

NORTH CAROLINA MATHEMATICS

Story Problems and Unknowns



Grade 2 | Operations and Algebraic Thinking

NC.2.OA.1

Represent, solve, and check the listed one-step and two-step story structures using a symbol for the unknown.

Seven instructional sections; 30 multiple-choice items and 30 open/performance tasks. Select short sessions across days. This is a reusable bank, not a 60-item test.

Teacher scripts, original block models, student organizers, detailed keys, evidence records, differentiation, and sources.

Aligned to current NC standards used in 2026-27 and 2027-28. Revised standards adopted in 2026 begin in 2028-29.

Free sample | Contents

NC.2.OA.1 | Second Grade mathematics

This sample contains 23 complete selected pages from the 83-page resource, plus this sample contents page. Original printed page numbers are retained. Gaps are intentional.

Included original pages: 1-20, 35-36, 68

Representative activities

M01: sample PDF page(s) 21; original page(s) 20

M02: sample PDF page(s) 21; original page(s) 20

O01: sample PDF page(s) 22; original page(s) 35

O02: sample PDF page(s) 23; original page(s) 36

Selected teacher prompts and keys: original page(s) 2, 68

Using this sample

Read the preparation and access guidance before using a selected activity.
Keep teacher keys and private preparation pages separate from student copies.
Use the original resource contents to see the scope of the complete packet.

Complete paid download

The complete resource includes the full PDF task bank and teaching materials.

TEACHER GUIDE

Choose a short-session pathway

Print only selected learner pages. Keep teacher models and all keys separate. The first portion of the bank holds choice pages; the second holds open/performance pages. Match IDs, not page proximity.

Day 1 (15-20 minutes): warm-up and I Do. Day 2: We Do. Day 3: collaborative practice. Day 4: independent practice and a short needs-based group. Day 5: exit evidence and revisit. Split a session further when needed.

Suggested core: M01/O01, M05/O05, M09/O09, M14/O14, M19/O19, M24/O24, M28/O28. Before teaching, choose additional tasks to cover every target below. Remaining items are for later dates and fresh evidence.

Allocation for both banks: warm-up 01-04; I Do 05-08; We Do 09-13; collaboration 14-18; independent 19-23; reteach 24-27; exit 28-30. Only selected examples are used in a lesson.

Contents: exact standard and targets; access and preparation; worked models; seven phase scripts; blank tools; choice bank; open bank; scoring and evidence records; inquiry and extension; worked keys; sources.

Use mathematical practices through sense-making, models, explaining a choice, checking, and revising. A correct multiple-choice selection does not replace the standard's actual performance.

TEACHER GUIDE

Exact NC standard

NC.2.OA.1: Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using representations and equations with a symbol for the unknown number to represent the problem, when solving:

- One-Step problems:
 - Add to/Take from-Start Unknown
 - Compare-Bigger Unknown
 - Compare-Smaller Unknown
- Two-Step problems involving single digits:
 - Add to/Take from-Change Unknown
 - Add to/Take from-Result Unknown

Source: NC DPI Second Grade Quick Reference Guide. Current source-verified standard, not a Common Core substitution.

Essential question: How can a model and equation reveal the hidden quantity in a story?

TEACHER GUIDE

Learning targets and evidence

- A: One-step add-to, start unknown
- B: One-step take-from, start unknown
- C: Compare, bigger unknown
- D: Compare, smaller unknown
- E: Two-step add-to, change unknown
- F: Two-step take-from, change unknown
- G: Two-step add/take, result unknown
- H: Two-step take/add, result unknown

Collect the actual performance named by the target, plus an explanation or check in any accessible mode. Target IDs appear in the included worked keys; use them with the evidence record.

Boundaries: One-step problems stay within 100. Two-step problems use single-digit starting/change quantities. In all cases, represent the unknown with a symbol and label its meaning. The included types match the specific NC bullets.

