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|  | **Autumn A** | **Autumn B** | **Spring A** | **Spring B** | **Summer A** | **Summer B** |
| **Year 7** | **Cells​**  **Key knowledge explored:** Observing cells, plant & animal cells, specialised cells, movement of substances, unicellular organisms.  **Skills developed:**  This topic helps students compare different types of cells whilst also teaches students how to use microscopes.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topic of cells in Year 9. | **Forces​**  **Key knowledge explored:** Contact/non-contact forces, Hooke’s Law, pressure types.  **Skills developed:**  Students will be able to differentiate between different types of forces, as well as test whether a spring obeys Hooke’s law.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topics of forces in Year 10 & 11.  **Particles**  **Key knowledge explored:** states of matter & properties, diffusion, energy changes, reactions.  **Skills developed:**  This topic will allow students to investigate a range of different reaction types and form predictions based on the knowledge they have acquired during this topic.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topics of Particle model and energy changes in Year 9. | **Organisation**  **Key knowledge explored:**  Organ systems, gas exchange, breathing, the skeleton, joints and muscles.  **Skills developed:**  This topic develops students’ understanding of the human body and how it works.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topic of organisation in Year 9 and homeostasis in Year 10.  **Waves**  **Key knowledge explored:**  Longitudinal and transverse waves, sound, the ear, echoes and ultrasound.  **Skills developed:**  This topic will enable students to explain how echoes are used in animal communication and how ships can determine the depths of oceans for safety including the development of their numeracy skills.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topic of waves in Year 11. | **Elements**  **Key knowledge explored:**  Atoms, elements and compounds, displacement reactions.  **Skills developed:**  This topic enables students to predict the outcomes of reactions based on knowledge acquired of reactivity.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topic of atomic structure and the periodic table in Year 9.  **Reproduction**  **Key knowledge explored:** adolescence, reproductive systems, fertilisation & implantation, development of the foetus, menstrual cycle, pollination, germination.  **Skills developed:**  Students will be able to discuss and explain the processes of reproduction in different organisms.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topic of inheritance in Year 10. | **Light**  **Key knowledge explored:**  Light, reflection, refraction, the eye and colour.  **Skills developed:**  This topic enables students to marvel at and explain how colour is seen and how rainbows are formed.  **Linked Learning:**  This topic deepens understanding formed from the topic of waves studied earlier this year and forms the basis of understanding for when students revisit the topic of waves in year 11.  **Chemical Reactions**  **Key content:** defining acids/alkalis, neutralisation, pH scale, indicators,  reactions of acids with metals & alkalis  **Skills developed:**  During this topic students will gain the practical skills to carry out a range of experiments based around the reactions of acids.  **Linked Learning:**  This topic forms the basis of understanding for when students study the topic of chemical changes in Year 10 | **Space**  **Key knowledge explored:** Planets & stars, gravity forces, galaxies, seasons/ day length, the earth and moon.  **Skills developed:**  This topic develops students understanding of how the Earth is affected by satellites and orbit patterns.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topic of space in Year 11 if they if a student studies triple science. |
| Assessment takes place through end of topic tests which combines a range of question types that explores both understanding of topic and skills developed. Students are notified of when these tests will take place. | | | | | | |
| **Year 8** | **Digestion and Organisation**  **Key knowledge explored:**  Nutrients, food tests, diet, digestive system, bacteria, enzymes, drugs, alcohol and smoking.  **Skills developed**:  Students will learn how food is used in the body and explain how the body would benefit would a healthy lifestyle.  **Linked Learning:**  This topic builds on learning from the Year 7 topics of cells and organisation, whilst providing foundational knowledge needed for students when studying the topic of organisation in greater detail in Year 9. | **Electricity​**  **Key knowledge explored:**  Circuits, charge, current, potential difference, magnetism and electromagnetism.  **Skills developed**:  This topic develops a student's practical skills to make complex working circuits.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topic of Electricity in Year 9.  **Periodic Table**  **Key knowledge explored:**  Metals & non-metals, trends, groups and periodicity.  **Skills developed:**  This topic allows students to use and develop practical inquiry methods to prove how elements show similarities between each other based on their placement on the periodic table.  **Linked Learning:**  This topic builds on learning from the Year 7 topic of elements, whilst providing foundational knowledge needed for students when studying the topic of atomic structure and the periodic table in greater detail in Year 9. | **Ecology**  **Key knowledge explored:**  Photosynthesis, chemosynthesis, respiration, food chains and ecosystems.  **Skills developed:**  This topic develops students understanding of biological significance and cause & consequence.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topic of Ecology in Year 11.  **Energy**  **Key knowledge explored:**  Food & fuels, particles, radiation, power, work, renewable and non-renewable resources.  **Skills developed:**  This topic helps students understand the reasons for the worldwide push on sustainable development and how renewable energy resources are used.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topic of Energy in Year 10. | **Separating Mixtures**  **Key knowledge explored:**  Mixtures, solutions, solubility, filtration, evaporation, distillation and chromatography.  **Skills developed:**  This topic develops students' inquiry and practical skills through a range of separation techniques.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topic of chemical analysis in Year 10.  **Inheritance and Evolution**  **Key knowledge explored:**  Competition, adaptation, variation, inheritance and extinction.  **Skills developed:**  Through this topic students will use new knowledge and apply it to explain possible reasons for either evolution or extinction for a range of species.  **Linked Learning:**  This topic builds on learning from the Year 7 topic of reproduction, whilst providing foundational knowledge needed for students when studying the topic of inheritance in greater detail in Year 10. | **Forces**  **Key knowledge explored:**  Speed, motion graphs, pressure and turning forces.  **Skills developed:**  Students in this topic will develop their skills of graph drawing and manipulation to calculate speed and acceleration.  **Linked Learning:**  This topic builds on learning from the Year 7 topic of forces, whilst providing foundational knowledge needed for students when studying the topics of forces in greater detail in Years 10 & 11.  **Metals and Non-Metals**  **Key knowledge explored:**  Metal reactions, displacement, extraction of metals, ceramics, polymers and composites.  **Skills developed:**  Students will deepen their understanding of different types of chemical reactions, whilst also using new knowledge of reactivity to predict products of displacement reactions.  **Linked Learning:**  This topic builds on learning from the Year 7 topic of elements, whilst providing foundational knowledge needed for students when studying the topics of chemical changes and using resources in greater detail in Years 10 & 11. | **Climate and the Earth’s Resources​**  **Key knowledge explored:**  Earth & atmosphere, the rock cycle, the water cycle, climate change, sedimentary, igneous and metamorphic rocks.  **Skills developed:**  This topic develops students understanding of the Earths formation and how crucial substances are recycled through our atmosphere.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topic of chemistry of the atmosphere in Year 11. |
| Assessment takes place through end of topic tests which combines a range of question types that explores both understanding of topic and skills developed. Students are notified of when these tests will take place. | | | | | | |
| **Year 9** | **Turning points in Biology**  **Key knowledge explored:**  Vaccines, antibiotics, DNA, theories of evolution, extinction and its prevention.  **Skills developed:**  This topic develops students understanding of the recent human fight against world changing diseases and the complications we face.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the topics of infection and response and also evolution in Year 10.  **New technology**  **Key knowledge explored:**  Atoms and particles, nanoparticles, nanomedicine, new fuels, reducing car exhaust emissions and investigating hybrid cars.  **Skills developed:**  This topic widens students' perspectives on how industry is working to provide sustainable development.  **Linked Learning:**  This topic forms the basis of understanding for when students revisit the ideas of sustainable development in Years 10 & 11. | **Turning points in physics**  **Key knowledge explored:**  Discovery of the universe, the big bang, space travel, radiation, radioactivity and its risks.  **Skills developed:**  This topic equips students with the knowledge to compare different theories over time to explain the creation of our universe.  **Linked Learning:**  This topic builds on learning from the Year 7 topic of space, whilst providing foundational knowledge needed for students when studying the topics of atomic structure and space in greater detail in Years 10 & 11. | **Cell biology**  **Key knowledge explored:**  Cell structure, animal and plant cells, cell differentiation, microscopy, mitosis, cell division, transport in cells ***and culturing microorganisms***.  **Skills developed:**  This topic helps students understand the methods of scientific enquiry, including how experimental evidence is used to prove scientific models and diagrams.  **Linked Learning:**  This topic is studied in greater detail at this point and requires previous knowledge and skills to be remembered from previous learning in Year 7 from the cells topic.  **Atomic Structure & Periodic Table**  **Key knowledge explored:**  **​**  Atoms, elements and compounds, model of the atom, relative atomic mass, electronic structure, periodic table, groups, periodicity ***and transition metals.***  **Skills developed:**  During this topic students will gain the skill of drawing electronic structures for atoms and ions, whilst also developing their ability to explain trends in periodicity.  **Linked Learning:**  This topic is studied in greater detail at this point and requires previous knowledge and skills to be remembered from previous learning in years 7 & 8. | **Organisation**  **Key knowledge explored:**  Digestive system, the heart and blood vessels, blood, health issues, cancer, plant tissues and organs.  **Skills developed:**  This topic develops students understanding of how multiple organ systems work together to form complex organisms.  **Linked Learning:**  This topic is studied in greater detail at this point and requires previous knowledge and skills to be remembered from previous learning in Years 7 & 8.  **Particle model of matter**  **Key knowledge explored:**  Density, changes of state, internal energy, specific heat capacity, latent heat, particle motionand ***pressure in gases.***  **Skills developed:**  This topic will allow students to predict the behaviour of solids, liquids and gases, explaining their uses in everyday life. Students will also be able to explain why and how engineers use these principles when designing spaceships and submarines.  **Linked Learning:**  This topic is studied in greater detail at this point and requires previous knowledge and skills to be remembered from previous learning in Year 7 through the particles topic. | **Bioenergetics**  **Key knowledge explored:**  Photosynthesis, respiration, response to exercise and metabolism.  **Skills developed:**  During this topic students will explore how plants harness the sun’s energy in photosynthesis. Students will be able to explain the importance of oxygen in aerobic and anaerobic respiration through the liberation of oxygen throughout the topic.  **Linked Learning:**  This topic is studied in greater detail at this point and requires previous knowledge and skills to be remembered from previous learning in Year 8 through the ecology topic.  **Bonding & Structure​**  **Key Content:**  Ionic bonding, covalent bonding, giant covalent structures, properties of compounds, polymers, metals, alloys and ***nanoparticles.***  **Skills developed:**  During this topic students will analyse and compare different types of structures and then link this to properties and uses in engineering and industry.  **Linked Learning:**  This topic is studied in greater detail at this point and requires previous knowledge and skills to be remembered from previous learning through the chemical reactions topic in Year 7. | **Energy changes**  **Key content:**  Exothermic and endothermic reactions, reaction profiles, bond energies ***and fuel cells.***  **Skills developed:**  Students will deepen their understanding of the interaction of the energy changes involved during the breaking and formation of bonds in a reaction. Students will also develop mathematical skills when calculating bond energies within a reaction.  **Linked Learning:**  This topic is studied in greater detail at this point and requires previous knowledge and skills to be remembered from previous learning in Year 7 from the chemical reactions topic.  **Electricity**  **Key knowledge explored:**  Current, P.d and resistance, charge, ohms law, series and parallel circuits, mains electricity and the national grid.  **Skills developed:**  During this topic students will further develop their skills and knowledge of the structure of insulators and conductors to make it possible to make more complex circuits to meet specific demands and criteria.  **Linked Learning:**  This topic is studied in greater detail at this point and requires previous knowledge and skills to be remembered from prior learning in Year 7 during the electricity topic. |
|  | Assessment takes place through end of topic tests which combines a range of question types that explores both understanding of topic and skills developed. Students are notified of when these tests will take place.  . | | Assessment focus areas: | | | |
| Cell Biology: Observed practical.  Atomic structure: End of topic test. | Organisation: End of topic test.  Atomic structure: End of topic test. | Bioenergetics: Observed practical.  Bonding: End of topic test. | Energy changes: End of topic test.  Electricity: End of topic test. |
| **Year 10** | **Infection & Response**  **Key knowledge explored:**  Communicable diseases, human defence systems, vaccinations, antibiotics and painkillers, the development of drugs, ***monoclonal antibodies and plant disease.***  **Skills developed:**  Students will develop their skills of explaining how both natural and artificial treatments can combat different forms of communicable diseases.  **Linked Learning:**  This idea of infection is studied in greater detail at this point and requires previous knowledge and skills to be remembered from prior learning in Year 9 during the turning points in biology topic.  **Chemical analysis​**  **Key knowledge explored:**  Pure substances, formulations, chromatography, testing for gases, ***spectroscopy and testing for positive and negative ions.