

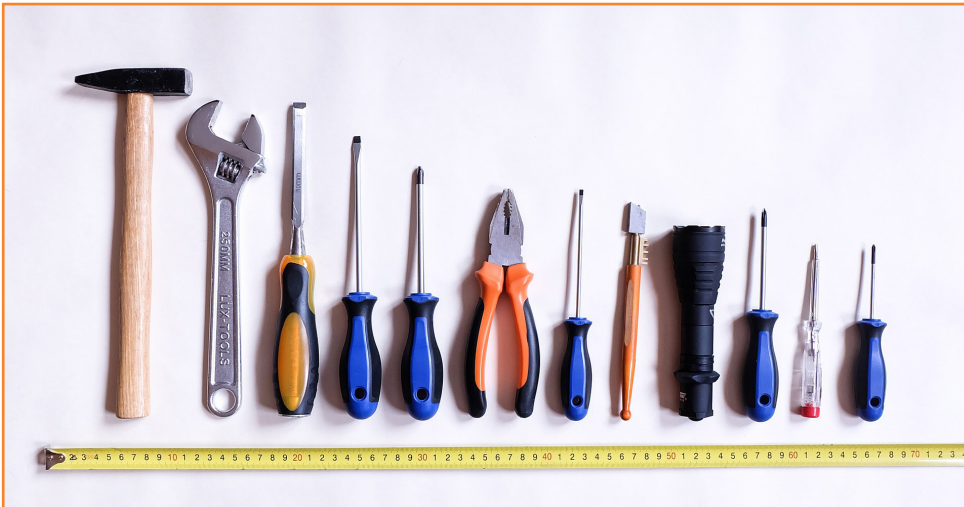
What's the Project?

How to plot and read Cartesian coordinates.

The Why behind the What

Knowing the location of something using coordinates has lots of real world applications.

- Air traffic controllers use coordinates to locate and track aeroplanes.
- Many jobs require mapping your geographic location on Earth using coordinates.
- The military use coordinates to locate targets, plan defences and position troops and equipment.



Technical Vocabulary

Positive Numbers:

Negative Numbers:

Intersect:

Handy Hint: Don't forget it's x before y when you're writing or plotting your coordinates!

Getting to Grips with Coordinates

Using Cartesian coordinates, we can figure out where something is located in relation to the point of origin.

Cartesian graphs have two intersecting number lines or axis on a grid.

- The **x-axis** is horizontal.
- The **y-axis** is vertical.
- The **point of origin** is the point where the x-axis and y-axis intersect (0,0).

Each number line has **negative** and **positive** numbers that move horizontally and vertically from the point of origin. Coordinates tell you where something is located on the grid.

When you're writing coordinates there are few rules to follow:

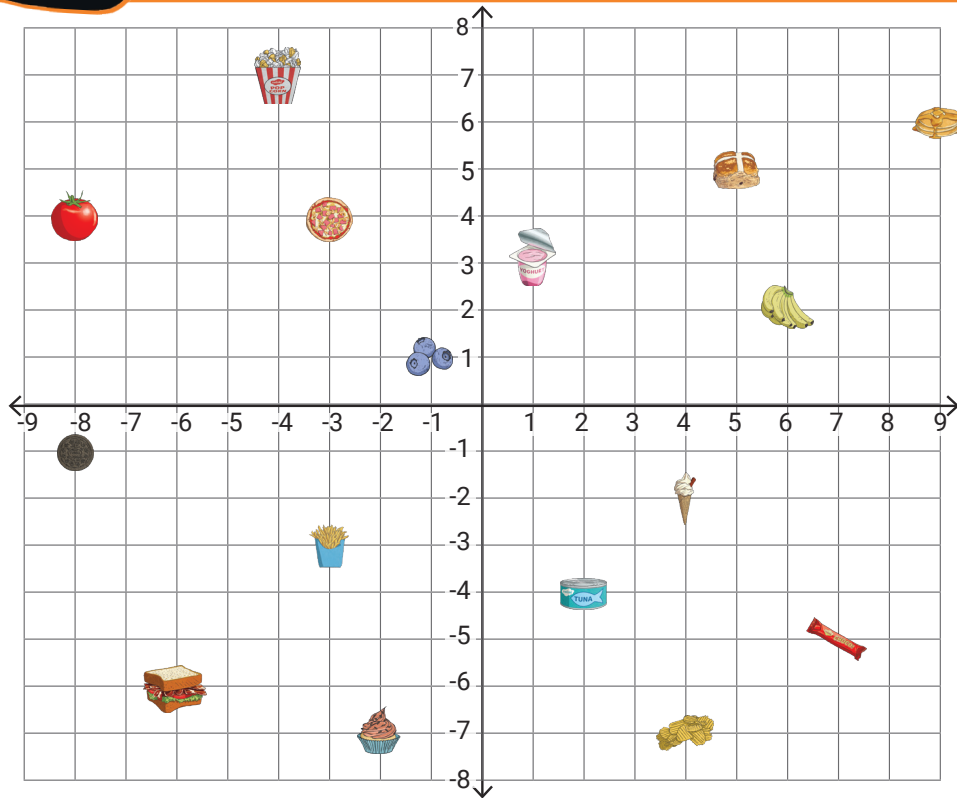
- The x coordinate always comes **before** the y coordinate.
- Put brackets around the coordinates, i.e. (4,6).
- Use a comma to separate the x and y coordinates with no gap, i.e. (-5,7).

