

The following pages will be graded on completion. They are worth 10 points per page. You may check your answers on the key posted in the room or on the key that is on my website.

## Metric Units of Measure and Conversions

Write the correct abbreviation for each metric unit or the metric unit that matches the abbreviation.

- 1) Kilogram = kg                      2) Milliliter = ~~mL~~ mL                      3) Kilometer = km
- 4) Meter = m                      5) Centimeter = cm                      6) Miliseconds = ms
- 7) Gram = g                      8) nanometer = nm                      9) Microgram = ug

Convert the following amounts. Write the conversion factor for each under the problem.  
If more than one conversion factor is needed, write them both.

10) 2000 mg = <u>2</u> g <u>1000mg = 1g</u>	11) 5L = <u>5000</u> mL <u>1L = 1000 mL</u>	12) 16 cm = <u>160</u> mm <u>1m = 100 cm</u> <u>1000 mm = 1 m</u>
13) 104 km = <u>104,000</u> m <u>1 Km = 1000 m</u>	14) 198,000 ng = <u>.000198</u> g <u>1g = 1,000,000,000 ng</u>	15) 2500 m = <u>2.5</u> km <u>1 Km = 1000 m</u>
16) 480 cm = <u>4.8</u> m <u>1 m = 100 cm</u>	17) 75 mL = <u>.075</u> L <u>1L = 1000 mL</u>	18) 65g = <del>65</del> <sup>65,000</sup> mg <u>1g = 1,000</u>
19) 5.6 kg = <u>5600</u> g <u>1 Kg = 1000g</u>	20) 50 cm = <u>.5</u> m <u>1m = 100cm</u>	21) 6.3 um = <u><math>6.3 \times 10^{-6}</math> or .0000063</u> m <u>1m = 1,000,000 um</u>
22) 8mm = <u>.8</u> cm <u>1m = 1000 mm</u> <u>1m = 100 cm</u>	23) 5.6 km = <u>560,000</u> <sup>or <math>5.6 \times 10^5</math></sup> cm <u>1 Km = 1000 m</u> <u>1m = 100 cm</u>	24) 120,000,000 ug = <u>.12</u> kg <u>1g = 1,000,000 ug</u> <u>1 Kg = 1000g</u>

# Metric Measurement Conversion

Directions: Write the equivalent measure for each problem. **SHOW ALL WORK!**

1. 470 ml = .47 L  
 $470 \text{ ml} \times \frac{1 \text{ L}}{1000 \text{ ml}} = .47 \text{ L}$

2. 2000 L = 2 kL  
 $2000 \text{ L} \times \frac{1 \text{ kL}}{1000 \text{ L}} = 2 \text{ kL}$

3. 83 g = .083 kg  
 $83 \text{ g} \times \frac{1 \text{ kg}}{1000 \text{ g}} = .083 \text{ kg}$

4. 41300 L = 41.3 kL  
 $41300 \text{ L} \times \frac{1 \text{ kL}}{1000 \text{ L}} = 41.3 \text{ kL}$

5. 5340 mg =  $5.34 \times 10^9$  ng  
 $5340 \text{ mg} \times \frac{1 \text{ g}}{1000 \text{ mg}} = 5.34 \text{ g} \times \frac{1,000,000,000 \text{ ng}}{1 \text{ g}}$

6. 2000 m = 2 km

7. 13200 kg =  $1.32 \times 10^7$  g

8. 1,000,000 μg = 1 g

9. 320 ml = .32 L  
 $320 \text{ ml} \times \frac{1 \text{ L}}{1000 \text{ ml}} = .32 \text{ L}$

10. 12 L = 12,000 ml  
 $12 \text{ L} \times \frac{1000 \text{ ml}}{1 \text{ L}} = 12,000 \text{ ml}$

11. 800 L = .8 kL

12. 250 cm = 2.5 m

13. 2000 μl = .002 L

14. 7000 ml = 7 L

15. 72 cm =  $7.2 \times 10^8$  nm  
 $72 \text{ cm} \times \frac{1 \text{ m}}{100 \text{ cm}} = .72 \text{ m} \times \frac{1 \times 10^9 \text{ nm}}{1 \text{ m}} = 7.2 \times 10^8$

16. 900 L = 900,000 ml

17. 65 m =  $6.5 \times 10^7$  μm  
 $65 \text{ m} \times \frac{1,000,000 \mu\text{m}}{1 \text{ m}} = 6.5 \times 10^7$

18. 100 cm = 1 m

Which Unit of measure would be best to measure:

(use only the base measurement and the prefixes Kilo, centi, milli. Example: meters, Kilometers, Centimeters, or millimeters).

