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| Required activity | Apparatus and technique reference | Competency assessed |
| 1. Investigation into the effect of a named variable on the rate of an enzyme-controlled reaction | a, b, c, f, l | 1a; 4a |
| 2. Preparation of stained squashes of cells from plant root tips; set-up and use of an optical microscope to identify the stages of mitosis in these stained squashes and calculation of a mitotic index | d, e, f | 1a; 3a; 3b |
| 3. Production of a dilution series of a solute to produce a calibration curve with which to identify the water potential of plant tissue | c, h, j, l | 2a; 2b; 5a |
| 4. Investigation into the effect of a named variable on the permeability of cell-surface membranes | a, b, c, j, l | 2c; 4b; 5b |
| 5. Dissection of animal or plant gas exchange or mass transport system or of organ within such a system | e, h, j | 1a; 3a |
| 6. Use of aseptic techniques to investigate the effect of antimicrobial substances on microbial growth | c, i | 3a; 3b; 5a |
| 7. Use of chromatography to investigate the pigments isolated from leaves of different plants eg leaves from shade-tolerant and shade- intolerant plants or leaves of different colours | b, c, g | 2d; 5a;  |
| 8. Investigation into the effect of a named factor on the rate of dehydrogenase activity in extracts of chloroplasts | a, b, c | 2a; 2b; 4a |
| 9. Investigation into the effect of a named variable on the rate of respiration of cultures of single-celled organisms | a, b, c, i | 2c; 4b; 5b |
| 10. Investigation into the effect of an environmental variable on the movement of an animal using either a choice chamber or a maze | h | 3b; 4a |
| 11. Production of a dilution series of a glucose solution and use of colorimetric techniques to produce a calibration curve with which to identify the concentration of glucose in an unknown ‘urine’ sample | b, c, f | 2d; 3b; 4b; 5b |
| 12. Investigation into the effect of a named environmental factor on the distribution of a given species | a, b, h, k, l | 2c; 4a;  |

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| 1. Follows written procedures | a. Correctly follows instructions to carry out experimental techniques or procedures. |
| 2. Applies investigative approaches and methods when using instruments and equipment | a. Correctly uses appropriate instrumentation, apparatus and materials (including ICT) to carry out investigative activities, experimental techniques and procedures with minimal assistance or prompting. b. Carries out techniques or procedures methodically, in sequence and in combination, identifying practical issues and making adjustments when necessary. c. Identifies and controls significant quantitative variables where applicable, and plans approaches to take account of variables that cannot readily be controlled. d. Selects appropriate equipment and measurement strategies in order to ensure suitably accurate results.  |
| 3. Safely uses a range of practical equipment and materials | a. Identifies hazards and assesses risks associated with these hazards, making safety adjustments as necessary, when carrying out experimental techniques and procedures in the lab or field. b. Uses appropriate safety equipment and approaches to minimise risks with minimal prompting.  |
| 4. Makes and records observations | a. Makes accurate observations relevant to the experimental or investigative procedure. b. Obtains accurate, precise and sufficient data for experimental and investigative procedures and records this methodically using appropriate units and conventions.  |
| 5. Researches, references and reports | a. Uses appropriate software and/or tools to process data, carry out research and report findings. b. Cites sources of information demonstrating that research has taken place, supporting planning and conclusions. |

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|  | Apparatus and techniques |
| AT a | use appropriate apparatus to record a range of quantitative measurements (to include mass, time, volume, temperature, length and pH) |
| AT b | use appropriate instrumentation to record quantitative measurements, such as a colorimeter or potometer |
| AT c | use laboratory glassware apparatus for a variety of experimental techniques to include serial dilutions |
| AT d | use of light microscope at high power and low power, including use of a graticule |
| AT e | produce scientific drawing from observation with annotations |
| AT f | use qualitative reagents to identify biological molecules |
| AT g | separate biological compounds using thin layer/paper chromatography or electrophoresis |
| AT h | safely and ethically use organisms to measure:* plant or animal responses
* physiological functions
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| AT i | use microbiological aseptic techniques, including the use of agar plates and broth |
| AT j | safely use instruments for dissection of an animal organ, or plant organ |
| AT k | use sampling techniques in fieldwork |
| AT l | use ICT such as computer modelling, or data logger to collect data, or use software to process data |