Mow More, Pay Less, Drive Steady

Teacher		**Class**	Grade 6
Subject	Math	**Topic**	Unit rates
Date		**Room**	
Lesson length	60 minutes	**Country**	United Kingdom

Students learn to find a unit rate and use it to solve problems. They solve lawn, price, and speed problems in pairs.

Curriculum links

- Solve unit rate problems including those involving unit pricing and constant speed.
- When given a proportional relationship between two quantities, make and use a ratio table to find missing values [1].
- Represent mathematical and real-world problems involving ratios and rates using scale factors, tables, graphs, and proportions [2].

Learning objectives

- Students will find unit rates for lawn work, unit pricing, and constant speed.
- Students will use unit rates to predict larger amounts and compare buys.

Success criteria

- I can find the amount for 1 unit with correct units.
- I can use that amount for 1 to solve price and speed problems.

What students already know

2-minute check: show 70 students in 5 classes and ask how many per class if shared equally, listen for divide 70 by 5.

Key words

rate	comparison of two different measures, like miles and hours [2][3]
unit rate	amount for one of something, like 30 miles for 1 hour [17]
unit price	cost for one item, ounce, or pound [23]
constant speed	staying at the same pace the whole trip with no slowing down [3]

Materials

- Whiteboard and markers
- Printed ratio tables for lawn problem
- Slides 1-11 with projector
- Worksheet Task C copies for first finding the unit rate, then multiplying to solve
- Pencils and scratch paper

Before the lesson

- Print ratio tables with 7 to 4 pair and 35-hour row labeled, one per pair
- Print Worksheet Task C for first finding the unit rate, then multiplying to solve, one per student
- Test Slide 5 Video clip 1 (0:00–1:55) and Slide 7 Video clip 2 (0:00–2:31)
- Set up whiteboard with rate table headings and units

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Lesson outline

0–5 min **Starter** 5 min · Whole class

Hook interest in unit rates and recall that bigger packs are not always cheaper.

YOU DO

1. Show Slide 1 and read the goal about unit prices and steady speeds.
2. Say the hook: If it took 7 hours to mow 4 lawns, how many could you mow in 35 hours if you never slowed down?
3. Show Slide 2 Best Deal Vote and take a quick vote on big pack, small pack, check price for 1 ounce, or favorite flavor.
4. Tell class that checking the price for 1 unit lets us compare fairly [14].

STUDENTS DO

1. Listen to the lawn question and make a quick guess.
2. Vote on Slide 2 and explain choice to a neighbor.
3. Share one reason why total price alone can mislead.

Say: If it took 7 hours to mow 4 lawns, how many could you mow in 35 hours if you never slowed down? For shopping, you cannot tell which pack is cheaper until you check the price for 1 unit. Today you will find the amount for one, then use it.

Ask: Why can't you tell the better buy from total price alone? (Sizes are different, so we need price for the same 1 unit [14].) · What do you think per hour means? (How much for 1 hour [17].)

Check understanding: Hands up for each vote choice; if most grab big pack, stress we must calculate before deciding.

Support: Offer sentence frame: I think ___ is cheaper because ___. **Stretch:** Ask what else besides price might change a choice if per-ounce costs are almost equal.

Use: Slides 1-2

5–17 min **Teaching** 12 min · Whole class

Model how to write a rate, divide to 1, label it, and multiply to solve.

YOU DO

1. Show Slides 3-4 steps and big idea that a unit rate tells you about ONE, then scales to anything.
2. Play Slide 5 Video clip 1 and ask students to listen for rate vs unit rate and dividing to get to 1.
3. Model two cases on the whiteboard with units: speed and price.
4. Show Slide 6 key words and have class repeat each with its example.

STUDENTS DO

1. Watch the video and note when the division makes the bottom equal 1.
2. Copy the two models with units: miles per hour and dollars per pound.
3. Choral-read Slide 6 words with examples.

Say: A rate compares two unlike amounts, like miles and hours [2]. A unit rate has 1 in the denominator [16]. We divide the top and bottom by the bottom number to get to 1 [17], label it per one, then multiply to answer a bigger question.

