

## Dimensional Analysis

There are a few different ways to look at dimensional analysis problems, the first being unit multipliers. Another method that I prefer is the skeleton or ladder method.

Example #1

Convert: 175 lbs → kg

### Unit multiplier method

$$175 \text{ lbs} \times \frac{1 \text{ kg}}{2.2 \text{ lbs}} = 175/2.2 = 79.55 \text{ kg}$$

### Skeleton/Ladder method

<del>175 lbs</del>	1 kg	= 175/2.2 = 79.55 kg
1	<del>2.2 lbs</del>	

To use the skeleton method you always start with what you know on top and 1 on the bottom, in the next space (rung of the ladder) the units on top go on the bottom and the desired units are on top. The starting units will cancel out. Any vertical bar means to multiply and the horizontal means to divide. The reason that I prefer this method is it keeps everything in a straight line and more organized. You notice in example two there is a unit on the bottom of the first rung because the starting value has g per (or divided by) cm<sup>2</sup>. Also remember cm<sup>2</sup> is just cm x cm, this is why you have to convert to mm twice.

Example #2

Convert: 1.42 g/cm<sup>2</sup> to mg/mm<sup>2</sup>

### Unit multiplier method

$$\frac{1.42 \text{ g}}{\text{cm}^2} \times \frac{1000 \text{ mg}}{1 \text{ g}} \times \frac{1 \text{ cm}}{10 \text{ mm}} \times \frac{1 \text{ cm}}{10 \text{ mm}} = (1.42 * 1000) / (10 * 10) = 14.2 \text{ mg/mm}^2$$

### Skeleton/Ladder method

<del>1.42 g</del>	1000 mg	<del>1 cm</del>	<del>1 cm</del>	= 1420/100 = 14.2 mg/mm <sup>2</sup>
<del>1 cm<sup>2</sup></del>	<del>1 g</del>	10 mm	10 mm	