

Watch data change

Grade 5 • NC.5.MD.2



Detailed teaching guide and reusable practice bank

30 multiple-choice items + 30 open or performance tasks

Seven instructional sections • worked solutions • printable workspaces

Current NC standards for 2026-27 and 2027-28. Not the future 2028-29 implementation.

Free sample | Contents

NC.5.MD.2 | Fifth Grade mathematics

This sample contains 20 complete selected pages from the 95-page resource, plus this sample contents page. Original printed page numbers are retained. Gaps are intentional.

Included original pages: 1-16, 45-46, 75, 85

Representative activities

M01: sample PDF page(s) 16; original page(s) 15

M02: sample PDF page(s) 17; original page(s) 16

O01: sample PDF page(s) 18; original page(s) 45

O02: sample PDF page(s) 19; original page(s) 46

Selected teacher prompts and keys: original page(s) 75, 85

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

Inside this packet

Pages 1-7: orientation, exact standard, teaching models, materials, access, and assessment tools. Seven section guides follow, then student task pages, complete worked keys, and sources. Each student page names its M or O item for easy selection.

Print selected student pages only. This is a reusable bank, not a 60-item test. A suggested core spans three sessions: session 1 uses M01/O01, the teacher model, and O09; session 2 uses M14/O14 plus O19 individually; session 3 uses reteach as needed and O28 with M28. Use remaining items for additional practice and conferences.

The seven section allocations are 4, 4, 5, 5, 5, 4, 3 of each item type. Section time suggestions are flexible. Actual collection tasks require five observation times and follow-up graph work; allow a separate 15-20 minute activity.

Essential question: What can repeated measurements tell us that a single observation cannot?

Prerequisites: Read equal-interval scales and tables; count and subtract whole numbers; distinguish labels from measurements. This is the NC time-series line-graph standard, not fraction line plots.

Materials: Pencil, timer, ten large precut paper shapes or large blocks (adults handle cutting), an opaque box, supplied grids and recording tables. Use classroom objects only. No student names, birth dates, heights, grades, or other personal information are collected.

TEACHER GUIDE

The standard and learning targets

Represent and interpret data.

- Collect data by asking a question that yields data that changes over time.
- Make and interpret a representation of data using a line graph.
- Determine whether a survey question will yield categorical or numerical data, or data that changes over time.

A | I can ask a question and collect nonpersonal data that change over time.

B | I can make an accurate line graph with labels, equal intervals, and connected consecutive observations.

C | I can interpret values, changes, and limits of a time-series line graph.

D | I can distinguish categorical, one-time numerical, and time-changing data questions.

Evidence: Observe the learner asking a time-changing question, collecting actual nonpersonal observations, creating a line graph, and interpreting a change. Supplied tables cannot substitute for evidence of collection.

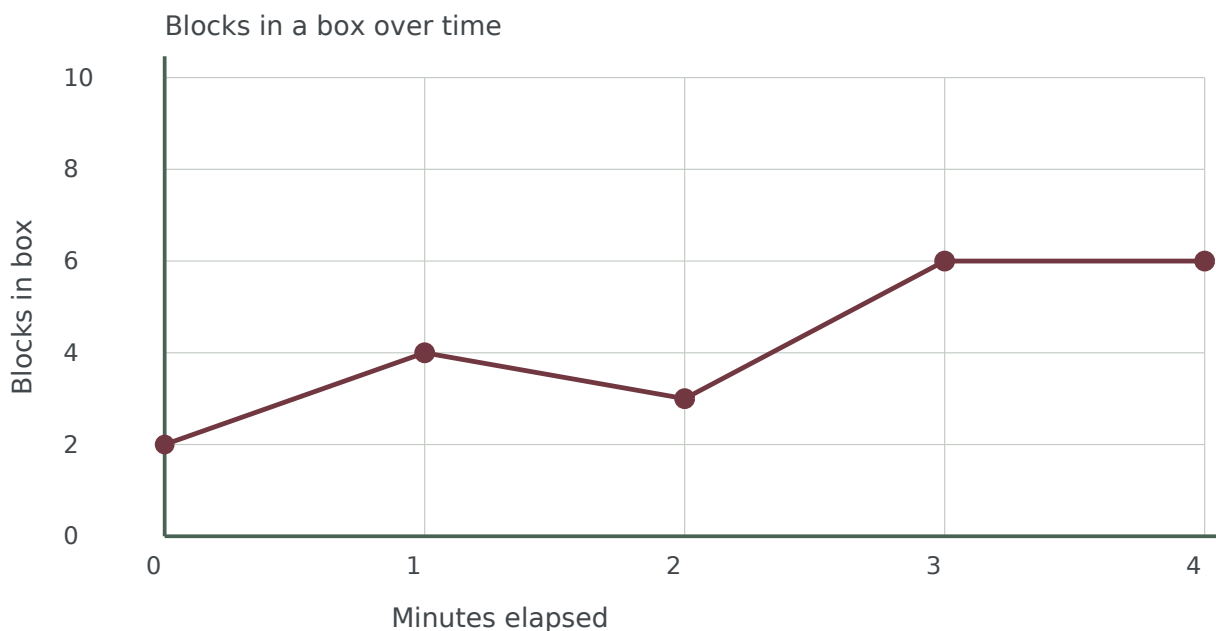
Practice connections: explain a representation, attend to units and scale, test a claim, and critique a partner's reasoning using mathematical evidence. Targets are instructional, not official cut scores.

