St Wilfrid's RC College

Biology

Curriculum Overarching Intent

Ensure students are given the opportunity to develop as mature young scientists with the ability to relate the importance of science to the world around them and make informed decisions

Prior Learning

- An understanding of how to work scientifically, asking relevant questions and using different types of scientific enquiries to answer them.
- Students learn in year 4 that living things can be grouped in a variety of ways. They have already considered in year 2 that things can be living, none living or have never been alive.
- Students have already learned to describe the simple functions of the basic parts of the digestive system in humans

	Vision	Key Concepts and Key Skills
Year 7	In primary school, students have been introduced to a number of organ systems, and they will begin their year 7 science studies learning about cells, the building blocks of life. They will see how cells are organised into tissues, organs and then organ systems, and learn how scientists can view cells using microscopes. Students will then study specialised cells, and learn how two of these specialised cells, the sex cells, are involved in reproduction to give rise to living organisms. Pupils will then conclude year 7 by studying how these living organisms survive within an ecosystem.	• Cell structure • Specialised cells • Microscopy skills and calculations • Animal Reproduction • The scientific method • Energy transfers within an ecosystem
Year 8	Students begin year 8 by building on their knowledge of the digestive system to learn how enzymes function within the system, and break down food. Students will gain knowledge of the breakdown of particular food groups, such as carbohydrates into glucose. Students will then study respiration, and see how this glucose reacts with oxygen to release energy. They will build on their knowledge of year 7 biology and study the circulatory and respiratory systems. The year will conclude with students learning about photosynthesis, and see how this biochemical reaction differs from respiration. Students will build upon their knowledge of reproduction from year 7, by learning how plants reproduce, and again comparing this to animal reproduction.	• Healthy diet • Action of enzymes • Digestion • Respiration • The scientific method • Circulatory and respiratory systems • Photosynthesis • Sampling techniques and fieldwork • Plant reproduction
Year 9	Students already have an understanding of how living organisms reproduce, but module 1 of year 9 aims to build on this by teaching them how genetic information is involved in reproduction. They will understand the structure of chromosomes and DNA, and why offspring do not look identical. They will also be able to predict inheritance of single traits and speak the language of genetics including appropriate use of all key words. Module 2 focuses on health and disease, a topic that has not yet been fully covered at key stage 3, however students will revisit the concept of white blood cells and bacterial cells from year 7. Built into this will be scientific skills such as investigation planning, graph reading and evaluation and debate. Module 3 will reintroduce the fundamentals of biology to build on their knowledge of the basics; cells, organs, organ systems and enzymes.	• DNA structure • Inheritance • Evolution • Cell division • Communicable and Non-communicable disease • Immunity • Antibiotic resistance • Transport of substances In the final module we will revisit these key concepts: • Cell structure • Specialised cells • Microscopy skills and calculations • Enzyme activity
Year 10	In year 10 students embark on their journey of GCSE Biology. They will use their fundamental knowledge of cells in KS3 to see how cells grow by mitosis. They will understand how we all begin from one single cell, and grow into full organisms. Students will study the science behind inheritance, and see how organisms have evolved through natural selection. They will then see how genetic information can be altered by the processes of genetic engineering and selective breeding. Finally, students end their year 10 studies by focussing on health and disease.	Students will study the following Edexcel GCSE topics: B1 – Fundamental Concepts of Biology B2 – Cells and Control B3 – Genetics B4 – Natural Selection, Evolution and Changing Genomes B5 – Health, Disease and the Development of Medicines
Year 11	Year 11 is the final part of their GCSE journey. Students will revisit the concept of photosynthesis in greater depth, and link this to how plants grow. Students will then focus on how hormones control and coordinate the responses of organisms, particularly animals. They will then study the circulatory system, and learn about the key organs involved in maintaining bodily functions. The final topic focuses on ecosystems, and how nutrients are recycled through organisms and the environment to link biological processes together.	Students will study the following Edexcel GCSE topics: B6 – Plants B7 – Homeostasis, Co-ordination and Control B8 – Exchange B9 – Ecosystems and Cycles
Year 12	Students will have studied a number of biological molecules throughout their key stage 3 and 4 modules, and year 12 biology starts by learning about the biochemical structures of these fundamental molecules. Students already have a basic concept of cells, but they will delve deeper into the organelles of cells and study brand new cellular structures such as the Golgi apparatus and the endoplasmic reticulum. The key concepts of biological molecules and cells will then be built upon in the rest of the topics, in which students will learn about the role of cells in immunity, gas exchange mass transport and cell division. Students will also meet new concepts, such as the exchange of gases in insects, DNA replication and enzyme inhibitors that can act as drugs.	Students will study the following AQA A-level topics: • Biological molecules • Cells • Cell Transport • Enzymes • Exchange • Immunity • Genetics and Cell Division • Mass Transport • Species, Taxonomy and Biodiversity • Populations
Year 13	Students conclude their key stage 5 studies by learning about two of the most important biochemical reactions in biology, photosynthesis and respiration. All of the knowledge from previous years is utilised to study these reactions in depth. Students then study the survival of organisms, including plants and animals, and how they respond to stimuli. Students will further their knowledge of genetics by studying inheritance, gene expression and see how scientists can manipulate genes in gene technology. They will conclude their year 13 studies by building upon the concept of homeostasis, studied in year 11, and begin to prepare for their final examinations.	Students will study the following AQA A-level topics: • Photosynthesis • Respiration • Simple Responses • Nervous Co-ordination • Inheritance • Ecosystems and Cycles • Gene Expression • Gene Technology • Homeostasis Students will also complete 12 required practical experiments, across both years of their A-level course, where they will be assessed on a variety of competencies and skills

