

Ratios in real life

Duration: 60–75 minutes

Unit: Unit 1 — Ratios and Proportional Relationships

Grade: 6

CCSS Standard: 6.RP.A.1

Lesson: 02 — Ratios in real life

Learning objectives

Students will understand that a ratio is a comparison of two quantities and will apply ratios in real-world contexts including recipes, sports, animals, and voting. Students will write ratios in all three forms, simplify ratios using the GCF, distinguish between part-to-part and part-to-whole ratios, and interpret the meaning of a ratio in context.

Materials needed

Whiteboard or projector, printed practice activity, pencils, optional colored markers for highlighting quantities being compared, and a simple table or chart for organizing ratio examples.



Understanding ratios

Prior knowledge

Before beginning this lesson, students should be comfortable with the concept of division as a comparison between two quantities. They should know how to find the Greatest Common Factor of two numbers and use it to simplify fractions. Familiarity with basic multiplication relationships — such as recognizing that 4:6 and 2:3 involve the same relationship — will help students connect new ratio concepts to what they already know about equivalent fractions. Students should also be able to read a simple table and extract numerical information from it, as several problems in this lesson present data in tabular form.



Key vocabulary

A **ratio** is a comparison of two quantities showing how much of one there is relative to the other. It can be written in three forms: using the word "to" (as in 2 to 3), using a colon (2:3), or as a fraction ($\frac{2}{3}$). All three forms express the same relationship.

Equivalent ratios are two or more ratios that describe the same relationship. Just as $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent fractions, the ratios 1:2 and 2:4 are equivalent ratios. Students can find equivalent ratios by multiplying or dividing both terms by the same non-zero number.

A **part-to-part ratio** compares one group to another group within a whole. A **part-to-whole ratio** compares one group to the total. For example, if a bag has 4 red marbles and 6 blue marbles, the part-to-part ratio of red to blue is 4:6, while the part-to-whole ratio of red to all marbles is 4:10.

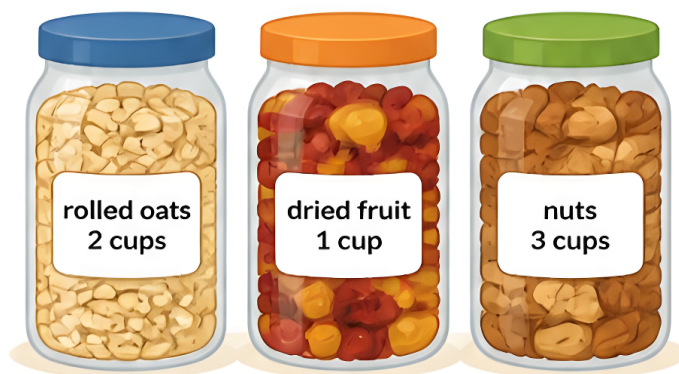
The simplest form of a ratio is the equivalent ratio in which both terms share no common factor other than 1, found by dividing both terms by their GCF.

Ratios in real-world contexts

Warm-up activity

Display on the board a simple scenario: a granola recipe that uses 2 cups of rolled oats, 1 cup of dried fruit, and 3 cups of nuts. Ask students to look at the three ingredients and think about how they might compare them.

Give them a moment to write down one comparison they notice — for example, “there are twice as many cups of oats as dried fruit” or “there are more nuts than oats.”



After students share a few observations, ask them to think about what happens when the recipe is doubled. Would the relationship between oats and dried fruit change?

Encourage students to reason through it: if oats go from 2 to 4 and dried fruit goes from 1 to 2, does the “twice as much” relationship still hold? Most students will recognize that it does, and this is the core intuition the lesson builds on.

Close the warm-up by telling students that today they are going to formalize that intuition using the mathematical language of ratios, and they will use it to solve real problems in four different real-world contexts.

Problem disparador

A school is planning a cooking event. The recipe calls for 2 cups of flour for every 3 cups of oats. The team wants to make a larger batch using 12 cups of oats. How many cups of flour will they need?

Ask students to think quietly for one minute before discussing with a partner. Then open a brief whole-class conversation.

Ask students what they notice about the relationship between flour and oats. Listen for students who describe it as “for every 2 cups of flour, there are 3 cups of oats” — that language signals they are thinking in ratios.

