MATHEMATICS / TEACHER PLANNING

Grade 6 · Topic 5

Understand and Use Ratio and Rate

Ten complete 45-minute lesson plans, with original examples, practice, answer keys, formative checks, and support strategies.

THE UNIT	THE PLAN
Content	Ratio comparisons; equivalent ratios; ratio tables and graphs; rates and unit rates; conversions within and across measurement systems.
Length	10 core lessons × 45 minutes (450 minutes total), plus optional checkpoint, modeling task and review.
Lesson coverage	Lessons 5-1 through 5-10, with optional assessment and review sessions.
Standards	Minnesota 2007 Mathematics Standards; effective for classroom teaching through the 2026–27 school year.

Intended use Teacher-facing guide. Practice prompts may be shared separately with students. All lesson examples and practice questions are newly written for this resource.

Planning note The ten lessons are organized separately. A checkpoint after Lesson 5-4 and a final review may be scheduled as additional sessions if needed.

Standards caution Lesson 5-10 involves conversion between customary and metric systems. Minnesota benchmark 6.3.3.1 explicitly describes conversions within measurement systems; cross-system conversion is therefore labeled a related extension rather than a direct one-to-one benchmark match.

Prepared for educator use | Grade 6 mathematics | 2026–27 standards context

Unit overview and instructional decisions

This unit progresses from ratio comparisons to equivalent ratios, tables, graphs, unit-rate reasoning, and conversions. Begin with concrete quantities before symbolic methods; ask students to explain the meaning and unit of each answer.

Lesson	Lesson focus	Priority Minnesota benchmark(s)
5-1	Understand Ratios	6.1.2.1
5-2	Generate Equivalent Ratios	6.1.2.2, 6.1.2.4
5-3	Compare Ratios	6.1.2.2, 6.1.2.4
5-4	Represent and Graph Ratios	6.1.2.4, 6.2.1.2
5-5	Understand Rates and Unit Rates	6.1.2.3, 6.1.2.4
5-6	Compare Unit Rates	6.1.2.3, 6.1.2.4
5-7	Solve Unit Rate Problems	6.1.2.3, 6.1.2.4
5-8	Ratio Reasoning: Convert Customary Units	6.3.3.1
5-9	Ratio Reasoning: Convert Metric Units	6.3.3.1
5-10	Relate Customary and Metric Units	6.1.2.4; related extension to 6.3.3.1

Daily instructional structure

Minutes	Purpose	Evidence to collect
0–5	Five-minute spiral review	Quick response from every student
5–8	Real-life launch and learning targets	Prediction / reasoning before a procedure
8–15	Explore with a table, diagram, or model	Students can name the compared quantities
15–25	Worked and guided examples	Students explain the factor, unit, or relationship
25–35	Independent practice	At least 3 tasks with written working
35–43	Group task and defense	Every group shows representation and interpretation
43–45	Individual exit ticket	Use result to plan the next lesson

Monitoring and differentiation

During independent practice, record which students can (a) name quantities and units, (b) choose the correct operation, and (c) justify the model. Score the exit ticket separately from group performance: it checks individual understanding.

Ready for next lesson: correct independent model and exit ticket. Partial understanding: correct arithmetic but incomplete labels or reasoning. Reteach: reversed ratio order, incorrect conversion direction, or an invalid unit-rate comparison.

Lesson 5-1 | Understand Ratios

GRADE 6 · TOPIC 5 | 45 MINUTES | MINNESOTA 6.1.2.1

What students will learn

Identify ratios as multiplicative comparisons; write ratios in words, colon notation, and fraction notation; distinguish part-to-part from part-to-whole comparisons.

Success criterion Given a set of two categories, students identify which quantities are compared, preserve their order, and write two correct ratios.

Vocabulary ratio, part-to-part, part-to-whole, terms of a ratio

45-minute lesson sequence

Time	Teaching phase	Teacher move / prompt
0–5	Review	What is the difference between 18 and 12? How might you compare these quantities without subtracting?
5–8	Connect / why it matters	Display 12 green and 8 orange tiles. Ask: “How many green tiles are there for every orange tile? How would you describe that relationship?”
8–15	Explore and visualize	Organize 12 green into three groups of 4 and 8 orange into two groups of 4. Compare green:orange = 12:8 = 3:2; then green:all tiles = 12:20 = 3:5.
15–25	Model and question	Model 15 fiction and 10 nonfiction books. Fiction:nonfiction = 15:10 = 3:2; nonfiction:total = 10:25 = 2:5. Ask why switching the order changes the ratio.
25–35	Independent practice	Students answer the three prompts on the next page independently, showing calculations, representations, and units as required.
35–43	Group reasoning	A team has 16 girls and 12 boys. Create and label one part-to-part ratio and one part-to-whole ratio; justify each.
43–45	Exit ticket	A case holds 10 pens and 6 pencils. What is the ratio pencils:all objects in simplest form?

Instructional note

Modeling idea Reveal two colored groups, then group equal clusters before showing the notation.

Look for Given a set of two categories, students identify which quantities are compared, preserve their order, and write two correct ratios.

