

Science PoS: Year 9 HT1 and HT2 - Topic 9I Energy

Students will colour code as they work through the scheme of work.

Students will learn about... Energy		
Grade 1-3	Grade 4-6	Grade 7-9
<p>Energy transfers and efficiency Describe ways in which energy is transferred and stored.</p> <p>National grid and how electricity is generated Describe how electricity is generated.</p> <p>Renewable resources and efficiency Know all of the renewable energy resources.</p> <p>Voltage and current Be able to list and identify components in a circuit.</p> <p>Power and energy Be able to explain what the power rating of an appliance is.</p> <p>Going green and preventing global warming Be able to explain what causes global warming.</p>	<p>Energy transfers and efficiency. Be able draw a simple Sankey diagram to scale.</p> <p>National grid and how electricity is generated Be able to consider advantages and disadvantages of different ways of generating electricity.</p> <p>Renewable resources and efficiency Be able to calculate the efficiency of an energy resources using a given equation.</p> <p>Voltage and current Be able to use an example of a model to explain how changing the voltage affects the circuit.</p> <p>Power and energy Be able to calculate the cost of electricity using a given equation.</p> <p>Going green and preventing global warming Be able to explain the greenhouse effect and its consequences.</p>	<p>Energy transfers and efficiency. Be able to explain what efficiency means.</p> <p>National grid and how electricity is generated Be able to explain why efficiency in the national grid is important and how to achieve this.</p> <p>Renewable resources and efficiency Be able to debate and choose the most efficient energy saving resources to be used in certain areas.</p> <p>Voltage and current Be able to explain potential different and current and hence how a voltmeter and ammeter work.</p> <p>Power and energy Be able to explain how we can cut electricity bills and be able to explain how this can help the environment.</p> <p>Going green and preventing global warming Be able to explain how we can reduce the rate that the greenhouse effect is occurring and impact of the greenhouse effect.</p>
<p>Assessment</p> <p>Via homework and an end of topic test.</p>		

Science (Biology) PoS: Year 9 HT1 and 2 - Topic 9C Photosynthesis

Students will colour code as they work through the scheme of work.

Students will learn about... Photosynthesis		
Grade 1-3	Grade 4-6	Grade 7-9
<p>What is photosynthesis? Can identify the raw materials and products of photosynthesis. Can recall reactants and products of respiration.</p> <p>How to test for photosynthesis? Can state that photosynthesis is the way in which plants make their own food.</p> <p>How the leaf is built for photosynthesis? Can state that leaves are where photosynthesis occurs.</p> <p>How plants are adapted to obtain water? Can define how water is transported in a plant.</p> <p>What we can use plants for Can understand the meaning of the term biomass and give an example.</p> <p>How some farming practices can affect the environment Can describe what organic farming is.</p>	<p>What is photosynthesis? Can explain why plants need to photosynthesise and respire. Can represent photosynthesis using a word equation.</p> <p>How to test for photosynthesis? Can describe the tests for photosynthesis and the necessity of light.</p> <p>How the leaf is built for photosynthesis? Can identify the internal tissues of a leaf and state their functions.</p> <p>How plants are adapted to obtain water? Can explain how roots and xylem vessels are specialised to carry out their function.</p> <p>What we can use plants for Can clarify how glucose produced in photosynthesis leads to an increase in biomass.</p> <p>How some farming practices can affect the environment Can explain the advantages and disadvantages of methods farmers can use to increase the yield of their crops.</p>	<p>What is photosynthesis? Can compare photosynthesis and respiration. Can represent photosynthesis using the symbol equation.</p> <p>How to test for photosynthesis? Can explain which factors affect the rate of photosynthesis.</p> <p>How the leaf is built for photosynthesis? Can explain how the internal leaf structures are adapted to their function.</p> <p>How plants are adapted to obtain water? Can explain why plants need minerals and why glucose needs to be transported around a plant.</p> <p>What we can use plants for Can explain how farmers use scientific advances to produce as much biomass as possible. Can reason logically how and why farmers use plant hormones.</p> <p>How some farming practices can affect the environment Can evaluate different farming methods.</p>
<p>Assessment</p> <p>Planning an investigation using grade ladder.</p> <p>Written end of topic assessment.</p>		

Science PoS: Year 9 HT1 and HT2 - Topic 9E & F Rocks and Metals

Students will colour code as they work through the scheme of work.

