GCSE → A Level Biology transition

Answers to maths skills practice questions

1 Numbers and units

1 **a** 1 kJ = 1000 J, so 4 500 000 J = 4 500 000/1000 kJ = 4500 kJ
b 1 MJ = 1000 kJ, so 4500 kJ = 4.5 MJ

2 1 m = 10^9 nm (there are a billion nanometre in a metre)

9.0×10^{-8} m = $9.0 \times 10^{-8} \times 10^9$ nm = $9.0 \times 10^{-8+9}$ nm = 9.0×10 nm = 90 nm

1.20×10^{-7} m = $1.20 \times 10^{-7} \times 10^9$ nm = $1.20 \times 10^{-7+9}$ nm = 1.20×100 nm = 120 nm

Range = 90 nm to 120 nm

3 **a** 10^{11} **b** 10^{12}
c 1000 + 1000 = 2000 **d** 100 − 0.01 = 99.99

4 **a** 10^1 or 10 **b** 10^{-3} or 0.001
c 10^6 or 1 000 00 **d** $100^2 \div 100 = 100$ or 10^2

5 **a** 4 mm **b** 130 s
c 31 300 µl **d** 0.000 104 mg

6 **a** 57 µm **b** 8.6 L or 8.6 dm^3
c 68 s **d** 0.09 mm

2 Decimals9 841.92 reW*nQEMC /P <MCID 17 >BDC q0.000008869 0 595.2 841.92 reW*n

5 Percentages and uncertainty

1 **a** $\frac{2240}{3600000} \times 100 = 0.06\%$ **b** $\frac{480}{3600000} \times 100 = 0.013\%$

2 5.88%

3

Sucrose conc. / mol dm^{-3}	Initial mass / g	Final mass / g	Mass change / g	Percentage change in mass
0.9	1.79	1.06	−0.73	−40.8%
0.7	1.86	1.30	−0.56	−30.1%
0.5	1.95	1.70	−0.25	−12.8%
0.3	1.63	1.76	+0.13	+8.0%
0.1	1.82	2.55	+0.73	+40.1%

4 **a** 1 cm^3 **b** 0.005 s **c** 0.05 °C

5

Measurement made	Equipment used	Absolute error	Relative error
Length of a fluid column in a respirometer is 6 mm	mm scale	0.5 mm	$\frac{0.5}{6}$ 100 8.3%

2 **c** Table 1: Strong correlation. Positive at the start. As light intensity increases, the increase in the rate of photosynthesis decreases (so the graph levels off).

Table 2: Strong correlation. Negative at the start. As time increases, the rate of the decrease of the concentration decreases (so the graph levels off).