TEACHER GUIDE

Anchor chart and worked model

Ask a measurable question about change over time. Name the same quantity, unit, and observation times. Record honest observations. Put time on the horizontal axis and the measured quantity on the vertical axis. Use equal numerical intervals. Plot pairs, then join consecutive observations. Title and label the graph. Categories and numbers describe data types; "over time" describes how repeated observations are collected.

Say: "How does the number of blocks in a box change each minute? Our demonstration table is minute 0: 2, minute 1: 4, minute 2: 3, minute 3: 6, minute 4: 6. I pair each minute with its count, plot (0,2),(1,4),(2,3),(3,6),(4,6), and connect consecutive times. From minute 1 to 2 the count decreases by 1. The flat last segment means no change between the two recorded counts. These are instructional data; actual collection comes later."



TEACHER GUIDE

Access and responsive teaching

Read directions neutrally; allow oral, signed, AAC, typed, or dictated explanations. Offer enlarged grids and high-contrast lines. A scribe may record a learner's stated coordinates or equation verbatim; record the support. When plotting is assessed, the learner must direct each point rather than the adult supplying locations.

Keep the conversion chart available for MD.1. For graph tasks, reading the axis labels aloud is access; telling the learner where a target point goes supplies the answer. Record any mathematical hint separately and collect a fresh independent response later.

Do not penalize spelling, handwriting, decoding, or accent. Mathematical quantities, units, scale and reasoning remain the evidence. Partner practice must end with an individual explanation.

Misconception response: If points are equally spaced vertically despite unequal values, trace the numerical scale from zero. If categorical answers are connected as a time series, ask what the horizontal positions mean. If a learner invents missing observations, record the gap honestly rather than treating it as zero.

Extension: Choose a different consistent vertical scale for the same data and explain why visual steepness changes while numerical differences do not. Explain why a graph does not establish a cause for a change.

Use short conferences and selected items. There are no official speed cutoffs or mastery claims in this packet. A blank page, inaccessible task, absence, or unclear response is N/O, not an observed incorrect answer.

TEACHER GUIDE

Performance evidence record

Observe the learner asking a time-changing question, collecting actual nonpersonal observations, creating a line graph, and interpreting a change. Supplied tables cannot substitute for evidence of collection.

Record an anonymous learner code, date, item, exact observable evidence, access support, mathematical cue (if any), score by dimension, and next teaching step. Do not collect children's personal information.

Anonymous code / date / item**Observed representation or equation****Observed reasoning and interpretation****Access support / mathematical cue****Next teaching step / fresh evidence needed**

TEACHER GUIDE

Scoring and reusable organizer

Score each dimension separately: representation, mathematical accuracy, and reasoning/context. 3 = accurate and explained independently; 2 = substantially correct with a minor interpretable error; 1 = partial relevant evidence; 0 = an interpretable observed incorrect attempt; N/O = unobserved, inaccessible, or insufficient evidence. These are local instructional descriptors, not official proficiency levels.

