

## Year 9 Curriculum Intent 2022-2023

### Year 9 Biology

Topic	Key Knowledge <i>What will all students KNOW by the end of the topic?</i>	Key Skills <i>What key skills will be learnt/developed by the end of the topic? What will all students be able to DO by the end of the topic?</i>	Assessment Opportunities <i>What are the key pieces of assessment? How will students be assessed?</i>	Links to prior and future knowledge
Cell Biology	<ul style="list-style-type: none"> <li>• Structure of eukaryotic cells: plant and animal cells</li> <li>• Function of cell organelles.</li> <li>• How to calculate order of magnitude.</li> <li>• How specialised cells are adapted to their function.</li> <li>• The importance of cell differentiation.</li> <li>• Stem Cells – functions, location and potential uses including therapeutic cloning</li> <li>• Structure of prokaryotic cells</li> <li>• <i>Cultural/ calendar appropriate lessons (Hallowe'en) to learn about the skeletal system including names and how muscles work</i></li> <li>• Different microscopy techniques to include light and</li> <li>• electron microscopes.</li> <li>• The difference between magnification and resolution.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify, draw, label and interpret cell images.</li> <li>• Build on experimental skills ready for KS4- Use a light microscope to observe, draw and label plant and animal cells</li> <li>• Build on microscopy skills from Year 7.</li> <li>• Evaluation skills e.g. pros and cons of the uses of different types of stem cells.</li> <li>• Consider the ethical implications of using stem cells.</li> <li>• Cell calculations using the magnification equation</li> <li>• Use of prefixes such as nano, micro, milli and conversions between units. To include use of standard form.</li> <li>• Use of models and analogies for cell division.</li> </ul>	<p>-Studying plant cells practical sheet and drawing in C/W and finish questions for H/W</p> <ul style="list-style-type: none"> <li>○ Plant cells</li> <li>○ Microscopy</li> <li>○ Practical skills</li> </ul> <p>- 2 x knowledge organiser test on cells topic spread across lessons 2 to 10</p> <ul style="list-style-type: none"> <li>○ Recall key terminology</li> </ul> <p>-Therapeutic cloning order of stages and embryonic vs adult stem cells: advantages vs disadvantages</p> <p>-Prokaryote vs eukaryote comparison extended writing question</p>	<p>Year 7 &amp; 8</p> <ul style="list-style-type: none"> <li>- Cell structure – animal, plant, specialised, bacteria and fungi</li> <li>- Structural hierarchy</li> <li>- Structure of DNA</li> <li>- Diffusion</li> </ul> <p>GCSE</p> <ul style="list-style-type: none"> <li>• AQA cell biology</li> </ul>

