Position and Direction: Map Coordinates

Aim:	**Success Criteria:**	**Resources:**
Describe positions on a 2D grid as coordinates in the first quadrant. I can read, write and plot coordinates in the first quadrant.	I can label the x-axis and y-axis. I know that a coordinate is represented by two numbers in brackets, separated by a comma. I can read a coordinate correctly by going along and then up.	**Lesson Pack** Dice
	Key/New Words: Coordinate, axis, quadrant.	**Preparation:** **Drawing a Coordinate Grid Resource Sheet** – per child Differentiated **Pirate Map Coordinates Activity Sheets** – per child **Coordinate Bingo Game** – per group

Prior Learning: It will be helpful if children can describe where things are using the language of position, direction and motion.

Learning Sequence

	**Around the Town:** Using the scene displayed on the **Lesson Presentation**, the children rehearse the language of position and direction by making mathematical statements about the position of the objects and the direction and routes between the objects. Differentiated word banks of vocabulary can be shown as needed to support and extend. Also includes differentiated challenges relating to the vocabulary of direction.	
	**Reading, Writing and Plotting Coordinates:** Use the information and images on the **Lesson Presentation** to explain that a coordinate is a way to locate a position on a map or graph by indicating how many units along, and how many units up the position is. Move on to explaining the x-axis, y-axis, and quadrant features of coordinates and how they are recorded inside brackets, separated by a comma. Emphasise at all times the importance of reading and writing coordinates in the correct order (along then up).	
	**Drawing a Coordinate Grid:** Provide each child with a copy of the **Drawing a Coordinate Grid Resource Sheet.** As a class, work through the step by step instructions and demonstrations on the **Lesson Presentation** of how to accurately draw and label a coordinate quadrant using a ruler and pencil.	
	**Coordinate Connect 3:** Using the coordinate grids drawn in the previous activity the children take it in turns to roll two dice to create a coordinate. Using different coloured pencils, they plot this coordinate on the grid. First person to get three coordinates in a row wins. Play the game twice to use both of the grids.	
	**Pirate Map Coordinates:** Children complete the differentiated **Pirate Map Coordinates Activity Sheets**; to demonstrate they can read, write and plot coordinates in the first quadrant.  Read, write and plot coordinates accurately (10 by 10 grid).  Read, write and plot coordinates accurately (15 by 10 grid).  Read, write and plot coordinates accurately (10 by 15 grid) with similarities such as (4, 3) and (3, 4).	
	**Diving into Mastery:** Schools using a mastery approach may prefer to use the following as an alternative activity. These sheets might not necessarily be used in a linear way. Some children might begin at the 'Deeper' section and in fact, others may 'dive straight in' to the 'Deepest' section if they have already mastered the skill and are applying this to show their depth of understanding.  **Children plot coordinates of a pirate map.**  **Children answer reasoning questions involving plotting coordinates on a pirate map.**  **Children find different ways of solving a problem involving plotting coordinates on a pirate map.**	
	**Coordinate Bingo:** Provide each group (up to 4 children) with a bingo card from the . The children take it in turns to randomly choose a calling card which will display a written coordinate. If any children have the matching coordinate plotted on one of their grids on their bingo card, they mark it off. The first child to mark off all their plotted coordinates wins.	

Exploreit

Pictureit: Create coordinate pictures by plotting coordinates on a grid and then writing the coordinates as an instructional list for a friend to plot on a blank grid.

Geographyit: Explore the use of coordinates on globes, atlases and online map tools.

Exploreit: Investigate the symmetry of coordinates by creating symmetrical coordinate pictures and comparing the numbers in the written coordinates. What patterns can they spot in the numbers?

Maths

Position and Direction


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Head Fm
240
200
180
170
Thornhill
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HOPE STA
Carr
Bottom
187
PH
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Bamford
Weir
Mills
Map Coordinates
Westfield
Garner Ho
Old Lees
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A 6187
290
270
Shatton Moor
Shatton Edge
395
Offerton
Hall

Aim

- I can read, write and plot coordinates in the first quadrant.

Success Criteria

- I can label the x-axis and y-axis.
- I know that a coordinate is represented by two numbers in brackets, separated by a comma.
- I can read, write and plot a coordinate correctly by going along and then up.

Around the Town

Use the vocabulary of position and direction to describe the routes between different places in the Twinkl town.

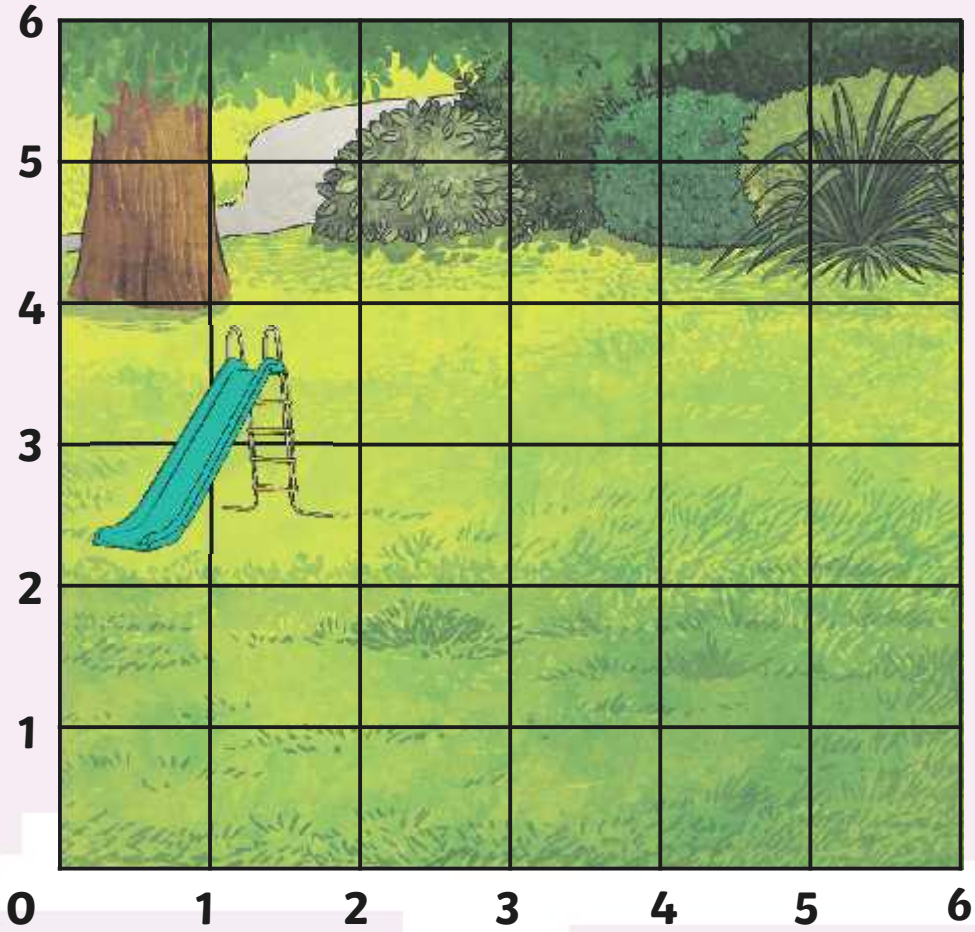
North
East
South
West
above
below
between
higher
lower
left
right

North-East
South-East
South-West
North-West
horizontal
vertical
diagonal
row
column
parallel

Show supporting vocabulary word bank

Hide supporting vocabulary word bank

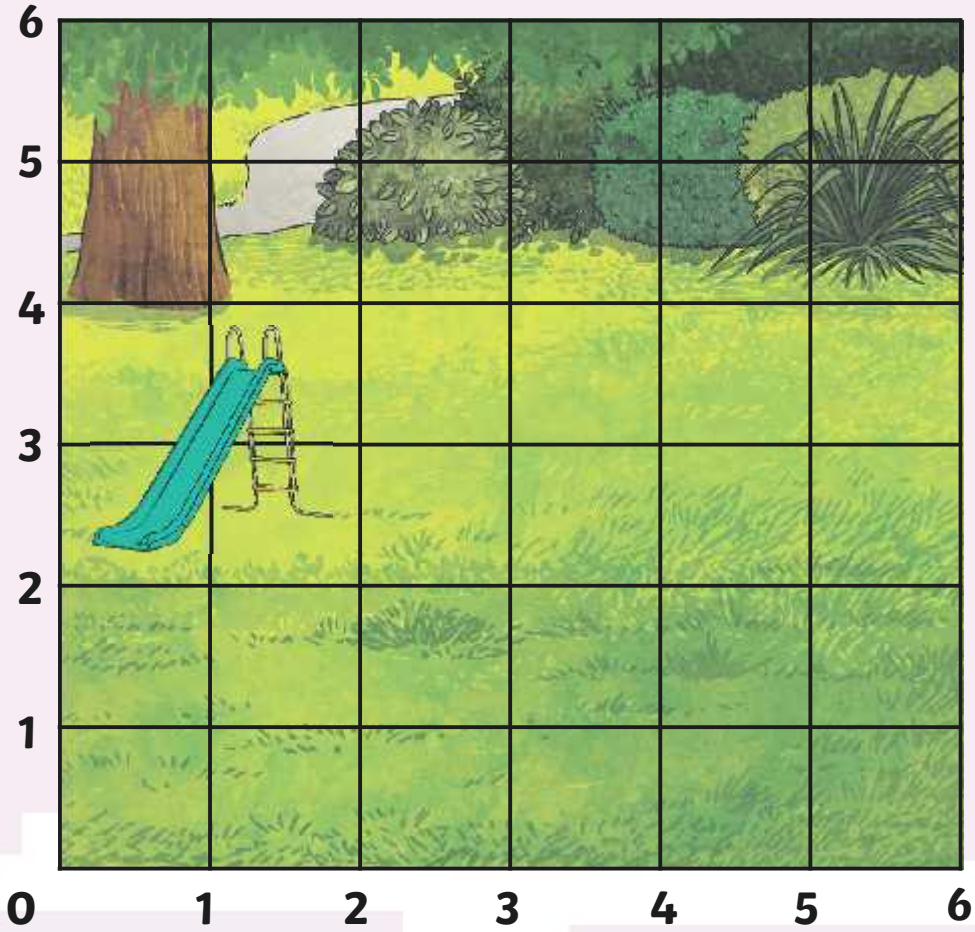
Reading Coordinates



Coordinates are a useful way to locate a position on a map or grid.

Here is a grid. It shows where the slide is in the park. Let's work together to read and write the coordinate.

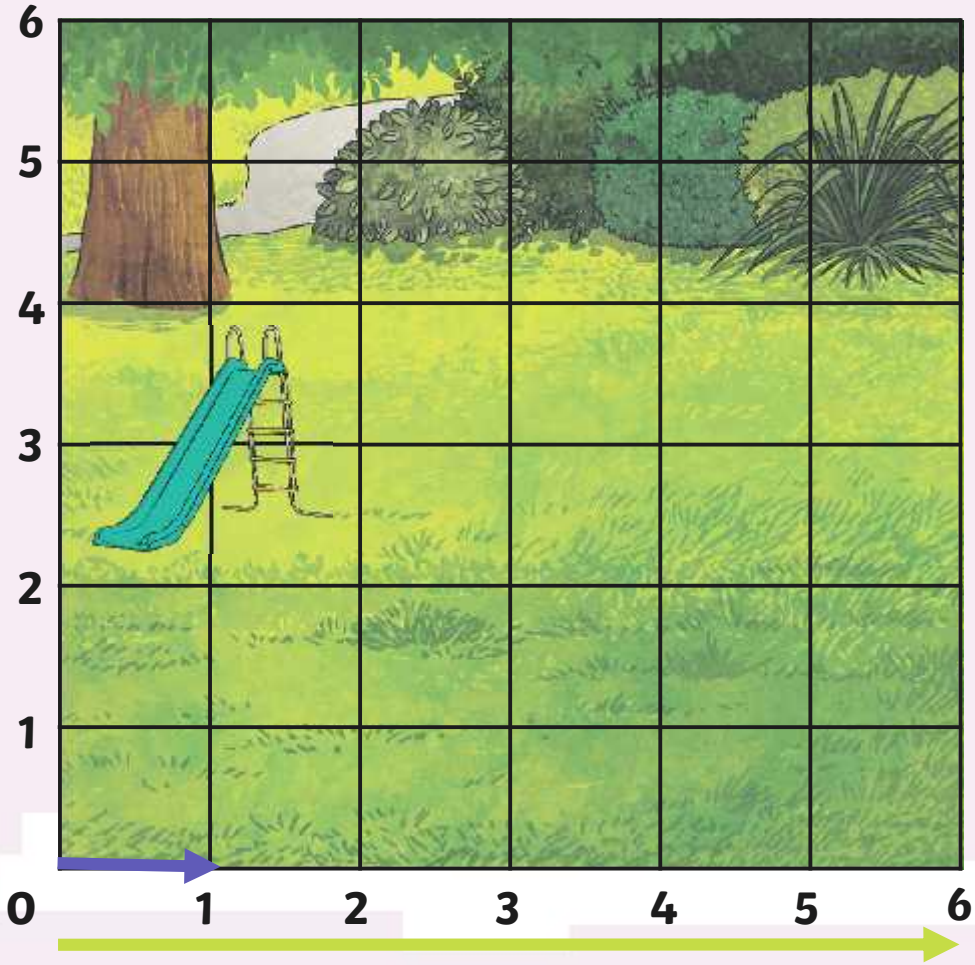
Reading Coordinates



Look carefully at the numbers across the bottom of the grid and up the side of the grid.

We will use these numbers to give the position of the slide.

Reading Coordinates

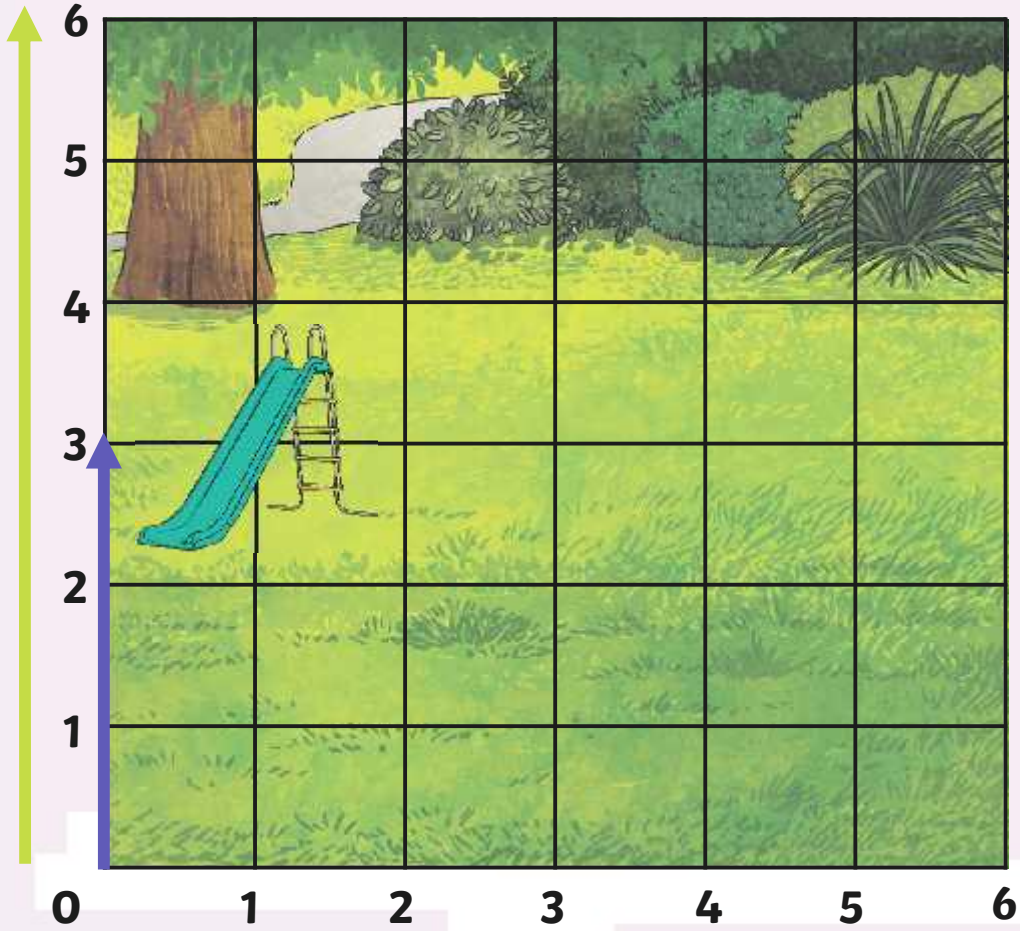


The numbers across the bottom of the grid are on the **x-axis**.

We **always** read the number on the x-axis first.

We can see that the slide is positioned on **line number 1** of the x-axis.

Reading Coordinates

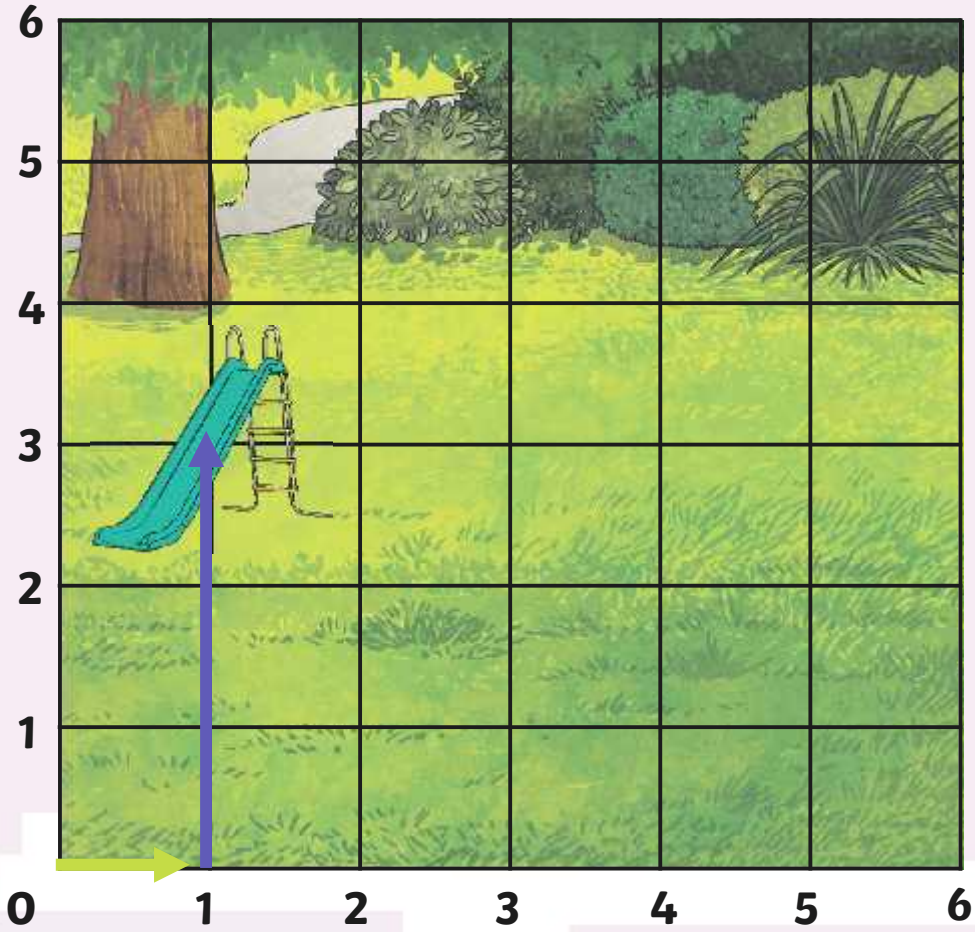


The numbers up the side of the grid are on the **y-axis**.