Lesson 5-1 | Teacher practice and answer key

STUDENT TASKS + EXPECTED RESPONSES · KEEP ANSWERS OFF STUDENT-FACING SLIDES

Independent practice (10 minutes)

1. **There are 18 blue beads and 12 yellow beads. Write blue:yellow and yellow:all.**

   Expected answer: 3:2; 2:5.

2. **A class has 28 students and 7 adults. Write students:adults in simplest form.**

   Expected answer: 4:1.

3. **There are three times as many red blocks as green blocks. Write red:green.**

   Expected answer: 3:1.

Group work (8 minutes)

A team has 16 girls and 12 boys. Create and label one part-to-part ratio and one part-to-whole ratio; justify each.

Expected reasoning Girls:boys = 16:12 = 4:3; boys:all = 12:28 = 3:7. Other correctly labeled comparisons are acceptable.

Exit ticket (2 minutes)

A case holds 10 pens and 6 pencils. What is the ratio pencils:all objects in simplest form?

Answer 6:16 = 3:8.

Respond to student thinking

Common issue	Teaching response
Misconception	Students confuse a ratio with the difference, or reverse the requested order.
Support	Use two colors of counters, label each quantity, and highlight the first term in the stated comparison.
Extension	Ask students to compare the same set using a part-to-part and a part-to-whole ratio and explain why the denominators differ.

Next-day action

Use the exit ticket to sort students into: Ready (correct model and units), Needs clarification (minor labeling or arithmetic issue), or Reteach (misidentified comparison, rate, or conversion). Start the next lesson with one targeted correction from today's work.

Lesson 5-2 | Generate Equivalent Ratios

GRADE 6 · TOPIC 5 | 45 MINUTES | MINNESOTA 6.1.2.2, 6.1.2.4

What students will learn

Generate equivalent ratios by scaling both terms by the same nonzero factor; complete ratio tables; explain why addition to both terms does not generally preserve a ratio.

Success criterion Students create at least three equivalent ratios and defend the scale factor used.

Vocabulary equivalent ratios, scale factor, ratio table, nonzero multiplier

45-minute lesson sequence

Time	Teaching phase	Teacher move / prompt
0–5	Review	Simplify 6:9. Explain how you know the ratio has not changed.
5–8	Connect / why it matters	A trail mix uses 2 scoops of cranberries for every 5 scoops of almonds. How many of each are needed for four batches?
8–15	Explore and visualize	Build the table (cranberries, almonds): (2,5), (4,10), (6,15), (8,20). Show multiplication by the same factor in each row.
15–25	Model and question	Start from 3:7. Multiply by 5 to obtain 15:35. Divide 12:28 by 4 to recover 3:7. Explain why 4:8 is not equivalent to 3:7.
25–35	Independent practice	Students answer the three prompts on the next page independently, showing calculations, representations, and units as required.
35–43	Group reasoning	Paint is mixed using 3 parts blue for every 2 parts yellow. Determine the quantities for four batches and seven batches. Make a table and explain why it works.
43–45	Exit ticket	Is 9:15 equivalent to 6:10? Explain with a common simplified ratio.

Instructional note

Modeling idea Animate one column of a ratio table at a time and highlight the common multiplier.

Look for Students create at least three equivalent ratios and defend the scale factor used.

Lesson 5-2 | Teacher practice and answer key

STUDENT TASKS + EXPECTED RESPONSES · KEEP ANSWERS OFF STUDENT-FACING SLIDES

Independent practice (10 minutes)

1. **Complete 4:9 = ___:36.**

   Expected answer: 16:36 (multiply each term by 4).

2. **Write 18:30 in simplest form.**

   Expected answer: 3:5 (divide each term by 6).

3. **Are 8:12 and 10:15 equivalent? Explain.**

   Expected answer: Yes. Both simplify to 2:3.

Group work (8 minutes)

Paint is mixed using 3 parts blue for every 2 parts yellow. Determine the quantities for four batches and seven batches. Make a table and explain why it works.

Expected reasoning Four batches: 12 blue, 8 yellow; seven batches: 21 blue, 14 yellow; both multiply the original terms by the same factor.

Exit ticket (2 minutes)

Is 9:15 equivalent to 6:10? Explain with a common simplified ratio.

Answer Yes. Both simplify to 3:5.

Respond to student thinking

Common issue	Teaching response
Misconception	Adding the same value to both terms (such as 3:5 → 5:7) is not an equivalent-ratio operation.
Support	Use two-row ratio tables and explicit multiplication arrows.
Extension	Ask for two different multiplication/division pathways producing the same ratio.

Next-day action

Use the exit ticket to sort students into: Ready (correct model and units), Needs clarification (minor labeling or arithmetic issue), or Reteach (misidentified comparison, rate, or conversion). Start the next lesson with one targeted correction from today's work.

Lesson 5-3 | Compare Ratios

GRADE 6 · TOPIC 5 | 45 MINUTES | MINNESOTA 6.1.2.2, 6.1.2.4

What students will learn

Compare two ratios using equivalent-ratio tables or per-one reasoning; justify which relationship is greater; recognize when ratios are equivalent.

