

[Science] [Year 9] Curriculum Map



YEAR 9	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Curriculum Content	<p><u>Composite: Understand the early atmosphere and how the Earth has changed over time.</u></p> <p>Component 1: CC</p> <ul style="list-style-type: none"> Know the composition of the Earth's earliest atmosphere. Know why Earth's early atmosphere was mainly carbon dioxide and how the oceans formed <p>Component 2: CC</p> <ul style="list-style-type: none"> Know how the amount carbon dioxide in the atmosphere decreased. Know how the amount of oxygen in the atmosphere increased. <p>Component 3: CCC</p> <ul style="list-style-type: none"> Know the current composition of the Earth's atmosphere. Know the natural factors which affect this composition. Know how human activity affects this composition. <p>Component 4: CC</p> <ul style="list-style-type: none"> Know the structure of the Earth and where rocks come from. Know why rocks are useful and Know some features of different types of rock. Know various rocks and classify them into groups based on their characteristics. Give examples of each. <p><u>Composite: Understand the process of weathering</u></p>	<p><u>Composite: Understand how speed is measured and how this affects motion.</u></p> <p>Component 1: CC</p> <ul style="list-style-type: none"> Know how to calculate speed. Know the units needed for speed. Know the difference between speed and velocity. Know relative motion <p>Component 2: CC</p> <ul style="list-style-type: none"> Interpret distance-time graphs. Know the motion of an object using a distance time graph. Know how to calculate speed using a distance-time graph <p>Component 3: CC</p> <ul style="list-style-type: none"> Know what gas pressure is and give examples of where it can be seen. Know the factors that effect gas pressure. Know how atmospheric pressure changes with altitude <p>Component 4: CC</p> <ul style="list-style-type: none"> Know what liquid pressure is. Know the factors that affect liquid pressure. Know why some objects float and sink <p>Component 5: CC</p> <ul style="list-style-type: none"> Know what pressure is Know how to calculate pressure. Understand how pressure affects different situations. 	<p><u>Composite: Understand the theory of evolution through natural selection.</u></p> <p>Component 1: CCC</p> <ul style="list-style-type: none"> Know the differences between species Know the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation Know the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection <p>Component 2 CCC</p> <ul style="list-style-type: none"> Know the changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction <p>Component 3: CCC</p> <ul style="list-style-type: none"> Know the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material. 	<p>Building on KS3 knowledge students will begin to explore the key concepts of energy, cells, and atoms in more detail in preparation for GCSE in year 10</p> <p><u>Composite: Understand the energy changes in a system before and after such changes.</u></p> <p>Component 1: CC</p> <ul style="list-style-type: none"> Know the energy changes in a system, and the ways energy is stored before and after such changes. <p>Component 2: C</p> <ul style="list-style-type: none"> Know how to construct Sankey diagrams and calculate efficiency of electrical appliances. <p>Component 3: CC</p> <ul style="list-style-type: none"> Know how energy is conserved and dissipated <p>Component 4: CC</p> <ul style="list-style-type: none"> Know how to calculate work done and power Know the factors that affect work <p>Component 6: CC</p> <ul style="list-style-type: none"> Know how to calculate energy efficiency for any energy transfer <p>Building on KS3 knowledge on atoms, elements and compounds</p> <p><u>Composite: Understand the Atomic structure and the periodic table</u></p>	<p>Building on KS3 knowledge students will explore cells in more depth</p> <p><u>Composite: Understand how structural differences between types of cells enables them to perform specific functions within the organism.</u></p> <p>Component 1: CC</p> <ul style="list-style-type: none"> Know how to calculate the size and scale of cells, tissues, organs, organ systems and organisms. Know the main systems in the human body and their functions. <p>Component 2: CC</p> <ul style="list-style-type: none"> Know the main organelles in an animal and plant cell and describe their function Describe the order of size of: cell, nucleus, chromosome and gene <p>Component 3: CCC</p> <ul style="list-style-type: none"> Know how to calculate the magnification of a light microscope. Know how to carry out calculations using the formula: real size = (image size)/magnification Know how to rearrange the equation to calculate image size or magnification. Know how to convert values for the units: cm, mm, μm and nm. Know where the site of aerobic respiration occurs and give examples of cells that contain a lot of mitochondria. 	<p>Component 7: CCC</p> <ul style="list-style-type: none"> Know how stem cells could be used to help treat some medical conditions. Know the risks and benefits, as well as the social and ethical issues concerning the use of stem cells from embryos in medical research and treatments. <p>Component 8: CC</p> <ul style="list-style-type: none"> Know what a chromosome is and where chromosomes are found in the cell. Know how cells divide through mitosis and label diagrams to represent this. <p>Component 10: CC</p> <ul style="list-style-type: none"> Know the main organs of a plant and describe their functions. Know the tissues in a leaf and describe their functions. Relate the structure of each tissue to its function in photosynthesis. <p>Component 11: CCC</p> <ul style="list-style-type: none"> Know the word and symbol equation for photosynthesis Know why photosynthesis is important for the survival of other organisms. Know the need for light, carbon dioxide and chlorophyll to make glucose and how to investigate this. Know why plants should be de-starched before photosynthesis

