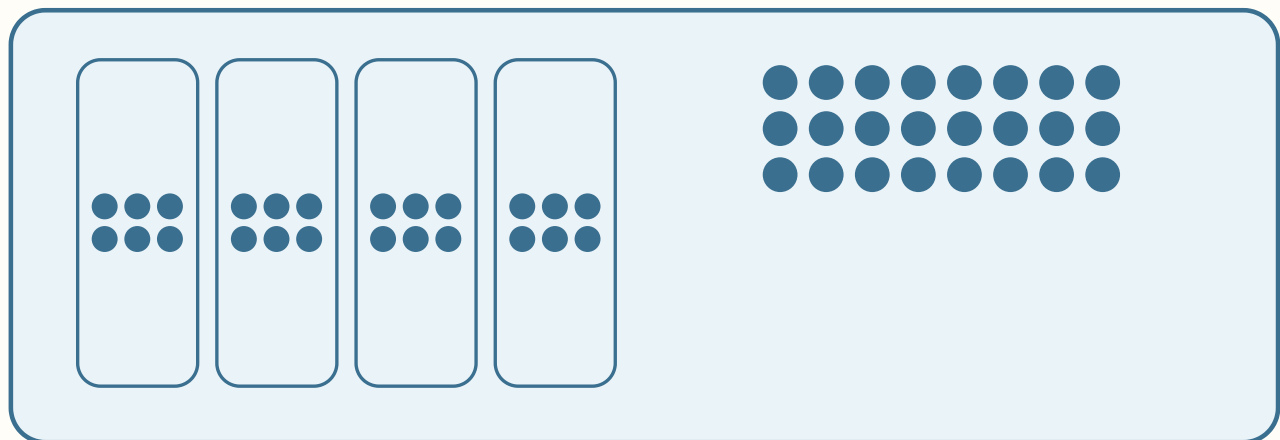


Division Reasoning Lab: Groups, Shares, and Remainders

6 complete activities from Division Reasoning Lab, each with a worked answer.



HOW TO USE

1. Read the situation and the evidence first.
2. Show your thinking in the work boxes, not only an answer.
3. Explain how you know your answer makes sense.
4. Try the new problem at the bottom of the page.

6 activities • 4 answer pages • From the 36-activity collection

11 US Letter pages • Print at 100% / Actual Size

Original Bobotemp educational printable • Fictional names, places and prices

Name _____ Date _____

LEVEL 1



Read the story. Use skip counting or a drawing to find how many equal groups you can make.

Ms. Ortiz has 35 crayons. She puts 5 crayons in each cup on the art table. How many cups does she fill? Draw the cups, skip count by 5, and write a division equation.

EVIDENCE TO USE

- Total: 35 crayons
- In each cup: 5 crayons
- Unknown: number of cups
- Skip count: 5, 10, 15, ...

1. Draw cups with 5 crayons each until you reach 35.

[illegible]

2. Write the division equation and a multiplication check.

A blank sheet of graph paper with a grid of squares. The grid consists of 10 columns and 10 rows of squares. The paper has rounded corners and a light gray border.

3. Write an answer sentence that uses the word cups.

TRY IT • Jamal has 48 stickers. Each sheet holds 8 stickers. How many sheets can he fill?

Name _____ Date _____

Fair Shares Dealing Mat

LEVEL 1



Deal the objects one at a time or in chunks so every group gets the same amount.

The nature club collected 27 pine cones. They share them equally among 3 tables for a craft. How many pine cones does each table get? Deal the pine cones one at a time onto the 3 table spaces on the dealing mat until all 27 are used.

DEALING MAT: ONE SPACE FOR EACH TABLE

EVIDENCE TO USE

- Total: 27 pine cones
- Number of tables: 3
- Unknown: pine cones at each table
- Each dealing round uses 3 pine cones

1. Deal tally marks one at a time onto the 3 table spaces on the mat above.

2. Count the rounds and write the division equation.

3. Check your answer with multiplication.

TRY IT • 32 counters are shared equally among 4 trays. How many counters go on each tray?

Name _____ Date _____

LEVEL 2 ●●○

Act as the judge. Solve the division, choose a remainder action, and use the clues to rule on each claim.

The school garden has 75 seedlings to move into trays. Each tray holds 8 seedlings. Every seedling must go in a tray. Rosa says 9 trays. Tomas says 9 R3 trays. Lin says 10 trays. Solve the division, choose a remainder action (report it, drop it, round up, or write a fraction), and decide who is right. Use the clues to confirm.

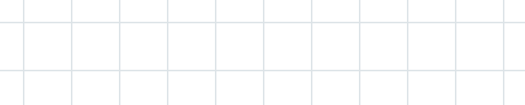
Trays	Who said it	Clue 1	Clue 2
8			
9	Rosa (Tomas: 9 R3)		
10	Lin		
11			

EVIDENCE TO USE

- 75 seedlings, 8 per tray
- Possible answers: 8, 9, 10, or 11 trays
- Clue 1: $8 \times \text{trays}$ is at least 75, so every seedling fits.
- Clue 2: One fewer tray would not hold all 75 seedlings.

