



# Our Lady and St. Bede Catholic Academy

## Science Curriculum – Year 7

	Autumn Term		Spring Term		Summer Term	
<b>Big Ideas &amp; Purpose</b>	Within this term students will be introduced to core scientific principles such as working like a scientist. cell structure, particle model and forces are the key scientific principals needed to enable any scientist to progress to higher level thinking. Throughout year and within the topics, students will be introduced to a range of new scientific skills that are needed to enable them to undertake practical work effectively in a lab.		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 Metals and their reactions; how awesome space and the universe is and how their bodies change. Students will investigate concepts deeper, observe and undertake chemical reactions using their practical skills gained in the autumn term.		During the summer term students will be making links with previous topics during the year and securing the key concepts from the autumn and spring term. Students will be looking at ecological systems and how animals and plants interact with each other, they will learn how to make different types of circuits and what acids and alkalis are.	
<b>Programme of Study</b>	<p><b>HT1</b> <b>Working as a scientist</b> Safety in the lab Lab equipment Measurement Heating water</p> <p><b>Cells</b> Inside cells Microscope Specialised Cells Cells, Organs and Tissues Microbes</p> <p><b>The particle model</b> Particle Model States of Matter Melting Boiling Expansion &amp; Contraction Gas pressure Density &amp; Volume</p>	<p><b>HT2</b> <b>Contact forces &amp; Gravity</b> Measuring forces Balanced forces Upthrust Friction Weight, mass, gravity Resultant forces Elasticity</p> <p><b>Movement</b> Skeleton Joints Muscles Muscle fatigue Sporting injuries</p>	<p><b>HT3</b> <b>Metals &amp; non metals</b> Making salts Materials &amp; their uses Metals &amp; oxygen Metals &amp; water Metals &amp; acids Testing gases</p> <p><b>Energy costs</b> Energy resources Generating electricity Mains electricity Power Paying for electricity</p> <p><b>Variation</b> Variation Classification Adaptation &amp; competition in plants &amp; animals</p>	<p><b>HT4</b> <b>Speed</b> Speed Acceleration Distance time graphs</p> <p><b>Human reproduction</b> Human reproduction Puberty Menstrual cycle Sex cells &amp; fertilisation Development of a baby</p> <p><b>Universe &amp; Space</b> Space &amp; the universe The solar system Day, night &amp; seasons Phases of the moon Eclipses &amp; constellations</p>	<p><b>HT5</b> <b>Interdependence</b> Habitats &amp; communities Predator/prey cycle Food chains Pyramids of numbers Damaging food webs</p> <p><b>Acids and Alkalis</b> Introducing acids &amp; alkalis Indicators pH scale Making indicators Neutralisation</p>	<p><b>HT6</b> <b>Plant reproduction</b> Plant reproduction Parts of a flower Seed dispersal</p> <p><b>Voltage, current &amp; resistance</b> Charge Circuits Series &amp; parallel Measuring current Measuring potential difference Analysing Circuits Resistance</p> <p><b>Separating Mixtures</b> Solutions Mixtures Solubility Chromatography Separating mixtures Distillation Rock Salt separation</p>
<b>Key Assessments</b>	<ul style="list-style-type: none"> <li>HT1 – working as a scientist, cells</li> <li>HT2 - scientific skills, Cells, particles, forces</li> </ul>		<ul style="list-style-type: none"> <li>HT3 – scientific skills, Cells, particles, forces, movement, metals &amp; non metals, energy costs</li> </ul>		<ul style="list-style-type: none"> <li>HT6 - End of year assessment covering: scientific skills, Cells, particles, forces, movement, metals</li> </ul>	

- HT4 - scientific skills, Cells, particles, forces, movement, metals & non metals, energy costs, variation, speed, reproduction

& non metals, energy costs, variation, speed, reproduction, space, interdependence, acids & alkalis, plant reproduction

### **Key Skills**

- Planning investigations
- Recording results
- Analysing results
- Using practical equipment
- Setting up practical equipment
- Making predictions
- Drawing graphs/presenting data

### **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, doctors, physiotherapists, chemists, botanists, environmental scientists, climatologists, zoologists, midwives, NASA, electricians, engineers.