and how rocks can change their formation through the rock cycle.

Component 1: C

- **Know** what the term porous means.
- **Know** examples of porous and non-porous rocks.
- **Know** rock samples and test them for their porosity

Component 2 : C

- **Know** some names of sedimentary rocks, metamorphic rocks and igneous rocks
- **Know** a sedimentary rock, metamorphic and igneous rock from its features
- **Know** how sedimentary rocks, metamorphic and igneous rocks are made,

Component 3: C

- **Know** that weathering is the wearing away of rocks and breaks it down into smaller bits.
- **Know** the 3 different types of weathering.
- **Know** how the various types of weathering break down rocks.

Component 4: C

- Know that volcanoes are the source of igneous rocks.
- Know the cross section of a volcano.
- Know how volcanoes are formed

Component 5: C **Know** the gas in air that makes rain more acidic than normal.

- **Know** the effects of acid rain on different types of rock.
- **Know** how pollution causes acid rain.

Component 6: CC

- **Know** stages of the carbon cycle.

Component 6: CC

- Know what is meant by a moment.
- Complete practical work safely to collect data.
- Know how to calculate the moment of a force.

Composite: Understand how the reactivity series was formed and be used to predict metal reactions.

Component 1: CC

- Know how some common metals react with water, oxygen and acid.
- Know how to deduce an order of reactivity of metals based on experiments.

Component 2: CC

- Know the position of carbon and hydrogen in the reactivity series and how to predict displacement reactions.

Component 3: CC

- Know the different processes for extracting metals.

Composite: Understand the structure of DNA and how we inherit our characteristics

Component 1: CC

- Know heredity as the process by which genetic information is transmitted from one generation to the next

Component 2: CCC

- Know the simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model

Composite: Understand how species are interdependent and Interact within an Environment

Component 1: CCC

- Know the importance of ecosystems
- Know how changing abiotic factors can affect an ecosystem
- Know how plants carry out photosynthesis and how plants use glucose and minerals for growth.

Component 2: CC

- Know what chemosynthesis is and how it affects an ecosystem
- Know how organisms respire both aerobically and anaerobically
- Know the process of fermentation.

Component 3: CC

- Know how to construct food chains
- Know organism relationships from food webs
- Know the relationship between predator and prey populations
- Know what pyramids for food chains can represent

Composite: Understand the process of energetics and how it relates to animals and plants.

Component 1: CCC

- Know the reactants in, and products of, photosynthesis, and a word summary for photosynthesis
- Know the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants

Component 1: CC

- Know the structure of atoms and use a range of different models to describe both the atoms themselves and the physical and chemical properties of the elements and compounds they form.

Component 2: CC

- Know how atomic models have developed along with data that have helped shape the periodic table we know today.

Component 3: CC

- Know how to write up word equations for chemical reactions
- Know how to write symbol equations for the same reactions.

- Know how to balance symbol equations

Component 4: CC

- Identifying the elements within compounds produce within chemical reactions.

Component 5:

- Develop practical investigative skills by carrying out an investigation.

Component 4: CC

- Know that all animals and plants produce carbon dioxide and water all the time as a by-product of aerobic respiration.
- Know what organisms need energy for.
- Know the tests for carbon dioxide and water.
- Know the site of aerobic respiration and be able to give examples of cells that contain a lot of mitochondria

Component 5: CCC

- Know the different factors that affect the rate of diffusion
- Know and apply knowledge of diffusion to practicals that investigate the factors

Component 6: CC

- Know the terms 'catalyst' and 'enzyme'.
- Know the properties of enzymes.
- Know why enzymes are specific and are denatured by high temperatures and extremes of pH.
- Know the lock and key theory and collision theory to explain enzyme action.