Success criterion Students compare two real-world ratios using the same reference quantity and explain their choice.

Vocabulary compare ratios, equivalent ratios, common corresponding quantity, part-to-whole

45-minute lesson sequence

Time	Teaching phase	Teacher move / prompt
0–5	Review	Are 2:5 and 4:10 equivalent? How can you verify?
5–8	Connect / why it matters	Team A makes 9 shots out of 15 attempts; Team B makes 12 out of 18. Which team has the higher success ratio?
8–15	Explore and visualize	Use successes per attempt: Team A $9 \div 15 = 0.60$; Team B $12 \div 18 \approx 0.667$. Alternatively compare 54:90 and 60:90.
15–25	Model and question	Compare 3 red cups for 8 blue cups with 5 red cups for 12 blue cups. The red-to-blue ratios are 0.375 and about 0.417; the second is greater.
25–35	Independent practice	Students answer the three prompts on the next page independently, showing calculations, representations, and units as required.
35–43	Group reasoning	Two smoothie recipes contain 6 cups of fruit in 15 cups of mixture and 9 cups of fruit in 20 cups of mixture. Which has a greater fruit concentration?
43–45	Exit ticket	Which is the higher ratio of correct answers: 4 out of 5 or 7 out of 10?

Instructional note

Modeling idea Reveal two completed ratio tables with matching denominator/total rows.

Look for Students compare two real-world ratios using the same reference quantity and explain their choice.

Lesson 5-3 | Teacher practice and answer key

STUDENT TASKS + EXPECTED RESPONSES · KEEP ANSWERS OFF STUDENT-FACING SLIDES

Independent practice (10 minutes)

1. **Which is greater: 5 green out of 12 or 7 green out of 15?**

   Expected answer: 7/15 ≈ 0.467 is greater than 5/12 ≈ 0.417.

2. **Compare 2 misses in 10 attempts with 3 misses in 15 attempts.**

   Expected answer: Equal: both are 0.20, or 1:5.

3. **Which is the higher correct-answer rate: 8 of 10 or 11 of 15?**

   Expected answer: 8/10 = 0.80; 11/15 ≈ 0.733. First is higher.

Group work (8 minutes)

Two smoothie recipes contain 6 cups of fruit in 15 cups of mixture and 9 cups of fruit in 20 cups of mixture. Which has a greater fruit concentration?

Expected reasoning First: 6/15 = 40%; second: 9/20 = 45%. Second recipe is more concentrated.

Exit ticket (2 minutes)

Which is the higher ratio of correct answers: 4 out of 5 or 7 out of 10?

Answer 4/5 = 80%, which exceeds 7/10 = 70%.

Respond to student thinking

Common issue	Teaching response
Misconception	Comparing numerators without comparing like totals; saying 12 is larger than 9 without considering attempts.
Support	Scale both ratios to a shared whole (e.g. per 10, per 100) before comparing.
Extension	Compare using two independent strategies and describe why both must agree.

Next-day action

Use the exit ticket to sort students into: Ready (correct model and units), Needs clarification (minor labeling or arithmetic issue), or Reteach (misidentified comparison, rate, or conversion). Start the next lesson with one targeted correction from today's work.

Lesson 5-4 | Represent and Graph Ratios

GRADE 6 · TOPIC 5 | 45 MINUTES | MINNESOTA 6.1.2.4, 6.2.1.2

What students will learn

Construct ratio tables; identify ordered pairs from a table; graph equivalent ratio relationships with labeled axes and consistent scales.

Success criterion Students correctly complete a table and plot at least three ordered pairs including (0,0), with axes and units labeled.

Vocabulary ratio table, ordered pair, coordinate plane, origin, equivalent ratios

45-minute lesson sequence

Time	Teaching phase	Teacher move / prompt
0–5	Review	On a coordinate grid, what does the ordered pair (3,6) mean? Which coordinate is horizontal?
5–8	Connect / why it matters	Two event tickets cost $7. What will 4, 6, or 8 tickets cost? How could a graph show the relationship?
8–15	Explore and visualize	Complete tickets 0,2,4,6,8 and costs $0,$7,$14,$21,$28. Label x as tickets and y as cost; plot points.
15–25	Model and question	For 3 notebooks costing $12, create pairs (0,0), (3,12), (6,24), (9,36). Explain that a matching table and graph describe the same quantity relationship.
25–35	Independent practice	Students answer the three prompts on the next page independently, showing calculations, representations, and units as required.
35–43	Group reasoning	A walking club records 5 km in 25 minutes at a constant rate. Prepare a table for 0, 5, 10, and 15 km and graph time against distance.
43–45	Exit ticket	If two bags cost $8, what point represents six bags on a bags-versus-cost graph?

Instructional note

Modeling idea Animate plotted points in table order; connect them only after explaining the underlying relationship.

Look for Students correctly complete a table and plot at least three ordered pairs including (0,0), with axes and units labeled.