Handy Hint: A long list of coordinates will look like this: (4,6), (-5,7), (3,-1), (4,3), (-8,-7). etc.

DIY MATHS

Installing the Coordinates

Get some practise installing the skill of reading coordinates by matching each set of coordinates with the food on the graph. The first one is done for you.



Technical Vocabulary

DIY MATHS

If you had to explain these mathematical terms to someone else, what would you say? Write your definitions of these mathematical terms. You may want to add a diagram to some of your definitions. Check online if you're not sure.

Coordinates:

Quadrant:

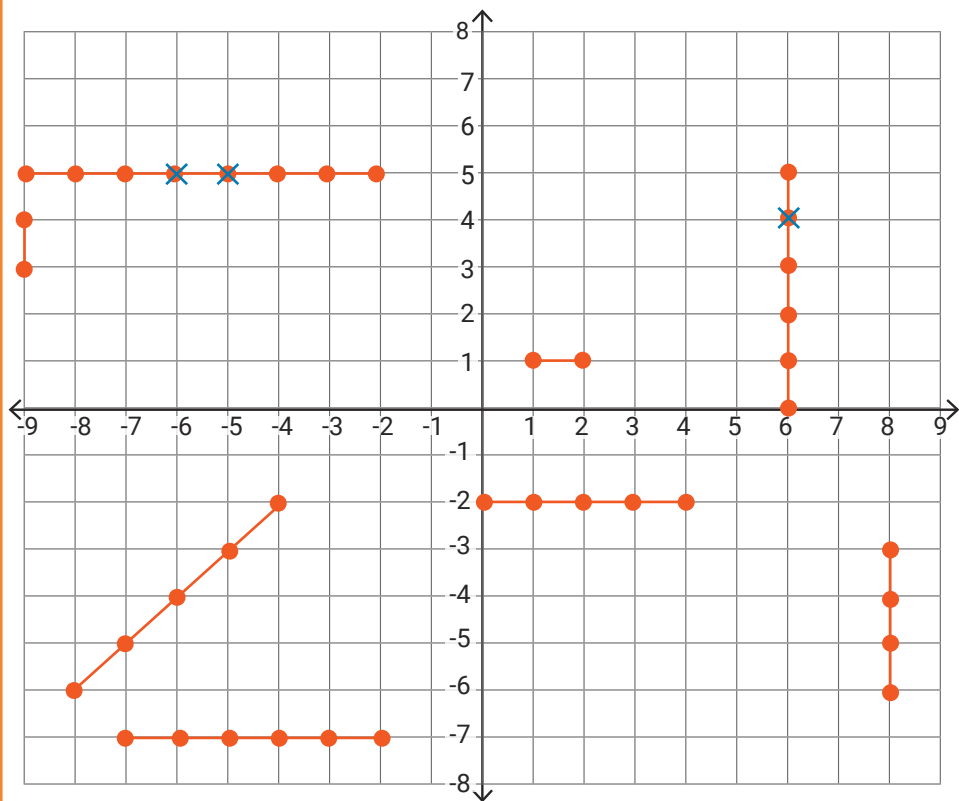
X-axis:

Horizontal:

Y-axis:

Vertical:

This is an example of what your Cartesian Battleship graph might look like:



Optional Extension

The mathematician René Descartes created the Cartesian graphing system. Do some research about Descartes, his life, mathematics, major discoveries (especially Cartesian coordinators) and contribution to modern mathematics. Present this in any form you choose – digital format, poster or any other creative way you can think of.