Students will learn about... Rocks and Metals		
Grade 1-3	Grade 4-6	Grade 7-9
<p>Metals, non-metals and alloys State the properties of metals and non metals. State what an alloy is.</p> <p>Uses of metals as building materials Complete practical safely and record appropriate observations. Name the products of the reaction.</p> <p>Metals and acid Identify that carbon dioxide is produced when acids react with carbonates. Describe the test for carbon dioxide. State that the production of a gas is evidence of a chemical reaction.</p> <p>Metal oxides and acids State that a colour change is evidence of a chemical reaction.</p> <p>Metal carbonate and acid Describe one example of making a salt by neutralisation. Represent neutralisation with a general and a specific word equation naming the salt correctly.</p> <p>Metal hydroxide and acid Describe what happens when metals corrode.</p> <p>Tarnishing metals Write word equations for the reactions of reactive metals with water.</p> <p>Metals reacting with water State some ways that metals can be protected against corrosion.</p> <p>How can corrosion be prevented? Be able to describe what happens during a displacement reaction.</p>	<p>Metals, non-metals and alloys Relate properties to uses. Describe how properties of alloys are different to the properties of metals.</p> <p>Uses of metals as building materials Construct word equations for the reaction. Describe the test for the gas produced. Predict the products of other metal/acid reactions.</p> <p>Metals and acid Describe how metal carbonates react with acids. Identify evidence which indicates that a chemical reaction has taken place. Represent reactions with metal carbonates by word equations, identify patterns in these and produce general equations. Name the salts produced and describe the uses of some of them. Describe the test for carbon dioxide.</p> <p>Metal oxides and acids Describe how metal oxides react with acids. Identify evidence which indicates that a chemical reaction has taken place. Represent reactions by word equations, identify patterns in these and produce general equations. Name a variety of salts and describe the uses of some of them.</p> <p>Metal carbonate and acid Describe how a salt and water are made when acids are neutralised by soluble bases. Represent examples of neutralisation with general and specific word equations. Name a variety of salts.</p> <p>Metal hydroxide and acid Write word equations for the reaction of metals with oxygen. Explain patterns in the way metal objects corrode.</p>	<p>Metals, non-metals and alloys Explain how decisions can be reached about which metals to use when building. Explain why the properties of alloys are different.</p> <p>Uses of metals as building materials Construct a symbol equation for the reaction.</p> <p>Metals and acid Represent the reaction between calcium carbonate and hydrochloric acid by a balanced chemical equation. Describe a range of applications of the reaction between carbonates and acids.</p> <p>Metal oxides and acids Represent the reaction between copper oxide and sulphuric acid by a balanced chemical equation. Explain how chemical bonds form and how some atoms form groups and make bonds as a group. Name a variety of salts and describe their uses.</p> <p>Metal carbonate and acid Represent chemical compounds by formulae and combine these into symbol equations. Use knowledge of reactions to make predictions about other reactions.</p> <p>Metal hydroxide and acid Write balanced symbol equations for the reaction of metals with oxygen.</p> <p>Tarnishing metals Use evidence to place the reactive metals in order of reactivity.</p> <p>Metals reacting with water Explain how metals can be protected against corrosion and suggest some practical uses of this.</p>

	<p>Tarnishing metals Describe how reactive metals are extracted from their compounds.</p> <p>Metals reacting with water Describe ways in which metals can be protected against corrosion.</p> <p>How can corrosion be prevented? Be able to explain the process of a displacement reaction using a model.</p>	<p>How can corrosion be prevented? Be able to predict whether a chemical reaction will take place or not based on its reactivity.</p>
<p>Assessment</p> <p>End of topic test.</p>		

Science PoS: Year 9 HT1 and HT2 - Topic 9A Genetics

Students will colour code as they work through the scheme of work.

