**Y9 – Fundamental Ideas (Biology, Chemistry & Physics)**

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|  | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | | Summer 1 | Summer 2 |
| Big Ideas | Biology 1a –  \*Cell biology  Biology 1b – \*Transport in cells  Chemistry 1a –\* Atomic structure | Chemistry 1a *(cont)* –\* Atomic structure  Chemistry 1b – \*The Periodic Table  Physics 1 – \*Particle Model | Biology 2a – \*Organisation and systems  Biology 2b – \*Organisation and systems  Chemistry 2 – \*Bonding, structure, and properties of matter | Chemistry 2 *(cont)* – \*Bonding, structure, and properties of matter  Physics 2a – \*Electricity | | Physics 2b – \*Electricity  Chemistry 3a – Quantitative chemistry (Foundation)  Physics 3 – \*Atomic structure | Physics 3 *(cont)* – \*Atomic structure |
| Topics | Prokaryotic/eukaryotic cells, specialised cells, microscopy, chromosomes, mitosis, and stem cells  Diffusion, osmosis, active transport, exchange surfaces  Atoms, elements, and compounds, separation techniques, electronic configuration | Atoms, elements, and compounds, separation techniques, electronic configuration  Trends in the Periodic Table, history of the Periodic Table  Motion in gases, density of materials, internal energy and changes of state, specific latent heat | Animal tissues, respiratory system, circulatory system, plant tissues and transport  Digestive system, enzymes, and food tests  Ionic, covalent, and metallic bonding, allotropes of carbon, changes of state | Ionic, covalent, and metallic bonding, allotropes of carbon, changes of state  Series and parallel circuits, resistance, IV characteristics, Thermistors and LDRs | | Power of appliances, plugs, National Grid.  R.A.M, R.F.M, %mass of an element in a compound, conservation of mass, concentration  Model of the atom, isotopes, radiation. | Nuclear equations, half-life, irradiation, and contaminations |
| Skills | DEVELOPMENT OF SCIENTIFIC THINKING  - Understanding how scientific theories develop over time  - Use a variety of models to represent ideas (2D & 3D forms)  - Appreciate ethical issues  - Describe and evaluate methods  - Recognise the importance of peer review | | EXPERIMENTAL SKILLS & STRATEGIES  -Plan investigations  - Carry out investigations  - Describe and suggest techniques | | | APPARATUS & TECHNIQUES  -Use a range of equipment to take measurements  - Safe use of heating equipment  - Use a range of equipment to observe biological changes  -Safe and ethical use of living organisms  - Measure rates of reaction  - Safely use a microscope  -Range of separation techniques  - Safe use of gases and reagents | |
| Assessment | Formative assessment every lesson.  Range of learning & skill-based homework.  Synoptic end of unit assessments | Formative assessment every lesson.  Range of learning & skill-based homework.  Synoptic end of unit assessments | Formative assessment every lesson.  Range of learning & skill-based homework.  Synoptic end of unit assessments | Formative assessment every lesson.  Range of learning & skill-based homework.  Synoptic end of unit assessments | | Formative assessment every lesson.  Range of learning & skill-based homework.  Synoptic end of unit assessments | Formative assessment every lesson.  Range of learning & skill-based homework.  Synoptic end of unit assessments  END OF YEAR ASSESSMENT |
| Linked learning | BIOLOGY topics: The topics taught at KS4 biology build upon students’ knowledge of understanding of KS3 science: cells, microscopes, exchange of substances, tissues, and organ systems. Links with other subjects: Maths – use of fractions, decimals, and percentages; proportion, graphical representations, standard form, order of operations, accuracy and interpreting data. English – comprehension and literacy skills. Food – nutrition and balanced diets. PE – benefits of exercise, respiration, and organ systems.  CHEMISTRY topics: C1 recaps and builds on prior knowledge from KS3 relating to particle and reactions. Links with other subjects: Maths – fractions, standard form, basic mathematical functions, rearranging equations. Tabulating and analysing data. English – comprehension and literacy skills. Physics – atomic structure and isotopes.  PHYSICS topics: Students will understand some of these subject areas from KS3 for example energy and electromagnetism, but it is largely new material. Links with other subjects: Maths – basic mathematical functions, algebra, plotting graphs, standard form, rearranging equations. Tabulating and analysing data. Geography – Energy resources.  Learning components at the start of lessons remind students of prior learning and emphasis links to prior topics | | | | | | |
| \*SMSC Links | 253 Provision for the spiritual development of pupils includes developing their:  - ability to be reflective about their own beliefs and perspective on life  - sense of enjoyment and fascination in learning about themselves, others, and the world around them,  - Use of imagination and creativity in their learning  254 Provision for the moral development of pupils includes developing their:  -understanding of the consequences of their behaviour and actions  - interest in investigating and offering reasoned views about moral and ethical issues and ability to understand and appreciate the viewpoints of others on these issues | | | | | | |
| Literacy | Scientific vocabulary, terminology, and definition  Interpret observations | | | Numeracy | Use decimal forms, standard form, ratios, fractions, percentages, makes estimates, uncertainties, determining quantities, SI units, convert units.  Handling data; interpret data, significant figures, construct tables and graphs, order of magnitude  Algebra: use common expressions, solve simple algebraic equations, rearrange equations  Graphs: translate information between tables and graphs, understand linear relationships, plot variables, calculate surface area and volume | | |
| Enrichment | Visiting STEM ambassadors. Biology challenge | | | | | | |
| Impact | Students are required to memorise key facts and be able to recall them and apply their knowledge to real life situations. A successful student will be able to link concepts together. Demonstrate the ability to work scientifically by following a method, identifying basic apparatus, collecting data, illustrating data, and drawing conclusions. Science will help students to become logical thinkers and problem solvers with a batter understanding of the world around them. Demonstrating resilience and the ability to consider moral and ethical implications of scientific developments. | | | | | | |

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| Ways to support student learning in this subject |
| * Encourage the completion of homework. * Encourage discussion of science issues that arise in the news. * Discuss science lessons and their progress. * Encourage a positive attitude towards science. * Encourage self-assessment and reflection using personalised learning checklists (PLCs) * Refer to the Periodic Table * Practice units, unit conversions, standard form, rearranging equations and encourage the use of a calculator * Learn Physics equations * Use of low stakes questioning and exam material to build confident and knowledge base * Encourage students to use GCSEPod to consolidate knowledge and build on recall skills * Refer students to LaunchPad revision materials * Purchase CGP revision guides and workbooks for independent revision and practice |