**Unit 0 Study Guide**

**The Step of the Scientific Method**

* Be able to name and identify the steps of the scientific method in a given scenario.

**Determining Variables**

* Be able to identify the independent, dependent and control variables in an experiment.

**Accuracy and Precision**

* Given a data table, be able to identify which trials are accurate, precise, both or neither.

**Metric Conversions**

1. 4m = \_\_\_\_\_\_\_mm
2. 49cm = \_\_\_\_\_\_\_m
3. 16kg = \_\_\_\_\_\_\_g
4. 97dm = \_\_\_\_\_\_\_mm
5. 25L = \_\_\_\_\_\_\_mL
6. 437dg = \_\_\_\_\_\_\_g
7. 4.3km = \_\_\_\_\_\_\_m
8. 5mm = \_\_\_\_\_\_\_cm
9. 1.6L = \_\_\_\_\_\_\_mL

**Dimensional Analysis:** Complete the following conversions **using the steps of dimensional analysis**

1. 0.85 qt = \_\_\_\_\_\_\_\_\_\_\_ mL
2. 61 cm = \_\_\_\_\_\_\_\_\_\_ ft

3. 1.2 kg = \_\_\_\_\_\_\_\_\_\_\_ oz

4. 2 L = \_\_\_\_\_\_\_\_\_\_ pt

5. The distance from a Port Huron to the Indiana State line is approximately 271 miles (via I-94). Express this distance in kilometers.

6. A baby born in the US weighs 3.295 kg according to the scale in the birthing room. Convert this to pounds and ounces so you can tell the grandparents how much the baby weighed.

7. A child requires a 5 ml dose of medicine each day. How many days would a gallon of this medicine last?

**Scientific Notation**

**Convert the following numbers to "Standard Notation" [ie, 103 = 1000]:**

1. 2 x 103 =
2. 2.331 x 105 =
3. 9.51 x 1022 =
4. 5 x 10-3 =
5. 7.6278 x 10-5 =
6. 8 x 10-1
7. The age of earth is approximately 4.5 X 109 years. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ yrs
8. The weight of one atomic mass unit (a.m.u.) is 1.66 x 10-27 kg

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_kg

**Calculating Density**

**Use the following formula to answer the problems. You must SHOW your work, CIRCLE your answer, and INCLUDE appropriate units.**

1. What is the density of carbon dioxide gas if 0.196 g occupies a volume of 100 mL?
2. A block of wood 3.0 cm on each side and has a mass of 27 g. What is the density of this block?
3. An irregularly shaped stone was lowered into a graduated cylinder holding a volume of water equal to 2.0 mL. The height of the water rose to 7.0 mL. If the mass of the stone was 25 g, what was its density?
4. A sample of copper has a mass of 89.6 g. If the density of copper is 8.96 g/cm3, what is the mass of copper?
5. Silver has a density of 10.5 g/cm3 and gold has a density of 19.3 g/cm3. Which would have a greater mass, 5 cm3 of silver or 5 cm3 of gold?

 **Scientific Notation and Significant Figures**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **# of Sig Figs** | **# in Scientific** **Notation** |  |  | **# of Sig Figs** | **# in Scientific** **Notation** |
| 1 | 1.05 |  |  | 12 | 12300000  |  |  |
| 2 | 0.0003040 |  |  | 13 | 56.340502 |  |  |
| 3 | 5.40 |  |  | 14 | 9.2003498 |  |  |
| 4 | 200  |  |  | 15 | 39999999  |  |  |
| 5 | 210 |  |  | 16 | 345.56 |  |  |
| 6 | 0.00120  |  |  | 17 | 4500 |  |  |
| 7 | 801.5 |  |  | 18 | 239.1300 |  |  |
| 8 | 0.0102  |  |  | 19 | .00004976  |  |  |
| 9 | 1,000 |  |  | 20 | 1.200 |  |  |
| 10 | 0.0009010  |  |  | 21 | 25.0086 |  |  |
| 11 | 101.0100 |  |  | 22 | 1000000 |  |  |