| Academic Year<br><br>Year; 10 | Content.<br>Unit title and brief outline of content.<br>**AQA Science GCSE** | Skills taught in each unit. | Assessment – what knowledge and skills will be assessed and how? |
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| **Autumn A** | P6 Molecules and Matter<br>• density<br>• sates of matter<br>• specific latent heat<br>P7 Radioactivity<br>• structure of the atom<br>• discovery of the nucleus<br>• alpha beta and gamma<br>• fission and fusion<br>C6 Electrolysis<br>• extraction of aluminium<br>• electrolysis of aqueous solutions<br>C7 Energy Changes<br>• exothermic and endothermic<br>• reaction profiles<br>• bond energy calculations<br>B1-6 Recap<br>B7 Non-Communicable diseases | Science has a spiral curriculum for scientific skills. All of the skills taught in Year 7-9 are delivered each half term in Year 10 with an increased focus on application of skills to an unfamiliar context.<br><br>Science practical investigation skills. Using scientific equipment to build evidence towards a conclusion. Converting data to different formats – manipulating raw data to create an appropriate graph. Understand how scientific methods and theories develop over time. Appreciate the power and limitations of science and consider any ethical issues which may arise. Use scientific theories and explanations to develop hypotheses. Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena. Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. Make and record observations and measurements using a range of apparatus and methods. Use scientific vocabulary, terminology and definitions. Evaluate the accuracy, reliability & validity of data. Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts. Recognise the importance of peer review of results and of communicating results to a range of audiences. Evaluate methods and suggest possible improvements | Each science is assessed half termly using GCSE questions, meaning that each student will sit 3x45 minute assessments for each of the Sciences studied that half term. As the terms progress, each subject will add more questions from previously taught content to ensure that the students retain a body of knowledge. Lessons and homework will be tailored to facilitate the interleaving of previous work. The assessments will carry the same weighting of content, science skills and |

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| | • cancer<br>• smoking<br>• diet and exercise<br>• alcohol and carcinogens | and further investigations. Recognise the importance of scientific quantities and understand how they are determined. Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences. Evaluate the accuracy, precision, reproducibility, reliability & validity of data and experimental technique of others. Apply mathematical principles to evaluate unfamiliar investigations. Explain everyday and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments. Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. Recognise when to apply a knowledge of sampling techniques to ensure any samples collected are representative. Use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate. Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano), interconvert units and use an appropriate number of significant figures in calculation. | application of science as the real GCSEs.<br>Though the grade boundaries will be similar to the GCSEs, grades will be capped at a 6 if the students do not achieve high marks in the level 7 and above style questions, which will be indicated as such on the cover of the assessment paper. |
| **Autumn B** | P7 Radioactivity (finish)<br>Consolidation of p1-7<br>C8 rates and equilibrium<br>• rates of reaction<br>• collision theory<br>• catalysts<br>• reversible reactions and dynamic equilibrium<br>C9 Crude Oil<br>• hydrocarbons<br>• fractional distillation<br>• cracking<br>B8 Photosynthesis<br>• rate of photosynthesis<br>• use of glucose<br>B9 Respiration<br>• aerobic and anaerobic<br>• metabolism and the liver | | |
| **Spring A** | P8 Forces in Balance<br>• vectors and scalars<br>• resultant force<br>• moments<br>• centre of mass<br>P9 Motion (4 lessons)<br>• motion graphs<br>• velocity and acceleration | | |

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| | C10 Organic reactions<br>• alkenes<br>• alcohols, carboxylic acids and esters<br>B10 The human nervous system<br>• homeostasis<br>• the nervous system<br>• relexes<br>• the brain and the eye<br>B11 Hormonal coordination<br>• hormonal control<br>• diabetes<br>• negative feedback<br>• hormones and reproduction<br>• plant hormones | | |
| **Spring B** | P10 Force and motion<br>• force and acceleration<br>• terminal velocity<br>• momentum<br>• elasticity<br>C11 Polymers<br>• polymerisation<br>• natural polymers and DNA<br>B11 Hormonal coordination (finish)<br>B12 Homeostasis<br>• Body temperature<br>• Waste products<br>• Kidneys, dialysis | | |
| **Summer A** | Exam preparation | | |
| **Summer B** | Consolidation | | |

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| | P11 Force and Pressure.<br>• Pressure in fluids<br>• Pressure at a surface<br>• Atmospheric pressure<br>Consolidation of C1-6<br>B13 – Reproduction<br>• Cell division<br>• DNA and genome<br>• Inheritance and genetics | | |

*Key Stage 2 content summary; Scientific enquiry principles. Plant biology, forces and magnets, rocks, Light, living things and their habitat, animals (inc. humans), states of matter, sound, electricity, properties and change of materials, Earth and space, evolution and inheritance.*

