

Key

Chapter 1 Worksheet

What is matter?

Anything that has mass and takes up space

- States of matter Solid (ice), liquid (liquid water), gas (water vapor)
- Composition of matter
- Examples

List an example of a homogeneous and heterogeneous mixture:

homogenous: uniform composition

- Saltwater
- Air
- Koolaid

heterogeneous: non-uniform composition

- Oil + Water mixture
- Soil
- Salad

What is an intensive property? Provide examples:

Property of matter that depends only on the type of matter in a sample and not on the amount.

- Color
- density
- temperature
- solubility

What is an extensive property? Provide examples:

Property that depends on amount of matter in a sample.

- mass
- volume
- energy

Give an example of a physical change and a chemical change:

Physical change: changes in matter that do not change composition of substance

- change of state
- temp
- volume

Chemical change: change that results in new substances

- combustion
- oxidation
- decomposition

What are significant figures?

All digits of a measured quantity.

What are the rules for sig figs?

- All non zero digits are
- Zeros between nonzero digits are significant
- Zeros at beginning of a number are never significant
- Zeros at end of a number are significant if it contains a decimal point.

Identify the number of significant figures:

432

3

0.00789

3

10100

3

3.040

4

7.5×10^3

2

120.00

5

560,000.

6

10^2

1

Write each number given using exactly the number of significant figures specified:

1. Rewrite 2543 with 2 sig figs: 2500

2. Rewrite 7.4368 with 3 sig figs: 7.44

3. Rewrite 120,000 with 4 sig figs: 1.200×10^5

Provide answers with the correct number of sig figs for following questions:

What is $12.35 \text{ mL} + 7.2 \text{ mL} + 0.678 \text{ mL}$?

$= 20.228$

$\rightarrow$

20.2 mL

Calculate: $4.56 \text{ cm} \times 2.3 \text{ cm} \times 0.123 \text{ cm}$

$= 1.290024 \text{ cm}$

$\rightarrow$

1.3 cm³

Convert the following problems:

0.00042 liters to milliliters

$$1 \text{ L} = 1,000 \text{ mL}$$

$$0.00042 \cancel{\text{L}} \cdot \frac{1,000 \text{ mL}}{1 \cancel{\text{L}}} = \boxed{0.42 \text{ mL}}$$

6700 milligrams to grams

$$1,000 \text{ mg} = 1 \text{ g}$$

$$6700 \cancel{\text{mg}} \cdot \frac{1 \text{ g}}{1,000 \cancel{\text{mg}}} = \boxed{6.7 \text{ g}}$$

35 meters to inches

$$1 \text{ in} = 2.54 \text{ cm}$$
$$100 \text{ cm} = 1 \text{ m}$$

$$35 \cancel{\text{m}} \cdot \frac{100 \cancel{\text{cm}}}{1 \cancel{\text{m}}} \cdot \frac{1 \text{ in}}{2.54 \cancel{\text{cm}}} = 1,377.95 \rightarrow \boxed{1378 \text{ in}}$$

What is 83° F converted into Celsius and Kelvin?

$$\begin{aligned} ^\circ\text{C} &= (^\circ\text{F} - 32^\circ\text{F}) \left(\frac{5^\circ\text{C}}{9^\circ\text{F}} \right) \\ &= (83 - 32) \left(\frac{5}{9} \right) \\ &= \boxed{28.3^\circ\text{C}} \end{aligned}$$

~~$$^\circ\text{C} = \text{K} - 273.15$$~~

$$\begin{aligned} \text{K} &= ^\circ\text{C} + 273.15 \\ &= 28.3 + 273.15 \\ &= \boxed{301.5 \text{ K}} \end{aligned}$$

What is 492K converted into Celsius and Fahrenheit?

$$\begin{aligned} ^\circ\text{C} &= \text{K} - 273.15 \\ 492 - 273.15 &= ^\circ\text{C} \\ 218.9^\circ\text{C} \end{aligned}$$

$$\begin{aligned} ^\circ\text{F} &= \left(\frac{9}{5} \right) (^\circ\text{C}) + 32^\circ\text{F} \\ &= \left(\frac{9}{5} \cdot 218.9 \right) + 32 \\ &= \boxed{425.9^\circ\text{F}} \end{aligned}$$

Solve for density:

A solution has a mass of 250.0 g and a volume of 200.0 mL. What is its density?

$$D = \frac{m}{V}$$

g/mL
g/cm³

$$\frac{250.0 \text{ g}}{200.0 \text{ mL}} = 1.25 \text{ g/mL} \rightarrow \boxed{1.250 \text{ g/mL}}$$