

NORTH CAROLINA MATHEMATICS

Grade 6 | Ratio reasoning

Use equivalent ratios



NC.6.RP.3 | Ratios and proportional relationships

Teacher guide, original student tasks, model organizers, worked answers and performance evidence records.

Reusable bank: 30 multiple-choice + 30 open/performance tasks. Seven instructional sections; select a small core across several lessons.

Aligned to current NC standards used in 2026-27 and 2027-28. The standards adopted in 2026 for 2028-29 are not substituted here.

Free sample | Contents

NC.6.RP.3 | Sixth Grade mathematics

This sample contains 10 complete selected pages from the 62-page resource, plus this sample contents page. Original printed page numbers are retained. Gaps are intentional.

Included original pages: 1-9, 45

Representative activities

M01: sample PDF page(s) 9; original page(s) 8

M02: sample PDF page(s) 10; original page(s) 9

O01: sample PDF page(s) 9; original page(s) 8

O02: sample PDF page(s) 10; original page(s) 9

Selected teacher prompts and keys: original page(s) 45

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

Contents and exact standard

Use ratio reasoning with equivalent whole-number ratios to solve real-world and mathematical problems by:

- Creating and using a table to compare ratios.
- Finding missing values in the tables.
- Using a unit ratio.
- Converting and manipulating measurements using given ratios.
- Plotting the pairs of values on the coordinate plane.

Navigation

Pages 3-6: targets, planning, worked models and reusable organizer. Seven teacher-section pages each precede their paired student task pages. After the bank: complete worked keys, scoring record, differentiation and sources. Each student page has a recognition task and a different performance task.

Suggested core: use the first M and O in each section, plus targeted items needed for uncovered targets. Use remaining tasks across later practice and conferences. A 60-item bank is not a single test.

Print only selected student task pages. Keep teaching examples and worked keys separate from independent assessment. All contexts and data are invented for instruction.

TEACHER GUIDE

Targets and implementation

A | I can create tables and compare ratios.

B | I can find missing values in ratio tables.

C | I can use a unit ratio to solve a problem.

D | I can convert measurements using a given ratio.

E | I can plot pairs from equivalent whole-number ratios.

Prerequisites and materials

Whole-number multiplication/division, fraction meaning, equivalent fractions and reading labelled tables. Paper, pencil, ruler and optional large paper counters. This packet supplies blank model boxes and a reusable table/double-line organizer. Coordinate grids are included for graph tasks. Calculators may check arithmetic after reasoning is shown; record their use.

Plan three or more sessions

Session 1 (25-35 min): warm-up, teacher model and selected We Do tasks. Session 2 (25-35 min): collaborative and independent tasks. Session 3 (20-30 min): misconception-based reteach and exit tasks. Expand time for explanation and models; no fixed speed cutoff.

Collect evidence

Record the actual representation, calculation, units and explanation for each target. Recognition alone does not demonstrate modeling. Ask: Which quantities are compared? What is one unit? What stays constant? Why does the result make sense?

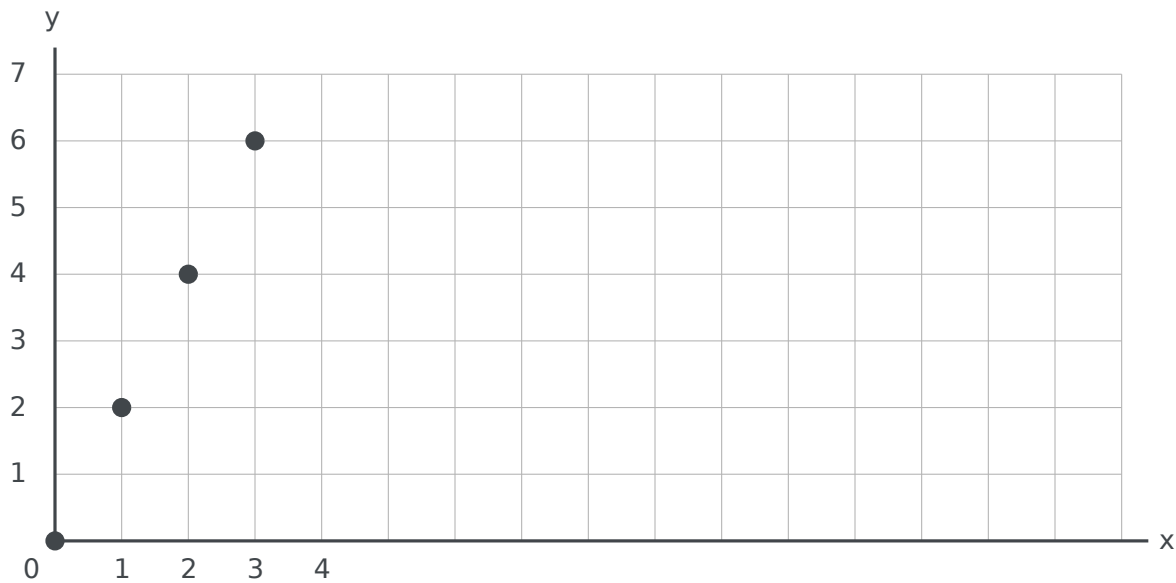
TEACHER MODEL

Think aloud and connect

Two markers in each box

Say: “The unit ratio is 2 markers per box. I multiply both columns by the same factor. At 3 boxes there are 6 markers. With x = boxes and y = markers, the pairs are $(0,0)$, $(1,2)$, $(2,4)$, $(3,6)$. A table for 3 markers per box has $(1,3)$, $(2,6)$, $(3,9)$, so that rate is larger. Equal box counts let us compare fairly.”