Our Lady and St. Bede Catholic Academy  
**Science Curriculum – Year 8**



	<b>Autumn Term</b>		<b>Spring Term</b>		<b>Summer Term</b>	
<b>Big Ideas &amp; Purpose</b>	<p>Within this term students will be building on core scientific principles that students were introduced to in year 7. They will develop their core knowledge by looking at the periodic table and linking it to the particle model in year 7. Students will also be further developing their skills interpreting data from different sources on health and digestion. Students will also learn how light and sound travel.</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 topic of Energy. The chemistry topics allow students to make observations and undertake experimental investigation and start to make the link between word equations and formulae. Students will gain an understanding of the earths structure and the types of rocks. They will also look at evolution and inheritance.</p>		<p>During the summer term students will be securing the key concepts from the autumn and spring term. Students will be studying the topic of heating and cooling, understanding how particles behave. They will start to understand the impact of humans on the earth, they will discuss the ecological issues in the world and the impact humans have on it. Students will develop their understanding of waves from year 7.</p>	
<b>Programme of Study</b>	<p><b>HT1</b>  <b>Breathing &amp; circulation</b>            Body defences            Lungs            Breathing            Gas Exchange            Smoking &amp; Asthma            Alcohol &amp; Drugs</p> <p><b>Sound &amp; Light</b>            Sound            Volume &amp; pitch            Echoes &amp; ultrasound            The Ear            Light            Reflection            Refraction            The eye            Lenses            Using light            Colour            EM spectrum</p>	<p><b>HT2</b>  <b>Digestion</b>            Unbalanced diet            Nutrients            Food tests            Digestive system            Enzymes</p> <p><b>Periodic Table</b>            Atomic structure            Electron structure            The alkali metals            The Halogens            Transition metals            Noble gases</p> <p><b>Electromagnets &amp; magnetism</b>            Magnets            Magnetic fields            Electromagnets</p>	<p><b>HT3</b>  <b>Elements</b>            Atoms, elements            Compounds, mixtures            Making compounds            Word equations            Chemical formulae</p> <p><b>Energy transfer</b>            Energy stores            Chemical energy            Thermal energy            Kinetic energy            GP energy            Elastic energy            Efficiency            Wasted energy</p>	<p><b>HT4</b>  <b>Evolution</b>            Adaptations            Extremophiles            Biodiversity            Interdependence            Sampling            Natural selection            Extinction/endangered</p> <p><b>Earth structure</b>            Earth structure            Sedimentary rocks            Igneous rocks            Metamorphic rocks            The rock cycle            Chemical erosion</p> <p><b>Inheritance</b>            Variation            Selective breeding            Cloning            Inheritance</p>	<p><b>HT5</b>  <b>Heating &amp; Cooling</b>            Thermal energy            Heating &amp; Cooling            Changing state            Cooling curves            Conduction &amp; convection            Insulation            Radiation</p>	<p><b>HT6</b>  <b>Earth resources &amp; Climate</b>            Reactivity series            Displacement            Potable water            Waste water            Carbon Cycle            Human impacts            Global warming            Recycling</p> <p><b>Waves</b>            Waves            Transverse &amp; longitudinal            Measuring waves            Exploring waves            Ultra sound</p>

**Key Assessments**

- HT1 – Breathing & Circulation, sound & light
- HT2 – Breathing & Circulation, sound & light, digestion
- HT3 - Breathing & Circulation, sound & light, digestion, periodic table, electromagnets & magnetism
- HT4 – Breathing & Circulation, sound & light, digestion, periodic table, electromagnets & magnetism, elements, energy transfer
- HT6 – End of year assessment covering: Breathing & Circulation, sound & light, digestion, periodic table, electromagnets & magnetism, elements, energy transfer, evolution, earth structure, inheritance, heating & cooling

