

A sample unit conversion involving a three-dimensional unit:

$$14.7 \text{ cm}^3 \text{ to } \text{mm}^3$$

Factors:

$$1 \text{ cm} = 10^{-2} \text{ m}$$

$$1 \text{ mm} = 10^{-3} \text{ m}$$

You have to convert all three dimensions, so you use the factor three times!

$$14.7 \text{ cm}^3 \times \frac{10^{-2} \text{ m}}{1 \text{ cm}} \times \frac{10^{-2} \text{ m}}{1 \text{ cm}} \times \frac{10^{-2} \text{ m}}{1 \text{ cm}} \times \frac{1 \text{ mm}}{10^{-3} \text{ m}} \times \frac{1 \text{ mm}}{10^{-3} \text{ m}} \times \frac{1 \text{ mm}}{10^{-3} \text{ m}} = 14700 \text{ mm}^3$$

At this point, we have cubic meters. Now we convert to cubic millimeters. Again, we apply the factor three times - once for each dimension.