B3. 1 Cells and Transport	B3. 2 Systems in the human body	B3. 3 Plants and photosynthesis	B3.4 Ecosystems and Biodiversity
1.1 The microscope - How microscopy techniques have developed over time - How to calculate the magnification, real size, and image of a specimen. - The differences in the magnification and resolution between a light microscope and an electron microscope	2.1 Aerobic respiration - Recall the chemistry of aerobic respiration - Understand why cellular respiration is so important	3.1 Specialised plant cells - Describe how plant cells may be specialised to carry out a particular function. - Explain how the structure of different types of plant cells relates to their function.	4.1 Organisation of an ecosystem - Discuss what is meant by a stable community. - Know how organisms are adapted to the conditions in which they live. - Know the relationship between communities and ecosystems.
1.2 Animal and plant cells - The main parts of animal cells - The similarities and differences between plant and animal cells	2.2 Anaerobic respiration - Describe why less energy is transferred by anaerobic respiration then by aerobic respiration - Explain what is meant by oxygen debt	3.2 Plant tissues and organs - Describe how the roots, stem, and leaves of a plant form a plant organ system for transport of substances around the plant.	4.2 Feeding relationships - Identify the importance of photosynthesis in feeding relationships. - Identify the main feeding relationships within a community. - Describe how the numbers of predators and prey in a community are related.
1.3 Multicellular & Unicellular - How bacteria compare to animal and plant cells. - The similarities and differences between eukaryotic cells and prokaryotic cells	2.3 Exchanging materials - Describe how the surface area to volume ratio varies depending on the size of an organism - Explain why large multicellular organisms need special systems for exchanging materials with the environment	3.3 Meristems and plant cloning - Recall the function of meristems in plants. - Describe how plant clones can be produced quickly and economically.	4.3 factors affecting communities - Identify some of the non-living(abiotic) and living (biotic) factors that affect communities.
1.4 Diffusion - How diffusion takes place and why it is important in living organisms - What affects the rate of diffusion	2.4 The blood - Recall how substances are transported to and from the cells - Know that blood is made up of different components - Describe the functions of each main component of blood	3.4 Evaporation & transpiration - Describe what transpiration is. - Explain the role of stomata and guard cells in controlling gas exchange and water loss.	4.4 Competition in animals - Understand why animals compete. - Describe the factors that organisms are competing for in a habitat. - Explain what makes an animal a successful competitor.
1.5 Osmosis - How osmosis differs from diffusion - Why osmosis is so important in animal cells.	2.5 Blood Vessels - Describe how the blood flows around the body - Recall that there are different types of blood vessels - Explain why valves are important	3.5 Factors affecting transpiration - Recall the factors which affect the rate of transpiration. - Describe the ways of investigating the effect of environmental factors on rate of water uptake.	4.5 Competition in plants - Know what plants compete for. - Understand how plants compete. - Describe the adaptations that plants have to make them successful competitors.

	- Explain the importance of a double circulation system		
1.6 Osmosis in plants	2.6 The heart	3.6 Photosynthesis	4.6 Field Investigations
- Why osmosis is so important in plant cells - How to investigate the effect of osmosis in plant tissues	- Recall the structure and function of the heart - Describe how the heart keeps its natural rhythm - Explain how artificial pacemakers work	- Recall the raw materials and energy source for photosynthesis. - Recall that photosynthesis is an endothermic reaction. - Recall the equations that summarise photosynthesis.	- How to measure the distribution of living things in their natural environment. - How finding the mean, median and mode can help you understand your data.
1.7 Active Transport	2.7 Breathing & gas exchange	3.7 The rate of photosynthesis	4.7 Biodiversity
- How active transport works - The importance of active transport in cells.	- Recall the structure of the human gas exchange system - Describe how gases are exchanged in the alveoli of the lungs	- Describe how temperature, light intensity and carbon dioxide concentration affect the rate of photosynthesis.	-What biodiversity is and why it is important.
	2.8 The chemistry of food	3.8 Making most of photosynthesis (H only)	4.8 Human factors affecting biodiversity
-	- Describe the basic structures of carbohydrates, proteins and lipids.	- Explain how different factors affecting the rate of photosynthesis interact. - Explain how humans can manipulate the environment in which plants grow.	- Some of the effects of the growth in human population on the Earth and its resources. - What is meant by deforestation. - Why loss of biodiversity matters. - The environmental effects of destroying peat bogs.
	2.9 The digestive system	3.9 Plant diseases	4.9 Land & water pollution
-	- Recall how the food you eat is digested in your body - Describe the role played by different parts of the digestive system - Explain the roles played by the different digestive enzymes	- Recall how plant diseases are spread. - Recall examples of viral and fungal diseases in plants.	- Some negative human impacts on ecosystems from polluting the land. - Some negative human impacts on ecosystems from polluting the water.
		3.10 Chlorophyll & chromatography	4.10 positive human impacts on ecosystem
	-	- Describe how chromatography works. - Recall chlorophyll and other plant pigments.	- How waste, deforestation and global warming all have an impact upon biodiversity. - Some of the ways in which people are trying to reduce the impact of human activities on ecosystems and maintain biodiversity.
		3.11 Analysing chromatograms	