Letter	Coordinates	Food
A	(-3,4)	
B	(4,-2)	
C	(-8,-1)	
D	(9,6)	
E	(-3,-3)	
F	(-1,1)	
G	(-8,4)	
H	(-6,-6)	
I	(5,5)	
J	(7,-5)	
K	(-4,7)	
L	(6,2)	
M	(2,-4)	
N	(4,-7)	
O	(-2,-7)	
P	(1,3)	

DIY MATHS

Practical Project

Get a blank Cartesian coordinates graph sheet and glue it into your maths book. Graph and connect each consecutive point with a line until you reach the word STOP. Then, start the next set of coordinates and repeat the process until your picture emerges. Colour it in when you're done!

$(-13,-6), (-14,-2), (-14,2), (-13,6), (-11,9), (-9,11), (-5,13), (-2,14), (2,14), (5,13), (9,11), (11,9), (13,6), (14,2), (14,-2), (13,-6)$ STOP

$(10,-10), (9,-11), (7,-12), (5,-13), (3,-13.5), (0, -14), (-3, -13.5), (-5,-13), (-7,-12), (-9,-11), (-10,-10)$ STOP

$(-6,4), (-6.5,4.5), (-9,2), (-10,5,0), (-10,-1), (-8.5,1), (-6,4)$ STOP

$(6,4), (6.5,4.5), (9,2), (10,5,0), (10,-1), (8.5,1), (6,4)$ STOP

$(-9,-1), (-7,1), (-6,1.5), (-4,1.5), (-3,1), (-2,0), (-1.5,-1), (-4,0), (-7,0), (-9,-1)$ STOP

$(9,-1), (7,1), (6,1.5), (4,1.5), (3,1), (2,0), (1.5,-1), (4,0), (7,0), (9,-1)$ STOP

$(-7,0), (-10,-2.5), (-12,-4), (-13,-6), (-13,-7), (-12.5,-9), (-11,-10), (-9,-10), (-7,-8), (-5.5,-5), (-5.5,-3.5), (-7,0)$ STOP

$(7,0), (10,-2.5), (12,-4), (13,-6), (13,-7), (12.5,-9), (11,-10), (10, -10) (9,-10), (7,-8), (6.5,-5), (6.5,-3.5), (7,0)$ STOP

$(6.5,-3.5), (3,-4), (-3,-4), (5.5,-3.5)$ STOP

$(6.5,-5), (2.5,-6), (-2.5,-6), (6.5,-5)$ STOP

$(-7,-8), (-5,-9.5), (-2,-10.5), (2,-10.5), (5,-9.5), (7,-8)$ STOP

What's Your Picture?

Handy Hint: Don't forget it's *x* before *y* when you're plotting coordinates!

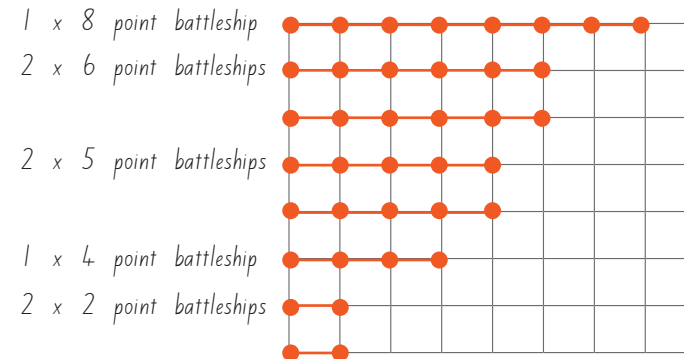
Job Share

DIY MATHS

Play Cartesian Battleships with a buddy.

1. Get a blank graph sheet each. Make sure you hide your sheet so you can't see the locations of each other's ships.

2. Plot your battleships anywhere on your Cartesian coordinate graph. Your ships can be horizontal, vertical or diagonal.



