

Maths skills

1 Magnification

1 a $\times 120$ b $\times 600$

2 $\times 26\,000$

3 $0.88\ \mu\text{m}$

2 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 $1\ \text{cm}^3$ b $0.005\ \text{s}$ c $0.05\ ^\circ\text{C}$

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	$\frac{0.5}{6} \times 100 = 8.3\%$
Volume of a syringe is 12 cm ³ of liquid	0.5 cm ³ divisions	0.25 cm ³	$\frac{0.25}{12} \times 100 = 2.1\%$

Change in mass of 1.6 g	balance with 2 d.p.	0.005 g	$\frac{0.005 \times 2}{1.6} \times 100 = 0.6\%$
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