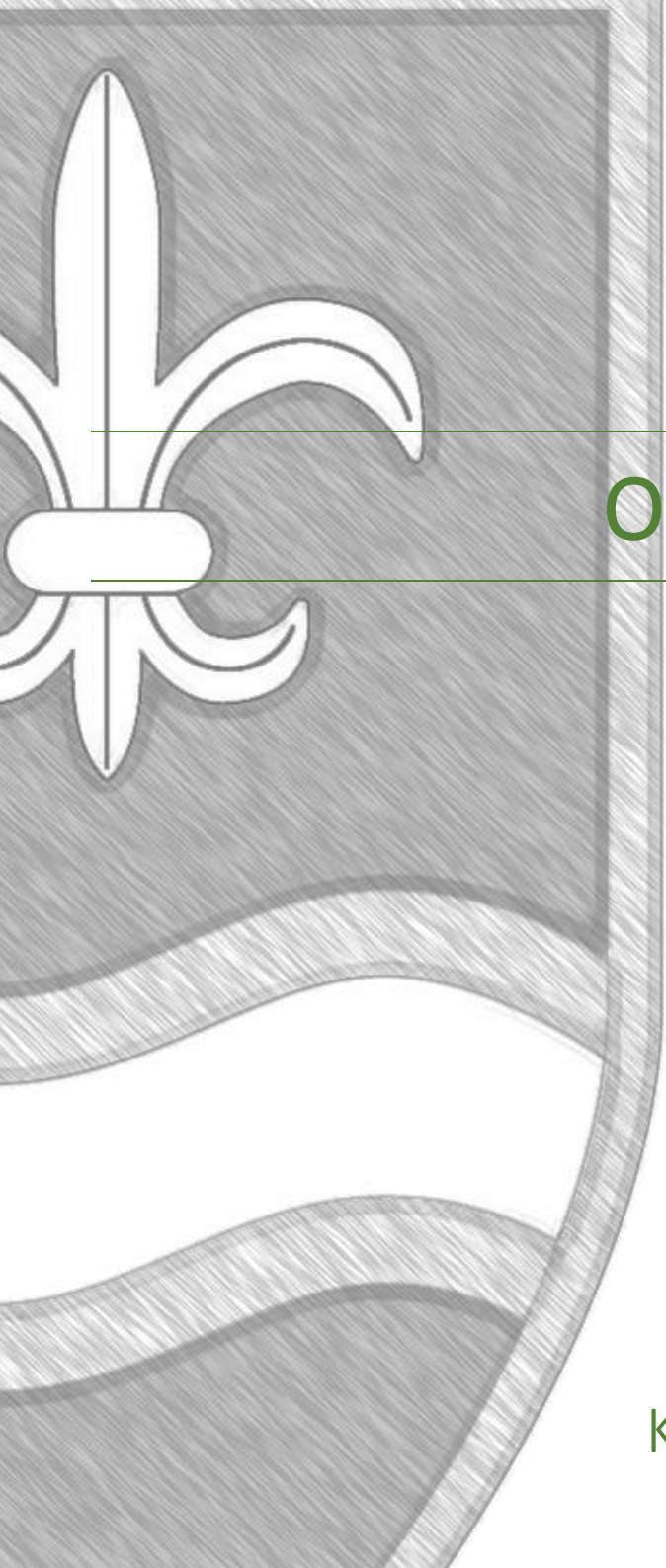
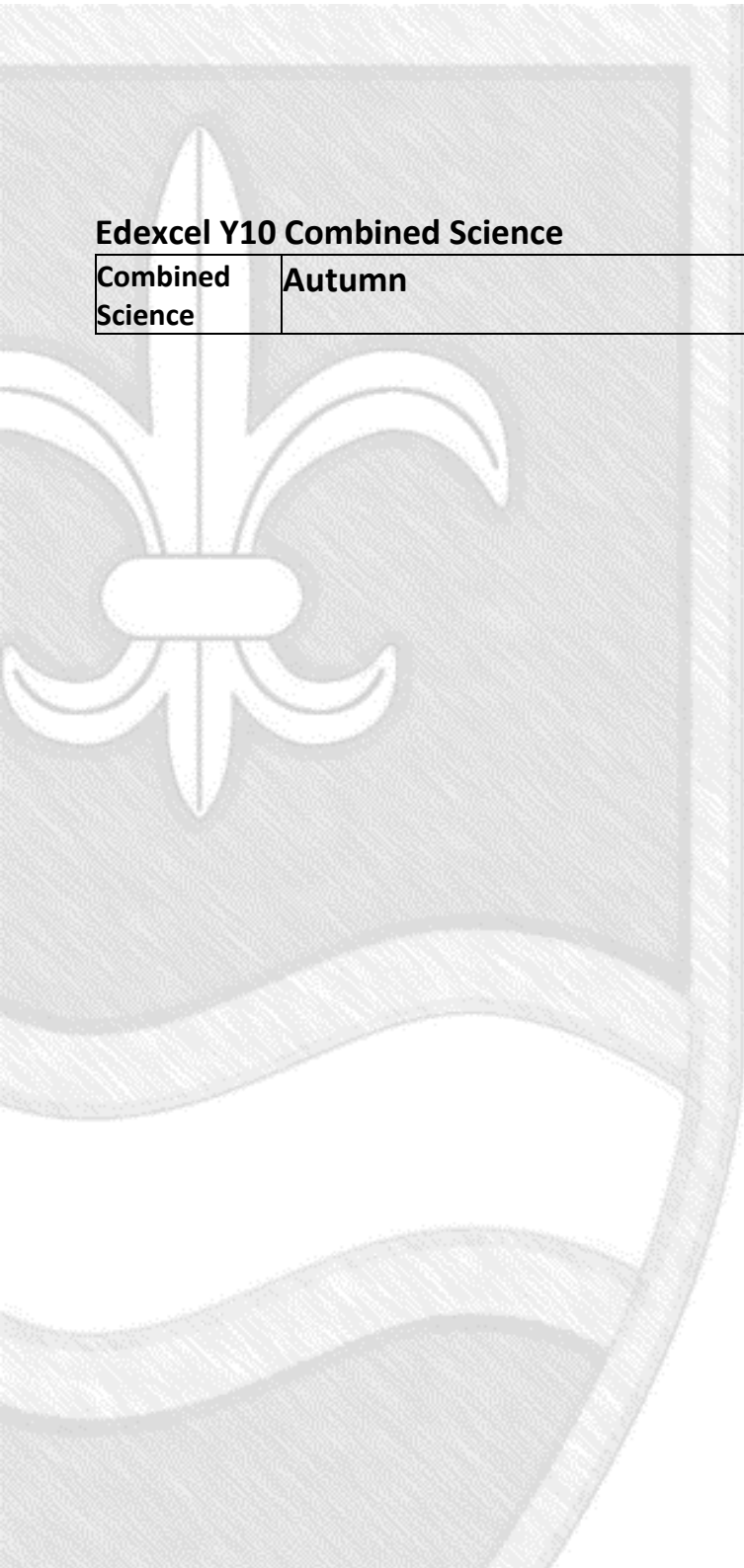