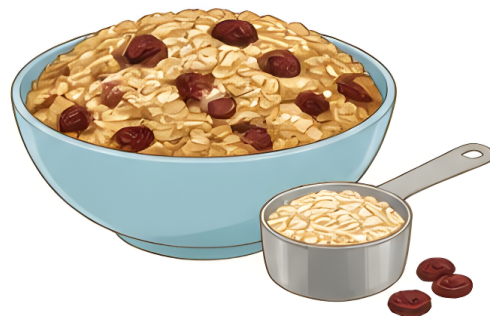
Avoid confirming or correcting answers at this stage. Tell students they will return to this problem once they understand the standard method.

Understanding ratios

Introduction and first exploration

Ratios are everywhere — in the kitchen, on the sports field, in nature, and in how communities make decisions. A ratio is a way to compare two quantities precisely, showing how much of one thing there is relative to another. Learning to read and use ratios helps make sense of data in any real-world situation.

Return to the granola recipe from the warm-up. The recipe uses 2 cups of rolled oats and 1 cup of dried fruit. The ratio of oats to dried fruit is 2 to 1 — meaning for every 2 cups of oats, the recipe uses 1 cup of dried fruit.



Now consider what happens when the recipe scales up. A single batch gives 2 cups of oats and 1 cup of dried fruit. A double batch gives 4 cups of oats and 2 cups of dried fruit. A triple batch gives 6 cups of oats and 3 cups of dried fruit.

Batch size	Cups of oats	Cups of dried fruit	Ratio (oats : dried fruit)
Single batch	2	1	2 : 1
Double batch	4	2	4 : 2
Triple batch	6	3	6 : 3

Write these on the board and ask students what they notice. The quantities change, but the relationship between them stays the same. 2:1, 4:2, and 6:3 are all equivalent — they all simplify to 2:1. This is the central insight: a ratio expresses a relationship, not just a fixed quantity. That relationship remains constant even as the amounts grow or shrink.

Three ways to write a ratio

Now introduce the three ways to write a ratio. The ratio of oats to dried fruit can be written as “2 to 1,” as “2:1,” or as the fraction $\frac{2}{1}$. All three forms communicate the same mathematical relationship. The choice of form depends on context — fractions are useful in calculations, colon form is common in everyday writing, and “to” language is natural in spoken explanation.

To language

2 to 1

Read as “2 to 1.”
Common in spoken
and written language.

Colon form

2 : 1

Read as “2 to 1.”
Common in everyday
writing and tables.

Fraction form

$\frac{2}{1}$

Read as “2 over 1.”
Useful in calculations
and equations.

Order matters

Emphasize to students that order matters. The ratio of oats to dried fruit (2:1) is a different statement than the ratio of dried fruit to oats (1:2). Always identify which quantity is named first in the problem before writing the ratio.

The standard method

When working with ratios in any context, a consistent four-step approach helps students interpret, write, and apply them with accuracy.

1**Identify the two quantities being compared.**

Read the problem carefully and ask: what two things are being related here? Label both quantities clearly before writing anything else.

2**Determine the order.**

Ratios are directional — the quantity mentioned first in the question goes first in the ratio. Skipping this step can lead to reversed ratios.

3**Write the ratio in simplest form.**

After writing the ratio as given, check whether both terms share a common factor. If they do, divide both by their GCF. For example, 8:4 simplifies to 2:1 because the GCF of 8 and 4 is 4.

4**Interpret the meaning in context.**

A simplified ratio is only fully understood when its meaning is stated in words. The ratio 2:1 for wins to losses means “for every 2 games won, the team lost 1.” Writing out that interpretation confirms understanding.



Walk through a quick application together.

A soccer team won 8 games and lost 4 games this season.

- The ratio of wins to losses is **8:4**. Dividing both by 4 gives the simplified ratio **2:1**, meaning for every 2 games won, the team lost 1.
- Then ask students to reverse it: what is the ratio of losses to wins?
- That gives **4:8**, simplified to **1:2** — for every 1 game lost, the team won 2.

Both ratios come from the same data, but they answer different questions and have different meanings.

