

## Year 12 Applied Science Sequence

|     | Content | Reference                | Knowledge Skills                     | Assessment             | Rationale                         |  |  |
|-----|---------|--------------------------|--------------------------------------|------------------------|-----------------------------------|--|--|
|     | Taught  |                          |                                      |                        |                                   |  |  |
|     | Year 12 |                          |                                      |                        |                                   |  |  |
| HT1 | Unit 1  | Topic A:                 | The periodic table, relative atomic  | <b>Formative</b>       | Comprises of a Biology,           |  |  |
|     |         | Periodicity and          | mass                                 | Assessment:            | Chemistry and Physics section.    |  |  |
|     |         | properties of            | The mole and reacting masses         | Daily, Weekly and      | The course begins with the        |  |  |
|     |         | elements                 | Preparing a standard solution and    | Monthly Reviews        | Biology content as this is their  |  |  |
|     |         | Topic D:                 | concentration                        | focussing on reviewing | first exam and it has the most    |  |  |
|     |         | Enzymes in               | Electronic structure                 | material on Essential  | new A Level standard content,     |  |  |
|     |         | action                   | Acid-base titration and volumetric   | Knowledge. Homework    | allowing for retrieval practice   |  |  |
|     |         | Tania E.                 | calculations                         | tests are completed    | throughout the year. The          |  |  |
|     |         | TOPIC E:<br>Diffusion of | Ionic bonding and formulae           | approximately every 3  | students look primarily at cells' |  |  |
|     |         |                          | Covalent bonding                     | lessons.               | structure, function and           |  |  |
|     |         | moloculoc                | Bonding and structure                | Use of TLaC techniques | specialisation followed by an in  |  |  |
|     |         |                          | investigation                        | in lessons to check    | depth look at tissues, including  |  |  |
|     |         |                          | Intermolecular forces                | pupil understanding of | epithelial, endothelial, muscle   |  |  |
|     |         |                          | Physical properties of period 2 and  | essential knowledge    | and nervous tissues' structure,   |  |  |
|     |         |                          | 3 elements                           | during each lesson.    | function and effects of diseases  |  |  |
|     |         |                          | Chemical properties of period 2      |                        | and treatments.                   |  |  |
|     |         |                          | and 3 elements (reaction with        | <u>Summative</u>       |                                   |  |  |
|     | Unit 3  |                          | oxygen)                              | Assessment:            | Unit 3 runs parallel with unit 1, |  |  |
|     |         |                          | Group 1 and 7 reactivity (alkali and | Assessment is taken in | and covers the practical skills   |  |  |
|     |         |                          | alkaline earth metals with water     | class and covers all   | required in a Science course. The |  |  |
|     |         |                          | and halogen displacement             | topics studied up to   | students take significant time    |  |  |
|     |         |                          | reactions)                           | this point.            | developing their graph and        |  |  |
|     |         |                          |                                      | Questions are taken    | method writing skills to improve  |  |  |
|     |         |                          | Protein structure                    | from past exam papers  | to a Level 3 standard and         |  |  |
|     |         |                          | •Active sites                        | and graded using       | evaluate a whole range of         |  |  |
|     |         |                          | Denaturation                         | typical grade          | practical's undertaken by others. |  |  |

|     |        |                | Enzymes as biological catalysts in  | boundaries from BTEC   | This builds on their expertise in |
|-----|--------|----------------|---|--|-----------------------------------|
|     |        |                | chemical reactions  | Applied Science exams  | the lab and prepares them for     |
|     |        |                | Enzymes as biological catalysts in  |  | the practical examilater in the   |
|     |        |                | chemical reactions  |  | vear                              |
|     |        |                | Factors that can affect enzyme  |  | year                              |
|     |        |                | activity  |  | In unit 1, the course moves onto  |
|     |        |                | Eactors that can affect onzume  |  | the chemistry section as this has |
|     |        |                | activity  |  | cignificant contant compared to   |
|     |        |                | Contains offersting the rate of   |  | the physics. The Chemistry        |
|     |        |                | Factors affecting the rate of   |  | the physics. The Chemistry        |
|     |        |                | diffusion   |  | aspect looks in detail at the     |
|     |        |                | Arrangement and movement of   |  | atomic structure covered at       |
|     |        | <b>—</b> : .   | molecules   |  | GCSE. It looks in more depth,     |
| HT2 | Unit 1 | Topic A:       | Reaction of metals with acids   | Formative  | including electronic orbitals,    |
|     |        | properties of  | Reactions of metals – displacement  | Assessment:  | intermolecular forces and         |
|     |        | elements       | Variable oxidation states of  | Daily, Weekly and  | coordinate bonds. The course      |
|     |        | olomonto       | transition metals   | Monthly Reviews  | then moves on to the properties   |
|     |        | Topic B:       | Revision  | focussing on reviewing   | of these substances due to their  |
|     |        | Structure and  | Test  | material on Essential  | location on the periodic table    |
|     |        | function of    | Intro to the history of the   | Knowledge. Homework  | and their electron arrangements.  |
|     |        | cells and      | microscope  | tests are completed  |                                   |
|     |        | tissues        | Preparation of basic biological   | approximately every 3  |                                   |
|     |        | Topic G:       | slides  | lessons.   |                                   |
|     |        | Energy content | Electron microscopes  | Use of TLaC techniques   |                                   |
|     |        | in fuels       | Root tip squash   | in lessons to check  |                                   |
|     |        |                | Magnification calculations  | pupil understanding of   |                                   |
|     |        |                | Structures in a cell  | essential knowledge  |                                   |
|     |        |                |   | during each lesson.  |                                   |
|     |        |                | Cells and their structures  | 0  |                                   |
|     |        |                | Cell structure  | Summative  |                                   |
|     |        |                | Research into Hans Christian Gram   | Assessment:  |                                   |
|     |        |                | Specialised cells   | Mock exam assessment   |                                   |
|     |        |                | Sex cells   | taken in the hall in   |                                   |
|     |        |                | Boot bair cells   | exam conditions  |                                   |
|     |        |                | Structure and function of the blood   |  |                                   |
|     |        |                | Cells and their structures<br>Cell structure<br>Research into Hans Christian Gram<br>Specialised cells<br>Sex cells<br>Root hair cells<br>Structure and function of the blood | Summative<br>Assessment:<br>Mock exam assessment<br>taken in the hall in<br>exam conditions. |                                   |