Our Lady's Catholic College

KS4 Science Curriculum Overview

Our Lady's Catholic College, Morecambe road, Lancaster, La12rx



Edexcel Y10 Combined Science

Combined Science	Autumn	Spring	Summer
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Biology	B1	B2 – B3	B4 – B5
	1. Microscopes and biological drawing 2. Size and units 3. Plant and animal cells (CP1) 4. Specialised cells 5. Bacterial cells 6. Enzymes 7. Enzyme action 8. Factors affecting enzymes (CP2) 9. Transporting substances 10. Osmosis in potatoes (CP4) Know How a light and electron microscope work and to understand the differences between magnification and resolution The organelles of eukaryotic and prokaryotic cells and how they are related to their function The function of enzymes and what factors affect enzyme activity How substances are transported Know how To use a light microscope to view eukaryotic cells To use the magnification calculation To explain why specialised cells are adapted to their function To compare and contrast the three transport processes	1. Mitosis 2. Growth in plants & animals 3. Stem Cells 4. The nervous system 5. Neurotransmission 6. Meiosis 7. DNA 8. Alleles 9. Inheritance 10. Gene mutation 11. Variation Know The process and importance of mitosis The importance of cell differentiation and the function of stem cells The structure and function of the nervous system and the importance of reflexes The process of meiosis and the key terms associated with inheritance The importance of mutation and variation Know how To explain the importance of mitosis and how cancer results in terms of cell division To explain how percentile charts are used to monitor growth and use these charts to plot and find masses and ranges Evaluate the use of stems cells in medicine Compare and contrast mitosis and meiosis To identify whether variation is continuous or discontinuous	1. Human evolution 2. Darwin's theory 3. Classification 4. Breeds and varieties 5. Genes in agriculture and medicine 6. Health and disease 7. Non-communicable disease 8. Cardiovascular disease 9. Pathogens 10. Physical and chemical barriers 11. The immune system Know The process of evolution and natural selection How organisms are classified into five kingdoms and three domains The process of selective breeding and genetic engineering The difference between communicable and non-communicable diseases What a pathogen is and the defence mechanisms the body has against these pathogens Know how To explain the fossil and tool evidence for human evolution To evaluate the benefits and risks of selective breeding and genetic engineering To use the formula for BMI and waist:hip ratio To evaluate immunisation, including the concept of herd immunity