For collection, also record whether the learner asked the question and gathered actual observations. For plotting, record whether the learner placed or explicitly directed the points. Do not infer either from recognition alone.

Question / quantity / unit / observation times**Data or ordered pairs****Representation check / interpretation**

TEACHER GUIDE

Warm-up | teaching moves

Bank: M01-M04 and O01-O04. Suggested selected-core time: 8 minutes; use fewer items if needed.

Launch (first 2 minutes). Say: "Our goal is to explain how we know. Today we will use time and measurement together." Ask learners to name the information and what must be found.

Explore one item: M01. Read neutrally, allow thinking time, then ask: "Which information supports your choice? Show where you used it." Keep the key teacher-only. Do not show a solution before independent evidence.

Practice (remaining work time). Select O01. Invite a learner to explain a step, then have everyone represent it independently.

Listen and look for: Observe the learner asking a time-changing question, collecting actual nonpersonal observations, creating a line graph, and interpreting a change. Supplied tables cannot substitute for evidence of collection.

If the response reveals confusion: If points are equally spaced vertically despite unequal values, trace the numerical scale from zero. If categorical answers are connected as a time series, ask what the horizontal positions mean. If a learner invents missing observations, record the gap honestly rather than treating it as zero.

Close: ask "What does your answer mean? How could you check it?" Record the exact item, observed evidence, access supports, any mathematical hint, and the next step. An unanswered item stays N/O.

Early-finisher or next-session challenge: Choose a different consistent vertical scale for the same data and explain why visual steepness changes while numerical differences do not. Explain why a graph does not establish a cause for a change.

TEACHER GUIDE

I Do | teaching moves

Bank: M05-M08 and O05-O08. Suggested selected-core time: 12 minutes; use fewer items if needed.

Launch (first 2 minutes). Say: "Our goal is to explain how we know. Today we will use time and measurement together." Ask learners to name the information and what must be found.

Model or confer (next 3-4 minutes). Say: "How does the number of blocks in a box change each minute? Our demonstration table is minute 0: 2, minute 1: 4, minute 2: 3, minute 3: 6, minute 4: 6. I pair each minute with its count, plot (0,2),(1,4),(2,3),(3,6),(4,6), and connect consecutive times. From minute 1 to 2 the count decreases by 1. The flat last segment means no change between the two recorded counts. These are instructional data; actual collection comes later."

Practice (remaining work time). Select O05. Invite a learner to explain a step, then have everyone represent it independently.

Listen and look for: Observe the learner asking a time-changing question, collecting actual nonpersonal observations, creating a line graph, and interpreting a change. Supplied tables cannot substitute for evidence of collection.

If the response reveals confusion: If points are equally spaced vertically despite unequal values, trace the numerical scale from zero. If categorical answers are connected as a time series, ask what the horizontal positions mean. If a learner invents missing observations, record the gap honestly rather than treating it as zero.

Close: ask "What does your answer mean? How could you check it?" Record the exact item, observed evidence, access supports, any mathematical hint, and the next step. An unanswered item stays N/O.

Early-finisher or next-session challenge: Choose a different consistent vertical scale for the same data and explain why visual steepness changes while numerical differences do not. Explain why a graph does not establish a cause for a change.

TEACHER GUIDE

We Do | teaching moves

Bank: M09-M13 and O09-O13. Suggested selected-core time: 15 minutes; use fewer items if needed.

Launch (first 2 minutes). Say: "Our goal is to explain how we know. Today we will use time and measurement together." Ask learners to name the information and what must be found.

Explore one item: M09. Read neutrally, allow thinking time, then ask: "Which information supports your choice? Show where you used it." Keep the key teacher-only. Do not show a solution before independent evidence.

Practice (remaining work time). Select O09. Invite a learner to explain a step, then have everyone represent it independently.

Listen and look for: Observe the learner asking a time-changing question, collecting actual nonpersonal observations, creating a line graph, and interpreting a change. Supplied tables cannot substitute for evidence of collection.

If the response reveals confusion: If points are equally spaced vertically despite unequal values, trace the numerical scale from zero. If categorical answers are connected as a time series, ask what the horizontal positions mean. If a learner invents missing observations, record the gap honestly rather than treating it as zero.