Worked example: 60 miles in 2 hours is a rate. Divide top and bottom by 2: 60 ÷ 2 = 30, 2 ÷ 2 = 1, so 30 miles in 1 hour is the unit rate [17]. $5.50 for 5 pounds of potatoes: 5.50 ÷ 5 = 1.10, so $1.10 per pound is the unit price [23].

Ask: How is 60 miles in 2 hours different from 30 miles in 1 hour? (First is a rate, second is a unit rate with 1 hour [17].) · How did we get $1.10 per pound? (Divided $5.50 by 5 pounds to get cost for 1 pound [23].)

Check understanding: Mini whiteboards: write the unit rate for 120 miles in 3 hours; expect 40 miles per hour [4]; reteach division if many miss.

Support: Keep the 3-step list visible and point to each step while dividing [17]. **Stretch:** Ask why 150 miles in 3 hours equals 50 miles in 1 hour [12] and how that helps predict 300 miles.

Use: Slides 3-6, Video clip 1 (0:00–1:55)

17–42 min **Main activity** 25 min · Pairs

Find the lawn unit rate and use it to predict lawns in 35 hours.

YOU DO

1. Play Slide 7 Video clip 2 about 4 lawns in 7 hours becoming per 1 hour.
2. Hand out printed ratio tables and model the lawn division on Slide 8.
3. Send pairs to solve: find unit rate, then multiply to find lawns in 35 hours with units shown.
4. Circulate, check tables of equivalent ratios [5], and push finishers to decimals.

STUDENTS DO

1. Build the ratio table from 7 to 4 up to 35 hours.
2. Divide to find lawns per 1 hour and write it with units.
3. Multiply by 35, box the answers, and show division and multiplication.

Say: Build the ratio table to find missing values for the 7-hour and 4-lawn problem [1]. Divide to get lawns for 1 hour, since a unit rate has 1 in the denominator [16]. Then multiply that amount for 1 by 35 hours to predict the total.

Worked example: Rate: 4 lawns in 7 hours. Unit rate: 4 ÷ 7 = 4/7 lawn per 1 hour, about 0.57. Multiply: 4/7 × 35 = 20. So 20 lawns in 35 hours at 4/7 lawn per hour. Check with table: 7 hours → 4 lawns, 14 → 8, 21 → 12, 28 → 16, 35 → 20 [1].

Ask: What division gives lawns per 1 hour? (4 lawns ÷ 7 hours = 4/7 lawn per hour.) · How does that answer lawns in 35 hours? (Multiply 4/7 by 35 to get 20 lawns [1].) · What is the other way to state the rate? (7 ÷ 4 = 1.75 hours per lawn.)

Check understanding: Each pair holds up table showing original rate, division to 1, and third pair for 35 hours; fix tables that skip the divide-to-1 step.

Support: Give a partly filled table with the 7 to 4 pair and the 35-hour row already labeled so students only fill in multiplies. **Stretch:** Ask what changes if the time is 36.5 hours and students must multiply a decimal by their unit rate.

Use: Slides 7-8, Video clip 2 (0:00–2:31)

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42–50 min **Application** 8 min · Pairs

Apply the same divide-to-1 then multiply method to unit pricing and constant speed.

YOU DO

1. Show Slide 9 grocery, road trip, and yard work cards.
2. Hand out Worksheet Task C and direct pairs to first find the unit rate, then multiply to solve
3. Have one pair report dollars per ounce and one report miles per hour to predict distance.
4. Remind class that speed is usually in miles per hour or mph [3].

STUDENTS DO

1. Solve Worksheet Task C price and speed items, first finding the unit rate then multiplying to solve with units shown
2. Circle the better buy after comparing the two per-unit costs.
3. Compare answers with neighbor and explain which division you used.

Say: Use the same steps for price and speed. Divide price by weight to get price for 1 unit [14]. Divide miles by hours to get miles per 1 hour. Write both answers with correct units.

Worked example: 372 miles on 12 gallons: 372 ÷ 12 = 31, so 31 miles per gallon [12]. That unit rate simplifies the rate so the denominator is 1 [12]. For 25 gallons, 31 × 25 = 775 miles.

