Using coordinates in all four quadrants to describe positions

National Curriculum attainment target

- Describe positions on the full coordinate grid (all four quadrants)

Lesson objective

- Use coordinates to describe the positions of shapes in all four quadrants

Previous related lessons

Unit 2, Week 3, Lesson 1; Unit 2, Week 3, Lesson 2

Prerequisites for learning

Pupils need to:

- be able to describe the position of a point on a grid as coordinates in the first quadrant

Vocabulary

coordinates, quadrant, negative, positive, x-axis, y-axis, x-coordinate, y-coordinate

Future related lesson

Unit 11, Week 3, Lesson 2

Success criteria

Pupils can:

- use coordinates to describe the positions of shapes in all four quadrants

Getting Started

- Choose an activity from Geometry – Position and direction.

Collins Connect
Year 6, Unit 11, Week 3

Teach

Resources

Resource 12: 4-quadrant coordinate grids (per child); ruler (per child)

- Display: the Coordinates tool showing a 4-quadrant coordinate grid.
- Plot and label these points: (3, 2), (–3, 2), (–3,–2) and (3, –2).
- Elicit that for a point:
  - in the first quadrant, both coordinates are positive;
  - in the second quadrant, the x-coordinate is negative and the y-coordinate is positive;
  - in the third quadrant, both coordinates are negative;
  - in the fourth quadrant, the x-coordinate is positive and the y-coordinate is negative.
- Say: **These points are the four vertices of a quadrilateral.** Ask: **Who can name the shape?** (rectangle)
- Distribute the rulers and Resource 12: 4-quadrant coordinate grids.
- Ask the children to plot the points on their grids and to join them up in order with their ruler
- Write on the board the list of points: A (–3, 2), B (5, 2), C (3, –3).
- Say: **These points are three of the four vertices of a parallelogram. Work out the coordinates of the fourth vertex D and complete your parallelogram.**
- Ask**: What are the coordinates of the fourth vertex D?** (–5, –3) **Can you explain to the class how you found your answer?**
- Write on the board the list of points: E (4, –2), F (0, –4), G (–4, –2).
- Say: **These points are three of the four vertices of a rhombus. Work out the coordinates of the fourth vertex H and complete your rhombus.**
- Ask**: What are the coordinates of the fourth vertex H**? (0, 0)
- Ask: **What might the coordinates of the fourth vertex H be if the shape is a kite?** (0, 1), (0, 2) (0, 3), (0, 4) and (0, 5).
- Write on the board the list of points: J (–5, –1), K (1, 5), L (5, 1).

- Say: **These points are three of the four vertices of a rectangle. Work out the coordinates of the fourth, vertex M, and complete your rectangle.**
- Ask**: What are the coordinates of the fourth vertex, M?** (–1, –5)
- Ask: **Who can tell me the coordinates of the point at which the diagonals of the rectangle intersect?** (0, 0) **How did you find the answer?**
- Write on the board the points: P (1, –3) and R (1, 5).
- Say: **The line PR is the diagonal of a square PQRS. Tell your partner how to locate the missing coordinates for the vertices Q and S.**
- Take feedback. Elicit the missing coordinates for Q (5, 1) and S (–3, 1). Using the Coordinates tool, plot the points on the grid and complete the square.

Individualised Learning

Refer to Activity 1 from the Learning activities on page 446.

Pupil Book 6C – Page 68: Using coordinates to locate shapes (2)

Progress Guide 6 – Extension, Year 6, Unit 11, Week 3, Lesson 1: Locate the shapes

Plenary

- Ask: **Can you name the quadrants in which the x-coordinates of a point are negative?** (2nd and 3rd quadrants) **… in which the y-coordinates of a point are negative?** (3rd and 4th quadrants) **… in which both the x- and the y-coordinates of a point are negative?** (3rd quadrant)
- Display: the Coordinates tool showing a 4-quadrant coordinate grid.
- Plot these points: A (2, 4), B (–2, 4) and C (–2, –4).
- Say: **These points are three of the four vertices of a rectangle. Tell your partner how to find the coordinates of the fourth vertex D of the rectangle.** Take feedback and elicit that the coordinates are (2, –4).
- Retain the points C (–2, –4) and D (2, –4) and replace B (–2, 4) with the point B (–1, 2). Ask the children to find the missing coordinates of the fourth vertex A of the parallelogram (3, 2).

Overcoming Barriers

- Check that the children use the term 'negative' and not 'minus' when they read coordinates such as (–4, –2), (5, –1) and (1, –3).