Close: ask "What does your answer mean? How could you check it?" Record the exact item, observed evidence, access supports, any mathematical hint, and the next step. An unanswered item stays N/O.

Early-finisher or next-session challenge: Choose a different consistent vertical scale for the same data and explain why visual steepness changes while numerical differences do not. Explain why a graph does not establish a cause for a change.

TEACHER GUIDE

Collaborative practice | teaching moves

Bank: M14-M18 and O14-O18. Suggested selected-core time: 13 minutes; use fewer items if needed.

Launch (first 2 minutes). Say: "Our goal is to explain how we know. Today we will use time and measurement together." Ask learners to name the information and what must be found.

Explore one item: M14. Read neutrally, allow thinking time, then ask: "Which information supports your choice? Show where you used it." Keep the key teacher-only. Do not show a solution before independent evidence.

Practice (remaining work time). Select O14. Partners take turns explaining; each learner creates their own response.

Listen and look for: Observe the learner asking a time-changing question, collecting actual nonpersonal observations, creating a line graph, and interpreting a change. Supplied tables cannot substitute for evidence of collection.

If the response reveals confusion: If points are equally spaced vertically despite unequal values, trace the numerical scale from zero. If categorical answers are connected as a time series, ask what the horizontal positions mean. If a learner invents missing observations, record the gap honestly rather than treating it as zero.

Close: ask "What does your answer mean? How could you check it?" Record the exact item, observed evidence, access supports, any mathematical hint, and the next step. An unanswered item stays N/O.

Early-finisher or next-session challenge: Choose a different consistent vertical scale for the same data and explain why visual steepness changes while numerical differences do not. Explain why a graph does not establish a cause for a change.

TEACHER GUIDE

Independent practice | teaching moves

Bank: M19-M23 and O19-O23. Suggested selected-core time: 17 minutes; use fewer items if needed.

Launch (first 2 minutes). Say: "Our goal is to explain how we know. Today we will use time and measurement together." Ask learners to name the information and what must be found.

Explore one item: M19. Read neutrally, allow thinking time, then ask: "Which information supports your choice? Show where you used it." Keep the key teacher-only. Do not show a solution before independent evidence.

Practice (remaining work time). Select O19. Complete the response individually, then explain a representation or equation.

Listen and look for: Observe the learner asking a time-changing question, collecting actual nonpersonal observations, creating a line graph, and interpreting a change. Supplied tables cannot substitute for evidence of collection.

If the response reveals confusion: If points are equally spaced vertically despite unequal values, trace the numerical scale from zero. If categorical answers are connected as a time series, ask what the horizontal positions mean. If a learner invents missing observations, record the gap honestly rather than treating it as zero.

Close: ask "What does your answer mean? How could you check it?" Record the exact item, observed evidence, access supports, any mathematical hint, and the next step. An unanswered item stays N/O.

Early-finisher or next-session challenge: Choose a different consistent vertical scale for the same data and explain why visual steepness changes while numerical differences do not. Explain why a graph does not establish a cause for a change.

TEACHER GUIDE

Small-group reteach | teaching moves

Bank: M24-M27 and O24-O27. Suggested selected-core time: 10 minutes; use fewer items if needed.

Launch (first 2 minutes). Say: "Our goal is to explain how we know. Today we will use time and measurement together." Ask learners to name the information and what must be found.

Explore one item: M24. Read neutrally, allow thinking time, then ask: "Which information supports your choice? Show where you used it." Keep the key teacher-only. Do not show a solution before independent evidence.

Practice (remaining work time). Select O24. Invite a learner to explain a step, then have everyone represent it independently.

Listen and look for: Observe the learner asking a time-changing question, collecting actual nonpersonal observations, creating a line graph, and interpreting a change. Supplied tables cannot substitute for evidence of collection.

If the response reveals confusion: If points are equally spaced vertically despite unequal values, trace the numerical scale from zero. If categorical answers are connected as a time series, ask what the horizontal positions mean. If a learner invents missing observations, record the gap honestly rather than treating it as zero.

Close: ask "What does your answer mean? How could you check it?" Record the exact item, observed evidence, access supports, any mathematical hint, and the next step. An unanswered item stays N/O.

Early-finisher or next-session challenge: Choose a different consistent vertical scale for the same data and explain why visual steepness changes while numerical differences do not. Explain why a graph does not establish a cause for a change.