Students will learn about... Genetics		
Grade 1-3	Grade 4-6	Grade 7-9
<p>Variation Can describe different types of variation and give examples of inherited and environmental features.</p> <p>DNA Can recognise that genes control characteristics in living things. Can give reasons why features are where they are. Can follow step by step instructions to extract DNA from kiwi fruit and consider risks associated with the practical activity.</p> <p>Genetic crosses Can use a model to show genetic crosses and the variation that can result from these crosses.</p> <p>Evolution and Natural Selection Can define evolution and provide examples of organisms that have changed over time. Can use a model to demonstrate advantageous adaptations. Can sequence the stages of natural selection with guidance.</p> <p>Scientific Skills and Enquiry Can use practical skills to carry out investigations in a safe manner. Are beginning to use some scientific words in the correct context. Can collect data, analyse information and use it to draw a simple conclusion.</p>	<p>Variation Can collect and display and analyse continuous data.</p> <p>DNA Can describe the difference between DNA, genes and chromosomes. Can describe the structure of DNA. Can extract DNA from kiwi fruit following multi-step instructions independently and complete a risk assessment for the activity.</p> <p>Genetic crosses Can model genetic crosses and complete a variety of genetic crosses to predict outcomes with help.</p> <p>Evolution and Natural Selection Can use key words to describe evolution. Can sequence the stages of natural selection using specific organisms as examples.</p> <p>Scientific Skills and Enquiry Can follow instructions independently to complete practical activities in a safe way, considering risks and control measures. Are beginning to evaluate methods of investigations and think about the limitations of these methods. Can collect data and display it in a suitable form independently. Are beginning to make links between different pieces of information before making a conclusion.</p>	<p>Variation Can collect data and make tally chart to convert continuous data into discontinuous data and then plot a frequency curve.</p> <p>DNA Can explain how important genes are in determining traits and characteristics. Can extract information from sources of text re the discovery of DNA structure. Can follow instructions independently to extract DNA from kiwi fruit and write a comprehensive risk assessment for this activity. Can evaluate the practical activity of extraction of DNA and suggest improvements to method.</p> <p>Genetic crosses Can predict the outcomes of genetic crosses and carry them out independently. Can evaluate usefulness of a model to demonstrate genetic crosses.</p> <p>Evolution and Natural Selection Can sequence the events in natural selection independently and explain why each of these events occur using examples.</p> <p>Scientific Skills and Enquiry Can follow detailed instructions independently and risk assess all practical activities. Can evaluate models and practical investigation methods, suggest improvements and recognise their limitations. Can present data in a variety of forms and analyse it confidently. Can work independently and draw together several pieces of information before presenting a conclusion, backing it up with evidence.</p>
Assessment		
Written assessment on Genetics		

Science PoS: Year 9 HT3 and HT4 - Topic 9H Reactions

Students will colour code as they work through the scheme of work.

Students will learn about... Reactions		
Grade 1-3	Grade 4-6	Grade 7-9
<p>Making new materials Describe the properties of some common materials. Link the properties of materials to their uses.</p> <p>How can the properties of materials be improved Link the properties of different polymers with their uses. Compare the properties of polymers with other materials.</p> <p>Investigating reactions State what happens to the mass of the chemicals in a reaction.</p> <p>Energetic reactions Explain what fuels are. Recall some examples of hydrocarbon fuels.</p> <p>Energy changes in reactions Carry out the practical safely and record results.</p>	<p>Making new materials Describe one way in which the properties of a natural material can be changed.</p> <p>How can the properties of materials be improved Explain what a composite material is.</p> <p>Investigating reactions Explain why mass seems to be lost in some reactions. Explain why mass seems to be gained in some reactions.</p> <p>Energetic reactions Recall which compounds are formed when hydrocarbons burn.</p> <p>Energy changes in reactions Describe the reaction as exothermic or endothermic.</p>	<p>Making new materials Explain what a polymer is.</p> <p>How can the properties of materials be improved Explain why new materials are developed.</p> <p>Investigating reactions Explain what happens to atoms in a chemical reaction.</p> <p>Energetic reactions Work out which chemicals are made when other fuels burn.</p> <p>Energy changes in reactions Predict the temperature change during a reaction depending on the reactants involved.</p>
Assessment		
Via homework and an end of topic test.		

Science PoS: Year 9 HT3 and HT4 - Topic 9L Pressure & Moments

Students will colour code as they work through the scheme of work.

Students will learn about... Pressure & Moments		
Grade 1-3	Grade 4-6	Grade 7-9
<p>Pressure and You State what is meant by pressure.</p> <p>Pressure in Liquids State what is meant by water pressure.</p> <p>Atmospheric Pressure Explain what air pressure is.</p> <p>Levers & Turning Effects Provide examples of forces producing turning effects.</p> <p>Balance of Moments Identify & calculate a moment of a force.</p> <p>Moments & Stability Identify how moments can cause instability.</p>	<p>Pressure and You Correctly use equation $P=F/A$ and appropriate units to calculate pressure body exerts on floor.</p> <p>Pressure in Liquids Build a model diving bell and explain how and why its depth can be controlled.</p> <p>Atmospheric Pressure Describe a manometer and explain how it works.</p> <p>Levers & Turning Effects Calculate the moment of a force.</p> <p>Balance of Moments Understand how to balance moments on an object.</p> <p>Moments & Stability Understand the interaction of two or more counter-acting moments.</p>	<p>Pressure and You Use P/F/A triangle to carry out a variety of calculations involving Pressure.</p> <p>Pressure in Liquids Pressure transmission in hydraulic brakes.</p> <p>Atmospheric Pressure Understand how atmospheric pressure changes with height.</p> <p>Levers & Turning Effects Explain how a lever works.</p> <p>Balance of Moments Successfully carry out calculations involving multiple moments.</p> <p>Moments & Stability Explain the stability of a simple device in terms of moments & turning effects.</p>
<p>Assessment</p> <p>Independent homework research task, end of unit test</p>		

Science PoS: Year 9 HT5 and HT6 - Keeping Healthy (B1) start of GCSE Biology

Students will colour code as they work through the scheme of work.

