

# Units That Carry Meaning

Student Worksheet | g09\_u01\_w04

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Today I can:** build conversion factors that equal one, cancel units, choose a conversion path, and round calculated results using significant figures.

**Time and use:** 95 minutes; class, homework, tutoring, club, or independent practice.

**Vocabulary / prerequisites:** conversion factor, dimensional analysis, reciprocal, scientific notation, significant figures, exact number, rounding; Week 3 measurement and uncertainty.

## A. Quick checks

1. How many significant figures are in 0.00450? In  $4.500 \times 10^3$ ?

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2. Which is exact: 12 eggs or 12.0 g? Why?

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3. Convert 2.50 m to cm.

\_\_\_\_\_

4. Convert 375 mL to L.

\_\_\_\_\_

5. Convert 1.25 h to s.

\_\_\_\_\_

6. Choose the factor that converts 60 min to hours: 60 min/1 h or 1 h/60 min.

\_\_\_\_\_

7. Complete  $18.0 \text{ g} \times (1 \text{ kg}/1000 \text{ g})$ .

\_\_\_\_\_

## B. Guided application

8. Convert  $2.35 \text{ g}/\text{cm}^3$  to  $\text{kg}/\text{L}$ .

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9. Convert 72.0 km/h to m/s.

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10. Apply significant figures:  $3.4 \times 2.15$ .

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11. Apply decimal-place rule:  $12.11 + 0.3 + 4.256$ .

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12. Write 0.0006780 in scientific notation.

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13. Why can you not convert 25 mL directly to grams without more information?

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14. Convert 3.50 ft to cm using 12 in/ft and 2.54 cm/in.

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### C. Apply to evidence

15. Convert 250 mg sodium to grams. What does this number not say about sodium metal in food?

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16. A probe travels 17.0 km/s. Convert to km/h.

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17. A 2.0-L bottle fills 125-mL cups. How many planned cups? State one real-world limitation.

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### Competition Corner

18. A lab needs 0.0500 g. A balance reads 48.7 mg. Convert, find the shortfall in g and mg, and discuss needed balance resolution.

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19. From  $m = 12.0$  g and  $V = 4.35$  mL, calculate density and choose among 2.8, 2.76, 2.759 g/mL.

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20. A student converts  $3.0 \text{ m}^2$  to  $300 \text{ cm}^2$ . Correct the setup and explain the square-factor error.

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