## Metric System

## Commonly Used Metric Relationships

 Length| $\begin{gathered} 1 \mathrm{~mm} \\ 1 \mathrm{~cm} \end{gathered}$ | $=$ $=$ | $\begin{aligned} & 0.1 \mathrm{~cm} \\ & 10 \mathrm{~mm} \end{aligned}$ | $\begin{gathered} 1 \mathrm{~mm} \\ 1 \mathrm{~m} \end{gathered}$ | $=$ $=$ | $\begin{gathered} 0.001 \mathrm{~m} \\ 1,000 \mathrm{~mm} \end{gathered}$ | $\begin{gathered} 1 \mathrm{~m} \\ 1 \mathrm{~km} \end{gathered}$ | $\begin{aligned} & = \\ & = \end{aligned}$ | $\begin{gathered} 0.001 \mathrm{~km} \\ 1,000 \mathrm{~m} \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | 1 cm | = | 0.01 m |
|  |  | 45 |  |  | 1011 | 1 m | $=$ | 100 c |


|  | Mass |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{array}{ccc} 1 \mathrm{mg} & =0.001 \mathrm{~g} \\ 1 \mathrm{~g} & =1,000 \mathrm{mg} \end{array}$ | $\begin{gathered} 1 \mathrm{~g} \\ 1 \mathrm{~kg} \end{gathered}$ | $\begin{aligned} & = \\ & = \end{aligned}$ | $\begin{gathered} 0.001 \mathrm{~kg} \\ 1,000 \mathrm{~g} \end{gathered}$ |  |  |  |
|  | Volume |  |  |  |  |  |
|  | $\begin{gathered} 1 \mathrm{~mL} \\ 1 \mathrm{~L} \end{gathered}$ | $=$ | $\begin{gathered} 0.001 \mathrm{~L} \\ 1,000 \mathrm{~mL} \end{gathered}$ | $\begin{gathered} 1 \mathrm{~mL} \\ 1 \mathrm{~L} \end{gathered}$ |  | $\begin{gathered} 1 \mathrm{~cm}^{3} \\ 1,000 \mathrm{~cm}^{3} \end{gathered}$ |

## Metric System Facts

Prefixes always have the same value no matter what the unit.

| Really Small |  |  | In the Middle |  |  | Really |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| pico | $10^{-12}$ | trillionth | centi | $10^{-2}$ | $1 / 100$ | kilo | $10^{3}$ | thousand |
| nano | $10^{-9}$ | billionth | deci | $10^{-1}$ | $1 / 10$ | mega | $10^{6}$ | million |
| micro | $10^{-6}$ | millionth | -- | $10^{0}$ | 1 | giga | $10^{9}$ | billion |
| milli | $10^{-3}$ | thousandth | deka | $10^{1}$ | 10 | tera | $10^{12}$ | trillion |
|  |  |  | hecto | $10^{2}$ | 100 |  |  |  |

E.g. A gigameter is 1 billion meters; a gigabyte is 1 billion bytes

## Other Metric Relationships to know

1 L of water has a mass of 1 kg .
$1 \mathrm{~cm}^{3}$ of water is 1 mL and has a mass of 1 g .
1 hectare is a square with sides measuring 100 m .
1 tonne (Metric ton) is $1,000 \mathrm{~kg}$ and can also be called a megagram.
$1 \mathrm{~m}^{3}$ of water has a mass of 1 tonne.