Lesson 5-4 | Teacher practice and answer key

STUDENT TASKS + EXPECTED RESPONSES · KEEP ANSWERS OFF STUDENT-FACING SLIDES

Independent practice (10 minutes)

1. **Four cups of rice cost $10. What do 8 cups and 12 cups cost?**

   Expected answer: 8 cups: $20; 12 cups: $30.

2. **Complete: 2 packs cost $6. Record points for 0, 2, 4, and 6 packs.**

   Expected answer: (0,0), (2,6), (4,12), (6,18).

3. **The points (1,3), (2,6), and (4,12) represent a ratio. What stays constant?**

   Expected answer: 3 units of y per one unit of x.

Group work (8 minutes)

A walking club records 5 km in 25 minutes at a constant rate. Prepare a table for 0, 5, 10, and 15 km and graph time against distance.

Expected reasoning (distance km, time min): (0,0), (5,25), (10,50), (15,75). Axes must identify quantity and units.

Exit ticket (2 minutes)

If two bags cost $8, what point represents six bags on a bags-versus-cost graph?

Answer (6,24), if x = bags and y = cost in dollars.

Respond to student thinking

Common issue	Teaching response
Misconception	Reversing x/y coordinates or using uneven scales without labeling units.
Support	Provide a pre-labeled axis frame and a partly completed table.
Extension	Explain why the graph includes (0,0) when there is no fixed fee.

Next-day action

Use the exit ticket to sort students into: Ready (correct model and units), Needs clarification (minor labeling or arithmetic issue), or Reteach (misidentified comparison, rate, or conversion). Start the next lesson with one targeted correction from today's work.

Lesson 5-5 | Understand Rates and Unit Rates

GRADE 6 · TOPIC 5 | 45 MINUTES | MINNESOTA 6.1.2.3, 6.1.2.4

What students will learn

Distinguish a ratio from a rate comparing different units; determine unit rates by division; label unit rates correctly in context.

Success criterion Students calculate rates per one unit with correct numerical values and unit labels.

Vocabulary rate, unit rate, denominator of 1, units, per

45-minute lesson sequence

Time	Teaching phase	Teacher move / prompt
0–5	Review	Simplify the equivalent ratio 4:10 and explain the operation.
5–8	Connect / why it matters	A reader finishes 90 pages in 3 hours. How many pages would the reader finish in one hour at the same rate?
8–15	Explore and visualize	Use a double number line or table: 3 hours → 90 pages; 1 hour → 30 pages. Explain “pages per hour.”
15–25	Model and question	A bus goes 144 miles in 4 hours: 36 miles/hour. Seven notebooks cost $17.50: $2.50/notebook. Explain why the denominator’s unit matters.
25–35	Independent practice	Students answer the three prompts on the next page independently, showing calculations, representations, and units as required.
35–43	Group reasoning	A bakery makes 48 muffins in 6 batches at a constant rate. Find muffins per batch and predict the number in 10 batches.
43–45	Exit ticket	Six equal boxes hold 54 kilograms of apples. What is the unit rate?

Instructional note

Modeling idea Highlight the “÷3” operation simultaneously on both rows of a rate table.

Look for Students calculate rates per one unit with correct numerical values and unit labels.

Lesson 5-5 | Teacher practice and answer key

STUDENT TASKS + EXPECTED RESPONSES · KEEP ANSWERS OFF STUDENT-FACING SLIDES

Independent practice (10 minutes)

1. **84 ounces are packed into 7 containers. Find ounces per container.**

   Expected answer: 12 ounces/container.

2. **A cyclist rides 75 miles in 3 hours. Find miles per hour.**

   Expected answer: 25 miles/hour.

3. **Five pens cost $7.25. Find the price of one pen.**

   Expected answer: $1.45 per pen.

Group work (8 minutes)

A bakery makes 48 muffins in 6 batches at a constant rate. Find muffins per batch and predict the number in 10 batches.

Expected reasoning 48 ÷ 6 = 8 muffins/batch; 8 × 10 = 80 muffins.

Exit ticket (2 minutes)

Six equal boxes hold 54 kilograms of apples. What is the unit rate?

Answer 9 kg per box.

Respond to student thinking

Common issue	Teaching response
Misconception	Dividing in the wrong direction; giving 3 hours per 90 pages when asked for pages per hour.
Support	Write a unit frame "___ [output units] / 1 [input unit]" before dividing.
Extension	Compare 1.5 pages/minute to 90 pages/hour and show whether they are equivalent.

Next-day action

Use the exit ticket to sort students into: Ready (correct model and units), Needs clarification (minor labeling or arithmetic issue), or Reteach (misidentified comparison, rate, or conversion). Start the next lesson with one targeted correction from today's work.

Lesson 5-6 | Compare Unit Rates

GRADE 6 · TOPIC 5 | 45 MINUTES | MINNESOTA 6.1.2.3, 6.1.2.4

What students will learn

Calculate and compare unit rates in consistent units; determine lower unit price or higher performance rate; justify the appropriate choice.

Success criterion Students determine two unit rates, label them, and explain which better answers the question.

