



ASPIRE • BELIEVE • ACHIEVE



Curriculum Overview

Year 7 Spring Term 1			
What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>Chemistry: Matter</p> <p>Continuing to build foundational chemistry knowledge, students study the materials around them in terms of solids, liquids and gases.</p> <p>Students appreciate that some substances are a combination of materials and how to separate these</p>	<p>Knowledge</p> <ul style="list-style-type: none">• Three main states of matter, solids, liquids and gases and the properties of each• Definition of boiling point and melting points• Definition of mixture• Description of three separation techniques; filtration, distillation and chromatography. <p>Understanding</p> <ul style="list-style-type: none">• Linking the state of a substance to use in the real world (fuels)• All substances can theoretically exist in all three states by varying the temperature of the substance (energy level of the particles)• That not all methods of separation are appropriate for all mixtures and why <p>Skills</p> <ul style="list-style-type: none">• Methodical method writing• Using models to represent the abstract• Write simple observations	<p>Being able to determine the state of a substance given the room temperature, the melting and boiling points</p> <p>Detailed justification of why petrol is such a valuable fuel based on its state compared to other fuels at room temperature.</p> <p>Making links and in depth understanding of models to realise that changes of pressure can also result in changes of state</p> <p>Detailed methods with logical structure</p> <p>Evaluating the strength and limitations of the particle model</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

Year 7 Spring Term 2

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>Energy and Ecosystems</p> <p>Energy transfer relating to physical processes and organic life. The relationships and interdependence between living things</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • The forms of energy including those are energy stores which are used as fuels and potential energy • The units of energy and the methods of measuring it • Main method of generating electrical energy • Definition of interdependence and give examples through food webs and seed dispersal • Plant cells and organs in plant reproduction <p>Understanding</p> <ul style="list-style-type: none"> • Calculate energy transfer effectiveness and costs • Describe the energy transfers through the process of generating electricity • Know the advantage and disadvantages of generating electricity • Describe the effects of pollution / hunting on ecosystem • The importance of bees in the ecosystem <p>Skills</p>	<p>Understanding that energy transfers usually result in a proportion of 'wasted' energy and link this to number of stages of energy transfer and efficiency</p> <p>Detailed evaluation of the production of electricity by 'traditional' means.</p> <p>Individual research into alternative methods of generating electricity and comparison of their effectiveness linking to number of energy transfers.</p> <p>Two or three step calculations to generate energy use and cost.</p> <p>Detailed analysis of graphs, drawing two or three concluding statements and commenting how the patterns change over the course of the graph.</p> <p>Independently producing a high quality project on the importance of bees with minimal guidance which demonstrates knowledge, understanding and creativity.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: 'Free science lessons'</p> <p>Seneca learning platform</p>

	<ul style="list-style-type: none"> • Construct graphs for discrete and continuous data • Interpreting graphs and draw conclusions • Using scientific formula and units • Using scientific language to describe processes / consequences in a logical sequence 		
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Year 8 Spring Term 1			
What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>Matter</p> <p>A closer look at the materials around us in terms of elements and how they are organised into the periodic table</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Symbols and names of elements • Properties of elements • Compounds are a combination of elements • What are polymers <p>Understanding</p> <ul style="list-style-type: none"> • Elements are arranged in the periodic table according to their properties allowing us to predict the properties of other elements • Naming compounds and representing them with symbols • The properties of elements change once they react together • Link polymer structure to function and give their real world uses <p>Skills</p> <ul style="list-style-type: none"> • Use symbols to represent elements and compounds • Identify patterns within data including more complex patterns • Writing detailed observations 	<p>Use of symbols consistently to represent elements and compounds</p> <p>Consistent correct naming of compounds based on the rules they have been taught</p> <p>Complex patterns identified within the periodic table and application of this to other groups which have not been directly studied (Group 2 / Group 4)</p> <p>Complex patterns with confident data use to support patterns</p> <p>Independent research on the use of polymers in our world, the problems related to this and the developments in technology to replace polymers.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

