KS5 BTEC NATIONAL DIPLOMA APPLIED SCIENCE LEVEL 3

KEVI HWGA Curriculum Map

Curriculum Purpose:		
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. 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. 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.

KING EDWARD VI HANDSWORTH WOOD GIRLS' ACADEMY

KEVI HWGA Curriculum Map

Year 12	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key Topics	**Unit 1 : Principles and Applications of Science 1** **Unit 5: Principles and Applications of Science II**	**Unit 1 : Principles and Applications of Science 1.** **Unit 5: Principles and Applications of Science II**	**Unit 2 –Practical Scientific Procedures and techniques** Titration Colorimetry Calorimetry Chromatography Scientific Skills **Unit 10** **Biological Moelecules and Metabolic Pathways** 10A Biochemical Moelcules 10B Respiration 10C Photosynthesis	**Unit 2 –Practical Scientific Procedures and techniques** Titration Colorimetry Calorimetry Chromatography Scientific Skills **Unit 10** **Biological Moelecules and Metabolic Pathways** 10A Biochemical Moelcules 10B Respiration 10C Photosynthesis	**Unit 2 –Practical Scientific Procedures and techniques** Titration Colorimetry Calorimetry Chromatography Scientific Skills **Unit 10** **Biological Moelecules and Metabolic Pathways** 10A Biochemical Moelcules 10B Respiration 10C Photosynthesis	**Unit 3H - Science investigation skills Electrical Circuits** Unit 3 - Science investigation skills 3H Waves continued. 3E Diffussion 3G Fuels 3F Plants 3D Proteins Electricity **Unit 6:Investigative Project** 6A Undertake a literature search and review to produce an investigative project proposal
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?* *What fundamental principles are used to understand the properties of substances?*	*How do scientists synthesis new materials and desired products using specialist laboratory techniques?* *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* *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. Physics: Waves in communication Chemistry: Periodicity and properties of elements Biology: Structures and functions of cells and tissues Proteins Protein structure, Enzymes as catalysts, factors that affect enzyme activity. Production and uses of substances in relation to properties. Electronic configuration, Ionic, covalent & metallic bonding. Intermolecular forces. Balancing equations and quantitative chemistry consisting of relative atomic mass, mole, reacting masses, yield, and concentration calculations. 5A Properties and Uses of substances 5B Organs and Systems 5C Thermal Physics, materials and fluids	Working with waves and the features and types of waves. Application of diffreaction grating.Using wave equations. Physics: Waves in communication Chemistry: Periodicity and properties of elements Biology: Structures and functions of cells and tissues Proteins Protein structure, Enzymes as catalysts, factors that affect enzyme activity. Production and uses of substances in relation to properties. Electronic configuration, Ionic, covalent & metallic bonding. Intermolecular forces. Balancing equations and quantitative chemistry consisting of relative atomic mass, mole, reacting masses, yield, and concentration calculations. 5A Properties and Uses of substances 5B Organs and Systems 5C Thermal Physics, materials and fluid	2A – Undertake titration, make a standard solution and colorimetry to determine the concentration of solutions. Plotting calibration graphs. Use of Beer-Lambert Law. Calibrating equipment. Balances, pH meters / probes. Using a range of glassware safely. 2B – Undertake calorimetry to study cooling curves Learning aim C & D 2C- Undertake chromatographic techniques to identify components in mixtures 2D – Review personal development for scientific skills for laboratory work	2A – Undertake titration, make a standard solution and colorimetry to determine the concentration of solutions. Plotting calibration graphs. Use of Beer-Lambert Law. Calibrating equipment. Balances, pH meters / probes. Using a range of glassware safely. 2B – Undertake calorimetry to study cooling curves Learning aim C & D 2C- Undertake chromatographic techniques to identify components in mixtures 2D – Review personal development for scientific skills for laboratory work	2A – Undertake titration, make a standard solution and colorimetry to determine the concentration of solutions. Plotting calibration graphs. Use of Beer-Lambert Law. Calibrating equipment. Balances, pH meters / probes. Using a range of glassware safely. 2B – Undertake calorimetry to study cooling curves Learning aim C & D 2C- Undertake chromatographic techniques to identify components in mixtures 2D – Review personal development for scientific skills for laboratory work	3H Waves 3E Diffusion 3G Fuels 3F Plants 3D Proteins Electricity
Key Internal	Pass: Typically requires the skill of exploring and introducing concepts, theory, outlining, identifying and describing concepts or content. Merit: Typically requires making links and connections between cencepts and elaborating on the causes or effects.					