Vocabulary unit price, comparison, better value, speed, rate

45-minute lesson sequence

Time	Teaching phase	Teacher move / prompt
0–5	Review	A jogger travels 12 miles in 3 hours. What is the speed per hour?
5–8	Connect / why it matters	Store A sells 6 peaches for $4.50. Store B sells 8 peaches for $6.40. Which store offers a lower price per peach?
8–15	Explore and visualize	A: $4.50 ÷ 6 = $0.75/peach. B: $6.40 ÷ 8 = $0.80/peach. Store A is cheaper per peach.
15–25	Model and question	Runner A completes 9 km in 45 min (0.20 km/min). Runner B covers 12 km in 50 min (0.24 km/min); Runner B has the greater rate.
25–35	Independent practice	Students answer the three prompts on the next page independently, showing calculations, representations, and units as required.
35–43	Group reasoning	Compare rental rates: $39 for 3 hours versus $56 for 4 hours. Which is the better hourly price? Explain whether the longer booking is automatically cheaper overall.
43–45	Exit ticket	Five granola bars cost $6.25; eight cost $9.60. Which offer has a lower unit price?

Instructional note

Modeling idea Reveal two unit-price calculations side by side, then circle the one matching the question.

Look for Students determine two unit rates, label them, and explain which better answers the question.

Lesson 5-6 | Teacher practice and answer key

STUDENT TASKS + EXPECTED RESPONSES · KEEP ANSWERS OFF STUDENT-FACING SLIDES

Independent practice (10 minutes)

1. **Four tickets cost $18; six tickets cost $25.50. Which has the lower ticket price?**

   Expected answer: $4.50 vs $4.25; six-ticket option.

2. **Writer A types 180 words in 3 min; Writer B types 245 words in 5 min. Who is faster?**

   Expected answer: 60 vs 49 words/min; Writer A.

3. **Car A travels 40 miles on 2 gal; Car B travels 66 miles on 3 gal. Which gets more miles per gallon?**

   Expected answer: 20 mpg vs 22 mpg; Car B.

Group work (8 minutes)

Compare rental rates: $39 for 3 hours versus $56 for 4 hours. Which is the better hourly price? Explain whether the longer booking is automatically cheaper overall.

Expected reasoning $13/hour vs $14/hour, so the first has a lower hourly rate. Total spending also depends on rental duration.

Exit ticket (2 minutes)

Five granola bars cost $6.25; eight cost $9.60. Which offer has a lower unit price?

Answer $1.25 each vs $1.20 each; eight-bar package.

Respond to student thinking

Common issue	Teaching response
Misconception	Using the total price instead of unit price; confusing “lowest price” with “highest speed.”
Support	Provide a comparison table with the heading “price ÷ quantity” or “distance ÷ time.”
Extension	Ask when a low unit price does not imply the best choice (quantity, waste, total cost).

Next-day action

Use the exit ticket to sort students into: Ready (correct model and units), Needs clarification (minor labeling or arithmetic issue), or Reteach (misidentified comparison, rate, or conversion). Start the next lesson with one targeted correction from today’s work.

Lesson 5-7 | Solve Unit Rate Problems

GRADE 6 · TOPIC 5 | 45 MINUTES | MINNESOTA 6.1.2.3, 6.1.2.4

What students will learn

Use unit rates to find unknown quantities; model equal-rate situations with tables or an equation; check that answers have reasonable units.

Success criterion Students solve a two-step real-world rate problem, showing the unit rate and interpreting the result.

Vocabulary constant rate, speed, distance, time, unit price, rate equation

45-minute lesson sequence

Time	Teaching phase	Teacher move / prompt
0–5	Review	A vehicle travels 90 miles in 2 hours. What is its average speed?
5–8	Connect / why it matters	A train covers 150 miles in 3 hours at a constant rate. How long would a 375-mile trip take?
8–15	Explore and visualize	Find 50 miles/hour. Use 375 ÷ 50 = 7.5 hours; verify that 50 × 7.5 = 375.
15–25	Model and question	A bus travels 168 miles in 3.5 hours. Unit rate is 48 miles/hour. To travel 240 miles at the same rate, it needs 5 hours.
25–35	Independent practice	Students answer the three prompts on the next page independently, showing calculations, representations, and units as required.
35–43	Group reasoning	A bus travels 210 km in 3.5 hours at constant speed. Estimate the travel time for 450 km; show a rate table or equation.
43–45	Exit ticket	Six pounds of fruit cost $9. What is the cost of 14 pounds at the same rate?

Instructional note

Modeling idea Trace arrows from rate calculation to a table and then to the context answer.

Look for Students solve a two-step real-world rate problem, showing the unit rate and interpreting the result.

Lesson 5-7 | Teacher practice and answer key

STUDENT TASKS + EXPECTED RESPONSES · KEEP ANSWERS OFF STUDENT-FACING SLIDES

Independent practice (10 minutes)

1. **A student reads 52 pages/hour. How many pages in 3.5 hours?**

   Expected answer: 182 pages.
2. **Six identical tickets cost $15. How much do 14 tickets cost?**

   Expected answer: $35 (unit price $2.50).
3. **A walker covers 92 km at 23 km/hour. How long is the walk?**

   Expected answer: 4 hours.

