

Plotting and reading points with negative co-ordinates

CURRICULUM ALIGNMENT

SHA.SAL.4a describe location on the full co-ordinate plane.

INTERACTIVES Coordinate Grid · challenge, display, explore

WHAT THIS LESSON TEACHES

A co-ordinate with a minus sign tells you to travel the opposite way from zero - left along the x-axis or down the y-axis.

→ For $(-5, 2)$ you go five squares LEFT then two squares UP.

→ A dot four left and one down from zero reads as $(-4, -1)$.

MODEL THIS ON THE BOARD

PLOTTING A MIXED-SIGN POINT

- 1 Start at $(0, 0)$ on the grid.
- 2 For the x number -5 move LEFT five squares.
- 3 For the y number 2 move UP two squares.
- 4 Mark the point and label it $(-5, 2)$.

LESSON ARC

Open with $(-5, -2)$ on the IWB and ask which way each minus sends you — left, then down. Walk three plotted examples on the coordinate-grid interactive, pointing at each minus and saying 'minus means the other way'. Pupils rule a four-quadrant grid $(-6$ to $6)$ in their copy and plot three points, then read three you place on the board. The Student Activity Book follows for solo practice.

TEACHING MOVES

1. **Getting Started.** Put $(-5, -2)$ up and take two or three hands-up answers, not call-outs. Listen for whether pupils link the minus to direction (left/down) or wrongly to 'a smaller number' — that tells you who needs the slow walk-through next.
2. **Watch and Notice.** Plot each pair one at a time on the coordinate-grid interactive, tapping the minus sign as you say 'go the other way'. On the read-back point, make the class look across first (four right), then down (two down), and agree $(4, -2)$ aloud before the on-screen label confirms it.
3. **Try It Together.** Rotate four pupils at the board, alternating read and plot — hide a label and have the class read it, then call a pair to plot. Watch for the swap error: a pupil reading $(4, -2)$ as $(-2, 4)$ has gone up-before-across. Revoice 'always across first, then up or down'.
4. **Plot and Read in Your Copy.** While pupils rule their -6 to 6 grid and plot the three points, walk the room glancing for across-before-up and minus signs landing in the right direction. No marking. Once most have the three plotted, place three fresh points on the board for them to read and record.
5. **Class Challenge.** Brisk board work — pupils take turns, the class predicts each answer before Check is tapped, confirm, move on. Don't re-explain each plot. For the complete-the-rectangle problem, let pupils reason aloud about which corner is missing rather than feeding them the pair.

6. What Did We Notice?. Pose $(-3, 4)$ versus $(4, -3)$ and listen for pupils naming order as the thing that changes everything. Revoice a strong answer: 'three left and four up is top-left; four right and three down is bottom-right — opposite corners.' Head off 'same because the numbers are the same'.

COMMON MISCONCEPTIONS

⚠ A pupil reads a placed point up-before-across — a dot four right and two down comes out as $(-2, 4)$ instead of $(4, -2)$.

Stop and revoice 'across first, then up or down' while tracing the path on the coordinate-grid interactive with your finger: along the x-axis to four, then drop down to the dot. Have the pupil read it again following your trace.

⚠ Pupils insist $(-3, 4)$ and $(4, -3)$ land in the same place 'because they're the same numbers and the same minus'.

Plot both on the interactive side by side so the class sees one in the top-left and one in the bottom-right. Same digits, opposite corners — the order and which number carries the minus decide everything.

⚠ A pupil treats the minus as making the number smaller rather than as a direction — they plot $(-5, 2)$ somewhere near the origin instead of five squares left.

Point at the minus and say 'this isn't a smaller five, it's a five going the other way'. Count the five squares left aloud with the class as you drag the point on the interactive.

DIFFERENTIATION

EMERGING

- Stay with one negative at a time on the IWB (like $(-5, 2)$) while the class moves to both-negative pairs; the pupil mirrors those simpler points in copy.
- Have them rule the grid axes lightly in pencil and number them 0 to ± 6 before any plotting, so the structure is set before they place a single dot.

DEVELOPING

- After the copybook points, give a pair like $(-4, 0)$ or $(0, -5)$ and ask where a point sits when one co-ordinate is zero — on an axis, not in a quadrant.
- Ask them to predict the quadrant from the signs alone before plotting: which corner does $(-, -)$ always land in?

PROFICIENT

- Narrate a harder variant of the rectangle challenge from the front: give two diagonal corners and ask them to find both missing corners and explain how they know.
- Pull them ahead into the Student Activity Book page while the class finishes the board work.

✂ **Cross-curricular:** Tie to Geography — read grid references on an Irish OS map, comparing how its eastings-then-northings rule matches 'across first, then up'.

ANSWER KEY

Scaffold: visual check on the page

Q1: $(-7, 8)$

Q2: $(-4, 3)$

Q3: No

a) Always : Negative x means a move left from zero.

b) Never : Swapping the numbers moves the point: $(-2, 5)$ is in the second quadrant and $(5, -2)$ in the fourth.

c) Sometimes : True for negative coordinates. False when both coordinates are positive.

d) Always : Points can lie in the bottom-left quadrant.

EXTENSION SHEET · STRETCH ANSWERS

S1: 4 units

S2: $(4, -4) \rightarrow Q4$

S3: 8 units

S4: $(-6, 9) \rightarrow Q2$