

## Section 2 : Metric System (Honors Chemistry)

**Prefixes:** (common prefixes used in chemistry)

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|       |       |              |                       |
|-------|-------|--------------|-----------------------|
| M     | mega  | a million    | BIGGER THAN THE BASE  |
| K     | kilo  | a thousand   |                       |
| <hr/> |       |              | → Base unit           |
| d     | deci  | a tenth      | smaller than the base |
| c     | centi | a hundredth  |                       |
| m     | milli | a thousandth |                       |
| μ     | micro | a millionth  |                       |
| n     | nano  | a billionth  |                       |

### Base Units

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|                  |                        |                      |                     |
|------------------|------------------------|----------------------|---------------------|
| <u>length</u>    | <u>mass</u>            | <u>liquid volume</u> | <u>solid volume</u> |
| m meters         | g grams                | L liter              | m <sup>3</sup>      |
| <u>weight</u>    | <u>temperature</u>     | <u>time</u>          |                     |
| N newton<br>dyne | K Kelvin<br>°C Celcius | seconds              |                     |

### Conversions in Metric

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*(combine a base unit with any prefix)*

*Example: (smaller than the base)*

|   |  |  |   |
|---|--|--|---|
| nm nanometer<br>1 x 10 <sup>9</sup> or 1 billion = 1m | 1/10 <sup>9</sup> of a meter           | μm micrometer<br>1 x 10 <sup>6</sup> or 1 million = 1m | 1/1,000,000 or 1/10 <sup>6</sup> of a meter |
| mm millimeter<br>1000mm = 1m                          | 1/10 <sup>3</sup> of a meter<br>1/1000 | cm centimeter<br>100cm = 1m                            | 1/100 of a meter                            |
| dm decimeter<br>10dm = 1m                             | 1/10 of a meter                        |  |   |

*Example: (larger than the base)*

Km kilometer  
1Km = 1000m

**1ml = 1cm<sup>3</sup> = 1cc**  
**1000ml = 1 liter**  
**1 liter = 1dm<sup>3</sup>**  
**1 gram of water = 1ml of water**  
**1 dm<sup>3</sup> = 1000cm<sup>3</sup>**  
**1 hour = 60 min = 3600 sec**

*(This is the same for all base units: g, L, or m<sup>3</sup>)*

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### Conversions from metric and English

|                |                  |                      |                    |
|----------------|------------------|----------------------|--------------------|
| <b>Length:</b> | 2.54 cm = 1 inch | 1 yard = .914 meters | 1.61Km = 1 miles   |
| <b>Volume:</b> | 29.57ml = 1 oz   | 3.785 L = 1 gallon   | 1 L = 1.057 quarts |
| <b>Mass:</b>   | .454Kg = 1 lbs   | 454g = 1lbs          | 1Kg = 2.20 lbs     |