Group work (8 minutes)

A bus travels 210 km in 3.5 hours at constant speed. Estimate the travel time for 450 km; show a rate table or equation.

Expected reasoning Rate = 210 ÷ 3.5 = 60 km/h. Time = 450 ÷ 60 = 7.5 hours.

Exit ticket (2 minutes)

Six pounds of fruit cost $9. What is the cost of 14 pounds at the same rate?

Answer $1.50 per pound; 14 lb cost $21.

Respond to student thinking

Common issue	Teaching response
Misconception	Multiplying when the unknown is time; neglecting to confirm whether the constant-rate assumption holds.
Support	Use a “known amount → per one → new amount” three-column organizer.
Extension	Create a rate problem whose answer is 2.5 hours and show more than one solution path.

Next-day action

Use the exit ticket to sort students into: Ready (correct model and units), Needs clarification (minor labeling or arithmetic issue), or Reteach (misidentified comparison, rate, or conversion). Start the next lesson with one targeted correction from today’s work.

Lesson 5-8 | Ratio Reasoning: Convert Customary Units

GRADE 6 · TOPIC 5 | 45 MINUTES | MINNESOTA 6.3.3.1

What students will learn

Choose an appropriate customary-unit conversion factor; convert length, capacity, and weight within the customary system; explain the multiplication or division used.

Success criterion Students select the correct factor, use it in the correct direction, and label the converted answer.

Vocabulary customary units, conversion factor, inches, feet, yards, cups, quarts, gallons, ounces, pounds

45-minute lesson sequence

Time	Teaching phase	Teacher move / prompt
0–5	Review	Recall: 1 foot = 12 inches; 1 gallon = 4 quarts. Which unit is smaller?
5–8	Connect / why it matters	A shelf is 5 feet 6 inches long. How many inches is its length?
8–15	Explore and visualize	Convert 5 feet into 60 inches, then add 6 inches: 66 inches. Discuss why the mixed-unit expression cannot be added as 5 + 6 = 11.
15–25	Model and question	Show 1 yard = 3 feet, so 3.5 yards = 10.5 feet; 1 gallon = 4 quarts, so 2.25 gallons = 9 quarts.
25–35	Independent practice	Students answer the three prompts on the next page independently, showing calculations, representations, and units as required.
35–43	Group reasoning	A garden is 4 yards long and 90 inches wide. Convert both dimensions to feet and identify the longer dimension.
43–45	Exit ticket	Convert 72 inches to yards. (1 yard = 36 inches)

Instructional note

Modeling idea Use unit tiles: reveal three 1-foot blocks per yard, then extend to decimal quantities.

Look for Students select the correct factor, use it in the correct direction, and label the converted answer.

Lesson 5-8 | Teacher practice and answer key

STUDENT TASKS + EXPECTED RESPONSES · KEEP ANSWERS OFF STUDENT-FACING SLIDES

Independent practice (10 minutes)

1. **Convert 4.5 feet to inches.**

   Expected answer: 54 inches.

2. **Convert 3 quarts to cups. (1 quart = 4 cups)**

   Expected answer: 12 cups.

3. **Convert 2 pounds 6 ounces to ounces. (1 pound = 16 ounces)**

   Expected answer: 38 ounces.

Group work (8 minutes)

A garden is 4 yards long and 90 inches wide. Convert both dimensions to feet and identify the longer dimension.

Expected reasoning 4 yards = 12 feet; 90 inches = 7.5 feet; the length is greater.

Exit ticket (2 minutes)

Convert 72 inches to yards. (1 yard = 36 inches)

Answer 2 yards.

Respond to student thinking

Common issue	Teaching response
Misconception	Multiplying when changing to a larger unit, or reading 3.5 feet as 3 feet 5 inches.
Support	Post a short conversion fact list and attach unit labels to every step.
Extension	Ask for a two-step conversion, such as 2.5 yards to inches, with two pathways.

Next-day action

Use the exit ticket to sort students into: Ready (correct model and units), Needs clarification (minor labeling or arithmetic issue), or Reteach (misidentified comparison, rate, or conversion). Start the next lesson with one targeted correction from today's work.

Lesson 5-9 | Ratio Reasoning: Convert Metric Units

GRADE 6 · TOPIC 5 | 45 MINUTES | MINNESOTA 6.3.3.1

What students will learn

Use metric scale factors for length, mass, and capacity; select a suitable target unit; convert metric quantities accurately and explain the direction.

Success criterion Students perform three metric conversions and confirm each with magnitude and unit reasoning.

Vocabulary metric system, meter, centimeter, kilometer, liter, milliliter, kilogram, gram

45-minute lesson sequence

Time	Teaching phase	Teacher move / prompt
0–5	Review	State: 1 kilometer = 1,000 meters; 1 liter = 1,000 milliliters; 1 kilogram = 1,000 grams.
5–8	Connect / why it matters	A drink dispenser holds 1.5 liters. How many 250-milliliter cups can it fill?
8–15	Explore and visualize	Convert 1.5 liters to 1,500 mL; divide by 250 mL/cup = 6 cups. Explain why the liters must first match the cup unit.
15–25	Model and question	2.4 km = 2,400 m; 730 g = 0.73 kg; 0.65 L = 650 mL. Show the size check in each direction.
25–35	Independent practice	Students answer the three prompts on the next page independently, showing calculations, representations, and units as required.
35–43	Group reasoning	Five table groups each need 1.25 liters of juice. How many milliliters are needed in all?
43–45	Exit ticket	Convert 840 centimeters to meters.