**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**



	<b>Autumn Term</b>		<b>Spring Term</b>		<b>Summer Term</b>	
<b>Big Ideas &amp; Purpose</b>	<p>Within this term students will be building on core scientific principles that students have developed in years 7 and 8. They will be further developing their numeracy skills within the types of reaction topic by balancing equations and within the topic of work they will use higher level thinking and mathematical skills to work out levers and moments.</p>		<p>During the spring term students will be focussing on studying in-depth the 3 core principles of science – Cells, particles and energy This will be the gateway to undertaking studies at GCSE. Students will develop further their scientific skills by undertaking different science investigations in Biology, 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</p>		<p>During the summer term students will be making links with previous topics during KS3 and securing their knowledge in preparation for their options and the next step at GCSE. Students need to be thinking like scientists to enable them to succeed at KS4. Students will look at the topic of organisation and focus on the digestive system, consolidating what they learnt in years 7 &amp; 8. They will also consolidate knowledge of Energy which they studies in year 8.</p>	
<b>Programme of Study</b>	<p><b>HT1</b>  <b>Photosynthesis</b>            Photosynthesis            Adaptation for photosynthesis            Starch testing            Mineral deficiency            Pyramids of numbers/biomass            Toxins in food chains            Diffusion            Respiration            Yeast</p> <p><b>Pressure</b>            Pressure            Pressure in fluids            Using pressure            Floating &amp; sinking            Hydraulics            Atmospheric pressure</p> <p><b>Work</b>            Work done            Levers &amp; pulleys            Moments</p>	<p><b>HT2</b>  <b>Types of reaction &amp; chemical energy</b>            Chemical reactions            Types of reactions            Combustion            Exo &amp; endothermic reactions            Chemical equations            Conservation of mass            Balancing equations            Thermal decomposition</p>	<p><b>HT3</b>  <b>Cells &amp; transport</b>            Chemical equations            What happens to mass in reactions            Balancing equations            Conservation of mass            Thermal decomposition</p>	<p><b>HT4.</b>  <b>Atoms, elements, compounds &amp; the periodic table</b>            Atoms, elements            Compounds, mixtures            Separating mixtures            Structure of the atom            History of the atom            Electronic structure            Isotopes            Ions            Conservation of mass            Chemical equations            History of the periodic table            Group 1 &amp; Group 0            Group 7            Displacement reactions</p>	<p><b>HT5</b>  <b>Energy</b>            Energy stores            Kinetic &amp; Gravitational energy            Specific heat capacity            Power            Efficiency            Renewable energy resources            Non-renewable energy resources</p>	<p><b>HT6</b>  <b>Organisation</b>            Tissues, organs &amp; organ systems            Digestive system            Food tests            Enzymes            Enzyme activity</p>

- Key Assessments**
- HT1 – Photosynthesis & Respiration, pressure, work
  - HT2 –Photosynthesis & Respiration, pressure, work, types of reaction & chemical energy
  - HT3 – Cells and methods of transport
  - HT4 - Cells and methods of transport, atoms, elements, compounds and the periodic table
  - HT6 – End of year assessment covering Cells and methods of transport, atoms, elements, compounds and the periodic table, energy

