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		End of unit assessment
		Knowledge Organiser
<b>P1 Energy</b> <ul style="list-style-type: none"> <li>Consider what happens when a spring is stretched. Describe what is meant by gravitational potential energy. Calculate the energy stored by an object raised above ground level.</li> <li>Describe how the kinetic energy store of an object changes as its speed changes. Calculate kinetic energy. Consider how energy is transferred.</li> <li>Understand what is meant by work done. Explain the relationship between work done and force applied.</li> </ul>		Gravitational Kinetic Thermal Power Specific heat capacity Efficiency
		End of unit assessment Paper 1 Mock
		Knowledge Organiser







<p>Identify the transfers between energy stores when work is done against friction.</p> <ul style="list-style-type: none"> <li>• Define power. Compare the rate of energy transfer by various machines and electrical appliances. Calculate power.</li> <li>• Understand how things heat up. Find out about heating water. Find out more about specific heat capacity.</li> <li>• Use theories to develop a hypothesis. Evaluate a method and suggest improvements. Perform calculations to support conclusions.</li> <li>• Explain ways of reducing unwanted energy transfer. Describe what affects the rate of cooling of a building. Understand that energy is dissipated.</li> <li>• Explain what is meant by energy efficiency. Calculate the efficiency of energy transfers. Find out about conservation of energy.</li> <li>• Describe the main energy sources available for use on Earth. Distinguish between renewable and non-renewable sources. Explain the ways in which the energy resources are used.</li> <li>• Analyse global trends in energy use. Understand what the issues are when using energy resources.</li> <li>• Recognise objects with energy. Recognise the different types of energy. Describe energy transfers. Use and describe the law of conservation of energy.</li> <li>• Substitute numerical values into equations and use appropriate units. Change the subject of an equation. Give an answer using an appropriate number of significant figures.</li> <li>• Recognise the difference between mean, mode and median. Explain the use of tables and frequency tables. Explain when to use scatter diagrams, bar charts and histograms.</li> </ul>		
<p><b>B1 Cell Biology</b></p> <ul style="list-style-type: none"> <li>• Describe the structure of eukaryotic cells and functions of sub-cellular components.</li> <li>• How to observe animal and plant cells using the light microscope and its limitations.</li> <li>• Compare the light microscope with the electron microscope, explaining how the development of the electron microscope has increased our understanding of cells.</li> <li>• Required practical: Using a light microscope to observe and record animal and plant cells How to look at everyday material and cells using a light microscope. Understand the difference between low and high power; draw and describe images at high and low magnification.</li> <li>• Describe the differences between prokaryotic and</li> </ul>		<p>Eukaryotic Prokaryotic Magnification Resolution Differentiation Specialisation Malignant Benign Stem cells</p>
		<p>How is this unit being assessed? End of unit assessment AP12 assessment Paper 1 Mock</p>
		<p>Knowledge Organiser</p>

<p>eukaryotic cells, and how they might have evolved over time.</p> <ul style="list-style-type: none"> <li>• Describe the process of mitosis using models.</li> <li>• Explain the importance of cell differentiation and link specialised cells to their tissues, organs and body systems. Describe the organisation within a multicellular organism.</li> <li>• Describe what cancer is and the factors that can trigger cells to become cancerous.</li> <li>• Describe the functions and uses of stem cells. Compare the use of embryonic and adult stem cells and the ethical implications of their use.</li> <li>• Explain the uses and risks of using stem cells in medicine, evaluating their benefits and disadvantages.</li> <li>• Give examples of where mitosis is necessary to produce identical daughter cells. Understand the need for reduction division, meiosis. Describe the use and potential of cloned cells in biological research.</li> <li>• Explain the process of aerobic respiration.</li> <li>• Describe the process of anaerobic respiration and compare it to aerobic respiration. Plan an investigation into factors affecting anaerobic respiration in dough-making.</li> <li>• Maths skills: Size and number Making estimates, ratio and proportion, standard and decimal form.</li> </ul>		
<p><b>C2 Structure, bonding and the properties of matter</b></p> <ul style="list-style-type: none"> <li>• Describe the three main types of bonding and how electrons are used in each.</li> <li>• Draw dot and cross diagrams to represent ionic bonds and calculate the charge on the ions.</li> <li>• Know the structure of ionic compounds and be able to work out their empirical formulae.</li> <li>• Draw dot and cross diagrams for small molecules and be able to work out their molecular formulae from models and diagrams.</li> <li>• Describe that metals have a giant structure consisting of metal ions and delocalised electrons.</li> <li>• Use the particle theory to explain changes of state and use state symbols in chemical equations.</li> <li>• Explain the melting points, boiling points and electrical conductivity of ionic compounds in terms of their bonding and structure.</li> <li>• Explain the melting points, boiling points and electrical conductivity of small-molecule substances in terms of their structure and intermolecular forces.</li> <li>• Describe the structure of polymers and explain their melting points in terms of the size of the polymer molecule and the intermolecular forces.</li> </ul>		<p>Covalent Ionic Metallic Lattice Empirical formulae Polymer Intermolecular Fullerene</p>
		<p>End of unit assessment Paper 1 Mock</p>
		<p>Knowledge Organiser</p>






