Teacher guide · Compare unit rates on the same basis

Original core section · Compare unit rates · 1 of 16

Target

Choose a defensible comparison by finding rates with the same units and direction, then interpret the result for the stated goal.

Fit and entry

A short supplement for U.S. Grade 6 students learning to compare unit rates. Students should have 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. Equivalent ratios 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. Begin with Equivalent ratios for prerequisite work, then Find and interpret per one, then Compare unit rates. Begin with comparisons only when students already understand per one and quantity units.

2. Give Readiness alone before any model, glossary or lesson. If prerequisite reasoning is unclear, use Equivalent ratios or Find and interpret per one as needed. Use the response to choose where to begin teaching.

3. Teach the model and guided page. Then give the separate Independent check file without the answer key. Lesson and check use different tasks.

4. Use the teacher guidance to choose one follow-up from the student’s response. Note why you chose it and give only that follow-up page.

5. Save the follow-up check, later revisit and application tasks until students are ready to try on their own. Their contexts and data differ, so the tasks may have different demands. If students have seen a task before, treat the response as practice.

6. Use the follow-up check after teaching, the later revisit after another learning opportunity, then the application task. Keep local notes on tasks already seen, tools and other support.

Printing and choosing tasks · Compare unit rates

Choose the student pages you need

Every student file is separate. Give readiness page 1 alone before models, lesson or glossary. Teach-lesson page 1 supplies the model/Worked example; page 2 supplies Guided task 1/Guided task 2. Check-only pages 1 and 2 supply Independent task 1/Independent task 2 and contain no model or intended key.

Give only page 1 of the chosen follow-up file. Save the follow-up check, later revisit and application tasks until students are ready to try on their own. Keep the classroom ZIP and teacher guide for teacher use; they contain answer keys.

When a student has already seen a task

The follow-up check, later revisit and application tasks use new data or contexts and may have different demands. If a student has seen a task, a worked example that answers it, or its answer key, note this and use the response as practice. Use a task the student has not seen to check their own reasoning.

Response criteria

Basis: uses the same units and direction for every compared rate, or explains a common-quantity comparison.

Calculation: finds each rate accurately with labeled quantities.

Decision: interprets higher output/speed or lower unit cost for the stated goal; accepts a tie.

Information: identifies the missing denominator and avoids ranking an incomplete rate.

Consider each part of the response

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

Choose a next move · continue · original core section 3 of 16

Student response

Independent task 1 and Independent task 2 show a shared basis, a goal-matched comparison, tie and missing-information reasoning.

Use Continue task · Continue file page 1

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

After the move

After teaching, use a follow-up check task the student has not seen. Note calculation, units and explanation separately, then choose the next teaching step from the response. If meaning remains unclear, ask for clarification before drawing a conclusion about the student’s understanding.

Checks after teaching

Follow-up check pages 1 and 2 contain Follow-up check tasks 1 and 2. Use both to examine the target components after a route. Later-revisit pages 1–2 are Later task 1/Later task 2. Transfer page 1 is Apply task. If evidence is still unclear, clarify or reteach and document what remains uncertain.

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Choose a next move · clarify

Choose a next move · clarify · original core section 4 of 16

Student response

The response is blank/ambiguous or a choice appears without comparable labeled rates.

Use Clarify task · Clarify file 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

After teaching, use a follow-up check task the student has not seen. Note calculation, units and explanation separately, then choose the next teaching step from the response. If meaning remains unclear, ask for clarification before drawing a conclusion about the student’s understanding.

Checks after teaching

Follow-up check pages 1 and 2 contain Follow-up check tasks 1 and 2. Use both to examine the target components after a route. Later-revisit pages 1–2 are Later task 1/Later task 2. Transfer page 1 is Apply task. If evidence is still unclear, clarify or reteach and document what remains uncertain.

Choose a next move · reteach

Choose a next move · reteach · original core section 5 of 16

Student response

After clarification the response still compares totals or mixes rate directions.

Use Follow-up task · Reteach file page 1

Teach with the supplied equal-group/table task. Keep both quantities named. If the prerequisite remains unclear, use Find and interpret per one per-one lesson before Compare unit rates.

After the move

After teaching, use a follow-up check task the student has not seen. Note calculation, units and explanation separately, then choose the next teaching step from the response. If meaning remains unclear, ask for clarification before drawing a conclusion about the student’s understanding.