Chemistry	C1 – C4	C5 – C8	C9 - C12
	- States of matter - Mixtures - Filtration and crystallisation - Paper chromatography - Distillation - Investigating inks (CP) - Structure of an atom - Atomic and mass number - Isotopes - Atomic number and the PT - Electronic configuration and PT Know How particles are arranged in different states and the properties of each state The practical set-up needed to separate different types of mixtures The structure of an atom and the properties of each subatomic particle How the atomic number and mass number of an atom (isotope) relates to their atomic structure and electron configuration Know how To separate different types of mixture in a laboratory How determine the atomic structure and electron configuration of an atom or isotope using a periodic table	- Ionic bonds, lattice and properties - Covalent bonds - Molecular compounds - Allotropes of carbon - Properties of metals - Bonding models - Acids and alkalis - Indicators - Neutralisation - Solubility Know The bonding, structure and properties of metals, ionic and covalent substances. The reactions and properties of acids and bases The role of indicators in acid-base reactions Know How To evaluate the advantages and disadvantages of bonding models To carry out acid-base reactions safely and make accurate observations To write and balance chemical equations To use solubility rules to predict if a substance will be soluble or not	- Empirical Formula - Conservation of mass - Moles (H) - Electrolysis - Electrolysis of copper sulphate (CP) - Reactivity - Ores - Oxidation & Reduction - Life cycle assessment and recycling - Dynamic Equilibrium Know What electrolysis and how it can be used to separate an ionic substance What dynamic equilibrium is and its role in the Haber process Know how To calculate the atomic mass of a substance To find or calculate the empirical formula of a substance if given the molecular formula, structure or reacting masses To calculate the amount of a substance when given data To calculate the empirical formula of a substance experimentally To predict the products of electrolysis To describe how to purify a metal depending on its reactivity To predict changes to the position of equilibrium when different conditions are changed

Physics	P1 – P2	P3 – P5	P6 – P8
	1. Vectors and scalars 2. Distance and velocity time graphs 3. Acceleration 4. Resultant forces 5. Newton's first law 6. Mass and weight 7. Newton's second law 8. Investigating acceleration (CP) 9. Newton's third law 10. Stopping distance	1. Energy stores 2. Energy transfers 3. Efficiency 4. Renewable and non-renewable resources 5. Describing waves 6. Investigating waves 7. Refraction 8. Electromagnetic waves 9. Using long & short wavelengths 10. Dangers of EM waves	1. Atomic Model 2. Inside Atoms 3. Electrons and orbits 4. Background radiation 5. Types of radiation 6. Decay 7. Half-life 8. Dangers of radioactivity 9. Work & Power 10. Vector Diagrams
	Know Define and explain different quantities Newton's laws and apply them to force problems The factors that affect stopping distance and how they can be mitigated Know how Change the subject of a formula correctly Describe distance/time or velocity/time graphs and to calculate speed, acceleration or distance from them Correctly use equipment to measure acceleration of an object	Know Different energy stores and transfers between them What the advantages and disadvantages are of different sources of energy The different types of waves, their properties and how to label a wave The EM spectrum, the uses, dangers and how they are produced Know how To investigate refraction To compare different sources of energy To calculate efficiency from a Sankey diagram or data	Know The atomic model and how it has been developed Sources of radiation and how it can be measured How nuclei decays and its half-life nature The dangers of radiation and the precautions needed How work and power can be used to describe the output of an entity Know how Measure half-life from a graph Resolve a vector diagram to find resultant force Measure radioactivity and how different types of radiation can be blocked