	<ul style="list-style-type: none"> <li>• Where DNA is found in the cell</li> <li>• The 3 main stages of the cell cycle, including mitosis.</li> <li>• How substances are transported in and out of cells by diffusion</li> <li>• Factors that affect the rate of diffusion including concentration gradients, temperature, and presence of a membrane/barrier.</li> <li>• Specific examples of where diffusion occurs in organisms</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise, draw, and interpret diagrams modelling diffusion</li> <li>• Apply knowledge of diffusion to real life examples</li> </ul>	<ul style="list-style-type: none"> <li>-Microscopy calculations in class and homework task</li> <li>-Diffusion show my homework quiz</li> <li>-Diffusion mini practical written conclusions</li> <li>-Year 9 Biology assessment in November</li> </ul>	
<p>Organisation: Tissues, Organs, and Organ Systems</p>	<ul style="list-style-type: none"> <li>• How cells, tissues, organs and organ systems relate to each other.</li> <li>• Structure and function of the human digestive system</li> <li>• Structure and function of enzymes</li> <li>• Which enzymes are responsible for digestion of each biological molecule, the products and where they are found in the body</li> <li>• The role of bile in lipid digestion</li> <li>• Structure and function of the human heart</li> <li>• Structure and function of blood vessels.</li> <li>• Components and functions of the blood.</li> <li>• Role of natural and artificial pacemakers.</li> </ul> <p><i>- Causes and treatments for coronary heart disease (related to cultural topic of valentine's day lesson and reference to non-communicable disease for next topic)</i></p>	<ul style="list-style-type: none"> <li>• Understanding of the hierarchy that our bodies and other multicellular organisms are built upon</li> <li>• Identify parts of the digestive system both those that come directly and indirectly into contact with food</li> <li>• Creating models to explain the lock and key theory of enzyme activity for specificity</li> <li>• How to safely carry out a heart dissection</li> <li>• Compare blood vessels to identify differences between all 3 types</li> <li>• Evaluate the pros and cons of different heart disease treatments including stents, biological and mechanical valves and pacemakers.</li> <li>• Analyse data to draw conclusions.</li> <li>• Identify key parts of the respiratory system in a lung dissection demo</li> </ul>	<ul style="list-style-type: none"> <li>-Practice exam questions on digestion (homework)</li> <li>-2 x knowledge organiser test (2 separate KO's) for organisation topic</li> <li>-Observations of heart dissection and written risk assessment by individuals</li> <li>- Blood vessels extended writing task</li> <li>-Ongoing SMH quizzes</li> <li>-Year 9 Biology assessment in February</li> </ul>	<p>Year 7 and 8</p> <ul style="list-style-type: none"> <li>- Structural hierarchy</li> <li>- Digestive system</li> </ul> <p>GCSE</p> <ul style="list-style-type: none"> <li>• AQA organisation</li> </ul>

	<ul style="list-style-type: none"> <li>• Structure and function of the respiratory system - The mechanisms of breathing</li> </ul>			
Infection and Response	<ul style="list-style-type: none"> <li>• The relationship between health and disease</li> <li>• Knowledge of examples of communicable diseases e.g., types of pathogens, spread of disease, symptoms, prevention and treatments <ul style="list-style-type: none"> <li>- First and second line of defence/Role of white blood cells</li> </ul> </li> <li>• Examples of sexually transmitted infections and ways reduce the spread</li> <li>• Immunity and vaccines</li> <li>• Use of painkillers and antibiotics and introduction as to how antibiotic resistance can occur.</li> <li>• The difference between communicable and non-communicable diseases. <ul style="list-style-type: none"> <li>- The effect of lifestyle on disease</li> <li>- Risk factors for diseases</li> </ul> </li> <li>• - Knowledge of what cancer is – types and risk factors <ul style="list-style-type: none"> <li>- Process involved in drug development and clinical trials.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Analyse and interpret disease incidence information from graphs</li> <li>• Research skills for finding out about different communicable disease examples</li> <li>• Apply key terminology from the immunity topic to practice questions</li> <li>• Interpret graphs for antibodies based on primary and secondary infections</li> <li>• Evaluate the pros and cons of vaccines and the idea of herd immunity (inc. a discussion about the MMR debate from the 80s/90s)</li> <li>• Explain the concern with overusing antibiotics in medical care</li> <li>• Analyse and interpret data on risk factors and make valid judgements</li> <li>• Develop awareness of the difference between correlation and causation</li> <li>• Appreciate the difference between benign and malignant tumours based on localisation or metastasis</li> <li>• Understand the ethical issues associated with drug trials including animal testing as well as the risks <ul style="list-style-type: none"> <li>- Explain how bias is eliminated in double blind trials and understand the importance of peer review and ongoing monitoring</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>-Poster/ Leaflet detailing research completed of each students assigned communicable disease</li> <li>- 2 x knowledge organiser tests on infection and response topic</li> <li>-Practice exam questions on communicable diseases topic covered as far as vaccines lesson</li> <li>-Analysing data in the lesson on graphs for risk and correlation and also information about antibiotic resistance</li> <li>-Drug development quiz on SMH</li> <li>- Year 9 Biology assessment in June</li> </ul>	<p>Year 7 and 8</p> <ul style="list-style-type: none"> <li>- Cells</li> </ul> <p>GCSE</p> <ul style="list-style-type: none"> <li>• AQA infection and response</li> </ul>
Infection and Response				