Instructional note

Modeling idea Use a base-ten place-value scale or the same base segment stretched/shrunk by powers of ten.

Look for Students perform three metric conversions and confirm each with magnitude and unit reasoning.

Lesson 5-9 | Teacher practice and answer key

STUDENT TASKS + EXPECTED RESPONSES · KEEP ANSWERS OFF STUDENT-FACING SLIDES

Independent practice (10 minutes)

1. **Convert 4.7 meters to centimeters.**

   Expected answer: 470 centimeters.

2. **Convert 3,650 milliliters to liters.**

   Expected answer: 3.65 liters.

3. **Convert 0.08 kilograms to grams.**

   Expected answer: 80 grams.

Group work (8 minutes)

Five table groups each need 1.25 liters of juice. How many milliliters are needed in all?

Expected reasoning $5 \times 1.25 = 6.25$ L = 6,250 mL.

Exit ticket (2 minutes)

Convert 840 centimeters to meters.

Answer 8.4 meters.

Respond to student thinking

Common issue	Teaching response
Misconception	Moving a decimal the wrong direction; mixing prefixes without checking how large the units are.
Support	Label an arrow from larger unit to smaller unit with “multiply,” then reverse for division.
Extension	Compare 0.35 km and 325 m; explain the comparison in a shared unit.

Next-day action

Use the exit ticket to sort students into: Ready (correct model and units), Needs clarification (minor labeling or arithmetic issue), or Reteach (misidentified comparison, rate, or conversion). Start the next lesson with one targeted correction from today’s work.

Lesson 5-10 | Relate Customary and Metric Units

GRADE 6 · TOPIC 5 | 45 MINUTES | MINNESOTA 6.1.2.4 (ratio reasoning); 6.3.3.1 (related extension)

What students will learn

Apply a provided customary-to-metric conversion factor; distinguish exact conversions from approximations; judge whether converted measurements are reasonable.

Success criterion Students show unit cancellation or matched-unit reasoning and communicate when a result is approximate.

Vocabulary cross-system conversion, approximate conversion factor, estimate, precision, measurement units

45-minute lesson sequence

Time	Teaching phase	Teacher move / prompt
0–5	Review	Convert 2.5 meters to centimeters. Explain why the numerical value increases.
5–8	Connect / why it matters	A route is 5 miles long. Using 1 mile ≈ 1.61 kilometers, estimate its length in kilometers.
8–15	Explore and visualize	Compute 5 × 1.61 = 8.05 km. Explain why ≈ is appropriate when the conversion factor is rounded.
15–25	Model and question	Using 1 inch = 2.54 cm, convert 80 inches to 203.2 cm. Using 1 kg ≈ 2.2 lb, convert 3.2 kg to about 7.04 lb.
25–35	Independent practice	Students answer the three prompts on the next page independently, showing calculations, representations, and units as required.
35–43	Group reasoning	One trail is 7 miles; another trail is 12 km. Estimate the first trail's length in km using 1 mile ≈ 1.61 km. Which trail is longer?
43–45	Exit ticket	Approximate the weight of 2 kg in pounds using 1 kg ≈ 2.2 lb.

Instructional note

Modeling idea Reveal "1 mile ≈ 1.61 km" above a pair of labeled scales and maintain the approximation sign throughout.

Look for Students show unit cancellation or matched-unit reasoning and communicate when a result is approximate.

Lesson 5-10 | Teacher practice and answer key

STUDENT TASKS + EXPECTED RESPONSES · KEEP ANSWERS OFF STUDENT-FACING SLIDES

Independent practice (10 minutes)

1. **Convert 10 feet to meters using 1 ft = 0.3048 m.**

   Expected answer: 3.048 meters.

2. **Convert 4 U.S. gallons to liters using 1 gal ≈ 3.79 L.**

   Expected answer: About 15.16 liters.

3. **Convert 50 centimeters to inches using 1 in = 2.54 cm. Round to a tenth.**

   Expected answer: About 19.7 inches.

Group work (8 minutes)

One trail is 7 miles; another trail is 12 km. Estimate the first trail's length in km using 1 mile ≈ 1.61 km. Which trail is longer?

Expected reasoning 7 miles ≈ 11.27 km. The 12-km trail is longer by approximately 0.73 km.

Exit ticket (2 minutes)

Approximate the weight of 2 kg in pounds using 1 kg ≈ 2.2 lb.

Answer About 4.4 pounds.

Respond to student thinking

Common issue	Teaching response
Misconception	Treating a rounded conversion factor as exact or multiplying by a factor that has the wrong direction.
Support	Print the needed conversion factor alongside each problem; write source and target units under the numbers.
Extension	Compare results from a rounded versus a more precise conversion factor, and discuss acceptable precision.