We **always** read the number on the y-axis **after** the x-axis.

We can see that the slide is positioned on **line number 3** of the y-axis.

Reading Coordinates



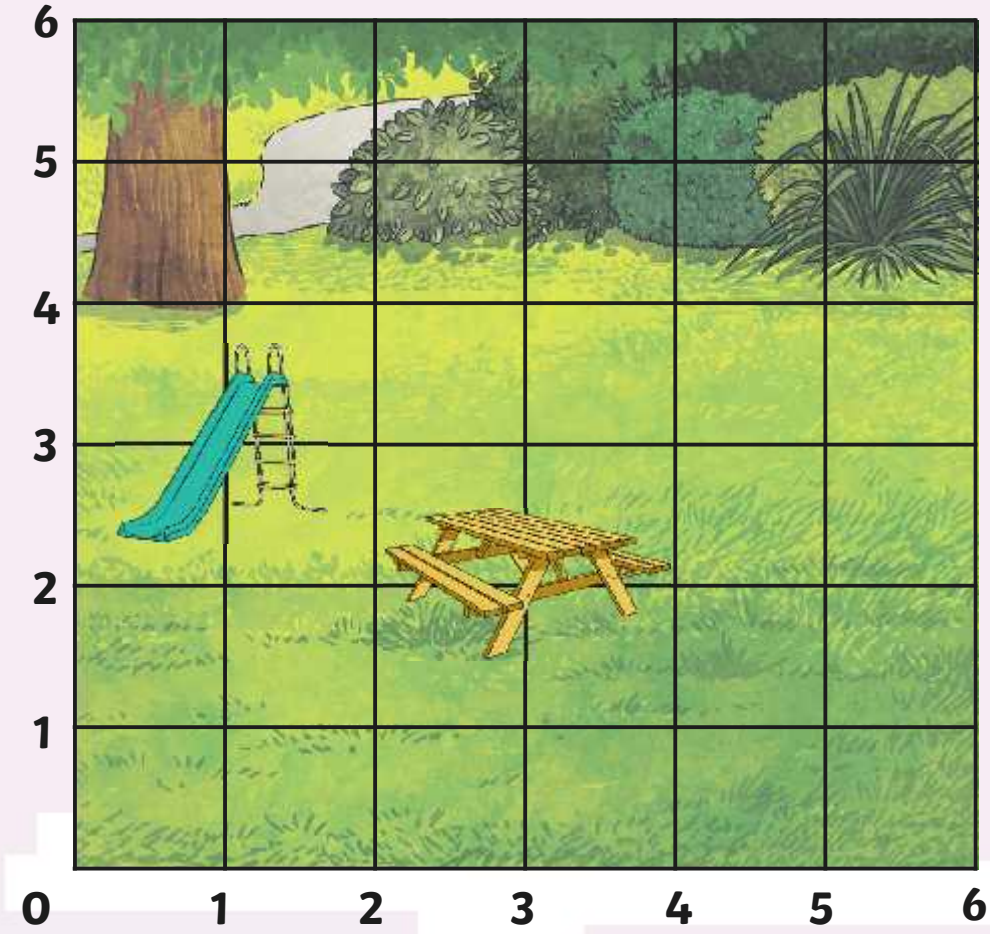
- We have located that the slide is on ***line 1*** of the *x-axis* (across) and ***line 3*** of the *y-axis* (up).

- There is a special way we write this as a coordinate:

(1, 3)

x-axis y-axis

Reading Coordinates



There is also a bench in the park.

It is at:

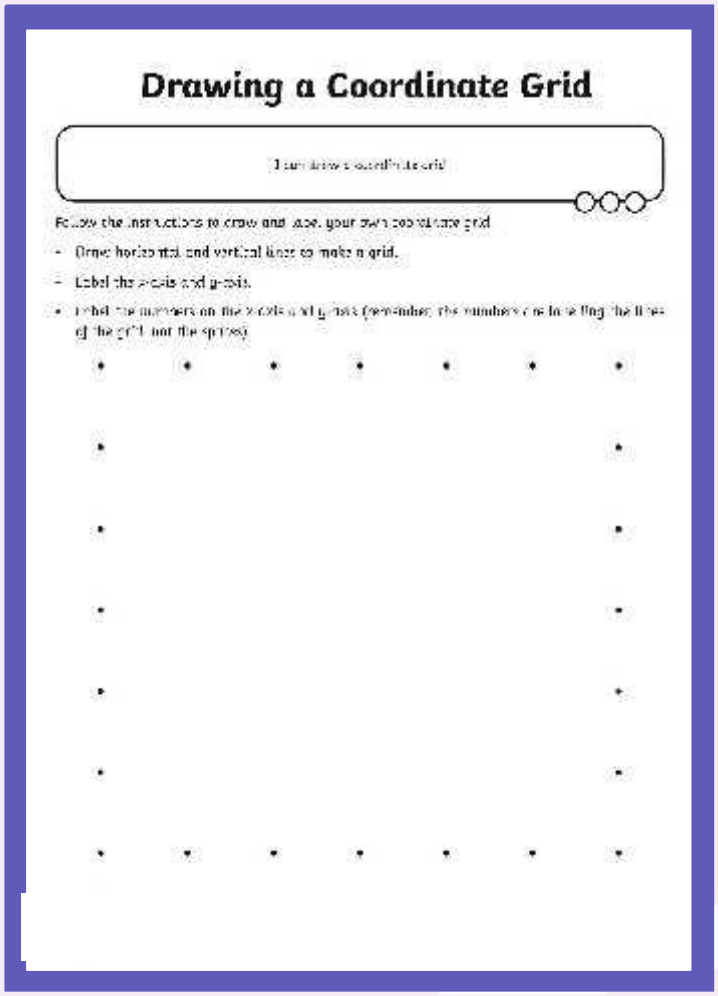
(3, 2)

x-axis y-axis

Where should we position the bench on the grid?

Answer

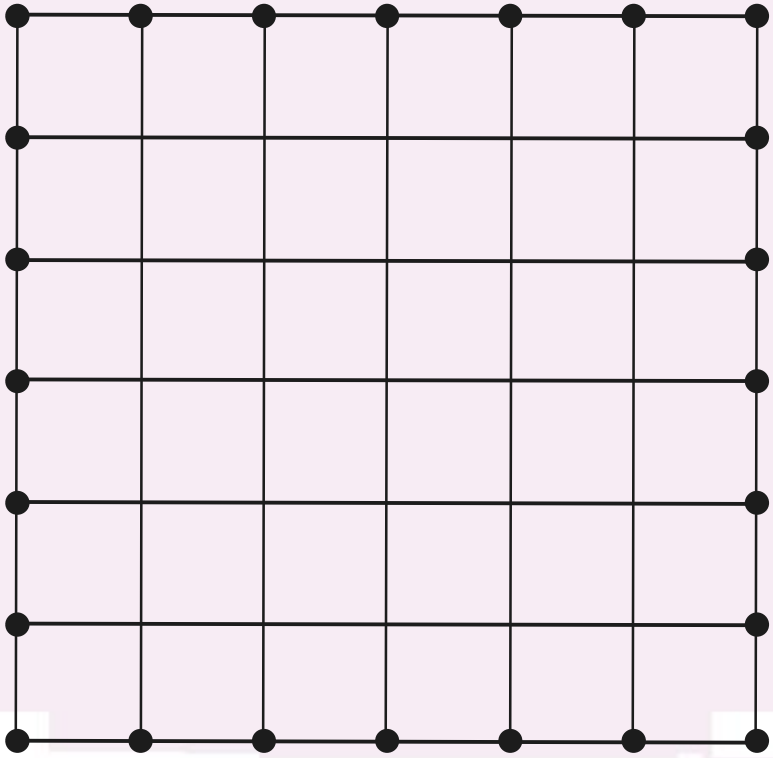
Drawing a Coordinate Grid



Follow the step by step instructions to draw and label your own coordinate grid which we will use in a coordinate game.

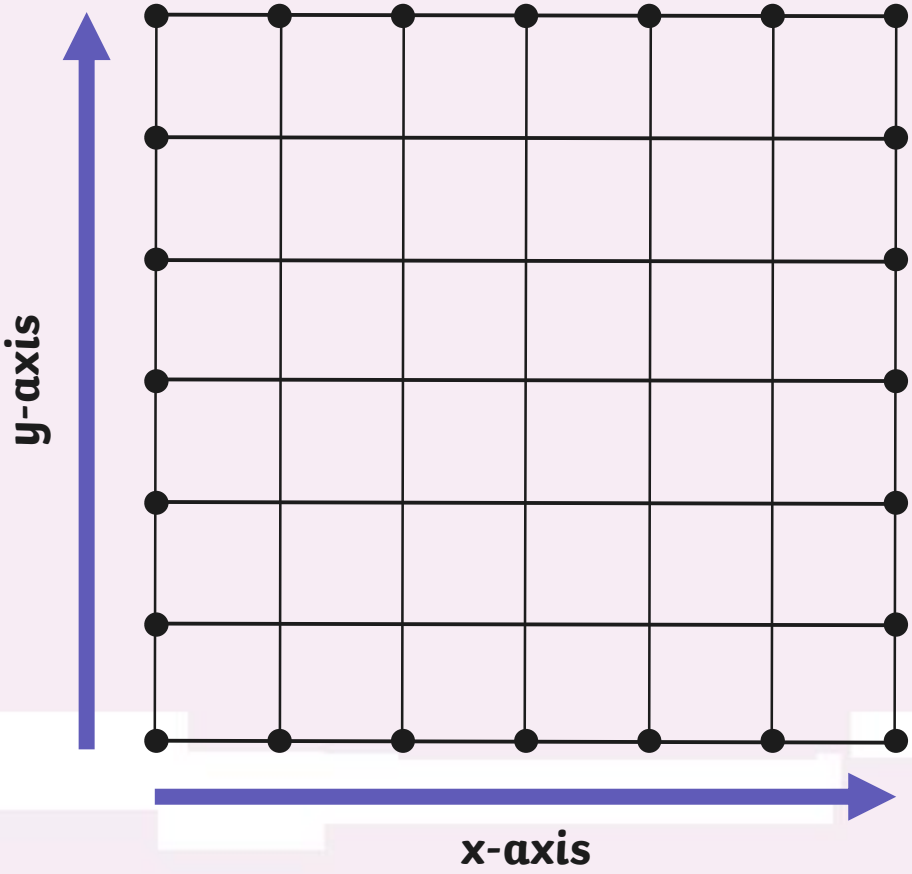
Drawing a Coordinate Grid

First, we need to draw the horizontal and vertical lines to create a grid:



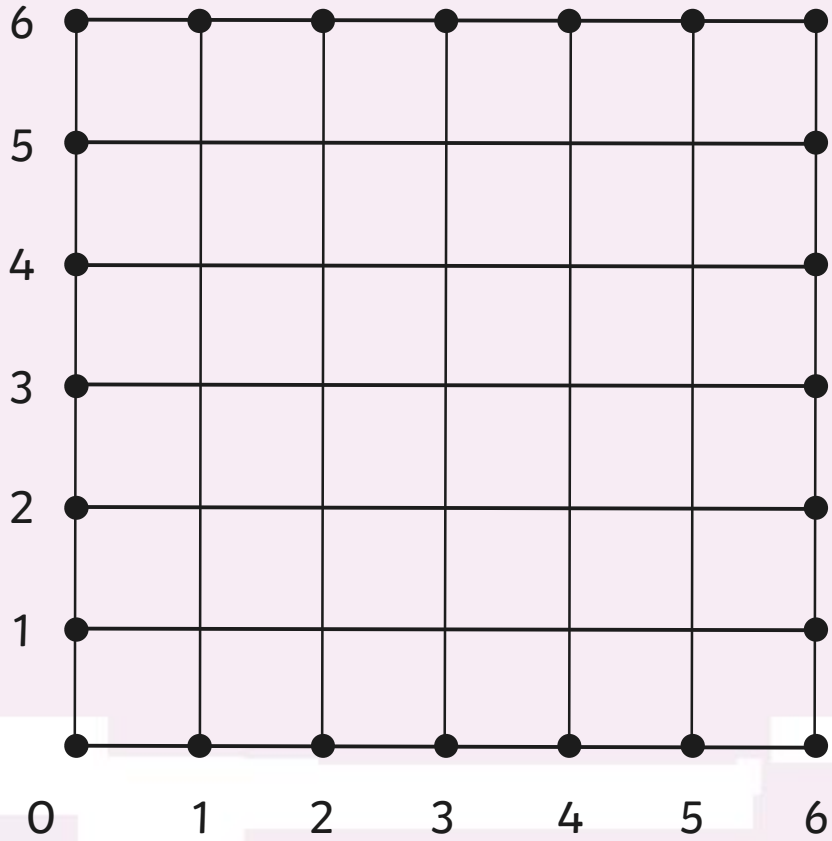
Drawing a Coordinate Grid

Then we need to label the **x-axis** and **y-axis**:



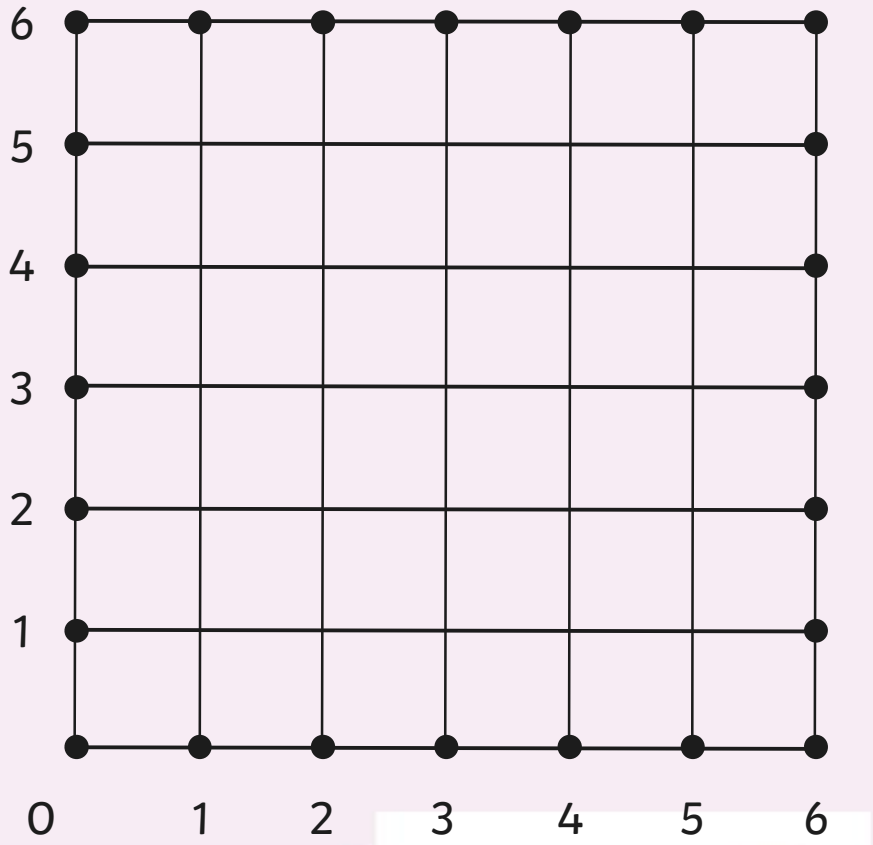
Drawing a Coordinate Grid

Next, we need to label the numbers on the x-axis and y-axis:

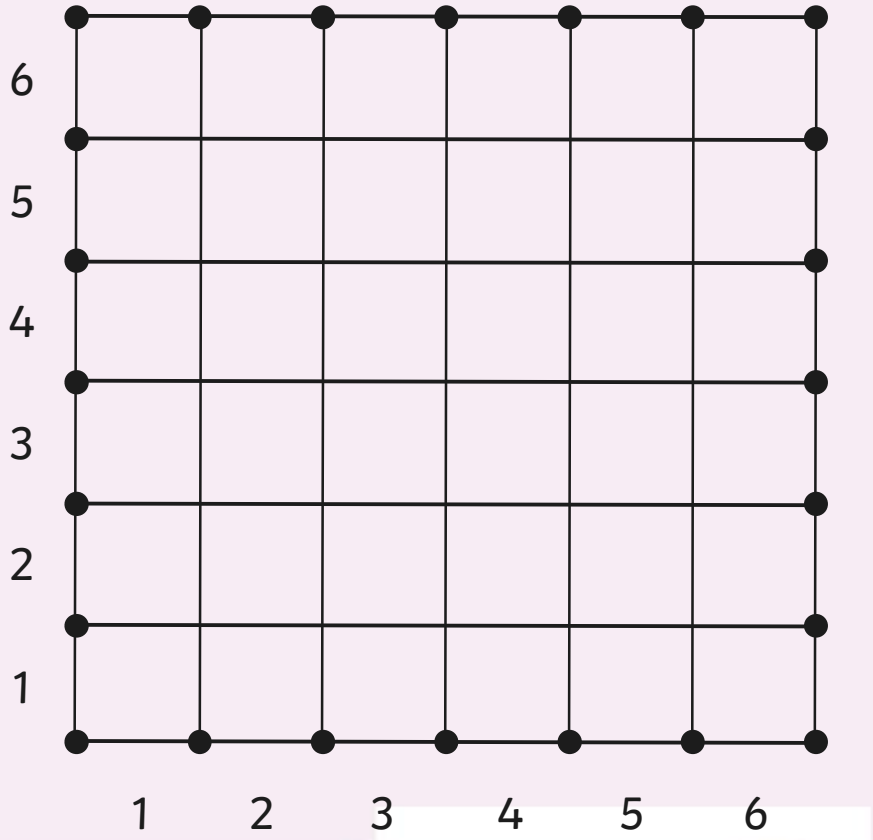


Drawing a Coordinate Grid

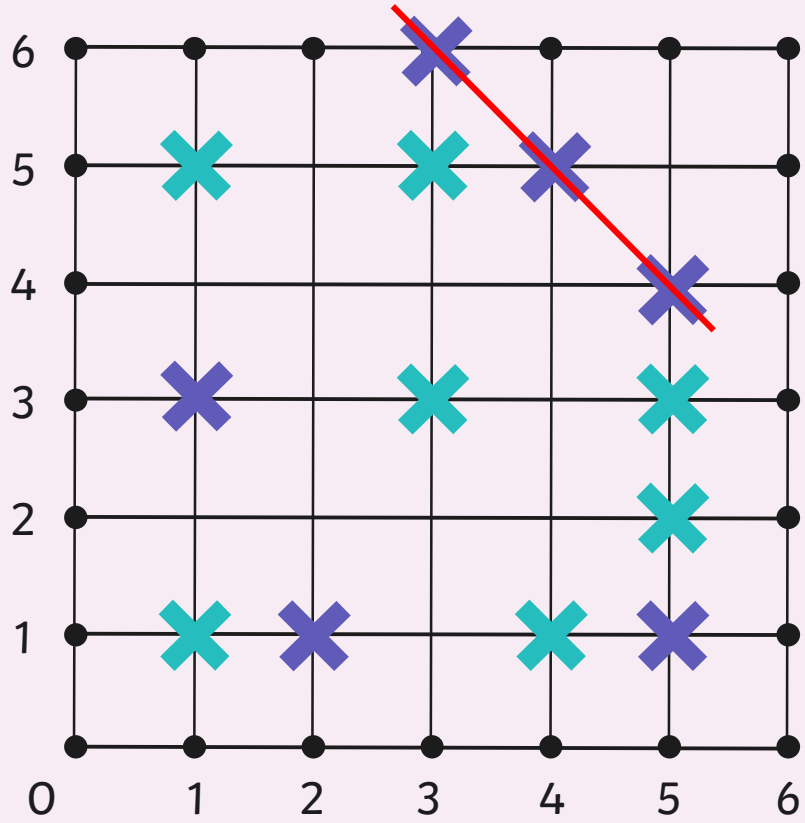
Remember, the numbers are labelling the **lines** of the grid, not the **spaces**.



