

Our Lady and St. Bede Catholic Academy
Science Curriculum – Year 7



Big Ideas & Purpose	Autumn Term	Spring Term	Summer Term			
	<p>Within this term students will be introduced to core scientific principles such as working safety, scientifically, cell structure, particle model and periodic table as well as energy transfer. During these topics' students will be introduced to new scientific skills needed to work in a lab.</p>	<p>Within this term students will be further developing their scientific ideas with a particular focus on making observations and developing numeracy skills as well as consolidating the autumn term key concepts. Students explore electricity and forces, planning and investigating concepts, and looking at chemical reactions and changes using their practical skills gained in the autumn term.</p>	<p>During the summer term students will be making links with previous topics during the year and securing the key concepts from the autumn term. Students will be looking at how our bodies change and sexual reproduction, the Earth and our awesome space, ecological systems and how animals and plants interact with each other and the topic of sound waves</p>			
Programme of Study	<p>HT1 Safety</p> <ul style="list-style-type: none"> Safety in the lab Lab equipment Bunsen burner Heating water Measurement <p>Working Scientifically</p> <ul style="list-style-type: none"> Data Collection Drawing Bar Graphs Drawing Line Graphs Analysing Graphs <p>Cells</p> <ul style="list-style-type: none"> Inside cells Microscope Specialised Cells Cells, Organs and Tissues 	<p>HT2 Atoms, Compounds and Elements</p> <ul style="list-style-type: none"> Particle Model States of Matter Melting Boiling Expansion and Contraction Gas pressure Density <p>Energy</p> <ul style="list-style-type: none"> Energy Stores Chemical energy Thermal Energy Heat transfer Radiation Energy Resources <p>Health</p> <ul style="list-style-type: none"> Skeleton Joints Muscles Muscle fatigue 	<p>HT3 Reactions</p> <ul style="list-style-type: none"> Chemical reactions Types of reactions Combustion Exothermic and endothermic reactions <p>Electricity</p> <ul style="list-style-type: none"> Charge Series and parallel circuits Measuring current Measuring potential difference 	<p>HT4 Forces</p> <ul style="list-style-type: none"> Measuring forces Balanced forces Up thrust Friction <p>Chemical Changes</p> <ul style="list-style-type: none"> Acids and alkalis pH scale Testing pH Making indicators Neutralisation 	<p>HT5 Inheritance</p> <ul style="list-style-type: none"> Puberty Reproductive systems Pregnancy Birth Variation Sexual reproduction in plants <p>The Earth</p> <ul style="list-style-type: none"> Space and the universe The solar system Day, night and the seasons Phases of the moon Eclipses and constellations 	<p>HT6 Ecology</p> <ul style="list-style-type: none"> Habitats and Communities Classification adaptation of plants and animals Competition Predator prey cycles Food chains <p>Waves</p> <ul style="list-style-type: none"> Waves properties Sound Volume and pitch Echoes and ultrasound The ear

Key Assessments

- HT2 – Safety, Working Scientifically, Cells
- HT3 – Working Scientifically, Cells, Atoms, Compounds and Elements, Energy, Health
- HT6 – End of year assessment covering from Half term 1-4.

Key Skills

- Planning investigations
- Recording results
- Analysing results
- Using practical equipment
- Setting up practical equipment
- Making predictions

Links to Careers

- Understanding the work of and developing professional skills for laboratory scientists and technicians.
- Developing an understanding of professional fields such as microbiologists, chemists, botanists, electricians, engineers, environmental scientists, climatologists, water treatment and purification engineers, zoologists, midwives, medical physics. SONAR.



