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)

List an example of a homogeneous and heterogeneous mixture:

homogenous: uniform composition

- orange juice
- Air
- coffee

heterogenous: non-uniform composition

- trail mix
- pizza
- 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 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.

- ▲ changes 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 nonzero digits are significant.
- Zeroes between nonzero digits are significant. "sandwhich"
- Zeroes at beginning of a number are never significant. "leading = NO"
- Zeroes at end of a number are significant if it contains a decimal point. "trailing 0's need decimal"

Identify the number of significant figures:

432	~~0.00~~789	10100	3.040
3	3	3	4

7.5×10^3	120.00	560,000.	$10^2 = 100$
2	5	6	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 mL + 7.2 mL + 0.678 mL?

2 dec. (1 dec.) 3 dec. places

$= 20.228$ mL → 20.2 mL

- Add/Subtract look for least # of decimal places.

Calculate: 4.56 cm × 2.3 cm × 0.123 cm

2 least # of sig figs

$= 1.290024$ cm → 1.3 cm

- Multiply / Divide look for least # of sig figs

want / have

Convert the following problems:

1 L = 1,000 mL

0.00042 liters to milliliters

2 sig figs

$0.00042\ \cancel{L} \cdot \frac{1000\ \text{mL}}{1\ \cancel{L}} = \boxed{0.42\ \text{mL}}$

6700 milligrams to grams

1000 mg = 1 g

2 sig figs

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

35 meters to inches

1 in = 2.54 cm

100 cm = 1 m

2 sig figs

$35\ \cancel{\text{m}} \cdot \frac{100\ \cancel{\text{cm}}}{1\ \cancel{\text{m}}} \cdot \frac{1\ \text{in}}{2.54\ \cancel{\text{cm}}} = 1{,}377.95\ \text{in} \rightarrow \boxed{1.4 \times 10^3\ \text{in} \quad \text{or} \quad 1400}$

What is 83° F converted into Celsius and Kelvin?

$°C = (°F - 32°F)\left(\frac{5°C}{9°F}\right)$

$= (83°F - 32°F)\left(\frac{5°C}{9°F}\right)$

$= \underline{28.3°C}$

$K = °C + 273.15$

$= 28.3°C + 273.15$

$= \underline{301.5\ K}$

What is 492K converted into Celsius and Fahrenheit?

$°C = K - 273.15$

$= 492\ K - 273.15$

$= \underline{218.9°C}$

$°F = \left(\frac{9}{5}\right)(°C) + 32°F$

$= \left(\frac{9}{5}\right)(218.9°C) + 32°F$

$= \underline{425.9°F}$

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 — units for density

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