Unit Conversions

3 strategies to arm yourself with solving unit conversions

By Mrs. Baker

Objective

We will understand 3 different “weapons” to solve unit conversions & when to use them.

Q1: Strategy 1

Proportions

Use with 1 step conversions (and maybe when #'s aren't "friendly")

Proportions

Ex:

Given that 1.5 c equals approximately 360 mL, how many mL are in 4.2 c?

This is one step. It gives us cups and mL, and is asking for cups and mL.

Put this example in your notes.

$$\frac{1.5\text{ c}}{360\text{mL}} = \frac{4.2\text{ c}}{x\text{ mL}}$$

Notice the units match on both sides of the equal sign.

Cross multiply (across the equal sign, you cross multiply).

$1.5x = (360)(4.2)$
$1.5x = 1{,}512$
$x = 1{,}008$ mL

Is this reasonable? Well, 1 cup is about 240 mL, so 240 times 4 is close to 1000; yep, it is reasonable.

Proportions

Ex:

Given that 1.5 tsp equals approximately 7.5 mL, how many mL are in 25 tsp?

This is one step. It gives us tsp and mL, and is asking for tsp and mL.

Put this example in your notes.

$$\frac{1.5 \text{ tsp}}{7.5 \text{ mL}} = \frac{25 \text{ tsp}}{x \text{ mL}}$$

Notice the units match on both sides of the equal sign.

Cross multiply (across the equal sign, you cross multiply).

$1.5x = (7.5)(25)$

$1.5 x = 187.5$ mL

$X = 125$ mL

Is this reasonable? Yes, if I have a higher number of mL to equal 1.5 tsp, then my answer of 125 mL is reasonable because it is a higher number than 25.

Q2: Strategy 2

Big to Small, Small to Big

Use with 1 step conversions when given the unit rate, or "1 = something"

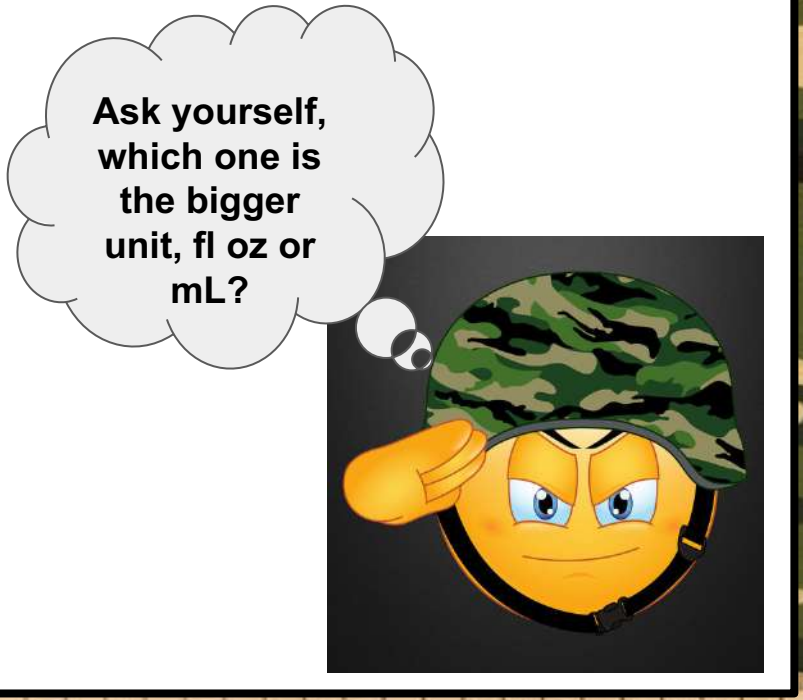
This is just figuring out when to multiply or divide.

B to S, S to B

Ex:

Given that 1 fl oz equals approximately 30 mL, how many fl. oz. are in 285 mL?

This is one step. It gives us fl oz. and mL, and is asking for fl oz. and mL.
Also, I have a unit rate (1 = something)



B to S, S to B

Ex:

Given that 1 fl oz equals approximately 30 mL, how many fl. oz. are in 285 mL?

This is one step. It gives us fl oz. and mL, and is asking for fl oz. and mL.
Also, I have a unit rate (1 = something)

Put this example in your notes:

Answer is:
fl oz, because 30 mL make up just 1 of it. So, the bigger unit is the one with the 1. (Big winners are number 1, too, right?!)