Year 8 Spring Term 2

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>Biological chemical reactions in ecosystems: Respiration and Photosynthesis</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Word and symbol equations for photosynthesis, anaerobic respiration and aerobic respiration • Conditions needs for each chemical reaction • Uses of fermentation • Names of plant cells, tissues and organs involved in photosynthesis • Minerals needed for healthy plant growth <p>Understanding</p> <ul style="list-style-type: none"> • Comparison between anaerobic and aerobic respiration including use, effectiveness, products and reactants • Linking the structure of plant cells, tissues and organs to their functions. • Effect of lack of minerals on plant growth <p>Skills</p> <ul style="list-style-type: none"> • Identifying resolution of equipment • Conducting repeats, identifying anomalies and calculating averages • Identify simple causes of error within an investigation • Select the correct graph for discrete and continuous data 	<p>Detailed comparison between biological reactions arranged in a logical, coherent way such as a Venn diagram.</p> <p>Detailed piece of scientific extended writing which explains how the structures in the plant are adapted for photosynthesis</p> <p>Full independent investigation (with minimal support) on the factors effecting the rate of photosynthesis, the effect of exercise on heart rate/breathing rate linked to respiration, or the effect of nutrients on plant growth.</p> <p>Detailed model of the plant/leaf with material choices fully justified and linked to the structure and/or function of the cell, tissue or organ that it is representing.</p> <p>Justification of equipment choices based on resolution.</p> <p>A broad range of errors identified within practical, beginning to classify the type of error seen and the effect that this may have on the result.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p> <p>Revision materials ready for AP2</p>

Year 9, 10 and 11

GCSE Chemistry C1 Atomic Structure			
What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
Atomic structure and Separating mixtures	<p>Knowledge</p> <ul style="list-style-type: none"> • Structure of the atom • Key dates, scientists and developments in the history of the atom • Definitions of ions and isotopes • Methods in separating mixtures <p>Understanding</p> <ul style="list-style-type: none"> • How experiments have driven changed our understanding of atomic structure • Predict the ions formed from elements • Identify isotopes • Select appropriate methods of separating given mixtures <p>Skills</p> <ul style="list-style-type: none"> • Link a conclusion / investigation to the amendment of a scientific idea • Evaluate models used to explain the abstract • Confident use of symbols to represent elements and compounds 	<p>Application of knowledge to predict ion formations and begin to make the link between this and why only certain atoms bond together</p> <p>In depth understanding of the atomic mass number and how it can be a 0.5 value</p> <p>Extended scientific writing to describe the developments to the atomic model over time</p> <p>Justified reasoning of the separation method chosen and the strengths and limitations of each one</p> <p>Linking atomic structure to patterns previous explored in KS3 of the periodic table</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

GCSE Chemistry C2 The Periodic Table

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>History of the periodic table and how atomic structure can explain trends</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Key dates, scientists and developments in the history of the periodic table • Trends of group 1, 7 <p>Understanding</p> <ul style="list-style-type: none"> • Applying knowledge of atomic structure to explain the trends shown in the periodic table and predict the behaviour of 'unknown' atoms <p>Skills</p> <ul style="list-style-type: none"> • Make predictions using scientific knowledge and understanding • Drawing conclusions from data • Link a conclusion / investigation to the amendment of a scientific idea 	<p>Extended scientific writing that explains the trends shown in the periodic table in relation to their atomic structure.</p> <p>Effective and throughout use of data when drawing conclusions</p> <p>Independent research to expand on the history of the periodic table to include some of the more recently discovered elements</p> <p>Ability to create their own periodic table from the data they are given about each element and compare to the modern version.</p> <p>Extending thoughts to other groups in the periodic table to explain reactivity of the noble gases or question the reactivity of transition and group 4 elements</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: 'Free science lessons'</p> <p>Seneca learning platform</p>

GCSE Chemistry C3 Structure and Bonding

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>The structure of compounds, simple molecules and giant structures from the atomic level and their properties</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Three types of bonding to join two elements together • Names of giant structures and list their properties • Definition, properties and uses of fullerenes • The different products carbon can form <p>Understanding</p> <ul style="list-style-type: none"> • Explain why two elements should react together based on knowledge of atomic structure • Which types of elements experience which bonding and explanation of how the bonding takes place through either shared, delocalised or exchange of electrons • Explanation of the properties based on the bonding within the structure <p>Skills</p> <ul style="list-style-type: none"> • Using models to represent the abstract and evaluating the strengths and limitations • Drawing scientifically and labelling appropriately • Writing scientifically to explain 	<p>Application of knowledge to 'unknown' substances to determine the type of bonding and the likely properties of these substances</p> <p>Independent research project on the use of polymers in real world applications, the advantages, disadvantages and possible alternatives.</p> <p>Independent research on nanoparticles including definition, applications and advantages and disadvantages of this technology.</p> <p>Independent project that summarises the uses of carbon, the bonding in its various structural forms, the applications, advantages and disadvantages</p> <p>Independent selection of materials and construction of models to show various type of bonding or structure</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: 'Free science lessons'</p> <p>Seneca learning platform</p>