Use fresh tasks on different dates before concluding that a skill is reliable. This packet supplies instructional evidence, not state endorsement or an official mastery threshold.

TEACHER GUIDE

Prepare, access, and language

Prerequisites: count objects one-to-one; connect numerals and quantities; understand joining, removing, and equal quantities. Briefly check these before introducing symbolic work.

Materials: pencils, crayons, blank paper, and large age-appropriate blocks or counters; 100 for OA.1 if needed, 20 for OA.2/OA.3, 25 for OA.4. For quantities to 100, groups of ten may replace loose objects. Adults handle cutting. All printed diagrams are conceptual models, not scale-measurement tools.

Vocabulary: start, change, result, more, fewer, difference, unknown, equation.

Read directions and choices neutrally. Allow oral, signed, AAC, pointed, drawn, built, or dictated responses. Enlarge print or use tactile blocks as access requires. Do not give a missing number, pair the child's objects, or supply the next operation during independent evidence.

Separate access help from mathematical cues in the record. Do not score decoding, spelling, handwriting, accent, or speech speed. If evidence is inaccessible or unclear, record N/O and revise access.

Visual support: base-ten blocks model known quantities in selected choice tasks; blank story organizers accompany open tasks. Independent diagrams do not contain solved quantities.

TEACHER MODEL | ADULT ONLY

Add-to start unknown

Some blocks plus 14 make 46. Say: "The start is hidden. I know the whole and the added part." Write $? + 14 = 46$. Split 46 into 14 and 32. Check $32 + 14 = 46$. Draw a bar with those two parts.

Say: "What does each part of the picture mean? What could we check?" Let the learner connect actions, the diagram, and the equation. These completed models are for instruction; keep them covered during fresh independent checks.

Known quantity

Unknown quantity

Teacher demonstration space: label quantities and actions

TEACHER MODEL | ADULT ONLY

Take-from start unknown

Some cards minus 18 leave 35. Say: "The starting whole includes both the cards left and the cards removed." Write $? - 18 = 35$; $35 + 18 = 53$. Check $53 - 18 = 35$. Draw 35 remaining and 18 removed as parts of 53.

Say: "What does each part of the picture mean? What could we check?" Let the learner connect actions, the diagram, and the equation. These completed models are for instruction; keep them covered during fresh independent checks.

Known quantity

Unknown quantity

Teacher demonstration space: label quantities and actions

TEACHER MODEL | ADULT ONLY

Compare: bigger and smaller

Mina has 28 blocks. Jo has 9 more: $28 + 9 = ?$; Jo has 37. Reverse the question: Jo has 37 and Mina has 9 fewer; $37 - 9 = ?$; Mina has 28. Align two bars at the same starting point. Label the extra segment 9; do not decide from a keyword alone.

Say: "What does each part of the picture mean? What could we check?" Let the learner connect actions, the diagram, and the equation. These completed models are for instruction; keep them covered during fresh independent checks.

Known quantity

Unknown quantity

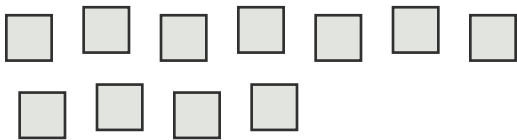
Teacher demonstration space: label quantities and actions

TEACHER MODEL | ADULT ONLY

Two-step change unknown

Start with 6 blocks, get some, then give away 3 and end with 8. Write $6 + ? - 3 = 8$. Undo the last action: $8 + 3 = 11$. Then $11 - 6 = 5$. Check $6 + 5 - 3 = 8$. In $8 - ? + 2 = 7$, undo $+2$: $7 - 2 = 5$; $8 - 5 = 3$. Check $8 - 3 + 2 = 7$. The unknown can be the second change: in $3 + 2 + ? = 9$, first $3 + 2 = 5$, then $9 - 5 = 4$. In $9 - 2 - ? = 4$, first $9 - 2 = 7$, then $7 - 4 = 3$.