Next-day action

Use the exit ticket to sort students into: Ready (correct model and units), Needs clarification (minor labeling or arithmetic issue), or Reteach (misidentified comparison, rate, or conversion). Start the next lesson with one targeted correction from today's work.

Optional mid-topic checkpoint | After Lesson 5-4

Use this five-item check after the first four lessons if students need a consolidation day. Adapt or extend it to suit classroom assessment needs.

1. A basket contains 14 red and 21 green apples. Write red:green in simplest form.

Key: 2:3.

2. Complete the equivalent ratio 3:8 = ___:40.

Key: 15:40.

3. Compare 4 correct out of 5 attempts to 9 correct out of 12. Which is greater?

Key: 4/5 = 0.80; 9/12 = 0.75. First is higher.

4. Three notebooks cost $9. Complete costs for 6 and 10 notebooks.

Key: $18 and $30.

5. A line graph of packs (x) and price (y) passes through (2,8) and (4,16). Give another point including units.

Key: For example (6 packs, $24); points (0,0),(1,4), etc. also valid.

Checkpoint interpretation

Score out of 5. A result of 4–5 generally supports progression to unit rates; 2–3 suggests a brief small-group re-modeling session; 0–1 suggests reteaching the difference between additive comparison, ratio, and ratio-table scaling before beginning Lesson 5-5. Use professional judgment and classwork evidence rather than a cutoff alone.

Optional visual task

Ask small groups to design an original poster comparing two classroom collections using a tape diagram, a ratio table, and a correctly labeled graph. Each group must explain when a ratio is part-to-part versus part-to-whole.

Optional end-of-topic review | Original problems

Use as a formative review or a teacher-created quiz after Lesson 5-10. The questions sample concepts from across the unit.

1. A lot holds 18 vans and 12 cars. Write vans:cars and vans:all vehicles in simplest form.

Teacher key: 3:2 and 3:5.

2. Complete 5:8 = ___:40.

Teacher key: 25:40.

3. Which is greater: 9 successes in 12 attempts, or 10 successes in 15?

Teacher key: 9/12 = 0.75 is greater than 10/15 ≈ 0.667.

4. Two bags cost $7. What ordered pair gives the cost for six bags? Use x = bags.

Teacher key: (6,21).

5. A bus travels 96 miles in 4 hours. Give the unit rate.

Teacher key: 24 miles/hour.

6. Four markers cost $5.80; six markers cost $8.10. Which has lower unit cost?

Teacher key: Six-marker set: $1.35 each versus $1.45 each.

7. A boat covers 135 km in 3 hours. How long for 315 km at the same rate?

Teacher key: 45 km/hour, then 7 hours.

8. Convert 2.5 yards to inches. (1 yard = 36 inches)

Teacher key: 90 inches.

9. Convert 3.6 liters to milliliters.

Teacher key: 3,600 mL.

10. Estimate 5 miles in km using 1 mile ≈ 1.61 km.

Teacher key: About 8.05 km.

Review decision

Do not average these ten items into a final achievement claim. Mark errors by type: ratio meaning (items 1–3), tables/graphs (4), unit rates (5–7), within-system conversions (8–9), and cross-system estimation (10). Revisit the specific representation or operation behind each error.

Unit planning notes and references

Pacing choices

Core plan: 10 × 45-minute lessons. Add a brief mid-topic checkpoint after Lesson 5-4 if needed, and reserve one additional period for cumulative review after Lesson 5-10. An optional mathematical modeling activity may follow Lesson 5-7.

Suggested materials

Colored counters or tiles; large ratio strips / tape diagrams; rulers and graph paper; blank coordinate grids; two-row tables; conversion-factor reference card; projector or whiteboard. These are optional teaching materials.

Standards interpretation

Code	Instructional role
6.1.2.1	Identify and use ratios as multiplicative comparisons; not equivalent to subtraction.
6.1.2.2	Equivalent ratios, fractions, percents, mixtures and ratio contexts.
6.1.2.3	Determine rates from ratios of quantities with unlike units.
6.1.2.4	Use multiplication/division reasoning to solve ratio and rate problems.
6.2.1.2	Represent relationships by tables, function rules and graphs; translate among them.
6.3.3.1	Solve context problems involving conversion of weight, capacity, measurement and time within systems.

About Lesson 5-10 alignment

Grade 6 benchmark 6.3.3.1 addresses conversions within measurement systems. Lesson 5-10 adds comparisons across customary and metric systems as a related ratio-reasoning extension (6.1.2.4); this cross-system work is not presented as a direct requirement of benchmark 6.3.3.1.

Standards and resource information

Lesson coverage: Grade 6 Topic 5, Understand and Use Ratio and Rate, Lessons 5-1 through 5-10. The guide includes optional mid-topic assessment, modeling, and final review activities.

Minnesota Department of Education, Mathematics standards page (2007 standards effective through 2026–27): https://education.mn.gov/MDE/dse/stds/Math/ . Full 2007 benchmark text: https://standards.education.mn.gov/sds/get/sbe/000417 .

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