### Key Skills

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

*Biology required practicals: microscopy, osmosis*

*Physics required practicals: Specific heat capacity*

### 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.



# Science Curriculum – Year 10 – Separate Science - Biology

	<b>Autumn Term</b>		<b>Spring Term</b>		<b>Summer Term</b>	
<b>Big Ideas &amp; Purpose</b>	Within the first term of the GCSE students will deepen their understanding of the key core biological principles by studying the organisation of animal including non-communicable diseases and the organisation of plants		Within the second term of the GCSE students will start to consolidate their working scientifically skills while also developing their knowledge in biology through studying respiration and the effects of exercise on the body as well as looking at photosynthesis and the factors affecting it. They will also study various types of communicable diseases and the treatments for them in both animals and plants.		Within the final term of year 10 students in biology will secure knowledge on previous topics as well as exploring the response to infection by the body, looking at the use of vaccination and the development of monoclonal antibodies to treat diseases and then the development and testing of drugs. Finally the cover the topics associated with ecology, cycling of carbon, water and materials as well as the implications of deforestation, pollution and land use. They understand the importance of sustainable food and biotechnology	
<b>Programme of Study</b>	<b>HT1 Animal organisation</b> Tissues&organs Digestive System Digestive Enzymes Food Tests Lungs The Heart Blood Vessels The blood Cardiovascular Disease Risk factors Smoking, alcohol, carcinogens Diet&exercise Cancer	<b>HT2 Plant organisation</b> Plant organs Tissues Methods of transport Transpiration Translocation	<b>HT3 Photosynthesis</b> Leaf adaptations Photosynthesis Limiting Factors Rate of Photosynthesis Limiting factors Uses of glucose  <b>Respiration</b> Aerobic Respiration Anaerobic Respiration Exercise Metabolism	<b>HT4 Infection</b> Bacterial disease Viral disease Fungal disease Protist disease Plant Diseases Plant Defence Bacterial growth	<b>HT5 Response to infection</b> Defence mechanisms Immune Response Monoclonal antibodies Vaccination Antibiotics&painkillers Discovering&developing drugs	<b>HT6 Ecology</b> Communities Abiotic&Biotic Factors Adaptations sampling Cycling Materials Decomposition Biodiversity Waste Management Land Use Deforestation&Global Warming Pyramids of Biomass Transfer of Biomass Food Security/sustainability Biotechnology

**Key Assessments**

**HT1** - Animal organisation  
**HT2** – Plant organisation

**HT3** - Photosynthesis & respiration, electrolysis,  
particle model of matter

**HT4** – Infection, atomic structure, energy changes

**HT6**

**Biology Paper 1 Assessment** (1hr15) Cell Biology, Animal & Plant Organisation, Infection & response, Photosynthesis, Respiration

**Chemistry Paper 1 Assessment** (1hr15) atomic structure, the Periodic Table, structure & Bonding, quantitative chemistry, chemical changes

**Physics Paper 1 Assessment** (1hr15) Energy and energy transfers, Electric Circuits and Electricity in the Home, particle model of matter, atomic structure, radiation

**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 – microbiology, 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.



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## Subject Curriculum – Year 10 – Separate Science - Chemistry

	<b>Autumn Term</b>		<b>Spring Term</b>		<b>Summer Term</b>	
<b>Big Ideas &amp; Purpose</b>	Within the first term of the GCSE students will continue to develop their understanding of core chemical principles, they apply this to structure and bonding and use mathematical skills to balance equations. They also put to use the working scientifically skills learnt to undertake a variety of practicals		Within the second term of the GCSE students will consolidate their working scientifically skills when completing a variety of required practical's when looking at electrolysis and energy changes.		Within the final term of year 10, students will secure understanding of previous topics and begin to put their mathematical skills to use with the challenging quantitative chemistry topic. These skills are then applied to the rates and equilibrium topic.	
<b>Programme of Study</b>	<b>HT1 Structure and Bonding</b> 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	<b>HT2 Chemical Changes</b> 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	<b>HT3 Electrolysis</b> Process of Electrolysis Extracting Metals Aqueous Solutions Molten Ionic Compounds Half Equations	<b>HT4 Energy Changes</b> Exothermic Reactions Endothermic Reactions Reaction Profiles Energy Changes Cells and Batteries Fuel Cells	<b>HT5 Quantitative chemistry</b> Conservation of mass Relative formula mass Moles Amounts of substances Balancing equations with moles Limiting factors Concentrations Titrations Percentage yield Atom economy Volume of gases	<b>HT6 Rates&amp;equilibrium</b> Collision theory Factors affecting the rate of reaction Catalysts Calculating rates Reversible reactions Equilibrium