Say: "What does each part of the picture mean? What could we check?" Let the learner connect actions, the diagram, and the equation. These completed models are for instruction; keep them covered during fresh independent checks.



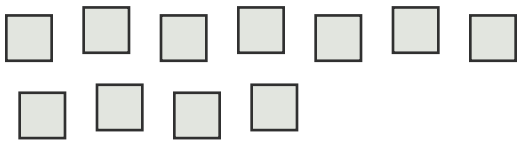
Teacher demonstration space: label quantities and actions

TEACHER MODEL | ADULT ONLY

Two-step result unknown

Start with 7, get 4, then give away 3. Write $7 + 4 - 3 = ?$; $7 + 4 = 11$; $11 - 3 = 8$. For $9 - 5 + 2$, first $9 - 5 = 4$, then $4 + 2 = 6$. Say: "Follow the events in order. Label what the final number means. Same-direction actions also occur: $3 + 2 + 4 = 9$, while $9 - 2 - 3 = 4$."

Say: "What does each part of the picture mean? What could we check?" Let the learner connect actions, the diagram, and the equation. These completed models are for instruction; keep them covered during fresh independent checks.



Teacher demonstration space: label quantities and actions

TEACHER GUIDE

Warm-up | teaching moves

Bank: M01-M04 and O01-O04. Selected core: M01/O01. Target for the open core: D: Compare, smaller unknown

0-2 minutes: Invite one familiar quantity or relationship. Ask what the child notices before evaluating it.

2-6 minutes: Have each learner attempt the selected open task. Ask "How does your model match?" Wait without supplying a number or operation.

6-10 minutes: Compare a correct explanation with an incomplete one. Ask what can be checked. Use the worked key only after the learner's attempt.

10-12 minutes (or stop sooner): Invite a new example or a different valid representation. Close by asking what the child can now explain.

Exact neutral prompt: "Show me how you know. What does this number or group represent?" Listen for: Represent, solve, and check the listed one-step and two-step story structures using a symbol for the unknown.

If evidence shows a misconception: If the child adds all visible numbers, act out each event and label the hidden quantity before calculating. If comparison is reversed, align bars and identify the longer one. For two-step change unknown, undo the last known event, then find the earlier change.

Extension: Change which quantity is hidden while keeping the same story relationship; write and check the new equation.

Record item/date, exact response, model or strategy, access supports, mathematical cues, and one next step. When teaching cues are used, do not label that attempt independent.

TEACHER GUIDE

I Do | teaching moves

Bank: M05-M08 and O05-O08. Selected core: M05/O05. Target for the open core: A: One-step add-to, start unknown

0-2 minutes: Read the selected task neutrally. Ask the child to name what needs to be found or shown.

2-6 minutes: Model one adult-only example above. Think aloud each step and match the equation to the representation. Let students watch before asking them to perform.

6-10 minutes: Compare a correct explanation with an incomplete one. Ask what can be checked. Use the worked key only after the learner's attempt.

10-12 minutes (or stop sooner): Invite a new example or a different valid representation. Close by asking what the child can now explain.

Exact neutral prompt: "Show me how you know. What does this number or group represent?" Listen for: Represent, solve, and check the listed one-step and two-step story structures using a symbol for the unknown.

If evidence shows a misconception: If the child adds all visible numbers, act out each event and label the hidden quantity before calculating. If comparison is reversed, align bars and identify the longer one. For two-step change unknown, undo the last known event, then find the earlier change.

Extension: Change which quantity is hidden while keeping the same story relationship; write and check the new equation.

Record item/date, exact response, model or strategy, access supports, mathematical cues, and one next step. When teaching cues are used, do not label that attempt independent.

TEACHER GUIDE

We Do | teaching moves

Bank: M09-M13 and O09-O13. Selected core: M09/O09. Target for the open core: E:
Two-step add-to, change unknown

0-2 minutes: Read the selected task neutrally. Ask the child to name what needs to be found or shown.

