Grade 3 · Unit 2 · Assessment Guide

Area and Multiplication

For the Parent or Teacher — What to look for

Unit 2 connects area to multiplication. The key conceptual move is seeing the unit squares in a rectangle as an ARRAY — rows and columns — so the area is rows × columns. Watch for students who count squares one by one (correct but slow) versus students who multiply (the unit's target strategy).

Problem 1 — Find the area of a 3×5 grid two ways

- Area = 15 sq units.
- Strong: Way 1 = count one by one OR row totals (5+5+5). Way 2 = multiply (3 × 5 = 15) OR column totals (3+3+3+3+3).
- ★ The point: see the rectangle as equal groups, not just isolated squares. If both 'ways' are 'count by 1s,' they haven't yet connected area to multiplication.

Problem 2 — Pat's rectangle has gaps

- Pat is WRONG. Area requires squares to cover the shape with NO gaps and NO overlaps.
- Strong: 'Gaps mean the squares don't fully cover the shape — the area would actually be more if you filled the gaps.' Hits the definition of area.
- Weak: just says 'it's 7' or 'Pat is right.'

Problem 3 — 6×4 rectangle, equal groups

- Area: 24 sq units. Equation: 6 × 4 = 24 (or 4 × 6 = 24).
- ★ Strong: sees the rectangle as either 4 rows of 6 OR 6 columns of 4 — the rows/columns ARE the equal groups. Explicit mention of 'rows' or 'columns' is the diagnostic.
- Weak: writes the equation but can't articulate what the equal groups are.

Problem 4 — 7-by-3 rectangle (no grid)

- Area: 21 sq inches.
- ★ Transition test: can they multiply side lengths WITHOUT counting squares? If their sketch shows them re-drawing all 21 squares, they're not yet at the abstract level.
- Strong: simple sketch of the outline, with '7 × 3 = 21' written next to it.

Problem 5 — Area of 8×5, 9×2, 4×4

- (a) 40 sq cm (b) 18 sq ft (c) 16 sq m.
- All three should be multiplication-based. (c) is a square — accept this with or without explicit recognition.
- Common error: confusing area with perimeter (writing 26 instead of 40 for 8×5).

Problem 6 — Choose units for area

- (a) sq in or sq cm — stamp (tiny)
- (b) sq ft or sq m — gym floor (huge)
- (c) sq in (or sq cm)
- (d) sq ft or sq m — basketball court
- Strong: picks the right size of unit for the object's scale. Weak: same unit for everything (e.g., 'sq in for everything').

Problem 7 — 12 sq in vs 12 sq ft

- NOT the same size. 12 sq ft is much bigger because a square foot is much bigger than a square inch.
- ★ Strong: '1 square foot is 12 inches by 12 inches = 144 square inches. So 12 sq ft is way larger than 12 sq in.' Reveals understanding that the NUMBER alone is meaningless without the UNIT.
- Weak: 'yes, both are 12' — fundamental unit confusion.

Problem 8 — L-shape: 4×3 + 4×6

- Top: 12 sq units. Bottom: 24 sq units. Total: 36 sq units.
- ★ Decompose-and-add strategy — the unit's Section C target.
- Weak: just multiplies all the numbers together (4×3×4×6) or struggles to find both pieces.

Problem 9 — Mia (split) vs Diego (subtract)

- Both methods give the same answer. The L-shape's area is the same regardless of how you compute it.
- ★ Strong: 'Yes — they're both finding the same area, just in different ways. Mia adds up pieces; Diego takes a big rectangle and removes the missing piece. Both give the total.'
- Reveals additive structure of area and flexibility in decomposition. Foreshadows the distributive property.

Problem 10 — 8×5 rectangle, what if 5 doubles?

- Original: 40 sq ft. After doubling height to 10: 80 sq ft.
- ★ The area DOUBLES. Strong: 'Doubling one side doubles the area, because you have twice as many rows of the same length.'
- Weak: thinks area also doubles AND something else; OR thinks 8+5 vs 8+10 (treats area as perimeter).

Problem 11 — Han: 6×3 = 9 because 6+3 = 9

- Han confused area with perimeter (or just with addition). Area = 6 × 3 = 18, not 9.
- ★ Strong: 'You multiply the side lengths to find area, not add. 6 × 3 = 18 squares.'
- Weak: 'no it's wrong' without identifying the addition-instead-of-multiplication mistake.
- This is one of the unit's most common student errors.

Problem 12 — Two rectangles with area = 12

- Possible: 1×12, 2×6, 3×4, 4×3, 6×2, 12×1.
- ★ Strong: gives two DIFFERENT factor pairs. Reveals understanding that many shapes can have the same area.
- Could 5×3 = 12? NO — 5×3 = 15. A strong student knows this requires the side lengths to multiply to 12.

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