

Pattern Quilt

Teacher Guide & Answer Keys

Grade 4 · All levels

Overview

Students design a class quilt. They use factor pairs to find every possible rectangular layout, decide which numbers of squares are prime or composite, use multiples to plan colors, and follow a pattern rule to predict what comes next.

Time: 2 class periods · **Product:** Quilt Design · **Standards:** 4.OA.B.4, 4.OA.C.5

Suggested pacing

- Day 1: Introduce the challenge, read the scenario together, and work Parts 1–2 in pairs.
- Day 2: Finish the remaining parts and create the final product.
- Wrap-up: Share products and reflect on strategies.

Levels

- **Remedial:** smaller numbers, fewer steps, more structure.
- **Standard:** grade-level numbers and the full set of tasks.
- **Advanced:** harder numbers, extra reasoning and multi-step questions.

All three levels practice the same learning goals, so the class can share and compare work.

Rubric

Category	4 Excellent	3 Good	2 Developing	1 Beginning
Math accuracy	All answers correct	Most answers correct	Some answers correct	Few answers correct
Shows work	Clear work for every step	Work for most steps	Some work shown	Little work shown
Explains thinking	Clear, complete explanations	Mostly clear explanations	Some explanation	Little explanation
Final product	Complete, neat and creative	Complete and neat	Partly complete	Not complete



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Answer key · Remedial KEY

Part 1: Quilt Layouts

1. List all the factor pairs of 24.

1 × 24, 2 × 12, 3 × 8, 4 × 6

2. How many different factors does 24 have?

8

3. Which layout would you choose for a quilt? Why?

Answers vary. Any factor pair is possible; long thin layouts like 1 × 24 are not practical.

Part 2: Prime or Composite?

4. How many rectangular layouts can be made with 13 squares? Is 13 prime or composite?

Only one (1 × 13). 13 is prime.

5. Is 15 prime or composite? Prove it with a factor pair.

Composite: 3 × 5 = 15.

Part 3: Color by Multiples

6. Which squares are blue AND have a star?

6, 12, 18, 24

7. What do you notice about those numbers?

They are the multiples of 6.

8. Is 24 a multiple of 3? How do you know?

Yes: 3 × 8 = 24.

Part 4: A Growing Border

9. Write the first six numbers in the pattern.

3, 7, 11, 15, 19, 23

10. Are the numbers odd, even, or do they switch? Explain why.

All odd. Adding an even number (4) to an odd number always gives an odd number.

11. Draw your quilt design with your layout, colors and border.

Check the layout uses the correct number of squares and the coloring follows the multiples.

Extension

39. Start at 3 and add 4 nine times: 3 + 9 × 4.



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Answer key · Standard KEY

Part 1: Quilt Layouts

1. List all the factor pairs of 48.

1 × 48, 2 × 24, 3 × 16, 4 × 12, 6 × 8

2. How many different factors does 48 have?

10

3. Which layout would you choose for a quilt? Why?

Answers vary. Any factor pair is possible; long thin layouts like 1 × 48 are not practical.

Part 2: Prime or Composite?

4. How many rectangular layouts can be made with 29 squares? Is 29 prime or composite?

Only one (1 × 29). 29 is prime.

5. Is 39 prime or composite? Prove it with a factor pair.

Composite: 3 × 13 = 39.

Part 3: Color by Multiples

6. Which squares are blue AND have a star?

12, 24, 36, 48

7. What do you notice about those numbers?

They are the multiples of 12.

8. Is 48 a multiple of 4? How do you know?

Yes: 4 × 12 = 48.

Part 4: A Growing Border

9. Write the first six numbers in the pattern.

5, 11, 17, 23, 29, 35

10. Are the numbers odd, even, or do they switch? Explain why.

All odd. Adding an even number (6) to an odd number always gives an odd number.

11. Draw your quilt design with your layout, colors and border.

Check the layout uses the correct number of squares and the coloring follows the multiples.

Extension

31 or 37 are prime (two factors). 36 has 9 factors because it is a square number: 6 × 6 pairs 6 with itself.



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Answer key · Advanced KEY

Part 1: Quilt Layouts

1. List all the factor pairs of 72.

1 × 72, 2 × 36, 3 × 24, 4 × 18, 6 × 12, 8 × 9

2. How many different factors does 72 have?

12

3. Which layout would you choose for a quilt? Why?

Answers vary. Any factor pair is possible; long thin layouts like 1 × 72 are not practical.

Part 2: Prime or Composite?

4. How many rectangular layouts can be made with 53 squares? Is 53 prime or composite?

Only one (1 × 53). 53 is prime.

5. Is 51 prime or composite? Prove it with a factor pair.

Composite: 3 × 17 = 51.

Part 3: Color by Multiples

6. Which squares are blue AND have a star?

12, 24, 36, 48, 60, 72

7. What do you notice about those numbers?

They are the multiples of 12.

8. Is 72 a multiple of 6? How do you know?

Yes: 6 × 12 = 72.

Part 4: A Growing Border

9. Write the first six numbers in the pattern.

7, 16, 25, 34, 43, 52

10. Are the numbers odd, even, or do they switch? Explain why.

Odd, even, odd, even, …. Adding an odd number (9) switches between odd and even.

11. Draw your quilt design with your layout, colors and border.

Check the layout uses the correct number of squares and the coloring follows the multiples.

Extension

No. The numbers are 7 more than a multiple of 9. 100 − 7 = 93, which is not a multiple of 9.



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Worked teacher example (Standard, Part 1)

List all the factor pairs of 48.

1 × 48, 2 × 24, 3 × 16, 4 × 12, 6 × 8

How many different factors does 48 have?

10

Which layout would you choose for a quilt? Why?

Answers vary. Any factor pair is possible; long thin layouts like 1 × 48 are not practical.

Model the first part aloud: read the situation, name the operation, estimate, solve, and check. Then let partners try Part 2.

Look for

- Students use correct notation and units in every answer.
- Students explain why an answer is reasonable (estimates, benchmarks, pictures).
- Final products show the math clearly, not just the answers.