

Teacher guide · Find and interpret per one

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Target

Find a requested unit rate and explain which quantity is measured per one of the other quantity.

Fit and entry

A bounded U.S. Grade 6 mathematics supplement, not a full ratios course. Local grade fit depends on the prerequisites below.

Name both quantities in a ratio in the intended order, make equivalent labeled pairs by scaling both quantities, divide whole numbers, and read a simple fraction as division. RR02 supplies ratio-language and equivalent-group work.

Materials

Paper and pencil. Optional counters for equal groups. No device, purchase, account or email is needed.

Teaching sequence

1. Start Here maps RR02 prerequisite → RR03 interpretation → RR04 comparison. A teacher may enter at RR04 only when per-one meaning and units are already secure.
2. Print readiness alone before any model, glossary or lesson. If prerequisite reasoning is insecure, teach RR02/RR03 as appropriate. Readiness is a routing conversation, not a diagnostic score.
3. Teach the model and guided page. Then give only the separate check file; provide no intended keys. Lesson and check use different stimuli.
4. Use the teacher criteria and response patterns; choose one supplied route and document why. Provide only that route page.
5. Reserve fresh recheck, later revisit and transfer selections. Their changed contexts/data are separate stimuli, not calibrated alternate forms. If shown before collection, label the later response practice.
6. Use fresh recheck after teaching, later revisit after another learning opportunity, then transfer. Record actual exposure, tools and response conditions locally.

Print and exposure · RR03

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Select files, not a full student packet

Every student file is separate. Give readiness page 1 alone before models, lesson or glossary. Teach-lesson page 1 supplies the model/M1; page 2 supplies G1/G2. Check-only pages 1 and 2 supply C1/C2 and contain no model or intended key.

Give only the chosen route file, page 1. Keep fresh-recheck pages 1–2, later-revisit pages 1–2 and transfer page 1 out of sight until their collection. Do not send the classroom ZIP or teacher guide to students. It contains teacher keys and all reserved tasks.

Exposure matters

The fresh/revisit/transfer tasks have new data or contexts; they are not calibrated equivalent forms. If a learner has seen a task, a model that answers it, or its key, record that exposure and use the response as practice. No repeated task is counted as fresh evidence.

Response criteria

Calculation: divides the requested numerator by its corresponding nonzero denominator.

Meaning: labels both quantities and identifies the quantity represented by 1.

Reason: explains equal groups, equivalent pairs or division with quantity meaning.

Condition: uses the supplied constant rate or equal-use assumption when extending.

Use criteria separately

Record calculation, quantity labels/direction, explanation and conditions separately. A correct bare number leaves meaning uncertain. A single arithmetic slip can coexist with sound rate reasoning. Use a tentative next step; do not make a summed mastery score or stable ability claim.

Choose a next move · continue

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Visible signal

C1 and C2 show requested units, direction and a defensible explanation.

Use RR03-N1 · student/route-continue page 1

Ask for the labeled rate and why it can be used for the new quantity.

After the move

Use an unused fresh recheck after the move. Describe calculation, units and explanation separately; choose the next move from visible evidence. If uncertainty remains, clarify conditions rather than infer stable ability.

Reserved evidence

Fresh-recheck page 1 is RR03-F1; page 2 is RR03-F2. Use both to examine the target components after a route. Later-revisit pages 1–2 are RR03-L1/L2. Transfer page 1 is RR03-T1. If evidence is still unclear, clarify or reteach and document what remains uncertain.

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Choose a next move · clarify

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Visible signal

A blank, unreadable or number-only answer leaves language, response mode or direction uncertain.

Use RR03-Q1 · student/route-clarify page 1

Read the task neutrally or allow an oral/labeled drawing response; ask what the 1 names. Supply no calculation or choice. Record the changed conditions.

After the move

Use an unused fresh recheck after the move. Describe calculation, units and explanation separately; choose the next move from visible evidence. If uncertainty remains, clarify conditions rather than infer stable ability.