Checks after teaching

Follow-up check pages 1 and 2 contain Follow-up check tasks 1 and 2. Use both to examine the target components after a route. Later-revisit pages 1–2 are Later task 1/Later task 2. Transfer page 1 is Apply task. If evidence is still unclear, clarify or reteach and document what remains uncertain.

Choose a next move · extend

Choose a next move · extend · original core section 6 of 16

Student response

The learner handles whole-number comparisons and boundaries; try an exact fraction comparison.

Use Extension task · Extend file page 1

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

After the move

After teaching, use a follow-up check task the student has not seen. Note calculation, units and explanation separately, then choose the next teaching step from the response. If meaning remains unclear, ask for clarification before drawing a conclusion about the student’s understanding.

Checks after teaching

Follow-up check pages 1 and 2 contain Follow-up check tasks 1 and 2. Use both to examine the target components after a route. Later-revisit pages 1–2 are Later task 1/Later task 2. Transfer page 1 is Apply task. If evidence is still unclear, clarify or reteach and document what remains uncertain.

Answer guidance · Compare unit rates · 1

Answer guidance · Compare unit rates · 1 · original core section 7 of 16

Readiness task

Task: A table lists 20 beads in 4 equal bags. Find beads per bag and explain what the 1 means. A second row says 6 beads per bag. Do these rows use the same units and direction?

Answer: 5 beads per bag; 1 bag; both rows use beads per bag.

Also accept: Labeled equal-sharing or table explanation.

Look for: This entry checks unit-rate prerequisite; use Find and interpret per one if it is unclear.

Worked example

Task: Use the pencil-stall model. Which stall has the lower dollars per pencil? Explain why a common basis matters.

Answer: Cedar at 2 dollars per pencil, compared with Maple at 3 dollars per pencil. Pack sizes differ, so total prices alone are not the needed comparison.

Also accept: Compare cost for a common number of pencils or pencils per dollar with the decision interpreted correctly.

Look for: Modeled answer is teaching, not an independent check.

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Answer guidance · Compare unit rates · 2

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Guided task 1

Task: Two machines work at constant rates. Machine A sorts 30 cards in 5 minutes. Machine B sorts 28 cards in 4 minutes. Which sorts more cards per minute? Name a common basis, calculate both rates, and compare.

Answer: A: 6 cards per minute; B: 7 cards per minute. B is faster despite its smaller total.

Also accept: Compare both over 20 minutes or minutes per card and interpret smaller time as faster.

Look for: Look for the totals trap and consistent direction.

Guided task 2

Task: At constant speeds cart A travels 12 meters in 4 seconds and cart B travels 15 meters in 5 seconds. Compare meters per second. Is there a faster cart in this model?

Answer: Both are 3 meters per second; tie.

Also accept: Common-time distances or correctly labeled reciprocal times.

Look for: Do not force a winner when rates are equal.

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Answer guidance · Compare unit rates · 3

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Independent task 1

Task: For identical notebooks with no fees, shop A charges 18 dollars for 6 notebooks; shop B charges 20 dollars for 5 notebooks. Which shop has the lower dollars per notebook? Show both rates and explain the comparison.

Answer: A: 3 dollars per notebook; B: 4 dollars per notebook. A has lower unit cost.

Also accept: Cost for a common number of notebooks or notebooks per dollar correctly interpreted.

Look for: Decision must match unit cost; no quality claim.

Independent task 2

Task: At constant rates sorter A handles 36 envelopes in 6 minutes, sorter B handles 24 envelopes in 4 minutes, and sorter C handles 40 envelopes but its time is not given. Compare A and B in envelopes per minute. Can you rank C against them? Explain what you need.

Answer: A and B each handle 6 envelopes per minute, so tie. C cannot be ranked without its elapsed time (or its unit rate). Its total 40 is insufficient.

Also accept: Common-time comparison with explicit missing time for C; possible examples show C could be faster/slower/tied.

Look for: Tie and insufficient information are separate judgments.

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Continue task

Task: Two constant-rate pumps fill water. Pump A fills 21 liters in 3 minutes; pump B fills 24 liters in 4 minutes. Which fills more liters in 2 minutes at its same rate? Explain using a common basis.