|     | I |                | M/hite blood calls                  |                        |  |
|-----|---|----------------|-------------------------------------|------------------------|--|
|     |   |                | white blood cells                   |                        |  |
|     |   |                |                                     |                        |  |
|     |   |                | Pulmonary system                    |                        |  |
|     |   |                | Arrangement and movement of         |                        |  |
|     |   |                | molecules                           |                        |  |
|     |   |                | •Temperature                        |                        |  |
|     |   |                | Arrangement and movement of         |                        |  |
|     |   |                | molecules                           |                        |  |
|     |   |                | • Diffusion of food dye through     |                        |  |
|     |   |                | agar                                |                        |  |
|     |   |                | eSocondany ovidence                 |                        |  |
|     |   |                |                                     |                        |  |
|     |   |                | Hazards associated with fuels       |                        |  |
|     |   |                | Hazards associated with rueis       |                        |  |
|     |   |                | •Moscuring bost onorgy released     |                        |  |
|     |   |                | from a fuel                         |                        |  |
|     |   |                | lipite of operate                   |                        |  |
|     |   |                | • Dianning anargy from foods        |                        |  |
|     |   |                | practical                           |                        |  |
|     |   |                | • Energy from foods practical       |                        |  |
|     |   |                | •Energy from focus practical        |                        |  |
|     |   |                | - Energy from condia way            |                        |  |
| UT2 |   | Topic B:       | Poot bair colls                     | Formativo              |  |
| п13 |   | Structure and  | RUUL Half CEIIS                     | Accossment:            |  |
|     |   | function of    | White blood colle                   | Assessment:            |  |
|     |   | cells and      | Enithelial colls                    | Monthly Povious        |  |
|     |   | tissues        | Bulmonany system                    | focussing on reviewing |  |
|     |   |                | Artorios and voins                  | material on Eccontial  |  |
|     |   | Topic G:       | Arteries and verns                  | Knowledge Hemowerk     |  |
|     |   | Energy content | diseases                            | tosts are completed    |  |
|     |   |                | UISEdSES<br>Cliding filoment theory | cests are completed    |  |
|     |   | Topic H:       |                                     | approximately every 3  |  |
|     |   | Electrical     | EUG traces                          | lessons.               |  |
|     |   | circuits       | Nervous system                      |                        |  |