<ul style="list-style-type: none"> <li>• Explain why substances with giant covalent structures are solids at room temperature.</li> <li>• Explain the properties of metals in terms of their structure and bonding and why we use alloys.</li> <li>• Explain the properties of diamond in terms of its covalent bonding and tetrahedral structure.</li> <li>• Describe how graphite differs from diamond and explain why graphite is soft and slippery and conducts electricity.</li> <li>• Describe the structure of graphene and fullerenes and know some properties and uses.</li> <li>• Be able to use different measurements of length such as metres, micrometres and nanometres, and interconvert these units.</li> <li>• Use 2D diagrams and 3D models to represent atoms, molecules, ionic structures and giant covalent structures, and calculate formulae of ionic structures.</li> </ul>		
<b>P2 Electricity</b> <ul style="list-style-type: none"> <li>• Define electric current</li> <li>• Distinguish between series and parallel circuits</li> <li>• Investigate current, potential difference and resistance in series circuits</li> <li>• Realise the link between current, potential difference and resistance</li> <li>• Gather valid data and use graphs to analyse it and draw conclusions.</li> <li>• Investigate the effect on its resistance of changing the length of a wire and the effect of connecting resistors in series and parallel</li> <li>• Investigate the characteristics of a thermistor, a light-dependent resistor and a diode</li> <li>• Describe the features of the mains electricity supply</li> <li>• Describe the structure of the National Grid</li> <li>• Investigate the energy transferred by and power ratings of a range of domestic appliances</li> <li>• Understand how to calculate power</li> <li>• Distinguish between current and potential difference</li> <li>• Recognise how algebraic equations define the relationships between variables</li> </ul>		<p>Current Potential Difference Resistance Series Parallel Thermistor Diode National Grid</p>
		<p>End of unit Assessment Paper 1 Mock</p>
		<p>Knowledge Organiser</p>
<b>B2 Organisation</b> <ul style="list-style-type: none"> <li>• Describe and explain how water moves by osmosis in living tissues.</li> <li>• Required practical: Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.</li> </ul>		<p>Osmosis Diffusion Active transport Partially permeable Enzymes Denatured Catalyst Lipase Amylase Protease Haemoglobin</p>

