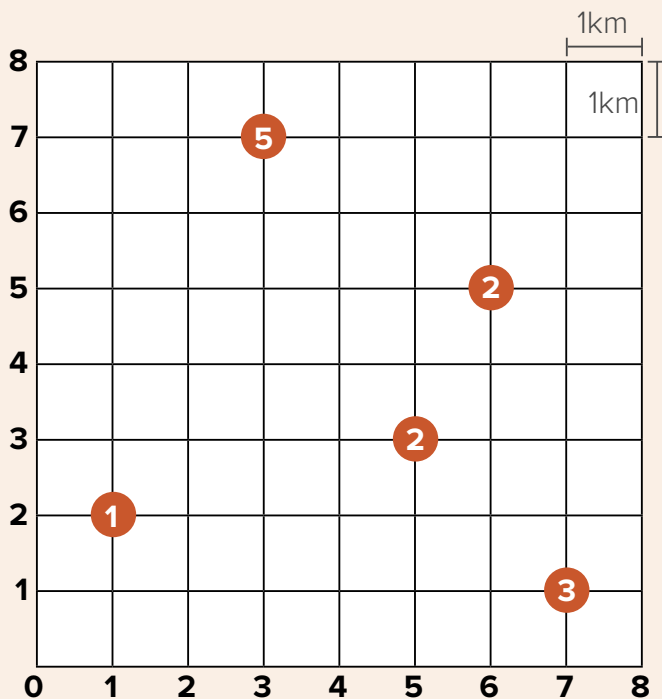
ACTIVITY

SEE IF YOU CAN SOLVE THIS PROBLEM

- 1 You are hosting a party and need to identify the best location for the venue
- 2 You want all 13 of your friends to attend
- 3 They will all be coming in **separate cars**
- 4 You want to make sure that they cover the **shortest total distance** so that the carbon emissions are as small as possible
- 5 The map below shows the road layout (the grid pattern) in **1km sections** that they can all travel along in any way they want to
- 6 The orange dots represent the neighbourhoods from where various numbers of your friends are going to travel to reach your party
- 7 The question is: Which grid intersection would be the best place to host your party to ensure the shortest total distance is covered by your guests?

THINGS TO CONSIDER

- Do you place your party closer to the group of 5 so that 5 people are traveling a shorter distance each?
- If you place it further away from the group of 5, and nearer to a group of 2, would this be better?
- For every 1km grid section the group of 5 must travel, it will equal a total travelling distance of 5km. Whereas, for every grid section a group of 2 travels, it will only equal a total of 2km



As you can see, this is not an easy problem to solve! There are multiple routes each group could take. Each move closer, or away, from any orange dot changes the sum for all the orange dots. So how can we solve this problem?

SOLUTION

- 1 Forget about the individual groups and count how many people need to move in total.
 $5+2+2+1+3=13$
 In total, thirteen people need to move.
- 2 Identify the middle person in a group of 13.
 1 2 3 4 5 6 **7** 8 9 10 11 12 13
 This would be person 7.
- 3 If you can identify the location of person Number 7, this may help.
- 4 Begin by adding up the group numbers moving from left to right. i.e. $1+5+2+2+3$
 The seventh person would be in the group of 2 located on the vertical gridline number 5.
- 5 Now add up the group numbers moving from the bottom to the top. i.e. $3+1+2+2+5$
 The seventh person would be in the group of 2 located on the horizontal gridline number 5.
- 6 The intersection of these two vertical and horizontal gridlines, is intersection 5,5. This is the best place to hold your party.
- 7 Test it! Move the party 1km away, in any direction, from grid intersect 5,5 and the total distance will increase.

SO WHAT?

While this may seem like an unlikely situation, it is actually a very simple and clever way to calculate a scenario where you may have to pick the best place to position a new hospital, or maybe a new distribution centre. This is maths being used in a very easy but effective way to make a decision that affects our world.

However, this is actually massively over-simplified, and many other factors (traffic density, road capacity) would also need to be considered. This would require even more complex maths to ensure the best results. Would you enjoy that challenge?

FIND OUT MORE

There are over 800 Maths, or closely linked to Maths, courses available in nearly 100 UK Higher Education Institutions. They will all be slightly different – some might focus on Statistics, or Economics, and for some courses you can do Maths and another subject. This is called a Joint Honours or Dual Honours degree. Liverpool Hope University offers a ‘Mathematics with a Year in Industry’ course, which you can read about here: www.hope.ac.uk/undergraduate/undergraduatecourses/mathematicswithayearinindustry/

Find out more on the links below:

www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-degree/mathematics

www.mathscareers.org.uk/career-profiles/

NEED HELP?

Why not chat live to the team at Shaping Futures to find out more about what is on offer, or to get further advice and guidance

www.shaping-futures.org.uk/activities