Guided practice — recipe and sports contexts

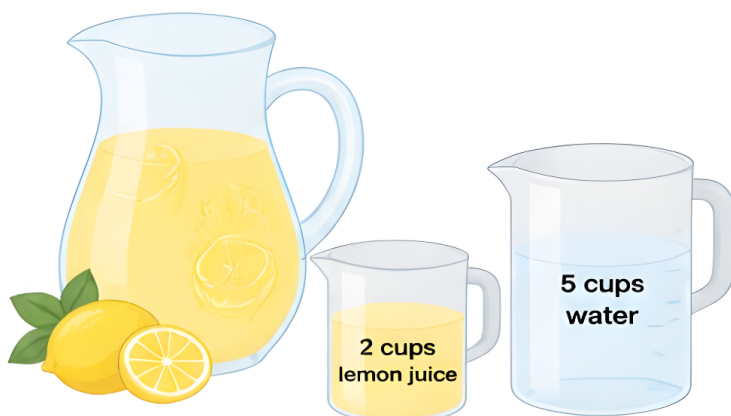
The first example comes from the practice activity. A lemonade recipe calls for 2 cups of lemon juice and 5 cups of water. Ask students to identify the two quantities (lemon juice and water), decide on the order (lemon juice is listed first in the question), and write the ratio.

Example 1: Lemonade recipe

The ratio of lemon juice to water is **2:5**.
Since 2 and 5 share no common factor other than 1, this ratio is already in simplest form.

Meaning: for every **2** cups of lemon juice, the recipe uses **5** cups of water.

This corresponds to answer choice c in the practice activity.



After confirming that answer, ask students what ratio would represent water to lemon juice. They should recognize that the order reverses to give **5:2** — a different ratio, a different meaning.

Example 2: Basketball free throws



A basketball player made 14 successful free throws out of 20 attempts.

The ratio of successful throws to total attempts is **14:20**.

The GCF of 14 and 20 is 2, so the simplified ratio is **7:10** — the player made 7 out of every 10 attempts.

Now, consider missed throws. Missed throws = $20 - 14 = 6$.

The ratio of missed to successful is **6:14**.

The GCF of 6 and 14 is 2, so the simplified ratio is **3:7** — for every 3 missed throws, there were 7 successful ones.

Attempts	20
Successful	14
Missed	6

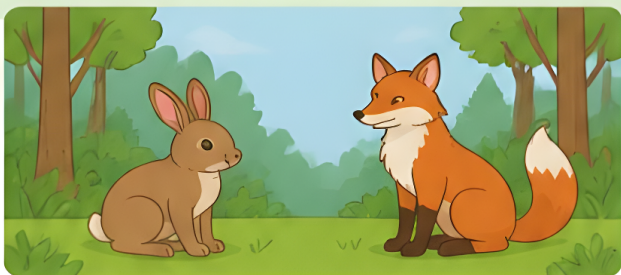
Point out that this second calculation required students to compute a quantity that wasn't directly given. Encourage students to always check whether they need to find a missing quantity before writing the ratio.

Guided practice — animals and voting contexts

A wildlife survey counted 24 rabbits and 16 foxes in a forest. Ask students to write the ratio of rabbits to foxes. Both quantities are given directly, so they write 24:16. The GCF of 24 and 16 is 8, so the simplified ratio is 3:2 — for every 3 rabbits in the forest, there are 2 foxes.

Then ask for the ratio of foxes to all animals counted. The total is 24 plus 16, which equals 40. The ratio of foxes to total is 16:40, and dividing both by 8 gives 2:5 — 2 out of every 5 animals counted are foxes. This is a part-to-whole ratio, and it is a good moment to pause and ask students what type of ratio this is and how they know.

Animals context



Rabbits = 24

Foxes = 16

Ratio of rabbits to foxes

$$24:16 \div 8 = 3:2$$

For every 3 rabbits, there are 2 foxes.

