Test	Results	Information
t-test	(Use a t-test table to look up your value of t) Obtained value > t value for a probability of 0.05 (the critical value), there is significant difference between A and B	Whether two sets of continuous data are significantly different from one another
Chi-squared (x2) test	(Use a χ 2 table to look up value of χ^2) Obtained value > χ^2 value for a probability of 0.05, there is significant difference between observed results and expected results	Whether observed results differ significantly from your expected result
Pearson's linear correlation	Value close to +1 indicates a positive linear correlation Value close to −1 indicates a negative linear correlation Value close to 0 indicates no correlation	Whether there is a linear correlation between two paired sets of data
Spearman's rank correlation	(Use correlation coefficient table to look up value of r_s) Obtained value of r_s > r_s value for a probability of 0.05, there is a significant correlation between your two values	Whether there is a correlation between two random paired sets of data
Simpson's index of diversity, *D*	0 (lowest species diversity) – 1 (highest species diversity)	To find species diversity after collecting data on species abundance

Standard deviation

$$s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$$

Standard error (S_M)

$$S_M = \frac{s}{\sqrt{n}}$$

t-test

$$t = \frac{|\bar{x}_1 - \bar{x}_2|}{\sqrt{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)}}$$

Chi-squared test

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

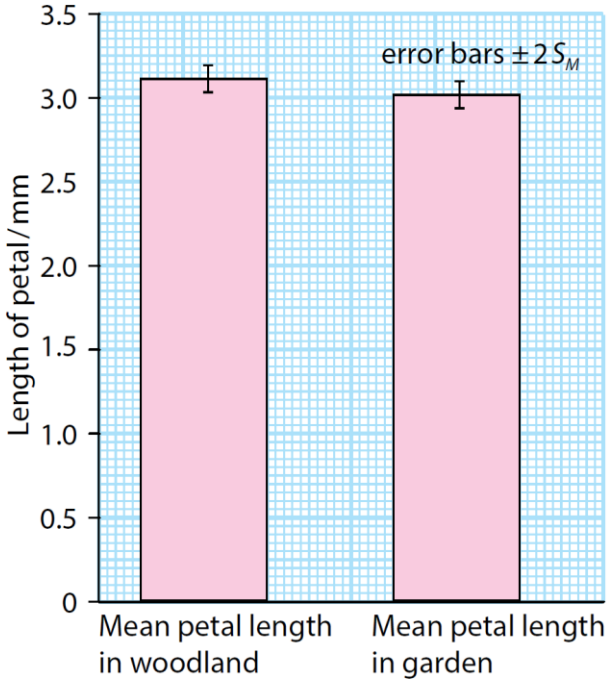
where: Σ = sum of
O = observed value
E = expected value

Pearson's linear correlation

$$r = \frac{\sum xy - n\bar{x}\bar{y}}{ns_x s_y}$$

Spearman's rank correlation

$$r_s = 1 - \left(\frac{6 \times \sum D^2}{n^3 - n}\right)$$



Simpson's index of diversity, *D*

$$D = 1 - \left(\sum \left(\frac{n}{N} \right)^2 \right)$$

Simple dilution and serial dilution

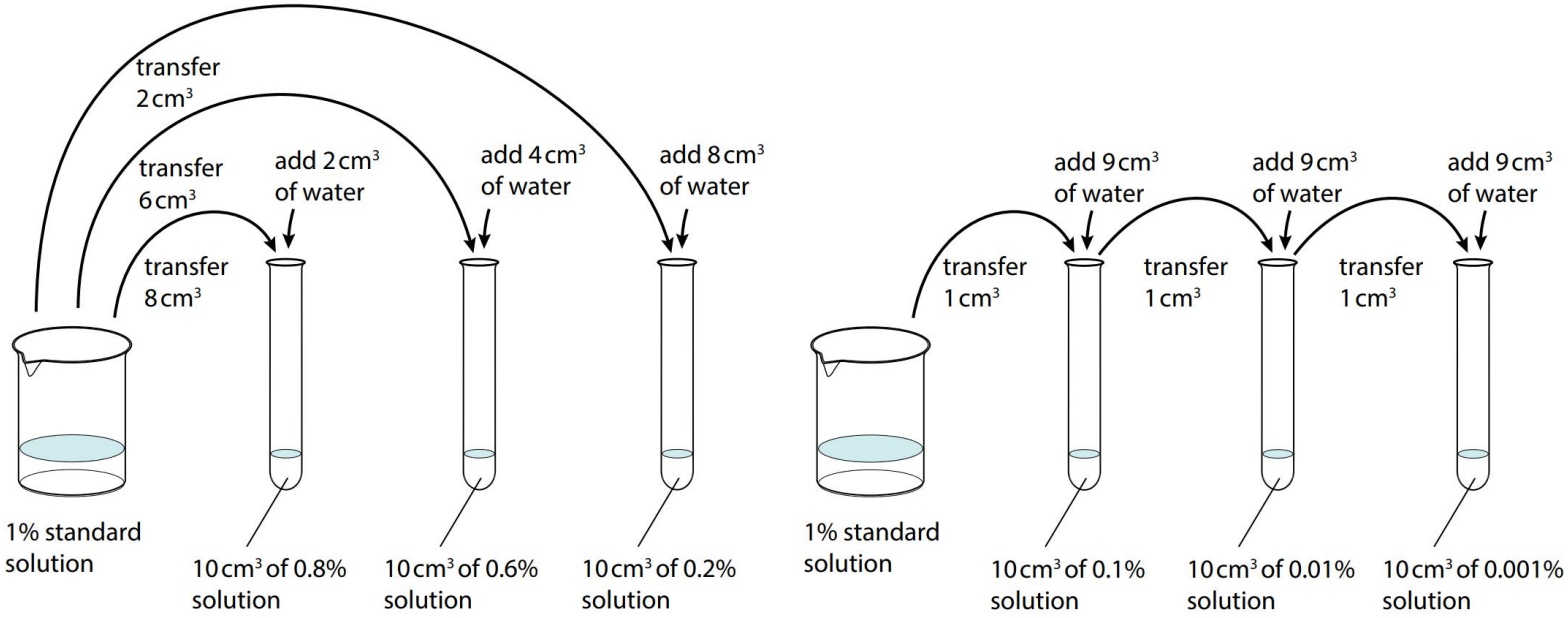


Figure P1.2 Producing a range of concentrations from a standard solution.