**TLDR 1.2 Matter and its Properties (pp. 10-19)**

1. Define the following terms:

***mass, matter, atom, element, compound, extensive property, intensive property, physical property, physical change, change of state, solid, liquid, gas, plasma, chemical property, chemical change, chemical reaction, reactant, product, mixture, homogeneous mixture, heterogeneous mixture, pure substance***.

2. Distinguish between **intensive** properties of matter and **extensive** properties of matter. Give an example of each.

3. Complete the following table regarding the physical properties of the various states of matter.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **State of matter** | shape  definite/indefinite | flows?  (y/n) | compressible? (y/n) | constant volume? (y/n) | expands when heated? (y/n) |
| solid | *definite* |  |  | *yes* |  |
| liquid |  | *yes* |  |  |  |
| gas |  |  | *yes* |  | *yes, alot* |

**Changes in Matter**

1. Restate, in your own words, the Law of Conservation of Mass.

2. Compare and contrast physical changes of matter and chemical changes of matter.

3. What are some of the indications that a chemical change has taken place?

**Mixtures of Matter**

1. What is the definition of a mixture? Compare and contrast heterogeneous mixtures and homogeneous mixtures.

2. List some examples of methods used to separate the substances in a mixture.

3. Draw the concept map classifying all matter in the universe described by Mr. Whalley in class. (A less-awesome example is on page 15 of your textbook).

**TLDR 2.1 The Scientific Method (pp. 31-35)**

1. Define the following terms:

***Scientific method, model, system, theory, hypothesis, scientific law.***

1. Evaluate the statement: “once a theory is proven, it becomes a law.”
2. How accurate is the linear depiction of the scientific method depicted on page 35?

**TLDR 2.2 Units of measurement (pp. 37-46)**

1. Whenever you have an equation relating two measure values to one another, you can write two conversion factors that can be used to convert a value measured in one of the units into a result expressed in the other. For example;



2. Write the two conversions that follow from the following unit equivalences listed below.

a. 1 km = 1000 m b. 1g = 10 dg c. 1 L = 100 cL d. 1 s = 1000 ms

e. 1 g = 1 000 000 μg f. 1 L = 1 000 000 000 nL g. 1 m = 1 000 000 000 000 pm

3. Use the conversion factors you wrote above to perform the conversions indicated below.

a. 3.65 km 🡪 \_\_\_m b. 7930 dg 🡪 \_\_\_g c. 6.50 L 🡪 \_\_\_cL d. 0.3405 ms 🡪 \_\_\_s

e. 650 μg 🡪 \_\_\_g f. 0.04056 L 🡪 \_\_\_nL g. 500 pm 🡪 \_\_\_m

**Dimensional analysis**

1. Use dimensional analysis to perform the following calculations using SI derived units.

[helpful conversion factors: 1.0 cm3 = 1.0 mL, 1.61 km = 1.0 mi., 2.54 cm = 1.0 in., 5280 ft. = 1.0 mi.]



a. 45.6 m2 🡪 \_\_\_cm2 b. 0.540 L 🡪 \_\_\_m3 c. 75.0 mi./hr 🡪 \_\_\_m/s

d. 1.78 g/cm3 🡪 \_\_\_kg/m3

e. Calculate the mass in kg of a rectangular gold bar with dimensions (l x w x h) 20.0 cm x 10.0 cm x 5.0 cm. The density of gold is 19.3 g/cm3.

2. Express your answers for the previous three questions using scientific notation, if you haven’t already.

**TLDR 2.3 Using Scientific Measurements (pp. 48-62)**

1. Compare and contrast precision and accuracy as applied to scientific measurements.

2. Write down the rules for significant zeros as listed in the textbook and/or your notes.

3. What is the equation for calculating percentage error?

4. Determine the number of significant digits in the following values.

a. 100 m b. 3.406 L c. 0.002 g d. 100.01 s e. 36 protons

f. 3.507 kg g. 6.00 x 103 L h. 100.00 m i. 4.065 g/cm3 j. 12 in = 1.0 ft

**Rules for doing arithmetic operations using significant digits.**

|  |  |
| --- | --- |
| Arithmetic Operators | |
| + -  (addition/ subtraction) | \* /  (multiplication/division) |
| The number of significant digits reported in the solution should be equal to the number of significant digits in the value used in the calculation that had the  **Fewest digits to the right of the decimal point.** | The number of significant digits reported in the solution should be equal to the number of significant digits in the value used in the calculation that had the  **Fewest number of significant digits.** |

3. Perform the indicated calculations and round your answers to the correct number of significant digits. Be sure to include the appropriate units in your answers.

a. 36.0 cm x 1.0 cm = b. 46.20g / 3.65 mL = c. 6.002 g x 12 nails =

d. 7.304 hr x (60mi/1hr)= e. (10.0 cm x 100.4 cm x 4.5 cm) x (11.34g/cm3)=

f. 9.605 mL – 6.0 mL = g. 10.037g + 3.6g= h. (2.604g + 3.45g) / (4.0mL) =