<ul style="list-style-type: none"> <li>Explain how active transport is different from diffusion and osmosis.</li> <li>Key concept: Investigating the need for transport systems Relating the need for transport systems to surface-area-to-volume ratio.</li> <li>Describe what enzymes are and how they work.</li> <li>Required practical: Investigate the effect of pH on the rate of reaction of amylase enzyme Investigate the effect of pH on the rate of reaction of amylase enzyme.</li> <li>Explain how the digestive system is adapted to its function.</li> <li>Investigating the digestive enzymes.</li> <li>Required practical: Use qualitative reagents to test for a range of carbohydrates, lipids and proteins Use qualitative reagents to test for a range of carbohydrates, lipids and proteins</li> <li>Explain how root hair cells are adapted for efficient osmosis, and the function of minerals in plants.</li> <li>Explain the effects of mineral deficiencies on plant growth, and the need for fertilisers to increase food production.</li> <li>Identify and explain how the structure of each part of the circulatory system relates to its function.</li> <li>Describe the structure and function of the heart.</li> <li>Identify the parts of the blood and explain how red blood cells and haemoglobin transport oxygen efficiently.</li> <li>Explain how the human gas exchange surface is adapted to its function.</li> <li>Identify the causes and symptoms of coronary heart disease. Describe and evaluate possible treatments of coronary heart disease.</li> <li>Maths skills: Extracting and interpreting information Extract and interpret information from tables, charts and graphs</li> </ul>		Atrium Ventricle Aorta Vena cava Artery Vein Capillary
		How is this unit being assessed? End of unit assessment Paper 1 Mock
		Knowledge Organiser
<b>C3 Quantitative Chemistry</b> <ul style="list-style-type: none"> <li>Explain the law of conservation of mass and apply it to balance symbol equations.</li> <li>Calculate relative formula masses and use them in balanced equations to verify the law of conservation of mass.</li> <li>Explain observed changes in mass during reactions in terms of loss or gain of gases from the atmosphere.</li> <li>Use the range of a set of measurements and their mean to specify the degree of uncertainty in a set of measurements.</li> <li>Describe the measurements of amounts of substances in moles; calculate the number of moles in a given mass and the mass of a given number of moles.</li> </ul>		Conservation Moles Reactants Products uncertainty
		How is this unit being assessed? End of unit assessment AP2 Assessment Paper 1 Mock
		Knowledge Organiser <a href="#">AQA GCSE Chemistry Separate Science U3 Quantitative Chemistry Knowledge Organiser.pdf</a> - TRIPLE




<ul style="list-style-type: none"> <li>Calculate the masses of reactants and products from balanced symbol equations and the mass of a given reactant or product.</li> <li>Use moles to balance an equation given the masses of the reactants and products.</li> <li>Know that the concentration of a solution can be measured in g/dm<sup>3</sup> and in mol/dm<sup>3</sup>.</li> <li>Use formula masses to convert grams into moles and vice versa.</li> <li>Use balanced symbol equations to determine the masses of reactants needed or the masses of products expected.</li> </ul>		<a href="#">AQA GCSE Chemistry Combined U3a Foundation Quantitative Chemistry Knowledge Organiser.pdf</a> - COMBINED FOUNDATION  <a href="#">AQA GCSE Chemistry Combined U3b Higher Quantitative Chemistry Knowledge Organiser.pdf</a> - COMBINED HIGHER
<b>P3 Particle model of matter</b> <ul style="list-style-type: none"> <li>States of matter from the perspective of the particles that make up the matter Density and the quantitative relationship between density, mass and volume Density = mass ÷ volume</li> <li>Eureka! Measuring the density of irregularly shaped objects through displacement</li> <li>Conservation of mass while matter changes from one state to another in a closed system Measuring the change of state from solid to liquid</li> <li>The role energy plays in changing the state of matter</li> <li>Particle theory of gases Internal energy as the combination of kinetic energy and potential energy in a system</li> <li>Each kilogram of any material will require different amounts of energy to increase its temperature by 1 °C Measuring the specific heat capacity of a material The quantitative relationship between specific heat capacity, mass, change in temperature and energy, E = mcΔθ</li> <li>Energy associated with the change of state of matter without any temperature change The quantitative relationship between latent heat mass and energy, E = ml</li> <li>Changing temperature changes the pressure in a closed system Temperature is related to the average kinetic energy of particles The quantitative relationship between temperature and pressure, p<sub>1</sub> ÷ V<sub>1</sub> = p<sub>2</sub> ÷ V<sub>2</sub></li> <li>Relationships between energy and time in melting solids through to gases The role of particle theory</li> <li>Getting the most out of graphs and interpreting the shapes of lines drawn on graphs</li> </ul>		Density Volume Internal energy Specific heat capacity Kinetic energy
		How is this unit being assessed? End of unit assessment Paper 1 Mock
		<a href="#">Knowledge Organiser</a>
<b>B3 Infection and Response</b> <ul style="list-style-type: none"> <li>Explain the differences between health and disease.</li> </ul>		Pathogen Malignant Benign Virus




