

**TEST 1 (of 3)**

**Show all of your work. Students should make use of the conversion factor method throughout and express their answers in scientific notation.**

- Complete the following sentences:
  - \_\_\_\_\_ property - A characteristic shown by a substance, without interacting with or changing into other substances.
  - \_\_\_\_\_ property - A characteristic of a substance appears as it interacts with, or transforms into, other substances
- Which of the following is a chemical change? Explain your reasoning.
  - Boiling canned soup.
  - Toasting a slice of bread.
  - Chopping a log.
  - Burning a log.
- Categorize the following in the table below: volume, density, melting point, color, weight

Property	
Intensive	Extensive

- Round off each number to the indicated number of significant figures:
  - 0.0003554 (to 2 SF)
  - 35.8348 (to 4 SF)
  - 144,000 to 1 SF)
- Convert the following into correct scientific notation:

e.g.  $14.3 \times 10^3 = 14,300 = 1.43 \times 10^4$

  - $0.2 \times 10^5$
  - $7500 \times 10^{-2}$
  - $0.077 \times 10^{-9}$
  - 150.
- Why is a quantitative observation more useful than a non-quantitative one? Which of the following are quantitative? (circle your answers)
  - The sun rises in the east.
  - An astronaut weighs one-sixth as much on the Moon as on Earth.
  - Ice floats on water.
  - An old fashioned hand pump cannot draw water from a well more than 34 ft deep.

7. (a) Write down a conversion factor (CF) ratio for converting grams to kilograms.
- (b)  $1 \text{ cm}^3 = 1 \times 10^{-6} \text{ m}^3$ . Write down a conversion factor (CF) ratio for converting  $\text{cm}^3$  to  $\text{m}^3$ .
- (c) The average density of the Earth is  $5.52 \text{ g/cm}^3$ . What is its density in  $\text{Kg/m}^3$ ?
8. Carry out the following calculation, paying special attention to significant figures, rounding, and units.

$$\frac{(6.022 \times 10^{23} \text{ atoms/mol})(1.19 \times 10^2 \text{ g})}{46.07 \text{ g/mol}} \quad \text{[where mol is the SI unit for moles of substance]}$$

9. Define specific gravity. What is the specific gravity of water? Why is the specific gravity of a substance a dimensionless quantity?
10. Given  $^{\circ}\text{F} = 9/5 ^{\circ}\text{C} + 32$  perform the following conversions:
- (a)  $-164 ^{\circ}\text{C}$  (the boiling point of methane) to  $^{\circ}\text{F}$ .
- (b)  $72 ^{\circ}\text{F}$  (a pleasant spring day) to  $^{\circ}\text{C}$ .
- (c)  $0 \text{ K}$  (absolute zero, theoretically the coldest possible temperature) to  $^{\circ}\text{C}$  and  $^{\circ}\text{F}$ .

#### BONUS

Copper can be drawn into thin wires. How many meters of 34-gauge wire (diameter =  $0.0160 \text{ cm}$ ) can be produced from the copper in  $5.01 \text{ lb}$  of copper ore that is 66% copper by mass?

- (a) Convert the mass of the ore in  $\text{lb}$  to  $\text{g}$  using the equivalence statement  $1 \text{ lb} = 454 \text{ g}$
- (b) If the ore is 66% by mass, what is the mass of copper in grams?
- (c) The density of copper =  $8.95 \text{ g/cm}^3$ . What is the volume of copper in  $\text{cm}^3$ ?
- (d) Treat the wire as a cylinder,  $\text{Volume} = \pi \times r^2 \times h$ .

Find height,  $h$ .