Answer: A: 7 liters per minute, 14 liters in 2 minutes; B: 6 liters per minute, 12 liters in 2 minutes. A fills more.

Also accept: Direct equivalent-pair comparison over 2 minutes.

Look for: Continue from secure basis and interpretation into a matched-time application.

Clarify task

Task: Machine A prints 16 tickets in 4 minutes; machine B prints 18 tickets in 3 minutes, each at a constant rate. Find tickets per minute for both. Explain orally, in writing or in a labeled table which is faster and why.

Answer: A: 4 tickets per minute; B: 6 tickets per minute; B is faster.

Also accept: A labeled table or oral explanation with the same mathematics.

Look for: Clarify response mode/task language without giving a rate or choosing the winner.

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Follow-up task

Task: For identical erasers with no fees, box A costs 10 dollars for 5 erasers; box B costs 12 dollars for 3 erasers. Make two labeled rows with a column for dollars per 1 eraser. Divide both quantities in each row by its eraser count. Which unit cost is lower? Why is 10 dollars versus 12 dollars not enough reasoning?

Answer: A: 2 dollars per eraser; B: 4 dollars per eraser. A has lower unit cost. Different eraser counts require a common basis, even though the totals happen to suggest the same winner here.

Also accept: Compare cost for a common number of erasers; table shows the labeled denominator 1.

Look for: If per-one meaning fails, return to Find and interpret per one before comparison.

Extension task

Task: At constant rates valve A releases 9 liters in 4 minutes and valve B releases 7 liters in 3 minutes. Which releases more liters per minute? Compare exactly with fractions, without rounding. Would comparing minutes per liter lead to the same choice? Explain.

Answer: A: 9/4 liters per minute; B: 7/3 liters per minute. Since 27/12 < 28/12, B releases more. Minutes per liter: A 4/9, B 3/7; B needs less time (28/63 > 27/63), giving the same choice.

Also accept: Compare volumes after 12 minutes (27 vs 28); for reciprocal comparison explain why smaller time means faster.

Look for: Extension compares simple fractions exactly and interprets reverse direction.

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Follow-up check task 1

Task: For identical folders with no fees, stall A charges 28 dollars for 7 folders; stall B charges 25 dollars for 5 folders. Which has the lower dollars per folder? Explain why comparing total prices could mislead.

Answer: A: 4 dollars per folder; B: 5 dollars per folder. A has lower unit cost despite its larger total price.

Also accept: Common-folder comparison or correctly interpreted folders per dollar.

Look for: This new task checks comparison of rates when totals could mislead. Save this task until students are ready to try on their own after the chosen follow-up.

Follow-up check task 2

Task: At constant speeds robot A travels 18 meters in 3 seconds; robot B travels 30 meters in 5 seconds. Robot C travels 42 meters with no elapsed time supplied. Compare A and B in meters per second. Can C be ranked? Explain.

Answer: A and B: 6 meters per second, tie. C needs elapsed time or its unit speed.

Also accept: Common-time reasoning plus missing-denominator explanation.

Look for: This new task asks students to explain both a tie and missing information; it may have different demands from earlier checks.

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Later task 1

Task: At constant rates press A makes 40 tiles in 8 minutes; press B makes 36 tiles in 6 minutes. Which makes more tiles per minute? Give both rates and justify the choice.

Answer: A: 5 tiles per minute; B: 6 tiles per minute. B makes more per minute despite fewer total tiles.

Also accept: Compare over 24 minutes or correctly interpreted minutes per tile.

Look for: Fresh context and totals trap after another learning opportunity.

Later task 2

Task: Two stalls sell identical clips with no fees. Stall A charges 16 dollars for 8 clips; stall B charges 14 dollars for 7 clips. Stall C charges 12 dollars but gives no clip count. Compare A and B in dollars per clip. Can C be ranked on unit cost? Explain.

Answer: A and B: 2 dollars per clip, tie. C needs the clip count or dollars per clip; lower total price does not establish lower unit cost.

Also accept: Cost for common clip count and explicit missing count for C.

Look for: This new task checks ties and missing information. Save this task until students are ready to try on their own later.