3. The objective of the game: sink all the ships of your opponent before they sink yours.

4. Fire missiles by taking turns to guess the coordinates of your opponent's ships.

5. Reply HIT or MISS for each missile and mark all hits with a cross through the coordinate point.

6. Let your opponent know that when all the points on a ship are HIT, the battleship is SUNK.

7. You might want to record the coordinates of all the missiles you fire on your graph so you don't end up firing in the same spot twice.



Teacher Guidance

Hi there,

This DIY Maths resource is designed to be used independently by your Year 7-8 students. It could be used as a follow up from explicit teaching or a task for students to work through and problem-solve as they go. There are a variety of tasks, including basic practise, practical skills, mathematical vocabulary, buddy teaching and extension activities.

Print it out as an A4 or A5 booklet in colour or black and white. The back page of the booklet is deliberately blank so that students can glue it easily into their maths books. You could also use this resource on a digital platform.

The answers to the questions for the 'Installing the Formula' section of the booklet are included at the bottom of this page so you can print them, cut them off and give them to students to self-mark.

FYI: Included with this resource is a blank black and white Cartesian Coordinate map. Students will need these to complete some of the DIY Maths tasks, so it might pay to have some printed and ready to go.

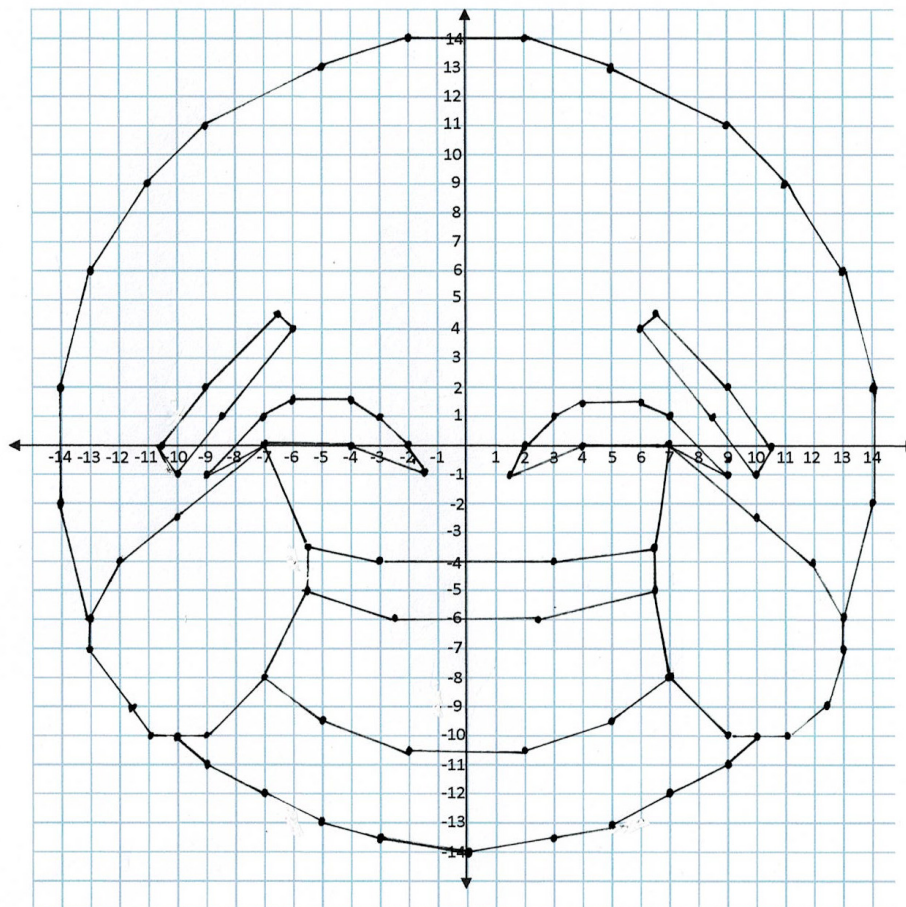
We hope you and your students enjoy using this resource.

Team Twinkl

Answers for 'Installing the Coordinates'

A - Pizza	B - Ice Cream	C - Biscuit	D - Pancakes
E - French Fries	F - Blueberries	G - Tomato	H - BLT Sandwich
I - Hot Cross Bun	J - Choco Bar	K - Popcorn	L - Bananas
M - Tuna	N - Potato Chips	O - Cupcake	P - Yoghurt

Picture for Practical Project: Tears of Laughter Emoji



Cartesian Coordinates Graph