**Key Assessments** HT1 – structure and bonding  
HT2 – Chemical changes,

HT3 - electrolysis  
HT4 – energy changes

**HT6**  
**Biology Paper 1 Assessment** (1hr15) Cell Biology, Animal & Plant Organisation, Infection & response, Photosynthesis, Respiration  
**Chemistry Paper 1 Assessment** (1hr15) atomic structure, the Periodic Table, structure & Bonding, quantitative chemistry, electrolysis, energy changes  
**Physics Paper 1 Assessment** (1hr15) Energy and energy transfers, Electric Circuits and Electricity in the Home, particle model of matter, atomic structure, radiation

### 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,*

### 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.



# Subject Curriculum – Year 10 – Separate Science - Physics

	<b>Autumn Term</b>		<b>Spring Term</b>		<b>Summer Term</b>	
<b>Big Ideas &amp; Purpose</b>	Within the first term of the GCSE students will further develop their understanding of core principles in Physics They will distinguish between series and parallel circuits. 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 HT2 students make links to chemistry by studying the particle model, changes of state and pressure.		Within the second term of the GCSE students look at the particle model and apply what they learnt at KS3 and in chemistry to look at how atoms can be re arranged. They then form strong links with chemistry when looking at the topic of atomic structure and the atom.		Within the final term of year 10 students will secure knowledge from topics earlier in the year and make links with content in Chemistry, they will study radioactive materials in medicine, industry, agriculture and electrical power generation. They then cover magnets and electromagnets, understanding that one is temporary and one is permanent,	
<b>Programme of Study</b>	<b>HT1</b> <b>Electric Circuits</b> Static electricity Circuits Electrical Current Resistance Potential Difference Resistors resistance Series Circuits Parallel Circuits Mains electricity	<b>HT2</b> <b>Electricity in the Home</b> Direct Current Alternating Current Mains Electricity National Grid Static Charge Electric Fields	<b>HT3</b> <b>Particle model</b> Density State Change Internal Energy Latent Heat Particle Motion in Gases Pressure in Gases	<b>HT4</b> <b>Atomic Structure</b> Mass/Atomic Number Model of the Atom	<b>HT5</b> <b>Radioactivity</b> Radioactive Decay Nuclear Equations Half Life Contamination Background Radiation Uses of Radiation Fission Fusion	<b>HT6</b> <b>Electromagnets&amp;Magnets</b> Magnets Electromagnets Motor effect Generators A/C generators transformers
<b>Key Assessments</b>	<b>HT1 - Electricity</b>		<b>HT3 – Particle model of matter</b>		<b>HT6</b>	

HT2 – Electricity in the home

HT4 – atomic structure

**Biology Paper 1 Assessment** (1hr15) Cell Biology, Animal & Plant Organisation, Infection & response, Photosynthesis, Respiration

**Chemistry Paper 1 Assessment** (1hr15) atomic structure, the Periodic Table, structure & Bonding, quantitative chemistry, chemical changes

**Physics Paper 1 Assessment** (1hr15) Energy and energy transfers, Electric Circuits and Electricity in the Home, particle model of matter, atomic structure, radiation

### 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: thermal insulation, resistance, I-V characteristics, density,*