Students will learn about... Keeping Healthy		
Grade 1-3	Grade 4-6	Grade 7-9
<p>The constituents of a balanced diet Can state the main food groups with examples.</p> <p>What the body does with energy in food Can describe what metabolic rate is.</p> <p>Analysing the effects of diet Can categorise foods according to how healthy they are.</p> <p>What pathogens are Can describe pathogens providing examples of different types.</p> <p>How pathogens enter the body and what can we do to prevent this Can describe ways in which pathogens enter the body.</p> <p>How Antibiotic resistance occurs Can use the words antibiotic and resistant confidently to describe how some bacteria become resistant to antibiotics.</p> <p>Investigating the action of antibiotics Can safely investigate the action of antibiotics using standard microbiology techniques.</p> <p>How vaccines protect us from diseases Can state the role of vaccines in preventing disease.</p>	<p>The constituents of a balanced diet Can explain the function in the body of these different food groups.</p> <p>What the body does with energy in food Can calculate metabolic rate.</p> <p>Analysing the effects of diet Can use sources of information to describe the role of cholesterol in the body.</p> <p>What pathogens are Can explain how these pathogens make us.</p> <p>How pathogens enter the body and what can we do to prevent this Can explain the role of white blood cells in prevent disease and the role of antibiotics.</p> <p>How Antibiotic resistance occurs Can explain how bacteria become resistant to antibiotics.</p> <p>Investigating the action of antibiotics Can explain the reasons for these specific techniques.</p> <p>How vaccines protect us from diseases Can explain how vaccines work to prevent disease.</p>	<p>The constituents of a balanced diet Can discuss the causes and effects of unbalances diets e.g anorexia nervosa.</p> <p>What the body does with energy in food Can explain how exercise and inherited factors can affect metabolic rate.</p> <p>Analysing the effects of diet Can justify the medical recommendation that people should take regular exercise and use statins.</p> <p>What pathogens are Can evaluate the work of Ignaz Semmelweis.</p> <p>How pathogens enter the body and what can we do to prevent this Can analyse/evaluate text/data with information on diseases such as SARS.</p> <p>How Antibiotic resistance occurs Can suggest ways to prevent antibiotic resistance developing.</p> <p>Investigating the action of antibiotics Can suggest how this procedure can be used in industry on a large scale.</p> <p>How vaccines protect us from diseases Can evaluate the effectiveness of vaccine programmes from data and consider the advantages and disadvantages of vaccines to society in general.</p>
<p>Assessment</p> <p>Teacher/peer marking, questioning, homework tasks, test.</p>		

Science PoS: Year 9 HT5 and HT6 - Foundation Chemistry (C1) start of GCSE Chemistry

Students will colour code as they work through the scheme of work.

Students will learn about...		
Grade 1-3	Grade 4-6	Grade 7-9
<p>That limestone undergoes thermal decomposition, and can be used to make a variety of building materials Can list some building uses of limestone.</p> <p>That metal carbonates undergo thermal decomposition Can list the products formed when metal carbonates decompose and state the test for CO₂.</p> <p>That limestone decomposes to give carbon dioxide, and quicklime which can be converted into slaked lime Can list the uses of slaked lime.</p> <p>How cement, concrete and glass are made and about mortar Can list the materials needed to make these products.</p> <p>That building materials have changed a lot, that technology makes new things possible AND debating quarrying Can describe advantages and disadvantages of quarrying.</p>	<p>That limestone undergoes thermal decomposition, and can be used to make a variety of building materials Can interpret the thermal decomposition of limestone as a word equation.</p> <p>That metal carbonates undergo thermal decomposition Can explain in terms of atoms, why mass must be conserved in a chemical reaction.</p> <p>That limestone decomposes to give carbon dioxide, and quicklime which can be converted into slaked lime Can interpret the word equation for the production of slaked lime.</p> <p>How cement, concrete and glass are made and about mortar Can interpret information and change its format in the poster.</p> <p>That building materials have changed a lot, that technology makes new things possible AND debating quarrying Can explain why dwelling places have changed.</p>	<p>That limestone undergoes thermal decomposition, and can be used to make a variety of building materials Can explain how cement, concrete and glass are made.</p> <p>That metal carbonates undergo thermal decomposition Can construct a symbol equation for the thermal decomposition of metal carbonates.</p> <p>That limestone decomposes to give carbon dioxide, and quicklime which can be converted into slaked lime Can combine information from the cycle and a list of ingredients to explain how mortar hardens.</p> <p>How cement, concrete and glass are made and about mortar Can combine the properties and uses of these materials.</p> <p>That building materials have changed a lot, that technology makes new things possible AND debating quarrying Can combine imagination and technology to design a house for the future.</p>
<p>Assessment</p> <p>Teacher/peer marking, questioning, homework tasks, test.</p>		

