The Unit Rate

Students name the number from Lesson 2 (unit rate, constant of proportionality), find it from a table and from words, check which pairs fit it, and compare two proportional relationships by their unit rates.

TIME	25 minutes (one student with a parent or tutor)
WHO	7th grade, about age 12. Follows Lesson 2, What Makes It Proportional.
MATERIALS	Student worksheet (PDF), the Deep Dive 5 page for this lesson, pencil.
PRIOR KNOWLEDGE	The table test (Lesson 2); unit rates (Lesson 1).
STANDARDS	NC.7.RP.2.
KEEP OUT	Reading the constant from a graph (Lesson 4) or an equation (Lesson 5). The word slope, now and all year.

Learning goals

1. Say that the constant of proportionality is the unit rate, the number that never changes.
2. Find it from a table (divide output by input) and from words (how much for one).
3. Check whether a pair fits by multiplying the input by the constant.
4. Compare two proportional relationships with matching units by their unit rates.

Vocabulary: say both, every time

The rule for the whole lesson: whenever the adult or the student says a math word, they follow it with the plain-English version. Proper term first, plain English second, until the student does it without being asked.

TERM	LOOKS LIKE	PLAIN ENGLISH
Constant of proportionality	35	The unit rate; the number it always multiplies by.
Constant	35, 35, 35	Never changes.
Compare	9 against 8	Decide which is more, and say why.

> THE ONE SENTENCE TO SAY OUT LOUD
>
> The constant of proportionality is the unit rate, the number that never changes.

Lesson timeline (25 minutes)

0:00 to 0:04	Warm-up. Divide the lemonade rows again. Ask: what is that number called? Give both names and the meaning of constant.
0:04 to 0:10	Mini-lesson: find it. From a table, from words (the landscaper). The four places list, with two saved for later.
0:10 to 0:15	Which pairs fit? Multiply the input by 35. The $80 pair that does not fit.
0:15 to 0:21	Compare. Mia and Jordan. The rule, and the warning about units. The three compare questions.
0:21 to 0:25	Exit ticket. Worksheet Part D. Success looks like both unit rates found before the comparison.

Misconceptions to listen for

- **Constant of proportionality is something new.** It is the unit rate.
- **Checking a pair by looking at the gap.** Multiply the input by the constant.
- **More total means a better rate.** Jordan's $40 for 5 hours is less per hour than Mia's $45.
- **Any two numbers can be compared.** Only when the units match.

Support and stretch

Support

Keep saying both names in one breath. For comparisons, write the units next to each unit rate before comparing, and only compare when they match.

Stretch

Give two relationships where the totals point one way and the unit rates the other. Ask the student to write a pair that fits a given constant and a pair that almost fits.

Where this goes next

Lesson 4: the graph. A proportional relationship is a straight line through the origin, and a bigger unit rate makes it steeper.

> THE HABIT TO BUILD
>
> Find the unit rate first. Everything else in this unit uses it.