An Example of a Metric Unit Conversion

1. We are going to set up the problem as a multiplication of ratios which are given in columns of the table for length.
2. We can flip the ratios upside down if we need to. This does not change their relationships.
3. We are going to determine if the problem is correctly setup by cross canceling units of dimension (such as "m").
4. We are going to use our calculators only during the last step as we multiply ratios and divide fractions.

Problem: How many centimeters (cm) are in 3 hectometers (hm)?

First analyze the problem: What unit are we starting with? **C**> hm (hectometers)
What unit do we want for our answer? **C**> cm (centimeters)

Where do we start? Well, we start with **3 hm**
Now we need a ratio that relates **hm** to **m**. In Table # 1 we find the ratio we need..

Table # 1 C Metric Conversion Table For Length

Number of Meters in each unit			**1 Unit**	**Number of units in each meter**					
1000 m	100 m	10 m	1 m	10 dm	100 cm	1000 mm	10^6 μm	10^9 nm	10^{12} pm
1 km	1 hm	1 dam	1 m	1 m	1 m	1 m	1 m	1 m	1 m

➚ Here is the column!

Place the ratio in the problem so that we can get the units **hm** to cross-cancel out.

3 ~~hm~~ x $\frac{100\ m}{1\ ~~hm~~}$ x ? Notice the "hm" units cross-canceled out and **m** are left. What's next?
We need to end up with **centimeters (cm)**, so find the column with centimeters.

3 ~~hm~~ x $\frac{100\ ~~m~~}{1\ ~~hm~~}$ x $\frac{100\ cm}{1\ ~~m~~}$ We wanted the "m" unit to cross-cancel.

So lets review some important points:
1. Notice that all of the dimensions that we **did not want**, canceled out.
2. And we are left with centimeters (cm), which is what we wanted.
3. From the setup alone, we can be sure that the answer is correct. (or will be correct if the calculator work is done correctly)

Remember: If the units are wrong, the answer will be wrong. **And I do not need a calculator to tell me that!**

Finishing the problem:

3 ~~hm~~ x $\frac{100\ ~~m~~}{1\ ~~hm~~}$ x $\frac{100\ cm}{1\ ~~m~~}$ = 30000 cm

To see some more examples, look at the Link **More Examples.**
If you are ready to do some practice problems look at the Link **Practice Problems**.