Drawing a Coordinate Grid



Coordinate Treasure Hunt



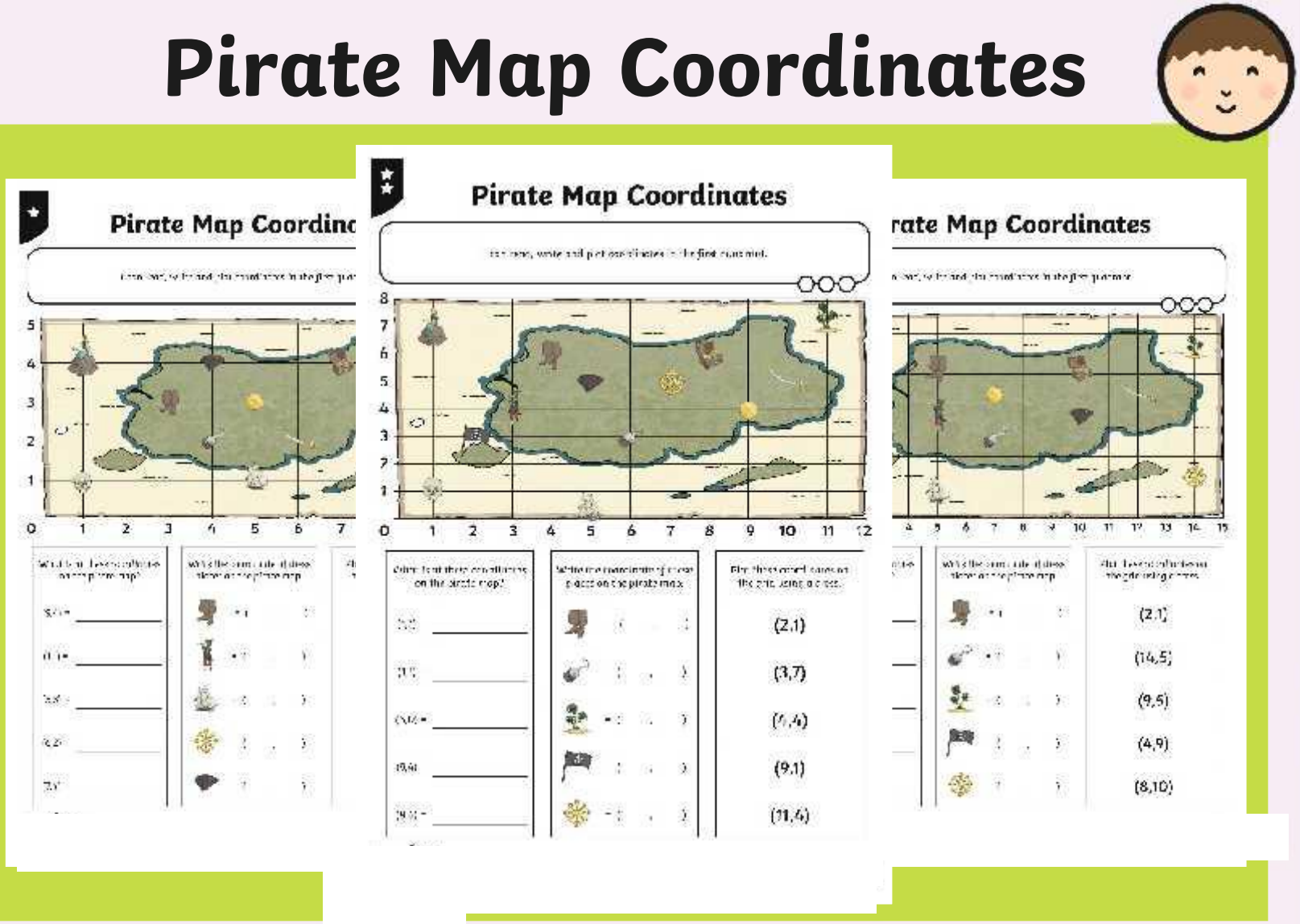
How to play:

- Use one of your labelled coordinate grids.
- Choose a different colour pencil/pen each.
- Take it in turns to roll two dice to make a coordinate.
- Plot your coordinate on the grid in your colour.
- The winner is the player who plots 3 coordinates in a row.

Remember to:

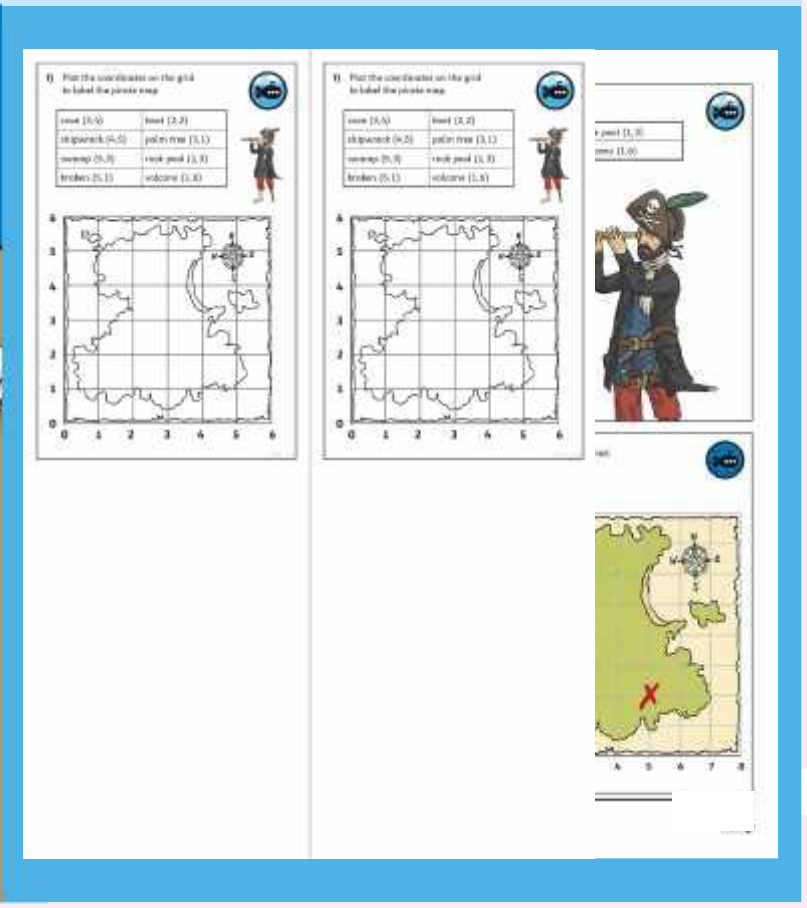
Read across the **x-axis** first and then read up the **y-axis** second.

Pirate Map Coordinates

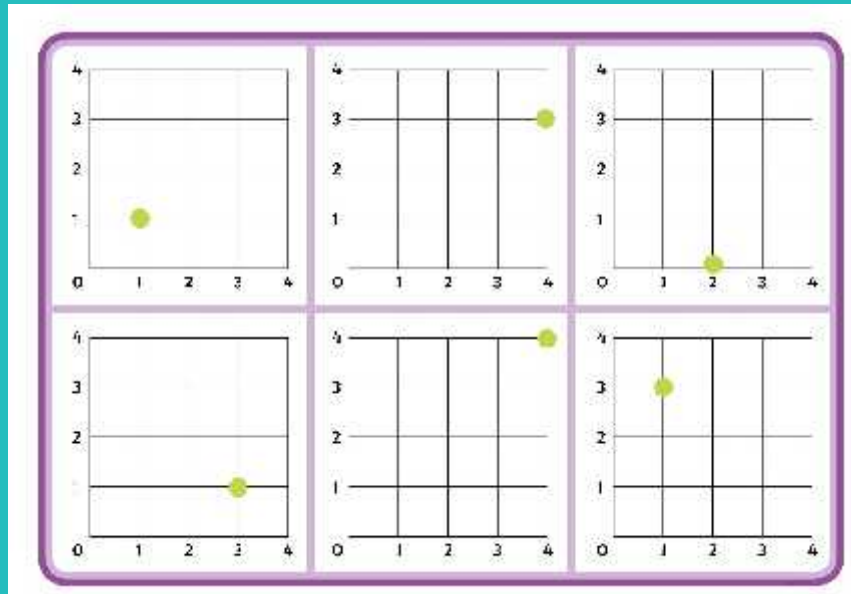


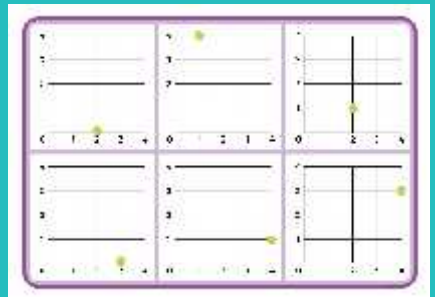
Diving into Mastery

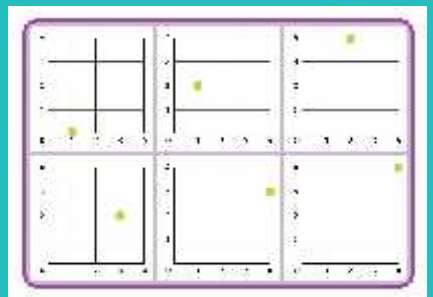
Dive in by completing your own activity!



Coordinate Treasure Hunt







How to play:

- Take it in turns to choose a card from the pile.
- Read the coordinate on the card.
- Cross off the grid on your game board if the plotted coordinate matches the written coordinate.
- The winner is the player who crosses off all their coordinate grids first.

A useful tip!
An easy way to remember is 'along the corridor and up the stairs'.

Aim

- I can read, write and plot coordinates in the first quadrant.

Success Criteria

- I can label the x-axis and y-axis.
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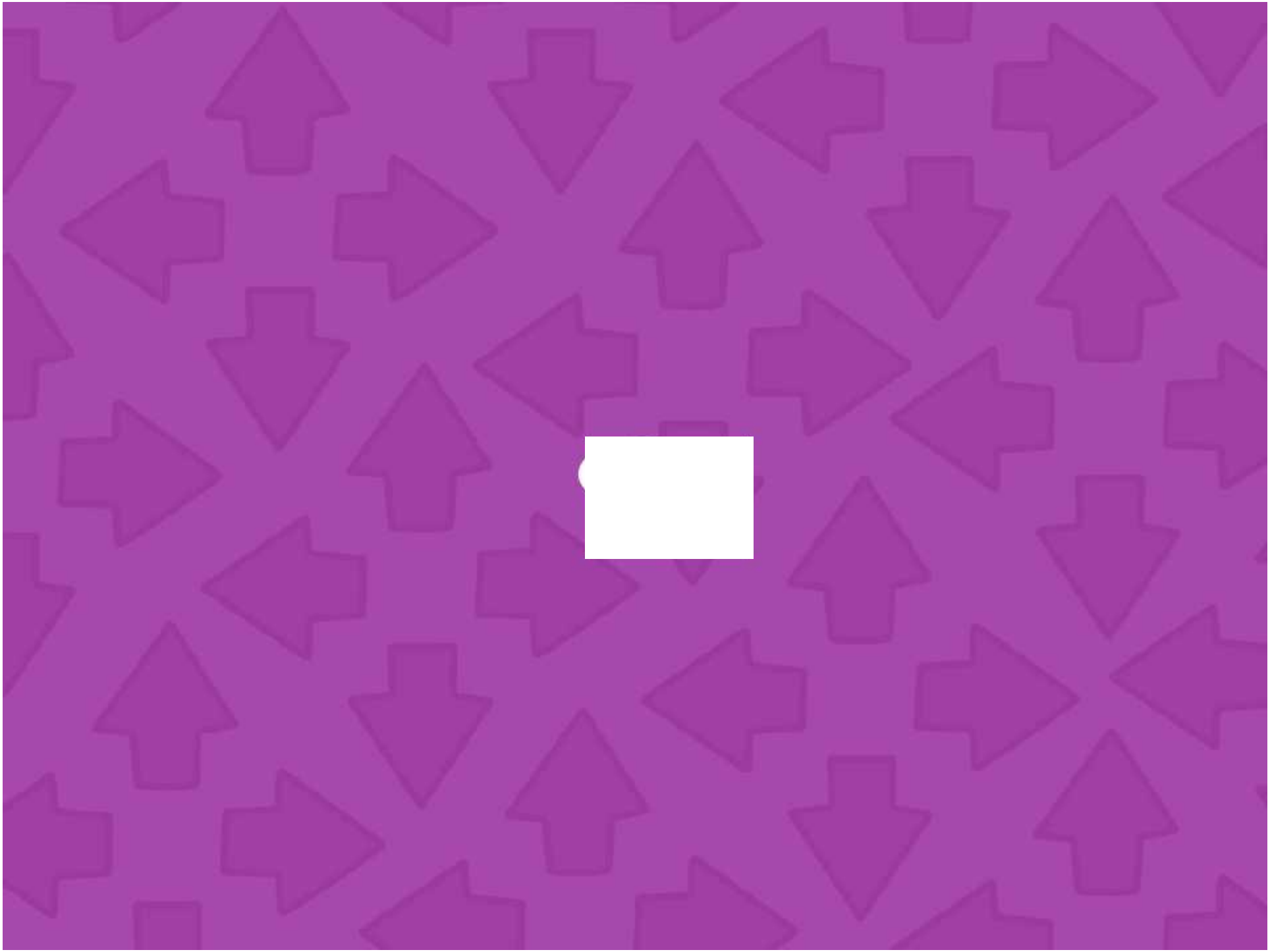
- I can read, write and plot a coordinate correctly by going along and then up.

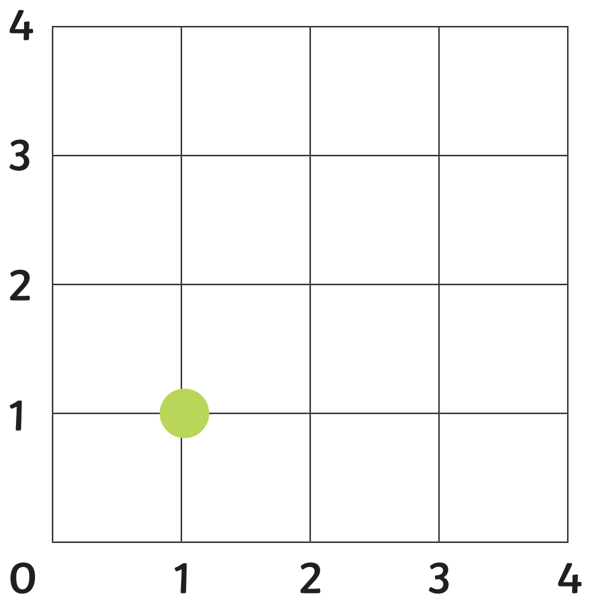


(0,1)	(0,2)	(0,3)
(0,4)	(1,0)	(1,1)

(1,2)	(1,3)	(1,4)
(2,0)	(2,1)	(2,2)

(2,3)	(2,4)	(3,0)
(3,1)	(3,2)	(3,3)