		- Recall how chromatography can be used for distinguishing pure substances from impure substances. - Recall how to interpret chromatograms. - Recall how to determine the Rf values from chromatograms.

C3. 1 Atomic structure	C3. 2 The periodic table	C3. 3 Acids, alkalis & salts
1.1 Scientific models of the atom	2.1 Development of periodic table	3.1 Salts from metals
- How and why the atomic model has changed over time. - That scientific theories are revised or replaced by new ones in light of new evidence.	- Describe how the periodic table was developed over time - Describe how testing a prediction can support or refute a new scientific idea	- Recall the reactions of Magnesium, Zinc and Iron with Hydrochloric Acid and Sulfuric Acid and how to collect the salts formed - Describe why these reactions are called redox reactions - Identify which species are oxidised and which are reduced in given chemical equations, in terms of electron transfer
1.2 Sub-atomic particles	2.2 Electronic structures & periodic table	3.2 Salts from insoluble bases
- The location, relative charge and relative mass of the protons, neutrons, and electrons in an atom. - What the atomic number and mass number of an atom represent. - Why atoms have no overall charge. - That atoms of a particular element have the same number of protons	- Explain how atomic structure is linked to the periodic table - Know how metals and non-metals differ, including the electronic structures of their atoms and their positions in the periodic table. - Know why the noble gases are so unreactive	- Describe the reaction between an acid and a base - Describe a method to prepare pure, dry crystals of the salts formed in neutralisation reactions between acids and insoluble bases - Predict products from given reactants - Use the formulae of common ions to deduce the formulae of salts
1.3 Sizes of atoms & isotopes	2.3 Group 1 The alkali metals	3.3 Making more salts
- How to work out the number of protons, neutrons and electrons - How to represents an atom's atomic number and mass number. - How to estimate the size and scale of atoms using SI units and the prefix – nano.	- Explain how the Group 1 elements behave. - Describe how the properties of the Group 1 elements change going down the group	- Describe the reactions of acids and alkalis - Recall the ions involved in neutralisation reactions - Describe the reactions of acids and carbonates - Describe a method for making pure, dry samples of a named soluble salt from the information provided
1.4 Electronic structures	2.4 Group 7 The halogens	3.4 Exothermic & Endothermic reactions
- How the electrons are arranged in an atom. - The electronic structures of the first 20 elements in the periodic table. - How to represents electronic structures in diagrams and using numbers.	- Describe how the Group 7 elements behave - Explain how the properties of the Group7 elements change going down the group	- Understand that energy cannot be created or destroyed in a chemical reaction - Know that energy is transferred to or from the surroundings in chemical reactions, and some examples of these exothermic and endothermic reactions - Distinguish between exothermic and endothermic reactions on the basis of the temperature change