Science PoS: Year 9 GCSE topic - Heat transfer

Students will colour code as they work through the scheme of work.

Students will learn about...Heat transfer		
Grade 1-3	Grade 4-6	Grade 7-9
<p>To describe infrared radiation Be able to name some objects that emit thermal radiation and describe infrared radiation as electromagnetic waves. Can describe what happened in their investigation.</p> <p>The ability of different surfaces to absorb and emit infrared radiation differently Can describe which surfaces are the best emitters of infrared radiation.</p> <p>The arrangement of particles in the different states of matter Can describe the physical characteristics of solids, liquids and gases.</p> <p>Conduction as a method of heat transfer Can state that metals are good conductors of energy.</p> <p>Convection as a method of heat transfer Can give examples of where convection currents occur.</p> <p>Planning an Investigation into rate of cooling Can investigate factors that affect the rate of energy transfer.</p> <p>Specific heat capacity Can state that more energy is required to raise the temperature of objects with a greater mass.</p> <p>U values of materials used in the building industry Can list methods of saving energy in a house and give a brief evaluation of the techniques.</p>	<p>To describe infrared radiation Be able to state that there is radiation, similar to light but invisible; that it is emitted by all objects. Also be able to explain that the hotter an object is, the more infrared radiation it emits in a given time. Be able to carry out an investigation on thermal radiation.</p> <p>The ability of different surfaces to absorb and emit infrared radiation differently Can describe which surfaces are the best emitters of infrared radiation. Can describe which surfaces are the best absorbers and reflectors of infrared radiation.</p> <p>The arrangement of particles in the different states of matter Can explain how the arrangement of particles in solids, liquids and gases gives rise to their properties, including density and whether they are able to flow.</p> <p>Conduction as a method of heat transfer Can also provide examples of some poor conductors or insulators and investigate this practically.</p> <p>Convection as a method of heat transfer Can also describe the process of convection in terms of particle movement in liquids and gases, and explain why convection cannot happen in solids.</p> <p>Planning an Investigation into rate of cooling Can also describe the factors that affect the rate of energy transfer.</p> <p>Specific heat capacity Can also explain that different materials of the same mass require different amounts of energy to raise their temperatures by the same amount.</p>	<p>To describe infrared radiation Be able to state that there is radiation, similar to light but invisible; that it is emitted by all objects. Also be able to explain that the hotter an object is, the more infrared radiation it emits in a given time. Be able to carry out an investigation on thermal radiation. Can describe applications of thermal imaging to Global surveillance.</p> <p>The ability of different surfaces to absorb and emit infrared radiation differently Can describe which surfaces are the best emitters of infrared radiation. Can describe which surfaces are the best absorbers and reflectors of infrared radiation. Can explain how the choice of a surface colour can affect the rate of temperature change of an object.</p> <p>The arrangement of particles in the different states of matter Can also explain changes of state ie evaporation and condensation using the kinetic theory.</p> <p>Conduction as a method of heat transfer Can also explain why metals are good conductors of energy in terms of electron behaviour.</p> <p>Convection as a method of heat transfer Can also give a detailed description of convection in terms of particle movement, expansion and density changes.</p> <p>Planning an Investigation into rate of cooling Can also suggest ways of controlling the flow of energy; how we can reduce or increase the rate of energy transfer in a variety of situations. Knows how to plan an investigation into energy transfer.</p> <p>Specific heat capacity Can also calculate the energy required to raise a known mass of material by a known temperature.</p>

	<p>U vales of materials used in the building industry Can also find the payback time of various energy saving measures. Can state the general relationship between U-values and insulation properties.</p>	<p>U vales of materials used in the building industry Can also explain energy transfers using U-values for materials.</p>
<p>Assessment</p> <p>Teacher/peer marking, questioning, homework tasks, topic test.</p>		