Ch. 1 Dimensional Analysis

. What is dimensional analysis?
- Dimensional analysis is a useful method that can be used to mathematically cancel out units in order to obtain a desired unit.

. Conversion factors are useful for dimensional analysis (conversion factors are ratios or mathematical relations used to convert one unit to another i.e. g/mol or 1 ft = 12 in)

SI unit prefixes

Prefix	mega	kilo	deci	centi	milli	micro	nano	pico
Symbol	M	k	d	c	m	μ	n	p
Value	10^6	10^3	10^{-1}	10^{-2}	10^{-3}	10^{-6}	10^{-9}	10^{-12}

Example: 1 g = 1000 mg

Common conversion factors

1 ft = 12 in	1 min = 60 s	1 mi = 1.609 km	1 mole = 6.02 x 10^{23} atoms (particles)

Practice:

1. A Nissan GTR R35 has a top speed of 196 mph. Convert this value to km/h.

2. For an experiment you need 25 mg of NaCl, how many grams are there in 25 mg of NaCl?

3. Convert 150 g to kg.

4. *Convert* 25 mg to g.

Solutions

1. **A Nissan GTR R35 has a top speed of 196 mph. Convert this value to km/h.**
   Solution:

$$\frac{196 \ mi}{h} \times \frac{1.609 \ km}{1 \ mi} = 315 \ \frac{km}{h}$$

2. **For an experiment you need 25 mg of NaCl, how many grams are there in 25 mg of NaCl?**
   Solution:

$$25 \ mg \ NaCl \times \frac{10^{-3} g}{1 \ mg} = 0.025 \ g \ NaCl$$

3. **Convert 150 g to kg**
   Solution:

$$150 \ g \times \frac{1 \ kg}{10^3 g} = 0.15 \ kg$$

4. **Convert 25 mg to g**
   Solution:

$$25 \ mg \times \frac{10^{-3} g}{1 \ mg} = 0.025 \ g$$