## Year 9 Chemistry

Topic	Key Knowledge <i>What will all students KNOW by the end of the topic?</i>	Key Skills <i>What key skills will be learnt/developed by the end of the topic? What will all students be able to DO by the end of the topic?</i>	Assessment Opportunities <i>What are the key pieces of assessment? How will students be assessed?</i>	Links to prior and further knowledge
Atomic structure and the Periodic Table	<ul style="list-style-type: none"> <li>• A simple model of the atom</li> <li>• The development of the model of the atom including:               <ul style="list-style-type: none"> <li>○ The Dalton Model</li> <li>○ The plum pudding model</li> <li>○ The nuclear model and</li> <li>○ The Bohr model including associated evidence</li> </ul> </li> <li>• The difference between atoms, elements and compounds</li> <li>• Sizes, locations, masses and charges of sub-atomic particles including relative atomic mass in elements, ions and isotopes</li> <li>• The electronic structure(s) of elements and ions up to and including calcium</li> <li>• How chemical reactions are represented using word and symbol equations</li> <li>• The development of the periodic table</li> <li>• The structure of the modern periodic table</li> <li>• The chemistry of the elements of:               <ul style="list-style-type: none"> <li>○ Group 1</li> <li>○ Group 7</li> <li>○ Group 0</li> </ul> </li> <li>• Properties of some of the transition metals</li> </ul>	<ul style="list-style-type: none"> <li>• Fluency in the use of IUPAC nomenclature regarding element symbols, atomic numbers and mass numbers and electronic structures.</li> <li>• Construction and use of word and symbol equations.</li> <li>• Explaining how new evidence can lead to changes in accepted models.</li> <li>• Application of key mathematical skills: calculating numbers of subatomic particles, the relative size of atoms, using extremely small and large numbers and the associated use of standard form, SI units and standard prefixes</li> <li>• Fluency in the use of IUPAC nomenclature regarding element symbols and electronic structures.</li> <li>• Construction and use of word and symbol equations.</li> <li>• Explaining how new evidence can lead to changes in accepted models.</li> </ul>	<p>History of the atom Exam Questions TA (hw)</p> <ul style="list-style-type: none"> <li>○ PPQ exam practice</li> <li>○ History of the atom</li> </ul> <p>Knowledge organiser test L5 PA (cw)</p> <ul style="list-style-type: none"> <li>○ Recall key terminology</li> </ul> <p>Group 0 SA (cw)</p> <ul style="list-style-type: none"> <li>○ Numbers of subatomic particles</li> <li>○ Group 0 properties</li> </ul> <p>PPQ cw PA</p> <ul style="list-style-type: none"> <li>• Halogens</li> </ul> <p>Transition metals HW TA (cw)</p> <ul style="list-style-type: none"> <li>○ Transition metal properties</li> </ul> <p>Elements, mixtures, compounds SMH</p> <ul style="list-style-type: none"> <li>• Identification</li> </ul> <p>General Non-formal</p> <ul style="list-style-type: none"> <li>• Homework</li> <li>• Starter tasks interleaving past knowledge</li> <li>• PPQ</li> <li>• AfL throughout lessons</li> </ul>	<p>Year 7 and 8</p> <ul style="list-style-type: none"> <li>- Atom structure</li> <li>- Elements and compounds</li> <li>- Word equations</li> <li>- Development of the periodic table</li> <li>- Properties of groups</li> </ul> <p>GCSE</p> <ul style="list-style-type: none"> <li>• AQA – atomic structure and the periodic table</li> </ul>

