

## SHAPE AND SPACE

### Pupils should be taught to:

Recognise positions and directions, and use co-ordinates

### As outcomes, Year 4 pupils should, for example:

Use, read and write:

prepositions and everyday words to describe position and direction...

*position, direction...*

*ascend, descend... journey, route, map, plan...*

*grid, row, column, origin, co-ordinates...*

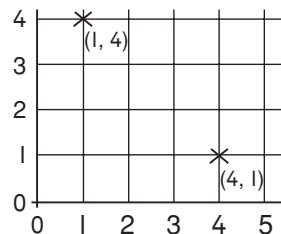
*compass point, north, south, east, west, north-east, north-west, south-east, south-west...*

*horizontal, vertical, diagonal...*

Describe and find the **position of a point on a grid of squares** where the lines are numbered.

Begin to understand the convention that (3, 2) describes a point found by starting from the origin (0, 0) and moving three lines across and two lines up.

Recognise that (4, 1) and (1, 4) describe different points.



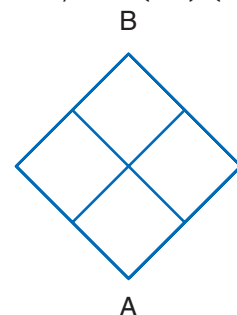
Recognise and identify simple examples of **horizontal or vertical lines** or edges in the environment. For example:

- the edge of the table is horizontal;
- the edge of the door is vertical...

Know that rows on a grid are described as horizontal, columns as vertical, and lines joining opposite corners as diagonals.

Use the eight **compass directions** N, S, E, W, NE, NW, SE, SW. For example:

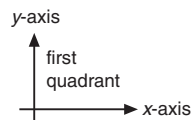
- Describe a south-east route from (1, 4) as going through the points (2, 3), (3, 2), (4, 1) and (5, 0).
- Work out that to travel along the grid lines for a total distance of 5 units from the origin takes you to (0, 5), (1, 4), (2, 3), (3, 2), (4, 1) or (5, 0).
- Describe all the different routes from A to B, travelling only north-east or north-west.



**As outcomes, Year 5 pupils should, for example:**

Use, read and write, spelling correctly, the vocabulary from the previous year, and extend to:  
*x-axis, y-axis... quadrant...  
 parallel, perpendicular...*

**Read and plot points** using co-ordinates in the first quadrant.



Know the convention that (3, 2) describes a point found by starting from the origin (0, 0) and moving three lines across and two lines up.

Respond to questions such as:

- These points are the co-ordinates of the vertices of a shape: (1, 5), (2, 5), (4, 3), (2, 1), (1, 1). What is the name of the shape?
- Three of the vertices of a square are (2, 1), (2, 4) and (5, 4). What are the co-ordinates of the fourth vertex?

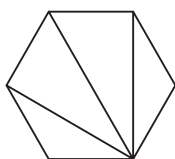
Know that:

- **perpendicular** lines are at right angles to each other;
- **parallel** lines are the same distance apart.

Recognise and identify parallel and perpendicular lines in the environment and in regular polygons such as the square, hexagon and octagon.

Know that a **diagonal** is a straight line drawn from a vertex of a polygon to a non-adjacent vertex. For example:

- Draw all the diagonals of a shape such as a pentagon or an octagon.

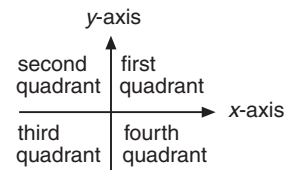


3 of the 9 diagonals of a hexagon

**As outcomes, Year 6 pupils should, for example:**

Use, read and write, spelling correctly, the vocabulary from the previous year, and extend to:  
*intersecting, intersection...  
 plane...*

**Read and plot points** using co-ordinates beyond the first quadrant.



Respond to questions such as:

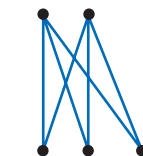
- The points (-1, 1), (2, 5) and (6, 2) are three of the four vertices of a square. What are the co-ordinates of the fourth vertex?
- Draw a polygon with each vertex lying in the first quadrant. Plot its reflection in the y-axis, and name the co-ordinates of the reflected shape.

Recognise **parallel and perpendicular lines** in quadrilaterals.

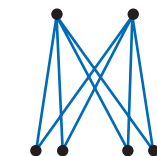
**See also properties of 3-D and 2-D shapes (page 103).**

Know that two lines that cross each other are called **intersecting lines**, and the point at which they cross is an intersection. For example:

- Identify all the intersections of lines drawn from 2 points to, say, 3, 4, 5... other points.



3 intersections



6 intersections

Predict the number of intersections from 2 points to 10 points.