Ratio of foxes to all animals

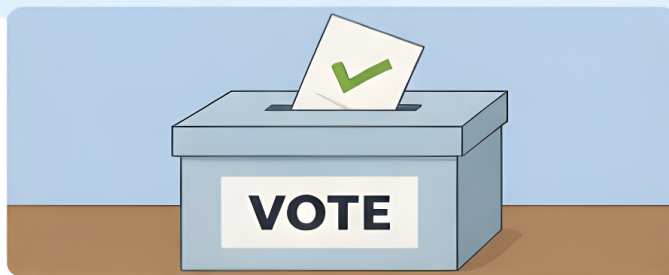
$$\text{Total animals} = 24 + 16 = 40$$

$$16:40 \div 8 = 2:5$$

2 out of every 5 animals are foxes.

This is a part-to-whole ratio.

Voting context



Votes for A = 30

Votes for B = 18

Votes for C = 12

Ratio of votes for A to votes for B

$$30:18 \div 6 = 5:3$$

For every 5 votes for A, there are 3 votes for B.

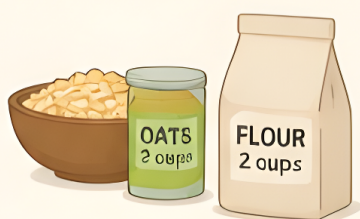
Ratio of votes for C to total

$$\text{Total votes} = 30 + 18 + 12 = 60$$

$$12:60 \div 12 = 1:5$$

1 out of every 5 students voted for candidate C.

Returning to the problem *disparador*



The recipe uses 2 cups of flour for every 3 cups of oats. Now with 12 cups of oats: the ratio 2:3 must stay constant.

Ask students how many times 3 goes into 12. The answer is 4, so the scale factor is 4.

Flour needed: $2 \times 4 = 8$ cups.

The ratio of flour to oats remains 8:12, which simplifies back to 2:3.

The problem *disparador* is now fully resolved.

Independent practice assignment

Students now work independently through the practice activity. They should complete problems in order, though the teacher may choose to assign specific problems based on student readiness.



Questions 1–5: single context practice

The early problems — questions 1 through 5 — focus on writing and simplifying ratios in a single context. Circulate as students work and listen for how they describe the ratios out loud.

- Students who say “2 out of 5” rather than “2 for every 5” may need a brief reminder about the language of ratios versus fractions.
- For question 3, watch for students who try to calculate wins and losses without identifying the total number of parts in the ratio first. The ratio 3:1 has 4 total parts, so 20 games divided by 4 gives groups of 5, leading to 15 wins and 5 losses.

Questions 6–9: multi-part and extended ratios

Questions 6 through 9 introduce multi-part problems and require students to compute totals, write multiple ratios from the same situation, and extend a ratio to a new quantity.

- For question 9c, where students must find how many deer would accompany 15 squirrels given a deer-to-squirrel ratio of 2:3, look for students who use the scale factor approach rather than guessing. Since 3 times 5 equals 15, the scale factor is 5, and deer would be 2 times 5, which equals 10.

Questions 10–15: reasoning and multi-step problems

Questions 10 through 15 include reasoning tasks, error analysis, and multi-step problems.

- Question 14 asks students to identify an error in a peer's statement — the student incorrectly compared girls to boys instead of girls to the total class. The correct ratio of girls to the whole class is 12:20, simplified to 3:5.
- Question 15 requires applying a ratio to find a missing monetary value and then verifying the result.

Closure and exit ticket

Closing the lesson

To close the lesson, bring the class back together for a brief whole-group discussion. Ask students to share one ratio they wrote during the independent practice and explain what it means in context. Encourage other students to confirm or respectfully challenge each other's interpretations. Pay special attention to whether students distinguish clearly between part-to-part and part-to-whole ratios when they explain.

Exit ticket

Display the following exit ticket for students to complete independently before leaving.

A trail mix recipe contains 10 almonds, 15 raisins, and 5 chocolate chips.



- 1 Write the ratio of almonds to raisins in simplest form.

Answer: _____

- 2 Write the ratio of chocolate chips to the total number of pieces in simplest form.

Answer: _____

- 3 If the recipe is doubled, does the ratio of raisins to almonds change? Explain your answer.

