

Science

Teachers: Helen Booth and Maria Brennan

The Science department offer practical and theoretical engaging lessons. All KS3 pupils study a three year rolling programme which covers units in Biology, Chemistry and Physics. The programme covers the skills outlined in the National Curriculum. It offers a clear transition and progression from KS3 to KS4. Students in Key Stage 4 will have the opportunity to study either Entry Level Science Award or Dual Award Science GCSE.

Schemes of work:

Year 7

Autumn One	Autumn Two	Spring One	Spring Two	Summer One	Summer Two
<p>Safety in the lab</p> <p>Earth and space</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about the movement of the Earth and other planets relative to the sun in the solar system. about the movement of the moon relative to the Earth. about the sun, Earth and moon as approximately spherical bodies. about the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. <p>KEYWORDS</p> <ul style="list-style-type: none"> Universe Orbit Rotation Eclipse Solar system 	<p>Animals including humans</p> <p>Students will learn:</p> <ul style="list-style-type: none"> to describe the changes as humans, develop to old age. to name the main part so the human circulatory system. to recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. to describe the ways in which nutrients and water are transported within animals (including humans). <p>KEYWORDS</p> <ul style="list-style-type: none"> Osmosis Diffusion Addiction Stimulants Depressants Nutrition Circulation <p>Evolution and inheritance</p>	<p>Properties and changes of materials</p> <p>Students will learn:</p> <ul style="list-style-type: none"> to compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. to apply knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. to give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. to demonstrate that dissolving, mixing and 	<p>Light</p> <p>Students will learn:</p> <ul style="list-style-type: none"> to recognise that light appears to travel in straight lines. to use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. to explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. to use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. <p>KEYWORDS</p> <ul style="list-style-type: none"> Lens Magnification Reflected Refracted Visible Wavelength 	<p>Living things and their habitats</p> <p>Students will learn:</p> <ul style="list-style-type: none"> to describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. the reasons for classifying plants and animals based on specific characteristics. <p>KEYWORDS</p> <ul style="list-style-type: none"> Classification Characteristics Environmental Inherited Species 	<p>Acids and Alkalis</p> <p>Students will learn:</p> <ul style="list-style-type: none"> to define acids and alkalis in terms of neutralisation reactions how to use the pH scale for measuring acidity/alkalinity; and indicators <p>KEYWORDS</p> <ul style="list-style-type: none"> Acid Alkali Base Compound Neutralisation Indicator

<p>Forces</p> <p>Students will learn:</p> <ul style="list-style-type: none"> to explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. to identify the effects of air resistance, water resistance and friction, that act between moving surfaces. to recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect. <p>KEYWORDS</p> <ul style="list-style-type: none"> Kinetic Thermal Potential Efficiency Conserved Gravitational 	<p>Students will learn:</p> <ul style="list-style-type: none"> to recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. to recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. to identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. <p>KEYWORDS</p> <ul style="list-style-type: none"> Adaptation Continuous Discontinuous Evolution Dominant Recessive Fertile Offspring 	<p>changes of state are reversible changes.</p> <ul style="list-style-type: none"> to explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. <p>KEYWORDS</p> <ul style="list-style-type: none"> Solute Solvent Solution Medium Solid Liquid Gas Reversible Physical Chemical 	<p>Electricity</p> <p>Students will learn:</p> <ul style="list-style-type: none"> to associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. to compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. to use recognised symbols when representing a simple circuit in a diagram. <p>KEYWORDS</p> <ul style="list-style-type: none"> Energy Charge Flow Current Generate Potential Power 		
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Year 8