St Wilfrid's RC College

Biology

Our Curriculum Progression Model is:

Readiness for their next step…

Year 13 Module 1 Respiration Photosynthesis Energy transfers and Cycles	**Year 13 Module 2** Simple responses Inheritance Nervous coordination	**Year 13 Module 3** Gene expression Gene technology Homeostasis
Year 12 Module 1 Biological molecules Enzymes Cells and Observing cells	**Year 12 Module 2** Genetics and cell division Cell Transport Immunity Gas Exchange	**Year 12 Module 3** Mass Transport Species, taxonomy and biodiversity Populations
Year 11 Module 1 Plants Homeostasis, coordination and control	**Year 11 Module 2** Transport and circulatory system	**Year 11 Module 3** Ecosystems
Year 10 Module 1 Key concepts in biology Cells and control	**Year 10 Module 2** Genetics Natural selection and evolution	**Year 10 Module 3** Health and disease
Year 9 Module 1 Genetics and evolution	**Year 9 Module 2** Pathogens and disease	**Year 9 Module 3** Fundamental concepts in Biology
Year 8 Module 1 Nutrition and digestion	**Year 8 Module 2** Respiration and circulatory system	**Year 8 Module 3** Photosynthesis and material cycles
Year 7 Module 1 Cells, tissues and organisms	**Year 7 Module 2** Reproduction	**Year 7 Module 3** Ecology

Knowledge over time

Knowledge over time

St Wilfrid's RC College

Biology

Key texts and websites that you can access to support their knowledge development in this subject include:

	Year 12	Year 13
	Exam Board website: AQA | AS and A-level | Biology | Specification at a glance AQA | Science | AS and A-level | Biology	
Websites	A Level Biology Revision | AQA, OCR, Edexcel And CIE Biology Master frameset (biologymad.com)	
Key texts and books	• Invisible Women by Caroline Criado-Perez • Anatomicum: (Welcome To The Museum) Hardcover – 19 Sept. 2019 • Entangled Life: The phenomenal Sunday Times bestseller exploring how fungi make our worlds, change our minds and shape our futures Paperback – 2 Sept. 2021 • A Short History of Nearly Everything (Bryson, 5) • Genome: The Autobiography of a Species in 23 Chapters by Matt Ridley • DNA: The Secret of Life by James Watson	

	Year 10	Year 11
	Exam Board website: https://qualifications.pearson.com/en/qualifications/edexcel-gcses/sciences-2016.html	
Websites	BBC Bitesize Oak Academy Kay science Knowledge organisers Seneca Learning YouTube – Primrose Kitten, FreeScienceLesson	BBC Bitesize Oak Academy Kay science Knowledge organisers Seneca Learning YouTube – Primrose Kitten, FreeScienceLesson
Key texts and books	• The Science of the Ocean: The Secrets of the Seas Revealed • Biology Made Easy: An Illustrated Study Guide For Students To Easily Learn Cellular & Molecular Biology: An Illustrated Study Guide For Students To Easily Learn Cellular & Molecular Biology • A (Very) Short History of Life On Earth: 4.6 Billion Years in 12 Chapters • The Body: A Guide for Occupants • The Fault in Our Stars by John Green • A Selfish Gene by Richard Dawkins • Sapiens 'A Brief History of Mankind' by Yuval Noah Harari	