Reserved evidence

Fresh-recheck page 1 is RR03-F1; page 2 is RR03-F2. Use both to examine the target components after a route. Later-revisit pages 1–2 are RR03-L1/L2. Transfer page 1 is RR03-T1. If evidence is still unclear, clarify or reteach and document what remains uncertain.

Choose a next move · reteach

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Visible signal

Clarification still shows reversed units or dividing without making the requested denominator 1.

Use RR03-R1 · student/route-reteach page 1

Teach with the supplied equal-group/table task. Keep both quantities named. If the prerequisite remains insecure, use RR02 labeled groups before RR03.

After the move

Use an unused fresh recheck after the move. Describe calculation, units and explanation separately; choose the next move from visible evidence. If uncertainty remains, clarify conditions rather than infer stable ability.

Reserved evidence

Fresh-recheck page 1 is RR03-F1; page 2 is RR03-F2. Use both to examine the target components after a route. Later-revisit pages 1–2 are RR03-L1/L2. Transfer page 1 is RR03-T1. If evidence is still unclear, clarify or reteach and document what remains uncertain.

Choose a next move · extend

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Visible signal

The learner explains both directions and is ready to examine a fresh fractional-rate error.

Use RR03-X1 · student/route-extend page 1

Ask for exact fractions or an equivalent common-quantity argument; ask how reversing direction changes the interpretation.

After the move

Use an unused fresh recheck after the move. Describe calculation, units and explanation separately; choose the next move from visible evidence. If uncertainty remains, clarify conditions rather than infer stable ability.

Reserved evidence

Fresh-recheck page 1 is RR03-F1; page 2 is RR03-F2. Use both to examine the target components after a route. Later-revisit pages 1–2 are RR03-L1/L2. Transfer page 1 is RR03-T1. If evidence is still unclear, clarify or reteach and document what remains uncertain.

Answer guidance · RR03 · 1

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RR03-S1 · readiness

Task: A club puts 12 cards into 3 equal packs. Write cards:packs in that order. How many cards are in each equal pack? Explain how both quantities change when you describe 1 pack.

Defensible answer: 12:3; 4 cards per pack. Divide 12 cards and 3 packs by 3 to obtain 4 cards and 1 pack.

Accept: Labeled equal groups, a ratio table or $12 / 3 = 4$ with the pack meaning.

Notice: Separate quantity order, equal-sharing meaning and arithmetic.

RR03-M1 · model

Task: Use the pump model. Explain why 5 liters per minute and $1/5$ minute per liter can both be correct. Which answers the question How many liters in one minute?

Defensible answer: 5 liters per minute answers the stated question; $1/5$ minute per liter answers time for one liter. Both describe the same stated constant rate in opposite directions.

Accept: A labeled explanation or table that connects 5 liters with 1 minute.

Notice: A model response is teaching evidence, never an independent check.

Answer guidance · RR03 · 2

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RR03-G1 · guided

Task: At a constant rate a printer makes 24 labels in 4 minutes. Find labels per minute. First name the quantity that must become 1, then divide both quantities.

Defensible answer: 6 labels per minute; 4 minutes becomes 1 minute by dividing by 4; 24 labels divided by 4 = 6.

Accept: Equal groups or a labeled table.

Notice: Does 1 attach to minute rather than label?

RR03-G2 · guided

Task: A dispenser pours 3 liters in 4 minutes at a constant rate. Find liters per minute. Write a fraction and explain its meaning. Could this be described as $\frac{4}{3}$ liters per minute? Explain.

Defensible answer: $\frac{3}{4}$ liter per minute. Each minute corresponds to $\frac{3}{4}$ liter. $\frac{4}{3}$ is minutes per liter, not liters per minute.

Accept: 0.75 liter per minute or a labeled fraction/table; decimal notation is acceptable but not required.

Notice: Fractions are meaningful for volume; do not require decimal conversion.

Answer guidance · RR03 · 3

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RR03-C1 · independent check

Task: A machine produces 35 stickers in 5 minutes at a constant rate. Find stickers per minute and explain the meaning of your answer. Show why your operation matches the requested units.

