

Perimeter of regular and irregular shapes

CURRICULUM ALIGNMENT

MEA.MSR.4a

determine and calculate units of measurement in fractional and/or decimal form to solve practical problems.

ALG.PRR.4a

identify, explain and apply generalisations, including properties of operations, mathematical models and patterns.

INTERACTIVES Shape Measurer · display, explore

WHAT THIS LESSON TEACHES

The perimeter is the total distance around the outside edge of a shape, found by adding every side length. For regular shapes multiply the side length by the number of sides.

→ A regular hexagon with each side 4 cm has perimeter $4 \times 6 = 24$ cm.

→ An L-shaped yard needs all six sides added: $10 + 8 + 6 + 4 + 6 + 8 = 42$ m.

MODEL THIS ON THE BOARD

PERIMETER OF A REGULAR HEXAGON

- 1 Count the sides: there are six equal sides.
- 2 Each side measures 4 cm so multiply 4 by 6.
- 3 The total fence needed is 24 cm.

LESSON ARC

Open by picturing the school yard from above — pupils suggest how to measure all the way round before any diagram appears. Bring up the labelled-shape diagrams on the IWB and walk a rectangle, regular pentagon and L-shape, pivoting on 'add every side once, but multiply when sides repeat'. The class totals an irregular shape side by side at the board, then pupils sketch and label each shape in their copy. The Class Challenge bank builds to a missing-side L-shape and a reversed square stretch.

TEACHING MOVES

1. **Getting Started.** Take two or three hands-up answers on fencing the yard, not open call-outs. Listen specifically for 'add up the sides' — if a pupil says 'count the squares inside', flag it gently now: that's area, which is the next lesson, not the distance round the edge.
2. **Watch and Notice.** Walk each labelled diagram aloud, one at a time. On the rectangle, write $4.5 + 2.5 + 4.5 + 2.5 = 14$ cm first, THEN reveal the doubling shortcut. On the pentagon, ask the class to predict 3.2×5 before you show it. On the L-shape, trace the top edge then the two bottom sections with your finger so pupils see they must match.
3. **Try It Together.** Count the sides first so the class knows how many numbers to expect. Have a pupil highlight each side in turn while the class calls the running total. Watch for pupils who stop adding before the last side — that's the most common slip here. Re-voice a strong answer: 'once we've added every side once, that total is the whole way round.'
4. **Sketch the Shapes in Your Copy.** Walk the room glancing for a clear perimeter sum written under each labelled shape. Look specifically for pupils circling a multiply shortcut (3.2×5) rather than writing the same number five times — that circle tells you who has spotted the repeated-side rule.

5. **Class Challenge.** Keep the board work brisk — pupils take turns, check each answer, class confirms, move on. On the hexagon push for 4×6 , not six 4s added. On the missing-side L-shape, make the pupil name how they found the missing length before adding. On the square stretch ask 'which operation undoes adding four equal sides?'
6. **What Did We Notice?.** Listen for pupils naming the condition out loud: the multiply shortcut works only when sides are equal. Re-voice it cleanly, then deliberately offer an irregular shape and ask 'can we multiply here?' to head off the 'you can always multiply' over-generalisation.

COMMON MISCONCEPTIONS

⚠ Pupils find the perimeter by counting the squares inside the shape, or describe filling it in — they've reached for area instead of the distance round the edge.

Trace your finger right around the outside edge of the IWB shape, then sweep across the inside, and name the difference: 'this line round the outside is perimeter; the space inside is something else, coming up next lesson.' Bring them back to adding side lengths.

⚠ On the regular pentagon or hexagon, pupils add the side length the wrong number of times — e.g. 3.2×4 for a five-sided shape — because they didn't count the sides first.

Stop and count the sides aloud as a class, tapping each one on the IWB. Establish 'five sides means five lengths' before any multiplying. Tie the multiplier directly to the side-count you just tapped out.

⚠ On the missing-side L-shape, pupils add only the labelled sides and ignore the unlabelled one, giving a total that's too small.

Before totalling, make the pupil point to every side and check each has a number. Use the rule from the worked L-shape — the long top equals the two shorter bottom sections added — to deduce the missing length first, then add.

DIFFERENTIATION

EMERGING

- Stay with the rectangle and a single labelled L-shape; let pupils add every side written out in full before any multiply shortcut is expected.
- Have the pupil number each side 1, 2, 3... on the copybook sketch and tick it off as they add, so no side gets skipped.

DEVELOPING

- After the hexagon, ask: a regular octagon has each side 4 cm — what's the perimeter, and what changed in your multiply?
- Give a missing-side L-shape where two sides are unlabelled, so they deduce both before totalling.

PROFICIENT

- Narrate a harder reverse at the board: a regular pentagon has a perimeter of 35 cm — how long is each side, and how did you undo the multiply?
- Pose: two different rectangles both have a perimeter of 20 cm — find them, and explain why more than one answer is possible.

✂ **Cross-curricular:** Tie to Geography — pupils trace the outline of a county on a map and discuss what measuring its real perimeter would involve.

ANSWER KEY

Scaffold: visual check on the page

Q1: 18 cm

Q2: 25 cm

Q3: 44 m

Q4: 42 m

Q5: 48 m

Q6: 60 m

a) Always : All sides are equal so the shortcut always works.

b) Sometimes : An L-shape has six sides. An irregular pentagon has five.

c) Sometimes : True for irregular shapes but not needed for regular ones.

d) Never : It could be any regular shape with any number of sides.

EXTENSION SHEET · STRETCH ANSWERS

S1: 46.5 m

S2: 36.5 m

S3: 25.6 m

S4: 25.2 m

S5: 39 m