# KS5 BTEC EXTENDED CERTIFICATE APPLIED SCIENCE LEVEL 3

KING EDWARD VI
HANDSWORTH WOOD
GIRLS' ACADEMY

## KEVI HWGA Curriculum Map

## Curriculum Purpose:

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| *Context* | **Beyond KEVI HWGA & Careers:** | BTEC National Diploma is an alternative route to similar careers and higher education courses that A Levels can lead to. It provides learners with real life scenarios to which they can apply the theory and content of the course. It also develops key transferable skills and a wider aspect of how the sciences are used in the context of the world around us. The course is considered more suited to some learners who feel they perform less well in exams, as it offers assessment in the form of coursework with only some units assessed using an external exams. The engaging aspects of the course lends itself to practical work and experiences such as visting industries and speaking to scientists. This course is equivalent to two A-Levels.<br>Biomedical Scientice is a popular choice. Other options are Laboratory technician/supervisor, Food Industry, Forensic Sciences, Pharmaceutical Science, Dental Technology, Quantity Surveying, Chiropractic, Paramedic, Nursing, Radiography, Physiotherapist and other healthcare professions. For the highest achievers, Pharmacy, medicine, optometry and denitistry is an option (these options require another science A Level in combination of this BTEC) |
| | **KS5 Intent** | KS5 Scientists will embark on a journey that encourages curiosity, inspires and nurtures a passion for the subject through an in-depth study of Chemistry, Biology and Physics through theory, research, independent study and practical work. We will provide an enriched, broad and stimulating curriculum that empowers students to make decisions, critically evaluate scientific and technological developments that impact society and equip them with the knowledge and skills to pursue further study and rewarding careers. |
| | **HPL** | Key HPL skills such as strategic planning, precision, analyse, evaluate, critical or logical thinking are embedded within the practical experience which complement the scientific investigative skills and assessment objectives set by the exam board.<br>Further HPL skills such as big picture thinking, connection finding, generalisation, self-regulation and meta-cognition will be developed through this broad curriculum; enriched with a range of opportunities from presenting, project work, research, discussion, trips and independent work. |

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| **Year 12** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
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| **Key Topics** | **Unit 1 : Principles and Applications of Science 1** | **Unit 1 : Principles and Applications of Science 1.** | **Unit 2 –Practical Scientific Procedures and techniques**<br>Titration<br>Colorimetry<br>Calorimetry<br>Chromatography<br>Scientific Skills | **Unit 2 –Practical Scientific Procedures and techniques**<br>Titration<br>Colorimetry<br>Calorimetry<br>Chromatography<br>Scientific Skills | **Unit 2 –Practical Scientific Procedures and techniques**<br>Titration<br>Colorimetry<br>Calorimetry<br>Chromatography<br>Scientific Skills | **Unit 3 - Science investigation skills**<br>Unit 3 - Science investigation skills<br>3H Waves continued.<br>3E Diffusion<br>3G Fuels<br>3F Plants<br>3D Proteins<br>Electricity |
| ***Big Qs Key Knowledge*** | ***How do scientists explore substances by anaysising and investigating them? How do they then use and interpret data to make meaningful conclusions and evaluations?*** | ***What is the basis for how communication devices work to deliver and revieve messages across the world and possibnly universe? How are circuilts used which gives rise to a range of appliancations.*** | ***How do scientists propose hypothesis and research, then carry out investigations to provide evidence for further research?*** | ***How do industries ensure safety is of paramount importances to empolyeres, consumers and the workforces as a whole?***<br>***What fundamental principles are used to understand the properties of substances?*** | ***How do scientists synthesis new materials and desired products using specialist laboratory techniques?***<br>***What rules and principles of key concepts are applied to manipulate a route or pathway to enable a particular product?*** | ***What knowledge and understanding is required to successfully answer Required Practical Question***<br>***How do we revise and study independently?*** |
| **KKnowledge and Skills** | Working with waves and the features and types of waves. Application of diffreaction grating.Using wave equations. | Working with waves and the features and types of waves. Application of diffreaction grating.Using wave equations. | 2A – Undertake titration, make a standard solution and colorimetry to determine the concentration of solutions. Plotting calibration graphs. Use of Beer-Lambert Law. | 2A – Undertake titration, make a standard solution and colorimetry to determine the concentration of solutions. Plotting calibration graphs. Use of Beer-Lambert Law. | 2A – Undertake titration, make a standard solution and colorimetry to determine the concentration of solutions. Plotting calibration graphs. Use of Beer-Lambert Law. | 3H Waves<br>3E Diffusion<br>3G Fuels<br>3F Plants<br>3D Proteins<br>Electricity |