	Year 7	Year 8	Year 9
Websites	https://www.bbc.co.uk/bitesize www.youtube.com - science channels Oak Academy Knowledge organisers (provided by school)	https://www.bbc.co.uk/bitesize www.youtube.com - science channels Oak Academy Knowledge organisers (provided by school)	https://www.bbc.co.uk/bitesize www.youtube.com - science channels www.genome.gov Oak Academy Knowledge organisers (provided by school) Seneca learning
Key texts and books	• My First Book of Microbes: Viruses, Bacteria, Fungi and More (My First Book of Science) • The Biology Book: Big Ideas Simply Explained • Pig Heart Boy by Malorie Blackman • Women in Science by Rachel Ignotofsky • Ocean by Hélène Druvert, Emmanuelle Grundmann • Super Simple Biology: The Ultimate Bitesize Study Guide • Knowledge Encyclopaedia Human Body! (Knowledge Encyclopaedias) • Out of Nothing by Daniel Locke and David Blandy • Anatomy by Hélène Druvert & Jean-Claude Druvert • Contagion by Terri Terry • The Diversity of Life by E Wilson • Secret Science by Dara O'Brien • The Lost Words by Robert Macfarlane & Jackie Morris • Forged in the Fire by Ann Turnbull		

St Wilfrid's RC College
Chemistry

Curriculum Overarching Intent
Ensure students are given the opportunity to develop as mature young scientists with the ability to relate the importance of science to the world around them and make informed decisions

Prior Learning
- An understanding of how to work scientifically, asking relevant questions and using different types of scientific enquiries to answer them.
- A good knowledge of the three states of matter, and how we change from one to the other.
- A grasp of how we can separate different types of mixtures, including filtration.