***  **Skills developed:**  During this topic students will develop their fine motor skills to analyse and identify the components of different compounds and products.  **Linked Learning:**  This topic is studied in greater detail at this point and requires previous knowledge and skills to be remembered from prior learning in Year 8 during the separating mixtures topic. | **Quantitative Chemistry Part 1**  **Key knowledge explored:**  Conservation of mass, relative formula mass, chemical measurements and moles.  **Skills developed:**  Through this topic students will develop their mathematical skills through the application of data provided by the periodic table.  **Linked Learning:**  This topic is made up of largely new content for students, with some links to the topic of chemical reactions studied in Year 7.  **Energy**  **Key knowledge explored:**  Energy stores and transfers, energy equations, power, conservation and dissipation of energy, efficiency and energy resources.  **Skills developed:**  This topic will deepen a student's understanding of the concept of energy that emerged in the 19th century, whilst also focussing on the skills required when rearranging complex mathematical equations.  **Linked Learning:**  This topic builds on prior learning from the energy topic in Year 8 and has strong links to the topics of forces and electricity taught in Years 10 & 11. | **Homeostasis and Response**  **Key knowledge explored: ​**  Homeostasis, nervous system, ***the brain and eye, thermoregulation, water balance***, the endocrine system, glucoregulation, reproduction, contraception, infertility and ***plant hormones.***  **Skills developed:**  This topic develops a student's understanding of the nervous and endocrine systems and explains how they both react to external and internal changes to ensure homeostasis is achieved.  **Linked Learning:**  This topic contains lots of new content and information with some links back to reproduction taught in Year 7.  **Atomic Structure**  **Key knowledge explored:**  Structure of the atom, isotopes, development of the atom, radiation, nuclear equations, half-life, contamination and irradiation.  **Skills developed:**  During this topic students will evaluate the uses of radiation and explain which source is best suited to a scenario. Students will also gain an understanding of the dangers associated to radiation and its complex nature.  **Linked Learning:**  This topic has strong content links with the atomic structure and periodic table topic studied in Year 9. | **Chemical changes**  **Key knowledge explored:**  Reactivity, extraction of metals, oxidation and reduction, reactions of acids, making salts, neutralisation reactions, strength of acids ***and titrations.***  **Skills developed:**  Students will continue to build on their skills of predicting and reasoning why a reaction happens the way it does. Students will also begin use very technical experimental equipment such as burettes to carry out titrations accurately.  **Linked Learning:**  This topic is now studied in greater detail and builds on prior knowledge attained during the chemical reactions and metals & non-metals topics studied in Year 7. | **Inheritance, variation and evolution**  **Key knowledge explored:**  Sexual and asexual reproduction, meiosis, DNA and the genome, ***DNA*** ***structure***, inheritance, inherited disorders, variation, evolution, selective breeding, genetic engineering, ***cloning***, ***evolution***, ***speciation***, fossils, extinction and classification.  **Skills developed:**  This topic exposes students to very complex and important scientific developments and questions students spiritually on the topic of ethics through usage.  **Linked Learning:**  **T**his topic is now studied in greater detail and builds on content taught through the turning points in biology topic in Year 9.  **Quantitative Chemistry Part 2**  **Key knowledge explored:**  Moles ***continued***, amount of substances, balancing equations, limiting reactants, concentration, ***percentage yield, atom economy and titrations.***  **Skills developed:**  Students will develop their mathematical skills and processes to calculate more complex measurements such as concentration and theoretical yields.  **Linked Learning:**  This dub-topic builds on the content taught earlier this year in both quantitative chemistry part 1 and chemical changes. | **Rates**  **Key knowledge explored:**  Calculating rate of reaction, factors affecting rate, collision theory and activation energy, catalysts, reversible reactions, equilibrium and Le Chatelier’s principle.  **Skills developed:**  This topic offers students the opportunities for developing their practical skills and investigating how changing factors can affect the rate of a reaction, in addition to the development of graph skills such as calculating the gradient of a tangent.  **Linked Learning:**  This topic contains lots of new content however the fundamentals from the chemical reactions topic in Year 7 are revisited and built upon.  **Forces Part 1**  **Key knowledge explored:**  Scalar and vector quantities, contact and non-contact forces, resultant forces and weight.  **Skills developed:**  Students in this topic will develop their understanding of Newton’s laws and make direct links between force and weight based on these.  **Linked Learning:**  The foundations of this topic are taught now, before the more complex mathematics content is taught in Year 11 at which students have developed their maths kills to be perform more complex calculations. |