2-6 minutes: Have each learner attempt the selected open task. Ask "How does your model match?" Wait without supplying a number or operation.

6-10 minutes: Compare a correct explanation with an incomplete one. Ask what can be checked. Use the worked key only after the learner's attempt.

10-12 minutes (or stop sooner): Invite a new example or a different valid representation. Close by asking what the child can now explain.

Exact neutral prompt: "Show me how you know. What does this number or group represent?" Listen for: Represent, solve, and check the listed one-step and two-step story structures using a symbol for the unknown.

If evidence shows a misconception: If the child adds all visible numbers, act out each event and label the hidden quantity before calculating. If comparison is reversed, align bars and identify the longer one. For two-step change unknown, undo the last known event, then find the earlier change.

Extension: Change which quantity is hidden while keeping the same story relationship; write and check the new equation.

Record item/date, exact response, model or strategy, access supports, mathematical cues, and one next step. When teaching cues are used, do not label that attempt independent.

TEACHER GUIDE

Collaborative practice | teaching moves

Bank: M14-M18 and O14-O18. Selected core: M14/O14. Target for the open core: F: Two-step take-from, change unknown

0-2 minutes: Read the selected task neutrally. Ask the child to name what needs to be found or shown.

2-6 minutes: Have each learner attempt the selected open task. Ask "How does your model match?" Wait without supplying a number or operation.

6-10 minutes: Partners take turns explaining and checking. Each learner makes a separate record; a shared answer alone is not individual evidence.

10-12 minutes (or stop sooner): Invite a new example or a different valid representation. Close by asking what the child can now explain.

Exact neutral prompt: "Show me how you know. What does this number or group represent?" Listen for: Represent, solve, and check the listed one-step and two-step story structures using a symbol for the unknown.

If evidence shows a misconception: If the child adds all visible numbers, act out each event and label the hidden quantity before calculating. If comparison is reversed, align bars and identify the longer one. For two-step change unknown, undo the last known event, then find the earlier change.

Extension: Change which quantity is hidden while keeping the same story relationship; write and check the new equation.

Record item/date, exact response, model or strategy, access supports, mathematical cues, and one next step. When teaching cues are used, do not label that attempt independent.

TEACHER GUIDE

Independent practice | teaching moves

Bank: M19-M23 and O19-O23. Selected core: M19/O19. Target for the open core: D: Compare, smaller unknown

0-2 minutes: Read the selected task neutrally. Ask the child to name what needs to be found or shown.

2-6 minutes: Have each learner attempt the selected open task. Ask "How does your model match?" Wait without supplying a number or operation.

6-10 minutes: Compare a correct explanation with an incomplete one. Ask what can be checked. Use the worked key only after the learner's attempt.

10-12 minutes (or stop sooner): Collect the response without coaching, note access and strategy, and choose a fresh task for the next date.

Exact neutral prompt: "Show me how you know. What does this number or group represent?" Listen for: Represent, solve, and check the listed one-step and two-step story structures using a symbol for the unknown.

If evidence shows a misconception: If the child adds all visible numbers, act out each event and label the hidden quantity before calculating. If comparison is reversed, align bars and identify the longer one. For two-step change unknown, undo the last known event, then find the earlier change.

Extension: Change which quantity is hidden while keeping the same story relationship; write and check the new equation.

Record item/date, exact response, model or strategy, access supports, mathematical cues, and one next step. When teaching cues are used, do not label that attempt independent.

TEACHER GUIDE

Small-group reteach | teaching moves

Bank: M24-M27 and O24-O27. Selected core: M24/O24. Target for the open core: H: Two-step take/add, result unknown

0-2 minutes: Read the selected task neutrally. Ask the child to name what needs to be found or shown.

2-6 minutes: Have each learner attempt the selected open task. Ask "How does your model match?" Wait without supplying a number or operation.

