MARINA INTERNATIONAL SCHOOL

COMBINED SCIENCE SCHEME OF WORK

FORM 4 - TERM 1

WEEK	TOPIC	TOPIC DETAILS
1.1	Characteristics of living organisms	☐ Describe the characteristics of living organisms by defining the terms: • Movement as an action by an organism causing a change of position or place. • respiration as the chemical reactions in cells that break down nutrient molecules and release energy • sensitivity as the ability to detect and respond to changes in the environment • growth as a permanent increase in size • reproduction as the processes that make more of the same kind of organism • excretion as removal from organisms of toxic materials and substances in excess of requirements • nutrition as taking in of materials for energy, growth and development
1.2	Cells and Cell structure	☐ Relate the structure of the following(specialized cells) to their functions: –– ciliated cells – movement of mucus in the trachea and bronchi –– root hair cells – absorption –– palisade mesophyll cells – photosynthesis –– red blood cells – transport of oxygen –– sperm and egg cells – reproduction ☐ Calculate magnification and size of biological specimens using millimetres ☐ State that living organisms are made of cells ☐ Describe and compare the structure of a plant cell with an animal cell, as seen under a light microscope, limited to cell wall, nucleus, cytoplasm, chloroplasts, vacuoles and location of the cell membrane ☐ State the functions of the structures seen under the light microscope in the plant cell and in the animal cell

WEEK	TOPIC	TOPIC DETAILS
2.1	The particulate nature of matter	1. State the distinguishing properties of solids, liquids and gases 2. Describe the structure of solids, liquids and gases in terms of particle separation, arrangement and types of motion 3. Describe the changes of state in terms of melting, boiling, freezing,evaporation, and condensation 4. Explain changes of state in terms of particle theory and the energy changes involved 5. Describe qualitatively the pressure and temperature of a gas in terms of the motion of its particles
2.2	Experimental techniques, measurement & Method of purification	6. Name and suggest appropriate apparatus for the measurement of time, temperature, mass and volume, including burettes, pipettes and measuring cylinders 7. Criteria of purity 8. Interpret simple chromatograms 9. Interpret simple chromatograms, including the use of Rf values 10. Describe and explain methods of separation and purification by the use of a suitable solvent, filtration, crystallisation, distillation, fractional distillation and paper chromatography 11. Suggest suitable separation and purification techniques, given information about the substances involved

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3.1	Motion	Use and describe the use of rules and measuring cylinders to find a length or a volume Use and describe the use of clocks and devices, both analogue and digital, for measuring an interval of time Obtain an average value for a small distance and for a short interval of time by measuring multiples (including the period of a pendulum) Define speed and calculate average speed from =(total distance)/(total time) Plot and interpret a speed-time graph and a distance-time graph Recognise from the shape of a speed-time graph when a body is: –– at rest –– moving with constant speed –– moving with changing speed Calculate the area under a speed-time graph to work out the distance travelled for motion with constant acceleration Calculate acceleration from the gradient of a speed-time graph Recognise linear motion for which the acceleration is constant and calculate the acceleration Recognise motion for which the acceleration is not constant Demonstrate understanding that acceleration and deceleration are related to changing speed including qualitative analysis of the gradient of a speed-time graph
3.2	Mass and weight	1. Distinguish between mass and weight 2. Know that the Earth is the source of a gravitational field 3. Describe, and use the concept of, weight as the effect of a gravitational field on a mass 4. Recognise that g is the gravitational force on unit mass and is measured in N / kg 5. Recall and use the equation W = mg
4.1	Movement in and out of cells	1. Define diffusion as the net movement of particles from a region of their higher concentration to a region of their lower concentration down a concentration gradient, as a result of their random movement 2. State that substances move into and out of cells by diffusion through the cell membrane 3. State that water diffuses through partially permeable membranes by osmosis 4. Define osmosis as the net movement of water molecules from a region of higher water potential (dilute solution) to a region of lower water potential (concentrated solution), through a partially permeable membrane 5. State that water moves in and out of cells by osmosis through the cell membrane 6. Investigate and describe the effects on plant tissues of immersing them in solutions of different concentrations

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5.1	Atoms, elements and compounds & Physical and chemical changes	1. Demonstrate understanding of the terms atom, molecule and ion 2. Identify physical and chemical changes, and understand the differences between them 3. Describe the differences between elements, mixtures and compounds, and between metals and non-metals 4. Define the terms solvent, solute, solution and Concentration 5. Describe the structure of an atom in terms of a central nucleus, containing protons and neutrons, and 'shells' of electrons 6. Describe the build-up of electrons in 'shells' and understand the significance of the noble gas electronic structures and of the outer shell electrons (The ideas of the distribution of electrons in s and p orbitals and in d block elements are not required) 7. State the charges and approximate relative masses of protons, neutrons and electrons 8. Define and use proton number (atomic number) as the number of protons in the nucleus of an atom 9. Define and use nucleon number (mass number) as the total number of protons and neutrons in the nucleus of an atom Use proton number and the simple structure of atoms to explain the basis of the Periodic Table, with special reference to the elements of proton numbers 1 to 20
6.1	Density , Effects of forces and pressure	Recall and use the equation ρ=m/v Describe an experiment to determine the density of a liquid and of a regularly shaped solid and make the necessary calculation Describe the determination of the density of an irregularly shaped solid by the method of displacement and make the necessary calculation Describe how forces may change the size, shape and motion of a body Plot and interpret extension-load graphs and describe the associated experimental procedure State Hooke's Law and recall and use the expression F = k x, where k is the spring constant Recognise the significance of the term 'limit of proportionality' for an extension-load graph Understand friction as the force between two surfaces which impedes motion and results in heating Recognise air resistance as a form of friction Find the resultant of two or more forces acting along the same line Recognise that if there is no resultant force on a body it either remains at rest or continues at constant speed in a straight line Relate qualitatively pressure to force and area, using appropriate examples Recall and use the equation p = F / A