Answer: _____

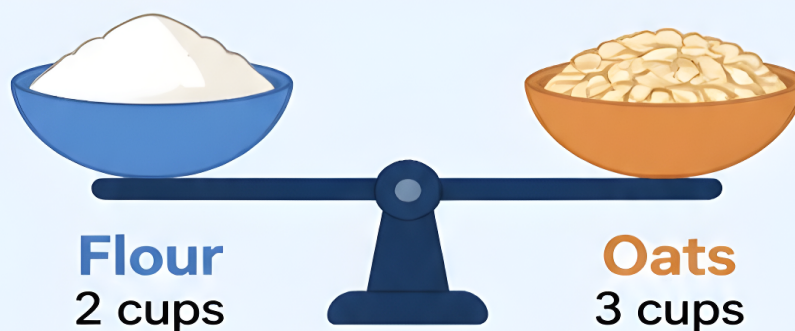
Expected responses

- 1 Almonds to raisins is 10:15, simplified to **2:3**.
- 2 Chocolate chips to total is 5:30, simplified to **1:6**.
- 3 No, the ratio does not change when the recipe is doubled because scaling multiplies all quantities by the same factor, preserving every ratio.

Use these responses to assess whether students have met the lesson's objectives and to identify any students who need additional support before the next lesson.

Common misconception — reversing the order of a ratio

One of the most frequent errors students make is writing the quantities in the wrong order. When asked for the ratio of flour to oats, a student might write 3:2 when the correct answer is 2:3 simply because they wrote the larger number first out of habit, or because they reversed which quantity they were tracking.

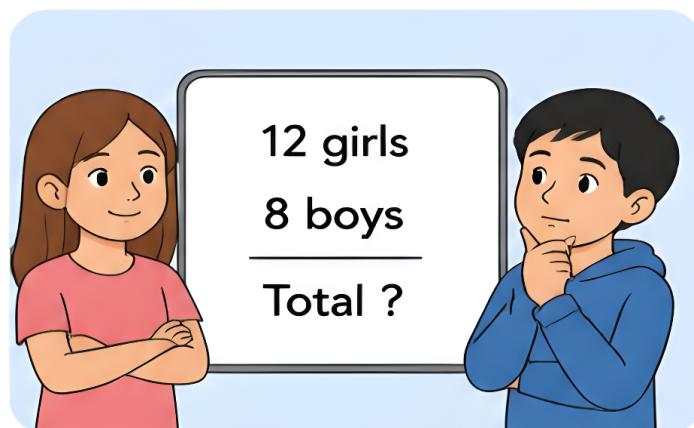


The best way to address this is to make order a deliberate, spoken step every time. Before writing any ratio, ask students to point to or underline the first quantity named in the question and the second quantity named in the question, then write them in that order. Practicing this physical habit reduces careless reversals significantly.

When you see this error in student work, resist the urge to simply mark it wrong and move on. Instead, ask the student to read their ratio back to you in words. “So you’re saying for every 3 cups of oats, there are 2 cups of flour?” The student will often catch the error themselves when they hear the sentence and compare it to the original problem. This approach builds the habit of verbal verification that strong ratio reasoning requires.

Common misconception — confusing part-to-part with part-to-whole

This error appears when a student is asked for the ratio of one group to the whole but instead writes the ratio of that group to the other group. For example, if asked for the ratio of girls to the whole class in a class of 12 girls and 8 boys, a student might write 12:8 instead of 12:20.



This confusion is especially common when the problem does not explicitly state the total. Students who do not automatically add the parts together before writing a part-to-whole ratio will skip that step and reach an incorrect answer.

When introducing any problem that involves a total, build the habit of writing out the sum explicitly before asking for ratios. Write “total = $12 + 8 = 20$ ” on the board before any ratio question is posed. Over time, students internalize this step.

Question 14 in the practice activity is designed precisely to surface this misconception. The fictional student wrote

“the ratio of girls to the whole class is 12:8,”

which is actually the part-to-part ratio of girls to boys. Discussing this error as a class — asking students to explain exactly what went wrong and how to fix it — is a powerful consolidation activity for the whole lesson.