Edexcel Y11 Combined Science

Combined Science Y11	Autumn	Spring	Summer
Biology	B6 – B7 1. Photosynthesis 2. Factors affect photosynthesis 3. Light intensity & photosynthesis (CP) 4. Absorbing water and mineral ions 5. Transpiration and translocation 6. Hormones 7. Hormones and the menstrual cycle 8. The menstrual cycle 9. Control of blood glucose 10. Type 2 diabetes Know The equation for photosynthesis and the factors that affect the rate of photosynthesis The structure and function of the stomata, xylem and phloem and how they are involved in the process of transpiration and translocation What hormones are and the examples of processes in which they are involved within the body The cause and control of type 1 and type 2 diabetes Know how To explain why photosynthesis is so important for almost all life forms on Earth.	B8 – B9 1. Efficient transport and exchange 2. The circulatory system 3. The heart 4. Cellular Respiration 5. Respiration rates (CP) 6. Ecosystems 7. Abiotic factors 8. Quadrats & transects 9. Parasitism and mutualism 10. Biodiversity 11. Water, carbon and nitrogen cycle Know The importance of SA:V and how the lungs are adapted to gas exchange The components of the blood and circulatory system and the structure and function of the heart The process of aerobic and anaerobic respiration Understand abiotic and biotic factors and understand the importance of biodiversity and how human activities affect biodiversity of ecosystems Understand the water, carbon and nitrogen cycle. Know how To explain how the circulatory system is adapted for its function Calculate heart rate, stroke volume and cardiac output To compare and contrast aerobic and anaerobic respiration	Combined Science Revision and Exams

	To explain how plants are adapted for transpiration and translocation Evaluate contraceptive methods Calculated the BMI/waist:hip ratio and explain their correlation with type 2 diabetes	To carry out random sampling using quadrats and a transect line to sample an ecosystem Explain how conservation of animals affects biodiversity	
Chemistry	C13 – C15 - Group 1 - Group 7 - Halogens - Group 0 - Rates of reaction - Factors affecting rates of reaction - Investigating reaction rates (CP) - Catalysts - Endo and exothermic reactions - Energy changes in reactions Know The properties and reactions of elements in group 1, 7 and 0 and how they are related to their bonding, structure and electron configuration What the rate of reaction is and the factors that affect the rate of reaction The roles and effect of catalysts Exothermic and endothermic reactions in terms of bond breaking and bond forming	C16 – C17 - Hydrocarbons in crude oil - Fractional distillation - The alkane homologous series - Complete & incomplete combustion - Combustible fuels & pollution - Breaking down hydrocarbons - The early atmosphere - The changing atmosphere - The atmosphere today - Climate change Know What hydrocarbons are and their applications How the structure of hydrocarbons are related to their applications The drawbacks of using hydrocarbons on the environment How the atmosphere has changed from the start of the life of the Earth to modern day The current problems associated with the atmosphere and how we are trying to mitigate them Know how	Combined Science Revision and Exams

	Know how To investigate how different factors affect the rate of reaction (H) Calculate the energy released in a reaction when given bond enthalpies How catalysts speed up the rate of reaction	To draw the structure of hydrocarbons when given their name Construct balanced symbol equations for the combustion of hydrocarbons	
Physics	P9 – P11 1. Electric Circuits 2. Current, potential difference 3. Current, energy and charge 4. Resistance 5. Investigating resistance (CP) 6. Power 7. Electrical Safety 8. Magnets and magnetic fields 9. Electromagnetism 10. Transformers Know Circuit symbols and how current, voltage and resistance are related to each other What electricity safety features in place and how they work The role transformers and how the national grid transports electricity efficiently Know how To correctly assemble a working circuit To investigate the current voltage characteristics of a lamp resistor and diode	P12 – P13 1. Particles & Density 2. Investigating Density (CP) 3. Energy & changes of state 4. Energy calculations 5. Investigating water (CP) 6. Gas temperature and pressure 7. Bending and stretching 8. Investigating springs (CP) 9. Extension and energy transfers Know The arrangement of particles in different states of matter, how it relates to the objects density and what happens during phase transitions How particles behave in a gas when heated and how that will affect the pressure exerted on the container How elastic and inelastic objects behave when a force is applied to them Know how To investigate the density of a liquid or solid To investigate the specific heat capacity of water Investigate how force is related to extension in elastic object and calculate the spring constant and energy stored	Combined Science Revision and Exams

