How do we actually USE a conversion factor?

Convert 15.75 m to cm

$1\text{ cm} = 10^{-2}\text{ m}$

$$15.75\text{ m} \times \frac{\text{cm}}{10^{-2}\text{ m}} = 1575\text{ cm}$$

* Similar to...

If X = 2, then

$$\frac{X}{2} = 1$$

15.75 / EE −2 .. on TI-83

* This fraction equals one, so multiplying by it does not change the VALUE of the number, only its UNITS!

Convert 0.01893 kg to g

$1\text{ kg} = 10^{3}\text{ g}$

$$0.01893\text{ kg} \times \frac{10^{3}\text{ g}}{\text{kg}} = 18.93\text{ g}$$

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

$mg = 10^{-3} g$ $\quad kg = 10^{3} g$

$$14500\ mg \times \frac{10^{-3}\ g}{mg} \times \frac{kg}{10^{3}\ g} = \boxed{0.0145\ kg}$$

Convert 0.147 cm^2 to m^2

$cm = 10^{-2} m$

$$0.147\ cm^2 \times \frac{10^{-2}\ m}{cm} \times \frac{10^{-2}\ m}{cm} = \boxed{1.47 \times 10^{-5}\ m^2} \quad (0.0000147\ m^2)$$

* Tip: don't use squared or cubed units as factors.

Note: For squared and cubed units, use each factor two (for squared) or three (for cubed) times. Remember that ...

$cm^2 = cm \times cm$ $\quad cm^3 = cm \times cm \times cm$

8.45 kg to μg

$kg = 10^{3} g$ $\quad \mu g = 10^{-6} g$

$$8.45\ kg \times \frac{10^{3}\ g}{kg} \times \frac{\mu g}{10^{-6}\ g} = 8450000000\ \mu g \quad (8.45 \times 10^{9}\ \mu g)$$

88100 kHz to MHz

$kHz = 10^{3} Hz$

$MHz = 10^{6} Hz$

$Hz = s^{-1}$ (Frequency)

$$88100\ kHz \times \frac{10^{3} Hz}{kHz} \times \frac{MHz}{10^{6} Hz} = 88.1\ MHz$$

Convert 38.47 in to m, assuming 2.54 cm = 1 in

$2.54\,cm = 1\,in \qquad cm = 10^{-2}\,m$

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

Convert 12.48 km to in

$2.54\,cm = 1\,in \qquad cm = 10^{-2}\,m \qquad km = 10^{3}\,m$

$$12.48\,km \times \frac{10^{3}\,m}{1\,km} \times \frac{1\,cm}{10^{-2}\,m} \times \frac{1\,in}{2.54\,cm} = 491300\,in$$

Accuracy and Precision

- two related concepts that you must understand when working with measured numbers!

Accuracy

- how close a measured number is to the CORRECT (or "true") value of what you are measuring

- "Is it right?"

- checked by comparing measurements against a STANDARD (a substance or object with known properties)

Precision

- how close a SET of measured numbers are to EACH OTHER

- "Can I reproduce this?"

- checked by repeated measurements