	Vision	Key Concepts and Key Skills
Year 7	Students begin their chemistry experience by exploring the particle model. They will look at how particles' movements and arrangements change when we heat them up and cool them down. Once students are secure with the particle model, we explore atoms, elements and compounds as different varieties of particle, linking back to previous learning when looking at their movement and arrangement. Once comfortable with the different varieties of particle, we explore how different types of particle can interact with each other, and also how they can be separated from each other. The scientific method is introduced here, with students starting to make hypothesis, distinguish variables and draw conclusions. In module 3 we investigate acids and alkalis. We look at their similarities, their differences, and how they react. We extend our practical repertoire by considering risks involved in scientific work, and how to minimise them.	• The particle model • Changes of state • Dissolving • Simple atomic model • The scientific method • Pressure • Atoms, elements and compounds • Separation methods • Pure substances and mixtures • Representing reactions as word equations • Acids and Alkalis • Neutralisation
Year 8	In year 7, we refer to chemical elements and compounds by their names. At the start of year 8, we start to translate this into chemical symbols and formulae. This then leads students on to explore the periodic table and all the information it grants us, while also learning about how it has been developed over time. We develop our knowledge on atomic structure from year 7, to link what the structure of an atom can tell us about where it is found on the periodic table. In module 2, we delve deeper into a specific chemical reaction; oxidation. We learn about why it is one of the most important reactions we use daily, but also how it comes with environmental repercussions. In module 3, we explore materials that come from the earth. We start by looking at how we extract metals from the earth's crust, and go on to develop our knowledge of the rest of the earth's crust in the rock cycle. We finish year 8 by analysing the changes in the Earth's atmosphere since its beginning. We link this to our module 2 learning by evaluating humans' effects on the atmosphere.	• Development of the periodic table • Atomic structure • Modern periodic table • Combustion • Oxidation • Chemical calculations • Effect of fuels on the environment • Metal extraction • Corrosion • The rock cycle • Earth's atmosphere • Carbon cycle
Year 9	Following on from our work on metals in module 3 of year 8, we look at how metals will have different chemical properties depending on their reactivity. During module 2 we use practical contexts to revisit key concepts from year 7 and year 8. We also use this time to develop our ability to represent reactions using word and symbol equations, including state symbols. We broaden our repertoire of particles to include ions and molecules in module 3, when we dig into the different bonding mechanisms of ionic, covalent and metallic substances.	• Reactivity series of metals • How metals react • Bonding • Acids as ionic substances During module 2, we will revisit the following concepts in a practical context, to develop our understanding of the scientific method, and how to represent reactions using equations: • Changes of state • Combustion • Metal reactions with acids
Year 10	Students start to follow the GCSE curriculum in year 10. We start with topic 2, linking to our year 7 work on particles and separation. We add to our change of state knowledge by including forces of attraction between particles in our explanations of particle movement and arrangement. Topic 1 allows us to revisit our atomic model, and how this links to the periodic table. When we look at bonding mechanisms again, we use these models to explain the physical properties of ionic, covalent and metallic substances. Linking to our work in year 7, we use ions to explain how acids and alkalis react, and how we can change the acidity of a substance in topic 3. Our increased work on ions becomes key when we then explore the separation of ionic substances in electrolysis.	Students will study the following Edexcel GCSE topics: Topic 1 – Fundamental concepts in chemistry Topic 2 – Changes of state and separation Topic 3 – Chemical changes (Acids and Electrolysis) Topic 5 – Separate chemistry content
Year 11	In topic 4, we explain, using reactivity, how metals are extracted from the earth's crust. We also explore the advantages and disadvantages of mining over recycling of metals. We delve deeper into the chemistry of group 1, 7 and 0 elements, and how their properties link to their position in the periodic table. In topic 7, we use our developed particle model to explain how the rate of a reaction can be manipulated by changing conditions. We finish our GCSE study by investigating how crude oil as a resource can be refined into useful fuels. We revisit the issues surrounding the burning of these fuels, and how this is changing the atmosphere that has developed over billions of years.	Students will study the following Edexcel GCSE topics: Topic 4 – Metal extraction and equilibria Topic 6 – Groups of the periodic table Topic 7 – Rates of reaction Topic 8 – Fuels and Atmosphere Topic 9 – Separate chemistry content
Year 12	In year 12 we split the study of chemistry into three distinct disciplines. Concepts that have been explored throughout KS3 and KS4 are revisited, such as bonding, rates of reaction, and organic compounds derived from crude oil. Students' basic understanding of organic compounds is developed further using organic mechanisms to show the synthesis of different organic materials. Our study of exothermic and endothermic reactions in year 11 is expanded to manipulating thermodynamic calculations to deduce enthalpy changes. Our knowledge of atomic structure and the periodic table allows us to further explore the patterns of periodicity. This then lets us look further into the elements of group 2 and group 7.	Students will study the following AQA A-level topics: **Physical Chemistry** Atomic structure Amount of substance Bonding Energetics Kinetics Equilibria Redox **Organic Chemistry** Nomenclature Isomerism Alkanes Haloalkanes Alkenes Alcohols Analysis **Inorganic Chemistry** Periodicity Group 2 elements Group 7 elements
Year 13	We finish our KS5 chemistry study by building further on our physical, organic and inorganic knowledge. Further organic syntheses are explored, and we use NMR and chromatography to complete our suite of organic analysis techniques. Our knowledge of the reactions of ions in solution leads us to investigate electrochemical interactions and how this produces an electric current. We build on our understanding of how acids and bases react by examining how buffer solutions allow pH to be maintained. In inorganic chemistry, the transition metals are defined, and their properties explained, by linking to their electronic configurations. The reactions of transition metal complexes are looked at, with particular focus on aqueous ions.	Students will study the following AQA A-level topics: **Physical Chemistry** Thermodynamics Rate equations Equilibria in gaseous systems Electrochemistry Acids and bases **Organic Chemistry** Optical isomerism Aldehydes and ketones Carboxylic acids and their derivatives Aromatic chemistry Amines Polymers Amino acids, DNA and Proteins Organic synthesis NMR and chromatography **Inorganic Chemistry** Periodicity Transition metals Reactions of aqueous metal ions Students will also complete 12 required practical experiments, across both years of their A-level course, where they will be assessed on a variety of competencies and skills

St Wilfrid's RC College

Chemistry

Our Curriculum Progression Model is:

Readiness for their next step…

Year 13 Module 1 • Aldehydes and Ketones • Carboxylic acids and their derivatives • Aromatics • Amines • Rate equations • Acids and bases	**Year 13 Module 2** • Polymers • Amino Acids, Proteins and DNA • Organic Synthesis • NMR • Chromatography • Electrochemistry • Transition Metals • Aqueous Ions	**Year 13 Module 3** • Exam Revision
Year 12 Module 1 • Bonding • Introduction to organic chemistry • Alkanes • Atomic structure • Amount of substance • Reduction and Oxidation	**Year 12 Module 2** • Haloalkanes • Alkenes • Alcohols • Energetics • Kinetics • Equilibria • Group 2 • Group 7	**Year 12 Module 3** • Organic Analysis • Optical Isomerism • Thermodynamics • Period 3 and their oxides
Year 11 Module 1 Metals and Extraction Groups of the Periodic Table	**Year 11 Module 2** Rates of Reaction Fuels and Atmosphere	**Year 11 Module 3** Exam Revision
Year 10 Module 1 States of Matter and Separation Atomic Structure and the Periodic Table	**Year 10 Module 2** Ionic, Covalent and Metallic Bonding and Properties Chemical Calculations	**Year 10 Module 3** Acids Electrolysis
Year 9 Module 1 Metals	**Year 9 Module 2** Practical skills Writing chemical equations	**Year 9 Module 3** Types of Substance
Year 8 Module 1 Periodic table	**Year 8 Module 2** Combustion	**Year 8 Module 3** Metals and the Atmosphere
Year 7 Module 1 Particles	**Year 7 Module 2** Elements, compounds and mixtures	**Year 7 Module 3** Acids and alkalis

Knowledge over time

Knowledge over time

St Wilfrid's RC College

Chemistry

Key texts and websites that you can access to support their knowledge development in this subject include:

	Year 12	Year 13
	Exam Board website: AQA | Science | AS and A-level | Chemistry AQA | AS and A-level | Chemistry | Specification at a glance	
Websites	A-Level Chemistry Revision | Revision Notes | Resources - StudyWise AQA A-level Chemistry Revision - PMT (physicsandmathstutor.com) A-level Chemistry Revision Resources - Faculty of Science, Agriculture & Engineering - Newcastle University (ncl.ac.uk) Advanced Level Organic Chemistry UK GCE AS A2 A Level Revision Notes doc brown iphone ipad notepad notebook netbook www.rsc.org www.chemguide.co.uk	
Key texts and books	• Periodic Tales: The Curious Lives of the Elements (Paperback) byBurns and Light Bulbs Shine • Marty Jopson • Chemistry: A very short introduction, by Peter Atkins) • Invisible Women by Caroline Criado-Perez • The Pleasure of Finding Things Out - Richard Feynman Periodic Tales - Hugh Aldersey-William	

	Year 10	Year 11
	Exam Board website: https://qualifications.pearson.com/en/qualifications/edexcel-gcses/sciences-2016.html	
Websites	BBC Bitesize Oak Academy Kay science Knowledge organisers Seneca Learning YouTube – Primrose Kitten, FreeScienceLesson	BBC Bitesize Oak Academy Kay science Knowledge organisers Seneca Learning YouTube – Primrose Kitten, FreeScienceLesson
Key texts and books	• Caesar's Last Breath: The Epic Story of The Air Around Us Paperback – 12 July 2018 • The Disappearing Spoon: And Other True Tales of Rivalry, Adventure, and the History of the World from the Periodic Table of the Elements (Young Readers Edition) • Periodic Tales: The Curious Lives of the Elements • Your Atomic Self: The Invisible Elements That Connect You to Everything Else in the Universe by Curt Stager • The Disappearing Spoon: And Other True Tales of Madness, Love, and the History of the World from the Periodic Table of the Elements by Sam Kean • Dr Jekyll and Mr Hyde by Robert Louis Stevenson	

	Year 7	Year 8	Year 9
Websites	https://www.bbc.co.uk/bitesize www.youtube.com - science channels Oak Academy Knowledge organisers (provided by school)	https://www.bbc.co.uk/bitesize www.youtube.com - science channels Oak Academy Knowledge organisers (provided by school)	https://www.bbc.co.uk/bitesize www.youtube.com - science channels www.genome.gov Oak Academy Knowledge organisers (provided by school) Seneca learning
Key texts and books	• The Stardust That Made Us: A Visual Exploration of Chemistry, Atoms, Elements and the Universe • The Extraordinary Elements: The Periodic Table Personified • The Periodic Table Book: A Visual Encyclopaedia of the Elements • Bad Science by Ben Goldacre • Exploring the Elements by Isabel Thomas • Outdoor Maker Lab by Robert Winston • Marie Curie and her Daughters by Imogen and Isabel Greenberg • Super Heavy by Kit Chapman • Graphic Science: Seven Journeys of Discovery by Darryl Cunningham • The Chemy Called Al by Wendy Isdell		