### 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.



# Subject Curriculum – Year 10 – Combined Science

	Autumn Term		Spring Term		Summer Term	
<b>Big Ideas &amp; Purpose</b>	Within the first term, GCSE students will deepen their understanding of key 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.	
<b>Programme of Study</b>	<b>HT1</b> <b>Chemistry:</b> Structure & bonding  <b>Physics:</b> Electrical circuits  <b>Biology:</b> Animal Organisation	<b>HT2</b> <b>Chemistry:</b> Chemical changes  <b>Physics:</b> Electricity in the home  <b>Biology</b> Plant organisation	<b>HT3</b> <b>Biology:</b> Photosynthesis & respiration  <b>Physics:</b> Particle model of matter  <b>Chemistry:</b> Electrolysis	<b>HT4</b> <b>Biology:</b> Infection  <b>Physics:</b> Atomic structure  <b>Chemistry:</b> Energy changes	<b>HT5</b> <b>Chemistry:</b> Quantitative chemistry  <b>Physics:</b> Radioactivity  <b>Biology:</b> Response to infection	<b>HT6</b> <b>Chemistry:</b> Rate of chemical change  <b>Physics:</b> Magnetism & electromagnets  <b>Biology:</b> Ecology
<b>Key Assessments</b>	<b>HT1</b> - Animal organisation, Atomic Structure and the Periodic Table, structure and bonding		<b>HT3</b> - Photosynthesis & respiration, electrolysis, particle model of matter <b>HT4</b> – Infection, atomic structure, energy changes		<b>HT6</b>	

**HT2** – Chemical changes, energy resources, plant organisation

**Biology Paper 1 Assessment** (1hr15) Cell Biology, Animal & Plant Organisation, Infection & response, Photosynthesis, Respiration

**Chemistry Paper 1 Assessment** (1hr15) atomic structure, the Periodic Table, structure & Bonding, quantitative chemistry, chemical changes

**Physics Paper 1 Assessment** (1hr15) Energy and energy transfers, Electric Circuits and Electricity in the Home, particle model of matter, atomic structure, radiation

### 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: food tests, enzymes, light intensity on rate of photosynthesis*
- *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.



# Subject Curriculum – Year 11 – Separate Science - Biology

	Autumn Term		Spring Term		Summer Term
<b>Big Ideas &amp; Purpose</b>	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.		
<b>Programme of Study</b>	<p><b>HT1</b> <b>Photosynthesis</b> Photosynthesis Limiting Factors Rate of Photosynthesis</p> <p><b>Ecology</b> 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>	<p><b>HT2</b> <b>Inheritance, variation &amp; reproduction</b> Variation Evolution Selective Breeding Genetic Engineering Cloning Understanding of Genetics Speciation Classification Sexual Reproduction Asexual Reproduction Meiosis DNA and the Genome DNA Structure Genetic Inheritance Inherited Disorders Sex Determination</p>	<p><b>HT3</b> <b>Hormones</b> Endocrine System Puberty and Menstrual Cycle Controlling Fertility Plant Hormones</p> <p><b>Homeostasis</b> Body Temperature Maintaining Water and Nitrogen Balance Blood Glucose Diabetes</p>	<p><b>HT4</b> <b>Nervous system</b> Synapses Reflexes Reaction Time The Brain The Eye Problems of the Eye</p>	
<b>Key Assessments</b>	<b>HT1</b> <b>Biology Paper 1 Assessment</b> (1hr15) Cell Biology, Transport and Division, plant and animal		<b>HT4 Paper 1 and 2</b> <b>(P1 detailed in HT1)</b>		<b>HT4 Paper 2</b>

Organisation, Photosynthesis, Infection & response and Respiration.

**Chemistry Paper 1 Assessment** (1hr15) Atomic Structure, Periodic Table, Structure & Bonding, Electrolysis, Energy Changes.

**Physics Paper 1 Assessment** (1hr15) Energy & energy Transfer, Electric Circuits, Electricity in the Home, Particle Model and Radioactivity.

**Biology Paper 2 Assessment** (1hr15) Hormones, nervous system, inheritance, variation & evolution, ecology.

**Chemistry Paper 2 Assessment** (1hr15) Rates of reaction, organic chemistry, chemical analysis, chemistry of the atmosphere, earth's Resources.

**Physics Paper 2 Assessment** (1hr15) Forces, waves, magnets & electromagnetism.

**HT 4 Paper 1 Paper 1 Mock Exam (1hr45)** which will assess Cell Biology, Organisation, Health and Disease as well as Metabolic Reactions.