Edexcel KS4 Separate Biology

Combined Science Y11	Autumn	Spring	Summer
Y10	B1 1. Microscopes 2. Plant and animal cells 3. Using microscopes (CP) 4. Specialised cells 5. Bacterial cells 6. Enzyme action 7. Enzyme activity 8. Factors affecting enzymes (CP) 9. Food tests (CP) 10. Transporting substances 11. Osmosis in potatoes (CP) Know How a light and electron microscope work and to understand the differences between magnification and resolution The organelles of eukaryotic and prokaryotic cells and how they are related to their function The function of enzymes and what factors affect enzyme activity How substances are transported Know how To use a light microscope to view eukaryotic cells To use the magnification calculation To perform calculations with numbers written in standard form To explain why specialised cells are adapted to their function How to use food tests to identify the main substances in food	B2 – B3 1. Mitosis 2. Growth in plants & animals 3. Stem Cells 4. The brain 5. Brain & spinal cord problems 6. The nervous system 7. The eye 8. Neurotransmission speeds 9. Sexual and asexual reproduction 10. Meiosis 11. DNA & DNA extraction 12. Protein synthesis 13. Genetic variance and phenotypes 14. Mendel 15. Alleles 16. Inheritance 17. Gene mutation 18. Variation Know The process and importance of mitosis The importance of cell differentiation and the function of stem cells The structure and function of the nervous system and the importance of reflexes The structure and function of the main parts of the brain and eye The process of meiosis and the key terms associate with inheritance The importance of mutation and variation Know how	B4 – B5 1. Human evolution 2. Darwin's theory 3. Classification 4. Breeds and varieties 5. Tissue culture 6. Genes in agriculture and medicine 7. GM and agriculture 8. Fertilisers and biological control 9. Health and disease 10. Non-communicable disease 11. Cardiovascular disease 12. Pathogens 13. Spreading pathogens 14. Virus life cycles 15. Plant defences and diseases 16. Physical and chemical barriers 17. The immune system 18. Antibiotics (CP) 19. Monoclonal antibodies Know The process of evolution and natural selection and understand how Darwin and Wallace came up with the idea of natural selection How organisms are classified into five kingdoms and three domains The process of selective breeding and genetic engineering The difference between communicable and non-communicable diseases What a pathogen is and the defence mechanisms the body has against these pathogens

	To compare and contrast the three transport processes	To explain the importance of mitosis and how cancer results in terms of cell division To explain how percentile charts are used to monitor growth and use these charts to plot and find masses and ranges Evaluate the use of stems cells in medicine To explain how brain and eye injuries are treated Compare and contrast mitosis and meiosis To extract DNA from fruit To identify whether variation is continuous or discontinuous	Know how To explain the fossil and tool evidence for human evolution and how the pentadactyl limb provides evidence for vertebrate evolution To evaluate the benefits and risks of selective breeding and genetic engineering To use the formula for BMI and waist:hip ratio To evaluate immunisation, including the concept of herd immunity
Y11	B6 – B7 1. Photosynthesis 2. Factors affect photosynthesis 3. Light intensity & photosynthesis (CP) 4. Absorbing water and mineral ions 5. Transpiration and translocation 6. Plant adaptations 7. Plant hormones 8. Use of plant hormones 9. Hormones 10. Hormones and the menstrual cycle 11. Control of blood glucose 12. Type 2 diabetes 13. Thermoregulation 14. Osmoregulation 15. The kidneys Know	B8 – B9 1. Efficient transport and exchange 2. Factors affecting diffusion 3. The circulatory system 4. The heart 5. Cellular Respiration 6. Respiration rates (CP) 7. Ecosystems 8. Energy transfer 9. Abiotic factors 10. Quadrats & transects (CP) 11. Parasitism and mutualism 12. Biodiversity 13. Preserving biodiversity 14. Water, carbon and nitrogen cycle 15. Rates of decomposition Know	Separate Biology Revision and Exams