St Wilfrid's RC College

Physics

Curriculum Overarching Intent
Ensure students are given the opportunity to develop as mature young scientists with the ability to relate the importance of science to the world around them and make informed decisions

Prior Learning
- An understanding of how to work scientifically, asking relevant questions and using different types of scientific enquiries to answer them.
- A good knowledge on the concept of Light and how it reflects off surfaces and can form shadows.
- An introductory awareness of other scientific concepts such as Space, Sound, Forces, Magnets and Electricity

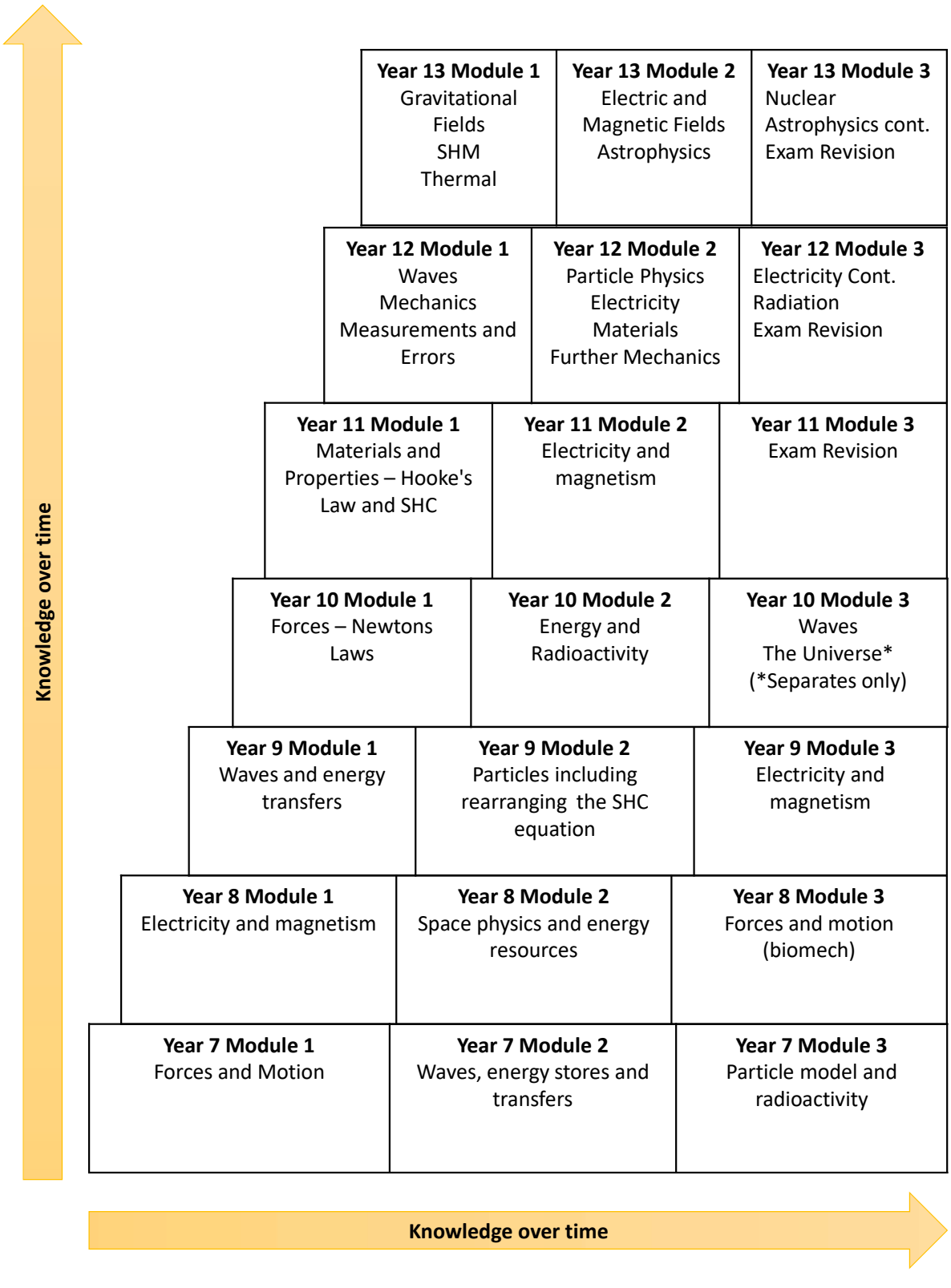
	Vision	Key Concepts and Key Skills
Year 7	Students will look at the relationships between speed, distance and time to begin to develop skills of both drawing and analysing graphs of motion. The wave speed equation is also introduced to aid the use of mathematical equations in a number of physical situations. Retrieval of real life situations relating to states of matter is used to give some context to the new concept of particle theory. Students develop a basic understanding of core scientific skills and concepts. They learn to use simple mathematical equations to model physical processes and understand that to investigate the world you need to change one variable, measure another and keep all other variables constant.	- Speed - Distance/time graphs - Relative motion - Forces - Energy stores - Light/Sound - Solids, liquids and gases - Changes of state
Year 8	Students should be able to build and construct simple series and parallel circuits with a good understanding of circuit components and their symbols. A deeper understanding of gravity, weight, air resistance and friction is developed. Students explore further details of the solar system and how the ways in which we have observed it has changed over time. Students continue to develop the basic understanding of core scientific skills and concepts. Learn to apply algebraic processes to mathematical modelling of physics concepts. Begin to develop an ability to apply physics concepts to decision making on a local, national and global basis. Students can graphically analyse experimental data.	- Current, voltage and resistance - Electric circuits - Magnetism - Forces and motion - Weight, mass and gravity - Moments - Pressure - Hooke's law - Origins of the universe - Models of the solar system
Year 9	Students should be competent with the USSR method in calculations starting with the energy topic. Light and sound is revisited to finalise the concept of these waves and how the eye works before looking how this is linked to the EM spectrum. The particle model is also revisited introducing the new concept of SHC and SLH and how this applies to changes of state and temperature changes in a substance. New topics of radioactivity and static electricity are introduced in preparation for GCSE content. Students build on their scientific understanding to a level where they can understand moderately complex scientific concepts with increasing levels of abstraction. Students can approach complex mathematical modelling in a systematic manner to draw correct conclusions. Students understand how to limit the error and uncertainty in an experiment.	- Energy - The eye - Refraction - The EM spectrum - Specific heat capacity/specific latent heat - Radiation and radioactivity - Electrical Power - Static electricity - Electromagnetism
