THOMAS ALLEYNE'S HIGH SCHOOL

UTTOXETER LEARNING TRUST
INSPIRED TEACHING INSPIRING CHILDREN

Curriculum Overview for: Biology

Key Stage 3/4 Academic Year Group: 9

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Cell Biology	Cell Biology	Cell Biology	Organisation	Organisation	Organisation
Content	-Cell types and structures -Microscopy -Cell differentiation -Cell Specialisation	-Stem Cells -Chromosomes and the cell cycle -Binary Fission	-Diffusion -Osmosis -Active Transport -Exchanging Substances	-Levels of Organisation -The Digestive System -Enzymes -Food Tests	-The Respiratory System -The Circulatory System -Cardiovascular Disease and Treatments	-Non-Communicable Diseases -Plant Organisation -Transport in Plants
Rationale/ Linking	In year 9 students initially study Cell Biology, where they must recall basic cell types and structure, identify the correct locations for genetic material, aerobic respiration and protein synthesis. Students will learn to observe cell diagrams and determine cell type (prokaryotic vs. eukaryotic). Students will also learn to differentiate between different specialised cells and describe the events occurring in the cell cycle, including mitosis. They will also determine the ploidy of the daughter cells, which is crucial information that they will require in order to understand future topics in year 11, such as human reproduction including sexual and asexual reproduction. The year 9 curriculum progresses on to include the fundamental concepts of diffusion, osmosis and active transport, which provides fertile ground to help set the stage for future learning. For example, students are expected to revisit concepts and content from this foundational year, as they move to more rigorous topics, such as bioenergetics (including respiration and photosynthesis) and osmoregulation (which includes detailed application of osmosis and active transport) and adaptations of organisms (where the importance of key ideas such as surface area : volume is reinforced).			In the second half of the spring term, students move on to study the module Organisation. Here, students build on their foundational knowledge of cells and transport of substances, and develop their understanding of how cells are arranged and organised within the whole organism. For example, students will learn about specialised cells of the digestive system (eg epithelial cells) and how these are arranged into tissues, organs and organ systems in order to ensure the efficient digestion and absorption of vital nutrients. Students will then learn how the circulatory system is adapted to supply these nutrients (and remove the waste products) to ensure proper functioning of cells, as well as linking the role of the respiratory system to that of the previously mentioned ones. This module provides a strong link between the content and ideas covered in the cells module as well as setting the scene for students to establish thorough links to future topics including homeostasis in year 10 and the immune system in year 11.		
Assessment	Formal assessment – once per half term which includes an interim assessment part way into each topic and a final assessment for each topic. Regular informal assessment opportunities built into lessons and homework.			Learning Resources	**CGP revision guide** **Cognito Youtube channel** **GCSEPod** **Revision resources available on TEAMS**	

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Curriculum Overview for: Combined Science (Chemistry)

Key Stage 3/4 Academic Year Group: 9

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Atoms and their history	Atomic Structure	The Periodic Table	Evolution of the Atmosphere	Pollution and Climate Change	Energy Changes
Content	• Atoms, Elements, and compounds. • Word and balanced symbol equations. • Mixtures and separating mixtures. • Early development of the atomic model.	• Structure of the atom. • Ions, atoms and isotopes. • Electronic structure	• Development and arrangement of the periodic table. • Groups 0, 1 and 7.	• History and the evolution of the atmosphere. • The carbon cycle	• Greenhouse gases and global warming. • Effects of global warming and carbon footprint. • Other pollution types (e.g. acid rain)	• Endothermic and Exothermic Reactions • *Bond breaking and Bond making in chemical reactions. • Cells and batteries
Rationale/ Linking	Follows on from work on elements compounds and mixtures in middle school. Begins to build in the first of the scientific skills WS1.1 Understanding how scientific methods and theories have developed over time.	Structure of the atom is fundamental to understanding all future chemical reactions. This knowledge underpins many of the future topics and is built on throughout the course.	Further development of the WS 1.1 skills and build in WS1.3 and WS 1.4 - power and limitations of science and the importance of peer review. Learning to navigate and use the PT, a tool to be used across many of the further topics in Chemistry e.g Bonding in Y10.	Teaches the processes that are required to understand how global warming works, build foundations for next steps. Linked to biology curriculum – carbon cycle revisited in Biology in Y10 (spiral learning).	Very relevant to current affairs, helps students to understand the causes and implications of climate change. Links to GCSE Geography curriculum particularly the urban issues and challenges unit.	Provides an understanding of why chemical reactions get hot or cold at foundation level this can be used in many everyday applications. At a higher level this provides the basic knowledge and skills for further education in science.
Assessment	Formal assessment – once per half term which includes an interim assessment part way into each topic and a final assessment for each topic. Regular informal assessment opportunities built into lessons and homework.			**Learning Resources**	**GCSE AQA Chemistry Textbook. Practical resources for displacement reactions, exothermic and endothermic reactions and fuel cells.**	