<ul style="list-style-type: none"> <li>Explain the impact of lifestyle on non-communicable diseases.</li> <li>Identify risk factors for cancer and explain the differences between types of tumours.</li> <li>Translate information between graphical and numerical forms and evaluate the strength of evidence.</li> <li>Recall the definition of a pathogen and explain how communicable diseases can be controlled.</li> <li>Describe the transmission and control of some viral diseases.</li> <li>Describe the symptoms of some bacterial diseases and explain how they can be controlled.</li> <li>Describe the transmission and treatment of the fungal disease rose black spot.</li> <li>Describe the transmission of malaria and evaluate control methods for the spread of malaria.</li> <li>Explain how the body protects itself from pathogens.</li> <li>Explain how antibody production can lead to immunity.</li> <li>Explain how antibiotics and painkillers can be used to treat diseases, including their limitations.</li> <li>Explain how mass vaccination programmes reduce the spread of a disease and evaluate the global use of vaccinations.</li> <li>Recall some traditional drugs and their origins and describe how new drugs are developed.</li> <li>Maths skills: Sampling and scientific data Understand why sampling is used in science and be able to explain different sampling techniques</li> </ul>		<p>Bacteria Fungi Vaccination Immunity Antibiotic Resistance</p>
		<p>How is this unit being assessed? End of unit assessment Paper 1 Mock</p>
		<p>Knowledge Organiser</p>
<p><b>P4 Atomic Structure</b></p> <ul style="list-style-type: none"> <li>To review the currently accepted model for atomic structure</li> <li>To describe the structure of each type of ionising radiation</li> <li>To list the hazards of radioactive contamination and state how contaminated waste can be disposed of</li> <li>To write balanced nuclear equations for alpha and beta decay</li> <li>To explain what is meant by the half-life of a radioisotope</li> <li>To understand the distinction between contamination and irradiation</li> <li>To describe how our ideas about the structure of the atom have changed over time</li> <li>To plot a graph and draw a curved line of best fit</li> </ul>		<p>Ionisation Contamination Irradiation Half –life</p>
		<p>How is this unit being assessed? End of unit assessment Paper 1 Mock</p>
		<p>Knowledge Organiser</p>
<p><b>B4 Infection and Response</b></p> <ul style="list-style-type: none"> <li>Describe the process of photosynthesis.</li> <li>Explain how plants use the products of photosynthesis.</li> </ul>		<p>Photosynthesis Diffusion Transpiration Translocation</p>



<ul style="list-style-type: none"> <li>Explain how the structure of a leaf is adapted for photosynthesis.</li> <li>Required Practical: Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed.</li> <li>Identify factors that affect the rate of photosynthesis and explain the interaction of factors in limiting the rate of photosynthesis.</li> <li>Explain how to control factors linked to photosynthesis that can increase food production.</li> <li>Key concept: Diffusion in living systems Explain the importance of diffusion in the movement of molecules around the plant.</li> <li>Describe the process of transpiration and the relationship between stoma and transpiration.</li> <li>Describe how xylem and roots are adapted to take in water and move it around the plant.</li> <li>Explain how transpiration is affected by different factors.</li> <li>Explain how the structure of phloem is adapted to its function of moving sugars around the plant.</li> <li>12 Maths skills: Surface area to volume ratio To know how to calculate surface area to volume ratio and how to apply ideas about surface area and volume.</li> </ul>		Stomata Xylem Phloem
		How is this unit being assessed? End of unit assessment Paper 1 Mock
		Knowledge Organiser
<b>C4 Chemical Changes</b> <ul style="list-style-type: none"> <li>Explain oxidation as gain of oxygen and reduction as loss of oxygen and recognise that metal oxides are bases or alkalis.</li> <li>Deduce an order of reactivity of metals based on their reactions, if any, with water or dilute acids.</li> <li>Recognise that metal compounds need to be reduced to free the metal and explain how extraction methods depend on metal reactivity.</li> <li>Explain reduction as a gain of electrons and oxidation as loss of electrons and write ionic equations for displacement reactions.</li> <li>Describe how to make salts by reacting metals with acids and write equations for the reactions.</li> <li>Describe ways that salts can be made and predict the products formed from given reactants.</li> <li>Describe how to make a pure, dry sample of a soluble salt and derive its formula.</li> <li>Prepare a pure, dry sample of a soluble salt from an insoluble oxide or carbonate.</li> <li>Use the pH scale to identify acidic and alkaline solutions and recognise how the pH changes when a strong acid neutralises a strong alkali.</li> </ul>		Oxidation Reduction Reactivity Electrolysis Soluble Insoluble Acidic Alkaline
		How is this unit being assessed? End of unit assessment Y11 Mock paper 1
		Knowledge Organiser