Assessment Outcomes	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.					
Feedback & Assessment	❖ Baseline GCSE SCIENCE Paper <u>Exam Units 1 & 5:</u> 1. Teacher assessed/feedback ❖ Internal Coursework assessment involves end of unit submissions and resubmissions/feedback	❖ Baseline GCSE SCIENCE Paper <u>Exam Units 1 & 5:</u> 1. Teacher assessed/feedback ❖ Internal Coursework assessment involves end of unit submissions and resubmissions/feedback	❖ <u>External Exam Unit 1 & 5 (January)</u> ❖ Internal Coursework assessment involves end of unit submissions and resubmissions/feedback	❖ Internal Coursework assessment involves end of unit submissions and resubmissions/feedback	❖ <u>External Exam Resits Unit 1 & 5 (May)</u> ❖ 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
Key Topics	**Unit 3 - Science investigation skills** 3H Waves 3E Diffussion 3G Fuels 3F Plants 3D Proteins Electricity	**Unit 3 - Science investigation skills** 3H Waves. 3E Diffussion 3G Fuels 3F Plants 3D Proteins Electricity	**Unit 8: Physiology of Human Body Systems** 8A The impact of disorders of the muscoskeletal system and their associated corrective treatments	**Unit 8: Physiology of Human Body Systems** 8B The impact of disorders on the physiology of the lymphatic system and the associated corrective treatments	**Unit 8: Physiology of Human Body Systems** 8C The physiology of the digestive system and the use of corrective treatments for dietary-related diseases	**Study leave coursework submissions and certification process.**

	Unit 4 : Principles and Applications of Science Unit 4A – Health and Safety **Unit 6:Investigative Project** 6A Undertake a literature search and review to produce an investigative project proposal.	**Unit 4 : Principles and Applications of Science 1 4B Organic Liquids** **Unit 6:Investigative Project** 6B Produce a plan for an investigative project based on the proposal	**Unit 4 : Principles and Applications of Science 1 4C Organic Solids** **Unit 6:Investigative Project** 6B Produce a plan for an investigative project based on the proposal	**Unit 4 : Principles and Applications of Science 1 4C Organic Solids** **Unit 6:Investigative Project** 6C Undertake the project, collecting analysing and presenting the results	**Unit 4 : Principles and Applications of Science 1 4D Scientific Information and Data** **Unit 6:Investigative Project** 6D Review the investigative projectusing the correct scientific principles	
Big Questions	***How are common principles and applications of science applied across chemistry, physics and biology? How do scientists create and test hypotheses?*** ***How do industries manufacture products?*** ***How do scientists test hypothesis, design investigations, analyse and present results?***	***How are common principles and applications of science applied across chemistry, physics and biology? How do scientists create and test hypotheses?*** ***How do industries manufacture products?*** ***How do scientists test hypothesis, design investigations, analyse and present results?***	***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** 3H Electrical circuits, components series and parallel. Calculating current, voltage & power. Energy usage and transfer` 3E Diffussion Factors that affect the rate of reaction, arrangement and movement of molecules. 3G Fuels	**Principles, Application of science** 3H Electrical circuits, components series and parallel. Calculating current, voltage & power. Energy usage and transfer` 3E Diffussion Factors that affect the rate of reaction, arrangement and movement of molecules. 3G Fuels	**Physiology** **Principles and Applications of Science** **Investigative Project** 4A: Application of health and safety legislation in scientific organisations. Awareness of the types of hazards. 4B Explore manufacturing techniques and testing methods for an organic	**Physiology** **Principles and Applications of Science** **Investigative Project** 4A: Application of health and safety legislation in scientific organisations. Awareness of the types of hazards. 4B Explore manufacturing techniques and testing methods for an organic	**Physiology** **Principles and Applications of Science** **Investigative Project** 4A: Application of health and safety legislation in scientific organisations. Awareness of the types of hazards. 4B Explore manufacturing techniques and testing methods for an organic	

	Types of fuels, hazards associated with fuel, calorimetry and calculations. Units of energy. 3F Plants Factors that affect plant growth and distribution, sampling techniques, sampling distribution and size 3H C2 Waves in communication 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.	Types of fuels, hazards associated with fuel, calorimetry and calculations. Units of energy. 3F Plants Factors that affect plant growth and distribution, sampling techniques, sampling distribution and size 3H C2 Waves in communication 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.	liquid such as reflux, distillation, solvent extraction. B1 Manufacturing techniques. Comparing laboratory with industrial methods.Boiling Point measurement and IR, HPLC & GC. 4C Crystalisation & Freezing. Purity. 4D: Understand how scientific information may be stored and communicated in a workplace laboratory D1 Systems for managing laboratory information D2 Communicating information in a scientific organisation	liquid such as reflux, distillation, solvent extraction. B1 Manufacturing techniques. Comparing laboratory with industrial methods.Boiling Point measurement and IR, HPLC & GC. 4C Crystalisation & Freezing. Purity. 4D: Understand how scientific information may be stored and communicated in a workplace laboratory D1 Systems for managing laboratory information D2 Communicating information in a scientific organisation	liquid such as reflux, distillation, solvent extraction. B1 Manufacturing techniques. Comparing laboratory with industrial methods.Boiling Point measurement and IR, HPLC & GC. 4C Crystalisation & Freezing. Purity. 4D: Understand how scientific information may be stored and communicated in a workplace laboratory D1 Systems for managing laboratory information D2 Communicating information in a scientific organisation	
Key Internal Assessment Objectives	Pass: Requires the skill of introducing concepts, theory, outlining, identifying and describing concepts or content. Merit: Requires making links and connections between cencepts and elaborating on the causes or effects. 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 6A & 4A skills summer transition task. ❖ <u>External Exam Unit 3 Mock Exam</u> ❖ Internal Coursework assessment involves end of unit submissions and resubmissions/feedback	❖ <u>External Exam Unit 3</u> 1. Teacher assessed/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	❖ Internal Coursework assessment involves end of unit submissions and resubmissions/feedback	❖ Internal Coursework assessment involves end of unit submissions and resubmissions/feedback