We will use the method of dimensional analysis, sometimes called the factor-label method. ... or, the "drag and drop" method!

Dimensional analysis uses conversion factors to change between one unit and another

What's a conversion factor? A simple equality.

$$12 in = 1 f f$$

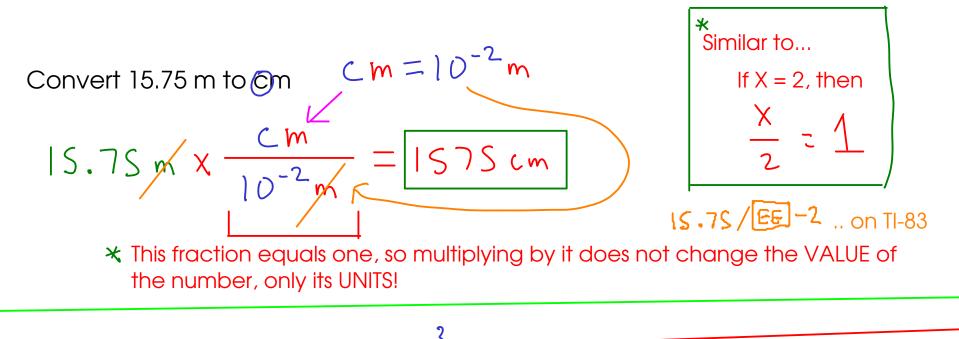
Conversion factors in metric

In the metric system, conversion factors between units may always be made from the metric prefixes!

For example, "Kilo-" means
$$10^3$$

 $K = 10^3$
 50
 $\frac{Kg = 10^3}{200}$ Just apply the
prefix to the
base unit.
 $\frac{KL = 10^3L}{KS = 10^3s}$

How do we actually USE a conversion factor?



Convert 0.0183 kg to g

$$\langle g = 10g^3$$

$$0.0183 \text{ Mg} \times \frac{10^3 \text{g}}{\text{Kg}} = 18.3 \text{g}$$

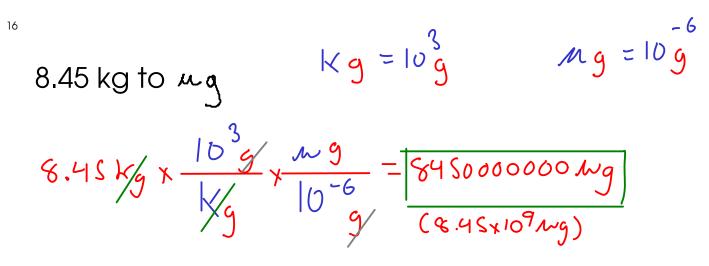
DRAG AND DROP

- Drag the part of the factor that contains the unit you want to get rid of (cancel out) to the BOTTOM.

- Then, drag the other half of the factor to the TOP

Convert 14500 mg to kg
$$ng = 10g^3$$
 $Kg = 10g^3$
14500 $mg \times \frac{10^{-3}g}{mg} \times \frac{Kg}{10^3g} = \underbrace{0.0145Kg}_{\text{vertermember that you can only "apply"}_{\text{units that don't have their own exponent to each side!}}$
Convert 0.147 cm² to m² $(m = 10^{-2}m)$
0.147 cm² $\times \frac{10^{-2}m}{Cm} \times \frac{10^{-2}m}{Cm} = \underbrace{1.47 \times 10^{-5} m^2}_{(0.0000147m^2)}$

When converting a squared or cubed unit, use each factor two (squared) or three (cubed) times, because



88100 kHz to MHz $KH_2 = 10^3 H_2 \qquad MH_2 = 10^6 H_2$ $KH_2 = 10^3 H_2 \qquad MH_2 = 10^6 H_2$ $KH_2 = 5^{-1} (Frequency)$ $KH_2 = 5^{-1} (Frequency)$ $KH_2 = 5^{-1} (Frequency)$ $KH_2 = 5^{-1} (Frequency)$

Convert 38.47 in to m, assuming 2.54 cm = 1 in
2.54 cm =
$$in$$
 $cm = 10^{-2}m$
38.47 in $\frac{2.54 cm}{in} \times \frac{10^{-2}m}{cm} = 0.9771 m$

Convert 12.48 km to in
2.54 cm = in
$$cm = 10^{2}$$
 $km = 10^{3}$ m
12.48 km x $\frac{10^{3}}{Km} \times \frac{cm}{10^{-2}} \times \frac{in}{2.54 cm} = \frac{491300 \text{ in}}{491300 \text{ in}}$