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| **Year 7 Content** *These units form the foundations of science. Without teaching these units, students would not have the basic knowledge to build upon over time.* Working scientifically, Cells, Particles and their behaviour, Forces, Structure of the body system, Elements, atoms and compounds, Reactions, Sound, Reproduction, Chemical reactions, Acids and Alkalis, Light, Space. | **Skills taught**. *Are the skills taught in a spiral curriculum? What is the rationale for your sequencing of skills*<br><br>*Science has a spiral curriculum for scientific skills. The first term is used to ensure that all students' skills are consistent and then each year layers the depth and complexity of skills required to succeed in every Key Stage in Science.*<br><br>Year 7 - science practical investigation skills. Using scientific equipment to build evidence towards a conclusion. Converting data to different formats – manipulating raw data to create an appropriate graph. Understand how scientific methods and theories develop over time. Appreciate the power and limitations of science and consider any ethical issues which may |
| **Year 8 Content** *These units build upon the foundations of science and deliver the key principles that can then be layered upon with more complexity in the next key stage.* | |

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| Health and Lifestyle, The periodic table, Electricity and magnetism, Ecosystems, Separating techniques, Energy, Adaptation and inheritance, Metals and Acids, Motion and Pressure, The Earth. | arise. Use scientific theories and explanations to develop hypotheses. Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena. Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. Make and record observations and measurements using a range of apparatus and methods. Use scientific vocabulary, terminology and definitions.<br><br>Year 8 – evaluate the accuracy, reliability & validity of data. Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts. Recognise the importance of peer review of results and of communicating results to a range of audiences. Evaluate methods and suggest possible improvements and further investigations. Recognise the importance of scientific quantities and understand how they are determined. Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences.<br><br>Year 9 – evaluate the accuracy, precision, reproducibility, reliability & validity of data and experimental technique of others. Apply mathematical principles to evaluate unfamiliar investigations. Explain everyday and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments. Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. Recognise when to apply a knowledge of sampling techniques to ensure any samples collected are representative. Use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate. Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano), interconvert units and use an appropriate number of significant figures in calculation.<br><br>**Year 10 & 11** focus on all of the skills with a stronger emphasis on application of scientific techniques.<br>Please see below for specific maths skills required in Year 9 - 11 |
| **Year 9 Content** *These units map out the start of GCSE and use all of the Ks3 content to deepen the complexity and understanding of the science.*<br>Cell Structure and transport, Conservation and dissipation of energy, Energy transfer by heating, Cell Division, Organisation and the digestive system, Atomic Structure, The periodic table, Structure and Bonding, Organising animals and plants, Energy resources, Electric circuits, Communicable diseases, Electricity in the home, Chemical calculations, Preventing and treating disease, Chemical changes. | |
| **Year 10 & 11** (Double and Triple work at a different pace so some topics in some classes will be taught at a different time) *These units are the culmination of content taught in previous years and require a firm grasp of skills and content before. They cannot be taught any earlier.*<br>Taught in specialisms.<br>Bioenergetics, Homeostasis and response, Inheritance, variation and evolution, Ecology, Quantitative chemistry, Chemical changes, Energy changes, The rate and extent of chemical change, Organic chemistry, Chemical analysis, Chemistry of the atmosphere, Using resources, Particle model of matter, Atomic structure, Electrolysis, Forces, Waves, Magnetism and electromagnetism. | |
| **Year 11 Content** – see above. | |

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| **Is all of the NC Ks3 content taught in Year 7 & 8? If not, where is this made up?** *The NC Ks3 content is delivered in Year 7-8 in Science, with students moving to Double and Triple science classes in Year 10. In Year 9, students start the GCSE course, building on the skills and content from Year 7 and 8.* | |
| ***Subject specific pedagogy statement;*** Science asks questions and finds the answers using scientific techniques. We the challenge the reliability of any conclusions made. Using this, we lift the veil on how the world around our students, from their phones to their heart, really works.<br>Science is the application of earned knowledge for the empowerment of our students.<br>*Students will use practical or research methods to investigate a question or observed phenomena and then critically evaluate the conclusions made and get a clearer understanding of the science underpinning the question. Question → investigate → evaluate → understand → Apply.* | |

**Maths skill requirements in Year 9, 10 and 11**

**1 Arithmetic and numerical computation**

a Recognise and use expressions in decimal form b Recognise and use expressions in standard form c Use ratios, fractions and percentages d Make estimates of the results of simple calculations

**2 Handling data**

a Use an appropriate number of significant figures b Find arithmetic means c Construct and interpret frequency tables and diagrams, bar charts and histograms d Understand the principles of sampling as applied to scientific data (biology only) e Understand simple probability (biology only) f Understand the terms mean, mode and median g Use a scatter diagram to identify a correlation between two variables (biology and physics only) h Make order of magnitude calculations

**3 Algebra**

a Understand and use the symbols: =, <, <<, >>, >, ∝ , ~ b Change the subject of an equation c Substitute numerical values into algebraic equations using appropriate units for physical quantities (chemistry and physics only) d Solve simple algebraic equations (biology and physics only)

**4 Graphs**

a Translate information between graphical and numeric form b Understand that $y = mx + c$ represents a linear relationship c Plot two variables from experimental or other data d Determine the slope and intercept of a linear graph e Draw and use the slope of a tangent to a curve as a measure of rate of change (chemistry and physics only) f Understand the physical significance of area between a curve and the x-axis and measure it by counting squares as appropriate (physics only)

**5 Geometry and trigonometry**

a Use angular measures in degrees (physics only) b Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects (chemistry and physics only) c Calculate areas of triangles and rectangles, surface areas and volumes of cubes