<ul style="list-style-type: none"> <li>• Explain the difference between strong acids and concentrated acids, and explain what happens during neutralisation.</li> <li>• Describe electrolysis and write half equations for the reactions at each electrode.</li> <li>• Predict the products of the electrolysis of molten binary compounds and explain how ions are discharged at each electrode.</li> <li>• Explain how and why aluminium is extracted by electrolysis of aluminium oxide.</li> <li>• Explain the products of electrolysis of copper sulfate using inert electrodes and predict the products that other aqueous solutions will form.</li> <li>• Investigate what happens when aqueous solutions are electrolysed using inert electrodes</li> <li>• Explain oxidation and reduction by electron transfer and relate the ease of losing electrons to reactivity.</li> <li>• Calculate acid concentrations and deduce the effect of hydrogen ion concentration on the numerical value of pH.</li> </ul>		
<p><b>B8 Ecology</b></p> <ul style="list-style-type: none"> <li>• Describe what an ecosystem is, explain the importance of high biodiversity, and what is meant by a self-supporting ecosystem.</li> <li>• Explain changes in the distribution of species in an ecosystem, identify factors that affect ecosystems, and describe stable and unstable populations.</li> <li>• Describe how changes in one population affect another, explain interdependent relationships and how predator–prey population cycles have cyclical changes.</li> <li>• Describe how competition impacts on populations, explain why animals in the same habitat are in competition and explain interspecific and intraspecific competition.</li> <li>• Required Practical: Measure the population size of a common species in a habitat Use scientific ideas to develop a hypothesis, plan experiments to test a hypothesis, explain the apparatus and techniques used to sample a population, explain how a representative sample was taken, and develop a reasoned explanation for some data.</li> <li>• Recall why animals have adaptations, and use surface area to volume ratio to explain some adaptations.</li> <li>• Identify adaptations of plants and bacteria, explain the importance of adaptations, and explain a range of plant adaptations.</li> <li>• Recall that many materials are recycled in nature, explain the stages in the water and carbon cycles, and the importance of recycling materials.</li> </ul>		<p>Ecosystem Biodiversity Distribution Population Habitat Interdependent Competition Intraspecific Interspecific Quadrat Adaptation Deforestation Conservation</p>
		<p>How is this unit being assessed? End of unit assessment Y11 Paper 2 mock</p>
		<p>Knowledge Organiser</p>

<ul style="list-style-type: none"> <li>Recall that plants take in carbon as carbon dioxide, explain how carbon is recycled, and interpret a diagram of the carbon cycle.</li> <li>Identify why land use has changed, describe the effects of changing land use and evaluate a change in land use.</li> <li>Identify the reasons for deforestation, describe the impact of peat bog destruction and deforestation, and evaluate the destruction of peat bogs and forests.</li> <li>Recall what global warming is, describe the causes of global warming, and explain how global warming impacts on biodiversity.</li> <li>Describe how waste production is linked to human population growth, the impact of waste on ecosystems, and how waste impacts on biodiversity.</li> <li>Identify pollution levels using indicator species, explain how indicator species measure pollution, and compare different methods of measuring pollution.</li> <li>Describe some conservation measures and the impact of breeding programmes, and explain how habitats are regenerated.</li> <li>Maths skills: Using graphs to show relationships Recognise direct proportionality in a graph, calculate reaction rates in linear graphs, and use the gradient of a graph to calculate the rate.</li> </ul>		
<b>C5 Energy Changes</b> <ul style="list-style-type: none"> <li>Identify exothermic and endothermic reactions and investigate the variables that affect temperature changes in reacting solutions.</li> <li>Investigate the variables that affect temperature changes in reacting solutions such as acid plus metals, acid plus carbonates, neutralisations, displacement of metals.</li> <li>Use reaction profiles to identify reactions as exothermic or endothermic and describe the activation energy of a reaction.</li> <li>Use bond energies to describe the energy changes in bond breaking and bond making and explain how a reaction is endothermic or exothermic overall.</li> <li>Measure temperature changes accurately and use them to compare the energy released by different fuels.</li> </ul>		<p>Exothermic Endothermic Neutralisation Displacement Activation energy</p>
		<p>How is this unit being assessed? End of unit assessment</p>
		<p>Knowledge Organiser</p>