**Paper 2 Mock Exam (1hr45)** that will cover the Nervous System, Hormones, Homeostasis and Reproduction

### 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
<b>Big Ideas &amp; Purpose</b>	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.	
<b>Programme of Study</b>	<p><b>HT1</b></p> <p><b>Rates of Reaction</b> 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><b>Crude Oil</b> Hydrocarbons Fractional Distillation Hydrocarbon Properties</p>	<p><b>HT2</b></p> <p><b>Organic Reactions</b> Alkenes Reactions of Alkenes Alcohols Carboxylic Acids</p> <p><b>Polymers</b> Addition Polymerisation Condensation Polymerisation Amino Acids DNA</p>	<p><b>HT3</b></p> <p><b>Chemical Analysis</b> Pure Substances Formulations Chromatography Tests for Gases Flame Tests Metal Hydroxides Halides and Sulfates Instrumental Methods Flame Emission Spectroscopy</p> <p><b>Earth's Resources</b> 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><b>HT4</b></p> <p><b>Using Our Resources</b> Corrosion and Prevention Alloys Ceramics and Polymers Composites Haber Process Production and Use of NPK Fertilisers</p> <p><b>The Atmosphere</b> Changes in Oxygen Changes in Carbon Dioxide Greenhouse Gases Climate Change Carbon Footprint Pollutants</p>

<b>Key Assessments</b>	<p><b>HT1</b></p> <p><b>Biology Paper 1 Assessment (1hr15)</b> Cell Biology, Transport and Division, plant and animal Organisation, Photosynthesis, Infection &amp; response and Respiration.</p> <p><b>Chemistry Paper 1 Assessment (1hr15)</b> Atomic Structure, Periodic Table, Structure &amp; Bonding, Electrolysis, Energy Changes.</p> <p><b>Physics Paper 1 Assessment (1hr15)</b> Energy &amp; energy Transfer, Electric Circuits, Electricity in the Home, Particle Model and Radioactivity.</p>	<p><b>HT 4 Paper 1</b></p> <p><b>Paper 1 Mock Exam (1hr45)</b> which will assess Atomic Structure, the Periodic Table, Bonding and Properties of Matter, Chemical Changes, Energy Changes and Rates of Reaction</p>	<p><b>HT4 Paper 2</b></p> <p><b>Paper 2 Mock Exam (1hr45)</b> that will assess Organic Reactions, Polymers, Chemical Analysis and the Atmosphere</p>
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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



# Subject Curriculum – Year 11 – Separate Science - Physics

	Autumn Term		Spring Term		Summer Term
<b>Big Ideas &amp; Purpose</b>	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. A significant proportion of these topics involves them using mathematical equations and applying their knowledge to rearrange equations.		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.		
<b>Programme of Study</b>	<b>HT1</b> <b>Forces and Motion</b> Displacement Speed Velocity Motion Graphs Acceleration Newtons First Law Newtons Second Law Newtons Third Law Forces and Braking Reaction Time Momentum	<b>HT2</b> <b>Waves</b> Transverse Waves Longitudinal Waves Properties of Waves Reflection of Waves Sound Waves Detection and Exploration Electromagnetic Waves	<b>HT3</b> <b>Light</b> Reflection of Light Refraction of Light Investigating Light Light and Colour Lenses Using Lenses	<b>HT4</b> <b>Electromagnetism</b> Magnetic Fields Electromagnets Motor Effect Generator Effect AC Generator Transformers  <b>Space</b> Solar System Formation Life Cycle of a Star Planets, Satellites and Orbits Expanding Universe Red Shift	
<b>Key Assessments</b>	<b>HT1</b> <b>Biology Paper 1 Assessment (1hr15)</b> Cell Biology, Transport and Division, plant and animal		<b>HT4 Paper 1 and 2 (P1 detailed in HT1)</b>		<b>HT4 Paper 2</b> <b>Paper 2 Mock Exam (1hr45)</b> that will assess Forces and Motion, Waves and Light, space

Organisation, Photosynthesis, Infection & response and Respiration.