GCSE Chemistry C4 Chemical Calculations

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>Use of the unit 'mole' to speak about quantities of atoms in real world applications</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Definition of relative atomic mass and molecular mass • Mole calculation linking mass and formula mass • Definition of term balanced equation, yield. • Mathematical processes to calculate percentage yield and mass. • Definition of concentration <p>Understanding</p> <ul style="list-style-type: none"> • Explain what is meant by the term 'mole' • Balance equations • Calculate relative formula mass; moles, mass or m_r when given the other two values; percentage yield; mass of substance needed or produced in chemical equations • Calculating concentrations <p>Skills</p> <ul style="list-style-type: none"> • Using standard form • Converting between measurements • Using scientific equations and calculations • Compare numbers in ratio • Calculate percentages including percentage increase or decrease 	<p>Confident and independent use of math to calculate a variety of different values</p> <p>Development of their own mnemonics / multi step process to answer the longer questions</p> <p>Suggesting why the product mass might vary from the reacting masses in real world applications.</p> <p>Independent research on the real world applications of these calculations by companies such as Procter and Gamble.</p> <p>Completion of multi-step equations to calculate mass of product produced or reacting masses.</p> <p>Study of atom economy, titration and calculations and volume of gas equation.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: 'Free science lessons'</p> <p>Seneca learning platform</p>

GCSE Chemistry C5 Chemical Changes

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>Reactions between acids and alkalis at an atomic level. How the reactivity series helps us predict reactions involving metals</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Definitions of reactivity series, displacement reactions, neutralisation, salt, concentration, strength, soluble, insoluble, acids / alkalis and bases, oxidation and reduction • Rules of naming compounds • More reactive elements will take the place of lesser reactive ones • That reacting substances form new products containing the same number and type of elements - conservation of mass in reactions • Methods of making salts / measuring pH <p>Understanding</p> <ul style="list-style-type: none"> • The behaviour of a substance in reaction evidences the reactivity of it • Explanation of why displacement reactions cannot be used to extract all metals and appropriate choice of reactants for those that can • Successfully predicting the products for displacement and neutralisation reactions • Explanation of the method chosen to make a specific salt including selection of reactants • Comparing strength and concentration of acids and alkalis • Evaluating the methods of measuring acidity or alkalinity <p>Skills</p> <ul style="list-style-type: none"> • Make predictions based on scientific knowledge • Risk assess practical • Write detailed observations of chemical reactions / practical investigation • Take steps in practical to be able to determine repeatability and reproducibility of results • Constructing word and symbol equations using symbols to represent elements and compounds • Balance symbol equations 	<p>Linking to atomic structure to explain the order of elements in the reactivity series.</p> <p>Linking to atomic structure and structure and bonding topics to explain how news bonds in the products would have been formed (formation of ions)</p> <p>Confidently construct half equations for displacement reactions</p> <p>Understanding of the term redox reaction and independently investigate examples</p> <p>Selection of the correct reactants and process to make salts and a detailed scientific explanation of this or evidence or practical performed.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

GCSE Chemistry C6 Electrolysis

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>How to separate compounds using a process called electrolysis</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Key definitions including electrolysis, anode, cathode, electrolyte and ion • Equipment used in electrolysis and how it is arranged • Metals form positive ions and non-metals negative ions • Charges are oppositely attracted to each other • Advantages and disadvantage of the process <p>Understanding</p> <ul style="list-style-type: none"> • Explaining why each substances is formed at that electrode • Evaluating the use of electrolysis in real world applications including metal extraction with links to previous topics on formation of ions <p>Skills</p> <ul style="list-style-type: none"> • Making predictions based on scientific knowledge and understanding • Use detailed observation for conclusions or future predictions • Using scientific terminology to describe and explain • 	<p>Linking to displacement reactions to explain why electrolysis is needed</p> <p>Constructing half equations for the changes at each electrode</p> <p>Suggesting further applications of the technology</p> <p>Application of understanding to methods of electrolysis on an industrial scale</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