Our Lady and St. Bede Catholic Academy

Science Curriculum – Year 8

Big Ideas & Purpose	Autumn Term	Spring Term	Summer Term		
Programme of Study	<p>Within this term students will be building on core scientific principles that students were introduced to in year 7. They will develop their practical skills further by investigating and making compounds and evaluating insulation. Students will also be further developing their skills interpreting data from different sources.</p>	<p>Within this term students will be consolidating key autumn term concepts. They will be further developing their practical and numerical scientific skills within the physics topics. The chemistry topics allow students to make observations and undertake experimental investigation to predict theories as well as investigate a murder!</p>	<p>During the summer term students will be securing the key concepts from the autumn term. Students will be studying the types of variation, and analysing data, they will discuss the ecological issues in the world and the impact humans have on it as well as undertaking sampling techniques. Students will gain an understanding of the earths structure and the types of rocks. They will also look at waves which include light, the eye and colour.</p>		
HT1 Working scientifically <ul style="list-style-type: none"> • Data collection • Drawing graphs • Analysing graphs Cells <ul style="list-style-type: none"> • Recapping cells • Microscope • Microbes Atoms, Compounds and Elements <ul style="list-style-type: none"> • Atoms, elements • Compounds, Mixtures • Making compounds • Word equations • Chemical formulae 	HT2 Energy <ul style="list-style-type: none"> • Energy transfers • Conduction • Heating and cooling • Changing state • Cooling curves • Insulation Health <ul style="list-style-type: none"> • Unbalanced diet • Nutrients • Food tests • Digestive system • Enzymes 	HT3 Electricity and magnetism <ul style="list-style-type: none"> • Circuits • Resistance • Magnets • Magnetic fields Solutions and mixtures <ul style="list-style-type: none"> • Solutions and mixtures • Solubility • Chromatography • Separating mixtures • Distillation • Rock salt 	HT4 Forces <ul style="list-style-type: none"> • Gravity • Weight • Drag Forces • Friction • Investigating Friction • Balanced and Unbalanced Forces Chemical Changes <ul style="list-style-type: none"> • Metals and Acids • Metals and Water • Metals and Oxygen • Reactivity Series • Extracting Metals • Making a Salt 	HT5 Inheritance <ul style="list-style-type: none"> • Variation and genetic data • Environmental • Continuous and discontinuous data • Selective breeding • Cloning The Earth <ul style="list-style-type: none"> • Earth structure • Sedimentary rocks • Igneous rocks • Metamorphic rocks • The rock cycle • Chemical erosion 	HT6 Ecology <ul style="list-style-type: none"> • Adaptations • Extremophiles • Biodiversity • Interdependence • Sampling Waves <ul style="list-style-type: none"> • Waves • The eye • Using light • Colour • EM spectrum

Key Assessments

- HT2 – Working Scientifically, Cells & elements
- HT4 – Working scientifically, Cells, Atoms, compounds, elements, Energy, Health, Solutions, and mixtures.
- HT5 – End of year assessment covering all units from half term 1-4.

Key Skills

- Planning investigations
- Making and testing predictions
- Recording results
- Analysing results
- Interpreting data from different sources
- Using scientific equipment
- Debating ecological issues/sustainability awareness

Links to Careers

- Understanding the work of and developing professional skills for laboratory scientists and technicians.
- Developing an understanding of professional fields such as microbiologists, chemists, botanists, electricians, engineers, environmental scientists, climatologists, water treatment and purification engineers, zoologists, midwives, medical physics, SONAR.