6-10 minutes: Compare a correct explanation with an incomplete one. Ask what can be checked. Use the worked key only after the learner's attempt.

10-12 minutes (or stop sooner): Invite a new example or a different valid representation. Close by asking what the child can now explain.

Exact neutral prompt: "Show me how you know. What does this number or group represent?" Listen for: Represent, solve, and check the listed one-step and two-step story structures using a symbol for the unknown.

If evidence shows a misconception: If the child adds all visible numbers, act out each event and label the hidden quantity before calculating. If comparison is reversed, align bars and identify the longer one. For two-step change unknown, undo the last known event, then find the earlier change.

Extension: Change which quantity is hidden while keeping the same story relationship; write and check the new equation.

Record item/date, exact response, model or strategy, access supports, mathematical cues, and one next step. When teaching cues are used, do not label that attempt independent.

TEACHER GUIDE

Exit ticket | teaching moves

Bank: M28-M30 and O28-O30. Selected core: M28/O28. Target for the open core: D: Compare, smaller unknown

0-2 minutes: Read the selected task neutrally. Ask the child to name what needs to be found or shown.

2-6 minutes: Have each learner attempt the selected open task. Ask "How does your model match?" Wait without supplying a number or operation.

6-10 minutes: Compare a correct explanation with an incomplete one. Ask what can be checked. Use the worked key only after the learner's attempt.

10-12 minutes (or stop sooner): Collect the response without coaching, note access and strategy, and choose a fresh task for the next date.

Exact neutral prompt: "Show me how you know. What does this number or group represent?" Listen for: Represent, solve, and check the listed one-step and two-step story structures using a symbol for the unknown.

If evidence shows a misconception: If the child adds all visible numbers, act out each event and label the hidden quantity before calculating. If comparison is reversed, align bars and identify the longer one. For two-step change unknown, undo the last known event, then find the earlier change.

Extension: Change which quantity is hidden while keeping the same story relationship; write and check the new equation.

Record item/date, exact response, model or strategy, access supports, mathematical cues, and one next step. When teaching cues are used, do not label that attempt independent.

TEACHER GUIDE

Anchor reminders

STORY -> MODEL -> EQUATION -> CHECK. What is known? What is hidden? Is it a start, change, result, bigger amount, or smaller amount? Let the story decide the operation, not one word.

Ask: Did I use every object exactly once? Does my equation match my picture? Does my answer describe what was asked?

These reminders are for instruction and supported practice. During independent evidence, record whether the reminder was supplied. Support should clarify access without silently supplying the tested relationship.

REUSABLE STUDENT ORGANIZER

Show, explain, and check

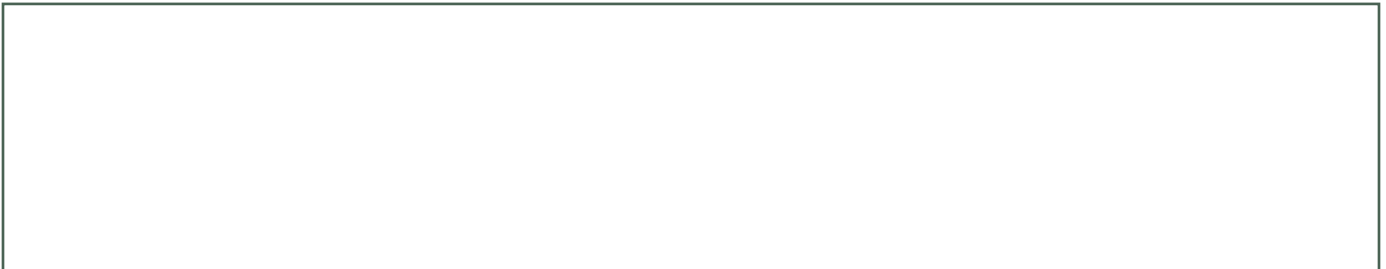
Known facts and what is unknown



My model



Equation with ? and a check



STUDENT CHOICE BANK

Choose and explain 01-02

M01 Mina has 8 blocks. Mina gets 3 more, then gets 2 more. How many blocks does Mina have now?

