

Multi-Step Problems & Equations - Reteach



TEKS 5.4(B)

Objective:

I can represent a multi-step word problem with an equation that uses a letter for the unknown quantity, solve it using the four operations, and check that my answer makes sense in the story.

The anchor strategy students will repeat all lesson:

Represent, then solve. (Read the whole story and find what the question is asking — that unknown gets a letter. Write ONE equation that shows every step of the story before you compute anything. Then solve one step at a time and check the answer against the question asked. If you compute before you represent, the numbers lie to you.)

TEACHER NOTES

This lesson targets four specific misconceptions, named here so you can listen for them:

1. Number grabbing — a student pulls out every number in the problem and applies one operation to all of them ("3 packs of 12 pencils and 5 more" becomes $3 + 12 + 5$). Multi-step problems have structure; each number plays a role in the story, and the equation has to show that structure before anyone computes.
2. Trusting keywords — a student sees "times" and multiplies, or "left" and subtracts, no matter what the story says. In "Jordan has 4 times as many marbles as Kim; Jordan has 36," the word "times" actually calls for division. Keywords describe relationships, not operations — the equation reveals the operation.
3. The letter must sit alone at the end — a student can write $n = 12 \times 4 - 8$ but freezes at $6 \times m - 9 = 15$, or believes the equals sign means "the answer is." The equals sign is a balance: both sides are the same amount, and the letter can live anywhere in the equation.
4. Stopping after one step — a student finds an intermediate value (the 168 bottles ordered) and writes it as the answer, never returning to what the question asked (how many are LEFT). The check step — reread the question, test for reasonableness — is part of solving, not an extra.

Visual anchor to keep posted:

Print the Graphic Organizer - Represent & Solve to post in your class. You may also laminate the poster and use as a dry erase board to model the examples.

Graphic Organizer - Represent & Solve:

1. What is the question asking? Choose a letter for the unknown. Let _____ stand for _____
2. Write the equation — one equation that shows every step.
3. Solve — one step at a time (multiply and divide before add and subtract).
4. Check — Did you answer the question asked? Is it reasonable?

Teacher language to keep repeating:

"What is the question asking? What letter stands for it? Show me the whole story in one equation before you solve."

Why teach the equation first and not keyword lists?

Keyword lists fail exactly where this standard lives: multi-step problems. "Times" can require division, "left" can require addition, and no keyword tells a student which step comes first. Writing one equation with a letter for the unknown is the representation work that state test items reward and the algebra readiness the next grade level builds on (one-variable equations in grade 6). Use keyword lists as a last resort for students.

I DO (modeled — teacher thinks aloud):

Problem 1: Tickets to the fair cost \$8 each. Mr. Lee buys 4 tickets and pays with a \$50 bill. How much change does he get?

Say, "Before I touch the numbers, what is the question asking? The change — that's my unknown, so let c stand for the change. Now the whole story in one equation: he pays 50, and the tickets cost 4 groups of 8, so $c = 50 - 4 \times 8$. I wrote the equation before computing anything. Now solve one step at a time: multiplication first, $4 \times 8 = 32$. Then $50 - 32 = 18$, so $c = 18$. Check: about \$50 minus about \$30 is about \$20 — \$18 is reasonable, and it answers the question asked: his change."

1. What is the question asking? Choose a letter for the unknown.

Let c stand for the change Mr. Lee gets.

2. Write the equation — one equation that shows every step.

$$c = 50 - 4 \times 8$$

3. Solve — one step at a time (multiply and divide before add and subtract).

$$4 \times 8 = 32$$

$$50 - 32 = 18$$

$$c = 18$$

4. Check — Did you answer the question asked? Is it reasonable?

\$18 — about $50 - 30 \approx 20$, and it answers the question. ✓

Problem 2 (the letter is not alone): A box holds 6 rows of muffins with the same number in each row. After 9 muffins are sold, 15 muffins are left. How many muffins were in each row?

Say, "The question asks how many muffins were in each row — let m stand for that. The story: 6 rows of m muffins, then 9 sold, then 15 left. One equation: $6 \times m - 9 = 15$. Notice the letter is not sitting alone at the end — that's allowed, because the equals sign is a balance, not a signal that the answer comes next. To solve, I undo the story backwards: if taking away 9 left 15, there were $6 \times m = 15 + 9 = 24$ muffins before the sale. Six equal rows make 24, so $m = 24 \div 6 = 4$. Check by running the story forward: $6 \times 4 = 24$, and $24 - 9 = 15$. ✓"

1. What is the question asking? Choose a letter for the unknown.

Let m stand for the muffins in each row.