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Curriculum Overview for: Combined Science (Physics)

Key Stage 3/4 Academic Year Group: 9

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Forces	Motion	Energy Stores	Introduction to Waves	Introduction to Circuits	Energy Recourses
Content	-Contact & Non-contact Forces -Magnets & Magnetic fields -Forces & Elasticity (springs) -Gravity	-Scalars and Vectors (definitions and examples) -Speed -Stopping Distance	-Energy Stores and Transfers -Efficiency	-Transverse and Longitudinal Waves -Properties of the Electromagnetic Spectrum -Reflection and Refraction	-Building Circuits and Circuit Diagrams -Current, Potential Difference and Resistance	-National and Global Energy Resources
Rationale/ Linking	Provides a good introduction to forces which underpins future work on motion. This also provides opportunities to develop practical skills progressively through practicals of increasing complexity.	Continues to develop student's understanding of using equations with the speed equation and an opportunity to explore unit conversions in familiar settings.	Introduces energy s tores and concepts of energy transfer so that students can identify these throughout their future studies. Although a full treatment of energy is completed in Y10, having an early awareness is essential given the ubiquitous nature of energy throughout physics.	Provides an application of energy transfers allowing students to appreciate the relevance of waves (and physics) to their everyday lives. This also underpins future study on waves in Y11	Provides another application of energy transfer and develops an understanding of circuits, including practical experience, to underpin study of this in Y10. By giving students some experience of building circuits in Y9, they are much more confident when they start their more detailed study of electricity in Y10.	Follows on from discussion of energy and looks at the application of this in real life. This gives students some concrete examples of how energy is used and brings together what they have studies on electricity, waves and energy transfers.
Assessment	Formal assessment – once per half term which includes an interim assessment part way into each topic and a final assessment for each topic. Regular informal assessment opportunities built into lessons and homework.			**Learning Resources**	**GCSE AQA Physics Textbook.** **CGP revision guide** **Cognito website** **GCSEPod**	

THOMAS ALLEYNE'S HIGH SCHOOL

UTTOXETER LEARNING TRUST
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Curriculum Overview for: Biology