(3,4)	(4,0)	(4,1)
(4,2)	(4,3)	(4,4)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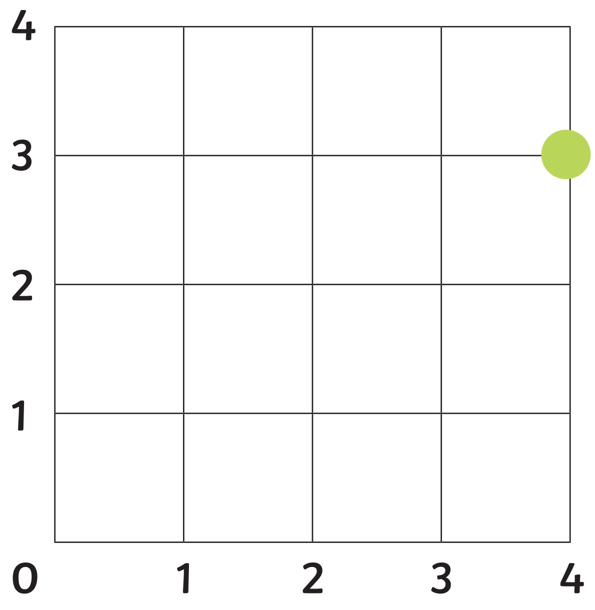
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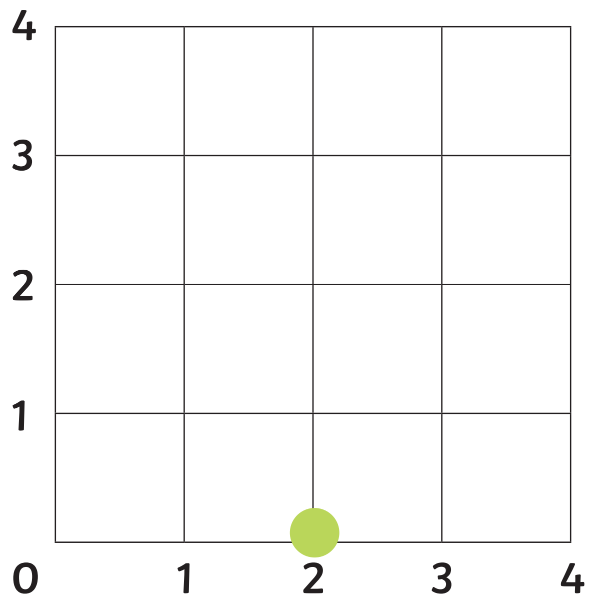
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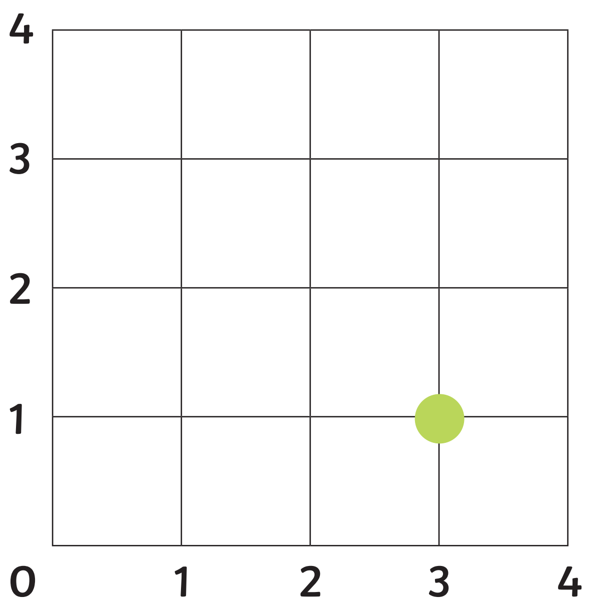
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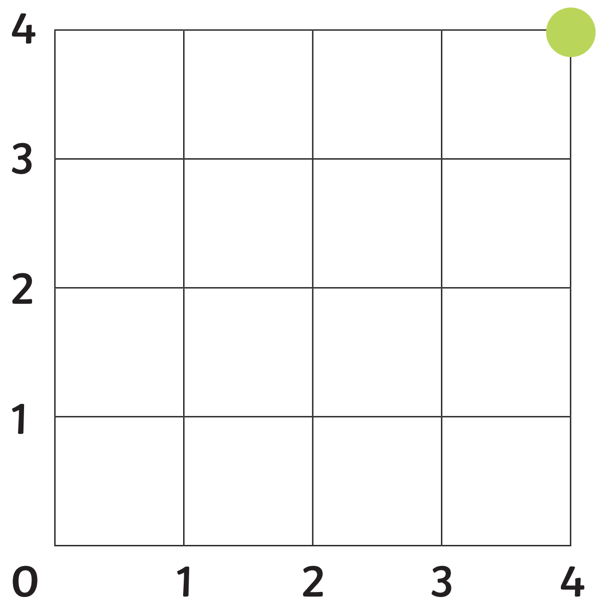
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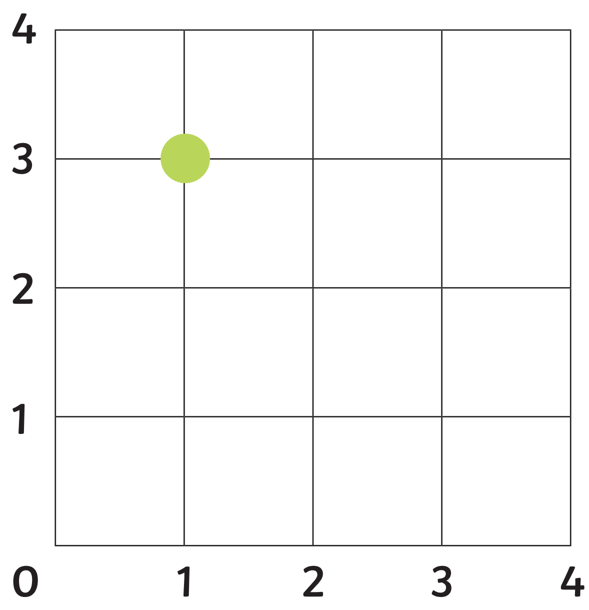
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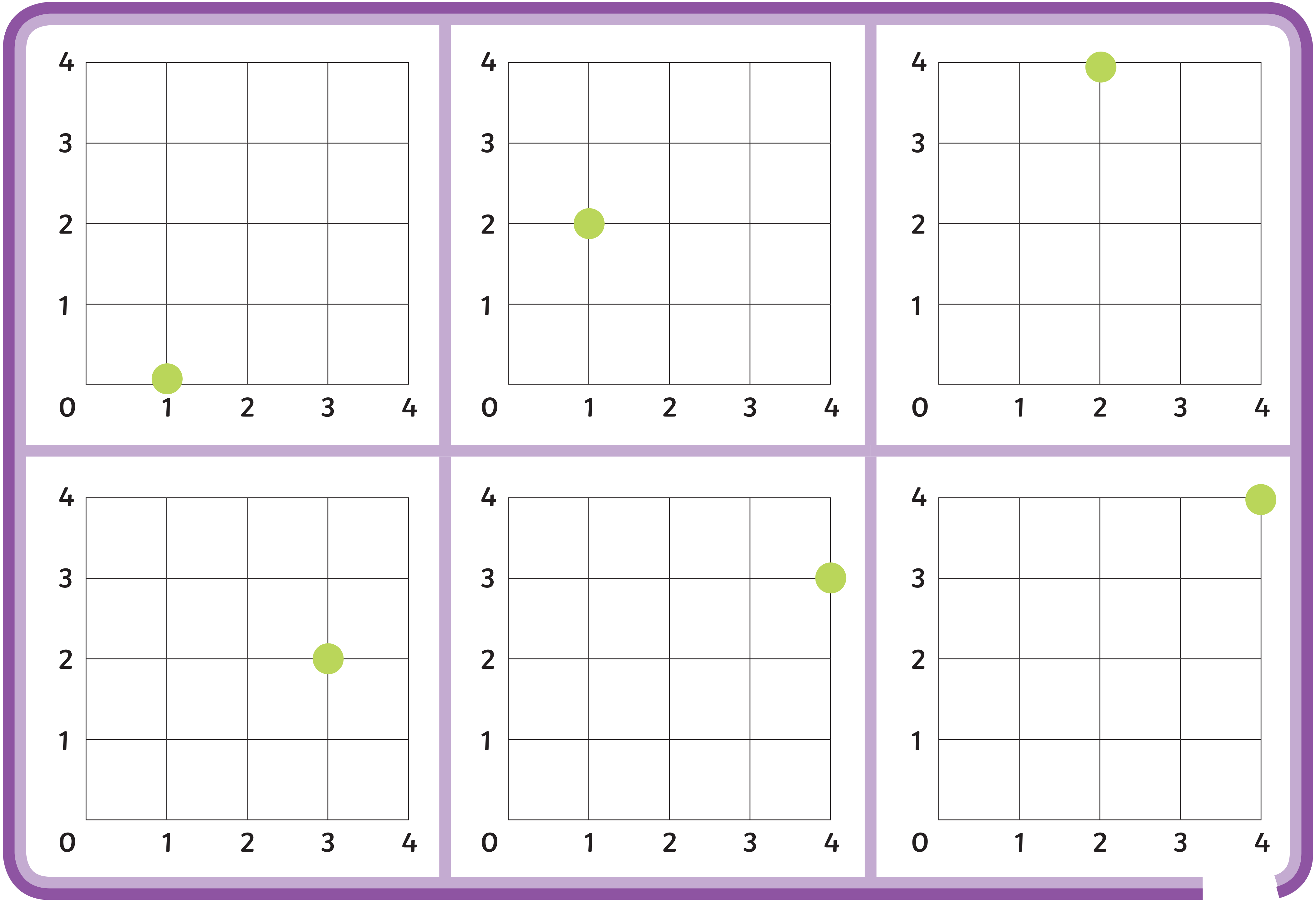