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| | Physics: Waves in communication<br>Chemistry: Periodicity and properties of elements<br>Biology: Structures and functions of cells and tissues<br>Proteins<br>Protein structure, Enzymes as catalysts, factors that affect enzyme activity.<br>Production and uses of substances in relation to properties.<br>Electronic configuration, Ionic, covalent & metallic bonding.<br>Intermolecular forces.<br>Balancing equations and quantitative chemistry consisting of relative atomic mass, mole, reacting masses, yield, and concentration calculations. | Physics: Waves in communication<br>Chemistry: Periodicity and properties of elements<br>Biology: Structures and functions of cells and tissues<br>Proteins<br>Protein structure, Enzymes as catalysts, factors that affect enzyme activity.<br>Production and uses of substances in relation to properties.<br>Electronic configuration, Ionic, covalent & metallic bonding.<br>Intermolecular forces.<br>Balancing equations and quantitative chemistry consisting of relative atomic mass, mole, reacting masses, yield, and concentration calculations. | Calibrating equipment. Balances, pH meters / probes. Using a range of glassware safely.<br>2B – Undertake calorimetry to study cooling curves<br>Learning aim C & D<br>2C- Undertake chromatographic techniques to identify components in mixtures<br>2D – Review personal development for scientific skills for laboratory work | Calibrating equipment. Balances, pH meters / probes. Using a range of glassware safely.<br>2B – Undertake calorimetry to study cooling curves<br>Learning aim C & D<br>2C- Undertake chromatographic techniques to identify components in mixtures<br>2D – Review personal development for scientific skills for laboratory work | Calibrating equipment. Balances, pH meters / probes. Using a range of glassware safely.<br>2B – Undertake calorimetry to study cooling curves<br>Learning aim C & D<br>2C- Undertake chromatographic techniques to identify components in mixtures<br>2D – Review personal development for scientific skills for laboratory work | |
| **Key Internal Assessment Outcomes** | Pass: Typically requires the skill of exploring and introducing concepts, theory, outlining, identifying and describing concepts or content.<br>Merit: Typically requires making links and connections between cencepts and elaborating on the causes or effects.<br>Distinction: Typically requires an evaluation of research and practical work to include comparisons, explaining and conclusions with supporting evidence. | | | | | |
| **Key External Assessment Outcomes** | Demonstrate knowledge of scientific facts, terms, definitions and scientific formulae. Demonstrate understanding of scientific concepts, procedures, processes and techniques and their application. Analyse, interpret and evaluate scientific information to make judgements and reach conclusions. Make connections, use and integrate different scientific concepts, procedures, processes or techniques. Use secondary data analysis. Evaluate. | | | | | |

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| **Feedback & Assessment** | ❖ Baseline GCSE SCIENCE Paper Exam Units 1 & 5: 1. Teacher assessed/feedback | ❖ Baseline GCSE SCIENCE Paper Exam Units 1 & 5: 1. Teacher assessed/feedback | ❖ External Exam Unit 1 (January)<br>❖ Internal Coursework assessment involves end of unit submissions and resubmissions/feedback | ❖ Internal Coursework assessment involves end of unit submissions and resubmissions/feedback | ❖ External Exam Resits Unit 1 ( May)<br>❖ Internal Coursework assessment involves end of unit submissions and resubmissions/feedback | ❖ Internal Coursework assessment involves end of unit resubmissions/feedback |