Key Stage 4 Academic Year Group: 10

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Bioenergetics	Bioenergetics	Homeostasis and Response	Homeostasis and Responses	Ecology	Ecology
Content	-Photosynthesis equations -The uses of glucose -Factors affecting the rate	-Aerobic respiration -Anaerobic respiration -The effects of exercise -Metabolism	-The nervous system -Reflexes	-The endocrine system (glucose regulation, reproductive system)	-Ecosystems and sampling -Adaptations -Food chains -Cycles (water, carbon)	-Biodiversity and managing waste -Global warming -Conservation
Rationale/ Linking	Following on from the focus on organ systems from the organisation module in the second half of year 9, year 10 students initially refocus their attention back to a sub-cellular level by looking at the reactions of photosynthesis and respiration. This links back to, and builds upon, the work on mitochondria, chloroplasts and the cytoplasm covered at the start of cell Biology in year 9. Because students have covered the topics of the digestive, respiratory and circulatory system in year 9, they can now apply their new understanding of respiration to the effects that exercise has on these systems and again look at how adaptations of the organ systems help to ensure an efficient rate of respiration can occur. The bioenergetics module's key topics of photosynthesis, respiration and metabolism provides a strong foundation to study the importance of homeostasis in the correct functioning of organisms, as well as allowing students to recognise the vital importance and role of producers and photosynthesis when they study ecology later in year 10.		Studying homeostasis at the half-way point the students' journey through the GCSE Biology course allows students to make and consolidate strong links between a myriad of topics covered so far in years 9 and 10. For example, glucose regulation provides strong links to the work on respiration covered in the previous bioenergetics module, the kidneys allows us to recall and apply knowledge of osmosis from cell biology in year 9, and the topics of the endocrine system and thermoregulation relate well to the topic of circulation and bioenergetics from previous modules. In year 11 students will refer back to the importance of homeostasis when we look at the effects of disease and how this can disrupt the balance of conditions, for example when a fever occurs during our response to infection.		This is an appropriate point to widen students understanding in Biology beyond that of sub-cellular processes and the defined limits of individual organisms. Various topics link very well with content from earlier in the year 10 course (including the links between food chains and photosynthesis, and the carbon cycle and global warming to respiration). The Summer term is an ideal opportunity to carry out sampling techniques on the school fields where there are ideal conditions for there to be an abundance of several plant species.	
Assessment	Formal assessment – once per half term which includes an interim assessment part way into each topic and a final assessment for each topic. Y10 trial exams take place in the summer term. Regular informal assessment opportunities built into lessons and homework.			Learning Resources	**CGP revision guide** **Cognito Youtube channel** **GCSEPod** **Revision resources available on TEAMS**	

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Curriculum Overview for: Combined Science (Chemistry)

Key Stage 4 Academic Year Group: 10

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Bonding and Structure	Bonding and Properties of Matter	Rates of Reaction	Rates of reaction and equilibria	Chemical Analysis	Using the Earth's resources
Content	• Ionic bonding • Covalent Bonding • Metallic bonding and the properties of metals. • Using models and diagrams to represent bonding. • States of matter.	• Properties of ionic compounds and simple covalent molecules. • Giant covalent structures and the allotropes of carbon. • An introduction to polymers.	• Finding and calculating the rate of reaction. • Introduction to collision theory. • The effect of concentration, temperature, surface area, pressure on the rate of reaction.	• Rate of reaction required practical • The effect of a catalyst on the rate of reaction. • Reversible reactions and equilibria.	• Pure substances and formulations • Chromatography • Testing for common gases.	• Water treatment processes. • Distillation required practical • Lifecycle assessments and reducing our use of resources. • Alloys as useful materials • Ceramics, Polymers and composites
Rationale/ Linking	This topic provides a spiral learning opportunity to revisit the structure of the atom from the start of Y9 and provides a perfect chance for retrieval practice then moving on to application of atomic structure. Topic also provides explanations for all chemical reactions that will be learnt about during Y10 and Y11.	Using work on bonding from last half term students now use this knowledge to explain the properties of a range of substances and link this to their applications in the wider world.	Understanding collision theory and rates of reaction provides opportunities for spiral learning from the energy changes topic, getting students to consider what is happening in a chemical reaction on a particle level.	Using understanding from spring 1 to make predictions. Developing skills WS 1.2, 1.5, 2.1, 2.2, 2.3, 2.4, 2.6, 2.7 and all WS3 skills.	Students continue to build heavily of the practical skills from WS2 and 3 that were developed during the Spring term.	As part of this topic students will also spiral back to the impact of humans on the environment (from Y9 atmosphere) with a focus on sustainable living and reducing our use of resources.
Assessment	Formal assessment – once per half term which includes an interim assessment part way into each topic and a final assessment for each topic. Y10 trial exams take place in the summer term. Regular informal assessment opportunities built into lessons and homework.			**Learning Resources**	**GCSE AQA Chemistry Textbook. Practical resources for rates of reaction required practical and chemical analysis testing.**	

