

Translating shapes on the co-ordinate plane

CURRICULUM ALIGNMENT

SHA.TRN.4a perform and devise a range of steps involving transformations.

INTERACTIVES Transformation Playground · challenge, display, explore

WHAT THIS LESSON TEACHES

A translation slides every point of a shape the same distance in the same direction. The shape never turns or flips.

→ Sliding a triangle 4 squares right and 2 squares down.

→ A triangle at (2,2), (4,2), (3,5) slid 3 right becomes an image at (5,2), (7,2), (6,5).

MODEL THIS ON THE BOARD

TRANSLATING A TRIANGLE ON THE GRID

- 1 Start with vertices at (1,1), (3,1) and (2,4).
- 2 Add 3 to each x-coordinate for a slide 3 right.
- 3 Subtract 2 from each y-coordinate for a slide 2 down.
- 4 The image vertices are now at (4,-1), (6,-1) and (5,2).

LESSON ARC

Open by sliding a triangle on the labelled coordinate-grid interactive — 3 right, 2 up — and ask what stayed the same. In Watch and Notice, work four slides where pupils predict one corner's new coordinates before you play each. Try It Together resets to (2,2) between three slides so pupils see the x-only / y-only pattern. Copybook: plot a triangle and its '4 right, 2 down' image in two columns. Class Challenge matches shapes to dashed targets.

TEACHING MOVES

1. **Getting Started.** Slide the triangle 3 right, 2 up once on the grid, then freeze it. Take two or three hands before revealing anything — you're fishing for 'the size and shape stayed the same, only the position moved.' If nobody says it, slide it back and forth once more without comment.
2. **Watch and Notice.** Before each of the four slides, name a pupil to predict one corner's new coordinates, then play it to check. On the '4 right' slide press the point: which number grew, which held? Revoice 'every corner moves the same amount' after the third slide, and flag the fourth (slide-then-reverse) as something you'll come back to in the maths talk.
3. **Try It Together.** Tap reset to (2,2) before each of the three slides so none of them continue from the previous image. Pick one corner and track it across all three so the pattern in the coordinates shows. Watch for pupils changing both numbers on a straight-right slide — remind them right/left only touches the x-number. Rotate a fresh pupil to the board each time.
4. **Plot the Slide in Your Copy.** As pupils plot the '4 right, 2 down' image, walk the room checking they added 4 to every x and subtracted 2 from every y — not just the first corner. This is whole-class copybook practice, not marking, so no grades. If 'vertex' comes up, say it's just the maths word for a corner.
5. **Class Challenge.** Brisk practice — pupils take turns at the board, hit Check, class confirms, move on. For the last item ask the class to say the move in words ('so many right, so many down') before a pupil applies it. A ✓ means the image landed exactly on the dashed target.

6. What Did We Notice?. Display-only talk. Steer pupils to notice the reverse of '4 right, 2 down' is '4 left, 2 up' and lands back at the start. Revoice: a slide can always be undone by sliding the same amount the other way. Close on: the shape's size never changes, only its position.

COMMON MISCONCEPTIONS

⚠ On a straight '4 right' slide a pupil adds 4 to both numbers — (2,2) becomes (6,6) instead of (6,2). Stop and track one corner on the grid interactive as it slides right — point at the y-number and ask 'did the up-down position change?' It didn't. A right/left slide only touches the x-number; an up/down slide only touches the y-number.

⚠ Pupils get the first corner right after '4 right, 2 down' but leave the other corners where they were, so the image is stretched, not slid.

Reset on the grid and slide the whole triangle at once so all three corners travel together. On squared paper, have them lay a pencil along one side and move it bodily — every corner shifts the same 4-across, 2-down step.

⚠ When describing the move that maps one shape to its image, pupils muddle direction — reading '4 right' as '4 left' or reversing up and down.

Anchor on one corner pair: 'this corner went FROM (1,1) TO (5,3) — did the x get bigger or smaller?' Bigger x means right, bigger y means up. Say it as a from-to before naming the direction.

DIFFERENTIATION

EMERGING

- Keep these pupils on single-direction slides (right OR down) in the copybook while the class does the two-direction '4 right, 2 down' image.
- Have them track just one corner across a slide on squared paper before plotting the whole triangle.

DEVELOPING

- After the copybook image, ask them to describe in words the translation that would undo it, then plot the return to prove it.
- Swap the numbers: give '5 left, 3 down' from a starting triangle whose corners cross zero, so they handle a coordinate getting smaller past a familiar point.

PROFICIENT

- Narrate a harder Class Challenge variant from the front: give only the original and image coordinates of two corners and ask the class to state the translation, then predict where the third corner must land.
- Pose on squared paper: if you slide a shape 3 right then 4 up, is there a single slide that does both at once? Describe it and explain how you know.

✂ **Cross-curricular:** Tie to Geography — reading a grid reference on an OSi map is the same 'along then up' coordinate move pupils use to track each corner here.

ANSWER KEY

Scaffold: visual check on the page

Q1: (8,2), (10,2), (9,5)

Q2: (7,2), (9,2), (8,5)

Q3: (3,6), (5,6), (4,9)

Q4: (2,5), (4,5), (3,8)

Q5: (5,-3), (7,-3), (6,0)

a) Always — This is the definition of translation.

b) Always — Translation never turns or flips the shape.

c) Never — Side lengths stay exactly the same.

d) Sometimes — It depends on the direction and distance chosen.

EXTENSION SHEET · STRETCH ANSWERS

S1: reflection

S4: reflection

S2: reflection

S5: rotation

S3: reflection