		- Carry out an investigation into energy changes in chemical reactions
	2.5 Explaining trends	3.5 Neutralisation & the pH scale
-	- Describe the trends in reactivity in Group 1 and Group 7 - Describe how electronic structure can explain trends in reactivity in these groups	- Describe solutions are acidic or alkaline - Use universal indicator to measure the approximate pH of a solution - Use the pH scale to identify acidic or alkaline solutions - Investigate pH changes when a strong acid neutralises a strong alkali
		3.6 Strong & weak acids (H only)
-	-	- Use and explain the terms dilute and concentrated, and weak and strong in relation to acids - Explain how the concentration of hydrogen ions in a solution affects the numerical value of pH (whole number values of pH only)

P3. 1 Matter and Particles	**P3. 2 Magnetism and Electromagnetism**	**P3. 3 Renewable Energy**
1.1 Matter and Particles	2.1 Magnetic fields	3.1 Energy demands
- The different properties of solids, liquids and gases. - The arrangement and motion of particles in a solid, liquid and a gas. - The difference between a physical and a chemical change. - The limitations of the simple particle model	- Recall the force rule for two magnetic poles near each other - Describe the pattern of magnetic field lines around a bar magnet - Describe what induced magnetism is - Explain why steel, not iron, is used to make permanent magnets	- Describe how most of your energy demands are met today - Recall what other energy resources are used - Describe how nuclear fuels are used in power stations - Know what other fuels are used to generate electricity
1.2 Density	2.2 Electromagnetism	3.2 Energy from wind & water
- How density is defined and its unit. - How to measure the density of a solid object or a liquid. - How to tell from its density if an object will float in water. - How to use the density equation to calculate the mass or the volume of an object or a sample	- Recall what a uniform magnetic field is - Explain what an electromagnet is and what it is used for - Describe the pattern of the magnetic field around a straight wire and a solenoid carrying a current - Describe how the strength and direction of each field above varies with position and with current	- Know what a wind turbine is made up of - Describe how waves can be used to generate electricity - Name the power station that uses water running downhill to generate electricity - Describe how tides can be used to generate electricity
1.3 Gas pressure & Temperature	2.3 The motor effect (H only)	3.3 Solar power

- How a gas exerts pressure on a surface - How the pressure of a gas in a sealed container is affected by temperature of the gas. - Why raising the temperature of a gas in a sealed container increases the pressure of the gas. - How to see evidence of gas molecules moving around at random.	- Describe how to change the size and reverse the direction of the force on a current carrying wire in a magnetic field - Describe how a simple electric motor works - Recall what is meant by magnetic flux density - Calculate the force on a current – carrying wire	- Describe what solar cells are and how they are used - Describe the difference between a panel of solar cells and a solar heating panel - Identify what a solar power tower is
1.4 Changes of state		3.4 Energy & the environment
- What is meant by the melting point and the boiling point of a substance. - What is needed to melt a solid or to boil a liquid. - Why the mass of a substance that changes state stays the same. - How to use the temperature-time graph to find the melting point or the boiling point of a substance.	-	- Explain what fossils fuels do to the environment - Identify why people are concerned about nuclear power - Compare the advantages and disadvantages of renewable energy resources - Evaluate the use of different energy resources
1.5 Internal energy		3.5 Big energy issues
- How increasing the temperature of a substance affects it internal energy. - How to explain the different properties of a solid, liquid and a gas. - How the energy of the particles of a substance changes when the substance is heated. - How to explain, in terms of particles why a gas exerts pressure.		• Discuss how best to use electricity supplies to meet variations in demand • Discuss which energy resources need to be developed to meet people's energy needs in future • State how the economic costs of different energy resources compare
1.6 Specific heat capacity		-
- What is meant by the specific heat capacity of a substance. - How to calculate the energy changes that occur when an object changes temperature. - How the mass of a substance affects how quickly its temperature changes when it is heated. - How to measure the specific heat capacity of a substance.	-	-
1.7 Specific latent heat (H only)		
- What is meant by latent heat as a substance changes its state. - What is meant by *specific* latent heat of fusion and vaporisation. - Hot to use latent heat in calculations. - How to measure the specific latent heat of ice and water.	-	-
1.8 Pure substances and mixtures		

- What is meant by the purity of a substance - How the everyday and scientific meanings of ‘pure’ differ. - How to use melting point data to distinguish pure from impure substances.	-	-