Autumn One	Autumn Two	Spring One	Spring Two	Summer One	Summer Two
<p>P9 – Pushes and pulls</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about forces and how they interact in the world to allow many of our daily activities to happen, including how forces interact in gases, liquids, a car or elastic materials. about moments and static electricity. <p>KEYWORDS</p> <ul style="list-style-type: none"> Elastic Gravity Weight Drag Speed Rocket <p>Suggested practical skills: P1, P2, P3, U1, U3, U4</p> <p>P8- Attractive forces</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about magnetism and the importance of the earth's magnetic field. how to build a simple electromagnet and uses for electromagnets. <p>KEYWORDS</p> <ul style="list-style-type: none"> Magnetic Attract Repel Non-contact Contact Electromagnet <p>Suggested practical skills: P1, P4, U1, U3, U4</p>	<p>B9 – Creepy crawlies</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about our ecosystem and how plants and animals interact Including food chains and food webs, as well as how different materials are recycled. how to sample and use equipment/resources to measure and learn about plants and animals in particular environments. <p>KEYWORDS</p> <ul style="list-style-type: none"> Herbivore Carnivore Predator Prey Habitat <p>Suggested practical skills: B3, U1, U3, U4</p> <p>B10- Extinction</p> <p>Students will learn:</p> <ul style="list-style-type: none"> be able to define a species and understand that plants and require different resources. about fossils and how living things have evolved over time. <p>KEYWORDS</p> <ul style="list-style-type: none"> Species Evolution 	<p>C1 – Physical and Chemical Change (include intro to C3 periodic table)</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about the particle models and changes of state (solid, liquid, gas). about the periodic table, how it is arranged including the location metals and non-metals and how it has changed over time. <p>KEYWORDS</p> <ul style="list-style-type: none"> Particle Particle theory Compound Mixture Compressed Matter <p>Suggested practical skills: C1, U1, U2, U3, U4</p> <p>C4 – Earth and atmosphere</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about composition and structure of the earth and the rock cycle. about the composition of gases in the atmosphere and how human activities are affecting these things. <p>KEYWORDS</p> <ul style="list-style-type: none"> Acid rain Atmosphere Burning 	<p>P11 – Fly me to the moon</p> <p>P12 – Final Frontiers</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about the Earth, the moon and our solar system. about how the laws of physics interact to allow us to put to rockets and satellites into space and that not all space missions are manned. about the sun and how planets in our solar system orbit around it. that there are billions on galaxies in the Universe and be able to compare the sizes of objects in space. <p>KEYWORDS</p> <ul style="list-style-type: none"> Star Orbit Galaxy Moon <p>Suggested practical skills: P1, P2, P3, U1, U3, U4</p>	<p>B1 – Dead or alive</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about plant and animal cells and the main organelles in both. that unicellular organisms only have one cell, whereas multicellular organisms have many cells some of which are specialised to do certain jobs. <p>KEYWORDS</p> <ul style="list-style-type: none"> Cell Tissue Organ Organ system <p>Suggested practical skills: B4, U3, U4</p> <p>B7 – You only have one</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about healthy diets and lifestyles and how exercise, food, alcohol and drugs can impact on health. about how food gets broken down in the digestive system and absorbed into blood (including digestive enzymes). <p>KEYWORDS</p> <ul style="list-style-type: none"> Carbohydrate Protein Fat 	<p>C12 – CSI</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about crime scene evidence and how to collect it with contaminating it. about fingers prints, blood groups and DNA can be used to identify people. <p>KEYWORDS</p> <ul style="list-style-type: none"> Evidence Fingerprints Blood Group DNA Chromatography <p>Suggested practical skills: C1, C3, U1, U2, U3, U4</p> <p>C6 – Sorting out</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about pure substances, mixtures and compounds. different ways to separate mixtures including filtration, crystallisation, distillation and chromatography. <p>KEYWORDS</p> <ul style="list-style-type: none"> Solution Filtering Decanting Centrifuging Distillation

	<ul style="list-style-type: none">• Variation• Extinct• Endangered	<ul style="list-style-type: none">• Catalytic converter• Nitrogen Oxides• Pollutant <p>Suggested practical skills: C1, C3, U1, U2, U3, U4</p>		<ul style="list-style-type: none">• Mineral• Enzyme• Performance Enhancer• Hallucinogen <p>Suggested practical skills: B1, B2, U1, U2, U3, U4</p>	<p>Suggested practical skills:</p>
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Year 9

