

## Scientific Notation

Scientists often deal with very small numbers (ie. Distance between 2 atoms) or very large numbers (ie. Number of kilometers to the moon). As a result, scientific notation was developed to express these large or small numbers in a condensed form.

- Measurements are based on the power ten notation ( $M \times 10^n$ )
- Examples:

$$7 \times 10^2 = 7 \times 10 \times 10 \text{ or } 700$$

$$7.00 \times 10^{-3} \text{g} = 7 \times \frac{1}{10} \times \frac{1}{10} \times \frac{1}{10} \text{ or } 0.007 \text{ g}$$

- To use scientific notation:
  - A) first move the decimal **behind** the first digit of the number
  - B) multiply your new number by **10**
  - C) the power is an integer which shows the **direction** and **number** of places you moved the decimal
    - : decimal moved to the left = **positive** integer
    - : decimal moved to the right = **negative** integer
- Example:
  - A) 46821.3g
  - B) 0.002571g

To change from scientific notation to standard form:

1. Move the decimal to the RIGHT for a positive exponent of 10.
2. Move the decimal to the LEFT for a negative exponent of 10.
3. Write the value in standard form.

Examples

1. **Positive exponents** -  $7.044 \times 10^2$  - move the decimal to the right two places to become 704.4
2. **Negative exponents** -  $1.28 \times 10^{-5}$  - move the decimal to the left 5 places to become 0.0000128