|     |  | Myelin sheath   | Lise of TI aC techniques  |  |
|-----|--|---|---|--|
|     |  | The brain   | in lossons to chock   |  |
|     |  |   |   |  |
|     |  |   | pupil understanding of  |  |
|     |  | Units of energy   | essential knowledge   |  |
|     |  | <ul> <li>Planning energy from foods</li> </ul>  | during each lesson.   |  |
|     |  | practical   |   |  |
|     |  | <ul> <li>Energy from foods practical</li> </ul>   | <u>Summative</u>  |  |
|     |  | investigation   | assessment:   |  |
|     |  | <ul> <li>Energy from candle wax</li> </ul>  | Assessment is taken in  |  |
|     |  | Use of electrical symbols to design   | class and covers all  |  |
|     |  | circuits  | topics.   |  |
|     |  | •Electrical resistance  | Ouestions are taken   |  |
|     |  | Use of electrical symbols to design   | from nast exam papers   |  |
|     |  | circuits  | and graded using  |  |
|     |  | •Thormistor invostigation   | typical grade   |  |
|     |  |   | houndaries from CCCE  |  |
|     |  |   | Chamistry systems   |  |
|     |  |   |   |  |
|     | Tania O  |   |   |  |
| HT4 | Topic C  | Introducing transverse and  | Formative   |  |
| HT4 | <br>Topic C<br>Waves and   | Introducing transverse and longitudinal waves and measuring   | Formative       Assessment:   |  |
| HT4 | <br>Topic C<br>Waves and<br>communication  | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves  | Formative       Assessment:       Daily, Weekly and   |  |
| HT4 | <br>Topic C<br>Waves and<br>communication  | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding  | Formative       Assessment:       Daily, Weekly and       Monthly Reviews   |  |
| HT4 | Topic C<br>Waves and<br>communication<br>Topic H:<br>Electrical  | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding<br>of superposition of waves   | Formative       Assessment:       Daily, Weekly and       Monthly Reviews       focussing on reviewing  |  |
| HT4 | Topic C<br>Waves and<br>communication<br>Topic H:<br>Electrical<br>circuits  | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding<br>of superposition of waves<br>Diffraction and superposition  | Formative       Assessment:       Daily, Weekly and       Monthly Reviews       focussing on reviewing       material on Essential  |  |
| HT4 | Topic C<br>Waves and<br>communication<br>Topic H:<br>Electrical<br>circuits  | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding<br>of superposition of waves<br>Diffraction and superposition<br>Industrial applications of  | Formative       Assessment:       Daily, Weekly and       Monthly Reviews       focussing on reviewing       material on Essential       Knowledge. Homework  |  |
| HT4 | Topic C<br>Waves and<br>communication<br>Topic H:<br>Electrical<br>circuits<br>Topic F: Plants                             | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding<br>of superposition of waves<br>Diffraction and superposition<br>Industrial applications of<br>diffraction gratings and the use of   | Formative       Assessment:       Daily, Weekly and       Monthly Reviews       focussing on reviewing       material on Essential       Knowledge. Homework       tests are completed  |  |
| HT4 | Topic C<br>Waves and<br>communication<br>Topic H:<br>Electrical<br>circuits<br>Topic F: Plants<br>and their                | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding<br>of superposition of waves<br>Diffraction and superposition<br>Industrial applications of<br>diffraction gratings and the use of<br>the wave equation.   | Formative         Assessment:         Daily, Weekly and         Monthly Reviews         focussing on reviewing         material on Essential         Knowledge. Homework         tests are completed         approximately every 3  |  |
| HT4 | Topic C<br>Waves and<br>communication<br>Topic H:<br>Electrical<br>circuits<br>Topic F: Plants<br>and their<br>environment | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding<br>of superposition of waves<br>Diffraction and superposition<br>Industrial applications of<br>diffraction gratings and the use of<br>the wave equation.<br>Progressive and stationary   | Formative         Assessment:         Daily, Weekly and         Monthly Reviews         focussing on reviewing         material on Essential         Knowledge. Homework         tests are completed         approximately every 3         lessons.   |  |
| HT4 | Topic C<br>Waves and<br>communication<br>Topic H:<br>Electrical<br>circuits<br>Topic F: Plants<br>and their<br>environment | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding<br>of superposition of waves<br>Diffraction and superposition<br>Industrial applications of<br>diffraction gratings and the use of<br>the wave equation.<br>Progressive and stationary<br>(standing) resonance   | Formative         Assessment:         Daily, Weekly and         Monthly Reviews         focussing on reviewing         material on Essential         Knowledge. Homework         tests are completed         approximately every 3         lessons.         Use of TLaC techniques  |  |
| HT4 | Topic C<br>Waves and<br>communication<br>Topic H:<br>Electrical<br>circuits<br>Topic F: Plants<br>and their<br>environment | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding<br>of superposition of waves<br>Diffraction and superposition<br>Industrial applications of<br>diffraction gratings and the use of<br>the wave equation.<br>Progressive and stationary<br>(standing) resonance<br>Musical instruments and  | Formative         Assessment:         Daily, Weekly and         Monthly Reviews         focussing on reviewing         material on Essential         Knowledge. Homework         tests are completed         approximately every 3         lessons.         Use of TLaC techniques         in lessons to check  |  |
| HT4 | Topic C<br>Waves and<br>communication<br>Topic H:<br>Electrical<br>circuits<br>Topic F: Plants<br>and their<br>environment | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding<br>of superposition of waves<br>Diffraction and superposition<br>Industrial applications of<br>diffraction gratings and the use of<br>the wave equation.<br>Progressive and stationary<br>(standing) resonance<br>Musical instruments and<br>calculation of the speed of waves   | Formative         Assessment:         Daily, Weekly and         Monthly Reviews         focussing on reviewing         material on Essential         Knowledge. Homework         tests are completed         approximately every 3         lessons.         Use of TLaC techniques         in lessons to check         pupil understanding of   |  |
| HT4 | Topic C<br>Waves and<br>communication<br>Topic H:<br>Electrical<br>circuits<br>Topic F: Plants<br>and their<br>environment | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding<br>of superposition of waves<br>Diffraction and superposition<br>Industrial applications of<br>diffraction gratings and the use of<br>the wave equation.<br>Progressive and stationary<br>(standing) resonance<br>Musical instruments and<br>calculation of the speed of waves<br>on a string.   | Formative         Assessment:         Daily, Weekly and         Monthly Reviews         focussing on reviewing         material on Essential         Knowledge. Homework         tests are completed         approximately every 3         lessons.         Use of TLaC techniques         in lessons to check         pupil understanding of         orsontial knowledge                             |  |
| HT4 | Topic C<br>Waves and<br>communication<br>Topic H:<br>Electrical<br>circuits<br>Topic F: Plants<br>and their<br>environment | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding<br>of superposition of waves<br>Diffraction and superposition<br>Industrial applications of<br>diffraction gratings and the use of<br>the wave equation.<br>Progressive and stationary<br>(standing) resonance<br>Musical instruments and<br>calculation of the speed of waves<br>on a string.   | Formative         Assessment:         Daily, Weekly and         Monthly Reviews         focussing on reviewing         material on Essential         Knowledge. Homework         tests are completed         approximately every 3         lessons.         Use of TLaC techniques         in lessons to check         pupil understanding of         essential knowledge                             |  |
| HT4 | Topic C<br>Waves and<br>communication<br>Topic H:<br>Electrical<br>circuits<br>Topic F: Plants<br>and their<br>environment | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding<br>of superposition of waves<br>Diffraction and superposition<br>Industrial applications of<br>diffraction gratings and the use of<br>the wave equation.<br>Progressive and stationary<br>(standing) resonance<br>Musical instruments and<br>calculation of the speed of waves<br>on a string.<br>Using equations on the speed of                                | FormativeAssessment:Daily, Weekly andMonthly Reviewsfocussing on reviewingmaterial on EssentialKnowledge. Homeworktests are completedapproximately every 3lessons.Use of TLaC techniquesin lessons to checkpupil understanding ofessential knowledgeduring each lesson.   |  |
| HT4 | Topic C<br>Waves and<br>communication<br>Topic H:<br>Electrical<br>circuits<br>Topic F: Plants<br>and their<br>environment | Introducing transverse and<br>longitudinal waves and measuring<br>speed of waves<br>Terms related to the understanding<br>of superposition of waves<br>Diffraction and superposition<br>Industrial applications of<br>diffraction gratings and the use of<br>the wave equation.<br>Progressive and stationary<br>(standing) resonance<br>Musical instruments and<br>calculation of the speed of waves<br>on a string.<br>Using equations on the speed of<br>waves and how waves produce | Formative         Assessment:         Daily, Weekly and         Monthly Reviews         focussing on reviewing         material on Essential         Knowledge. Homework         tests are completed         approximately every 3         lessons.         Use of TLaC techniques         in lessons to check         pupil understanding of         essential knowledge         during each lesson. |  |