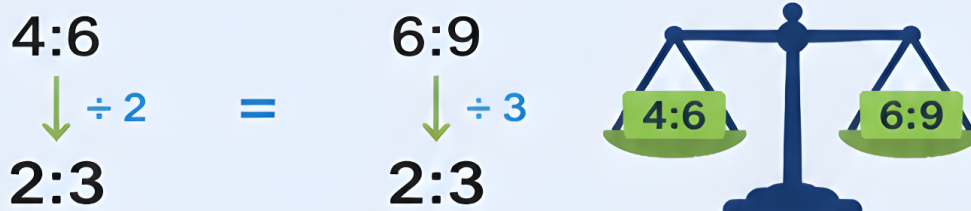
Common misconception about ratios

Common misconception — thinking different-looking ratios are not equivalent

Students often believe that 2:3 and 4:6 are different ratios because the numbers are different. This misconception mirrors the difficulty students sometimes have with equivalent fractions, and it responds to the same instructional strategy: simplification.

When students encounter this, ask them to simplify both ratios by dividing by the GCF. The ratio 4:6 has a GCF of 2, giving 2:3. The ratio 6:9 has a GCF of 3, also giving 2:3. Once students see that both simplify to the same ratio, the equivalence becomes concrete.

Question 10 in the practice activity addresses this directly, asking whether 6:9 and 4:6 represent the same relationship. The answer is true — both simplify to 2:3 — but the problem is intentionally framed as a false statement to prompt students to check before concluding. Some students will correctly say true; others will say false without simplifying. The explanation requirement is what matters most here.



Common misconception — forgetting to compute a missing quantity before writing a ratio

Some problems give all the numbers students need. Others require a calculation first — finding a total by adding parts, or finding a missing part by subtracting. Students who rush to write a ratio without checking whether all quantities are known will often write incomplete or incorrect ratios.

For example, in the basketball free-throw problem, the number of missed throws is not stated. Students must subtract 14 from 20 to get 6 before they can write the ratio of missed to successful throws. Students who skip this step might write 14:6 (reversing completed and missed) or 20:14 (using total instead of missed).

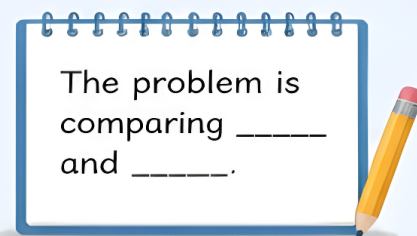
Encourage students to always ask themselves: “Do I have both numbers I need?” before writing any ratio. If the answer is no, they should find the missing value first.

Differentiation — support for students who need more scaffolding

Students who struggle with this lesson typically need support in one of three areas: identifying which two quantities to compare, determining the correct order, or simplifying using the GCF.

Identifying quantities

Provide sentence frames such as "The problem is comparing _____ and _____." Having students fill in that sentence before writing any ratio grounds their work in language before numbers.



Determining the correct



Encourage students to physically circle the first quantity mentioned in the question and draw an arrow to where they write it in the ratio. A consistent physical routine reduces the cognitive demand of tracking order.

Question: There are 8 red balls and 12 blue balls. Write the ratio of red balls to blue balls.

Ratio: 8:12

Simplifying using the GCF

Students who are not yet confident finding the GCF can be encouraged to use a factor list. Write all factors of each number, circle the largest shared one, and divide. Having a multiplication chart available also removes a barrier for students who are still building fluency with basic facts, allowing them to focus on the conceptual work of the lesson.

18: 1, 2, 3, 6, 9, 18

24: 1, 2, 3, 4, 6, 8, 12, 24

GCF = 6

$18 \div 6 : 24 \div 6 = 3 : 4$

Differentiation — extension for students ready for deeper challenge

Students who demonstrate quick mastery can explore ratios involving three quantities, sometimes called three-way ratios. For example, a trail mix with 10 almonds, 15 raisins, and 5 chocolate chips can be expressed as a ratio of almonds to raisins to chocolate chips: 10:15:5, simplified to 2:3:1. Ask these students to write and simplify three-way ratios from the practice activity problems and explain what each one means.