| **Year 13** | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
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| **Key Topics** | **Unit 3 - Science investigation skills**<br>3H Waves<br>3E Diffusion<br>3G Fuels<br>3F Plants<br>3D Proteins<br>Electricity | **Unit 3 - Science investigation skills**<br>3H Waves.<br>3E Diffusion<br>3G Fuels<br>3F Plants<br>3D Proteins<br>Electricity | **Unit 8: Physiology of Human Body Systems**<br>8A The impact of disorders of the muscoskeletal system and their associated corrective treatments | **Unit 8: Physiology of Human Body Systems**<br>8B The impact of disorders on the physiology of the lymphatic system and the associated corrective treatments | **Unit 8: Physiology of Human Body Systems**<br>8C The physiology of the digestive system and the use of corrective treatments for dietary-related diseases | **Study leave coursework submissions and certification process.** |
| *Big Questions* | ***How are common principles and applications of science applied across chemistry, physics and biology? How do scientists create and test hypotheses?*** | ***How are common principles and applications of science applied across chemistry, physics and biology? How do scientists create and test hypotheses?*** | ***What is Physiology? How do the systems function and what occurs when disease or dysfunction affects the system?*** | ***What is Physiology? How do the systems function and what occurs when disease or dysfunction affects the system?*** | ***What is Physiology? How do the systems function and what occurs when disease or dysfunction affects the system?*** | |
| **Key Knowledge** | **Principles, Application of science** | **Principles, Application of science** | **Physiology** | **Physiology** | **Physiology** | |

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| | 3H Electrical circuits, components series and parallel. Calculating current, voltage & power. Energy usage and transfer`<br>3E Diffussion<br>Factors that affect the rate of reaction, arrangement and movement of molecules.<br><br>3G Fuels<br>Types of fuels, hazards associated with fuel, calorimetry and calculations. Units of energy.<br><br>3F Plants<br>Factors that affect plant growth and distribution, sampling techniques, sampling distribution and size<br><br>3H C2 Waves in communication<br>Electromagnetic spectrum are grouped according to the frequency. How the applications of electromagnetic waves in communications are related to frequency, including: satellite, communication, mobile phones, Bluetooth®, infrared, Wi-fi. | 3H Electrical circuits, components series and parallel. Calculating current, voltage & power. Energy usage and transfer`<br>3E Diffussion<br>Factors that affect the rate of reaction, arrangement and movement of molecules.<br><br>3G Fuels<br>Types of fuels, hazards associated with fuel, calorimetry and calculations. Units of energy.<br><br>3F Plants<br>Factors that affect plant growth and distribution, sampling techniques, sampling distribution and size<br><br>3H C2 Waves in communication<br>Electromagnetic spectrum are grouped according to the frequency. How the applications of electromagnetic waves in communications are related to frequency, including: satellite, communication, mobile phones, Bluetooth®, infrared, Wi-fi. | 8A The impact of disorders of the muscoskeletal system and their associated corrective treatments<br><br>8B The impact of disorders on the physiology of the lymphatic system and the associated corrective treatments<br><br>8C The physiology of the digestive system and the use of corrective treatments for dietary-related diseases | 8A The impact of disorders of the muscoskeletal system and their associated corrective treatments<br><br>8B The impact of disorders on the physiology of the lymphatic system and the associated corrective treatments<br><br>8C The physiology of the digestive system and the use of corrective treatments for dietary-related diseases | 8A The impact of disorders of the muscoskeletal system and their associated corrective treatments<br><br>8B The impact of disorders on the physiology of the lymphatic system and the associated corrective treatments<br><br>8C The physiology of the digestive system and the use of corrective treatments for dietary-related diseases | |

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| **Key Internal Assessment Objectives** | Pass: Requires the skill of introducing concepts, theory, outlining, identifying and describing concepts or content.<br>Merit: Requires making links and connections between cencepts and elaborating on the causes or effects.<br>Distinction: Requires an evaluation of research and practical work to include comparisons, explaining and conclusions with supporting evidence. | | | | | |
| **Key External Assessment Objectives** | Demonstrate knowledge of scientific facts, terms, definitions and scientific formulae. Demonstrate understanding of scientific concepts, procedures, processes and techniques and their application. Analyse, interpret and evaluate scientific information to make judgements and reach conclusions. Make connections, use and integrate different scientific concepts, procedures, processes or techniques. Use secondary data analysis. Evaluate. | | | | | |
| **Feedback & Assessment** | ❖ Unit 3 Summer prep.<br>❖ External Exam Unit 3 1. Teacher assessed/feedback | ❖ External Exam Unit 3 1. Teacher assessed/feedback | ❖ External Exam Unit 3 Mock Exam<br>Internal Coursework assessment involves end of unit submissions and resubmissions/feedback | ❖ Internal Coursework assessment involves end of unit submissions and resubmissions/feedback | Internal Coursework assessment involves end of unit submissions and resubmissions/feedback | ❖ Internal Coursework assessment involves end of unit submissions and resubmissions/feedback |