Our Lady and St. Bede Catholic Academy Science Curriculum – Year 9

Big Ideas & Purpose	Autumn Term		Spring Term		Summer Term	
Big Ideas & Purpose	Within this term students will be building on core scientific principles that students have developed in years 7 and 8. In working scientifically, cells and atoms, elements and compounds. They will be further developing their numeracy skills within the energy topic.		During the spring term students will be focussing on developing further their working scientifically skills by carrying out different science investigations in Chemistry and Physics. They will use observational skills, when carrying out practicals, present data graphically and consolidate their scientific knowledge by making valid predictions and conclusions		During the summer term students will be making links with previous topics during the year and securing their knowledge in preparation for their options. Students will be learning about inheritance with a particular focus on how things change over time and why we need to protect animals. Students will also be learning about the Earth and the impact that humans have on it. We then look at plants, the effect of deficiencies and how food chains work. We look at how toxins can be damaging and build up in the food chains and can be passed onto us the consumer. Lastly, students study waves and the properties of the eye, light and colour as well as the EM spectrum.	
Programme of Study	HT1 Working scientifically	HT2 Health	HT3 Reactions	HT4. Forces	HT5 Inheritance	HT6 Ecology
	<ul style="list-style-type: none"> Data collection Drawing graphs Analysing graphs <p>Cells</p> <ul style="list-style-type: none"> Diffusion Respiration Yeast <p>Atoms, Compounds and elements</p> <ul style="list-style-type: none"> Development of the periodic table Atomic Structure Electron structure The alkali metals The halogens Transition metals and noble gases 	<ul style="list-style-type: none"> Body defences Lungs Breathing and gas exchange Smoking and asthma Alcohol and drugs <p>Energy</p> <ul style="list-style-type: none"> Energy Stores Work Done Potential Energy Kinetic Energy Elastic energy Power Efficiency Wasted energy 	<ul style="list-style-type: none"> Chemical equations What happens to mass in reactions Balancing equations Conservation of mass Thermal decomposition <p>Electricity</p> <ul style="list-style-type: none"> Magnets and Magnetic Fields Electromagnets Generating electricity Mains electricity Paying for electricity 	<ul style="list-style-type: none"> Speed Acceleration Distance time graphs Pressure Moments <p>Chemical Changes</p> <ul style="list-style-type: none"> Metals and oxygen Metals and water Metals and acid Reactivity series Displacement Testing gases 	<ul style="list-style-type: none"> Inheritance, species, chromosomes Genetic diagrams Cloning and genetic modification Natural Selection Endangered V extinction <p>The Earth</p> <ul style="list-style-type: none"> Potable water Waste water Carbon cycle Human impacts Global warming Recycling 	<ul style="list-style-type: none"> Photosynthesis Adaptation for photosynthesis Starch testing Mineral deficiency Pyramids of numbers/biomass Toxins in food chains <p>Waves</p> <ul style="list-style-type: none"> Properties of Waves The eye Using light Colour EM Spectrum

Key Assessments

- HT2 - Working Scientifically, Cells, atoms, elements, compounds
- HT4 – Working scientifically, Cells, particles, Energy, Periodic Table
- HT6 – End of year assessment covering units from half term 1-4.
- Energy, Periodic Table, Electricity, Organ Systems

Key Skills

- Planning investigations
- Recording results
- Analysing results
- Interpreting data from different sources
- Communicating scientists ideas
- Using scientific equipment
- Debating ecological issues

Links to Careers

- Understanding the work of and developing professional skills for laboratory scientists and technicians.
- Developing an understanding of professional fields such as microbiologists, chemists, botanists, electricians, engineers, environmental scientists, climatologists, water treatment and purification engineers, zoologists, midwives, medical physics, SONAR.



Our Lady and St. Bede Catholic Academy

Science Curriculum – Year 10 – Separate Science - Biology

	Autumn Term		Spring Term		Summer Term	
Big Ideas & Purpose	Within the first term of the GCSE students will develop their understanding of core biological principles including the structure and functioning of cells, methods of transport as well as undertaking two required practicals		Within the second term of the GCSE students will start to consolidate their working scientifically skills while also developing their knowledge in biology of respiration and the effects of exercise on the body as well as looking at stem cells, their use for treatments of diseases and the ethical issues surrounding their use.		Within the final term of year 10 students in biology will secure knowledge on previous topics as well as exploring plant and animal organisation, communicable and non-communicable diseases and the development and testing of drugs.	
Programme of Study	HT1 Cell Biology Animal and Plant Cells Specialised Cells Observing Cells Prokaryotic Cells	HT2 Cell Transport Diffusion Active Transport Osmosis Exchange Surfaces	HT3 Cell Division Cell Cycle Differentiation Stem Cells Therapeutic Cloning	HT4 Respiration Aerobic Respiration Anaerobic Respiration Exercise Metabolism	HT5 Organisation Digestive System Digestive Enzymes Food Tests Lungs The Heart Blood Vessels Cardiovascular Disease Plant Organ Systems Transpiration Translocation	HT6 Infection Communicable diseases Immune Response Vaccination Drugs Plant Diseases Plant Defence Bacterial growth
Key Assessments	HT2 – Cell Biology (1hr)		HT3 - Cell Biology, cell transport, cell division (1hr)		HT6 – Biology Paper 1 Assessment (1hr45) that will include Cell Biology, cell transport and Cell Division, Organisation, respiration.	