Year 10	Students in Year 10 start studying GCSE science. In physics we continue to develop out understanding of 'Forces'. We investigate Newtons Laws in more depth including calculations involving momentum and impulse. We then look further into 'Energy', specifically in relation to moving vehicle and safety. We also deepen out understanding of radioactivity and the changing atomic model. Finally we study wave theory and make links to everyday applications such as waves in medicine. Separate Scientists also study aspects of cosmology when looking at 'The Universe', drawing in other all aspects of the course.	Students will study the following Edexcel GCSE topics: 1 – Key concepts of Physics 2 – Motion and Forces 3 – Conservation of Energy 4 – Waves 5 – Light and the Electromagnetic Spectrum 6 – Radioactivity 7 – Astronomy
Year 11	Continuing on the GCSE course, materials and their properties. We build on theoretical concepts to look at practical investigations such as Hooke's Law and specific heat capacity. We delve further into electricity, looking at Ohms Law, transformers and the National Grid. Throughout the course we build on key mathematical and physical skills and concepts – including mathematical manipulation of data, data analysis and practical skills.	Students will study the following Edexcel GCSE topics: 8 – Energy, Forces and doing Work 9 – Forces and their Effects 10 – Electricity and Circuits 11– Static Electricity 12 – Magnetism and the Motor Effect 13 – Electromagnetic Induction 14 – Particle Model 15 – Forces and Matter
Year 12	Y12 starts by embedding maths skills needed in A-level Physics such as specified fundamental (base) units of measurement. Practical work in the subject needs to be underpinned by an awareness of the nature of measurement errors and of their numerical treatment. Concepts that have been explored throughout KS3/KS4 are revisited, such as waves, mechanics and electricity and enhanced further. The relatively new content of particles introduces students both to the fundamental properties of matter, and to electromagnetic radiation and quantum phenomena whilst also re-examining the work done on radiation in KS4.	Students will study the following AQA A-level topics: • Measurements and their errors • Particles and radiation • Waves • Mechanics • Materials • Electricity Students complete 12 required practical experiments, across both years where they will be assessed on a variety of competencies and skills
Year 13	The earlier study of mechanics is further advanced through a consideration of circular motion and simple harmonic motion (the harmonic oscillator). A further section allows the thermal properties of materials, the properties and nature of ideal gases, and the molecular kinetic theory to be studied in depth. The ideas of gravitation, electrostatics and magnetic field theory are developed to emphasise one of the great unifying ideas in physics. Students are then made aware of the physics that underpins nuclear energy production and also of the impact that it can have on society. Finally we finish off with the optional module of Astrophysics where fundamental physical principles are applied to the study and interpretation of the Universe	Students will study the following AQA A-level topics: • Further Mechanics • Thermal Physics • Fields and their consequences • Nuclear Physics • Option Module: Astrophysics