TEACHER GUIDE

Exit ticket | teaching moves

Bank: M28-M30 and O28-O30. Suggested selected-core time: 5 minutes; use fewer items if needed.

Launch (first 2 minutes). Say: "Our goal is to explain how we know. Today we will use time and measurement together." Ask learners to name the information and what must be found.

Explore one item: M28. Read neutrally, allow thinking time, then ask: "Which information supports your choice? Show where you used it." Keep the key teacher-only. Do not show a solution before independent evidence.

Practice (remaining work time). Select O28. Complete the response individually, then explain a representation or equation.

Listen and look for: Observe the learner asking a time-changing question, collecting actual nonpersonal observations, creating a line graph, and interpreting a change. Supplied tables cannot substitute for evidence of collection.

If the response reveals confusion: If points are equally spaced vertically despite unequal values, trace the numerical scale from zero. If categorical answers are connected as a time series, ask what the horizontal positions mean. If a learner invents missing observations, record the gap honestly rather than treating it as zero.

Close: ask "What does your answer mean? How could you check it?" Record the exact item, observed evidence, access supports, any mathematical hint, and the next step. An unanswered item stays N/O.

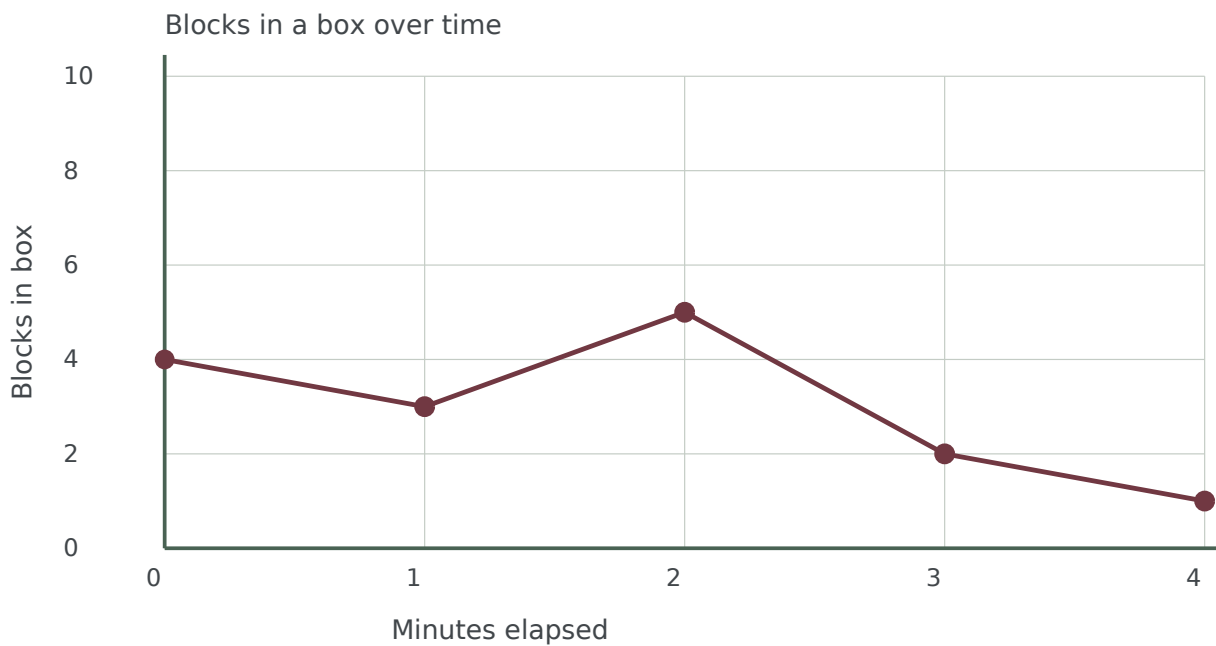
Early-finisher or next-session challenge: Choose a different consistent vertical scale for the same data and explain why visual steepness changes while numerical differences do not. Explain why a graph does not establish a cause for a change.

STUDENT TASK • MULTIPLE CHOICE

M01 | Warm-up

Target: Interpret values, changes, and limits of a time-series line graph.