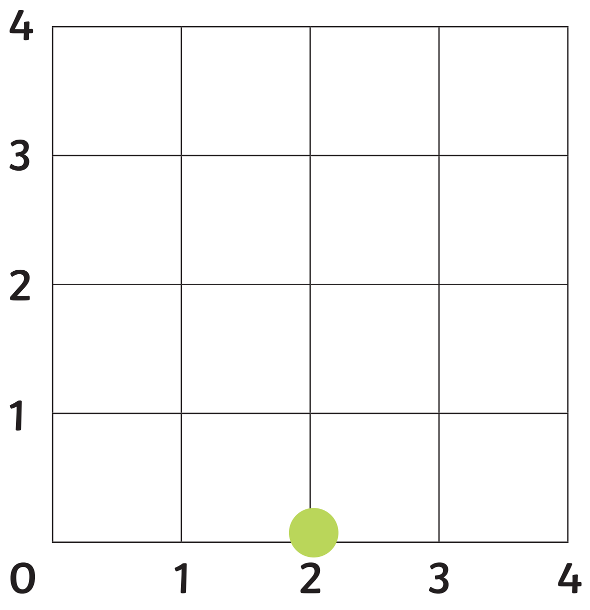
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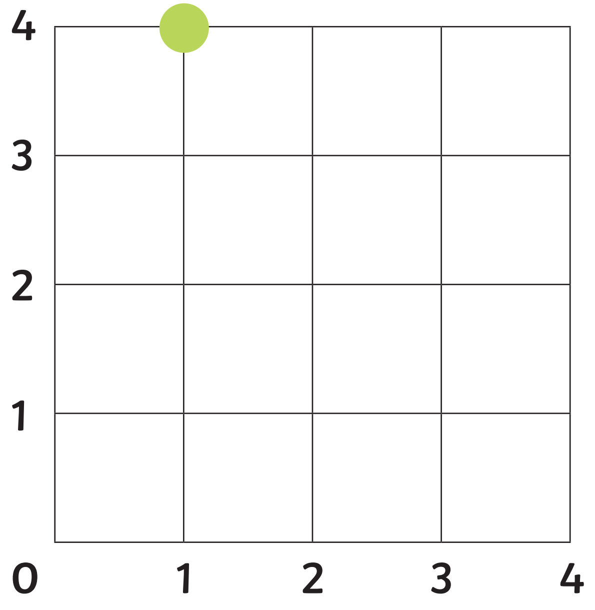
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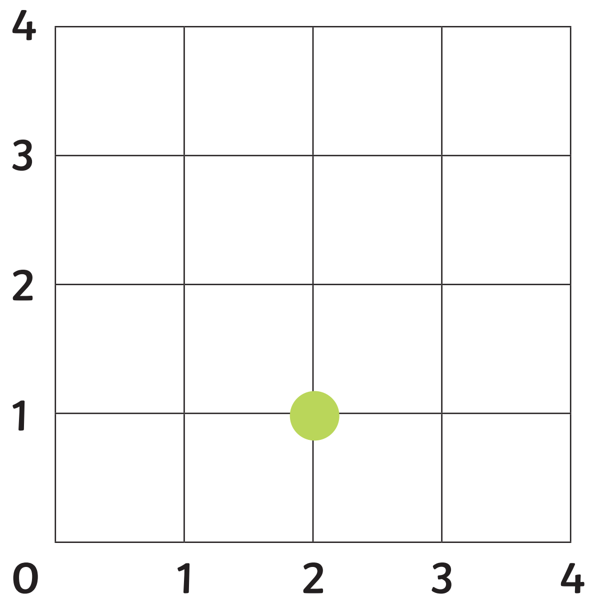
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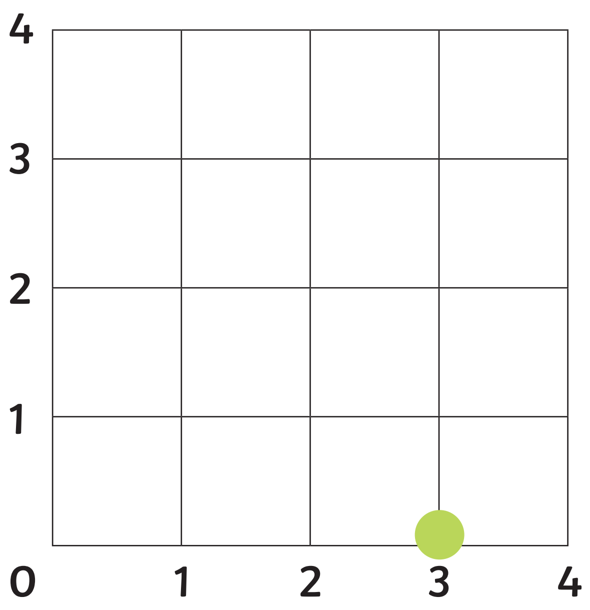
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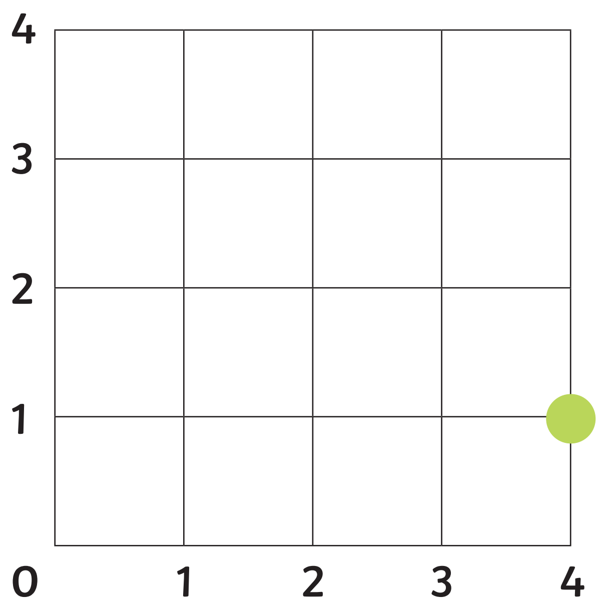
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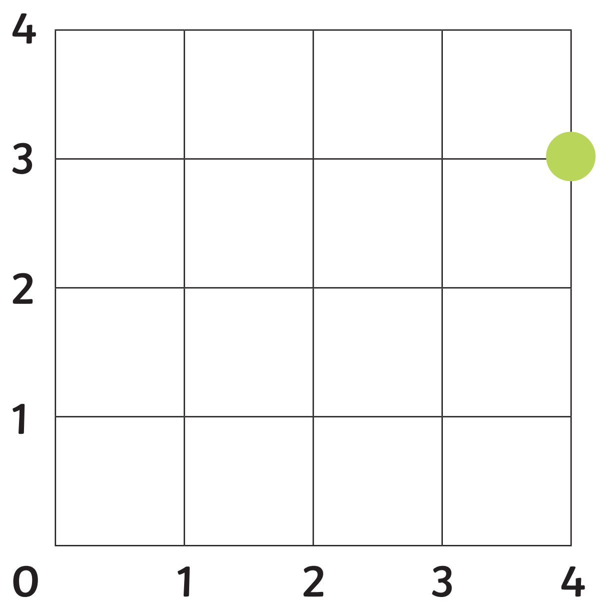
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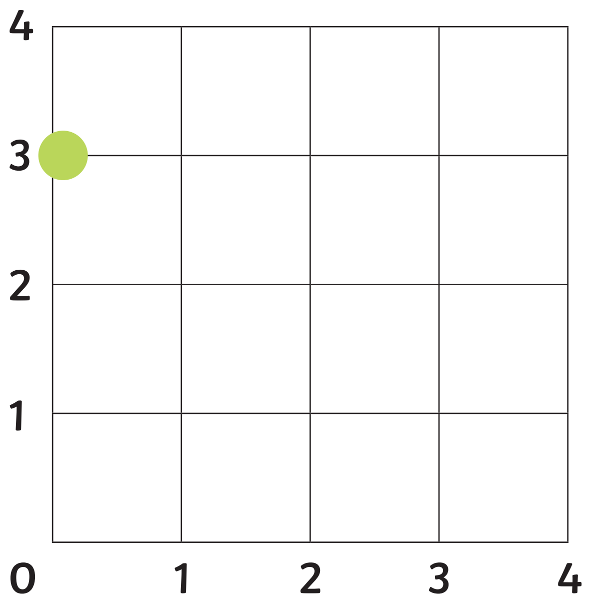
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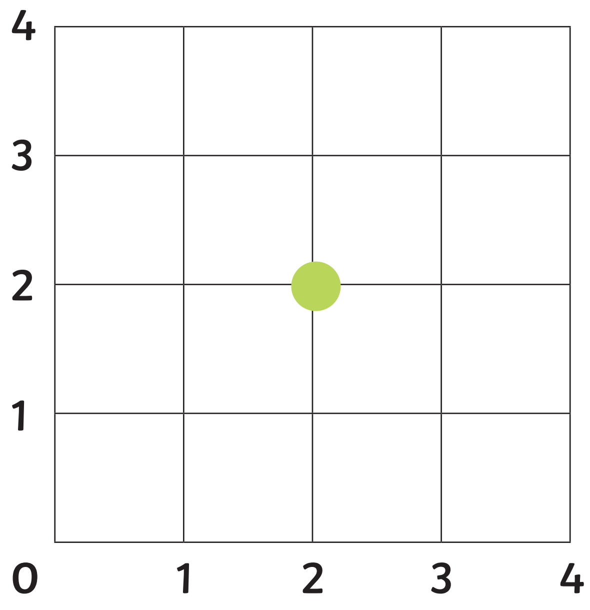
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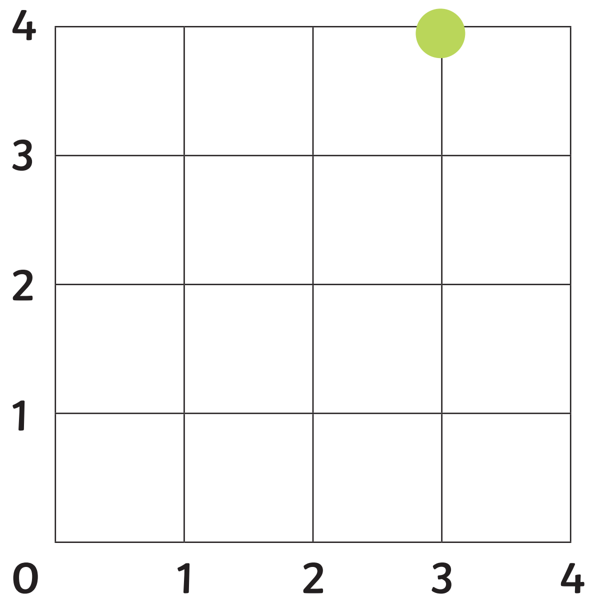
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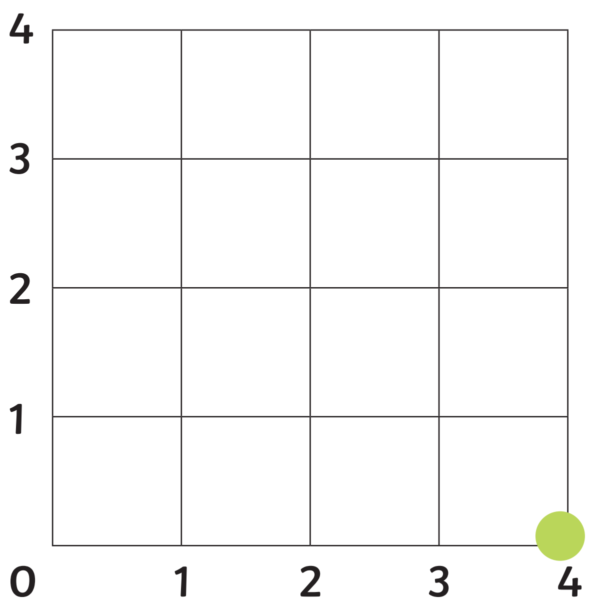
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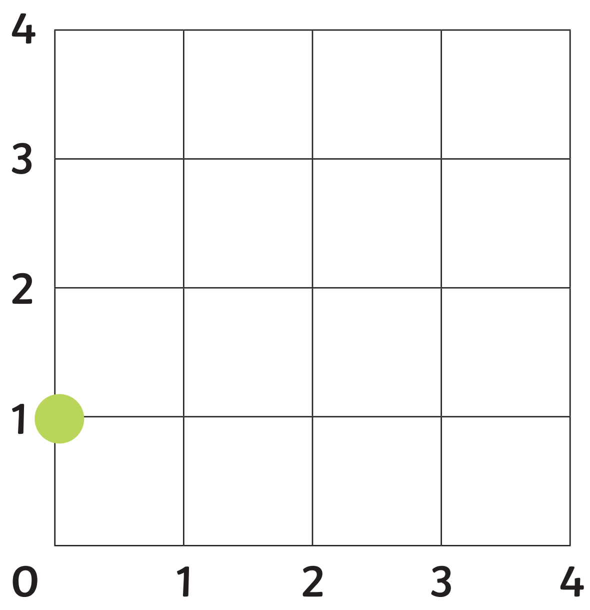
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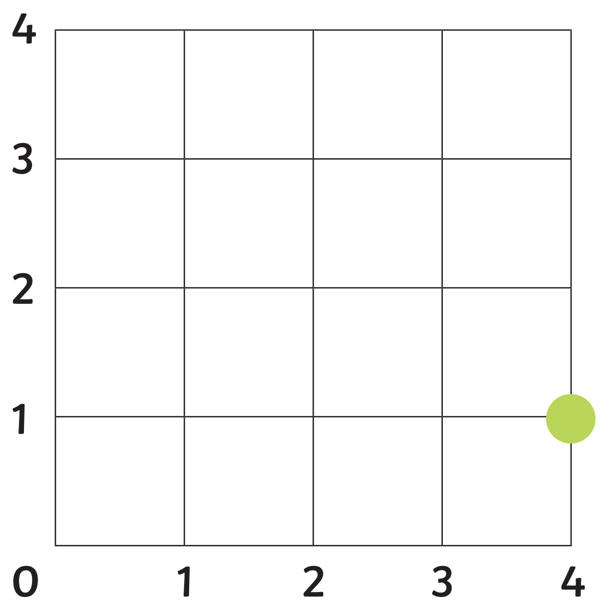
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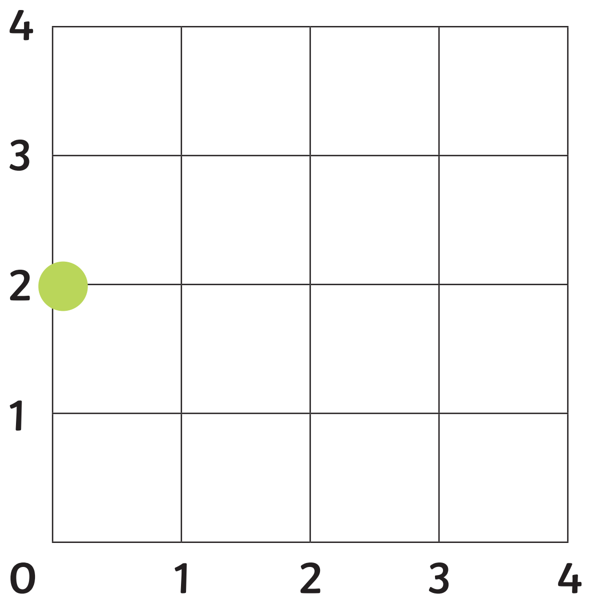
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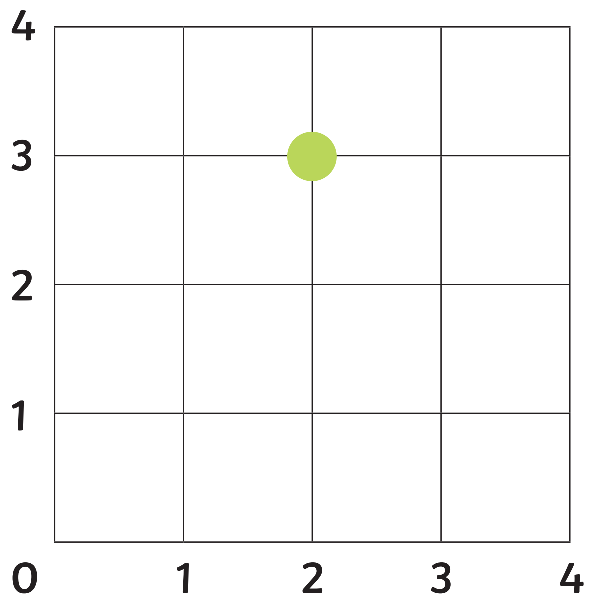
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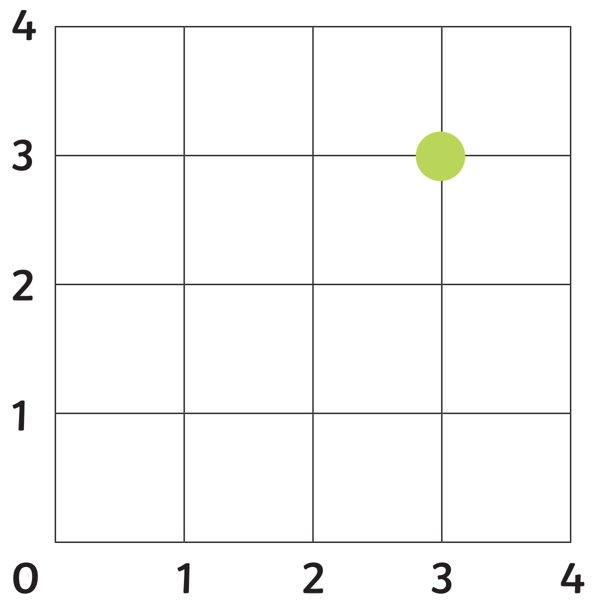
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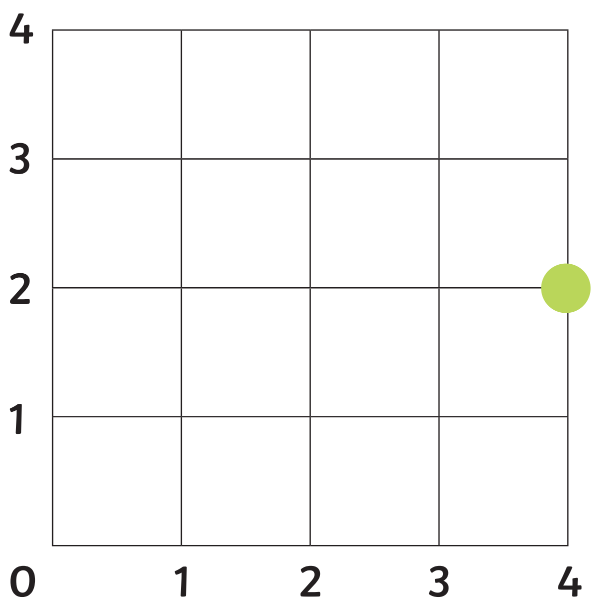
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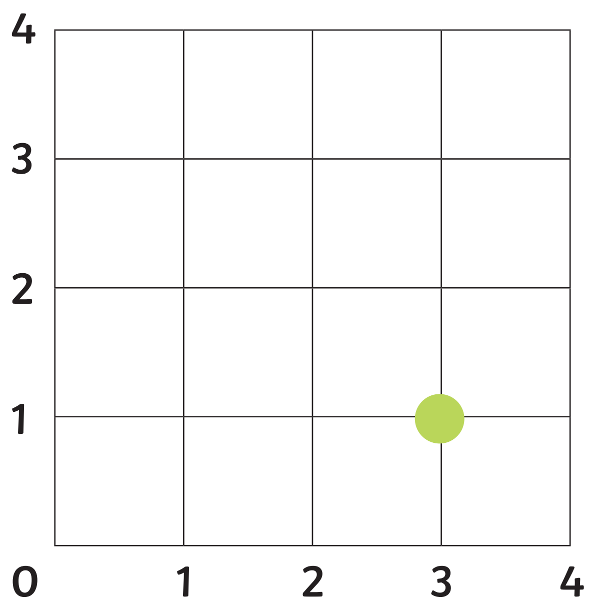
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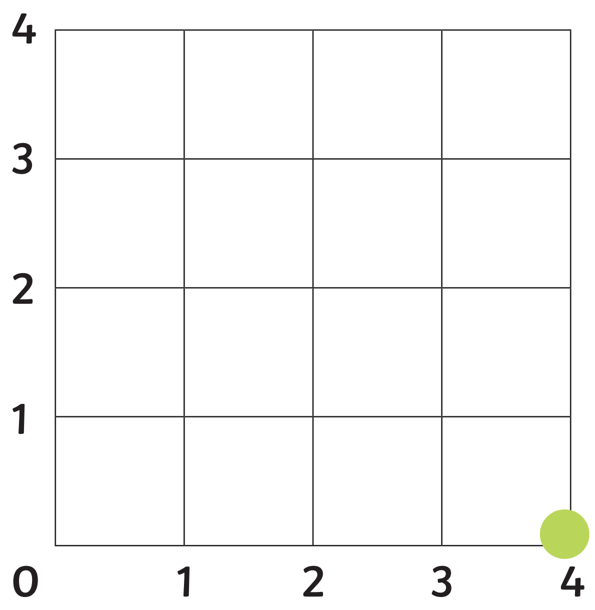
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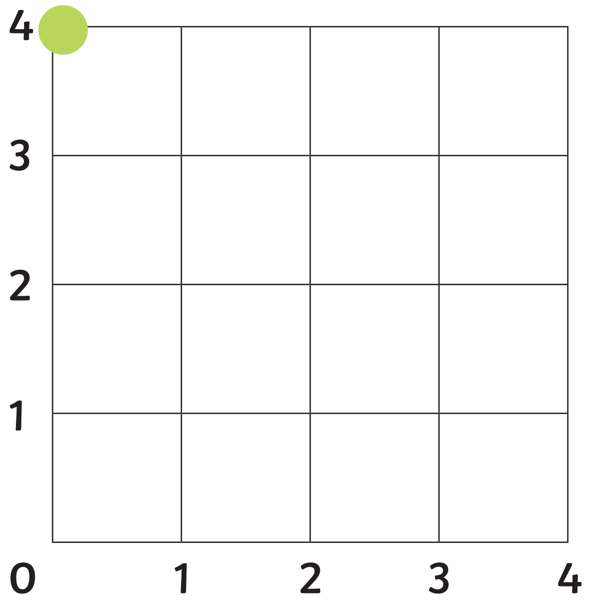
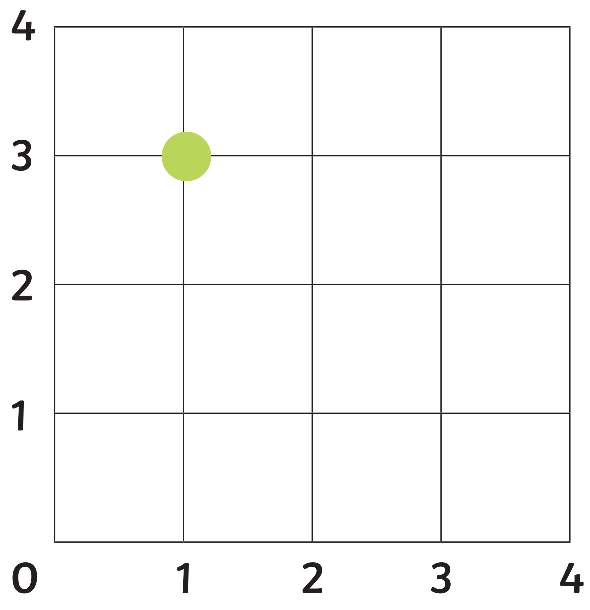
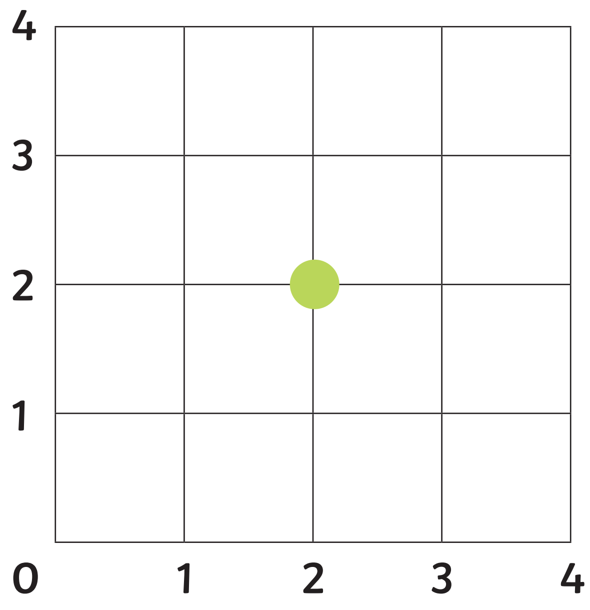
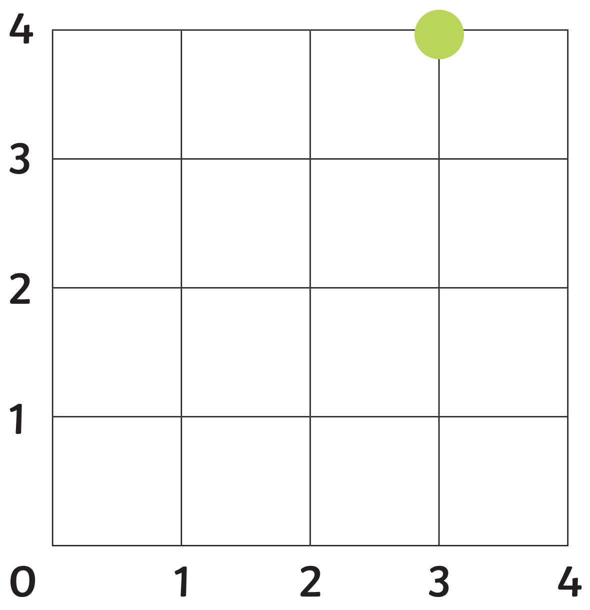
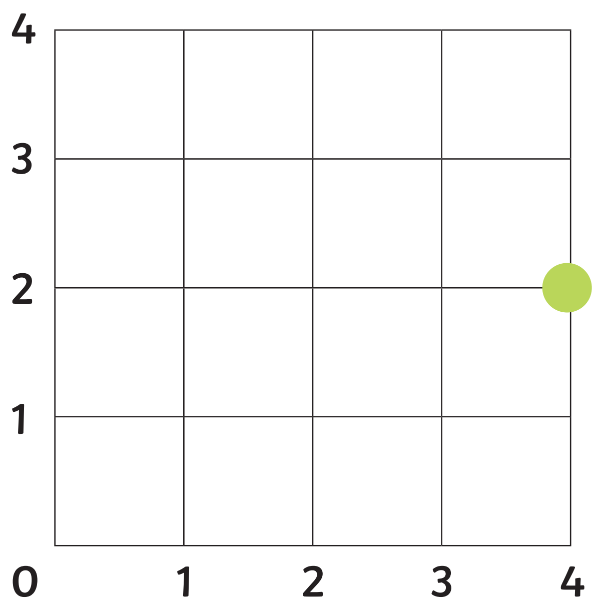
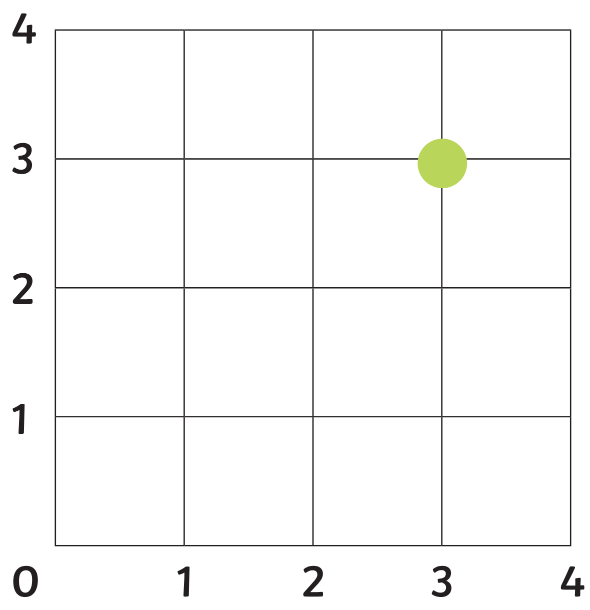






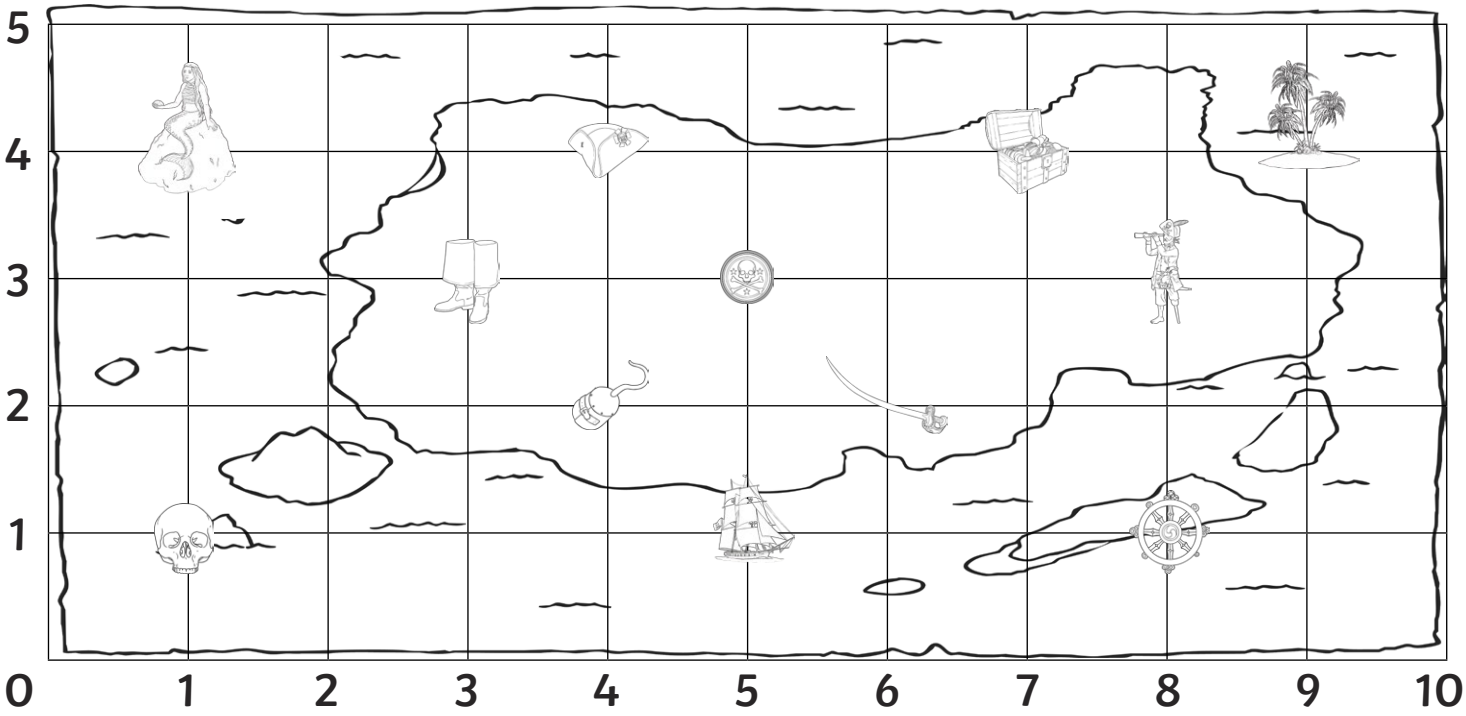






Pirate Map Coordinates

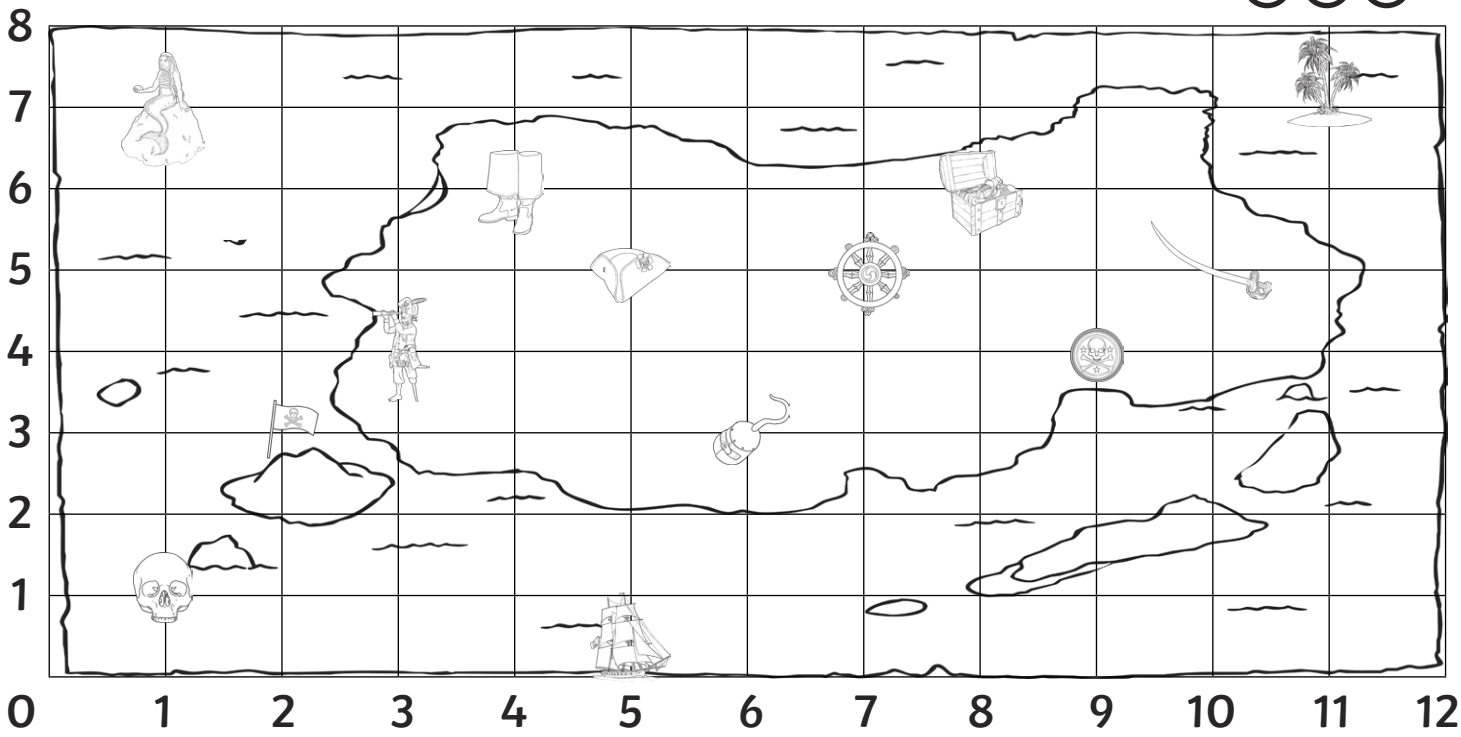
I can read, write and plot coordinates in the first quadrant.