<p>Chemical Analysis</p>	<ul style="list-style-type: none"> <li>○ Physical separation processes including: <ul style="list-style-type: none"> <li>○ Filtration, simple and fractional distillation and chromatography</li> </ul> </li> <li>○ The difference between pure substances and mixtures and formulations</li> <li>○ The gases: <ul style="list-style-type: none"> <li>○ Hydrogen</li> <li>○ Oxygen</li> <li>○ Carbon dioxide and</li> <li>○ Chlorine <ul style="list-style-type: none"> <li>▪ can be identified by simple laboratory tests and the positive test results for these gases</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ Be able to explain how chromatography separates mixtures.</li> <li>○ Interpretation of chromatograms Describing how to carry out tests for gases</li> <li>○ Application of key mathematical skills:</li> <li>○ Calculating Rf values or distances moved by a solvent or a substance during chromatography.</li> <li>○ Practical skills and development and apparatus use: Setting up running paper chromatography</li> </ul>	<p>Distillation extended writing TA (cw)</p> <ul style="list-style-type: none"> <li>○ Distillation</li> <li>○ Literacy</li> </ul> <p>Knowledge organiser Test L15 PA (cw)</p> <ul style="list-style-type: none"> <li>○ Recall key terminology</li> </ul> <p>Tests for gases SMH</p> <ul style="list-style-type: none"> <li>• Tests for gases</li> </ul> <p>Exam Questions SA (cw) (Not formal assessment)</p> <ul style="list-style-type: none"> <li>○ Separation techniques</li> </ul> <p>General Non-formal</p> <ul style="list-style-type: none"> <li>• Homework</li> <li>• PPQ</li> <li>• AfL throughout lessons</li> </ul>	<p>Year 7 and 8</p> <ul style="list-style-type: none"> <li>- Separation techniques</li> <li>- Gas tests</li> </ul> <p>GCSE</p> <ul style="list-style-type: none"> <li>• AQA chemical analysis</li> </ul>
<p>Chemistry of the atmosphere</p>	<ul style="list-style-type: none"> <li>• The carbon cycles</li> <li>• The theory of how the Earth's early atmosphere was generated, how it has changed and what has and is currently changing it.</li> </ul> <p>Specifically:</p> <ul style="list-style-type: none"> <li>○ Combustion reactions</li> <li>○ Carbon dioxide production</li> <li>○ Other pollutants</li> <li>○ Locking up in rocks and the ocean</li> <li>○ Photosynthesis</li> </ul> <ul style="list-style-type: none"> <li>• The proportions of the different gases in the atmosphere</li> <li>• Principles behind the greenhouse effect</li> </ul>	<ul style="list-style-type: none"> <li>• Recall key terminology</li> <li>• Create a cycle to show the flow of carbon throughout a system</li> <li>• Explaining how (new) evidence can lead to changes in and/or re-enforcement of accepted models.</li> <li>• Be able to evaluate the quality of evidence</li> <li>• Be able to describe uncertainties in evidence</li> <li>• Be able to describe how a range of pollutants are formed and predict the products of combustion reactions</li> <li>• Be able to describe and explain the problems caused by increased levels of pollutants</li> </ul>	<p>SMH Quiz</p> <ul style="list-style-type: none"> <li>• Combustion</li> <li>• Changing atmosphere</li> <li>• Carbon footprint</li> <li>• Greenhouse Gases</li> <li>• Pollution</li> </ul> <p>PPQ (cw)</p> <ul style="list-style-type: none"> <li>• Chemistry of the atmosphere</li> </ul> <p>General Non-formal</p> <ul style="list-style-type: none"> <li>• Homework</li> <li>• Starter tasks interleaving past knowledge</li> <li>• PPQ</li> <li>• AfL throughout lessons</li> </ul>	<p>Year 7</p> <ul style="list-style-type: none"> <li>• Renewable and Non-Renewable Energy Sources</li> </ul> <p>Year 8</p> <ul style="list-style-type: none"> <li>• Combustion</li> <li>• Respiration</li> <li>• Photosynthesis</li> </ul> <p>GCSE AQA Chemistry of the Atmosphere</p>

	<ul style="list-style-type: none"> <li>• How human activities contribute towards the greenhouse effect</li> <li>• Principles behind and effects of climate change</li> <li>• The definition of a carbon footprint, how its value is arrived at and how it can be reduced</li> <li>• A range of common atmospheric pollutants, their sources and effects</li> </ul>	<ul style="list-style-type: none"> <li>• Be able to describe effects of global climate change</li> <li>• Be able to discuss the scale, risk and environmental implications of climate change</li> <li>• Be able to describe actions to reduce greenhouse gas emission but also why these may be limited</li> </ul>		
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### Year 9 Physics