GCSE Chemistry C7 Energy Changes

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>How energy levels change throughout a chemical reaction to either release or absorb heat energy</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Definitions of endothermic and exothermic reactions and activation energy • Recognise a reaction profile • Energy is needed to break bonds, energy is released when bonds are made • Uses of endothermic and exothermic reactions <p>Understanding</p> <ul style="list-style-type: none"> • Plan and carry out investigation that could determine whether a reaction is endothermic or exothermic • Read and create reaction profiles to show both types of reaction • Calculate bond energies to determine whether a reaction is exothermic or endothermic • Evaluate uses of these reactions and suggest future applications. <p>Skills</p> <ul style="list-style-type: none"> • Construction of graphs to display reaction profiles • Drawing scientifically to show compounds in their display formula • Identification of number of bonds through display formula • (Practical / investigation skills will also be developed however are not a primary focus for this topic) 	<p>Independent research project on the applications of endothermic and exothermic reactions</p> <p>Development and creation of a product which utilises one of these reactions</p> <p>Design / implementation of an experimental method that considers how to reduce error and increase precision accuracy and validity.</p> <p>Confident calculations of bond energies following logically sequences stages.</p> <p>Links to previous topics on enzymes, chemical reactions and rate of reaction regarding activation energy and use of catalysts.</p> <p>Study of chemical cells, batteries, fuel cells, real world applications and the advantages and disadvantages of the technology.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

GCSE Chemistry C8 Rates and Equilibrium

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>How we can control and manipulate how quickly a chemical reaction takes place</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Methods for measuring rate of reaction –the reduction of reactants or the increase in products • List methods of increasing the rate of a chemical reaction • Some reactions are reversible and the symbol that represents this • Reversible reactions are exothermic in one direction and endothermic in the opposite <p>Understanding</p> <ul style="list-style-type: none"> • Selecting / evaluating methods of measuring rate of reaction • Explain why certain factors can increase or decrease the rate of a chemical reaction • Evaluation of the strengths of limitations of our abilities to alter rate of reaction • Selecting favourable conditions to push a reversible reaction in a certain direction to alter equilibrium <p>Skills</p> <ul style="list-style-type: none"> • Independently generate hypothesis that refer to the IV and DV • Make detailed predictions based on scientific theory • Identify variables with measurements and manage control variables • Write a logical method with detail on equipment resolution • Take measures to decide on repeatability and reproducibility of results • Draw complex conclusions from graphs with multiple variables and construct tangents • Draw detailed conclusions with refer to data • Suggest uncertainties in practical 	<p>Confidently calculating rate of reaction at a specific point using a tangent and understanding the difference between this calculation and that of average rate.</p> <p>Link to previous topics in explanations which may include particle theory, activation energy, naming the type of reaction studied, predicting or naming the products, balancing equations</p> <p>Extended scientific explanation on why selection of certain conditions will push equilibrium in either the forward or reverse direction.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

GCSE Chemistry C9 Crude Oil and Fuels

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>The extraction and uses of crude oil</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Crude oil is a mixture of hydrocarbons • Names of some hydrocarbons and the properties of long and short chains • The definition of hydrocarbons, alkanes and alkenes • The mixture of hydrocarbons is separated using fractional distillation • Uses of hydrocarbons • Hydrocarbons can be split using cracking <p>Understanding</p> <ul style="list-style-type: none"> • Identifying hydrocarbons, alkanes and alkenes through words, symbols, display formula or bromine test of saturation • Comparison between alkanes and alkenes • Explanation of how hydrocarbons are separated using their boiling points • Evaluating the uses of hydrocarbons • Detailed description of cracking, the conditions required and evaluation of use of its products <p>Skills</p> <ul style="list-style-type: none"> • Use conservation of mass to predict products of reactions • Balance symbol equations • Use scientific terminology to describe and explain 	<p>Explaining the relationship between chain length and BP using particle model.</p> <p>Applying mathematical formula and use of 'n' to write alkanes and alkenes</p> <p>Independent research into the use of crude oil and the products we make from it, evaluation of their use against the impact on our environment and suggestion of alternatives</p> <p>Independent research on a big question with references – such as 'when will we run out of fuel?'</p> <p>Extended and detailed scientific writing on this topic that summarises how important crude oil is.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: 'Free science lessons'</p> <p>Seneca learning platform</p>

