

Proportional Reasoning

8.1 Comparing and Interpreting Rates

Learning Outcome:

Learn to represent, interpret, and compare rates.

Investigation:

Given the following definition of a rate:

A comparison of two amounts that are measured in different units.

With a partner, write down as many rates as you can think of:

A unit rate is a rate in which the numerical value of the second term is 1.

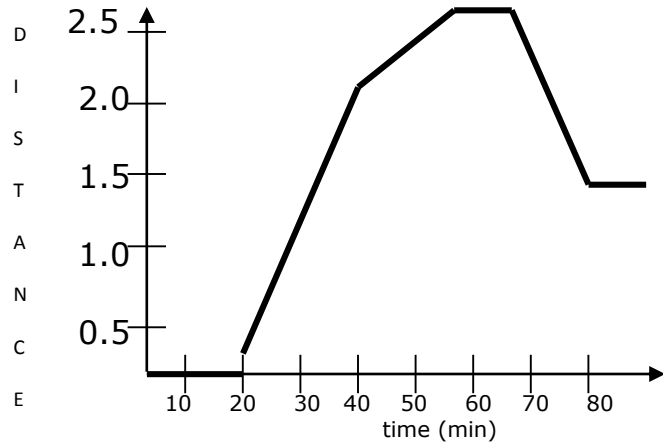
Write down a few examples of a unit rate:

Examples:

- 1) Payten can buy a 12kg turkey from one store for \$42.89. A second store has turkeys advertised for \$1.49/lb. There is about 2.2lb in 1kg.

Which store has the lower price?

2) Describe a scenario that could be represented by this graph. Compare the rates shown, and discuss why the rates may have changed.



3) When making a decision about buying a vehicle, fuel efficiency is often an important factor.

The gas tank on Graham's new car has a capacity of 55L. The owner's manual claims that the fuel efficiency of Graham's car is 7.6L/100 km on the highway. Before Dakota's first big highway trip, he set his trip meter to 0km so he could keep track of the total distance he drove. He started with the gas tank full. Each time he stopped to fill up the tank, he recorded the distance he had driven and the amount of gas he purchased.

Fill up	Total Distance Driven (km)	Quantity of Gas Purchased (L)
1	645	48.0
2	1037	32.1

On which leg of Dakota's trip was his fuel efficiency the best?

8.2 Solving Problems That Involve Rates

Learning Outcome:

Learn to analyze and solve problems that involve rates.

Investigation:

A car travels at 80km/h. What other rates, expressed using different units, could be used to describe the speed of the car? What would be some of the advantages of using these other rates?

Examples:

1) After graduation, Kendall moves to a town near the Canada-U.S. border. The gas tank of his truck holds about 90L. He can either buy gas in his town at \$1.06/L or travel across the border into the United States to fill up at \$2.86 U.S./gal.

a) Which option makes the most sense economically? (1 U.S. gallon is equivalent to 3.79L, \$1 U.S. is \$1.02 Can)

b) Kendall thinks that saving less than \$10 is not worth the time. If he had half a tank of gas in his truck, would it be worthwhile for him to fill up in the United States today?

Work with a partner for the following question:

- 2) Describe a situation in which each unit rate might be used. Identify and explain factors that could influence the unit rate in this situation:
- a) 0.05 mg/kg
 - b) 98.5¢/L
 - c) 7.2 MBps
- 3) Jenean is asked to order snacks for an office meeting of 180 people. She decides to order dessert squares, which come in boxes of 24. She estimates that she will need 2.5 squares/person. How many boxes should she buy?
- 4) Leah walks briskly, at 6km/h. When she walks at this rate for 2h, she burns 454 Cal. Brady walks at a slower rate, 4km/h, burning 62 Cal in 30 min. If Leah walks for 3h, how much longer will Brady have to walk in order to burn the same amount of Calories?