<b>Topic</b>	<b>Key Knowledge</b> <i>What will all students KNOW by the end of the topic?</i>	<b>Key Skills</b> <i>What key skills will be learnt/developed by the end of the topic? What will all students be able to DO by the end of the topic?</i>	<b>Assessment Opportunities</b> <i>What are the key pieces of assessment? How will students be assessed?</i>	<b>Links to prior and further knowledge</b>
<b>Energy</b>	<ul style="list-style-type: none"> <li>• Quantifying changes in energy stores using conservation of energy</li> <li>• Describing increases and decreases in the amounts of energy associated with movement, temperature, position in field (GPE) and elastic distortions</li> <li>• Power as the rate of doing work OR the rate of energy transfer</li> </ul> Main energy resources <ul style="list-style-type: none"> <li>• Renewable &amp; non-renewable</li> <li>• Energy resources are used for transport, heating &amp; electricity generation</li> <li>• Economic, social, ethical &amp; political, issues</li> </ul>	<ul style="list-style-type: none"> <li>• Be able to use energy equations (work done, EPE)</li> <li>• Be practise using equations</li> <li>• SI units</li> <li>• Use of multipliers (especially kJ and kW)</li> <li>• Identify patterns &amp; trends in data given in graphical and tabula form</li> <li>• Developing a line of argument using advantages and disadvantages of different energy resources</li> </ul>	Questioning in classes Marking of work in books Energy Stores SMH quiz Conservation of Energy SMH Quiz KO Test Renewable Energy Assessed Task Questions in Autumn Assessment	Year 7 and 8 - Energy topic GCSE AQA Energy
<b>Electricity</b>	<ul style="list-style-type: none"> <li>• Circuit symbols, current &amp; potential difference</li> <li>• Series &amp; parallel circuits</li> <li>• Required practical 4 – IV graphs (in 3 parts – resistor, filament lamp &amp; diode)</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise &amp; recall circuit symbols</li> <li>• Draw simple circuits including the positioning of voltmeters &amp; ammeters</li> <li>• Building simple circuits</li> </ul>	Questioning in classes Marking of work in books Circuits and Current SMH quiz Electricity practical Write up Quiz	Year 7 and 8 - Electricity GCSE AQA Electricity

	<ul style="list-style-type: none"> <li>- Ohm's law &amp; resistance</li> </ul>	<ul style="list-style-type: none"> <li>Calculations involving current, energy, charge, p.d. &amp; time</li> <li>Use of models to understand the unobservable</li> <li>Building more complex circuits &amp; taking measurements</li> <li>Plot and draw appropriate graphs selecting appropriate scales for the axes.</li> <li>- Lines of best fit</li> </ul>	Ohms Law SMH Quiz	
<b>Forces</b>	<ul style="list-style-type: none"> <li>What are forces?</li> <li>Contact &amp; non-contact forces</li> <li>Freebody diagrams</li> <li>Weight, mass &amp; gravity</li> <li>Forces &amp; elasticity</li> <li>Required Practical 6-Force &amp; extension for a spring</li> <li>Hooke's Law</li> <li>- Concept of directly proportionality</li> </ul>	<ul style="list-style-type: none"> <li>Draw free body diagrams of forces acting on an object - Practical skills in relation to measuring mass &amp; weight and using appropriate values to calculate g</li> <li>Recognition of variables that are directly proportional from data in a table &amp; from a graph <ul style="list-style-type: none"> <li>- Recognition of when direct proportionality reaches a limit</li> <li>- Plot and draw appropriate graphs selecting appropriate scales for the axes.</li> </ul> </li> <li>- Lines of best fit</li> </ul>	Questioning in classes Marking of work in books Contact and Non-contact Force SMH quiz KO Quiz Hooke's Law SMH Quiz	Year 7 and 8 - Forces GCSE AQA Forces
<b>Particles in Matter</b>	Density differences between solids, liquids & gases <ul style="list-style-type: none"> <li>Use of the equation density = mass/volume (including rearranging)</li> <li>How to determine the density of regular and irregular shaped objects and liquids experimentally (GCSE Required Practical 3) <ul style="list-style-type: none"> <li>Differences in arrangement, motion &amp; spacing of particles in solids, liquids and gases</li> </ul> </li> <li>The particle model of matter to explain density of materials. <ul style="list-style-type: none"> <li>Changes of state including heating &amp; cooling curves</li> </ul> </li> </ul>	Use of formulae in calculations <ul style="list-style-type: none"> <li>Calculations involving rearranging</li> <li>Use of correct units</li> <li>Ensuring that units match (e.g., the need to convert between g &amp; kg if density is given in kg/m<sup>3</sup> and mass in g)</li> <li>Converting between cm &amp; m; g &amp; kg</li> </ul> Use of formulae in calculations <ul style="list-style-type: none"> <li>Calculations involving rearranging</li> <li>Use of correct units</li> <li>Ensuring that units match (e.g., the need to convert between J &amp; kJ if SHC or SLH given in kJ/kg°C and energy in J)</li> </ul>	Questioning in classes Marking of work in books KO Quiz Write up of Specific Heat Capacity Practical	Year 7 and 8 - Matter GCSE AQA Particle Model