GCSE Chemistry C12 Chemical Analysis

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>Testing for pure compounds and mixtures</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Definition of purity, mixture and formulation • Chromatography can be used to separate substances in a mixture • Gas test for hydrogen, oxygen carbon dioxide and chlorine <p>Understanding</p> <ul style="list-style-type: none"> • Detailed description of how chromatography separates mixtures • Detailed description of how you can use boiling point to determine the purity of a substance • Identification of compounds in a mixture through chromatography analysis and Rf values • Identification of gases based on their reactions and response to indicators <p>Skills</p> <ul style="list-style-type: none"> • Writing a detailed method with logical structure 	<p>Independent study on the tests for positive and negative ions</p> <p>Independent study on instrumental analysis to identify compounds within a mixture</p> <p>Organised and systematic practical use of knowledge to identify an unknown substance with minimal supervision</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

GCSE Chemistry C13 The Earth's Atmosphere

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>How Earth's atmosphere has changed over time and the current impacts of the human population on it.</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Composition of the Earth's atmosphere today and historically • Define 'locked up' carbon • Name greenhouse gases • List factors increasing the global warming <p>Understanding</p> <ul style="list-style-type: none"> • Explanation of how the Earth's atmosphere has changed over time • Explain the causes and processes of global warming • Evaluate the extend of global warming • Suggest to what extend we will be able to reduce global climate change <p>Skills</p> <ul style="list-style-type: none"> • Writing to compare • Critically evaluate and synthesis evidence to justify claims 	<p>Links to previous topics on photosynthesis and respiration</p> <p>Evaluating alternative theories of the historic composition of the Earth's atmosphere or comparing it to other planets in the solar system</p> <p>Independent research on how greenhouse gases can be monitored using infrared spectroscopy.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: 'Free science lessons'</p> <p>Seneca learning platform</p>

GCSE Chemistry C14 The Earth's Resources

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>The limitations of Earth's resources</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Definition of finite, renewable, potable water, life cycle assessment, copper rich ores and low grade ores • Examples of finite and renewable resources • List the stages in creating a life cycle assessment <p>Understanding</p> <ul style="list-style-type: none"> • Analysing changes in the amount of finite sources available • Describe the stages of creating potable water and how these differ around the world • Describe the treatment of waste water and sewage • Evaluate the methods to extract copper from high and low grade ores. • Compare the life cycle assessments of different products such as paper and plastic bags • Evaluate recycling <p>Skills</p> <ul style="list-style-type: none"> • Provide references • Use discrete and continuous data • Identify trends and patterns within results • Critically evaluate sources and synthesis information to draw conclusions 	<p>Independently applying the principles learnt in this topic to everyday life and implements reduce, reuse and recycle ideals.</p> <p>Extended scientific writing describing and evaluating the processes of generating potable water, extracting copper or recycling.</p> <p>Independent research on another finite resource and evaluate its use – such as helium.</p> <p>Independent organisation of information into thinking tools or mind maps.</p> <p>Critically evaluate considering validity of claims made in investigations / statistics generated</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: 'Free science lessons'</p> <p>Seneca learning platform</p>

GCSE Physics P 1 Energy and Energy Resources

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>Energy is transferred but not created or destroyed</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • List the types of energy including energy stores and potential energy • Work done, potential energy kinetic energy and power equations <p>Understanding</p> <ul style="list-style-type: none"> • Explain how energy can be wasted if not destroyed or 'used up' and conserved in closed systems • Explanation of how work done can be reduced and / or energy transfer can be more efficient • Evaluate the methods to improve energy efficiency • Calculate gravitational potential, elastic potential or kinetic energy. • Explain the connection between energy and power <p>Skills</p>	<p>Confident in using and re-arranging equations to solve problems</p> <p>Deriving equations through deep understanding of how the components interact e.g. weight, height and gravitational potential energy.</p> <p>Completing multi-step calculations</p> <p>Extended scientific writing evaluating the methods of reducing energy waste</p> <p>Individually planning and possible conducting practical that could prove the connections in an equation.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: 'Free science lessons'</p> <p>Seneca learning platform</p>

GCSE Physics P2 Energy Transfer By Heating

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>Transfer of heat energy via conduction and specific heat capacity</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Heat can be transferred through a substance by conduction • Definition of specific heat capacity, insulators and conductors • Equation to calculate specific heat capacity <p>Understanding</p> <ul style="list-style-type: none"> • Explanation of how heat energy is transferred by conduction and therefore why some materials are better conductors / insulators • Calculation of specific heat capacity and use of the equation to explain real world examples of this (swimming pools) • Evaluation (including cost analysis) of heating and insulating buildings. <p>Skills</p>	<p>Independent study on the absorption and emission of infrared radiation.</p> <p>Model home / ice box cooler in which material selection has been justified to ensure insulation.</p> <p>Independent practical planning (and/or investigation) into real life application of insulators e.g. sleeping bags / duvet tog ratings.</p> <p>Confident in re-arranging the equation to perform necessary calculations ensuring appropriate units and conversion of units where needed.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