**Chemistry Paper 1 Assessment** (1hr15) Atomic Structure, Periodic Table, Structure & Bonding, Electrolysis, Energy Changes.

**Physics Paper 1 Assessment** (1hr15) Energy & energy Transfer, Electric Circuits, Electricity in the Home, Particle Model and Radioactivity.

**Biology Paper 2 Assessment** (1hr15) Hormones, nervous system, inheritance, variation & evolution, ecology.

**Chemistry Paper 2 Assessment** (1hr15) Rates of reaction, organic chemistry, chemical analysis, chemistry of the atmosphere, earth's Resources.

**Physics Paper 2 Assessment** (1hr15) Forces, waves, magnets & electromagnetism.

**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, space.

## 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
<b>Big Ideas &amp; Purpose</b>	Within the autumn term of the Combined Science GCSE students consolidate their working scientifically skills while also developing their knowledge of inheritance, variation, and the types of reproduction, as well as ecological systems and cycles in biology. With in the chemistry topic, students will look in depth at crude oil and its properties. Students will also develop their mathematical skills recalling and applying equations as well as using models to solve complex problems within the topic of forces and motion in physics.		In the final term of their studies, students will secure all of their scientific knowledge and skills within the last topics the specification. Students will learn about the nervous system and endocrine system in biology. They will look at the atmosphere of the earth and its resources and analyse substances through a variety of methos in chemistry. In physics students will study waves, the EM spectrum and electromagnetism.		
<b>Programme of Study</b>	<b>HT1</b> <b>Chemistry</b> Rates of Reaction  <b>Physics</b> Forces  <b>Biology</b> Ecology	<b>HT2</b> <b>Chemistry</b> Organic chemistry (crude oil)  <b>Physics</b> Motion  <b>Biology</b> Inheritance, variation & reproduction	<b>HT3</b> <b>Biology</b> Homeostasis & hormones  <b>Chemistry</b> Chemical Analysis  <b>Physics</b> Waves	<b>HT4</b> <b>Biology</b> Nervous system <b>Chemistry</b> Earth's Atmosphere & Resources  <b>Physics</b> Electromagnetic Spectrum Electromagnetism	

<p><b>Key Assessments</b></p>	<p><b>HT1</b>  <b>Biology Paper 1 Assessment</b> (1hr15) Cell Biology, Transport and Division, plant and animal Organisation, Photosynthesis, Infection &amp; response and Respiration.  <b>Chemistry Paper 1 Assessment</b> (1hr15) Atomic Structure, Periodic Table, Structure &amp; Bonding, Electrolysis, Energy Changes.  <b>Physics Paper 1 Assessment</b> (1hr15) Energy &amp; energy Transfer, Electric Circuits, Electricity in the Home, Particle Model and Radioactivity.</p>	<p><b>HT4 Paper 1 and 2 (P1 detailed in HT1)</b>  <b>Biology Paper 2 Assessment</b> (1hr15) Hormones, nervous system, inheritance, variation &amp; evolution, ecology.  <b>Chemistry Paper 2 Assessment</b> (1hr15) Rates of reaction, organic chemistry, chemical analysis, chemistry of the atmosphere, earth's Resources.  <b>Physics Paper 2 Assessment</b> (1hr15) Forces, waves, magnets &amp; electromagnetism.</p>	<p><b>HT4 Paper 2</b>  <b>Biology Paper 2 Assessment</b> (1hr15) Hormones, nervous system, inheritance, variation &amp; evolution, ecology.  <b>Chemistry Paper 2 Assessment</b> (1hr15) rates of reaction, organic chemistry, chemical analysis, chemistry of the atmosphere, earth's Resources.  <b>Physics Paper 2 Assessment</b> (1hr15) Forces, waves, magnets &amp; electromagnetism.</p>
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### 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, sampling 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