Known starting amount: 8. Each small square stands for 1.



- A. 11
- B. 10
- C. 13
- D. 5

M02 Sam has 9 cards. Sam gives away 4, then gives away some more. Now 3 cards remain. How many cards did Sam give away the second time?

- A. 5
- B. 1
- C. 2
- D. 9

STUDENT PERFORMANCE | WARM-UP

001 | Show your thinking

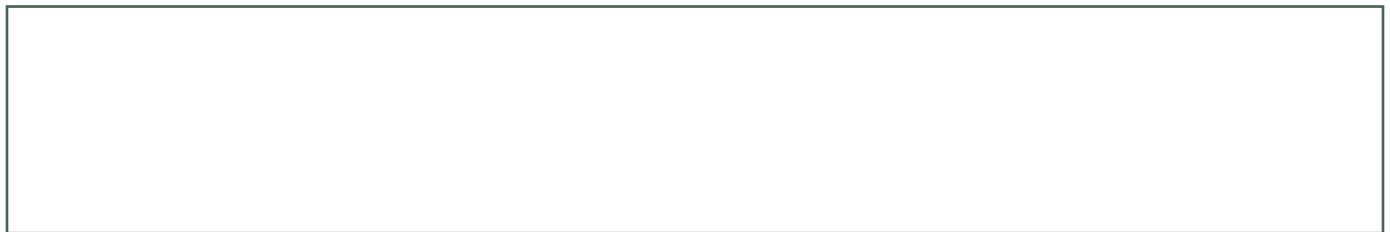
Name _____ Date _____

Kai has 100 beads. Ren has 10 fewer beads than Kai. How many beads does Ren have? Show a model. Write an equation with ? for the unknown. Solve and check.

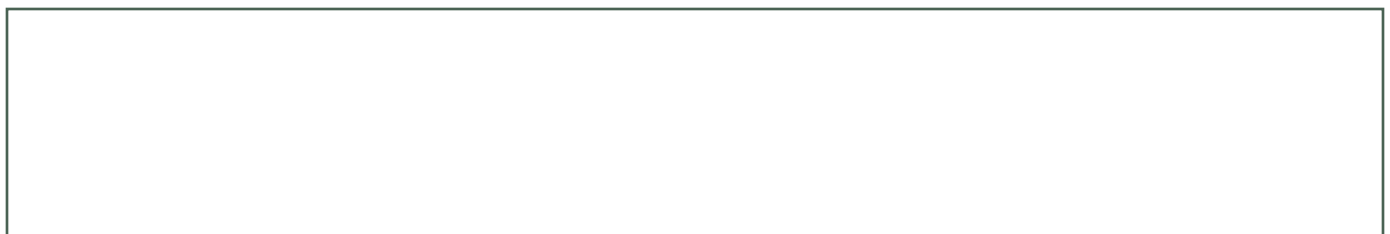
Model: draw or build, then label your quantities



Equation with ?



Solution and check in the story



You may explain aloud, point, build, draw, or write.

