

Design a Theater

Teacher Guide & Answer Keys

Grade 4 · All levels

Overview

Students design the seating plan for a community theater. They use arrays and area models to multiply, find partial products, compare amounts with multiplicative comparison, and calculate ticket sales for a sold-out show.

Time: 3 class periods · **Product:** Theater Seating Plan · **Standards:** 4.NBT.B.5, 4.OA.A.1, 4.OA.A.2

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.
- Day 3: Share products in a gallery walk and reflect.

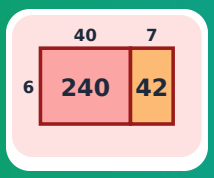
Levels

- **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: The Main Floor

1. Sketch an area model. Break the number of seats in a row into tens and ones.

14 = 10 + 4

2. Find the partial products and add them.

(6 × 10) + (6 × 4) = 60 + 24 = 84

3. How many seats are on the main floor?

84 seats

Part 2: The Side Sections

4. Find the partial products and add them.

(4 × 20) + (4 × 3) = 80 + 12 = 92

5. How many seats are in the side sections?

92 seats

6. How many seats does the theater have in all?

84 + 92 = 176 seats

Part 3: Compare the Crowds

7. Write a multiplication equation for the number of adults.

3 × 28 = 84

8. How many people came in all?

28 + 84 = 112 people

9. Were there enough seats for everyone? Explain.

Yes. 112 people and 176 seats.

Part 4: Sold Out!

10. How much money do ticket sales bring in for one sold-out show?

176 × $5 = $880

11. Estimate to check. Show your rounding.

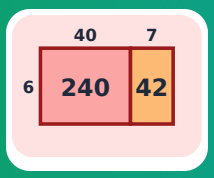
about 200 × 5 = 1,000, which is close to 880

12. Draw your seating plan. Label the rows and seats in each section.

Check that each section is drawn as an array with the correct rows and seats per row.

Extension

8 × 14 = 112 seats (or 84 + 2 × 14).



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Answer key · Standard KEY

Part 1: The Main Floor

1. Sketch an area model. Break the number of seats in a row into tens and ones.

26 = 20 + 6

2. Find the partial products and add them.

(8 × 20) + (8 × 6) = 160 + 48 = 208

3. How many seats are on the main floor?

208 seats

Part 2: The Side Sections

4. Find the partial products and add them.

200 + 30 + 80 + 12 = 322

5. How many seats are in the side sections?

322 seats

6. How many seats does the theater have in all?

208 + 322 = 530 seats

Part 3: Compare the Crowds

7. Write a multiplication equation for the number of adults.

4 × 52 = 208

8. How many people came in all?

52 + 208 = 260 people

9. Were there enough seats for everyone? Explain.

Yes. 260 people and 530 seats.

Part 4: Sold Out!

10. How much money do ticket sales bring in for one sold-out show?

530 × $7 = $3,710

11. Estimate to check. Show your rounding.

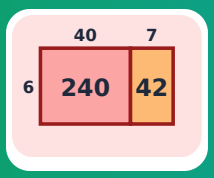
about 500 × 7 = 3,500, which is close to 3,710

12. Draw your seating plan. Label the rows and seats in each section.

Check that each section is drawn as an array with the correct rows and seats per row.

Extension

The third section needs 70 seats. Any factor pair of 70 works, such as 2 × 35, 5 × 14, 7 × 10, 10 × 7.



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Answer key · Advanced KEY

Part 1: The Main Floor

1. Sketch an area model. Break the number of seats in a row into tens and ones.

38 = 30 + 8

2. Find the partial products and add them.

(9 × 30) + (9 × 8) = 270 + 72 = 342

3. How many seats are on the main floor?

342 seats

Part 2: The Side Sections

4. Find the partial products and add them.

200 + 160 + 40 + 32 = 432

5. How many seats are in the side sections?

432 seats

6. How many seats does the theater have in all?

342 + 432 = 774 seats

Part 3: Compare the Crowds

7. Write a multiplication equation for the number of adults.

6 × 57 = 342

8. How many people came in all?

57 + 342 = 399 people

9. Were there enough seats for everyone? Explain.

Yes. 399 people and 774 seats.

Part 4: Sold Out!

10. How much money do ticket sales bring in for one sold-out show?

774 × $9 = $6,966

11. Estimate to check. Show your rounding.

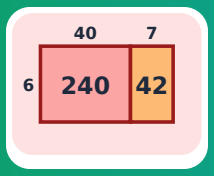
about 800 × 9 = 7,200, which is close to 6,966

12. Draw your seating plan. Label the rows and seats in each section.

Check that each section is drawn as an array with the correct rows and seats per row.

Extension

Yes. Doubling the rows and halving the seats per row rearranges the same seats: both equal 432.



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Worked teacher example (Standard, Part 1)

Sketch an area model. Break the number of seats in a row into tens and ones.

26 = 20 + 6

Find the partial products and add them.

(8 × 20) + (8 × 6) = 160 + 48 = 208

How many seats are on the main floor?

208 seats

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.