

# Contents

|                                             |             |
|---------------------------------------------|-------------|
| <b>List of Figures</b>                      | <b>vii</b>  |
| <b>List of Tables</b>                       | <b>xi</b>   |
| <b>Acknowledgements</b>                     | <b>xiii</b> |
| <b>Introduction</b>                         | <b>xv</b>   |
| <b>Health and Safety</b>                    | <b>xvii</b> |
| <b>1 Measurements and Calculations</b>      | <b>1</b>    |
| 1.1 Units and measurements                  | 1           |
| 1.2 Measuring the volumes of liquids        | 4           |
| 1.3 Pipetting                               | 8           |
| 1.4 Weighing                                | 15          |
| 1.5 Calculations                            | 19          |
| <b>2 Preparing Solutions</b>                | <b>23</b>   |
| 2.1 Common terms defining solutions         | 23          |
| 2.2 Precautions in making solutions         | 23          |
| 2.3 Making solutions                        | 24          |
| 2.4 Dilutions to prepare standard solutions | 26          |
| 2.5 Molar solutions                         | 29          |
| 2.6 Calculations involving solutions        | 31          |
| <b>3 Separation of Liquids and Solids</b>   | <b>35</b>   |
| 3.1 Filtration                              | 35          |
| 3.2 Centrifugation                          | 39          |
| 3.3 Chromatography                          | 45          |
| 3.4 Electrophoresis                         | 51          |
| <b>4 Common Techniques and Equipment</b>    | <b>55</b>   |
| 4.1 Titration                               | 55          |
| 4.2 Spectrophotometry                       | 60          |
| 4.3 Aseptic techniques                      | 69          |
| 4.4 Disinfectants                           | 73          |
| <b>5 Microscopy and Histology</b>           | <b>75</b>   |
| 5.1 Light microscopy                        | 75          |
| 5.2 Slide preparation                       | 84          |
| 5.3 Cell Counting                           | 89          |

|          |                                                                                                 |            |
|----------|-------------------------------------------------------------------------------------------------|------------|
| <b>6</b> | <b>Cardiorespiratory Measurements</b>                                                           | <b>93</b>  |
| 6.1      | Techniques to investigate cardiovascular function                                               | 93         |
| 6.2      | Techniques to investigate respiratory function                                                  | 104        |
| <b>7</b> | <b>Recording and Presenting Data</b>                                                            | <b>111</b> |
| 7.1      | Keeping a laboratory book                                                                       | 111        |
| 7.2      | Presentation of data                                                                            | 112        |
| 7.3      | Recording data in tables                                                                        | 112        |
| 7.4      | Presenting data in graphs                                                                       | 113        |
| 7.5      | Describing data statistically                                                                   | 117        |
|          | <b>Recommended Reading</b>                                                                      | <b>119</b> |
|          | <b>Appendices</b>                                                                               |            |
|          | <b>Appendix 1: Rules for Powers</b>                                                             | <b>121</b> |
|          | <b>Appendix 2: Rules for Logarithms</b>                                                         | <b>123</b> |
|          | <b>Appendix 3: Factors to Consider When Making Solutions</b>                                    | <b>125</b> |
|          | <b>Appendix 4: Principle of Spectrophotometry</b>                                               | <b>127</b> |
|          | <b>Appendix 5: Descriptive Statistics and Formulae</b>                                          | <b>129</b> |
|          | <b>Appendix 6: Using Software to Draw Tables, Graphs and Calculating Descriptive Statistics</b> | <b>133</b> |
|          | <b>Index</b>                                                                                    | <b>137</b> |