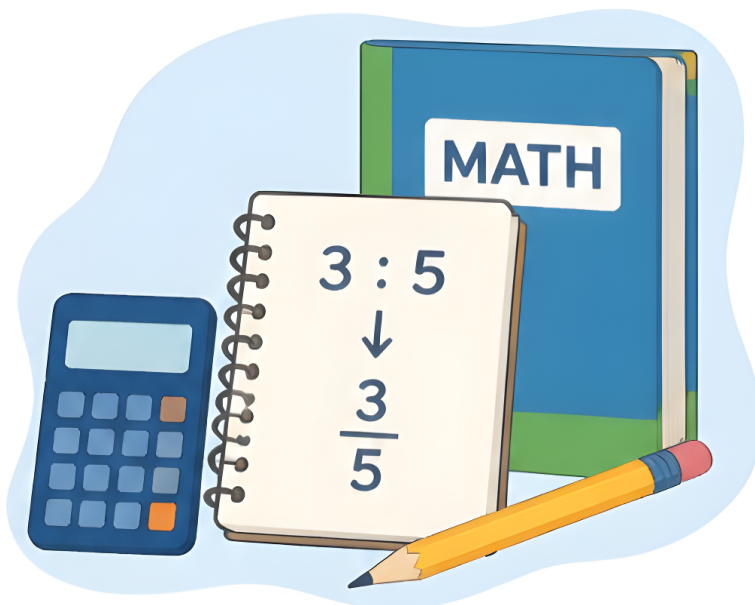
A further extension is question 7 from the practice activity, which asks students to reason about whether two ratios with a shared reference quantity can be combined. The ratio of red to blue is 3:2 and the ratio of red to green is 3:5. Because red equals 3 in both, the ratio of blue to green can be read directly as 2:5. This is a meaningful early encounter with ratio chains that previews proportional reasoning in later units.



Connections to other standards and upcoming content

This lesson builds the foundation for nearly all proportional reasoning work in Grade 6 and Grade 7. The concept of equivalent ratios developed here connects directly to unit rates (6.RP.A.2), where one quantity in a ratio is scaled to 1. It also anticipates ratio tables and graphing proportional relationships (6.RP.A.3), where students extend the same ratio across multiple values in a structured way.

The simplification process in this lesson reinforces fraction work from earlier grades and explicitly connects ratios to fraction notation. When students write a ratio as $\frac{3}{5}$ and simplify it to lowest terms, they are using the same GCF-based reasoning they applied to fractions in Grade 5. Making this connection explicit helps students see ratios not as an entirely new topic but as an extension of their existing number sense.



Looking forward, the part-to-whole ratio concept introduced in this lesson becomes the foundation for understanding percentages in later Grade 6 work. A percentage is a part-to-whole ratio with a denominator of 100. Students who understand part-to-whole ratios conceptually will find the transition to percentage reasoning far more natural.

The four real-world contexts used in this lesson — recipes, sports, animals, and voting — are intentionally varied to demonstrate that ratio reasoning is not domain-specific. As students move through the curriculum, encourage them to recognize ratios in science class when studying populations, in social studies when analyzing data, and in physical education when tracking statistics. The more contexts students encounter ratios in, the more flexible and durable their understanding becomes.

Notes for lesson reflection

After delivering this lesson, take a few minutes to reflect on the following. During the guided practice phase, which context — recipes, sports, animals, or voting — generated the most confusion? If students struggled most with the voting problem, it may be because it involves three candidates and requires finding a total that is the sum of three values rather than two. A brief revisit at the start of the next lesson focusing on three-value totals could address this efficiently.

Pay attention to how students performed on question 14, the error analysis item. If many students agreed with the fictional student's incorrect ratio rather than identifying the mistake, the distinction between part-to-part and part-to-whole likely needs more direct instruction in the next session. Consider opening the following lesson with a short sorting activity where students classify a set of ratios as part-to-part or part-to-whole before doing any calculation.

If exit ticket responses show that students can simplify ratios correctly but cannot explain what the simplified ratio means in context, the conceptual understanding of ratio as a relationship — rather than just a pair of numbers — needs reinforcement. Asking students to write the meaning of every ratio in a full sentence, rather than just simplifying and stopping, is a simple routine change that builds this habit over time.

Overall, the goal of this lesson is not just procedural fluency in writing and simplifying ratios but the ability to recognize a ratio relationship in an unfamiliar real-world situation and communicate its meaning clearly. Students who leave this lesson able to do both are well prepared for the proportional reasoning work that follows throughout the unit.