Key Skills

- Using prefixes and suffixes
- Draw and interpret images of cells
- Calculate magnification
- Evaluate treatments
- Make predictions and conclusions
- Plan experiments to test hypotheses
- *Required practicals – microscopy, microbiology, osmosis, food tests, enzymes*

Links to Careers

Operating Theatre Live in the summer term run a day long workshops with a large group of year 10 students. The day focusses on offering a curriculum linked learning experience based around the dissection of real anatomical specimens in a real operating theatre. During the day students learn more about exciting careers in medicine & healthcare. Year 10 girls are offered the chance to attend a conference aiming to inspire girls into a STEM career. The event not only has a focus on careers but also confidence in public speaking for interviews as well as giving the girls a chance to network with local employers.



Our Lady and St. Bede Catholic Academy

Subject Curriculum – Year 10 – Separate Science - Chemistry

	Autumn Term		Spring Term		Summer Term	
Big Ideas & Purpose	Within the first term of the GCSE students will develop their understanding of core chemical principles including the structure of the atom and the development of the periodic table.		Within the second term of the GCSE students will consolidate their working scientifically skills when completing a variety of required practical's. They will also apply their knowledge from the previous term to understand structure and bonding and use mathematical skills to balance equations.		Within the final term of year 10, students will secure understanding of previous topics and will explore how the process of electrolysis occurs, they will also observe and measure and record energy changes as well as being able to provide everyday examples of these..	
Programme of Study	HT1 Atomic Structure Atoms, Elements and Compounds Mixtures Model of the Atom Relative Atomic Mass Electronic Structure	HT2 Periodic Table Structure of the periodic table Development of the periodic table Metals and Non-Metals Group 0 Group 1 Group 7 Transition Metals	HT3 Structure and Bonding Chemical Bonds Ionic Compounds Covalent Compounds Properties of Small Giant Covalent Structures Metallic Bonds Properties of Metals Alloys States of Matter State Symbols Nanoparticles Uses of Nanoparticles	HT4 Chemical Changes Balanced Equations Moles Metal Oxides Reactivity Series Extracting Metals Oxidation and Reduction Acids and Metals Neutralisation of Acids Soluble Salts pH Scale Neutralisation Concentrations Titrations Strong and Weak Acids	HT5 Electrolysis Process of Electrolysis Extracting Metals Aqueous Solutions Molten Ionic Compounds Half Equations	HT6 Energy Changes Exothermic Reactions Endothermic Reactions Reaction Profiles Energy Changes Cells and Batteries Fuel Cells
Key Assessments	HT2 – Atomic Structure and the Periodic Table (1hr)		<ul style="list-style-type: none"> HT3 – Atomic Structure, the Periodic Table and Structure and Bonding (1hr) 		<ul style="list-style-type: none"> HT6 – Chemistry Paper 1 Assessment (1hr45) that will include Atomic Structure, the Periodic Table, Structure and Bonding, Electrolysis, Energy Changes 	

Key Skills

- Using prefixes and standard form
- Use of models
- Develop hypotheses
- Plan experiments
- Evaluate data
- *Required practicals- making salts, neutralisation, electrolysis, Temperature changes, rates of reaction, chromatography, identifying ions, water purification*

Links to Careers

Year 10 girls are offered the chance to attend a conference aiming to inspire girls into a STEM career. The event not only has a focus on careers but also confidence in public speaking for interviews as well as giving the girls a chance to network with local employers.



