

WORKSHEET High school · ages 14–18

Metric conversions

All the prefixes, scientific notation and dimensional analysis.



Name _____ Date _____ Class _____ Score _____ / 28

DIMENSIONAL ANALYSIS

Start with the quantity. Multiply by fractions equal to 1, with the unwanted unit on the bottom so it cancels. Square the factor for area, cube it for volume.

$$72 \text{ km/h} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ h}}{3600 \text{ s}} = 20 \text{ m/s}$$

SCIENTIFIC NOTATION

 $a \times 10^n$ with $1 \leq a < 10$
T 10^{12} · G 10^9 · M 10^6 · k 10^3 m 10^{-3} · μ 10^{-6} · n 10^{-9} · p 10^{-12}
ROUNDING RULE Round to 3 significant figures unless the answer is exact. Where asked, give scientific notation ($a \times 10^n$ with $1 \leq a < 10$).

A

All the prefixes

Convert. Give your answer in scientific notation.

- | | | | |
|---|-------------------------|---|-------------------------|
| 1 | 269 kL = _____ μ L | 2 | 823 μ g = _____ ng |
| 3 | 4.87 pm = _____ μ m | 4 | 1.15 μ L = _____ nL |
| 5 | 407 L = _____ ML | | |

B

Scientific notation

Rewrite, or convert from scientific notation.

- | | | | |
|---|-------------------------|---|---|
| 6 | $7 \times 10^5 =$ _____ | 7 | $2.5 \times 10^6 \text{ m} =$ _____ Mm |
| 8 | 400,000 = _____ | 9 | $1.4 \times 10^{-3} \mu\text{m} =$ _____ nm |

C

Long conversions

Chain the factors. Cancel units as you go.

- | | | | |
|----|--------------------|----|------------------------|
| 10 | 0.5 gal = _____ mL | 11 | 0.5 in = _____ μ m |
| 12 | 1 qt = _____ mL | 13 | 4 lb = _____ mg |
| 14 | 2 yd = _____ cm | | |

D Area and volume

Square the factor for area, cube it for volume.

15 $100 \text{ in}^3 =$ _____ mL

17 $10 \text{ mi}^2 =$ _____ km^2

19 $5 \text{ acre} =$ _____ ha

16 $1 \text{ ft}^3 =$ _____ L

18 $0.5 \text{ gal} =$ _____ cm^3

E Rates and density

Use dimensional analysis: line up the fractions so the units cancel.

20 $36 \text{ km/h} =$ _____ m/s

22 $125 \text{ mL/min} =$ _____ L/h

24 $80 \text{ km/h} =$ _____ mi/h

21 $14.7 \text{ lb/in}^2 =$ _____ kg/cm^2

23 $60 \text{ mi/h} =$ _____ m/s

25 $10 \text{ gal/min} =$ _____ L/min

F Word problems

Show your work in the box. Include units.

- 26 An IV drip delivers 500 mL per hour. How many liters does it deliver in 4 hours?

WORK

Answer _____ L

- 27 A metal block has a mass of 135 g and a volume of
- 50 cm^3
- . What is its density in
- kg/m^3
- ? Give 3 significant figures.

WORK

Answer _____ kg/m^3

- 28 Noah tiles a square of side 12 m. What is the area in square millimeters? Give your answer in scientific notation.

WORK

Answer _____ mm^2