**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 biologyBiology 1b – \*Transport in cellsChemistry 1a –\* Atomic structure  | Chemistry 1a *(cont)* –\* Atomic structure Chemistry 1b – \*The Periodic TablePhysics 1 – \*Particle Model | Biology 2a – \*Organisation and systemsBiology 2b – \*Organisation and systemsChemistry 2 – \*Bonding, structure, and properties of matter | Chemistry 2 *(cont)* – \*Bonding, structure, and properties of matterPhysics 2a – \*Electricity | Physics 2b – \*ElectricityChemistry 3a – Quantitative chemistry (Foundation)Physics 3 – \*Atomic structure | Physics 3 *(cont)* – \*Atomic structure |
|  Topics | Prokaryotic/eukaryotic cells, specialised cells, microscopy, chromosomes, mitosis, and stem cellsDiffusion, osmosis, active transport, exchange surfacesAtoms, elements, and compounds, separation techniques, electronic configuration | Atoms, elements, and compounds, separation techniques, electronic configurationTrends in the Periodic Table, history of the Periodic TableMotion in gases, density of materials, internal energy and changes of state, specific latent heat | Animal tissues, respiratory system, circulatory system, plant tissues and transportDigestive system, enzymes, and food testsIonic, covalent, and metallic bonding, allotropes of carbon, changes of state | Ionic, covalent, and metallic bonding, allotropes of carbon, changes of stateSeries 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, concentrationModel 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 assessmentsEND 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 learning254 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 definitionInterpret 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 magnitudeAlgebra: use common expressions, solve simple algebraic equations, rearrange equationsGraphs: 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
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