What is at these coordinates on the pirate map?	Write the coordinate of these places on the pirate map:	Plot these coordinates on the grid using a cross.
(9,4) = _____	 = (,)	(2,1)
(1,1) = _____	 = (,)	(3,4)
(5,3) = _____	 = (,)	(5,2)
(6,2) = _____	 = (,)	(9,1)
(7,4) = _____	 = (,)	(7,3)

Pirate Map Coordinates

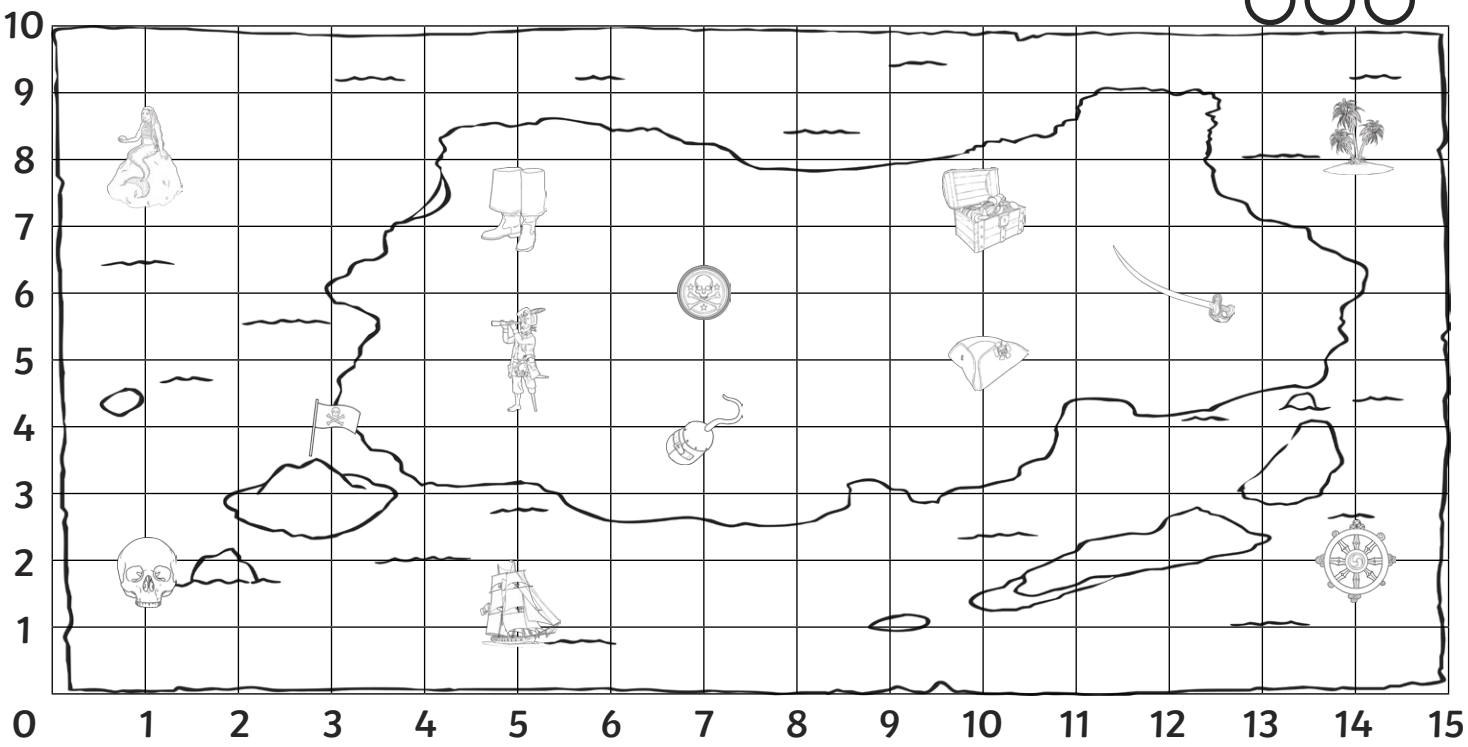
I can read, write and plot coordinates in the first quadrant.



What is at these coordinates on the pirate map?	Write the coordinate of these places on the pirate map:	Plot these coordinates on the grid using a cross.
(1,7) = _____	 = (,)	(2,1)
(1,1) = _____	 = (,)	(3,7)
(5,0) = _____	 = (,)	(4,4)
(9,4) = _____	 = (,)	(9,1)
(8,6) = _____	 = (,)	(11,4)

Pirate Map Coordinates

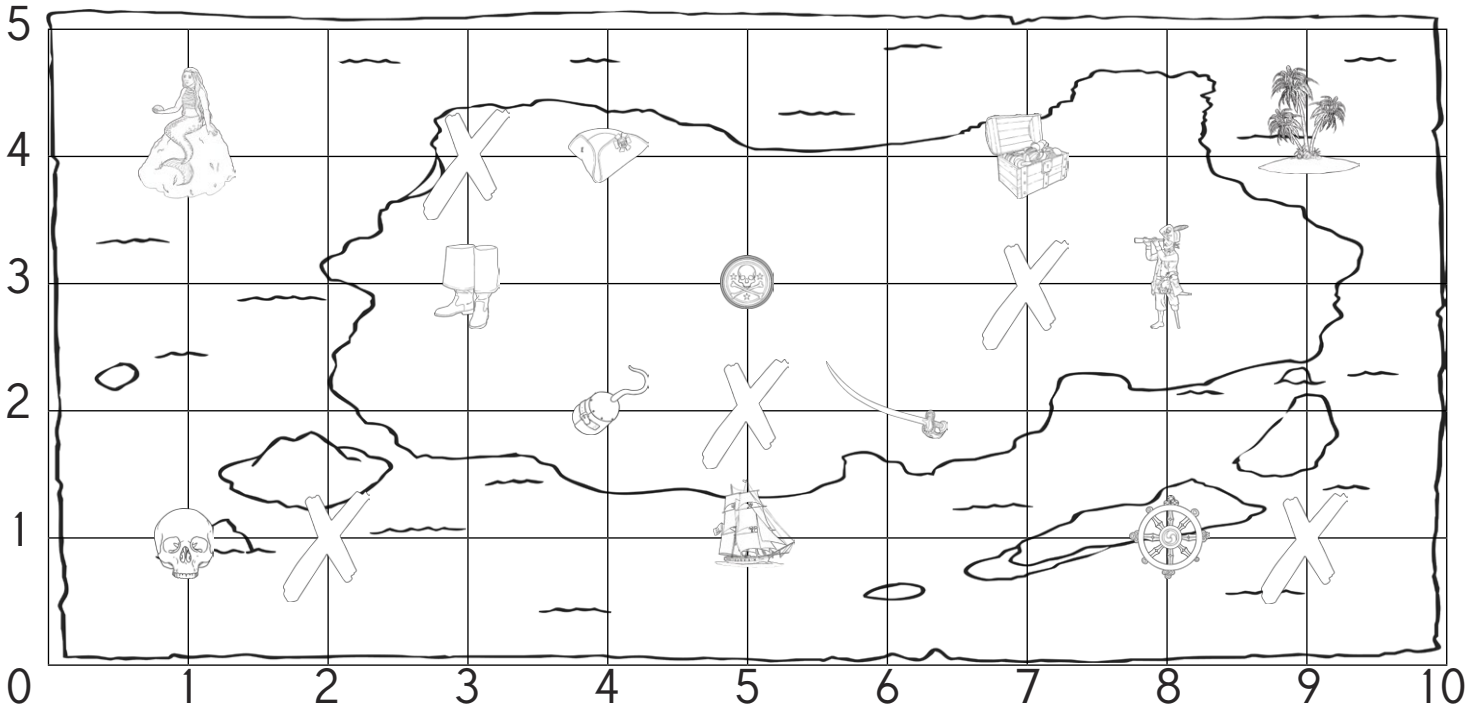
I can read, write and plot coordinates in the first quadrant.



What is at these coordinates on the pirate map?	Write the coordinate of these places on the pirate map:	Plot these coordinates on the grid using a cross.
(5,5) = _____	 = (,)	(2,1)
(7,6) = _____	 = (,)	(14,5)
(12,6) = _____	 = (,)	(9,5)
(10,7) = _____	 = (,)	(4,9)
(1,8) = _____	 = (,)	(8,10)

Pirate Map Coordinates **Answers**

I can read, write and plot coordinates in the first quadrant.



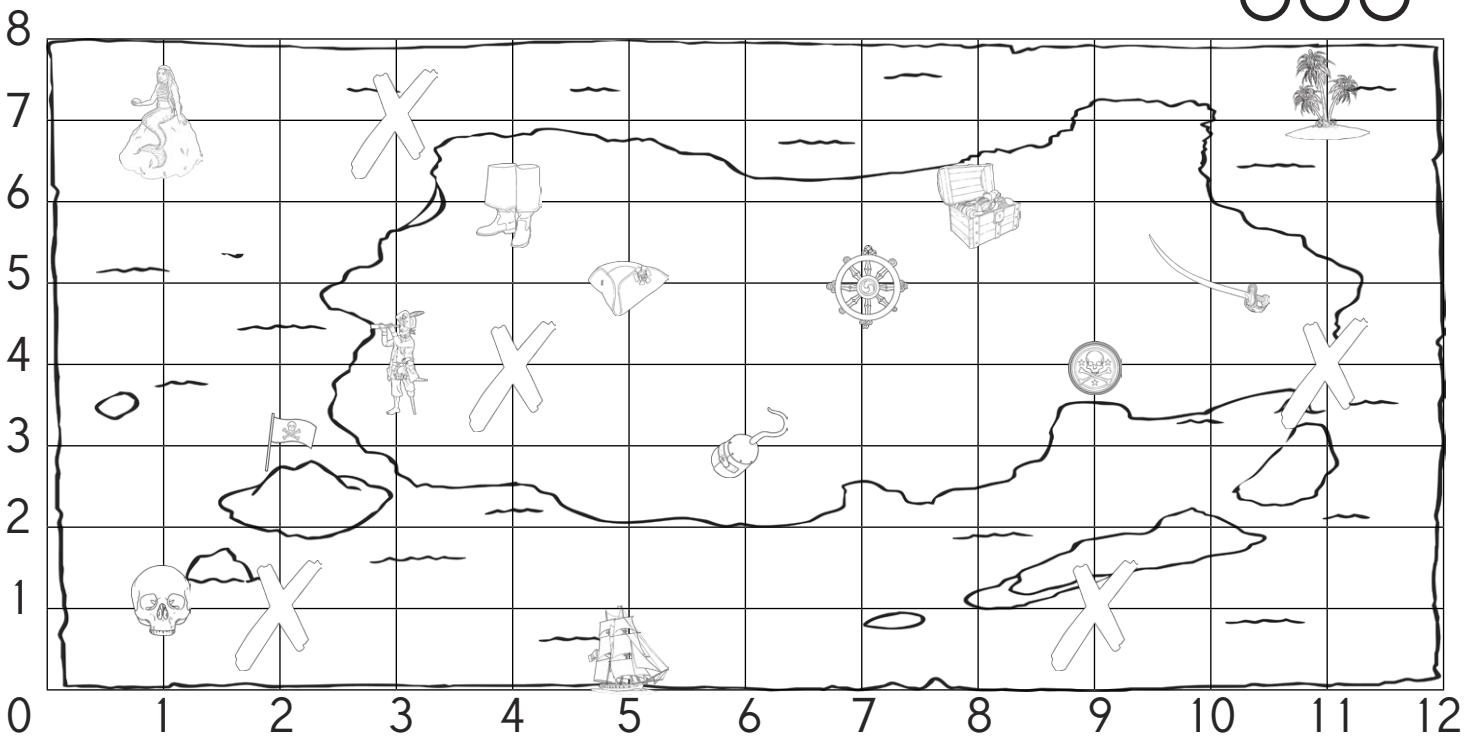
What is at these coordinates on the pirate map?	
(9,4) =	palm trees
(1,1) =	skull
(5,3) =	gold coin
(6,2) =	sword
(7,4) =	treasure

Write the coordinate of these places on the pirate map:	
	= (3 , 3)
	= (8 , 3)
	= (5 , 1)
	= (8 , 1)
	= (4 , 4)

Plot these coordinates on the grid using a cross.
(2,1)
(3,4)
(5,2)
(9,1)
(7,3)

Pirate Map Coordinates **Answers**

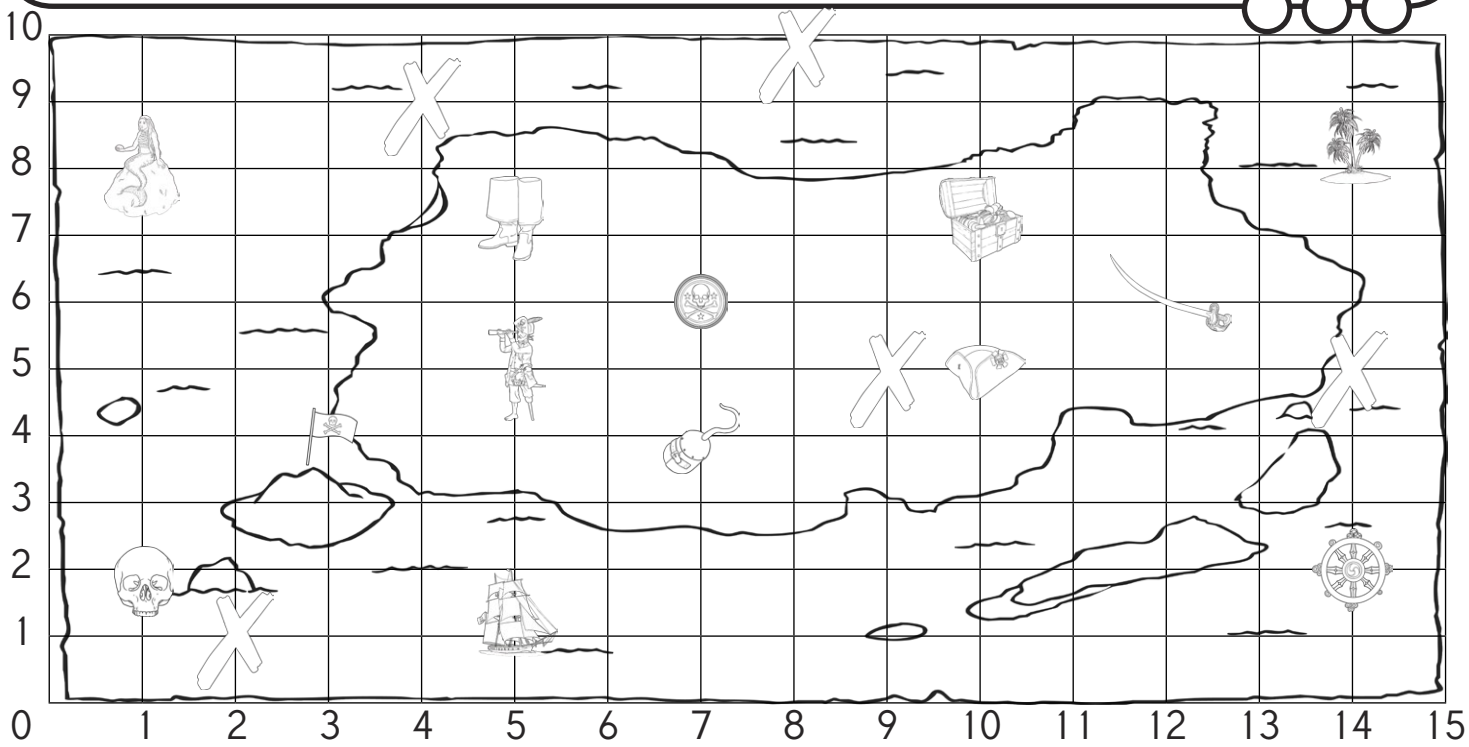
I can read, write and plot coordinates in the first quadrant.



What is at these coordinates on the pirate map?	Write the coordinate of these places on the pirate map:	Plot these coordinates on the grid using a cross.
(1,7) = mermaid	 = (4 , 6)	(2,1)
(1,1) = skull	 = (6 , 3)	(3,7)
(5,0) = ship	 = (11 , 7)	(4,4)
(9,4) = gold coin	 = (2 , 3)	(9,1)
(8,6) = treasure	 = (7 , 5)	(11,4)

Pirate Map Coordinates

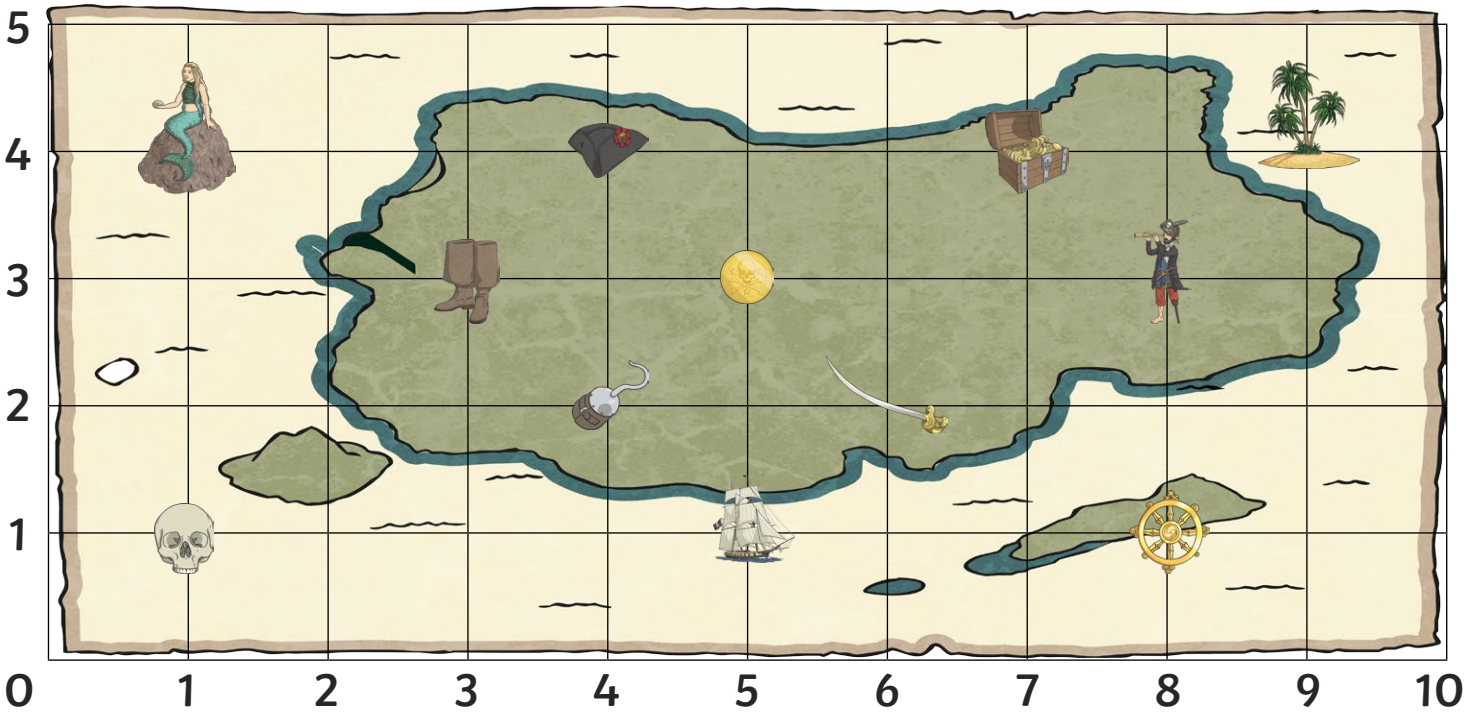
I can read, write and plot coordinates in the first quadrant.



