

Unit Conversions

Conversion Factors

Before attempting to convert units, determine the conversion factors needed. Conversion factors are obtained by first determining the relationship between the old set of units and the new set. The numerical data may be well known or found in a table of conversion factors. First write the relationship as a simple equation. Next, divide both sides so the equation has the form $1=A/B$. Note that *two* conversion factors may be written for every simple equation. Choose the appropriate conversion factor as instructed below. The following example illustrates a simple equation and the corresponding conversion factors.

Example: $1mi = 5280ft$ yields $1 = \frac{5280ft}{1mi}$ $1 = \frac{1mi}{5280ft}$

Unit Conversion

The following steps outline the procedure for converting units from one system to another. Below each step is a sample calculation illustrating how to convert 95 kilometers per hour to meters per second.

1. Write the known measurement as a fraction on the left of a blank line. Leave plenty of room to the right for conversion factors.

$$\frac{95km}{hr}$$

2. Multiply this fraction by conversion factors so the old units cancel. Write each conversion factor as a separate fraction.

$$\frac{95km}{hr} \cdot \frac{1000m}{1km} \cdot \frac{1hr}{60min} \cdot \frac{1min}{60s}$$

3. Cancel the old units. Multiply the numerator and denominator separately, keeping any units that did not cancel.

$$\frac{95km}{hr} \cdot \frac{1000m}{1km} \cdot \frac{1hr}{60min} \cdot \frac{1min}{60s} = \frac{95 \cdot 1000 \cancel{m}}{60 \cdot 60 \cancel{h}} = \frac{95000m}{3600s}$$

4. Now divide the numerator by the denominator and keep the appropriate number of significant digits. Remember to record the new units!

$$\frac{95km}{hr} \cdot \frac{1000m}{1km} \cdot \frac{1hr}{60min} \cdot \frac{1min}{60s} = \frac{95 \cdot 1000 \cancel{m}}{60 \cdot 60 \cancel{h}} = \frac{95000m}{3600s} = 26.38 \frac{m}{s} = 26 \frac{m}{s}$$