How do we actually USE a conversion factor?

Convert 15.75 m to cm

$cm = 10^{-2} m$

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

* 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

$kg = 10^{3} g$

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

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

$cm = 10^{-2} m$

Tip: Don't make a conversion factor out of a base that already has an exponent. Use m instead of m^2 here ...

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

$0.0000147\ m^2$

For squared or cubed units, use each conversion factor 2 (squared) or 3 (cubed) times. Remember, the prefixes are also squared or cubed:

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

8.45 kg to mg

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

$$8.45\ kg \times \frac{10^{3}\ g}{kg} \times \frac{mg}{10^{-6}\ g} = 8450000000\ mg = 8.45 \times 10^{9}\ mg$$

88100 kHz to MHz

$kHz = 10^{3} Hz$ $\quad MHz = 10^{6} Hz$

$Hz = s^{-1}$ (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

$2.54\,cm = in$

$cm = 10^{-2}\,m$

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

Convert 12.48 km to in

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

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

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