Ask: How do you find the better buy? (Find dollars per ounce for each and pick the smaller [14].) · How do you use miles per hour to predict distance? (Multiply miles per 1 hour by hours [12].)

Check understanding: Cold-call two pairs for their unit rates with units; recalculate on board if values differ.

Support: Let students first compare rates where division gives a whole number, such as 176 mugs made in 8 hours is 22 mugs per hour [16], before moving to decimals. **Stretch:** Have winners compare two packs where the unit rates round to the same cent and explain which rounding choice is fair.

Use: Slide 9, Worksheet Task C

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50–60 min **Plenary** 10 min · Whole class

Return to the lawn problem and confirm what counts as a unit rate.

YOU DO

1. Show Slide 10 and have pairs restate lawns in 35 hours and the rate.
2. Show Slide 11 true or false and vote on each claim about denominator 1.
3. Correct the false claim that 60 miles in 2 hours is a unit rate, stressing 30 miles in 1 hour is [17].
4. Link back to success criteria and give exit ticket.

STUDENTS DO

1. Think, pair, share: 20 lawns in 35 hours at 4/7 lawn per hour.
2. Vote true or false and justify with the divide-to-1 rule.
3. Complete exit ticket on paper.

Say: Think, pair, share the lawn answer again. A unit rate always has 1 in the denominator, like $0.75 per 1 bottle. We will check that idea with true or false, then you will show it on your own.

Ask: 7 hours to mow 4 lawns. How many in 35 hours and at what rate? (20 lawns at 4/7 lawn per hour, or 1.75 hours per lawn.) · Is 60 miles in 2 hours a unit rate? (False; it is a rate, the unit rate is 30 miles in 1 hour [17].)

Check understanding: Exit tickets sorted into got it, shaky, reteach; reteach small group on dividing top and bottom by bottom number [17] if needed.

Support: Provide sentence frames like ___ per 1 ___ means ___ and allow a multiplication table [17]. **Stretch:** Ask students to explain why faster speed gives more miles per 1 hour but fewer minutes per mile.

Use: Slides 10-11

Common mistakes

Mistake	How to spot it	How to fix it
Flipping the division, like dividing weight by price for unit price	Units read ounces per dollar instead of dollars per ounce	Reset with units first: price ÷ weight gives cost for 1 unit [14], check with $5.50 for 5 pounds is $1.10 per pound [23].
Calling any rate a unit rate, like 60 miles in 2 hours	Denominator is not 1 but student labels it per hour	Remind a unit rate has 1 in the denominator [16]; show 60 miles in 2 hours is a rate but 30 miles in 1 hour is the unit rate [17].
Leaving the answer without units or with wrong units	Writes 0.57 or 20 with no lawns, hours, or per	Require label it per one [3]; practice dividing top number by bottom number to make bottom 1 and keep units [19].

Support

- Give a partly filled table with the 7 to 4 pair and the 35-hour row already labeled so students only fill in multiplies.
- Provide worked model of 150 miles in 3 hours equals 50 miles in 1 hour [12] to copy.
- Allow calculator for decimal division while focusing on what per one means [16].

Stretch

- Ask what changes if the time is 36.5 hours and students must multiply a decimal by their unit rate.
- Ask teams to predict miles for 25 gallons using miles per gallon [12] and check with a proportion.
- Ask students to explain why faster speed gives more miles per 1 hour but fewer minutes per mile.

For the LSE or teaching assistant

Sit with table group during main activity; guide ratio table rows, prompt divide to get to 1, check units are spoken aloud.

Check for understanding

Question	Answer
7 hours to mow 4 lawns. What is lawns per 1 hour?	4/7 lawn per hour, about 0.57
$5.50 for 5 pounds of potatoes. What is the unit price?	$1.10 per pound [23]
Car goes 120 miles in 3 hours at constant speed. How far in 5 hours?	40 miles per hour [4], so 200 miles

Homework

Finish Worksheet Task C price and speed items, first finding the unit rate then multiplying to solve

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