What is at these coordinates on the pirate map?	Write the coordinate of these places on the pirate map:	Plot these coordinates on the grid using a cross.
(5,5) = pirate	 = (5 , 7)	(2,1)
(7,6) = gold coin	 = (7 , 4)	(14,5)
(12,6) = sword	 = (14 , 8)	(9,5)
(10,7) = treasure	 = (3 , 4)	(4,9)
(1,8) = mermaid	 = (14 , 2)	(8,10)

Pirate Map Coordinates

I can read, write and plot coordinates in the first quadrant.



What is at these coordinates on the pirate map?	Write the coordinate of these places on the pirate map:	Plot these coordinates on the grid using a cross.
(9,4) = _____	 = (,)	(2,1)
(1,1) = _____	 = (,)	(3,4)
(5,3) = _____	 = (,)	(5,2)
(6,2) = _____	 = (,)	(9,1)
(7,4) = _____	 = (,)	(7,3)

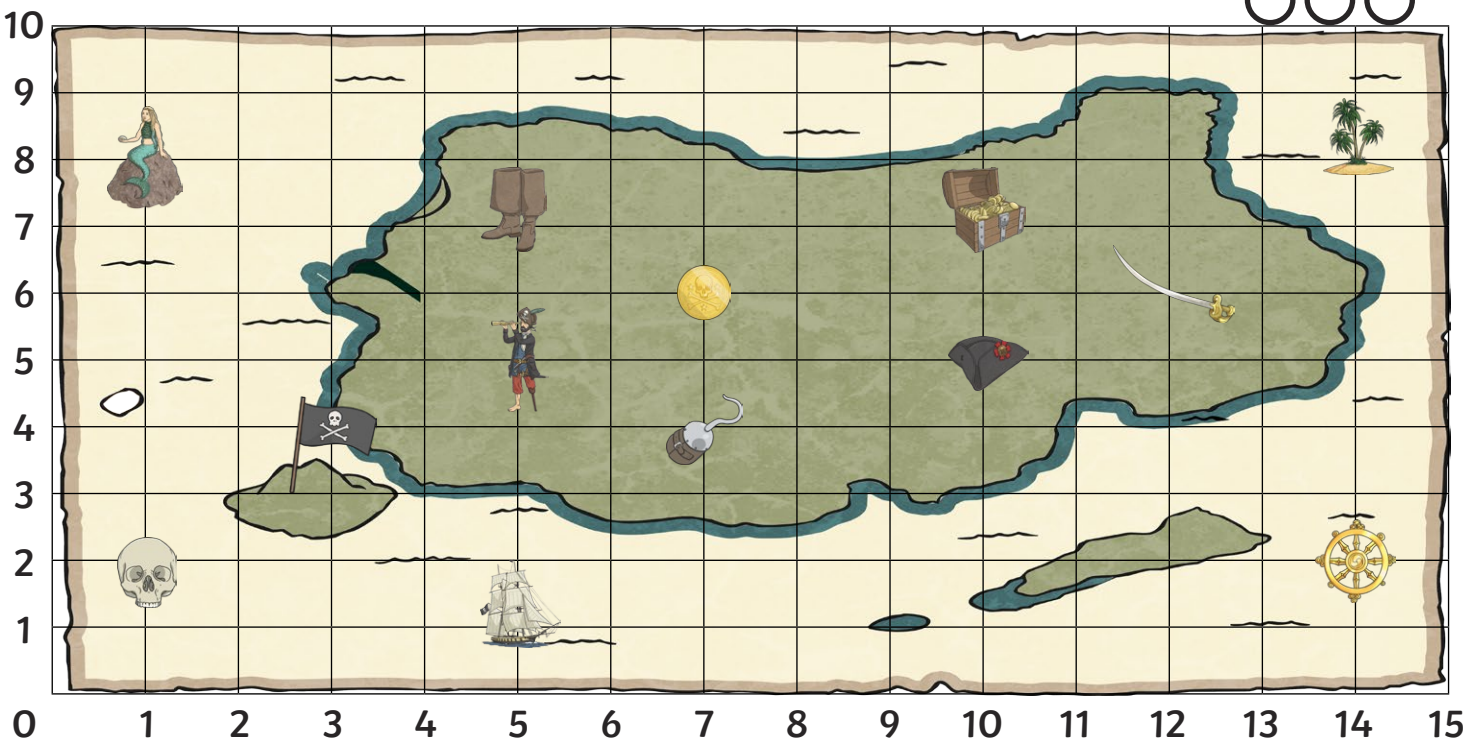
Pirate Map Coordinates

I can read, write and plot coordinates in the first quadrant.

What is at these coordinates on the pirate map?	Write the coordinate of these places on the pirate map:	Plot these coordinates on the grid using a cross.
(1,7) = _____	 = (,)	(2,1)
(1,1) = _____	 = (,)	(3,7)
(5,0) = _____	 = (,)	(4,4)
(9,4) = _____	 = (,)	(9,1)
(8,6) = _____	 = (,)	(11,4)

Pirate Map Coordinates

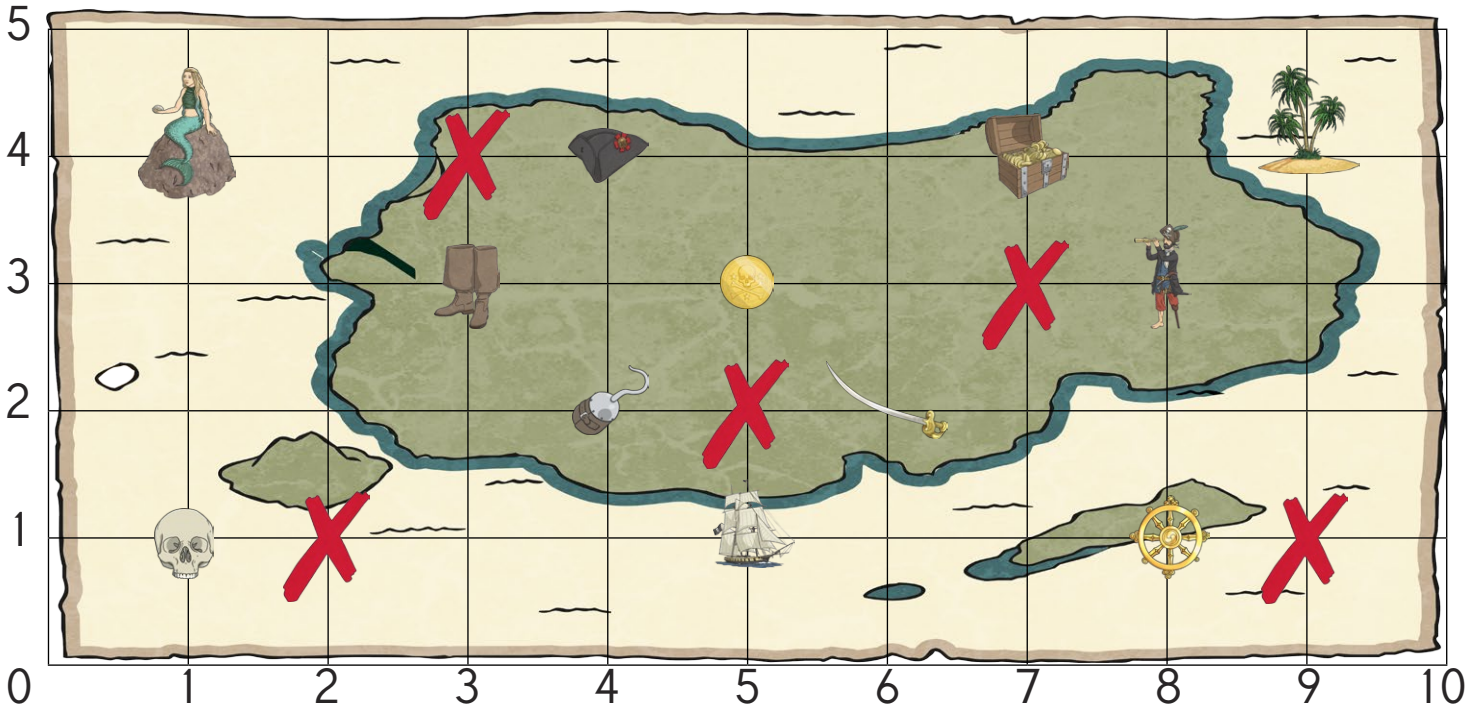
I can read, write and plot coordinates in the first quadrant.



What is at these coordinates on the pirate map?	Write the coordinate of these places on the pirate map:	Plot these coordinates on the grid using a cross.
(5,5) = _____	 = (,)	(2,1)
(7,6) = _____	 = (,)	(14,5)
(12,6) = _____	 = (,)	(9,5)
(10,7) = _____	 = (,)	(4,9)
(1,8) = _____	 = (,)	(8,10)

Pirate Map Coordinates **Answers**

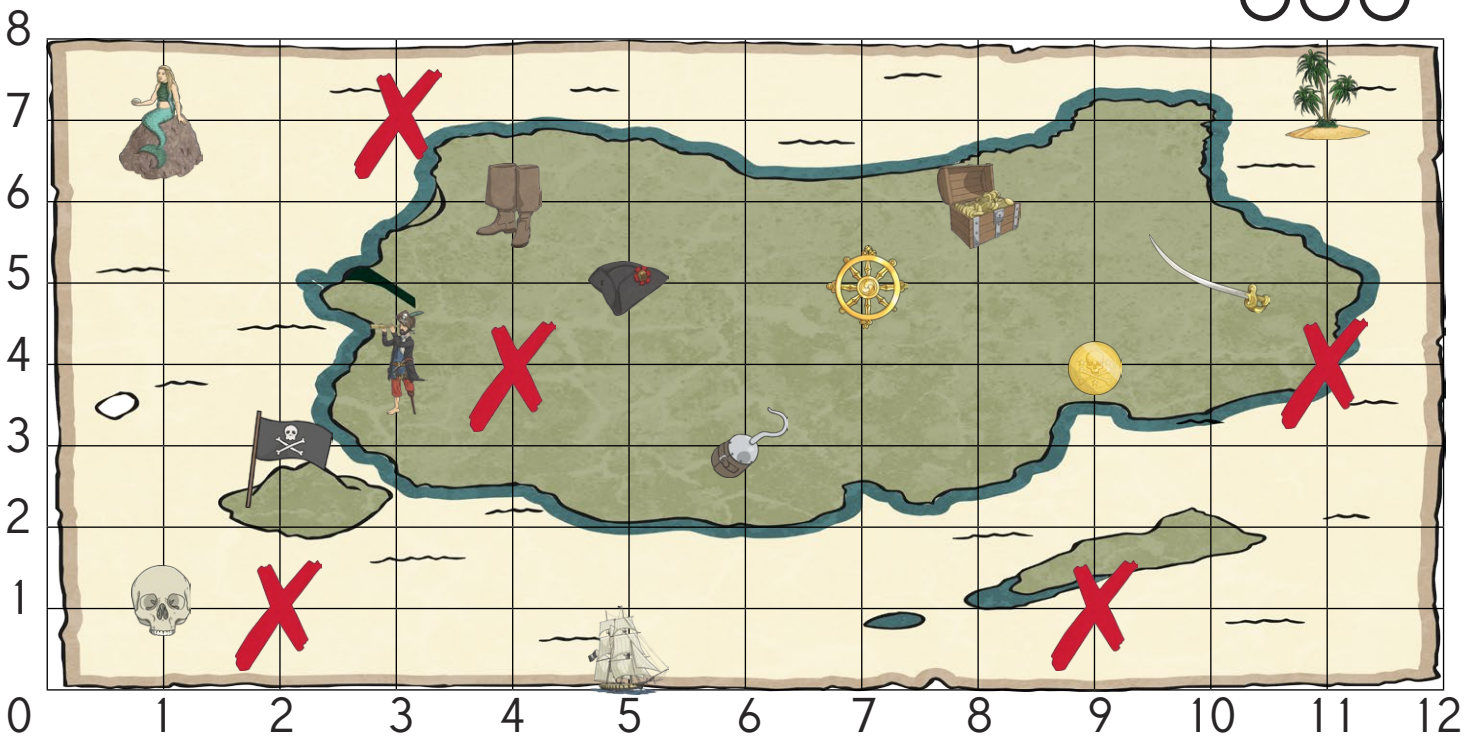
I can read, write and plot coordinates in the first quadrant.



What is at these coordinates on the pirate map?		Write the coordinate of these places on the pirate map:		Plot these coordinates on the grid using a cross.
(9,4) =	palm trees		= (3 , 3)	(2,1)
(1,1) =	skull		= (8 , 3)	(3,4)
(5,3) =	gold coin		= (5 , 1)	(5,2)
(6,2) =	sword		= (8 , 1)	(9,1)
(7,4) =	treasure		= (4 , 4)	(7,3)

Pirate Map Coordinates **Answers**

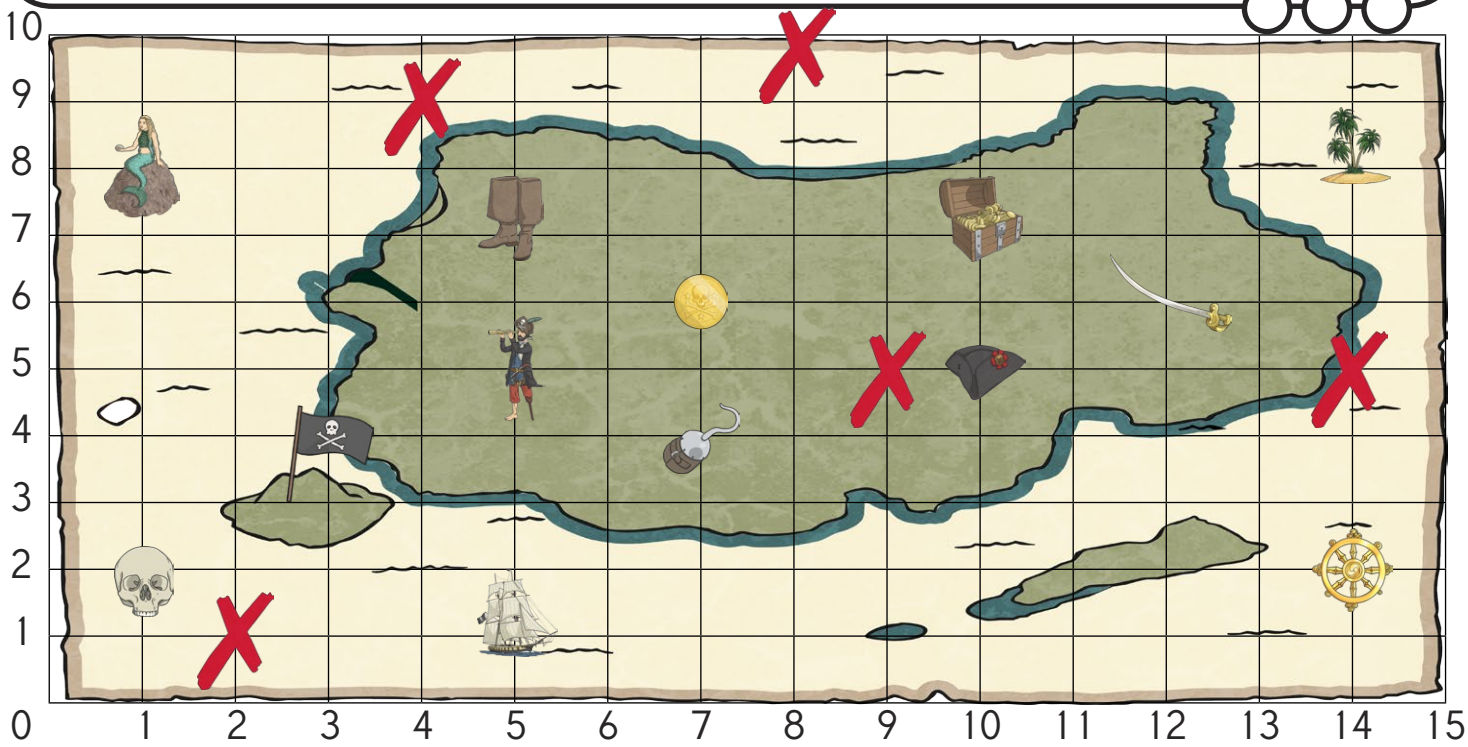
I can read, write and plot coordinates in the first quadrant.



What is at these coordinates on the pirate map?		Write the coordinate of these places on the pirate map:		Plot these coordinates on the grid using a cross.
(1,7) =	mermaid		= (4 , 6)	(2,1)
(1,1) =	skull		= (6 , 3)	(3,7)
(5,0) =	ship		= (11 , 7)	(4,4)
(9,4) =	gold coin		= (2 , 3)	(9,1)
(8,6) =	treasure		= (7 , 5)	(11,4)

Pirate Map Coordinates

I can read, write and plot coordinates in the first quadrant.

