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

**Physical Science Guided Notes**

**Measurement**

**Accuracy vs. Precision**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_=how close a measurement is to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ value
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_=how close a \_\_\_\_\_\_\_\_\_\_\_\_ of measurements are to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Percent Error**

* Indicates the \_\_\_\_\_\_\_\_\_\_\_\_\_\_of a measurement

****

* Example: A student determines the density of a substance to be 1.40 g/mL. Find the % error if the accepted value of the density is 1.36 g/mL.

**Number vs. Quantity**

* Quantity=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-
* ALL OF YOUR ANSWERS WILL REQUIRE UNITS OR IT IS WRONG!!!!

**SI Units**

* Show the basics of the metric system measurements with 7 base quantities
* We will look at 5

|  |  |  |  |
| --- | --- | --- | --- |
| **Quantity** | **Symbol** | **Base Unit** | **Abbreviation** |
| Length |  |  |  |
| Mass |  |  |  |
| Time |  |  |  |
| Temperature |  |  |  |
| Amount |  |  |  |

**SI Prefixes**

* Prefix with a base unit to tell you the total quantity
* You will be converting between prefixes
* Rules:
  + Find the difference between (subtract) the exponents(little number on the upper right) of the two prefixes
  + Move the decimal that many places
    - If there is no decimal, put it at the very end on the right
    - Add zeros in any empty spaces

*Prefixes*

|  |  |  |
| --- | --- | --- |
| **Prefix** | **Symbol** | **Factor** |
|  |  |  |
|  |  |  |
|  |  |  |
| BASE UNIT | ----- | 100 |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Remember: **K**ing**H**ector**D**ied**B**y**D**rinking**C**hocolate**M**ilk**U**ntil**N**ow

**K H D B d c m u n**

* If you move to the right, move the decimal to the right
* If you move to the left, move the decimal to the left

Converting Practice:

1. 532 m=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_km
2. 20 cm=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m
3. 0.032 L=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_mL
4. 45 um=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_nm
5. 805 dm=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_km

**Factor Label Method**

* When you aren’t moving from SI prefix to SI prefix (ex. Inches to centimeters)
* Units or \_\_\_\_\_\_\_\_\_\_ are \_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Steps:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Practice

* How many milliliters are in 1.0 quart of milk (1 L=1.057 qt)?
* Your European hairdresser wants to cut your hair 8.0 cm shorter. How many inches will he be cutting off? (1 in=2.54 cm)
* BHS football needs 550 cm for a 1st down. How many yards is this? (1 in=2.54 cm; 12 in=1 ft; 3 ft= 1 yard)
* A piece of wire is 1.3 m long. How many 1.5 cm pieces can be cut from this wire? (1 piece=1.5 cm)

**Scientific Notation**

*Converting to Scientific Notation*

* Move decimal until there’s \_\_\_\_\_\_ digit to its \_\_\_\_\_\_\_\_.

Places moved=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Large # (\_\_\_\_\_\_\_\_\_\_) 🡪\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_exponent
* Small #(\_\_\_\_\_\_\_\_\_\_) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_exponent

Practice

* 2,400,000 ug=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* 0.00256 kg=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* 7 x 105 km=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* 6.2 x 104 mm=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Using your calculator with scientific notation

(5.44 × 107 g) ÷ (8.1 × 104 mol) =

Type on your calculator:

**Significant Figures (Honors)**

* Indicate the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of a measurement

Recording Sig Figs

* Sig figs in a measurement included the \_\_\_\_\_\_\_\_\_\_\_\_ digits \_\_\_\_\_\_\_\_ a final \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_digit

Counting Sig Figs:

* Count all numbers except:
  + Leading Zeros: 0.0025 (2 Total Sig Figs)
  + Trailing Zeros without a decimal point: 2,500 (2 total sig figs)
* Practice
  + 23.50 \_\_\_\_\_\_\_\_\_\_\_\_
  + 402 \_\_\_\_\_\_\_\_\_\_\_\_\_
  + 5,280 \_\_\_\_\_\_\_\_\_\_\_\_
  + 0.080 \_\_\_\_\_\_\_\_\_\_\_\_
* Calculating with sig figs
  + Multiplying & Dividing: The # with the \_\_\_\_\_\_\_\_\_\_\_\_ sig figs determines the # of sig figs in the answer.
    - Ex.
  + Adding & Subtracting: The # with the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ value determines the place of the last sig fig in the answer.
    - Exs.
  + Exact numbers: do not limit the # of sig figs in the answer
    - Counting numbers: 12 students
    - Exact conversion: 1 m= 100 cm
    - 1 in any conversion: 1 in=2.54 cm

Practice Problems