# Unit 0.1: Metric System

**Notes for/from class**

**Further Reference: 1.2 The Way Science Works and 1.3 Organizing Data**

**THE BASICS**

1. The 7 SI base units and what each measures:
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_) – a measure of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_) – a measure of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_) – a measure of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_) – a measure of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_) – a measure of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_) – a measure of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_) – a measure of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Every measurement will include \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**PREFIXES**

1. The prefixes from largest to smallest:
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_) : one \_\_\_\_\_\_\_\_\_\_\_\_ is equal to 1000 meters
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_) : one \_\_\_\_\_\_\_\_\_\_\_\_ is equal to 100 liters
   3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_) : one \_\_\_\_\_\_\_\_\_\_\_\_ is equal to 10 grams
   4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_) : one \_\_\_\_\_\_\_\_\_\_\_\_ is equal to 1/10 meters
   5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_) : one \_\_\_\_\_\_\_\_\_\_\_\_ is equal to 1/100 liters
   6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_) : one \_\_\_\_\_\_\_\_\_\_\_\_ is equal to 1/1000 grams
2. Remember, these \_\_\_\_\_\_\_\_\_\_\_\_\_\_ are always added to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Bases in order:
   1. \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
4. And to help you remember:
   1. \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_

**CONVERTING UNITS**

1. When you are converting from on unit to another, you:
   1. First, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Then, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. If you move to the \_\_\_\_\_\_\_\_\_\_\_\_\_ (aka: \_\_\_\_\_\_ to \_\_\_\_\_\_) the you move the decimal to the \_\_\_\_\_\_\_\_\_\_\_\_\_

**Notes for/from class**

1. If you move to the \_\_\_\_\_\_\_\_\_\_\_\_\_ (aka: \_\_\_\_\_\_ to \_\_\_\_\_\_) the you move the decimal to the \_\_\_\_\_\_\_\_\_\_\_\_\_

**PRACTICE PROBLEMS:**

1. 1 meter = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ hectometers K H Da B D C M
2. 2.5 kilograms = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ grams K H Da B D C M
3. 17.504 deciliters = \_\_\_\_\_\_\_\_\_\_\_\_ decaliters K H Da B D C M
4. 2.16 grams = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ kilograms K H Da B D C M
5. 3.2 liters = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ centiliters K H Da B D C M
6. 1 meter = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ centimeters K H Da B D C M
7. 9.3 decameters = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ millimeters K H Da B D C M

**PRECISION AND ACCURACY**

1. Precision is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

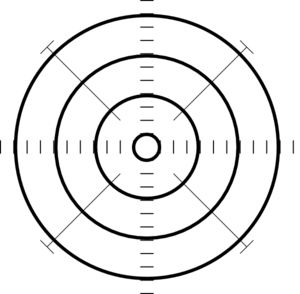
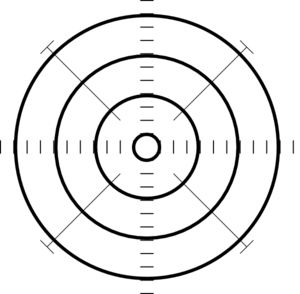
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

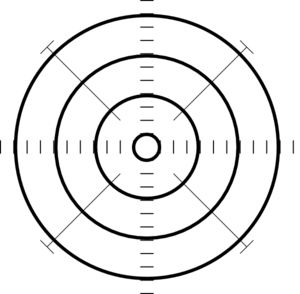
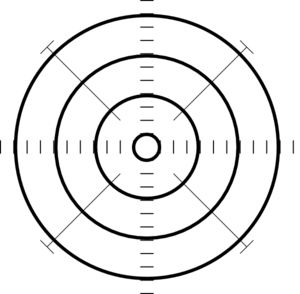
1. Accuracy is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Draw a picture of the following:

Not accurate and not precise Accurate and not precise



Not accurate, but precise both accurate and precise

1. Explain a scenario where you can be precise, but not accurate.

# Unit 0.2: Scientific Notation (HONORS ONLY)

**Notes for/from class**

**Further Reference: 1.3 Organizing Data**

**SCIENTIFIC NOTATION**

1. Scientific notation is the way of writing \_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_ numbers that are hard to express \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   1. A number is written in Scientific notation with the following form:
      1. \_\_\_\_\_ x\_\_\_\_\_\_\_
      2. Where C is between \_\_\_\_\_\_ and \_\_\_\_\_\_ and \_\_\_\_\_\_ is an integer

**PRACTICE PROBLEMS:** Circle the numbers that are written in correct scientific notation

2.35 x 105 2.1203 x 10-16 5 x 10-9 45.9 x 10-6

3.214 x 101 10.3 x 109 -78.3 x 1023 6.09 x 107

12 x 100 1.9 x 10-22 -4.89 x 108

**LARGE NUMBER PRACTICE PROBLEMS:** Decimal notation to scientific notation

Decimal Notation: Scientific Notation:

123,000,000,000 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

45,000,000 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

67,800,000,000,000 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**LARGE NUMBER PRACTICE PROBLEMS: S**cientific notation to decimal notation

Scientific Notation: Decimal Notation:

7.82 x 103 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3.04 x 108 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5 x 104 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Q1 – Which direction did the decimal move if you are going from Sci Notation to decimal notation for a VERY LARGE NUMBER (more than 1)?**

**Notes for/from class**

**SMALL NUMBER PRACTICE PROBLEMS:** Decimal notation to scientific notation

Decimal Notation: Scientific Notation:

0.000000034 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

0.0000000005609 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

0.000000000064 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**SMALL NUMBER PRACTICE PROBLEMS: S**cientific notation to decimal notation

Scientific Notation: Decimal Notation:

4.8 x 10-6 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1.2 x 10-2 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9 x 10-8 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Q2 – Which direction did the decimal move if you are going from Sci Notation to decimal notation for a VERY SMALL NUMBER (less than 1)?**

# Unit 0.3: The Nature of Science

**Notes for/from class**

**Further Reference: 1.1 Nature of Science and 1.2 The Way Science Works**

**SCIENCE**

* + - 1. The goal of science is to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      2. Scientists hypothesize in order to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a certain situation
         1. Long held assumptions \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Question everything, but make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. You must be able to create \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ based on that question

**SCIENTIFIC INQUIRY:**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. Hypothesis = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

WITHIN THE EXPERIMENT:

* 1. Independent variable is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
     1. Example:
     2. There can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ independent variable
  2. Dependent variable is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
     1. Example:
  3. Constants are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
     1. Example:
  4. Control group is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
     1. Example:
  5. Experimental group is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
     1. Example:
  6. Scientists \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Notes for/from class**

* + 1. Repeat the experiment to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    2. Average the results to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. Your data is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Evidence is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ NOT \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Evidence can be \_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. Quantitative data is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      1. 4 examples of quantitative data:
   5. Qualitative data is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      1. 4 examples of qualitative data:
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. Restate your \_\_\_\_\_\_\_\_\_\_\_\_, and state whether your data \_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_ your hypothesis.
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_