Our Lady and St. Bede Catholic Academy

Subject Curriculum – Year 10 – Separate Science - Physics

	Autumn Term		Spring Term		Summer Term	
Big Ideas & Purpose	Within the first term of the GCSE students will develop their understanding of core principles in Physics including the concept of energy and how it is transferred. Students will also discuss the limits of our use of fossil fuels and global warming as critical problems we face their century.		Within the second term of the GCSE students will consolidate their working scientifically skills when completing a variety of required practicals in which they investigate electrical circuits and electricity in the home. They will understand how homes are wired and well as being able to wire a plug. In HT4 students make links to chemistry by studying the particle model, changes of state and pressure.		Within the final term of year 10 students will secure knowledge from topics earlier in the year and make links with content in Chemistry by exploring the science of atomic structure as well as the uses that we have for radioactive materials in medicine, industry, agriculture and electrical power generation. They will also cover the large topic of forces.	
Programme of Study	HT1 Conservation of Energy Energy Stores Changes in Energy Work Done Potential Energy Energy Changes in Systems Power Energy Transfers in Appliances Conservation and Dissipation of Energy Efficiency	HT2 Energy Transfer Energy Transfers in a System Thermal Conductivity Insulators Reducing Unwanted Energy Transfers Specific Heat Capacity Energy Resources Non-Renewable Energy Resources Renewable Energy Resources Environmental Impact of Energy Resources	HT3 Electric Circuits Circuit Diagram Symbols Electrical Charge Current Resistance Potential Difference Resistors Series Circuits Parallel Circuits	HT4 Electricity in the Home Direct Current Alternating Current Mains Electricity National Grid Static Charge Electric Fields Particle Model Density State Change Internal Energy Latent Heat Particle Motion in Gases Pressure in Gases	HT5 Radioactivity Atomic Structure Mass/Atomic Number Model of the Atom Radioactive Decay Nuclear Equations Half Life Contamination Background Radiation Uses of Radiation Fission Fusion	HT6 Forces Scalars and Vectors Contact and Non-Contact Gravity Resultant Forces Work Done Forces ad Elasticity Moments, Levers and Gears
Key Assessments	HT2 – Conservation of Energy (1hr)		HT3 – Conservation of Energy, Energy Transfer and Energy Resources, Electric Circuits, Electricity in the Home (1hr)		HT6 – Physics Paper 1 Assessment (1hr45) that will include Conservation of Energy, Energy Transfer, Electric Circuits, Electricity in the Home, Particle Model and Radioactivity	

Key Skills

- Recall and apply equations in different contexts
- Develop hypotheses
- Plan experiments
- Evaluate data
- Use of models to solve problems
- Using prefixes and standard form
- Use of models
- Using prefixes
- *Required practicals: Specific heat capacity, thermal insulation, resistance, I-V characteristics, density, force and extension*

Links to Careers

Year 10 girls are offered the chance to attend a conference aiming to inspire girls into a STEM career. The event not only has a focus on careers but also confidence in public speaking for interviews as well as giving the girls a chance to network with local employers.



Our Lady and St. Bede Catholic Academy

Subject Curriculum – Year 10 – Combined Science

	Autumn Term		Spring Term		Summer Term	
Big Ideas & Purpose	Within the first term of the GCSE students will develop their understanding of core scientific principles including the structure and functioning of cells and cell transport, the structure of the atom and the concept of energy and how it is transferred.		Within the second term of the GCSE students will start to consolidate their working scientifically skills while also developing their knowledge in biology of respiration, effects of exercise, stem cells and the ethical issues surrounding their use. In physics, they will study the topic of electrical circuits and electricity in the home, learning how homes and plugs are wired. In chemistry they will use their mathematical skills to undertake quantitative chemistry and look at chemical changes.		Within the final term of year 10 students will secure knowledge of previous topic. In biology they will explore plant and animal organisation, communicable and non-communicable diseases and the development and testing of drugs. In physics they look at matter and molecules, density and radioactivity. Whilst in chemistry they will observe and measure energy changes and understand electrolysis.	
Programme of Study	HT1 Chemistry: Atomic Structure Periodic Table Physics: Energy Biology: Cell Biology	HT2 Chemistry: Structure and Bonding Physics: Energy resources Biology Cell Transport	HT3 Biology: Cell division Physics: Electric circuits Chemistry: Quantitative chemistry	HT4 Biology: Respiration Physics: Electricity in the home Chemistry: Chemical Changes	HT5 Chemistry: Energy Changes Physics: Molecules and matter Biology: Animal and plant organisation	HT6 Chemistry: Electrolysis Physics: Radioactivity Biology: Communicable Disease Non-Communicable Disease Testing and developing drugs
Key Assessments	HT2 Paper (1hr) on Cell Biology, Atomic Structure and the Periodic Table		HT3 Paper (1hr) on Cell Biology, Energy, Atomic Structure, the Periodic Table and Structure and Bonding		HT6 Biology Paper 1 Assessment (1hr15) on Cell Biology, transport and division and Respiration Chemistry Paper 1 Assessment (1hr15) on Atomic Structure, the Periodic Table, Structure and Bonding, quantitative chemistry, chemical changes Physics Paper 1 Assessment (1hr15) that will include Conservation of Energy, Energy Transfer, Electric Circuits and Electricity in the Home	