| Assessments | Infection: An extended piece of writing.  Chemical analysis: Observed practical. | Quantitative: End of topic test.  Energy: End of topic test. | Homeostasis: End of topic test AND extended writing assessment. | Chemical changes: Observed practical | Inheritance: End of topic test.  Quantitative: End of topic test. | Rates: Observed practical.  Forces: End of topic test. |
| **Year 11** | **Ecology**  **Key knowledge explored: ​**  Adaptations, interdependence and competition, the carbon and water cycles, biodiversity, ***trophic levels and food production***.  **Skills developed:**  Students during this topic will develop their skills of extracting and interpreting information form charts, graphs and tables and using this to form conclusions.  **Linked Learning:**  This topic builds on the skills and knowledge students gained when ecology was studied in Year 8.  **Chemistry of the atmosphere**  **Key knowledge explored:**  Composition and evolution of the Earth’s atmosphere, greenhouse gases and their effects and atmospheric pollutants.  **Skills developed:**  During this topic students will develop their literacy skills when completing extended writing tasks detailing the evolution of the Earth’s atmosphere.  **Linked Learning:**  This topic revisits the themes of the topic studied in Year 8 called climate and the Earth’s resources. | **Organic Chemistry**  **Key knowledge explored:**  Crude oil, hydrocarbons, fractional distillation, cracking and alkenes, ***alcohols, carboxylic acids and the reactions of organic compounds along with the formation of polymers and amino acids.***  **Skills developed:**  During this topic students will develop their skills of drawing out and comparing different organic compounds and explaining the expected reactions these compounds will undergo.  **Linked Learning:**  This topic brings ideas together from multiple topics studied previously such as the energy topics studied in Years 8 & 10 as well as the energy changes topic in Year 9.  **Magnetism and Electromagnetism​**  **Key knowledge explored:**  Permanent and induced magnetism, magnetic fields, the motor effect, electromagnetism, electric motors, ***the generator effect, transformers, loudspeakers and microphones.***  **Skills developed:**  Through this topic students will understand how fundamental knowledge and understanding can be used to explain how and why electromagnetism is used in motors and cranes.  **Linked Learning:**  This topic contains largely new content covering magnetism however then combines the information with ideas and skills from the electricity topic studied in Year 9. | **Using Resources**  **Key knowledge explored:**  Obtaining potable water, phytomining and bioleaching, life cycle assessments, recycling and reusing, ***preventing corrosion and***  ***the Haber process.***  **Skills developed:**  During this topic students will develop their literacy skills when evaluating LCAs of similar products, with a focus on the environmental impact.  **Linked Learning:**  This topic builds upon the knowledge and skills acquired by students when studying the climate and Earth’s resources topic in Year 8.  **Waves**  **Key knowledge explored:**  Transverse and longitudinal waves, the wavespeed equation, electromagnetic waves, ***reflection, P&S waves, lenses and black body radiation.***  **Skills developed:**  This topic allows students to combine practical and mathematical skills to investigate how a ripple tank can be used to measure frequency, wavelength and speed of a wave.  **Linked Learning:**  This is a large topic that combines the concepts of both light and sound waves that have previously taught separately through the topics of light and waves in Year 7. | **Forces Part 2**  **Key knowledge explored:**  Elasticity, ***moments, levers, gears, pressure,*** motion graphs, acceleration, stopping distances and momentum**.**  **Skills developed:**  During this topic students will develop their graph skills to draw accurate D-T graphs and calculate gradients and tangents to work out speed and instantaneous speed.  Linked Learning:  This topic follows on from the forces part 1 topic taught in Year 10. This topic is more challenging and requires students to have a greater understanding of graph skills and algebra.  ***Space***  ***Key knowledge explored:***  ***The solar system, satellites, the life cycle of a star, red-shift and evidencing the big bang.***  ***Skills developed:***  ***This topic develops a student's understanding of how speed and distance are measured in space in regard to distant galaxies. Students will also gain the skills needed to compare different stars in our universe.***  ***Linked Learning:***  ***This is an exciting triple science topic that ties together difficult concepts of space and mathematics. The learning builds on that done in the space topic in Year 7.*** | Revision of:  Key content  Key knowledge  Key practical skills  Key mathematical skills | N/A |
| Assessments | Ecology: End of topic test.  Chemistry of the atmosphere: Extended writing assessment. | Organic: End of topic test.  Magnetism: End of topic test AND observed practical. | Using resources: End of topic test.  Waves: End of topic test. |  | **GCSE summer examinations.** |  |

N.B Any content in bold italic are classed as triple science content only.