So, we are given the mL, which is the smaller unit. We are going to the bigger unit. (S to B)

Make yourself small (x in front of body) then go big (spread arms out). You just made a division sign. You divide 285 by 30, to get an answer of 9.5 fl oz.
Is this reasonable?

B to S, S to B

Ex:

Given that 1 fl oz equals approximately 30 mL, how many mL are in 28 fl oz?

This is one step. It gives us fl oz. and mL, and is asking for fl oz. and mL.
Also, I have a unit rate (1 = something)

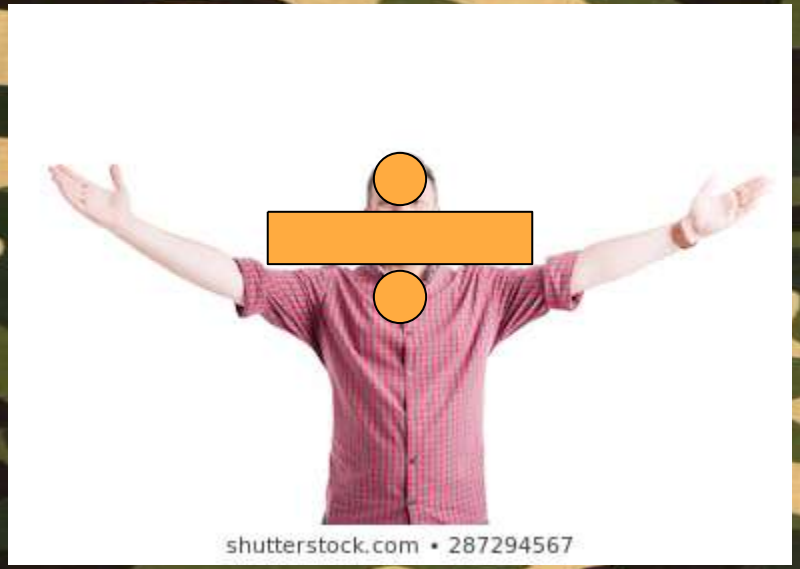
Put this example in your notes:
Which is the bigger unit?
Fl oz

We are given fl oz., the bigger unit, so we need to go to the smaller unit of mL. We are going big to small.

Make yourself big by spreading your arms out wide, then make yourself small by crossing arms in front of body. You just made an "x" for times.
28 x 30 = 840.

Is this reasonable? Yes, you multiply 1fl oz by 28 to get 28 fl oz, so 30 would also have to be multiplied by 28 to keep everything balanced.

Images



Q3: Strategy 3

Railroad Tracks, Mole Method, or Dimensional Analysis

Use with multiple step conversions or conversions dealing with things such as vol. & time or distance & time

Q3: Railroad Tracks

Ex:

How many liters are in 3 quarts?
Given (slash these are basic and you should memorize them)

4 qts = 1 gal
16 c = 1 gal
1000 mL = 1 L
1 c = 240 mL

If I need all of these conversions, I need to jump on the tracks and get there faster.

Q3: Railroad Tracks

Ex:

How many liters are in 3 quarts?
Given (slash these are basic and you should memorize them)

4 qts = 1 gal
16 c = 1 gal
1000 mL = 1 L
1 c = 240 mL

If I need all of these conversions, I need to jump on the tracks and get there faster.

Start = what you are given / know

End = What the question wants you to find

3 qt	1 gal	16 c	240 mL	1 L
	4 qt	1 gal	1 c	1000mL

Put this example in your notes.

Notice, the units line up one on top, then one on bottom. This cancels them out.

Multiply everything on the top, multiply everything on the bottom, and divide.

3 x 16 x 240 = 11,520

4 x 1000= 4000

11,520 / 4000 = 2.88 L

Is this reasonable?

Liter and Gallon Images

Q3: Railroad Tracks

Ex:

How many quarts are in 10 L?

4 qts = 1 gal
16 c = 1 gal
1000 mL = 1 L
1 c = 240 mL

If I need all of these conversions, I need to jump on the tracks and get there faster.

Start = what you are given / know

End = What the question wants you to find

10 L	1000mL	1 c	1 gal	4 qt
	1 L	240 mL	16 c	1 gal

What happens next, after the numbers are filled in?

End

Include a 1–2 sentence summary at the end of your notes, and get out a calculator.
Time to practice!