St Wilfrid's RC College

Physics

Our Curriculum Progression Model is:

Readiness for their next step…



St Wilfrid's RC College

Physics

Key texts and websites that you can access to support their knowledge development in this subject include:

	Year 12	Year 13
	Exam Board website: AQA | Science | AS and A-level | Physics AQA | AS and A-level | Physics | Specification at a glance	
Websites	A Level Physics Online A-Level Physics Revision - StudyWise AQA Physics Revision - Physics & Maths Tutor (physicsandmathstutor.com)	
Key texts and books	• How to Teach Quantum Physics to Your Dog • How to Teach Relativity to Your Dog • Breakfast with Einstein: The Exotic Physics of Everyday Objects • A short History of Nearly Everything - Bill Bryson • Why don't penguins' feet freeze? – NewScientist • The Grand Design – Stephen Hawkin and Leonard Mlodinow • The Quantum Universe: Everything that can happen does happen – Brian Cox and Jeff Forshaw	

	Year 10	Year 11
	Exam Board website: https://qualifications.pearson.com/en/qualifications/edexcel-gcses/sciences-2016.html	
Websites	BBC Bitesize Oak Academy Kay science Knowledge organisers Seneca Learning YouTube – FreeScienceLessons, The whole of Edexcel Physics Paper 1 in only 56 minutes! GCSE 9-1 revision - YouTube	BBC Bitesize Oak Academy Kay science Knowledge organisers Seneca Learning YouTube – FreeScienceLessons, The whole of Edexcel Physics Paper 1 in only 56 minutes! GCSE 9-1 revision - YouTube
Key texts and books	• Storm in a Teacup: The Physics of Everyday Life • What If?: Serious Scientific Answer to Absurd Hypothetical Questions: Serious Scientific Answers to Absurd Hypothetical Questions • Interesting Stories For Curious People: A Collection of Fascinating Stories About History, Science, Pop Culture and Just About Anything Else You Can Think of • Dune by Frank Herbert • The War of the Worlds by H. G. Wells • A Brief History of Time by Stephen Hawkins • Beyond Infinity by Eugenia Cheng	

	Year 7	Year 8	Year 9
Websites	https://www.bbc.co.uk/bitesize www.youtube.com - science channels Oak Academy Knowledge organisers (provided by school)	https://www.bbc.co.uk/bitesize www.youtube.com - science channels Oak Academy Knowledge organisers (provided by school)	https://www.bbc.co.uk/bitesize www.youtube.com - science channels www.genome.gov Oak Academy Knowledge organisers (provided by school) Seneca learning
Key texts and books	• Astrophysics for Young People in a Hurry: with Gregory Mone • Energy, Light and Electricity - Introduction to Physics - Physics Book for 12 Year Old | Children's Physics Books • The Universe: The book of the BBC TV series presented by Professor Brian Cox • The Physics Puzzle Book for Young and Older Teenagers • Cosmos by Karl Sagan • Mysteries of the Quantum Universe by Thibault Damour & Mathieu Burniat • Tim Peake: Ask An Astronaut by Tim Peake • Apollo by Matt Fitch, Chris Baker, Mike Collins • Infinite Wonder: An Astronaut's Photographs from a Year in Space by Scott Kelly		