Defensible answer: 7 stickers per minute. Divide 35 stickers by 5 minutes; the equivalent pair is 7 stickers in 1 minute.

Accept: A labeled table, equal time groups or a clear equation and sentence.

Notice: Correct number without units does not establish direction.

RR03-C2 · independent check

Task: At a constant rate a hose supplies 5 liters in 2 minutes. Find liters per minute. Then find minutes per liter. Explain why the unit labels differ.

Defensible answer: $\frac{5}{2}$ ($2\frac{1}{2}$) liters per minute and $\frac{2}{5}$ minute per liter. The first describes water in 1 minute; the second time for 1 liter.

Accept: 2.5 liters per minute and 0.4 minute per liter; correctly labeled reciprocal relationships.

Notice: Do not treat an inversion as merely a division slip.

Answer guidance · RR03 · 4

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RR03-N1 · continue

Task: A conveyor carries 27 boxes in 9 minutes at a constant rate. Find boxes per minute. At that same rate, how many boxes pass in 4 minutes? Explain.

Defensible answer: 3 boxes per minute and 12 boxes in 4 minutes.

Accept: Equivalent labeled pairs or multiplication after a correct unit rate.

Notice: Continue when labels, direction and explanation in the check are secure.

RR03-Q1 · clarify

Task: A cart travels 18 meters in 3 seconds at a constant speed. Find meters per second. Explain in words or a labeled drawing what the 1 means.

Defensible answer: 6 meters per second; the 1 is 1 second.

Accept: Read-aloud/oral/drawing response with the same mathematics.

Notice: This alternate response helps clarify an ambiguous or blank response; record support used.

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Answer guidance · RR03 · 5

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RR03-R1 · reteach

Task: At a constant rate, a machine fills 16 liters in 4 minutes. Draw four equal time groups, label each group 1 minute, and share the 16 liters equally among them. State liters per minute. Then describe what changes in both quantities when 4 minutes becomes 1 minute.

Defensible answer: Each group is 4 liters in 1 minute; divide both quantities by 4.

Accept: Four labeled groups or a matching ratio table.

Notice: Prompt meaning before procedure; if ratio labels/equal groups remain insecure use RR02.

RR03-X1 · extend

Task: A fictional response says: 7 liters in 3 minutes means $\frac{3}{7}$ liters per minute. At a constant rate, correct the units or number and explain both directions. Which quantity can be 1 in each statement?

Defensible answer: $\frac{7}{3}$ liters per minute (1 minute); $\frac{3}{7}$ minute per liter (1 liter). The fictional response reversed the direction.

Accept: Mixed number $2\frac{1}{3}$ for $\frac{7}{3}$; either correct unit relabeling or complete paired statements with explanation.

Notice: Extension deepens direction and non-integer reasoning, not speed.

Answer guidance · RR03 · 6

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RR03-F1 · fresh recheck

Task: A scanner reads 28 pages in 7 minutes at a constant rate. Find pages per minute. Explain which quantity becomes 1 and what your answer means.

Defensible answer: 4 pages per minute; 1 minute; 4 pages scanned each minute.

Accept: Labeled table/equal groups or explanatory equation.

Notice: Reserve until after the chosen route; if shown earlier use as practice.

RR03-F2 · fresh recheck

Task: A valve releases 7 liters in 4 minutes at a constant rate. Find liters per minute and minutes per liter. Explain the difference.

Defensible answer: $\frac{7}{4}$ liters per minute and $\frac{4}{7}$ minute per liter.

Accept: $1\frac{3}{4}$ liters per minute; clear correctly labeled reciprocal explanation.

Notice: Checks fraction direction with fresh data; not a calibrated equivalent form.

Answer guidance · RR03 · 7

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RR03-L1 · later revisit

Task: A belt moves 32 centimeters in 8 seconds at a constant speed. Find centimeters per second and explain the meaning.

Defensible answer: 4 centimeters per second. Each second corresponds to 4 centimeters.

Accept: Correct labeled equation/table.

Notice: Collect after another learning opportunity with no prior solutions visible.