	The equation for photosynthesis and the factors that affect the rate of photosynthesis The structure and function of the stomata, xylem and phloem and how they are involved in the process of transpiration and translocation Understand the effects of plant hormones What hormones are and the examples of processes in which they are involved within the body The cause and control of type 1 and type 2 diabetes Know how To explain why photosynthesis is so important for almost all life forms on Earth. To explain how plants are adapted for transpiration and translocation Explain the commercial use of plant hormones Evaluate contraceptive methods Calculated the BMI/waist:hip ratio and explain their correlation with type 2 diabetes	The importance of SA:V and how the lungs are adapted to gas exchange The components of the blood and circulatory system and the structure and function of the heart The process of aerobic and anaerobic respiration Understand abiotic and biotic factors and understand the importance of biodiversity and how human activities affect biodiversity of ecosystems Understand the water, carbon and nitrogen cycle. Know how To explain how the circulatory system is adapted for its function Calculate heart rate, stroke volume and cardiac output To compare and contrast aerobic and anaerobic respiration To carry out random sampling using quadrats and a transect line to sample an ecosystem Explain how conservation of animals affects biodiversity	
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Edexcel KS4 Separate Chemistry

Combined Science Y11	Autumn	Spring	Summer
Y10	C1 – C7 - States of matter - Mixtures - Filtration and crystallisation - Paper chromatography - Distillation - Investigating inks (CP) - Drinking water - Structure of an atom - Atomic and mass number - Isotopes - Elements and the periodic table - Atomic number and the PT - Electronic configuration and PT - Ionic bonds, lattice and properties - Covalent bonds - Molecular compounds - Allotropes of carbon - Properties of metals - Bonding models Know How particles are arranged in different states and the properties of each state The practical set-up needed to separate different types of mixtures The structure of an atom and the properties of each subatomic particle How the atomic number and mass number of an atom (isotope) relates to their atomic structure and electron configuration The bonding, structure and properties of metals, ionic and covalent substances.	C8 – C10 - Acids and alkalis & indicators - Looking at acids - Bases & Salts - Preparing copper sulfate (CP) - Alkalis and balancing equations - Neutralisation (CP) - Reactions of acids with carbonates - Solubility - Empirical Formula - Conservation of mass - Moles - Electrolysis - Electrolysis of copper sulphate (CP) - Products from electrolysis Know The reactions and properties of acids and bases The role of indicators in acid-base reactions What electrolysis and how it can be used to separate an ionic substance Know how To carry out acid-base reactions safely and make accurate observations To write and balance chemical equations To use solubility rules to predict if a substance will be soluble or not To calculate the atomic mass of a substance To find or calculate the empirical formula of a substance if given the molecular formula, structure or reacting masses To calculate the amount of a substance when given data	C11 – C14 - Reactivity - Ores - Oxidation & Reduction - Life cycle assessment and recycling - Dynamic Equilibrium - Transition metals - Corrosion - Electroplating - Alloying - Uses of metals and their alloys - Yields - Atom economy - Concentrations - Titrations & Calculations - Acid Alkali titration - Molar volume of gases Know What dynamic equilibrium is and its role in the Haber process The reactions of metals and different techniques to reduce or prevent them Know how To describe how to purify a metal depending on its reactivity To calculate atom economy, concentrations of solutions and molar volume of gases

