# US CONVERSION STEPS
"Dimensional Analysis"

1. Read the question to figure out what you have/know. The question will provide you with information that identifies your starting point and your final destination.

   Starting point = the number and unit provided by the question
   Final destination = the units desired after converting

2. Using the information gathered from the question, identify/highlight your starting point and your final destination.

3. Determine the means in which you will get from your starting point to your final destination (simply find "connections" or conversion factors between your starting and final unit).

4. Create a fraction by placing your starting point over one.

5. Multiply between fractions.

6. Write in the bottom unit of the new fraction. This should be the same as the top unit of the previous fraction.

7. Create a fraction using the previously identified "connections" or conversion factors. Your bottom unit will guide you.

8. Ask yourself, "Do I have the desired unit (final destination) on the top of the new fraction?"

   Go back to step 5

   NO

   Proceed to step 9   **YES**
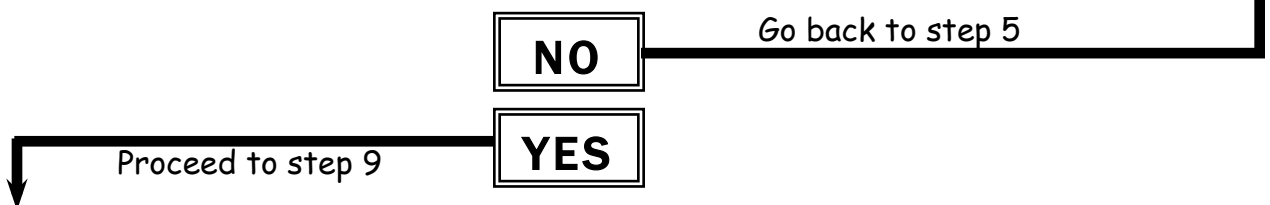
9. Cancel any units that are diagonal. This should leave you with only the unit(s) that represent your final destination.

10. Multiply the top of the fractions...multiply the bottom of the fractions...divide the product of the top by the product of the bottom.

ALWAYS include the units as you work your problems. The units will help you decide how to place the conversion factors. Your goal is to set up the problem so that the units you don't want are cancelled out, and the desired unit(s) is in the final answer.

EXAMPLE

□ **STEP 1** - Read question and identify any given information

HOW MANY SECONDS ARE IN 25 HOURS?

Starting Point = 25 hours
Final Destination = seconds

□ **STEP 2** – Write your starting point and your final destination

25 Hours → seconds

□ **STEP 3** – Find "connections" (conversion factors) between your starting point and final destination

1 hour = 60 minutes
1 minute = 60 seconds

□ **STEP 4** - Place your starting point over "1"

$$\frac{(25 \text{ hours})}{(1)}$$

□ **STEP 5** – Multiply between fractions

$$\frac{(25 \text{ hours})}{(1)} \quad \frac{(\underline{\hspace{2cm}})}{(\hspace{2cm})}$$

□ **STEP 6** – Write in bottom unit of new fraction (same as top unit of previous fraction)

$$\frac{(25 \text{ hours})}{(1)} \quad \frac{(\underline{\hspace{2cm}})}{(\hspace{1cm} hours)}$$

□ **STEP 7** – Create a fraction using the appropriate connection

Since you are starting at hours, the first connection (conversion factor) used is 1 hour = 60 minutes.

$$\frac{(25 \text{ hours})}{(1)} \quad \frac{(60 \text{ minutes})}{(1 \text{ hour})}$$

□ **STEP 8** – Determine if you have the correct unit on the top of the new fraction

Since the desired unit is not on top of the new fraction, it is necessary to create another fraction with the remaining connection (conversion factor) of 1 minute = 60 seconds. Using the top unit from the previous fraction as a guide, 1 minute makes up the denominator 60 seconds the numerator. Now that the unit of seconds is on the top you can move on to **STEP 9**

$$\frac{(25 \text{ hours})}{(1)} \quad \frac{(60 \text{ minutes})}{(1 \text{ hour})} \quad \frac{(60 \text{ seconds})}{(1 \text{ minute})}$$

□ **STEP 9** – Cancel all units that are diagonal

$$\frac{(25 \text{ hours})}{(1)} \quad \frac{(60 \text{ minutes})}{(1 \text{ hour})} \quad \frac{(60 \text{ seconds})}{(1 \text{ minute})}$$

□ **STEP 10** – Multiply the top…multiply the bottom…divide top by bottom.

$$\frac{(25 \text{ hours})}{(1)} \quad \frac{(60 \text{ minutes})}{(1 \text{ hour})} \quad \frac{(60 \text{ seconds})}{(1 \text{ minute})} = \frac{(25)(60)(60 \text{ seconds})}{(1)(1)(1)} = 90,000 \text{ seconds}$$