Key Skills

- Recall and apply equations in different contexts
- Plan experiments and make predictions
- Present and Evaluate data
- Make conclusions
- Use of models to solve problems
- *Biology required practicals: microscopy, osmosis, food tests, enzymes,*
- *Chemistry required practicals: making salts, electrolysis, Temperature changes*
- *Physics required practicals: Specific heat capacity, resistance, I-V characteristics, density*

Links to Careers

Operating Theatre Live in the summer term run a day long workshops with a large group of year 10 students. The day focusses on offering a curriculum linked learning experience based around the dissection of real anatomical specimens in a real operating theatre. During the day students learn more about exciting careers in medicine & healthcare.

Year 10 girls are offered the chance to attend a conference aiming to inspire girls into a STEM career. The event not only has a focus on careers but also confidence in public speaking for interviews as well as giving the girls a chance to network with local employers.



Our Lady and St. Bede Catholic Academy

Subject Curriculum – Year 11 – Separate Science - Biology

	Autumn Term		Spring Term		Summer Term
Big Ideas & Purpose	Within the autumn term of the Biology GCSE students will continue to consolidate their working scientifically skills while also developing their knowledge on the nervous system, and the endocrine system. Students will look at how the body maintains a steady state and then study the importance of photosynthesis.		Within the final term students will secure all of their scientific knowledge and skills. Students will learn about the process of evolution, inheritance and cell division. They will look at how humans can affect biodiversity through pollution and the effects this has on the earth's atmosphere. They will also look at the transfer of energy and how we can become more sustainable.		
Programme of Study	<p>HT1 Photosynthesis Photosynthesis Limiting Factors Rate of Photosynthesis</p> <p>Nervous System Synapses Reflexes Reaction Time The Brain The Eye Problems of the Eye</p>	<p>HT2 Hormones Endocrine System Puberty and Menstrual Cycle Controlling Fertility Plant Hormones</p> <p>Homeostasis Body Temperature Maintaining Water and Nitrogen Balance Blood Glucose Diabetes</p>	<p>HT3 Reproduction Sexual Reproduction Asexual Reproduction Meiosis DNA and the Genome DNA Structure Genetic Inheritance Inherited Disorders Sex Determination</p> <p>Variation and Evolution Variation Evolution Selective Breeding Genetic Engineering Cloning Understanding of Genetics Speciation Classification</p>	<p>HT4 Classification Communities Abiotic Factors Biotic Factors Adaptations Levels of Organisation Cycling Materials Decomposition Environmental Change Biodiversity Waste Management Land Use Deforestation Global Warming Pyramids of Biomass Transfer of Biomass Food Security Biotechnology</p>	
Key Assessments	<p>HT2 Paper 1 Mock Exam (1hr45) which will assess Cell Biology, Organisation, Health and Disease as well as Metabolic Reactions.</p>		<p>HT 4 Paper 1 Paper 1 Mock Exam (1hr45) which will assess Cell Biology, Organisation, Health and Disease as well as Metabolic Reactions.</p>		<p>HT4 Paper 2 Paper 2 Mock Exam (1hr45) that will cover the Nervous System, Hormones, Homeostasis and Reproduction</p>

Key Skills

- Develop hypotheses
- Plan experiments to test hypotheses
- Interpreting diagrams and data
- Develop explanations and understanding of familiar and unfamiliar facts
- *Biology required practicals; reaction time, rate of photosynthesis, field investigations, plant responses, rates of decay*

Links to Careers

- Understanding the work of and developing professional skills for laboratory scientists and technicians.
- Developing an understanding of professional fields such as microbiologists, chemists, botanists, electricians, engineers, environmental scientists, climatologists, water treatment and purification engineers, zoologists, midwives, medical physics