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Curriculum Overview for: Combined Science (Physics)

Key Stage 4 Academic Year Group: 10

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Forces and their influence on Motion	Analysis of Motion	Calculating Changes in Energy	Density and Thermal Energy	Electricity	Electricity
Content	-Newtons Laws -Acceleration -Terminal Velocity	-Motion graphs -Momentum and Collisions	Quantitative treatment of energy stores -Kinetic Energy Gravitational Energy Energy Transfers	-Density -Heat Capacity -Latent Heat -Conduction	-Factors Affecting Resistance -V-I Characteristics of components	-Energy transfers within circuits -Mains electricity and the National Grid.
Rationale/ Linking	Builds on Y9 work on forces with quantitative treatment of the material. Allows more difficult calculations to be introduced to build on prior work.	Builds on work from Autumn 1 to apply force and motion to more complex systems. Provides an opportunity to revisit stopping distances from Y9 through motion graphs.	Builds on Y9 work on energy stores to include equations to calculate changes in energy. As students now have developed greater confidence in using equations, they are in a much better position to excel on the more complex equations encountered in this topic.	By considering their KS3 work on matter and particles, coupled with their understanding developed from the Y10 topic on energy, students develop a deeper understanding of the energy changes that take place during heating and changes of state. This dovetails with opportunities to study matter and density in more detail.	Builds on Y9 study of electricity as well as providing foundation for Y11 study on electromagnetism. Having developed some understanding of simple circuits, current and PD in Y9, students are then able to apply this understanding to a range of more complext circuits and components. Completes the year by applying what has been learnt on circuits to real world applications to consider mains electricity and the national grid.	
Assessment	Formal assessment – once per half term which includes an interim assessment part way into each topic and a final assessment for each topic. Y10 trial exams take place in the summer term. Regular informal assessment opportunities built into lessons and homework.			**Learning Resources**	**GCSE AQA Physics Textbook.** **CGP revision guide** **Cognito website** **GCSEPod**	

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UTTOXETER LEARNING TRUST
INSPIRED TEACHING INSPIRING CHILDREN

Curriculum Overview for: Biology

Key Stage 4 Academic Year Group: 11

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Infection and Response	Infection and Response	Inheritance, Variation and Evolution	Inheritance, Variation and Evolution	Completion of course, revision and exams	
Content	-Communicable diseases -Defences against infection	-Vaccination and drug development	-Types of reproduction -DNA and the genome -Mendelian Inheritance	-Genetic technologies -Selective breeding -Natural selection -Classification -Extinction	Exam practice, review of required practical's and key content	
Rationale/ Linking	Students are required to build on from their understanding of cell types from year 9 and prior knowledge of bacterial replication through binary fission. The work on immunity links back to the ideas in year 9 and 10 that require an understanding of the key idea of specificity of shape in order for processes to work effectively (as exemplified in the lock and key model of enzyme activity in year 9, the role of neurotransmitters and receptors in year 10, and the mechanism of antibody/antitoxin complementarity with antigens in this current module.		This is a broad module in scope and content and allows opportunity throughout for highly relevant spiral learning and review. For example, the more in depth study of the DNA molecule and the work on reproduction and cell division links back to year 9's Cell Biology module. The section on evolution by natural selection requires prior knowledge and understanding from the Ecology module in year 10, and students recall the work from the Infection and Response module earlier in year 10 when looking at antibiotic resistance as evidence for evolution by natural selection.		Key content revision focuses on common areas of weakness that have been identified through class and trial assessments. Resources are provided for students to develop their factual recall of the content to ensure preparation of AO1 style questions. Students review the required practical's reinforce the disciplinary skills developed through the course. Continued focus on exam practice and technique to prepare students for the final exams, in particular AO2 and AO3 style questions.	
Assessment	Y11 Mock Exams in the Autumn Term – one full exam paper. Formal assessment – once per half term which includes an interim assessment part way into each topic and a final assessment for each topic. Regular informal assessment opportunities built into lessons and homework.		**Learning Resources**		**CGP revision guide** **Cognito Youtube channel** **GCSEPod** **Revision resources available on TEAMS**	