19. The volume of a bathtub? L

20. The mass of a car? kg

21. The distance to the restroom from Mr. Mann's room? m

22. The distance to Manhattan? Km

23. The mass of aspirin in one pill? mg

24. The volume of a glass of water? mL or cL

25. Density is the measurement of mass <sup>Density</sup> & volume.

26. The formula for density is mass/volume & the units are g/mL.

27. What is the density of Aluminum if 50 g has a volume of 18.5 mL?

$$D = \frac{m}{V} = \frac{50 \text{ g}}{18.5 \text{ mL}} = 2.7 \text{ g/mL}$$

28. What is the mass of Lead if it's density is 11.35 g/mL and there is a volume of 1.3L?

$$\frac{m}{V} \cdot V = \frac{m}{V} \cdot V \quad m = D \cdot V \quad m = 11.35 \text{ g/mL} \cdot 1.3 \text{ L} = 14.8 \text{ g}$$

## Significant Figures

1. Determine the number of significant figures in the following numbers:

a. 3500 2

b. 45.1 3

c. 305 3

d. 0.1340 4

e. 420.10 5

f. 0.000210 3

g.  $3.05 \times 10^{18}$  3

h.  $1.440 \times 10^{-5}$  4

2. Round the following numbers to 3 significant figures.

a. 452.12 452

b. 0.01253 0.0125

c. 1.645 1.64

d. 62.75 62.8

e. 4809.4 4810

f. 1.5860 1.59

3. Perform the following calculations- keeping the correct number of significant figures.

a.  $4.52 + 6.257 = 10.78$

b.  $8.6942 - 5.236 = 3.458$

c.  $4.52 \times 0.124 = .560$

d.  $524.01 \times 25.04 = 13120$

e.  $85.30 / 80.040 = 1.066$

f.  $265.14 / 51.0007 = 5.1988$

## Percent Error-

Calculate the percent error. Show all work.

1. EV = 1.24g  
AV = 1.30g

$$\frac{|1.24 - 1.30|}{1.30} \times 100 = 4.62\%$$

4. EV = 22.2L  
AV = 22.4L

$$\frac{|22.2 - 22.4|}{22.4} \times 100 = .893\%$$

2. EV =  $1.24 \times 10^4$ g  
AV =  $9.98 \times 10^3$ g

$$\frac{|1.24 \times 10^4 - 9.98 \times 10^3|}{9.98 \times 10^3} \times 100 = 24.2\%$$

5. EV = 125.2mg  
AV = 124.8mg

$$\frac{|125.2 - 124.8|}{124.8} \times 100 = .321\%$$

3. EV = 252ml  
AV = 225ml

$$\frac{|252 - 225|}{225} \times 100 = 12\%$$

6. EV = 2.86 mL  
AV = 2.59 mL

$$\frac{|2.86 - 2.59|}{2.59} \times 100 = 10.4\%$$

## Scientific Notation

25. Express each of the following large numbers in scientific notation.

(a) 120

$$1.2 \times 10^2$$

(b) 3000

$$3 \times 10^3$$

(c) 65 000

$$6.5 \times 10^4$$

(d) 34 000

$$3.4 \times 10^4$$

(e) 45 000 000

$$4.5 \times 10^7$$

(f) 4 000 000 000 000

$$4 \times 10^{12}$$

26. Express each of the following small numbers in scientific notation.

(a) 0.002

$$2 \times 10^{-3}$$

(b) 0.000 004 5

$$4.5 \times 10^{-6}$$

(c) 0.000 003

$$3 \times 10^{-6}$$

(d) 0.000 000 64

$$6.4 \times 10^{-7}$$

(e) 0.004

$$4 \times 10^{-3}$$

(f) 0.000 000 000 000 000 08

$$8 \times 10^{-17}$$

27. Express each in standard notation.

example:  $1.24 \times 10^{-3} = 0.001\ 24$

(a)  $2.5 \times 10^{-4}$

$$.00025$$

(b)  $2.5 \times 10^8$

$$250\,000\,000$$

(c)  $2.51 \times 10^{-1}$

$$.251$$

28. Express each in scientific notation.

(a) 13 000

$$1.3 \times 10^4$$

(b) 0.005 06

$$5.06 \times 10^{-3}$$

(c) 7 091 000

$$7.091 \times 10^6$$

(d) -0.000 005

$$-5 \times 10^{-6}$$

(e)  $36 \times 42 \times 456$

$$6.89 \times 10^5$$

29. Calculate. Express your final answer in scientific notation.

(a)  $(-5.4 \times 10^5) \times (4.0 \times 10^2)$

$$-2.16 \times 10^8$$

(b)  $(7.3 \times 10^{-2}) / (3.01 \times 10^3)$

$$2.43 \times 10^{-5}$$

(c)  $(3.0 \times 10^2) \times (2.2 \times 10^{-3})$

$$6.6 \times 10^{-1}$$