- experiments and describe how this is done.
- Know experiments that can show that plants produce oxygen in the light

Revision

End of year test

	<ul style="list-style-type: none">• Know how carbon is recycled in nature.• Know how human activity is upsetting the 'balance' of carbon		<p>and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere</p> <ul style="list-style-type: none">• Know the adaptations of leaves for photosynthesis. <p>Component 2: CC</p> <ul style="list-style-type: none">• Know aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life• Know how to represent aerobic respiration using the word equation• Know the process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration• Know the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism.			
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<p>Prior knowledge and skills (from previous year / key stage)</p>	<p>Early atmosphere</p> <ul style="list-style-type: none"> Students will have looked at how burning fossil fuels contribute towards global warming <p>Rocks</p> <ul style="list-style-type: none"> Students will have done some work on rocks and rock formation in KS2 compare and group together different kinds of rocks on the basis of their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock recognise that soils are made from rocks and organic matter 	<p>Speed and motion</p> <ul style="list-style-type: none"> Student will have looked at forces and how they affect objects Students will have looked at balanced and unbalanced forces and naming some of the opposing forces on an object. Student will have looked at how speed can be measured in KS2 <p>Reactivity series:</p> <ul style="list-style-type: none"> Students will have looked at properties of metals and non-metals within year 7 and 8 and will have looked at how chemical reactions take place between elements. <p>DNA and Inheritance:</p> <ul style="list-style-type: none"> Students will have studied reproduction and how characteristics come from your parents which produced variation. 	<p>Evolution</p> <ul style="list-style-type: none"> recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution <p>Ecosystems:</p> <ul style="list-style-type: none"> Students will have already looked at animals and plants and how they are adapted to their habitat in KS2 Students will have looked at food chains and food webs in some detail at KS2. <p>Energetics:</p> <ul style="list-style-type: none"> Students will have touched upon how animals and plants respire and will know that in order for plants to produce food they carry out a process called photosynthesis. 	<p>Energy :</p> <ul style="list-style-type: none"> Students should recognise the different types of energy and how energy is transformed. Students will have covered efficiency and how to calculate efficiency of appliances along with the use of Sankey diagrams. Students will have covered the difference between non-renewable and renewable energy and how electricity is generated. <p>Atomic structure:</p> <ul style="list-style-type: none"> Students should recognise the term atom and the arrangement of subatomic particles. Students should have an awareness of the Periodic Table and how it is arranged Students will be able to describe methods to separate a mixture (filtration, evaporation, crystallisation, distillation) and the principles behind each method. 	<p>Cells :</p> <ul style="list-style-type: none"> Students will have gone through the basic similarities and differences between animal and plant cells. Students will have gone through some specialised cells in year 7 Students will have had a go at microscopes and observing cells such as onion cells. Students will have touched on diffusion and how particles move from high to low concentration. 	<p>Cells :</p> <ul style="list-style-type: none"> Students will have gone through the basic similarities and differences between animal and plant cells. Students will have gone through some specialised cells in year 7 Students will have had a go at microscopes and observing cells such as onion cells. Students will have touched on diffusion and how particles move from high to low concentration.
<p>Core Knowledge Organiser content</p>	<p>Core questions with answers will be given to students at the beginning of each unit.</p>	<p>Core questions with answers will be given to students at the beginning of each unit.</p>	<p>Core questions with answers will be given to students at the beginning of each unit.</p>	<p>Core questions with answers will be given to students at the beginning of each unit.</p>	<p>Core questions with answers will be given to students at the beginning of each unit.</p>	<p>Core questions with answers will be given to students at the beginning of each unit.</p>