Subject Curriculum – Year 11 – Separate Science - Chemistry

	Autumn Term		Spring Term		Summer Term
Big Ideas & Purpose	Within the autumn term of the Chemistry GCSE students will consolidate previously learned knowledge. They will look at rates of reaction, polymers and organic Chemistry. They will also apply their knowledge about chemical reactions and formula during these topics. Students will be able to explain how different organic molecules can be modified to make new useful materials.		Within the final term students will secure all of their scientific knowledge and skills and focus on chemical analysis. They will look at the Earth and the impact humans have on the Earth. Students will learn about the changing atmosphere and the role that scientists play in developing solutions.		
Programme of Study	<p>HT1 Rates of Reaction Calculating Rates Factors which Affect Rate of Reaction Collision Theory Activation Energy Catalysts Reversible Reactions Energy Changes and Reversible Reactions Equilibrium Changing Concentration Changing Temperature Changing Pressure</p> <p>Crude Oil Hydrocarbons Fractional Distillation Hydrocarbon Properties</p>	<p>HT2 Organic Reactions Alkenes Reactions of Alkenes Alcohols Carboxylic Acids</p> <p>Polymers Addition Polymerisation Condensation Polymerisation Amino Acids DNA</p>	<p>HT3 Chemical Analysis Pure Substances Formulations Chromatography Tests for Gases Flame Tests Metal Hydroxides Halides and Sulfates Instrumental Methods Flame Emission Spectroscopy</p> <p>Earth's Resources Sustainable Development Potable Water Analysis of Water Purification of Water Waste Water Treatment Alternative Methods of Extracting Metals Life Cycle Assessment Reducing Uses of Resources</p>	<p>HT4 Using Our Resources Corrosion and Prevention Alloys Ceramics and Polymers Composites Haber Process Production and Use of NPK Fertilisers</p> <p>The Atmosphere Changes in Oxygen Changes in Carbon Dioxide Greenhouse Gases Climate Change Carbon Footprint Pollutants</p>	

Key Assessments	HT2 Paper 1 Mock Exam (1hr45) which will assess Atomic Structure, the Periodic Table, Bonding and Properties of Matter, Chemical Changes, Energy Changes and Rates of Reaction	HT 4 Paper 1 Paper 1 Mock Exam (1hr45) which will assess Atomic Structure, the Periodic Table, Bonding and Properties of Matter, Chemical Changes, Energy Changes and Rates of Reaction	HT4 Paper 2 Paper 2 Mock Exam (1hr45) that will assess Organic Reactions, Polymers, Chemical Analysis and the Atmosphere
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Key Skills

- Use and construct 2D models.
- Investigate reactions of different substances.
- Use expressions in decimal form.
- Interpret results to identify unknown chemicals.
- *Required practicals:* rates of reaction, chromatography, identifying ions, water purification

Links to Careers

- Understanding the work of and developing professional skills for laboratory scientists and technicians.
- Developing an understanding of professional fields such as microbiologists, chemists, botanists, electricians, engineers, environmental scientists, climatologists, water treatment and purification engineers, zoologists, midwives, medical physics



Our Lady and St. Bede Catholic Academy

Subject Curriculum – Year 11 – Separate Science - Physics

	Autumn Term		Spring Term		Summer Term
Big Ideas & Purpose	Within the autumn term of the Physics GCSE, students will consolidate all their previous learning and look at forces and motion, looking at Newton's 3 laws. They will cover the different waves and EM waves.		Within the final term students will secure all of their scientific knowledge and skills within the last topics. They will continue to look at waves, in the form of light. They will look at electromagnetism and are then lucky enough to study the exciting and amazing topic of space, looking at our expanding universe and the planets within it.		
Programme of Study	HT1 Forces and Motion Displacement Speed Velocity Motion Graphs Acceleration Newtons First Law Newtons Second Law Newtons Third Law Forces and Braking Reaction Time Momentum	HT2 Waves Transverse Waves Longitudinal Waves Properties of Waves Reflection of Waves Sound Waves Detection and Exploration Electromagnetic Waves	HT3 Light Reflection of Light Refraction of Light Investigating Light Light and Colour Lenses Using Lenses	HT4 Electromagnetism Magnetic Fields Electromagnets Motor Effect Generator Effect AC Generator Transformers Space Solar System Formation Life Cycle of a Star Planets, Satellites and Orbits Expanding Universe Red Shift	
Key Assessments	HT2 Paper 1 Mock Exam (1hr45) which will assess Energy and Energy Resources and well as Electric Circuits, Electricity in the Home, Molecules and Matter and Radioactivity.		HT 4 Paper 1 Paper 1 Mock Exam (1hr45) which will assess Energy and Energy Resources and well as Electric Circuits, Electricity in the Home, Molecules and Matter and Radioactivity.		HT4 Paper 2 Paper 2 Mock Exam (1hr45) that will assess Forces and Motion, Waves and Light.