| HT5 | Topic C   | Refractive index.<br>Equations<br>Energy usage<br>• Practical investigation<br>Energy usage<br>• Practical investigation<br>• Revision session<br>Factors that can affect plant<br>growth and/or distribution<br>Sampling techniques<br>Sampling sizes<br>• Statistical analysis of data<br>Refractive index   | Mock exam assessment<br>taken in the hall in<br>exam conditions.<br>Assessment is taken in   |  |
|-----|---|--|--|--|
|     | Waves and<br>communication<br>Topic F: Plants<br>and their<br>environment | Total internal reflection, critical<br>angles<br>Electromagnetic waves and inverse<br>square law for intensity<br>Wave intensity, inverse square law,<br>communication<br>Communication, specification,<br>examination technique and<br>revision<br>Use of command words, prefixes,<br>units, symbols and equations<br>Sample paper<br>Sampling sizes<br>•Plant population investigation<br>Sample assessment material | class and covers all<br>topics.<br>Questions are taken<br>from past exam papers<br>and graded using<br>typical grade<br>boundaries from BTEC<br>Applied Science exams. |  |
| HT6 | Revisit of all content  | All  | Assessment is taken in<br>class and covers all<br>topics.  |  |

|  |  | Questions are taken    |  |
|--|--|------------------------|--|
|  |  | from past exam papers  |  |
|  |  | and graded using       |  |
|  |  | typical grade          |  |
|  |  | boundaries from BTEC   |  |
|  |  | Applied Science exams. |  |