The graph shows a pretend block collection. How does the number of blocks change from minute 1 to minute 2?



- A. 3 more blocks
- B. 2 more blocks
- C. 1 more blocks
- D. 2 fewer blocks

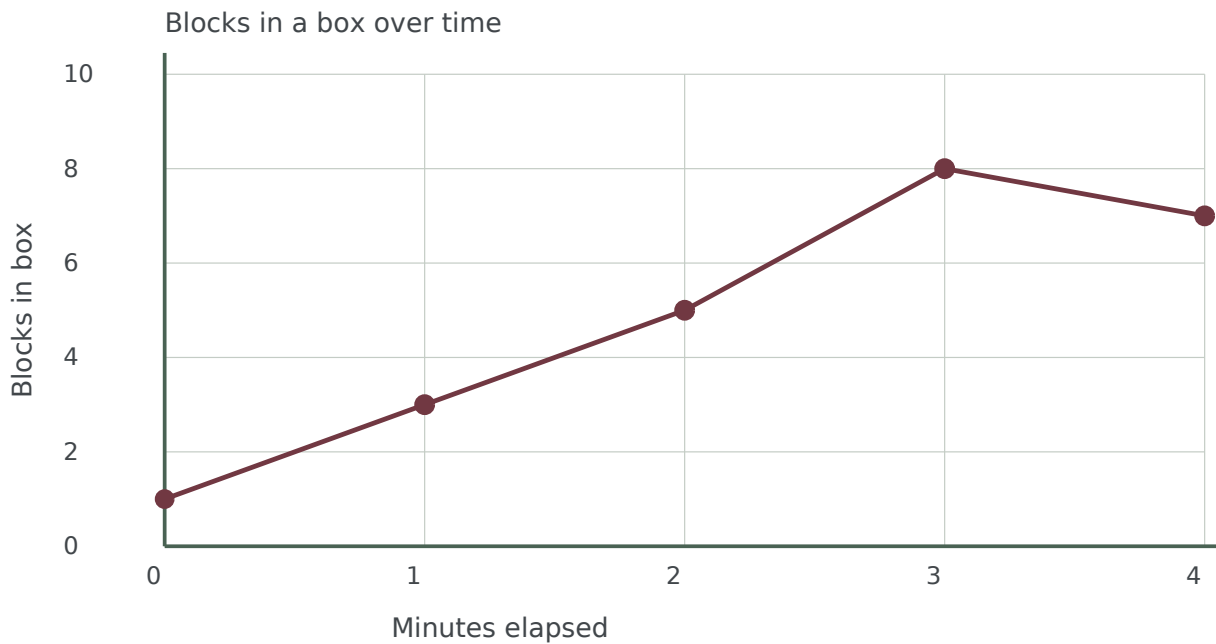
Reason for my choice:

STUDENT TASK • MULTIPLE CHOICE

M02 | Warm-up

Target: Interpret values, changes, and limits of a time-series line graph.

The graph shows a pretend block collection. How does the number of blocks change from minute 0 to minute 1?



