

Chapter 3 Perimeter and Area Foundations

Teacher Guide and Diagnostic Answer Key

Teacher Guide

Teacher Chapter-at-a-Glance

A ruler or measuring tape (optional)

Spend the most time on the Common-Trap Worked Example (perimeter vs. area confusion). It is the chapter's central error and appears in nearly every problem type.

Ask: does this question want the distance around, or the space inside?

Mastery Decision Guide

What a missed Tripwire item actually means, and what to do about it before moving on.

Confirmation and Fresh Recheck

Confirm with: Ask, “Does the situation describe distance around or space inside?” before allowing a formula.

Fresh recheck: Use one 13 m by 5 m rectangle; ask first for fencing, then for floor covering, with correct unit types.

Decision rule: Move forward only when the fresh response is secure and the reasoning survives the changed representation or context.

Missed Tripwire #1 → Adding sides when the question asks for area (Mistake 2). Adds sides and labels result with square units. Review before the next chapter.

Ready to Learn Check

Quick check before starting. A wrong answer below points to a specific gap worth closing first, not just a miss to shrug off.

1. A shape has four sides measuring 3 cm, 4 cm, 3 cm, and 4 cm. What is the total distance around it?

Correct answer: 14 cm

Likely wrong answer: 12 cm (multiplying 3×4 instead of adding all four sides)

Misconception: Reaching for multiplication instead of simply adding every side.

Next move: Review adding several numbers together before starting the chapter.

2. Multiply 3 m by 4 m. What is the product, including its unit?

Correct answer: 12 m^2

Likely wrong answer: 12 m (leaving the unit as plain metres)

Misconception: Not yet connecting multiplying two length units to a squared unit.

Next move: Preview why multiplying two lengths produces a squared unit before starting the chapter.

3. If a shape's sides are measured in centimetres, what unit would you use for the space inside it?

Correct answer: cm^2

Likely wrong answer: cm

Misconception: Using the same unit for length and for the flat space it encloses.

Next move: Preview the difference between a length unit and a square unit before starting the chapter.

Practice

Assign the full set or select items for targeted review. Teacher solutions follow each question.

1. A ribbon goes around a poster. Should you find perimeter or area?

Solution: 1. perimeter

2. A carpet covers a bedroom floor. Should you find perimeter or area?

Solution: 2. area

3. Find the perimeter of 8 cm by 5 cm.

Solution: 3. 26 cm

4. Find the perimeter of 13 m by 6 m.

Solution: 4. 38 m

5. Find the area of 9 cm by 4 cm.

Solution: 5. 36 cm^2

6. Find the area of 12 m by 7 m.

Solution: 6. 84 m^2

7. A square has side length 7 cm. Find its perimeter.

Solution: 7. 28 cm

8. A square has side length 9 m. Find its area.

Solution: 8. 81 m^2

9. A garden is 15 m by 8 m. Find the fencing needed.

Solution: 9. 46 m

10. The same garden needs grass seed. Find the area.

Solution: 10. 120 m^2

Chapter Answer Key

Tripwire Check

1. No. The student found the perimeter (38 m), not the area. The actual area is $14 \times 5 = 70 \text{ m}^2$.

Exit Ticket

1. 50 cm

2. 24 m^2

3. Border is a length; wall surface is an area.

Worksheet 1: Guided Practice

1. perimeter

2. 20 cm

3. 24 cm ²	4. area
5. 26 m	6. 30 m ²
7. perimeter	8. 20 cm
9. area	10. 22 cm
11. 18 cm ²	12. perimeter
13. 25 cm ²	14. area
15. perimeter	

Worksheet 2: Independent Practice

1. 18 cm	2. 14 cm ²
3. 32 cm	4. 30 m
5. 39 m ²	6. 52 m
7. 40 cm	8. 84 cm ²
9. 64 cm ²	10. 169 m ²
11. 50 m	12. 60 m ²
13. 50 cm	14. 7200 cm ²
15. 48 m and 144 m ²	

Worksheet 3: Mixed Practice & Application

Item 14 (Non-Routine)

Correct answer: Rectangle A: P = 24 cm, A = 32 cm². Rectangle B: P = 24 cm, A = 27 cm². Both perimeters are 24 cm, but the areas differ because the same total side length can enclose different amounts of space depending on the shape.

Likely wrong answer: Assuming matching perimeters must mean matching areas.

Misconception: Treating perimeter and area as interchangeable, so that two shapes with the same perimeter are expected to have the same area.

Next move: Have the student compute both areas side by side and see directly that equal perimeters do not force equal areas.

Item 15 (Non-Routine)

Correct answer: The student added the sides ($2 \times (12 + 5) = 34$) instead of multiplying. That finds perimeter, not area, and the unit should be m, not m^2 . The correct area is $12 \times 5 = 60 \text{ m}^2$.

Likely wrong answer: 34 m^2 is correct because adding the sides seems like measuring the carpet.

Misconception: Adding the sides of a rectangle when the question asks for the flat space (area) it covers.

Next move: Reinforce that carpet, soil, and paint always mean area, never perimeter, then have the student redo the calculation with multiplication.

1. 48 m	2. 108 m^2
3. Fencing uses m; soil uses m^2 .	4. 96 cm
5. 540 cm^2	6. 44 m and 121 m^2
7. 30 m^2	8. 54 m
9. 625 cm^2	10. 1.2 m^2
11. The student found perimeter, and the unit should be cm.	12. 7 cm
13. 9 cm	14. (see diagnostic above)
15. (see diagnostic above)	

Variation Lab — Expected Ideas

1. 10×4 rectangle: perimeter 28 m; area 40 m^2 . The dimensions stay fixed; the requested measurement changes.

2. 5×3 : $A=15$, $P=16$. 5×6 : $A=30$, $P=22$. Doubling one dimension doubles area but does not double perimeter.

3. Example: 2×12 and 3×8 both have area 24, but perimeters 28 and 22.

Transfer Check — Suggested Responses

Familiar: 38 m. Altered: 84 m^2 . Non-routine: $2(9 + w)=30$, so $w=6 \text{ cm}$ and area= 54 cm^2 . Repair: 44 cm^2 is area; perimeter is 30 cm.