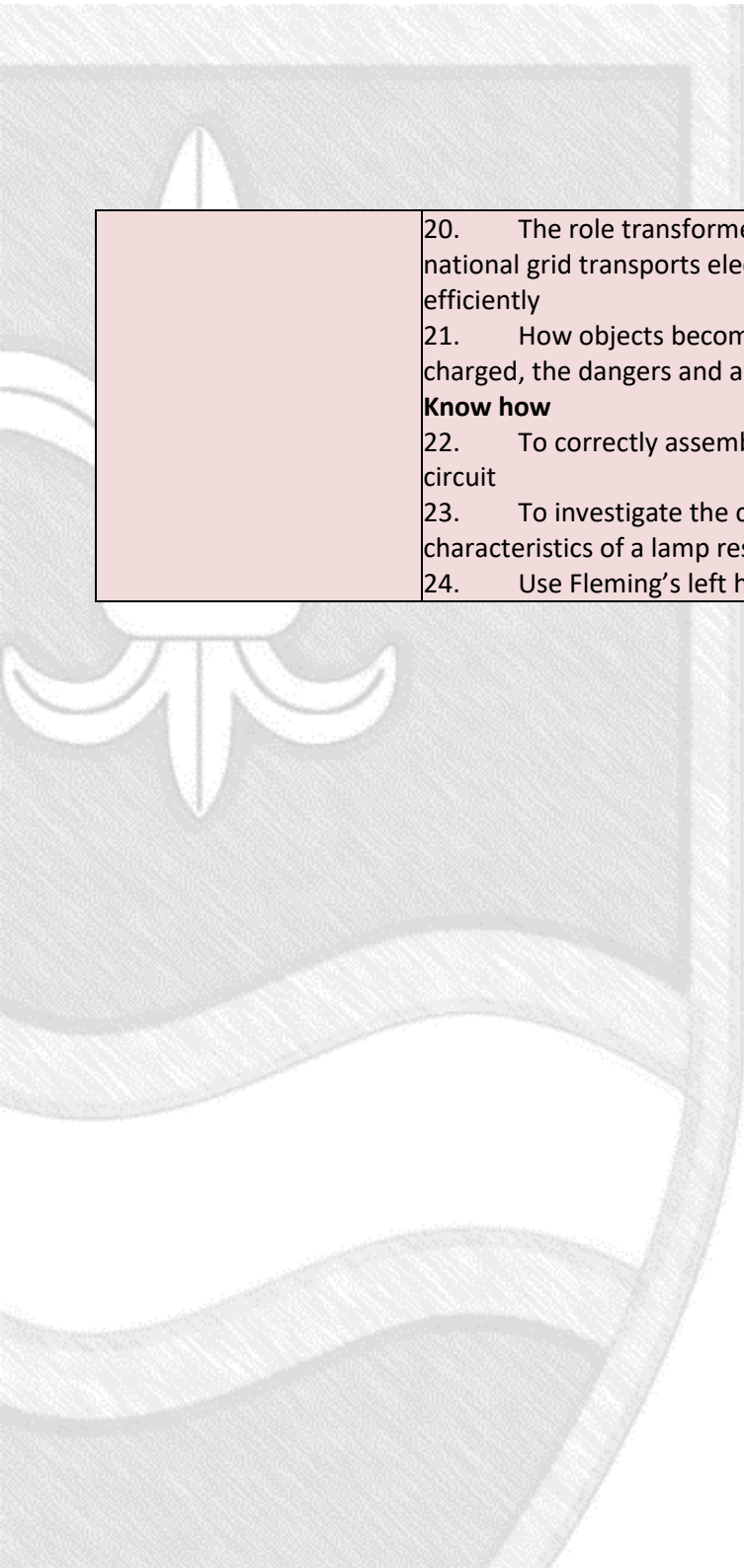
	Know how To separate different types of mixture in a laboratory How determine the atomic structure and electron configuration of an atom or isotope using a periodic table To evaluate the advantages and disadvantages of bonding models	To calculate the empirical formula of a substance experimentally To predict the products of electrolysis	
Y11	C14 – C20 1. Fertilisers and the Haber processes 2. Factors affecting equilibrium 3. Chemical cells and fuel cells 4. Group 1 5. Group 7 6. Halogens 7. Group 0 8. Rates of reaction 9. Factors affecting rates of reaction 10. Investigating reaction rates (CP) 11. Catalysts and activation energy 12. Endo and exothermic reactions 13. Energy changes in reactions 14. Hydrocarbons in crude oil & natural gas 15. Fractional distillation of crude oil 16. The alkane homologous series	C21 – C26 11. Breaking down hydrocarbons 12. The early atmosphere 13. The changing atmosphere 14. The atmosphere today 15. Climate change 16. Alkenes & Alkanes 17. Ethanol production 18. Alcohols 19. Combustion of alcohols (CP) 20. Carboxylic acid 21. Polymer properties and uses 22. Condensation & Addition polymerisation 23. Flame tests and photometry 24. Test for negative and positive ions 25. Identifying ions (CP) 26. Composite materials 27. Nanoparticles	Separate Chemistry Revision and Exams

	17. Combustible fuels and pollution Know The Haber process and how its conditions are optimum The properties and reactions of elements in group 1,7 and 0 and how they are related to their bonding, structure and electron configuration What the rate of reaction is and the factors that affect the rate of reaction The roles and effect of catalysts Exothermic and endothermic reactions in terms of bond breaking and bond forming What hydrocarbons are and their applications How the structure of hydrocarbons are related to their applications The drawbacks of using hydrocarbons on the environment Know how To predict changes to the position of equilibrium when different conditions are changed To investigate how different factors affect the rate of reaction (H) Calculate the energy released in a reaction when given bond enthalpies How catalysts speed up the rate of reaction To draw the structure of hydrocarbons when given their name Construct balanced symbol equations for the combustion of hydrocarbons	Know The drawbacks of using hydrocarbons on the environment How the atmosphere has changed from the start of the life of the Earth to modern day The current problems associated with the atmosphere and how we are trying to mitigate them The structure of different organic functional groups The qualitative tests for different ions Composite materials and nanoparticles Know how To draw the structure of hydrocarbons when given their name Construct balanced symbol equations for the combustion of hydrocarbons How to draw organic reactions using their structures To draw polymers from addition and condensation polymerisation To identify different ions from a series of tests	
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Edexcel KS4 Separate Physics