RR03-L2 · later revisit

Task: A sprayer uses 11 liters in 5 minutes at a constant rate. Find liters per minute. A fictional note says 5/11 liters per minute. Explain the error.

Defensible answer: $11/5$ liters per minute ($2 \frac{1}{5}$); $5/11$ would be minutes per liter.

Accept: A correctly labeled 2.2 liters per minute plus direction explanation.

Notice: Use new context/data to revisit direction; this is not empirical retention evidence.

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Answer guidance · RR03 · 8

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RR03-T1 · transfer

Task: A craft station uses 18 meters of ribbon for 6 identical banners, with no waste. Find meters per banner. How much ribbon is needed for 4 identical banners? State the assumption that lets you use the same rate.

Defensible answer: 3 meters per banner; 12 meters for 4 banners. Each banner uses the same amount and no waste is included.

Accept: Equivalent labeled ratios or multiplication using 3 meters per banner.

Notice: Notice whether the learner carries the condition into a new setting.

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Supports and boundaries

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Preserve the learning target

Reading or written-language load: Read task words without explaining the rate, allow oral explanations or labeled diagrams; offer sentence frame ____ units of ____ for each 1 _____. Keep constant: The rate, requested direction and comparison goal stay unchanged. Limit: Record the response mode and assistance; supported work is not evidence of unaided reading/writing.

Arithmetic blocks rate meaning: Separate reasoning from computation. First ask the learner to label the division and the quantity represented by 1. If using a calculator, record it. Keep constant: The learner must choose the correct division/direction and interpret units. Limit: Calculator-supported responses do not establish unaided arithmetic fluency.

Ratio prerequisite or per-one meaning: Use RR02 labeled complete groups for ratio order/scaling, then RR03 equal-time/equal-item groups before RR04 comparisons. Keep constant: Return to the original target only after prerequisite support. Limit: Do not interpret an unfinished higher-target task as stable inability.

Scope

Interpret per one, preserve direction and units, compare on the same basis, explain ties and missing information, and apply a stated constant rate. No percent, measurement conversion, coordinate graphing, complex fractions or complete proportionality course.

Standards fit

6.RP.A.2, selected 6.RP.A.3b. RR03 addresses unit-rate meaning and language; RR04 addresses selected comparison and unit-pricing/constant-rate problems. These materials do not assess the whole standard or establish course alignment.

<https://www.thecorestandards.org/Math/Content/6/RP/>

Provenance and use

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Original materials

All tasks, fictional responses and contexts are original instructional authoring for this commission. Numerical data are constructed, not measured observations.

Teachers may print, use and adapt these materials for their teaching. Retain Mentor Teaching attribution and identify local changes.

Native editable tables; no third-party images, copied worksheets or custom font assets. PDF exports use standard system-font subsets.

Source ledger

OWNER-COMMISSION-20260930: Bounded collection architecture and independent-AI review workflow.

CCSS-6-RP: Scope/grade-fit reference; tasks and examples are original, not copied from the standard. <https://www.thecorestandards.org/Math/Content/6/RP/>

RR02-0.1.7: Read-only prerequisite source. Original source and 18 PDF/DOCX files unchanged; bundle uses 9 HTML variants with decorative response-line ARIA and small-screen reflow corrected. Instructional text and print/binary files preserved; original public files retained.

RR02-0.1.7-html-response-lines-r1: Nine HTML variants of accepted RR02 v0.1.7. Decorative response-line ARIA and small-screen reflow corrected; instructional text and print/binary files preserved. All 9 files include screen-only CSS; 6 also change response-line ARIA. Original public files remain unchanged.

Factual limits

AI-authored. Review status and exact versions must be recorded separately. Classroom effectiveness, classroom timing, empirical assessment equivalence, Word/Google Docs behavior and assistive-technology use have not been established. Brief responses support a tentative teaching decision, not a diagnosis, stable ability rank or mastery score.

Keep the record local

Use shared/local-decision-record if helpful. Keep any student response information locally; do not submit names, work or records to the site. Public version and actual review status are recorded separately on the resource page.