Boxes (x)	Markers (y)
0	0
1	2
2	4
3	6



TEACHER MODEL

From a model to an explanation

Conversion example: given 1 yard = 3 feet, build rows (yards,feet): (1,3),(2,6),(5,15). Five yards equals 15 feet. Reversing the ratio gives $\frac{1}{3}$ yard per foot, so 15 feet divided by 3 returns 5 yards. Use only the supplied conversion facts; do not assume students memorized them.

Teacher questions and anticipated responses

Ask: “What is being held constant?” Expect the multiplicative relationship or the part-to-whole relationship, rather than the numerical difference. Ask: “Where is one unit in your model?” Have the student point and label it. Ask: “Can a second representation show the same relationship?” Require the same quantities and units in both.

Respond to an additive error

Say: “Show one complete batch or one percent unit. Now make two copies without changing what is inside a copy.” Compare that model with adding the same number to both quantities. Record the support and use a fresh item afterward.

Do not supply the performance answer

During independent work, read wording neutrally and clarify vocabulary without choosing a ratio direction, a multiplier, a benchmark, a table entry or a graph scale. Demonstrating any of these is answer-supplying support; record it and reassess later.

Reasoning extension

Across two sessions, invent a realistic relationship, represent it two ways, and ask a partner to identify an incorrect row or claim. Revise the wording after feedback. Evaluate the explanation and consistency, not the decoration.

REUSABLE STUDENT ORGANIZER

Name quantities before calculating

Name: _____ Date: _____

Quantities and units: _____

Quantity 1: _____	Quantity 2: _____



Equation, matching units and explanation

TEACHER | Warm-up

Warm-up plan

Activate prior meaning

Bank allocation: M01-M04 and O01-O04. Selected core: M01 and O01; replace or add items for a target needing evidence.

0-2 min | Ask learners to name the two quantities before comparing. Give individual think time, then invite a description with “for every.”

2-6 min | Say: “Identify the quantities and units. Show the relationship with a model or table. Explain why your calculation matches that relationship.” Allow oral, signed or dictated explanations.

6-10 min | Confer: “What would stay the same if the batch or whole changed? Show where your answer appears in your model.” Ask for a different representation only after the first is complete.

Core performance focus: Find missing values in ratio tables.

Look for: 5 pencils per bag. $4 \times 5 = 20$ pencils. Completed rows: (2,10), (4,20), (6,30).

If reasoning breaks down: return to one labelled unit or one complete batch. Distinguish a quantity from its unit. Do not tell the learner the missing multiplier during the independent check.

Early finisher: create a new example with different quantities and verify it with a second representation. Record date, item, actual evidence, access support and next teaching step. Shorten this section for an exit ticket; timing is flexible.

WARM-UP

M01 + O01 | Student tasks

Name: _____ Date: _____

M01 | Target D

Given 1 liter = 1000 milliliters, how many milliliters equal 6 liters?

- A. 4800
- B. 2400
- C. 3600
- D. 6000

O01 | Target B | Show your reasoning

A supply table pairs bags and pencils: (2,10), (4,?), (?,30). Complete both missing entries. Build and label a table, then explain how the same ratio holds in every row.

Model / table / calculation**Answer with units and explanation**

WARM-UP

M02 + 002 | Student tasks

Name: _____ Date: _____

M02 | Target C

5 identical notebooks cost \$40. At the same price per notebook, what is the cost in dollars of 8 notebooks?

A. 64

B. 52

C. 40

D. 76

002 | Target D | Show your reasoning

Given 1 hour = 60 minutes, how many minutes equal 5 hours? Show a ratio table or labelled diagram. Then convert your answer back to the original unit to check it.

Model / table / calculation**Answer with units and explanation**

TEACHER ONLY | WORKED KEYS

Items 01-02

M01 | D. 6000

Use the given ratio 1000 milliliters per liter. $6 \times 1000 = 6000$; equivalently $6000 \div 1000 = 6$. Answer: 6000 milliliters.

Check alternatives: A: 4800; B: 2400; C: 3600. Compare each with the worked relationship above; none satisfies it.

Diagnostic check: Track the common multiplier, table-column order and requested output unit. A swapped coordinate or added amount does not preserve the requested relationship.

001 | Sample complete response

5 pencils per bag. $4 \times 5 = 20$ pencils. Completed rows: (2,10), (4,20), (6,30).

M02 | A. 64

Unit ratio: $40/5 = 8$ dollars/notebook. Multiply $8 \times 8 = 64$ dollars.

Check alternatives: B: 52; C: 40; D: 76. Compare each with the worked relationship above; none satisfies it.

Diagnostic check: Track the common multiplier, table-column order and requested output unit. A swapped coordinate or added amount does not preserve the requested relationship.

002 | Sample complete response

Use the given ratio 60 minutes per hour. $5 \times 60 = 300$; equivalently $300 \div 60 = 5$. Answer: 300 minutes.