GCSE Physics P3 Energy Resources

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>The supply and demand of electrical energy</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • List several methods of generating electricity • List some advantages and disadvantages of each method of generating electricity • Define renewable, non-renewable, carbon-neutral <p>Understanding</p> <ul style="list-style-type: none"> • Describe the sequence of generating electricity for a number of methods (identify what they all have in common) • Evaluate method of generating electricity (also considering the methods versatility in always meeting energy demands and cost) • Select methods of generating electricity most appropriate to given situation and justify answers <p>Skills</p>	<p>Understanding that the power of the wind is equal to V^3 through use of previously learnt equation on kinetic energy.</p> <p>Individual additional research into the topic to consider the effectiveness of case studies – wind farms off the East Coast of England for example.</p> <p>Model, design, built their own method of generating electricity and evaluate its usefulness as a source of electrical energy.</p> <p>Individual research project on the current energy providers, their charges and methods of generating electricity and justify which is currently the best provider.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

GCSE Physics P4 Electrical Circuit

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>What electricity is and how can we use it.</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Symbols to represent components in circuits and what they do • Recognise and be able to draw simple series and parallel circuits • Charge, potential difference and resistance calculations • Voltage, current and resistance – what they are and how to measure them • List factors that increase resistance <p>Understanding</p> <ul style="list-style-type: none"> • Comparison between voltage, current and resistance in series and parallel circuits • Design circuits to meet particular requirements or that are capable of performing certain functions <p>Skills</p> <ul style="list-style-type: none"> • Construct and interpret current-potential difference graphs • Calculate charge, potential difference and resistance. 	<p>Individual research project on static charge in which knowledge and understanding is demonstrated through small practical, every day examples of this</p> <p>Link to previous topic and understanding that those metals which delocalise more electrons are the better electrical conductors.</p> <p>Construction of complete circuits with minimal supervision and problem solving without teacher support</p> <p>Detailed model or analogy constructed which highlights the differences between series and parallel circuits in terms of current and voltage.</p> <p>Application of knowledge to a wide variety of circuits draw in difference ways.</p> <p>Confidence in completing multistep processes that may also require the re-arrangement of equations and / or conversions between units.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

GCSE Physics P5 Electricity in the Home

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>How electricity from power stations reaches and is used in our homes</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Components of the national grid • Components of a plug • Power and charge calculations • Appliances often have energy efficiency ratings <p>Understanding</p> <ul style="list-style-type: none"> • Explanation for the need of step up and step down transformers • Explanation of the safety features in all UK plugs • Comparison between alternating and direct current • Calculation of power and charge • Explanation of the energy transfers in a circuit • Evaluation of appliance efficiency. <p>Skills</p>	<p>A comparison between UK plugs and those around the world – what safety features may be different, why and the potential consequences of this.</p> <p>Extended scientific writing on the safety features of plugs with a labelled diagram</p> <p>Links to previous topics of energy transfers to show the energy transfers in a circuit and to calculate wasted energy and efficiency when given the appropriate data</p> <p>Confidence in completing multistep processes that may also require the re-arrangement of equations and / or conversions between units.</p> <p>Independent research into the charge of an electron and how many pass through a wire when the current is 1A.</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

GCSE Physics P6 Molecules and Matter

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>Building on KS3 changes of state, consider the energy changes associated with it and density</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Density calculations • Method for measuring an objects density • Changes of state including sublimation • Definition of latent heat <p>Understanding</p> <ul style="list-style-type: none"> • Explanation of density in terms of particle model • Using kinetic theory to compare energy levels at each stage and energy needed to change state. • Able to now explain the consistency in temperature as substances change state though latent heat of fusion and vaporisation • Explain the links between gas pressure, temperature and pressure and real life applications. • Use models to represent particle and kinetic theory and evaluate the usefulness of these <p>Skills</p> <p>Converting between units Using standard form</p>	<p>Independently creating models or analogies to show changes of state, the particle model and kinetic theory.</p> <p>Independently researching Boyle’s Law.</p> <p>Extended scientific writing explaining the changes of state</p> <p>Rearrangement of equations and conversion between units as needed</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

