

Science Data Detectives

Use rates, ratios, and percent to make sense of measurements.

GRADE 8 • TEKS 8.2.C

8.2.C "use mathematical calculations to assess quantitative relationships in data; and"

NAME _____

DATE _____

CALCULATE THE RELATIONSHIP

A quantitative relationship compares two measured amounts. To find a unit rate, divide the measured output by the input and include units. To find a percent, divide the part by the whole, then multiply by 100.

WORKED EXAMPLE

A snail moves 28 cm in 4 minutes.
What is its average speed in cm/min?

1. Write the rate: 28 cm / 4 min.
2. Divide: $28 / 4 = 7$.
3. Keep the units: 7 cm/min.

Answer: 7 cm/min

PRACTICE 6 problems

- 1** An aquatic plant produces 45 mL of oxygen in 5 minutes. What is its average oxygen-production rate?

ANSWER _____

- 2** A mineral sample has a mass of 54 g and a volume of 6 cm³. Calculate its density.

ANSWER _____

- 3** A tray starts with 48 seeds. After one week, 12 seeds have sprouted. What percent of the seeds sprouted?

ANSWER _____

- 4** Plant A grows 36 mm in 6 days. Plant B grows 40 mm in 8 days. Which plant grows faster, and by how many mm/day?

ANSWER _____

- 5** Water temperature rises from 18°C to 30°C in 2 minutes. What is the average rate of temperature change?

ANSWER _____

- 6** A metal sample has a mass of 72 g and a volume of 9 cm³. What is its density?

ANSWER _____

APPLY IT Show your work

- 1** The table shows how much battery charge three solar chargers added during a test. Which charger had the greatest charge rate? If it kept that rate for 30 minutes, how many percentage points of charge would it add?

SOLAR CHARGER TEST

Charger	Charge gained	Test time
A	24 percentage points	12 min
B	27 percentage points	9 min
C	32 percentage points	16 min

ANSWER _____

- 2** A student makes a 200 mL electrolyte solution containing 2 g of salt. At the same salt concentration, how many grams of salt are needed for 500 mL of solution?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The table shows data from a class investigation of cricket chirps. Find the rate of change in chirps per °C. Then predict the number of chirps in 15 seconds at 30°C. Explain how the data support your prediction.

CRICKET CHIRP INVESTIGATION

Temperature	Chirps in 15 seconds
12°C	18
16°C	26
20°C	34
24°C	42

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	An aquatic plant produces 45 mL of oxygen in 5 minutes. What is its average oxygen-production rate?	9 mL/min
2	A mineral sample has a mass of 54 g and a volume of 6 cm ³ . Calculate its density.	9 g/cm³
3	A tray starts with 48 seeds. After one week, 12 seeds have sprouted. What percent of the seeds sprouted?	25%
4	Plant A grows 36 mm in 6 days. Plant B grows 40 mm in 8 days. Which plant grows faster, and by how many mm/day?	Plant A, by 1 mm/day.
5	Water temperature rises from 18°C to 30°C in 2 minutes. What is the average rate of temperature change?	6°C/min
6	A metal sample has a mass of 72 g and a volume of 9 cm ³ . What is its density?	8 g/cm³

PART 2 • APPLY IT

1. **Charger B, 90 percentage points.** Find each unit rate: A is 2 percentage points/min, B is 3 percentage points/min, and C is 2 percentage points/min. Charger B adds $3 \times 30 = 90$ percentage points.
2. **5 g** The concentration is 2 g / 200 mL, or 1 g / 100 mL. A 500 mL solution needs 5 groups of 100 mL, so it needs 5 g of salt.

CHALLENGE

The rate is 2 chirps per °C. The prediction is 54 chirps in 15 seconds because every 4°C increase adds 8 chirps, so a 6°C increase from 24°C adds 12 chirps to 42.

Accept equivalent rate units, such as 9 mL per minute. For Problem 4, students may show Plant A at 6 mm/day and Plant B at 5 mm/day before stating the difference.