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Apply task

Task: A team needs exactly 12 identical brushes. Supplier A sells only whole packs of 4 brushes for 12 dollars per pack; supplier B sells only whole packs of 6 brushes for 15 dollars per pack. There are no fees. Compare dollars per brush, then choose the lower total cost for exactly 12 brushes and give that cost. State how the whole-pack condition affects your calculation.

Answer: A: 3 dollars per brush, 3 packs cost 36 dollars; B: 5/2 dollars per brush, 2 packs cost 30 dollars. B has both lower unit cost and lower total cost for exactly 12 because both whole pack sizes divide 12.

Also accept: Equivalent pairs or pack-count calculation with labels; 2.5 dollars per brush accepted.

Look for: Unit price and feasible purchase are separate; do not assume arbitrary fractional packs.

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 Equivalent ratios labeled complete groups for ratio order/scaling, then Find and interpret per one equal-time/equal-item groups before Compare unit rates comparisons. Keep constant: Return to the original target only after prerequisite support. Limit: Do not interpret an unfinished higher-target task as a lasting difficulty.

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. Find and interpret per one addresses unit-rate meaning and language; Compare unit rates 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/

Classroom use and limits

Classroom use and limits · original core section 16 of 16

Using these materials

These original tasks use fictional contexts and constructed numerical data.

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

Tables in the Word files are editable. No third-party images or copied worksheets are included.

Standards reference

Common Core Grade 6 ratios and proportional relationships: scope and grade reference. Tasks and examples are original. https://www.thecorestandards.org/Math/Content/6/RP/

Teaching limits

Brief responses help you choose a next teaching step. They do not establish a diagnosis, stable ability rank or mastery score. Classroom effectiveness, timing and equal difficulty across checks have not been established. Editable Word pagination and accessibility may vary with local software.

Keep the record local

Use the optional local decision record if helpful. Keep student names, work and response notes locally; do not submit them through the site.

Fictional teaching response — sound for the named task

Named task: Independent task 1: identical notebooks, no fees

Fictional response — sound for the named task: “Shop A: $18 ÷ 6 = $3 per notebook. Shop B: $20 ÷ 5 = $4 per notebook. A has the lower dollars per notebook for these identical notebooks with no fees.”

Visible evidence: Both correctly labeled rates on one basis and a conclusion within the supplied conditions.

Not established: A comparison of arbitrary whole-pack purchase totals, fees or different notebook qualities.

Clarify: Ask why the same dollars-per-notebook basis is required.

Next teaching/evidence: Use Follow up check after another learning opportunity; reserve Later revisit.

This response is invented for teacher interpretation. Accept defensible alternatives. Record access, prior exposure and the actual response; do not assign an ability label or claim mastery from this example.

Follow up check

Reserve: Later revisit

Fictional teaching response — partially developed

Named task: Independent task 1: identical notebooks, no fees

Fictional response — partially developed: “A is $3 per notebook, so choose A.”

Visible evidence: One accurate labeled rate and the intended conclusion.

Not established: The other shop’s rate or an explicit common-basis comparison.

Clarify: Ask for B’s dollars per notebook and an explanation comparing those two rates.

Next teaching/evidence: If a common basis remains unclear, use the Clarify machine task to label and compare both tickets-per-minute rates, then seek an unused follow-up.

This response is invented for teacher interpretation. Accept defensible alternatives. Record access, prior exposure and the actual response; do not assign an ability label or claim mastery from this example.

Clarify

Reserve: Later revisit

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Fictional teaching response — plausible error

Named task: Independent task 1: identical notebooks, no fees

Fictional response — plausible error: “A is cheaper because $18 is less than $20.”

Visible evidence: Correct ordering of the listed totals and the intended choice, but the expressed explanation compares totals alone.

Not established: A valid unit-rate comparison when the quantities differ; totals alone do not settle dollars per notebook.

Clarify: Ask how many notebooks each total buys and what each price would be for one notebook.

Next teaching/evidence: Use Clarify: 16 tickets in 4 minutes is 4 per minute, and 18 tickets in 3 minutes is 6 per minute. Keep both quantities and rate direction explicit. Then use the separate follow-up; reserve Later revisit.

This response is invented for teacher interpretation. Accept defensible alternatives. Record access, prior exposure and the actual response; do not assign an ability label or claim mastery from this example.

Clarify

Reserve: Later revisit