Combined Science Y10	Autumn 2025	Spring 2026	Summer 2026
Y10	P1 – P3 - Vectors and scalars - Distance and velocity time graphs - Acceleration - Resultant forces - Newton's first law - Mass and weight - Newton's second law - Investigating acceleration (CP) - Newton's third law - Momentum - Stopping distances - Braking distance and energy - Crash Hazards - Energy stores & transfers - Energy efficiency - Keeping warm - Stored energies - Renewable and non-renewable resources Know Define and explain different quantities Newton's laws and apply them to force problems The factors that affect stopping distance and how they can be mitigated Different energy stores and transfers between them What the advantages and disadvantages are of different sources of energy Know how Change the subject of a formula correctly	P4 – P5 - Describing waves - Investigating waves - Refraction - Waves crossing boundaries - Ears and hearing - Ultrasound - Infrasound - Ray diagrams (CP) - Colour - Lenses - Electromagnetic waves - Using long & short wavelengths - Radiation & temperature - Investigating radiation (CP) - Dangers of EM waves Know The different types of waves, their properties and how to label a wave The EM spectrum, the uses, dangers and how they are produced How colour interacts additively and the role of filters The frequency range of ultrasound and infrasound and their applications Know how To investigate refraction Draw accurate ray diagrams To investigate radiation	P6 – P8 - Atomic Model - Inside Atoms - Electrons and orbits - Background radiation - Types of radiation - Decay - Half-life - Radioactive decay - Using radioactivity - Dangers of radioactivity - Nuclear energy - Nuclear fission & fusion - The solar system - Gravity & orbits - Life cycles of stars - Red shift - Origin of the Universe - Work & Power Know The atomic model and how it has been developed Sources of radiation and how it can be measured How nuclei decays and its half-life nature The dangers of radiation and the precautions needed The advantages and disadvantages of nuclear power The process of nuclear fission and fusion the components of a nuclear reactor How work and power can be used to describe the output of an entity

	Describe distance/time or velocity/time graphs and to calculate speed, acceleration or distance from them To compare different sources of energy Correctly use equipment to measure acceleration of an object To calculate efficiency from a Sankey diagram or data		The structure of the solar system The theories for the origin of the universe and the evidence for each theory Know how Measure half-life from a graph Measure radioactivity and how different types of radiation can be blocked Calculate work and power
Y11	P9 – P12 - Objects affecting each other - Vector diagrams - Rotational forces - Electric Circuits - Current, potential difference - Current, energy and charge - Resistance - Investigating resistance (CP) - Power - Electrical Safety - Static electricity - Electrical fields - Magnets and magnetic fields - Electromagnetism - Magnetic forces - The national grid - Transformers Know - Circuit symbols and how current, voltage and resistance are related to each other - What electricity safety features in place and how they work	P12 – P15 - Particles & Density - Investigating Density (CP) - Energy & changes of state - Energy calculations - Investigating water (CP) - Gas temperature and pressure - Gas pressure & volume - Bending and stretching - Investigating springs (CP) - Extension and energy transfers - Pressure in fluids - Pressure & upthrust Know The arrangement of particles in different states of matter, how it relates to the objects density and what happens during phase transitions How particles behave in a gas when heated and how that will affect the pressure exerted on the container How elastic and inelastic objects behave when a force is applied to them How a difference in pressure leads to upthrust Know how To investigate the density of a liquid or solid	Separate Physics Revision and Exams



	20. The role transformers and how the national grid transports electricity efficiently 21. How objects become statically charged, the dangers and applications Know how 22. To correctly assemble a working circuit 23. To investigate the current voltage characteristics of a lamp resistor and diode 24. Use Fleming's left hand rule	To investigate the specific heat capacity of water Investigate how force is related to extension in elastic object and calculate the spring constant and energy stored	
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