Autumn One	Autumn Two	Spring One	Spring Two	Summer One	Summer Two
<p>P4 – Hot stuff</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about energy transferred as heat, using the particle model to understand how heat is transferred in solids, liquids and gases (including changes in state). how insulation can reduce heat loss and use this knowledge to investigate how effective takeaway packaging is. <p>KEYWORDS</p> <ul style="list-style-type: none"> Heat Temperature Conductor Insulator <p>Suggested practical skills: P3, U1, U2, U3, U4</p> <p>P1 – Getting the message</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about sound waves and how coding messages can increase security. about light waves and how light travels. about the electromagnetic spectrum and how it is used in communication and modern technologies. 	<p>B2 – Babies and reproduction</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about the male and female reproductive systems, moving through the reproductive cycle from sperm and egg to childbirth. about plant reproduction and how important pollination is for human food security. <p>KEYWORDS</p> <ul style="list-style-type: none"> Sperm Egg Embryo Foetus Cord Placenta <p>B11 –My genes</p> <p>Students will learn:</p> <ul style="list-style-type: none"> that our DNA codes for who we are but can be affected by the environment that we live in. that DNA is found on chromosomes and small sections of chromosomes are called genes and these code of specific traits. <p>KEYWORDS</p> <ul style="list-style-type: none"> Nucleus Chromosome Genes Dominant Recessive 	<p>C10 – Are you overreacting?</p> <p>C11- How fast, how slow?</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about chemical reactions and what causes them to stop. more about the periodic table and learn more about groups 1, 7 and 0 and how they react. how to react metals including magnesium with acid and learn more about the order of reactivity. about the rate of reaction and things that can affect this including catalyst, surface area and concentration. <p>KEYWORDS</p> <ul style="list-style-type: none"> Chemical reaction Reversible reaction Equilibrium Alkali metals Halogens Noble gases Concentration Surface area Catalyst Activation energy <p>Suggested practical skills: C1, C3, U1, U2, U3, U4</p>	<p>P2 – Full spectrum</p> <p>Students will learn:</p> <ul style="list-style-type: none"> more about the electromagnetic spectrum including visible light. about uses for infrared, radio and microwaves. <p>KEYWORDS</p> <ul style="list-style-type: none"> Spectrum Laser Infrared Microwave <p>Suggested practical skills: U1, U2, U3</p> <p>P3- Medical Rays</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about the rest of the electromagnetic spectrum including UV, X-rays and gamma rays. about the uses and the dangers associated with these parts of the electromagnetic spectrum. <p>KEYWORDS</p> <ul style="list-style-type: none"> Diagnosis Treatment X-ray Gamma ray Ultraviolet Background radiation 	<p>B3 –Control Systems</p> <p>Students will learn:</p> <ul style="list-style-type: none"> that it is important that our internal environment remains constant including our water levels and blood sugars. that the kidneys are responsible for keeping our water levels balanced and that the pancreas releases the insulin needed to manage our blood sugars. <p>KEYWORDS</p> <ul style="list-style-type: none"> Homeostasis Glucose Excrete Pancreas Insulin <p>Suggested practical skills: B1, B2, B4, U3, U4</p> <p>B4 –Fooling your senses</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about the human eye and other human senses including taste and touch. about the nervous system and how our pain receptors and reflexes work. <p>KEYWORDS</p> <ul style="list-style-type: none"> Receptor Nerve Neuron Senses 	<p>C8 – Heavy metals</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about the properties of metals and ways that metals can be extracted from their ores. how to protect metals and the advantages/disadvantages of different metals and their uses. <p>KEYWORDS</p> <ul style="list-style-type: none"> Panning Allergic Extract Electroplating Density Recycling <p>Suggested practical skills: C1, C2, U1, U2, U3, U4</p> <p>C2 –Acids and Alkalis</p> <p>Students will learn:</p> <ul style="list-style-type: none"> about how to handle acids and alkalis safely. about neutralisation and its uses. <p>KEYWORDS</p> <ul style="list-style-type: none"> Indicator pH Neutral Indigestion <p>Suggested practical skills: C1, C3, U1, U2, U3, U4</p>

KEYWORDS <ul style="list-style-type: none"> • Signal • Noise • Code • Analogue • Digital <p>Suggested practical skills: : P2, P3, U1, U3, U4</p>	<p>Suggested practical skills: B1, B4, U1, U3, U4</p>			<p>Suggested practical skills: B1, U1, U3, U4</p>	
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Year 8-10 Practical Skills	
Universal science skill areas (U)	
U1	Use of appropriate apparatus to make and record a range of measurements accurately.
U2	Safe use of appropriate heating devices and techniques.
U3	Obtaining and recording the results of a practical activity in an appropriate format.
U4	Follow a plan.
Biology skill areas (B)	
B1	Use of appropriate apparatus to observe and measure a biological change or process.
B2	Measure the rate of a reaction in biology.
B3	Use appropriate sampling techniques to investigate the distribution and abundance of organisms in an ecosystem via direct use in the field.
B4	Use of appropriate apparatus, and techniques to magnify a biological sample.
Chemistry skill areas (C)	
C1	Use of appropriate apparatus to conduct and monitor chemical reactions
C2	Safe use of a range of equipment to purify and/ or separate chemical mixtures.
C3	Safe and careful handling of gasses, liquids and solids.
P4	Use of appropriate apparatus and techniques carry out electrolysis.
Physics skill areas (P)	
P1	Use of appropriate apparatus and techniques to measure and observe the effects of forces on the extension of springs
P2	Use of appropriate apparatus and techniques for measuring motion.
P3	Safe use of appropriate apparatus to measure energy changes/transfers including work done.
P4	Use of appropriate apparatus to measure current, potential difference and resistance. Some of these skill areas are sub-divided into individual skills. Learners can be given half a point.

Syllabus materials KS4:

[Entry Level - Science - R483 \(from 2016\) – OCR](#)

[GCSE - Twenty First Century Science Suite - Combined Science B \(9-1\) - J260 \(from 2016\) - OCR](#)

Careers in Science:

[1438 My Learning My Future Science FINAL.pdf \(careersandenterprise.co.uk\)](#)