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Curriculum Overview for: Combined Chemistry

Key Stage 4 Academic Year Group: 11

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Quantitative Chemistry	Organic Chemistry	Chemical Changes	Chemical Changes	Completion of course, revision and exams	
Content	• Relative formula mass • Calculating concentrations	• Crude oil, hydrocarbons and fractional distillation. • Combustion and cracking.	• The reactions of metals including with acid and redox. • The reactivity series. • Extraction of metals by reduction.	• The pH scale neutralisation and salts. • Electrolysis	Exam practice, review of required practical's and key content	
Rationale/ Linking	Topic starts with spiralling back to atomic structure and the periodic table with students analysing information about subatomic particles from the periodic table. Students then use numeracy skills from maths with the introduction to quantitative calculations.	Students spiral learn from the using resources topic with the introduction of organic chemistry and processing and uses of crude oil (non-renewable resource). Combustion links to the changing atmosphere from Y9. Students also use skills from bonding to apply to hydrocarbons.	Spiralling round again from the using resources topic on alloys and corrosion students revisit the reactions and extractions of metals. Students also revisit displacement reactions that they first met in year 9 with the halogen displacement reactions.	Students draw on their knowledge from KS3 when studying the pH scale and neutralisation. Finally students learn about electrolysis which while conceptually challenging ties many other areas and gives an excellent opportunity to revisit many topics prior to starting formal class revision. For example atomic structure, energy changes (half equations), properties of ionic substances, sustainability, resources and extracting metals.	Key content revision focuses on common areas of weakness that have been identified through class and trial assessments. Resources are provided for students to develop their factual recall of the content to ensure preparation of AO1 style questions. Students review the required practical's reinforce the disciplinary skills developed through the course. Continued focus on exam practice and technique to prepare students for the final exams, in particular AO2 and AO3 style questions.	
Assessment	Y11 Mock Exams in the Autumn Term – one full exam paper. Formal assessment – once per half term which includes an interim assessment part way into each topic and a final assessment for each topic. Regular informal assessment opportunities built into lessons and homework.			**Learning Resources**	**GCSE AQA Chemistry Textbook. Practical resources for Neutralisation, Reduction, Extraction of Metals and Electrolysis**	

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Curriculum Overview for: Combined Science (Physics)

Key Stage 4 Academic Year Group: 11

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	The Atom and Radiation	Dangers and Applications of Nuclear Physics	Waves	Electromagnetism and Space	Completion of course, revision and exams	
Content	-History of the Atom -Radioactivity -Half Life	-Irradiation and Contamination -Nuclear Fission, Reactors and Fusion	-Wave Properties -Investigating - Waves -Uses and Dangers of the EM spectrum	Magnetic Fields -Electromagnetic Devices Solar Systema and Space	Exam practice, review of required practical's and key content	
Rationale/ Linking	Builds on work from Y9 chemistry, providing opportunity to revisit this topic.	Follows from Autumn 1 where students can use what they have learnt about radiation to discuss and explain its uses and dangers.	Builds on work on the EM spectrum covered in Y9 to give students a more detailed understanding of waves.	Builds on work from Y9 on magnetic fields (giving opportunity to revisit this) and Y10 electricity. Students then apply what they know about forces and motion to scenarios in space	Key content revision focuses on common areas of weakness that have been identified through class and trial assessments. Resources are provided for students to develop their factual recall of the content to ensure preparation of AO1 style questions. Students review the required practical's reinforce the disciplinary skills developed through the course. Continued focus on exam practice and technique to prepare students for the final exams, in particular AO2 and AO3 style questions.	
Assessment	Y11 Mock Exams in the Autumn Term – one full exam paper. Formal assessment – once per half term which includes an interim assessment part way into each topic and a final assessment for each topic. Regular informal assessment opportunities built into lessons and homework.			**Learning Resources**	**GCSE AQA Physics Textbook.** **CGP revision guide** **Cognito website** **GCSEPod**	