<p>Assessment Objectives</p>	<p>A01: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. A02: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. A03: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions</p>	<p>A01: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. A02: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. A03: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions</p>	<p>A01: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. A02: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. A03: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions</p>	<p>A01: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. A02: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. A03: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions</p>	<p>A01: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. A02: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. A03: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions</p>	<p>A01: Demonstrate knowledge and understanding of: 1) scientific ideas 2) scientific techniques and procedures. A02: Apply knowledge and understanding of: 1) scientific ideas 2) scientific enquiry, techniques and procedures. A03: Analyse information and ideas to: 1a) interpret 1b) evaluate 2a) make judgements 2b) draw conclusions</p>
<p>Vocabulary/Key subject terminology</p>	<p><u>The Earth keywords</u> Crust Mantle Core Outer Core Inner Core Atmosphere Troposphere Uplift Respiration Combustion Photosynthesis Dissolving Carbon Cycle Carbon Store Climate Change Deforestation Radiation Greenhouse Effect Greenhouse Gases/ Global warming</p> <p><u>Rocks</u> Sedimentary Igneous Metamorphic Porous Weathering Sediment Physical Weathering Freeze-Thaw Chemical Weathering Biological Weathering</p>	<p><u>Speed and Motion keywords</u> Speed Distance Time Metres Motion Relative Pressure Newton Upthrust Molecules Particles Collide Surface Flow Compress Force Area Solid Liquid Gas Moment Pivot</p> <p>Reactivity series: Metal, Non-metal, displacement, extraction</p> <p>Inheritance: Characteristics Genes Chromosomes DNA</p>	<p>Evolution: Darwin, Fossilisation, adaptation, traits, biodiversity, variation, characteristics, extinction.</p> <p>Keywords: Ecosystem Photosynthesis, pyramid of numbers and biomass chemosynthesis, glucose, biomass Community, Ecosystem, Population, Interdependent Biodiversity</p> <p>Keywords: Energetics Respiration Photosynthesis Energy Adaptation Dependence</p>	<p>Physics (Energy) keywords: Energy Dissipation Conservation Transformation National grid Temperature</p> <p>Chemistry (Atomic structure) keywords: Aqueous solution Atom Atomic number Balanced symbol equation Chromatography Compound Electron Electronic structure Element Group Ion Isotope Law of conservation of mass Mass number Neutron Noble gases Nucleus (of an atom) Periodic table Product Proton Reactant Shell</p>	<p>Biology (Cells) keywords Cells Organisation Diffusion Active transport Osmosis Partially permeable membrane Microscopic Multicellular Organism Meristems</p>	<p>Biology (Cells) keywords Cells Organisation Diffusion Active transport Osmosis Partially permeable membrane Microscopic Multicellular Organism Meristems</p>

	Erosion Transport Deposition Compaction Cementation Rock Cycle	Double helix Alleles Bases		State symbol Symbol equation Word equation Alkali metals Halogens		
Assessment 1	<ul style="list-style-type: none"> Teacher assessment in the form of a QWC set at the end of each unit 	<ul style="list-style-type: none"> Teacher assessment in the form of a QWC set at the end of each unit AP1 assessment point 	<ul style="list-style-type: none"> Teacher assessment in the form of a QWC set at the end of each unit Required practical assessed 	<ul style="list-style-type: none"> Teacher assessment in the form of a QWC set at the end of each unit Required practicals assessed AP2 assessment point 	<ul style="list-style-type: none"> Teacher assessment in the form of a QWC set at the end of each unit. Required practicals assessed 	<ul style="list-style-type: none"> Required practical test paper AP3 assessment point
Assessment 2	Core questions with answers will be given to students at the beginning of each unit. Students will have mini quizzes alongside a teacher assessment per unit	Core questions with answers will be given to students at the beginning of each unit. Students will have mini quizzes alongside a teacher assessment per unit	Core questions with answers will be given to students at the beginning of each unit. Students will have mini quizzes alongside a teacher assessment per unit	Core questions with answers will be given to students at the beginning of each unit. Students will have mini quizzes alongside a teacher assessment per unit	Core questions with answers will be given to students at the beginning of each unit. Students will have mini quizzes alongside a teacher assessment per unit	Core questions with answers will be given to students at the beginning of each unit. Students will have mini quizzes alongside a teacher assessment per unit
Cross Curricular Links with other Faculties	Maths skills – graphs, calculations English – literacy skills – focusing on keywords, tier 3 vocabulary, connectives, SPAG, synonyms,	Maths skills – graphs, calculations English – literacy skills – focusing on keywords, tier 3 vocabulary, connectives, SPAG, synonyms,	Maths skills – graphs, calculations English – literacy skills – focusing on keywords, tier 3 vocabulary, connectives, SPAG, synonyms,	Maths skills – graphs, calculations English – literacy skills – focusing on keywords, tier 3 vocabulary, connectives, SPAG, synonyms,	Maths skills – graphs, calculations English – literacy skills – focusing on keywords, tier 3 vocabulary, connectives, SPAG, synonyms,	Maths skills – graphs, calculations English – literacy skills – focusing on keywords, tier 3 vocabulary, connectives, SPAG, synonyms Geography – seasons link
Extra-Curricular Offer	STEM club, Science club, Revision club	STEM club, Science club, Revision club	STEM club, Science club, Revision club			
Time Allocation	6	6	6	6	5	5

