

Perimeter of rectangles and regular shapes

CURRICULUM ALIGNMENT

SHA.SHP.3b

represent shapes with drawings and models, and calculate dimensions of shapes.

NUM.OPS.3

understand and apply flexibly the four operations; and the relationships between operations.

INTERACTIVES Shape Measurer · 2d, challenge

LESSON ARC

Open with a 5 cm × 2 cm rectangle on the IWB and ask which sides match before any adding. Walk one worked example pivoting on 'pair one of each, then double' — $7 + 4 = 11$, doubled is 22 cm — then generalise to the square and pentagon as multiplication. Pupils work a 6 cm × 3 cm rectangle two ways in copybook and confirm the totals match. Class Challenge runs a square, rectangle, hexagon and octagon at the board.

TEACHING MOVES

- Getting Started.** Display the 5 cm × 2 cm rectangle with the top and one side labelled. Take three hands-up answers, not call-outs, and listen for 'opposite sides match'. Revoice it as 'the top equals the bottom, and the two sides are the same' — but hold the shortcut back for the next step.
- Watch and Notice.** Show $7 + 4 + 7 + 4$ the long way, then the smart way (one of each, doubled), stressing both give 22 cm. After the rectangle, run a thumbs-up settle check before moving to the square's $4 \times$ side. Pause after the pentagon and ask a pupil to predict the hexagon rule before you reveal it.
- Try It Together.** A pupil at the board names the equal sides of the 6 cm × 3 cm rectangle (both 6, both 3) before any adding. Take $6 + 3 = 9$, doubled is 18 cm, and revoice as 'two of each, so add one pair and double it'. If a pupil adds all four singly, accept it as a check but push for the paired version too. Keep this beat to the single rectangle.
- Work It Two Ways in Your Copy.** Pupils work the 6 cm × 3 cm rectangle both ways in copybook, then the 8 cm × 5 cm. Walk the room glancing for both methods landing on the same total — if a pupil gets two answers, prompt them to recount one method rather than telling them where the slip is.
- Class Challenge.** Start with the on-screen 4×4 square (16 cm), then sketch the 10×6 rectangle, regular hexagon (side 5) and octagon (side 7) at the board in turn, labelling side lengths. Pupils take turns naming the equal sides; class confirms before moving on. Watch the 10×6 for pupils multiplying instead of pairing — revoice as 'two tens and two sixes'. Keep it brisk.
- What Did We Notice?.** Listen for 'every side is the same, so the same number is added over and over — that's multiplication'. Then draw an irregular six-sided shape with six different lengths and ask whether the shortcut would work, so pupils see the rule's limit before the bell.

COMMON MISCONCEPTIONS

⚠ Pupils apply the multiplication shortcut to any shape — 'six sides, so just times the first side by six' — even when the sides aren't equal.

Draw an irregular six-sided shape with six different lengths on the board. Ask which side you'd multiply by — there's no single answer. Make the rule explicit: multiplying only works when every side is equal; an irregular shape needs every side added.

⚠ On the 10×6 rectangle, pupils multiply $10 \times 6 = 60$ because they've just used multiplication for the hexagon and octagon.

Stop and point at the four sides. A rectangle has two tens and two sixes, not ten sixes. Revoice as 'two tens and two sixes — $20 + 12 = 32$ cm'. Sketch the four labelled sides so the pairing is visible.

⚠ Pupils work a perimeter two ways, get two different totals, and assume the second method is just 'a different answer'.

Don't supply the correct total. Tell them one method has a counting slip and ask them to recount the long-way addition side by side. The point of two methods is that matching totals prove the answer — mismatched ones flag an error to hunt down.

DIFFERENTIATION

EMERGING

- Stay with the 'add all four sides one under the other' method only; introduce the pairing shortcut once the slow method is secure. Use squared paper so pupils can count the side lengths rather than read labels.
- In the copybook task, give just the $6 \text{ cm} \times 3 \text{ cm}$ rectangle and skip the second rectangle until the first is checked.

DEVELOPING

- After the copybook task, give a rectangle where pupils know the perimeter and one side and must find the other (e.g. perimeter 20 cm, one side 6 cm — what's the short side?).
- Hand them a regular shape with a perimeter and ask how many sides it has if each side is 5 cm and the total is 40 cm.

PROFICIENT

- During Class Challenge, narrate a harder variant aloud: 'a regular shape has perimeter 48 cm and each side is 8 cm — how many sides, and what's the shape called?' Pupils reason backwards from the multiplication.
- Pose in copybook: can two different rectangles have the same perimeter? Find two and explain why the area might still differ — a bridge to the area work coming next.

➤ **Cross-curricular:** Tie to PE — pupils measure the four sides of the basketball court or yard markings in metres and find the perimeter the smart, paired way.

ANSWER KEY

- a) Perimeter = distance all the way around. **Q1:** 76 m
- b) Add all four sides for a rectangle. **Q2:** 84 m
- c) Area = number of unit squares covered (rows \times columns). **Q3:** 44 m
- Q4:** 36 cm

EXTENSION SHEET · STRETCH ANSWERS

- S1:** 106 m **S2:** 77 m