Grade 3 • Unit 7 • Assessment Guide

Two-Dimensional Shapes and Perimeter

For the Parent or Teacher — What to look for

Unit 7 develops geometric reasoning about quadrilaterals and introduces PERIMETER as a measurable attribute distinct from area. The biggest conceptual challenge is keeping perimeter (a length, in 1D units) and area (a covering, in square units) clearly separated. Watch for students confusing the two.

Problem 1 — Identify quadrilaterals

- Quadrilaterals: square, rectangle, rhombus, trapezoid (all 4-sided).
- NOT quadrilaterals: triangle (3), pentagon (5), hexagon (6).
- ★ Strong: 'A quadrilateral has exactly 4 sides.' Should articulate '4 sides' or '4 straight sides.'
- Weak: only circles square and rectangle (missing rhombus and trapezoid).

Problem 2 — Statements about all rectangles

- TRUE for all rectangles: (b) opposite sides equal, (c) all angles right, (d) 4 sides.
- NOT TRUE for all rectangles: (a) all sides equal (that's a SQUARE specifically).
- ★ Strong: 'A rectangle doesn't need all 4 sides equal — that's only true for squares. A 5-by-3 rectangle has equal opposite sides but not all 4 the same.'
- ★ This question reveals whether the student understands the rectangle definition precisely or just thinks 'rectangle = 4 sides with right angles, often oblong.'

Problem 3 — Draw a non-rectangle, non-square, non-rhombus quadrilateral

- Possible: a trapezoid, kite, parallelogram (non-rectangle), or general irregular quadrilateral.
- ★ Strong: a quadrilateral that is clearly NOT any of the named types — no parallel sides equal, no right angles. Reveals knowledge of the broader category.
- Weak: draws something that IS one of the excluded types (square, rectangle, rhombus) and doesn't notice.

Problem 4 — Square ⊆ rectangle?

- YES every square is a rectangle (has 4 right angles + opposite sides equal).
- NO not every rectangle is a square (a 5×3 rectangle has different side lengths).
- ★ Strong: 'Squares meet all the rules for rectangles AND have the extra rule that all sides are equal. So squares are special rectangles.'
- This is the hierarchy of shapes — a key Grade 3 reasoning move.
- Weak: says 'no, they're different' (misses the inclusion).

Problem 5 — Perimeter of basic shapes

- (a) $2 \times (8 + 5) = 26$ cm. (b) $4 \times 7 = 28$ in. (c) $4 + 6 + 9 = 19$ ft.
- ★ Strong: uses multiplication for the square (4×7), not 7+7+7+7. Shows efficiency.
- ★ Diagnostic: do they add ALL FOUR sides for the rectangle (not just $8 + 5 = 13$, which would be only two sides)?

Problem 6 — Pentagon: missing side, perimeter = 32

- Missing: $32 - (5+7+10+4) = 32 - 26 = 6$ cm.
- ★ Strong: 'The total of all sides is 32. The four known sides add to 26, so the missing side must be 6.'

- Weak: just adds 5+7+10+4 = 26 and doesn't realize they need to subtract from 32; OR misadds.

Problem 7 — Mai's garden 12×7

- Perimeter: 2(12+7) = 38 meters.
- ★ Strong: recognizes this is a perimeter question (fence = boundary).
- Watch: students might compute area (12 × 7 = 84) by mistake — the fence is the BOUNDARY, not the inside.

Problem 8 — 6×4 rectangle: P and A

- Perimeter: 20 cm. Area: 24 sq cm.
- ★ Strong explanation: 'Perimeter is the distance around the outside (length). Area is how much space the rectangle covers inside (square units).'
- ★ Watch for confusion: writes the same value for both, or swaps the labels.
- The explanation is the BIG diagnostic — can they distinguish the two concepts in their own words?

Problem 9 — Two rectangles with P=16

- Possibilities: 1×7 (area 7), 2×6 (area 12), 3×5 (area 15), 4×4 (area 16).
- ★ Strong: draws two different rectangles with P=16 and notices the AREAS are different.
- Diagnostic: 'No, they don't have the same area. Even though the perimeter is the same, the shapes are different.' This is the key insight — perimeter and area aren't tied to each other.

Problem 10 — Same area, same perimeter?

- Han is WRONG. Two rectangles can have the same area but different perimeters.
- Example: 1×12 has area 12, perimeter 26. 3×4 has area 12, perimeter 14. Same area, different perimeters.
- ★ Strong: provides a concrete counterexample.
- Weak: agrees with Han, or disagrees without an example. The example is the diagnostic — it forces them to actively dis-prove the claim.

Problem 11 — Square P=20, find area

- Side: 20 ÷ 4 = 5 cm. Area: 5 × 5 = 25 sq cm.
- ★ This problem REQUIRES going from perimeter back to side length, then computing area. Two-step reasoning.
- Strong: 'A square has 4 equal sides, so each side is 20 ÷ 4 = 5. Then 5 × 5 = 25.'
- Weak: confuses the formula; OR computes area as 20 × 20 = 400.

Problem 12 — Sam's shape vs Mei's same-P-different-A

- YES both can be right. Same perimeter doesn't force same area.
- Example: Sam has 3×6 (P=18, A=18) and 4×5 (P=18, A=20)... actually 3+6=9 doubled is 18, area 18. But these have different perimeters. Let's try Sam = 5+4=9, P=18, A=20 ; Mei could have 8+1 = 9, P=18, A=8.
- Better: Sam: 3×6 → P=18, A=18. Mei: 7×2 → P=18, A=14.
- ★ Strong: gives concrete shapes proving the claim. Reveals understanding that perimeter and area are independent attributes.

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