2. Write the equation — one equation that shows every step.

$$6 \times m - 9 = 15$$

3. Solve — one step at a time (multiply and divide before add and subtract).

$$6 \times m = 15 + 9 = 24$$

$$m = 24 \div 6$$

$$m = 4$$

4. Check — Did you answer the question asked? Is it reasonable?

$$6 \times 4 - 9 = 15 \text{ — the story checks out. } \checkmark$$

WE DO (guided — work together, students prompt the steps):

Have students name each move ("What is the question asking? What letter stands for it? Does the equation show every step?"). Each problem hits a target misconception:

1. Ava buys 3 packs of 12 pencils and 5 single pencils. How many pencils does she have? Number-grabbers will write $3 + 12 + 5 = 20$. Represent first: $p = 3 \times 12 + 5$, so $p = 36 + 5 = 41$. Each number has a role — 3 packs OF 12, plus 5 more. (Number-grabbing trap.)
2. Jordan has 4 times as many marbles as Kim. Jordan has 36 marbles. How many does Kim have? Keyword-trusters see "times" and compute $36 \times 4 = 144$. The equation shows the truth: $4 \times k = 36$, so $k = 36 \div 4 = 9$. Ask: can Kim have MORE than Jordan? (Keyword trap.)
3. A school orders 7 boxes of 24 juice bottles. Students drink 150 bottles. How many bottles are left? Students who stop early answer 168. The equation holds both steps: $b = 7 \times 24 - 150 = 168 - 150 = 18$. Reread the question before writing the answer. (Stopping-early trap.)

YOU DO (independent — students use the organizer on their own):

1. Movie tickets cost \$9 each. A family buys 5 tickets and pays with three \$20 bills. How much change do they get? ($c = 3 \times 20 - 5 \times 9 = 60 - 45 = 15$. \$15.)
2. Mr. Diaz shares 96 stickers equally among 8 students, then gives each student 3 more. How many stickers does each student get? ($s = 96 \div 8 + 3 = 12 + 3 = 15$.)
3. Solve: $5 \times n + 7 = 42$. ($5 \times n = 42 - 7 = 35$, so $n = 35 \div 5 = 7$. The letter is not alone — balance both sides.)
4. A baker makes 240 cookies. She packs them into boxes of 12 and sells 9 of the boxes. How many boxes are left? ($b = 240 \div 12 - 9 = 20 - 9 = 11$.)

Find the error:

This is at the heart of the reteach — students analyze and fix a peer's work and name the mistake (for example, a peer solves the pencil problem with $3 + 12 + 5 = 20$, or answers 168 bottles when the question asked how many are LEFT). Prompt them to reteach it to their peer. An alternative is create a problem with a mistake and allow the students to analyze the error and fix it with a partner.

Exit ticket:

Assign the quick check from the teacher dashboard.

Multi-Step Problems & Equations



WE DO

- 1** Ava buys 3 packs of 12 pencils and 5 single pencils. How many pencils does she have?

1. What is the question asking? Choose a letter for the unknown.

Let _____ stand for _____

2. Write the equation — one equation that shows every step.

3. Solve — one step at a time (multiply and divide before add and subtract).

4. Check — Did you answer the question asked? Is it reasonable?

My equation: _____ **My answer:** _____

WE DO

- 2** Jordan has 4 times as many marbles as Kim. Jordan has 36 marbles. How many marbles does Kim have?

1. What is the question asking? Choose a letter for the unknown.

Let _____ stand for _____

2. Write the equation — one equation that shows every step.

3. Solve — one step at a time (multiply and divide before add and subtract).

4. Check — Did you answer the question asked? Is it reasonable?

My equation: _____ **My answer:** _____

WE DO

- 3** A school orders 7 boxes of 24 juice bottles. Students drink 150 bottles. How many bottles are left?

1. What is the question asking? Choose a letter for the unknown.

Let _____ stand for _____

2. Write the equation — one equation that shows every step.

3. Solve — one step at a time (multiply and divide before add and subtract).

4. Check — Did you answer the question asked? Is it reasonable?

My equation: _____ **My answer:** _____

YOU DO

- 4** Movie tickets cost \$9 each. A family buys 5 tickets and pays with three \$20 bills. How much change do they get?

1. What is the question asking? Choose a letter for the unknown.

Let _____ stand for _____

2. Write the equation — one equation that shows every step.

3. Solve — one step at a time (multiply and divide before add and subtract).

4. Check — Did you answer the question asked? Is it reasonable?

My equation: _____ **My answer:** _____

YOU DO

- 5** Mr. Diaz shares 96 stickers equally among 8 students, then gives each student 3 more. How many stickers does each student get?

1. What is the question asking? Choose a letter for the unknown.

Let _____ stand for _____

2. Write the equation — one equation that shows every step.

3. Solve — one step at a time (multiply and divide before add and subtract).

4. Check — Did you answer the question asked? Is it reasonable?

My equation: _____ **My answer:** _____

YOU DO

- 6** Solve the equation: $5 \times n + 7 = 42$

1. What is the question asking? Choose a letter for the unknown.

Let _____ stand for _____

2. Write the equation — one equation that shows every step.

3. Solve — one step at a time (multiply and divide before add and subtract).

4. Check — Did you answer the question asked? Is it reasonable?

My equation: _____ **My answer:** _____

YOU DO

- 7** A baker makes 240 cookies. She packs them into boxes of 12 and sells 9 of the boxes. How many boxes are left?

1. What is the question asking? Choose a letter for the unknown.

Let _____ stand for _____

2. Write the equation — one equation that shows every step.

3. Solve — one step at a time (multiply and divide before add and subtract).

4. Check — Did you answer the question asked? Is it reasonable?

My equation: _____ **My answer:** _____

Graphic Organizer - Represent & Solve

1. What is the question asking? Choose a letter for the unknown.

Let _____ stand for _____

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