	<ul style="list-style-type: none"> <li>• Internal energy of a system</li> <li>• Specific heat capacity.</li> <li>• Describing increases and decreases in the amounts of energy associated with temperatures</li> <li>• Specific latent heat</li> </ul>			
<b>Atomic Structure</b>	<ul style="list-style-type: none"> <li>• Atoms &amp; isotopes</li> <li>• - Radioactive decay &amp; nuclear radiation</li> </ul>	Recall the history of the atom Describe how the model of the atom developed Recall key terminology including the nature of alpha, beta & gamma decay Balance nuclear equations	Questioning in classes Marking of work in books Alpha, Beta Gamma SMH quiz	Year 7 and 8 - Periodic Table - Electricity GCSE AQA Atomic Structure

**Assessment:** Year 9 students will be assessed throughout the year through summative and formative assessments

- Formative assessments are more diagnostic than evaluative and allows to monitor pupil learning style and ability, to provide ongoing feedback and allow us to improve and adjust our teaching methods to help students progress. These may take the form of, but are not limited to:
  - Questioning in class
  - Impromptu quizzes
  - Prepare for Learning and Review Activities
  - Monitoring of class work and homework
  - Peer Review
  - Self-Assessment
- Our summative assessments aim to evaluate student learning and academic achievement. These assessments will also allow us to provide feedback and help improve the students progress throughout their education at All Hallows. These assessments in year 9 will take the form of:
  - Six synoptic assessments made using GCSE style questions. One for each branch of Science will be completed in January and one in May
  - A portfolio of data taken from the activities mentioned in the “Assessment Points” column below

**Assessments:**

Subject	January Assessment	May Assessment
Biology	<ul style="list-style-type: none"> <li>• Cell Biology Topic</li> </ul>	<ul style="list-style-type: none"> <li>• Organisation Topic</li> <li>• Cell Biology Topic</li> </ul>
Chemistry	<ul style="list-style-type: none"> <li>• Elements, mixtures and Compounds</li> <li>• Chemical Analysis Topic</li> <li>• History and Structure of the Atom</li> </ul>	<ul style="list-style-type: none"> <li>• Periodic Table Topic</li> <li>• Atomic Structure Topic</li> <li>• Chemical Analysis Topic</li> </ul>
Physics	<ul style="list-style-type: none"> <li>• Energy Topic</li> <li>• Particle Model Topic</li> </ul>	<ul style="list-style-type: none"> <li>• Electricity Topic</li> <li>• Forces Topic</li> </ul>



		<ul style="list-style-type: none"><li>• Energy Topic</li><li>• Particle Model Topic</li></ul>
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