**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Chapter 1 Review**

1. Explain the difference between accuracy and precision
2. Identify what type of graph you would use for the following
   1. Showing parts of a whole-
   2. Comparing two variables-
   3. Show information gathered by counting-
3. Define the following
   1. Hypothesis
   2. Scientific Theory
   3. Scientific Law
   4. Control/Constant
   5. Independent Variable
   6. Dependent Variable
4. Explain why the scientific method does not always have to be the same ordered step-wise process.
5. Meredith found the molar mass to be 130 g/mol but the accepted literature value is 135 g/mol. What was Meredith’s percent error? Should she redo the experiment? Why or Why not?
6. Michelle found the temperature outside to be 76 degrees Fahrenheit. The actual temperature outside is 81. What was her percent error?

1. Correctly identify the prefix and abbreviation that goes with each metric unit exponent

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Prefix |  |  |  | ---- |  |  |  |  |  |
| Exponent | 103 | 102 | 101 | base | 10-1 | 10-2 | 10-3 | 10-6 | 10-9 |
| Abbreviation |  |  |  | --- |  |  |  |  |  |

Correctly identify how many base units are to each prefix, or each prefix is to base units

1 km= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m

1 hm= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m

1 dam= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m

1 m= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_dm

1 m= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cm

1 m= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_mm

1 m= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_um

1 m= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_nm

1. Convert the following measurements within the metric system. You can use whatever method you like (subtracting exponents, factor label) and is easiest for you.

5 m=\_\_\_\_\_\_\_\_cm

5 m=\_\_\_\_\_\_\_\_km

25 cm=\_\_\_\_\_\_\_\_mm

3000 mm=\_\_\_\_\_\_\_\_m

3000 m=\_\_\_\_\_\_\_\_hm

1000 g=\_\_\_\_\_\_\_\_mg

325 m=\_\_\_\_\_\_\_\_km

136.3 mL=\_\_\_\_\_\_\_L

9.3 mL=\_\_\_\_\_\_\_\_\_\_L

0.36 mL=\_\_\_\_\_\_\_\_\_uL

12.3 dam=\_\_\_\_\_\_\_\_\_km

343.5 nm=\_\_\_\_\_\_\_\_\_\_mm

1. Convert the following using dimensional analysis (factor label/train track method)
   1. How many kilometers are in 12.6 miles? (0.6 miles=1 km)
   2. How many seconds in 32.4 hours? ( 1 hour=60 minutes; 1 minute=60 seconds)
   3. If a woman’s mass is 150 pounds, how many grams is this? (1 pound=2.2 kg)
   4. Convert 0.075 miles into inches (1 mile=5280 feet, 1 ft=12 inches)
   5. Convert 3.6 feet into meters (1 ft=2.54 cm)
2. Convert the following into scientific notation:
   1. 43,680\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. 0.087\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. 0.120\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. 23,000\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. 458\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Convert the following from scientific notation into expanded (normal) form
   1. 4.44 x 10-4\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. 2.3 x 102\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. 1.9 x 10-1\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. 8.2 x 107\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. 9.37 x 10-3\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Chapter 1 How to’s**

***Converting between units with the same base (mg to g, kg to g, mL to L, etc)***

1. Find the difference between the exponents of the two prefixes
2. Move the decimal that many places
3. Move to the left if going left on the scale, move right if going right on the scale

**Remember: K H da B d c m u n**

* To the left of the base (da, h, k) the exponent increases by one da=101; h=102; k=103
  + Remember the number of base units in these is equal to 1+ the # of zeros in the exponent (1 hm=100 m)
  + Also can see that it increases by a factor ten as go to the left 1 dag=10g; 1 hg=100 g, 1kg=1000 g)
* To the right of the base the d, c, m exponent increases by one, micro (u) is 106 and nano is 109 (remember nano and nine both start with the letter n)
  + Remember the number of base units in these is equal to 1+ the # of zeros in the exponent (1 hm=100 m)
  + Also can see that it increases by ten as go to the left 1 dag=10g; 1 hg=100 g, 1kg=1000 g) except for micro and nano
    - Just remember micro is 6 zeros after the 1 and nano is 9

***Factor Labels***

* Identify starting and ending units
* Ask yourself if you need a conversion factor (will always be given…so if one is there the answer is YES!)
  + If units in the problem are the same as the units in the conversion factor, you only need two train tracks
  + If they are not the same, will need more than one...
    - Ex. If going from inches to m, and you are given the factor 1 in=2.54 cm, you will need to go from inches to centimeters and then to meters
* Fill in units and numbers into factor label
  + Make sure conversion factors match your train tracks
* Multiply all top numbers, multiply all bottom numbers and then divide the top by the bottom
* Check units and answers

Note: if using this for basic metric units (like cm to km) set up your factor label going from cm to meters and then from meters to km

***Scientific Notation***

* + Move decimal until there’s 1 digit to its left. Places moved = exponent.
  + Large # (>1) ⇒ positive exponent  
    Small # (<1) ⇒ negative exponent
  + Only include two places after the decimal (so if there are more numbers round the second number appropriately)
    - Ex. 324300 would be 3.24 x 105
    - Ex. 324500 would be 3.25 x 105
  + Type in calculator as 3.24 E 5
  + For negative exponents like 3.24 x 10-5 you would do 3.24 E -5