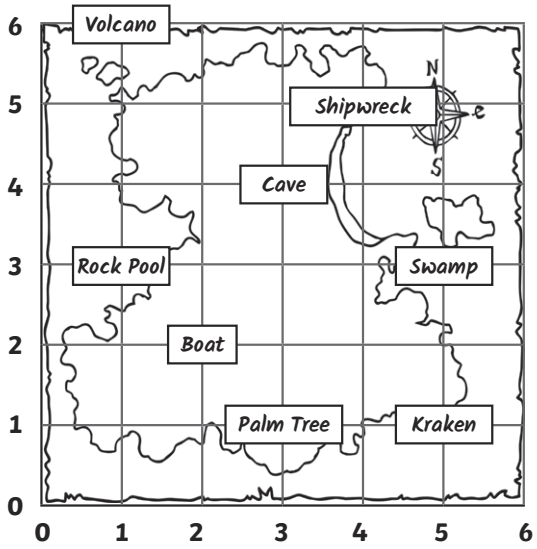


What is at these coordinates on the pirate map?	
(5,5) =	pirate
(7,6) =	gold coin
(12,6) =	sword
(10,7) =	treasure
(1,8) =	mermaid

Write the coordinate of these places on the pirate map:	
	= (5 , 7)
	= (7 , 4)
	= (14, 8)
	= (3 , 4)
	= (14, 2)

Plot these coordinates on the grid using a cross.
(2,1)
(14,5)
(9,5)
(4,9)
(8,10)

1)



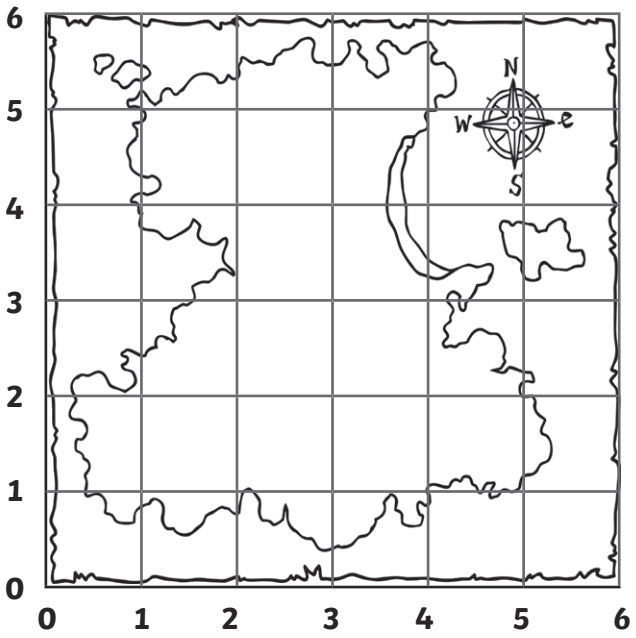
1) Agree – The route shown in green passes along the edge of 7 squares. 7 × 100 = 700.

1) a) Multiple answers possible.

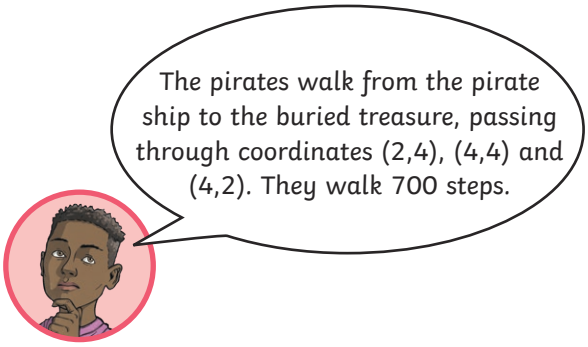
b) (1,4) to (2,6) to (9,6) or (1,4) to (9,4) to (9,6) are the shortest routes that the pirate could take. They are both 500 steps.

Plot the coordinates on the grid to label the pirate map.

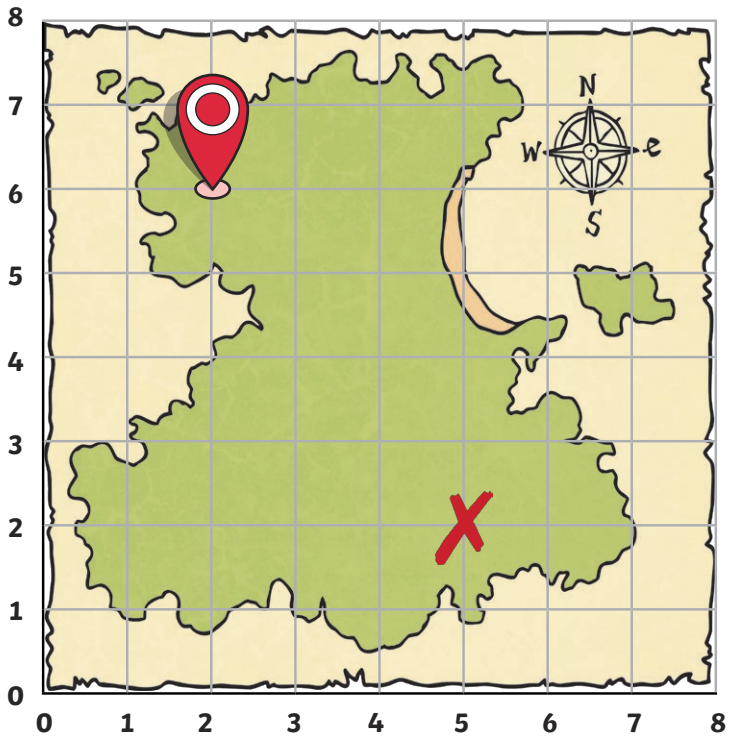
cave (3,4)	boat (2,2)	swamp (5,3)	rock pool (1,3)
shipwreck (4,5)	palm tree (3,1)	kraken (5,1)	volcano (1,6)



1) A pirate ship drops anchor at (2,6). The red cross shows where the treasure is buried. The map is drawn to represent 100 steps between each adjacent coordinate.



Is this correct? Explain your reasoning.



1) A pirate is standing at the coordinate (1,4).

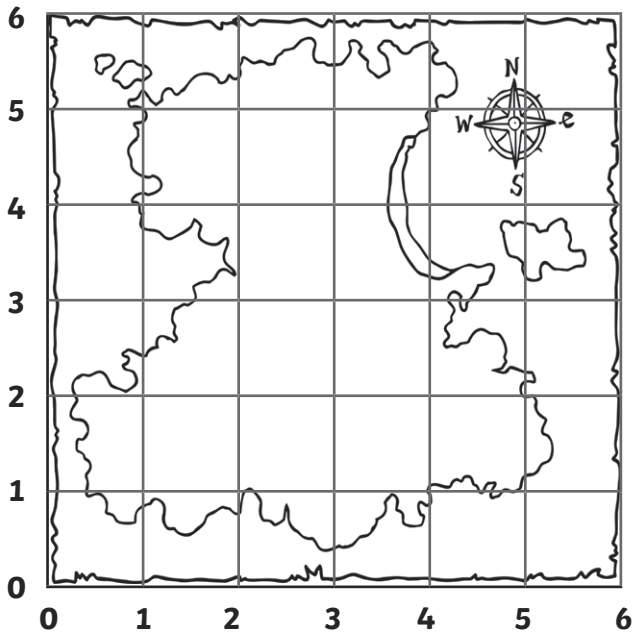
a) Find as many ways as possible the pirate can reach the treasure by plotting a route of exactly 6 coordinates, (including the start and finish positions).

b) If the map is drawn to represent 50 steps between each adjacent coordinate, plot the coordinates of the shortest route the pirate can take to reach the treasure. How many steps will this take?

Key	
	Pirate
	Treasure

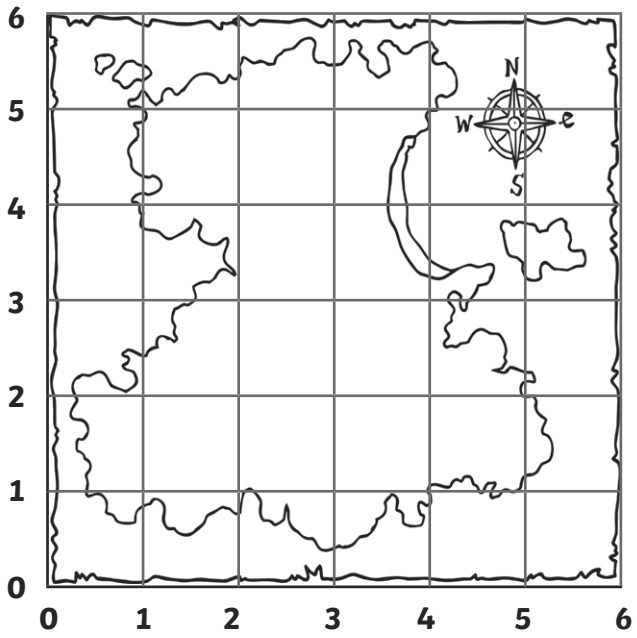
1) Plot the coordinates on the grid to label the pirate map.

cave (3,4)	boat (2,2)
shipwreck (4,5)	palm tree (3,1)
swamp (5,3)	rock pool (1,3)
kraken (5,1)	volcano (1,6)

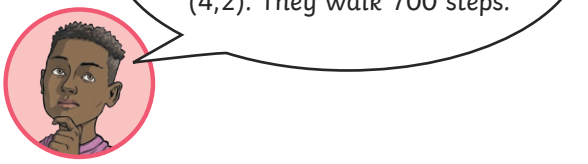


1) Plot the coordinates on the grid to label the pirate map.

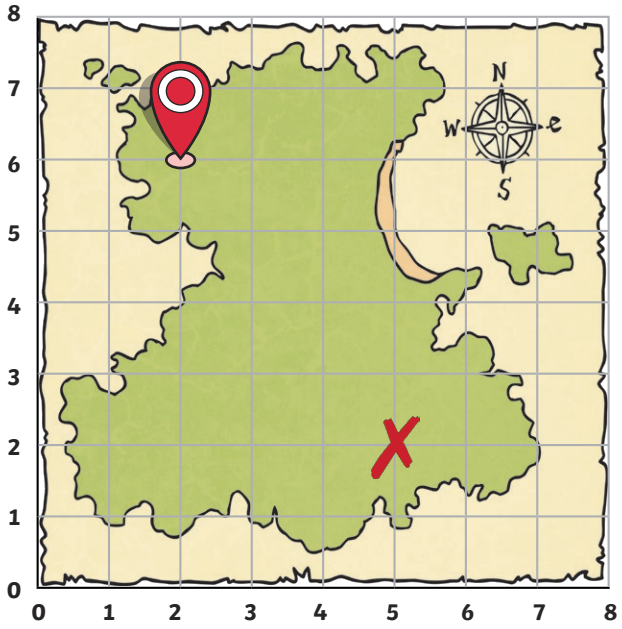
cave (3,4)	boat (2,2)
shipwreck (4,5)	palm tree (3,1)
swamp (5,3)	rock pool (1,3)
kraken (5,1)	volcano (1,6)



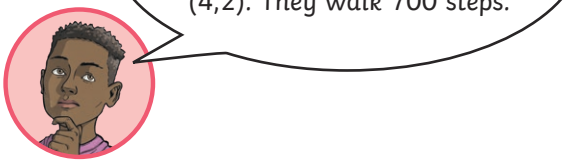
1) A pirate ship drops anchor at (2,6). The red cross shows where the treasure is buried. The map is drawn to represent 100 steps between each adjacent coordinate.



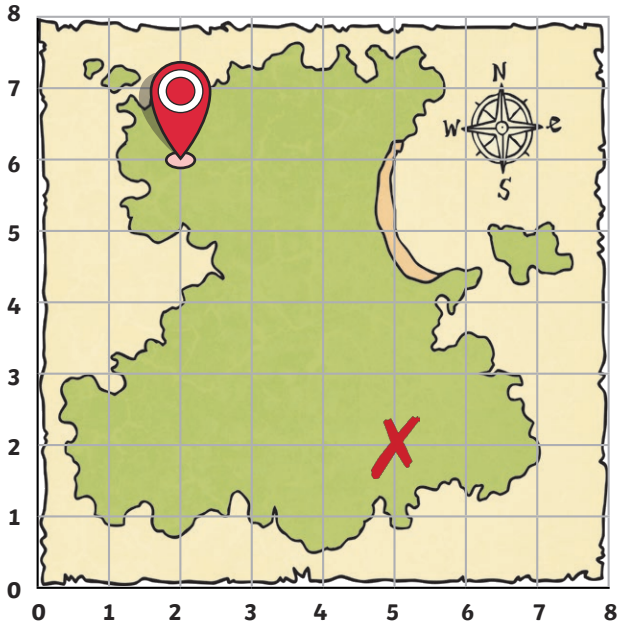
Is this correct? Explain your reasoning.



1) A pirate ship drops anchor at (2,6). The red cross shows where the treasure is buried. The map is drawn to represent 100 steps between each adjacent coordinate.



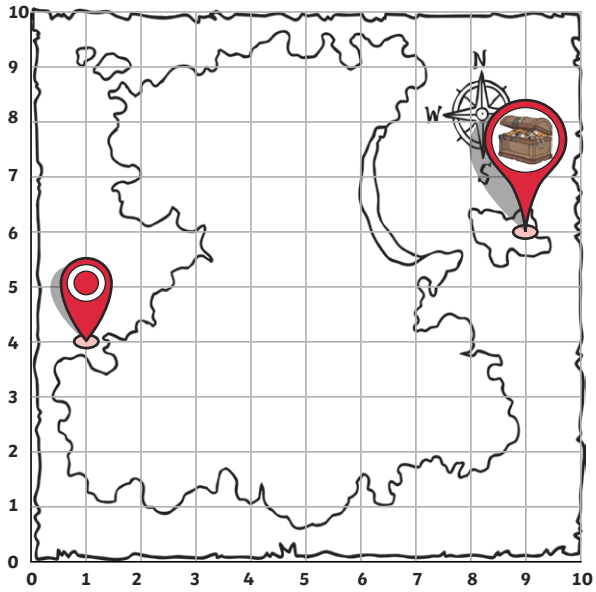
Is this correct? Explain your reasoning.



1) A pirate is standing at the coordinate (1,4).

a) Find as many ways as possible the pirate can reach the treasure by plotting a route of exactly 6 coordinates, (including the start and finish positions).

b) If the map is drawn to represent 50 steps between each adjacent coordinate, plot the coordinates of the shortest route the pirate can take to reach the treasure. How many steps will this take?

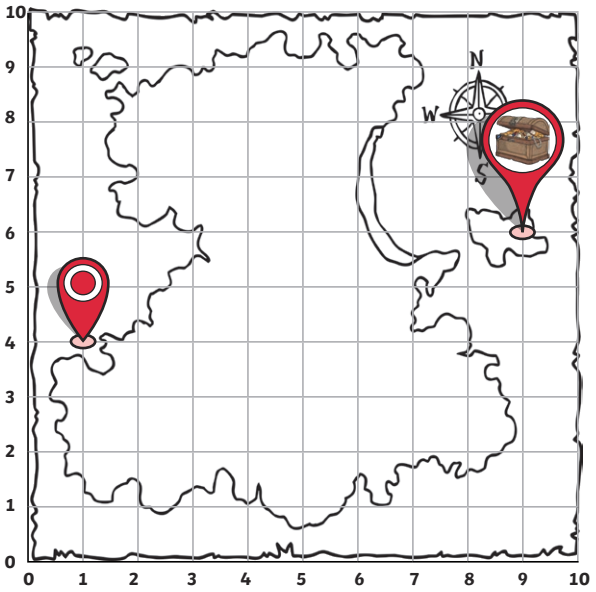


Key	
	Pirate
	Treasure

1) A pirate is standing at the coordinate (1,4).

a) Find as many ways as possible the pirate can reach the treasure by plotting a route of exactly 6 coordinates, (including the start and finish positions).

b) If the map is drawn to represent 50 steps between each adjacent coordinate, plot the coordinates of the shortest route the pirate can take to reach the treasure. How many steps will this take?



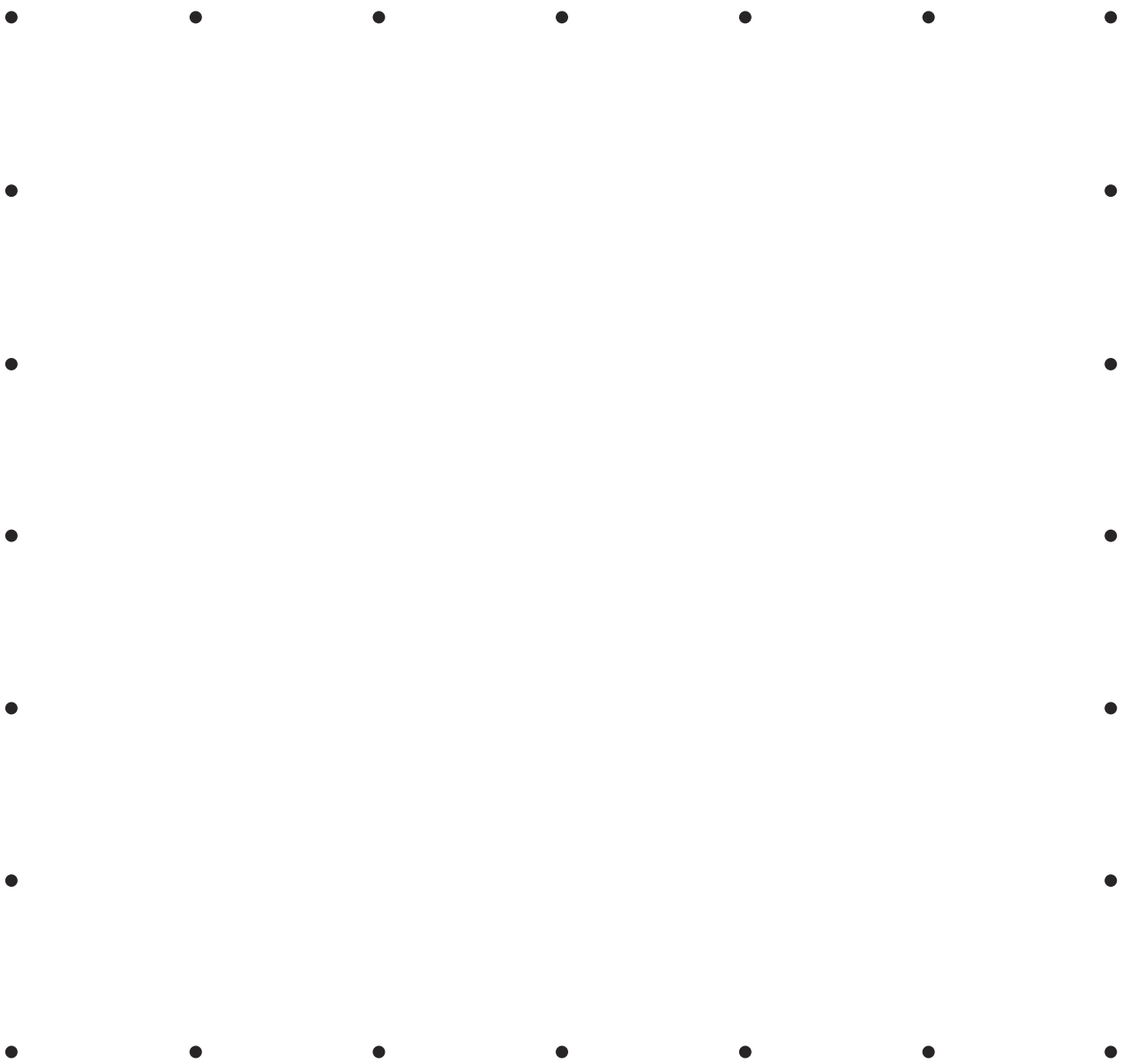
Key	
	Pirate
	Treasure

Drawing a Coordinate Grid

I can draw a coordinate grid

Follow the instructions to draw and label your own coordinate grid.

- Draw horizontal and vertical lines to make a grid.
- Label the x-axis and y-axis.
- Label the numbers on the x-axis and y-axis (remember, the numbers are labelling the lines of the grid, not the spaces).



Position and Direction | Map Coordinates

I can read, write and plot coordinates in the first quadrant.		
I can label the x-axis and y-axis.		
I know that a coordinate is represented by two numbers in brackets, separated by a comma.		
I can read a coordinate correctly by going along and then up.		

Position and Direction | Map Coordinates

I can read, write and plot coordinates in the first quadrant.		
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I know that a coordinate is represented by two numbers in brackets, separated by a comma.		
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Position and Direction | Map Coordinates

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I know that a coordinate is represented by two numbers in brackets, separated by a comma.		
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