

Grade 4 • Unit 6 • Assessment Guide

Multiplying and Dividing Multi-digit Numbers

For the Parent or Teacher — What to look for

Unit 6 is the heart of multi-digit operations: partial-products for multiplication and partial-quotients for division. Watch whether students rely on place-value decomposition or are trying to memorize an algorithm they don't understand. Pay particular attention to how they INTERPRET remainders — that's a big shift in Grade 4.

Problem 1 — Doubling pattern from 4

- 4, 8, 16, 32, 64, 128, 256.
- Patterns: all even; each is a power of 2; ones digit cycles 4, 8, 6, 2, 4, 8, ...
- ★ Strong: notices powers of 2 (or doubling) AND cyclic ones digit.
- Weak: continues the pattern but says nothing beyond 'they get bigger.'

Problem 2 — Skip-count by 5 from 5

- 5, 10, 15, ..., 50. 20th term: 100.
- ★ Strong: 'the n-th term is 5n,' so the 20th is 100. Doesn't have to list.
- Weak: counts term by term and makes an error.

Problem 3 — 46×8 , 327×4 , 53×27

- $46 \times 8 = 368$. $327 \times 4 = 1,308$. $53 \times 27 = 1,431$.
- ★ Strong: clean partial products for 53×27 — $50 \times 20 + 50 \times 7 + 3 \times 20 + 3 \times 7 = 1000 + 350 + 60 + 21 = 1,431$.
- Weak: tries the standard algorithm and loses track of place value.

Problem 4 — 38×24 partial products

- $30 \times 20 = 600$, $30 \times 4 = 120$, $8 \times 20 = 160$, $8 \times 4 = 32$. Total = 912.
- ★ Strong: cleanly fills in 4 sub-products.
- Weak: skips one of the four (very common — forget the cross terms 30×4 or 8×20).

Problem 5 — Diego's compensation (26×4)

- Diego is correct.
- For 39×5 : $40 \times 5 - 1 \times 5 = 200 - 5 = 195$.
- Strong: applies the 'just under a friendly number' idea.
- Weak: doesn't apply the strategy.

Problem 6 — $84 \div 6$, $256 \div 8$, $745 \div 5$

- $84 \div 6 = 14$. $256 \div 8 = 32$. $745 \div 5 = 149$.
- ★ Strong: shows partial quotients ($745 \div 5$: 100 fives = 500; 40 fives = 200; 9 fives = 45; total 149).
- Weak: tries long division without place-value understanding.

Problem 7 — $73 \div 4$ markers

- Each gets 18; remainder 1.
- Strong: thinks about CONTEXT — what does the leftover marker actually MEAN?

- Weak: '18.25 markers' — turns whole markers into fractions of markers.

Problem 8 — 125 students, 30/bus

- $125 \div 30 = 4 \text{ R } 5$. Need 5 buses (round UP).
- ★ THE classic 'remainder up' problem.
- Weak: answers 4 (drops remainder) or 4.17 (fraction of a bus).

Problem 9 — 47 cookies, 6 per bag

- $47 \div 6 = 7 \text{ R } 5$. Full bags: 7. Left: 5.
- ★ 'Remainder down' / keep-remainder. Strong: 7 full bags, 5 leftover.
- Weak: rounds up to 8 bags (wrongly applies bus logic).

Problem 10 — Lin's compensation for 46×8

- $46 \times 10 = 460$. $2 \times 46 = 92$. $460 - 92 = 368$. ✓
- For 36×9 : $36 \times 10 = 360$. $1 \times 36 = 36$. $360 - 36 = 324$.
- Strong: applies the compensation correctly.
- Weak: subtracts wrong amount (e.g., 9 instead of 36).

Problem 11 — Pat's $38 \times 4 = 1232$?

- WRONG. Pat ignored place value. $38 \times 4 = 152$, not 1232. He just concatenated digit products.
- ★ Strong: identifies that 38 is $30 + 8$, so the correct breakdown is $30 \times 4 + 8 \times 4 = 120 + 32 = 152$.
- Weak: just agrees because the calculations ' $8 \times 4 = 32$ ' and ' $3 \times 4 = 12$ ' look right separately.

Problem 12 — Story for $156 \div 4$

- $156 \div 4 = 39$, no remainder.
- Strong: story matches (e.g., 'There are 156 chairs and 4 rows. How many per row?' Answer 39, no leftovers).
- If they pick a different scenario expecting a remainder, they need to compute carefully — $156 \div 4$ actually has no remainder.
- Accept any coherent story with correctly interpreted (no) remainder.

— end —