1. Solve $75 \div 8$ and write $8 \times q + r = 75$ (q = full trays, r = leftover).

2. Name the remainder action and defend it.

A large rectangular area filled with a light gray grid, intended for drawing a picture. The grid consists of 15 columns and 10 rows.

3. Rule on Rosa, Tomas, and Lin in one sentence each.

TRY IT • Ava has 50 photos. Each album page holds 6 photos. How many pages can she fill completely?

Name _____ Date _____

LEVEL 2



Build a ladder of easy multiples of the divisor. Then climb down the ladder to divide.

Build a ladder of friendly multiples for the divisor 7: 7×1 , 7×2 , 7×5 , 7×10 , 7×20 , 7×50 , and 7×100 . Then use rungs from your ladder to solve $497 \div 7$. The art room has 497 craft sticks to bundle in groups of 7. How many bundles can be made?

LADDER FOR 7

Rung	Product
7×1	
7×2	
7×5	
7×10	70
7×20	
7×50	
7×100	

EVIDENCE TO USE

- Ladder rungs: $\times 1$, $\times 2$, $\times 5$, $\times 10$, $\times 20$, $\times 50$, $\times 100$
- Start rung: $7 \times 10 = 70$
- Tip: double 7×10 to get 7×20
- Bundle size: 7 sticks

1. Complete every rung of the 7 ladder in the table.

[illegible]

2. Subtract rungs from 497 and record each partial quotient.

[illegible]

3. Add the partial quotients and check with multiplication.

TRY IT • Build a ladder for 9 and use it to solve $657 \div 9$.

Name _____ Date _____

LEVEL 3



Use anchor facts for the divisor to subtract big friendly chunks. Show every partial quotient.

A science center packs 875 colored beads into tubes of 25 for a sorting game. How many tubes does it fill? Use anchor facts for 25, such as 25×4 , 25×10 , 25×20 , and 25×30 . Show your partial quotients and explain why 25 is a friendly divisor.

EVIDENCE TO USE

- Dividend: 875 beads
- Divisor: 25 beads per tube
- Anchor: $25 \times 4 = 100$
- Anchor: $25 \times 10 = 250$
- Anchor: $25 \times 30 = 750$

1. Choose anchor facts and subtract them from 875.

[illegible]

2. Add the partial quotients and check with $25 \times$ quotient.

[illegible]

3. Explain how $25 \times 4 = 100$ makes 25 a friendly divisor.

TRY IT • Solve $640 \div 20$ using anchor facts for 20.

Name _____ Date _____

Area Models at Scale: Garden Plot

LEVEL 3



Build a multi-section area model with a 2-digit side. Your sketch does not need to be drawn to scale; label every section clearly. Connect each section to a partial quotient step.

A rectangular community garden plot has an area of 1,938 square meters. One side is 17 meters. Build a multi-section area model: choose sections whose areas are multiples of 17, record the area left after each section, and find the other side length. Then explain how the area model matches partial quotients.

EVIDENCE TO USE

- Area: 1,938 square meters
- Known side: 17 meters
- $17 \times 100 = 1,700$
- $17 \times 10 = 170$
- Each section area = $17 \times \text{section length}$

1. Draw the rectangle with at least 3 sections and label each area and length.

2. Find the missing side and check with multiplication.

3. Explain how your sections match partial quotient steps.

TRY IT • A rectangle has an area of 2,310 square feet and one side of 21 feet. Find the other side.

1. Packing Problems: How Many Cups?

LEVEL 1

 $35 \div 5 = 7$. Ms. Ortiz fills 7 cups.

WORKED REASONING • This is a How Many Groups? story because the size of each group (5 crayons) is known. Skip count by 5: 5, 10, 15, 20, 25, 30, 35. That is 7 counts, so 7 cups. Repeated subtraction agrees: subtracting 5 from 35 seven times reaches 0. Equation: $35 \div 5 = 7$. Check: $5 \times 7 = 35$. Answer: Ms. Ortiz fills 7 cups.

WATCH FOR • Some students answer 5 because 5 is in the story. The 5 is the number of crayons in each cup, not the number of cups. Ask: What does each skip count stand for? Each count is one full cup.

TRANSFER • $48 \div 8 = 6$, so he fills 6 sheets. Check: $8 \times 6 = 48$.

2. Fair Shares Dealing Mat

LEVEL 1

 $27 \div 3 = 9$. Each table gets 9 pine cones.

WORKED REASONING • This is a How Many in Each Group? story because the number of groups (3 tables) is known. Deal 1 to each table per round. Each round uses 3: 3, 6, 9, 12, 15, 18, 21, 24, 27. That is 9 rounds, so each table has 9. Dealing in chunks also works: give 5 to each (15 used), then 4 more to each (12 used). $15 + 12 = 27$ and $5 + 4 = 9$. Equation: $27 \div 3 = 9$. Check: $3 \times 9 = 27$.

WATCH FOR • Students may deal unevenly or stop early and leave pine cones undealt. Fair shares must be equal and use the whole total. Have students count every table space and confirm the mat holds 27 altogether.