- A. 3 more blocks
- B. 2 more blocks
- C. 1 fewer blocks
- D. 1 more blocks

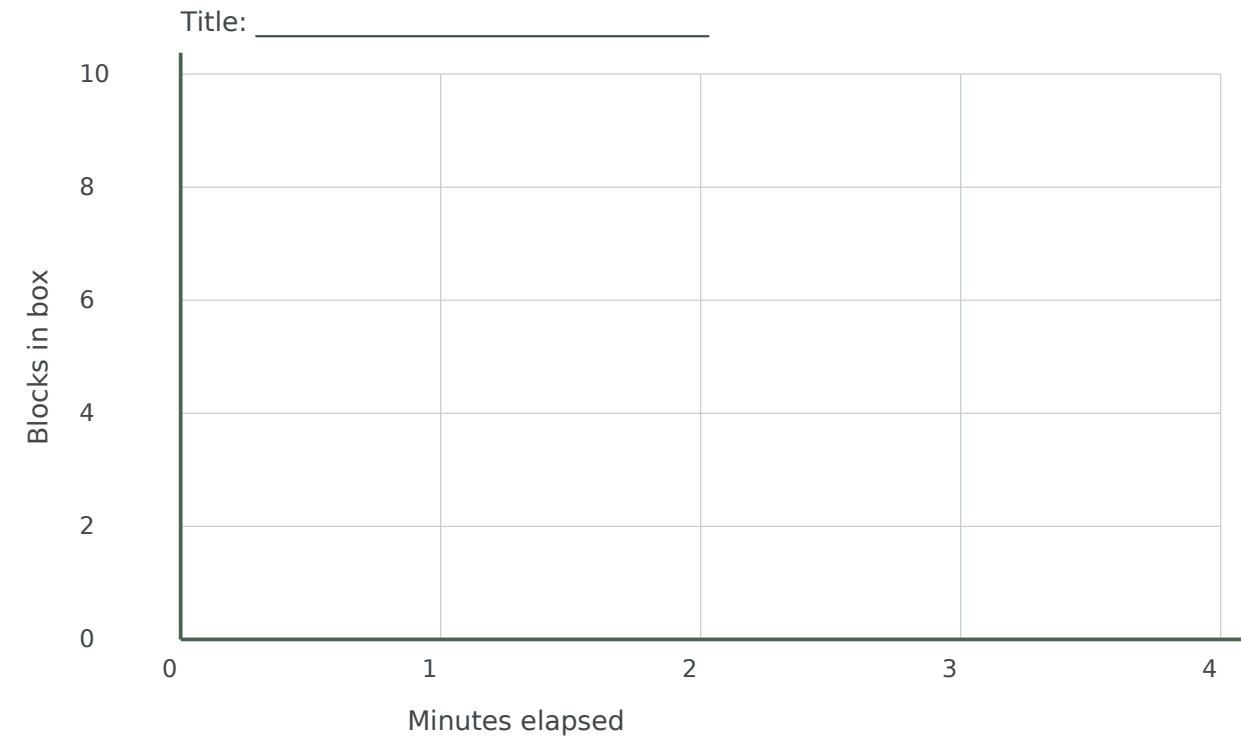
Reason for my choice:

STUDENT TASK • OPEN / PERFORMANCE

001 | Warm-up

Target: Make an accurate line graph with labels, equal intervals, and connected consecutive observations.

Instructional data: at minutes 0, 1, 2, 3, 4, a box holds 3, 7, 9, 8, 9 blocks. Title the graph, plot all observations, and connect consecutive points. Describe one change using both times and values.



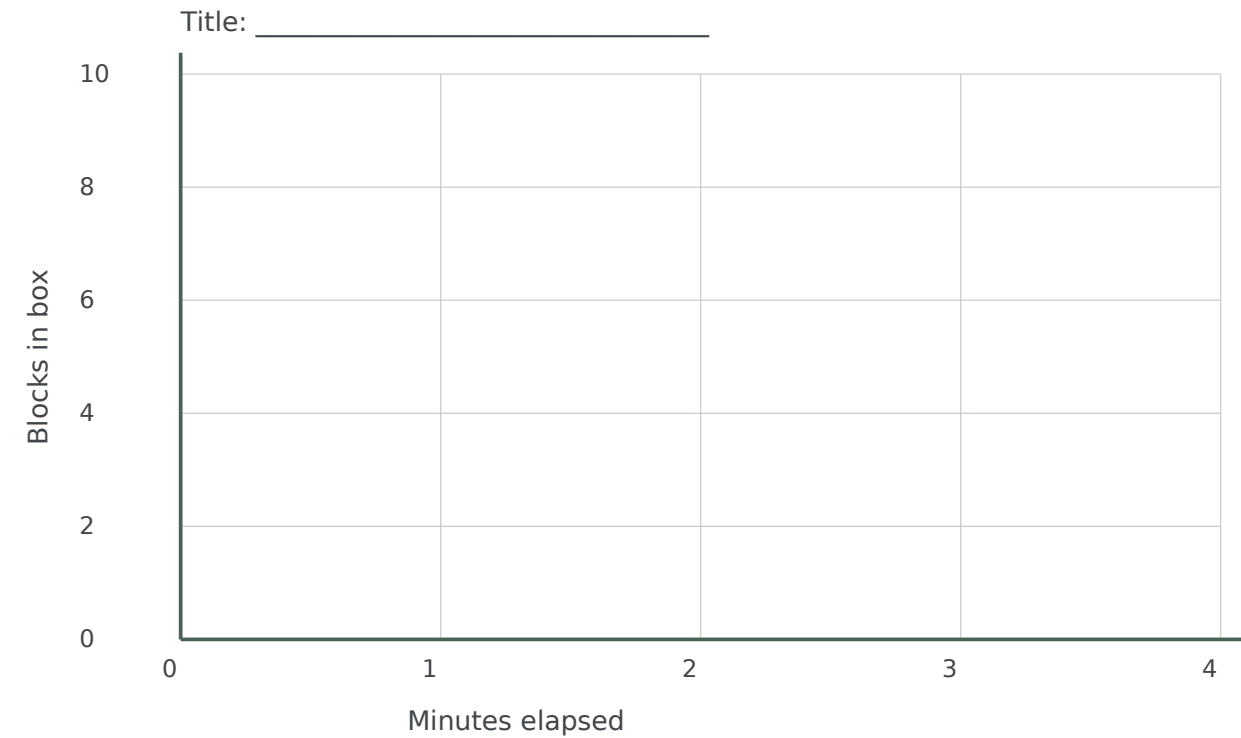
My reasoning / work / interpretation:

