

Module 1: Development of practical skills in biology

1.1.1 Planning

- (a) experimental design, including to solve problems set in a practical context
- Including selection of suitable apparatus, equipment and techniques for the proposed experiment.
- Learners should be able to apply scientific knowledge based on the content of the specification to the practical context.
- HSW3
- (b) identification of variables that must be controlled, where appropriate
- (c) evaluation that an experimental method is appropriate to meet the expected outcomes.
- HSW6

1.1.2 Implementing

- (a) how to use a wide range of practical apparatus and techniques correctly
- As outlined in the content of the specification and the skills required for the Practical Endorsement. HSW4
- (b) appropriate units for measurements
- M0.1*
- (c) presenting observations and data in an appropriate format.
- HSW8

1.1.3 Analysis

- (a) processing, analysing and interpreting qualitative and quantitative experimental results
- Including reaching valid conclusions, where appropriate. HSW5
- (b) use of appropriate mathematical skills for analysis of quantitative data
- Refer to Section 5e for a list of mathematical skills that learners should have acquired competence in as part of their course. HSW3
- (c) appropriate use of significant figures
- M1.1*
- (d) plotting and interpreting suitable graphs from experimental results, including,
- M3.2*
M3.3, M3.5
- (i) selection and labelling of axes with appropriate scales, quantities and units
- (ii) measurement of gradients and intercepts.

1.1.4 Evaluation

- (a) how to evaluate results and draw conclusions
- HSW6
- (b) the identification of anomalies in experimental measurements

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- (c) the limitations in experimental procedures
- (d) precision and accuracy of measurements and data, including margins of error, percentage errors and uncertainties in apparatus *M1.11*
- (e) the refining of experimental design by suggestion of improvements to the procedures and apparatus. HSW3