Key Skills

- Interpreting diagrams and data
- Develop explanations and understanding of familiar and unfamiliar facts
- Recall and apply equations in different contexts
- Use models to solve problems
- *Required practicals: force and extension, Newton's second law, waves, light, IR radiation*

Links to Careers

- Visit to Kielder Observatory to investigate the work of a professional astronomer.
- Understanding the work of and developing professional skills for laboratory scientists and technicians.
- Developing an understanding of professional fields such as microbiologists, chemists, botanists, electricians, engineers, environmental scientists, climatologists, water treatment and purification engineers, zoologists, midwives, medical physics



Subject Curriculum – Year 11 - Combined Science

	Autumn Term		Spring Term		Summer Term
Big Ideas & Purpose	Within the autumn term of the Combined Science GCSE students consolidate their working scientifically skills while also developing their knowledge around the photosynthesis, the nervous system and endocrine system in biology and then the topic of forces and motion in physics. Students will also develop their mathematical skills recalling and applying equations as well as using models to solve complex problems.		Within the final term students will secure all of their scientific knowledge and skills within the last topics. Students will learn about the process of reproduction and then look at genetics and ecology in biology. They will look at the atmosphere of the earth and its resources in chemistry. In physics students will study waves, the EM spectrum and electromagnetism.		
Programme of Study	HT1 Chemistry Rates of Reaction Physics Forces Biology Photosynthesis	HT2 Chemistry Crude oil Physics Motion Biology Nervous System Homeostasis and hormones	HT3 Biology Reproduction Chemistry Chemical Analysis Earth's Atmosphere Earth's Resources Physics Waves	HT4 Biology Genetics Ecology Chemistry Earth's Atmosphere Earth's Resources Physics Electromagnetic Spectrum Electromagnetism	
Key Assessments	HT2 Biology Paper 1 Assessment (1hr15) that will include Cell Biology, Transport and Division, Organisation, Photosynthesis, Infection and Respiration. Chemistry Paper 1 Assessment (1hr15) that will include Atomic Structure, the Periodic Table, Structure and Bonding, Electrolysis, Energy Changes. Physics Paper 1 Assessment (1hr15) that will include Conservation of Energy, Energy Transfer, Electric Circuits, Electricity in the Home, Particle Model and Radioactivity.		HT4 Paper 1 Biology Paper 1 Assessment (1hr15) that will include Cell Biology, Transport and Division, Organisation, Photosynthesis, Infection and Respiration. Chemistry Paper 1 Assessment (1hr15) that will include Atomic Structure, the Periodic Table, Structure and Bonding, Electrolysis, Energy Changes. Physics Paper 1 Assessment (1hr15) that will include Conservation of Energy, Energy Transfer, Electric Circuits, Electricity in the Home, Particle Model and Radioactivity.		HT4 Paper 2 Biology Paper 2 Assessment (1hr15) that will include Hormones, Reproduction, Nervous System and Genetics. Chemistry Paper 2 Assessment (1hr15) that will include Rates of Reaction, Crude Oil, Chemical Analysis, Earth's Atmosphere and the Earth's Resources. Physics Paper 2 Assessment (1hr15) that will include Forces and Motion and Radioactivity.

Key Skills

- Develop hypotheses
- Plan experiments to test hypotheses
- Interpreting diagrams and data
- Develop explanations and understanding of familiar and unfamiliar facts
- Recall and apply equations in different contexts
- Use models to solve problems
- *Biology required practicals; reaction time, light intensity on rate of photosynthesis, field investigations*
- *Chemistry required practicals: rates of reaction, chromatography, water purification*
- *Physics required practicals: force and extension, Newton's second law, waves, IR radiation*

Links to Careers

- Understanding the work of and developing professional skills for laboratory scientists and technicians.
- Developing an understanding of professional fields such as microbiologists, chemists, botanists, electricians, engineers, environmental scientists, climatologists, water treatment and purification engineers, zoologists, midwives, medical physics