TRANSFER • $32 \div 4 = 8$ counters on each tray. Check: $4 \times 8 = 32$.

13. Remainder Decision Court

LEVEL 2

10 trays. $75 \div 8 = 9 \text{ R}3$, and the 3 extra seedlings need one more tray, so round up to 10 trays.

WORKED REASONING • $8 \times 9 = 72$ and $75 - 72 = 3$, so $75 \div 8 = 9 \text{ R}3$. Check: $8 \times 9 + 3 = 75$. Every seedling must go in a tray, so the 3 leftover seedlings need a tray too. Action: round up. Clue 1 keeps 10 and 11 trays (80 and 88 are at least 75). Clue 2 keeps 8, 9, and 10 trays (one fewer tray holds 56, 64, or 72), but not 11, since 10 trays hold 80. Only 10 trays passes both. Rosa leaves 3 seedlings out, Tomas's answer is not a count of trays, and Lin is right.

WATCH FOR • Students often stop at 9 because it is the quotient, or write 9 R3 trays. A count of trays must be a whole number, and the wording every seedling must go in a tray means the remainder forces one more tray.

TRANSFER • $50 \div 6 = 8 \text{ R}2$. The question asks for completely full pages, so drop the remainder: 8 full pages. Check: $6 \times 8 + 2 = 50$.

14. Friendly Multiples Ladder

LEVEL 2

$497 \div 7 = 71$. The art room makes 71 bundles.

COMPLETED LADDER FOR 7

Rung	Product
7×1	7
7×2	14
7×5	35
7×10	70
7×20	140
7×50	350
7×100	700

 $497 \div 7$

Subtract	Left	Partial quotient
350 (7×50)	147	50
140 (7×20)	7	20
7 (7×1)	0	1
Total		71

WORKED REASONING • Ladder: $7 \times 1 = 7$, $7 \times 2 = 14$, $7 \times 5 = 35$, $7 \times 10 = 70$, $7 \times 20 = 140$, $7 \times 50 = 350$, $7 \times 100 = 700$. 700 is too big for 497. Use 7×50 : $497 - 350 = 147$. Use 7×20 : $147 - 140 = 7$. Use 7×1 : $7 - 7 = 0$. Partial quotients: $50 + 20 + 1 = 71$. Check: $7 \times 71 = 490 + 7 = 497$. This is How Many Groups? division: 71 bundles of 7.

WATCH FOR • Students may add the rung products ($350 + 140 + 7$) instead of the partial quotients ($50 + 20 + 1$). Have them write each partial quotient in its own column next to each subtraction.

TRANSFER • $657 \div 9 = 73$: $9 \times 50 = 450$ (207 left), $9 \times 20 = 180$ (27 left), $9 \times 3 = 27$. $50 + 20 + 3 = 73$. Check: $9 \times 73 = 657$.

25. Two-Digit Divisor Intro: Anchor 25

LEVEL 3

$875 \div 25 = 35$. The center fills 35 tubes.

WORKED REASONING • This is How Many Groups? division because the group size is 25. $25 \times 30 = 750$, and $875 - 750 = 125$ left. $125 = 100 + 25$, and $25 \times 4 = 100$ and $25 \times 1 = 25$, so $25 \times 5 = 125$. $125 - 125 = 0$. Partial quotients: $30 + 5 = 35$. Check: $25 \times 35 = 750 + 125 = 875$. Another path: $875 = 800 + 75$. Each 100 holds four 25s, so $800 \div 25 = 32$, and $75 \div 25 = 3$. $32 + 3 = 35$.

WATCH FOR • With 2-digit divisors, students sometimes divide by only one digit, such as $875 \div 5$, or by the tens digit. Anchor facts keep the divisor whole: every step must subtract a multiple of 25.

TRANSFER • $20 \times 30 = 600$, 40 left; $20 \times 2 = 40$. $30 + 2 = 32$, so $640 \div 20 = 32$. Check: $20 \times 32 = 640$.

26. Area Models at Scale: Garden Plot

LEVEL 3

 $1,938 \div 17 = 114$. The other side is 114 meters.

17 BY 114 METERS

	100	10	4
17	1,700	170	68

WORKED REASONING • Section 1: $17 \times 100 = 1,700$; $1,938 - 1,700 = 238$ left. Section 2: $17 \times 10 = 170$; $238 - 170 = 68$ left. Section 3: $17 \times 4 = 68$; $68 - 68 = 0$. Side length: $100 + 10 + 4 = 114$ meters. Check: $17 \times 114 = 1,700 + 170 + 68 = 1,938$. Each section is one partial quotient step: the section length is the partial quotient, and the section area is the amount subtracted.

WATCH FOR • Students may split the area by place value, such as $1,900 + 38$, even though 17 does not divide those parts evenly. Every section must be 17 meters tall, so every section area must be a multiple of 17.

TRANSFER • $21 \times 100 = 2,100$ (210 left) and $21 \times 10 = 210$, so the side is $100 + 10 = 110$ feet. Check: $21 \times 110 = 2,310$.