STUDENT PERFORMANCE | WARM-UP

002 | Show your thinking

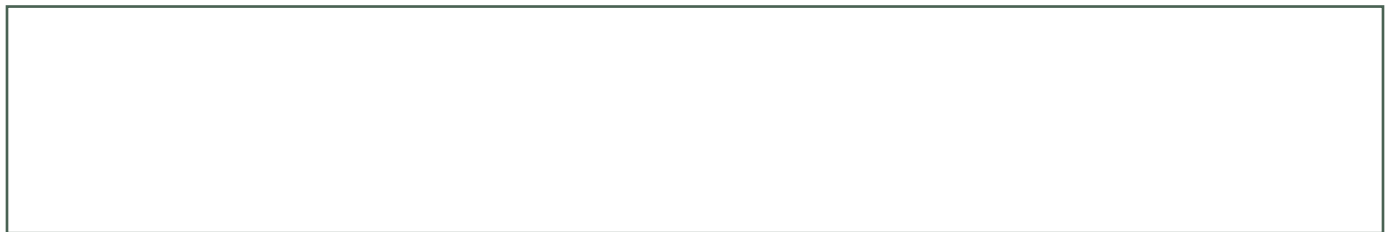
Name _____ Date _____

Emi has 75 beads. Ren has 16 fewer beads than Emi. How many beads does Ren have? Show a model. Write an equation with ? for the unknown. Solve and check.

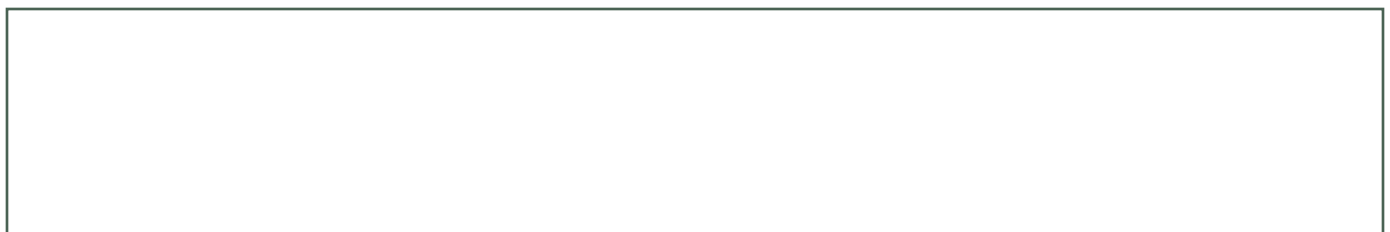
Model: draw or build, then label your quantities



Equation with ?



Solution and check in the story



You may explain aloud, point, build, draw, or write.

TEACHER-ONLY WORKED KEYS

Items 01-02

M01 | C: 13

Target: G: Two-step add/take, result unknown

Unknown = 13. Equation: $8 + 3 + 2 = ?$. $8 + 3 = 11$; $11 + 2 = 13$. Representation: Draw the three groups 8, 3, and 2; join them to make 13. Label the unknown as the story asks, not just the last number calculated.

Distractor check: 11: stops after the first event; 5: counts only the two changes; 10: ignores the first change. These are possible errors, not diagnoses from a choice alone.

001 | Sample performance

Target: D: Compare, smaller unknown

Unknown = 90. Equation: $100 - 10 = ?$. $100 - 10 = 90$. Check: $90 + 10 = 100$. Representation: Draw the larger bar 100; the shorter bar is 90 with a difference of 10. Label the unknown as the story asks, not just the last number calculated.

M02 | C: 2

Target: F: Two-step take-from, change unknown

Unknown = 2. Equation: $9 - 4 - ? = 3$. After the first change: $9 - 4 = 5$. Then $5 - 3 = 2$. Check: $9 - 4 - 2 = 3$. Representation: Draw 9 starting cards; cross out 4 and then a missing group of 2, leaving 3. Label the unknown as the story asks, not just the last number calculated.

Distractor check: 1: counts one too few; 9: reports the starting amount; 5: stops at an intermediate amount. These are possible errors, not diagnoses from a choice alone.

002 | Sample performance

Target: D: Compare, smaller unknown

Unknown = 59. Equation: $75 - 16 = ?$. $75 - 16 = 59$. Check: $59 + 16 = 75$. Representation: Draw the larger bar 75; the shorter bar is 59 with a difference of 16. Label the unknown as the story asks, not just the last number calculated.

Accept equivalent correct models and accessible explanations. Record actual strategy, access support, and mathematical cues separately.