Workshop: Conversion of Units and Transposing Equations

The Learning Enhancement Team, UEA

Conversion of units

1. Convert each of the following into grams, writing each answer in standard form:
   a. 1 kg
   b. 1 mg
   c. 1 mcg
   d. 5 kg
   e. 250 kg
   f. 3500 mg

2. Convert each of the following into the given unit, writing each answer in standard form:
   a. 120 ml into mcl
   b. 4500 mcg into nanograms
   c. 2.2 l into ml
   d. 0.56 g into mg
   e. 0.000235 g into mcg

3. Convert each of the following into the given unit, writing each answer in standard form:
   a. 54000 mg into g
   b. 250000 mg into kg
   c. 0.25 ml into l
   d. 6250000 nanograms into mg

4. Convert each of the following into the given unit, writing each answer in standard form:
   a. 1.25×10^{14} mg into g
   b. 9.5×10^{20} kW into W

c. 650×10^{15} mcg into kg

d. 1.224×10^{-12} ml into l

e. 1.5×10^{-6} MJ into mJ

f. 56×10^4 cm into km

Transposing equations

5. Make x the subject of each of the following:

   a. $5x = b$

   b. $z = a + x$

   c. $y = mx + c$

   d. $y - 10 = 3(x - 2)$

   e. $\frac{x+5}{p} = q$

6. In each of the following, make the give variable [in brackets] the subject:

   a. $C_1V_1 = C_2V_2$ $[V_1]$

   b. $E = h\frac{c}{\lambda}$ $[h]$

   c. $I = \frac{m}{h^2}$ $[h]$

   d. $A = \frac{\sqrt{HM}}{60}$ $[M]$

Mixed Questions

7. The body mass index (BMI) of a person is calculated as:

$$\text{BMI} = \frac{\text{Mass (Kg)}}{(\text{Height (m)})^2}$$

Find the height of a person in centimetres, given that they have a body mass index of 22.5 and a mass of 90000 g.

8. The wavelength of a light wave (λ), in m, can be calculated using the speed of light (c) and the frequency (v):

$$\lambda = \frac{c}{v}$$

It is found that a light wave has a wavelength of 1.5×10^{-5} mm. The speed of light is 3×10^8 ms^{-1}

a. Convert the wavelength into metres
b. By rearranging the equation, and using your answer to part a, find the frequency of the light wave.