STUDENT TASK • OPEN / PERFORMANCE

002 | Warm-up

Target: Make an accurate line graph with labels, equal intervals, and connected consecutive observations.

Instructional data: at minutes 0, 1, 2, 3, 4, a box holds 2, 6, 8, 7, 9 blocks. Title the graph, plot all observations, and connect consecutive points. Describe one change using both times and values.



My reasoning / work / interpretation:

TEACHER ONLY • KEEP SEPARATE FROM STUDENT PAGES

M worked keys 01-03

M01 | B. 2 more blocks

Compare 3 with 5. The difference is 2; there are 2 more blocks. Distractor checks: 3 more blocks: Counts tick marks rather than intervals. 1 more blocks: Counts labeled grid steps as single blocks. 2 fewer blocks: Reverses the direction of change.

Diagnostic check: ask the learner to reconstruct the answer before assigning a misconception. An incorrect option can reflect a scale/order/unit error, arithmetic slip, or incomplete reading; the choice alone does not identify the cause.

M02 | B. 2 more blocks

Compare 1 with 3. The difference is 2; there are 2 more blocks. Distractor checks: 3 more blocks: Reports the final count instead of the difference. 1 fewer blocks: Reports the initial count with the wrong direction. 1 more blocks: Reports the initial count instead of the difference.

Diagnostic check: ask the learner to reconstruct the answer before assigning a misconception. An incorrect option can reflect a scale/order/unit error, arithmetic slip, or incomplete reading; the choice alone does not identify the cause.

M03 | C. 2 more blocks

Compare 5 with 7. The difference is 2; there are 2 more blocks. Distractor checks: 12 more blocks: Adds the two observations instead of comparing them. 1 more blocks: Counts labeled grid steps instead of block units. 7 fewer blocks: Reports the final count and reverses direction.

Diagnostic check: ask the learner to reconstruct the answer before assigning a misconception. An incorrect option can reflect a scale/order/unit error, arithmetic slip, or incomplete reading; the choice alone does not identify the cause.

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O worked keys 01-03

001 | Sample / criteria

Plot (0, 3), (1, 7), (2, 9), (3, 8), (4, 9). Connect only consecutive observations with straight segments; title: Blocks in a box over time. From minute 0 to 1, the count changes from 3 to 7: increases by 4. Other accurately described intervals are valid. Lines show change between recorded times; they do not prove exact unobserved counts.

002 | Sample / criteria

Plot (0, 2), (1, 6), (2, 8), (3, 7), (4, 9). Connect only consecutive observations with straight segments; title: Blocks in a box over time. From minute 0 to 1, the count changes from 2 to 6: increases by 4. Other accurately described intervals are valid. Lines show change between recorded times; they do not prove exact unobserved counts.

003 | Sample / criteria

One-time numerical. The question asks for numbers at one time. A valid new question names the same measurable quantity, unit, and repeated observation times; for example, "How many of these objects are in the box at the end of each minute?" For a plant, measure the same plant height in cm each day; for reading, pages completed each day. Distinguish numerical data type from the time-changing collection design.