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7.1	Density , Effects of forces and pressure	Recall and use the equation ρ=m/v Describe an experiment to determine the density of a liquid and of a regularly shaped solid and make the necessary calculation Describe the determination of the density of an irregularly shaped solid by the method of displacement and make the necessary calculation Describe how forces may change the size, shape and motion of a body Plot and interpret extension-load graphs and describe the associated experimental procedure State Hooke's Law and recall and use the expression F = k x, where k is the spring constant Recognise the significance of the term 'limit of proportionality' for an extension-load graph Understand friction as the force between two surfaces which impedes motion and results in heating Recognise air resistance as a form of friction Find the resultant of two or more forces acting along the same line Recognise that if there is no resultant force on a body it either remains at rest or continues at constant speed in a straight line Relate qualitatively pressure to force and area, using appropriate examples Recall and use the equation p = F / A
8.1	Biological molecules	1. List the chemical elements that make up: ☐ carbohydrates ☐ fats ☐ proteins 2. State that large molecules are made from smaller molecules, limited to: ☐ starch and glycogen from glucose ☐ proteins from amino acids ☐ fats and oils from fatty acids and glycerol 3. Describe the use of: ☐ iodine solution to test for starch ☐ Benedict's solution to test for reducing sugars ☐ biuret test for proteins ☐ ethanol emulsion test for fats and oils 4. State that water is important as a solvent
9.1	Enzymes	1. Define enzymes as proteins that function as biological catalysts 2. Explain enzyme action with reference to the complementary shape of the active site of an enzyme and its substrate and the formation of a product 3. Investigate and describe the effect of change in temperature and pH on enzyme activity 4. Explain the effect of changes in temperature on enzyme activity, in terms of kinetic energy, shape and fit, frequency of effective collisions and denaturation 5. Explain the effect of changes in pH on enzyme activity in terms of shape and fit and denaturation

WEEK	TOPIC	TOPIC DETAILS
10.1	The Periodic Table & Periodic trend	1. Describe the Periodic Table as a method of classifying elements and its use to predict properties of elements 2. Describe the change from metallic to nonmetallic character across a period 3. Describe and explain the relationship between Group number, number of outer shell electrons and metallic/non-metallic character
10.2	Group properties	4. Describe lithium, sodium and potassium in Group I as a collection of relatively soft metals showing a trend in melting point, density and reaction with water 5. Predict the properties of other elements in Group I, given data, where appropriate 6. Describe the halogens, chlorine, bromine and iodine in Group VII, as a collection of diatomic non-metals showing a trend in colour and physical state 7. State the reaction of chlorine, bromine and iodine with other halide ions
10.3	Transition elements & Noble gases	8. Predict the properties of other elements in Group VII, given data where appropriate 9. Identify trends in other groups, given data about the elements concerned 10. Describe the transition elements as a collection of metals having high densities, high melting points and forming coloured compounds, and which, as elements and compounds, often act as catalysts 11. Describe the noble gases, in Group VIII or 0, as being unreactive, monoatomic gases and explain this in terms of electronic structure 12. State the uses of the noble gases in providing an inert atmosphere, i.e. argon in lamps, helium for filling balloons
11.1	WORK, ENERGY AND POWER	1. Relate (without calculation) work done to the magnitude of a force and distance moved in the direction of the force 2. Recall and use W = Fd = ΔE 3. Demonstrate an understanding that work done = energy transferred 4. 2 Demonstrate understanding that an object may have energy due to its motion (kinetic energy, K.E.) or its position (potential energy, P.E.) and that energy may be transferred and stored 5. Give and identify examples of changes in kinetic, gravitational potential, chemical potential, elastic potential (strain), thermal, sound and electrical potential energy that have occurred as a result of an event or process
12.1	WORK, ENERGY AND POWER	6. Recall and use the expressions K.E. = ½mv2 and gravitational potential energy (G.P.E) = mgh or change in G.P.E = mgΔh 7. Recognise that energy is transferred during events and processes, including examples of transfer by forces (mechanical working), by electric currents (electrical working), by heating and by waves 8. Apply the principle of conservation of energy to simple examples 9. Relate (without calculation) power to work done and time taken, using appropriate examples 10. Recall and use the equation P = ΔE / t in simple systems, including electrical circuits 11. Distinguish between renewable and nonrenewable sources of energy

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13.1	WORK, ENERGY AND POWER	12. Describe how electricity or other useful forms of energy may be obtained from: ☐ chemical energy stored in fuel ☐ water, including the energy stored in waves, in tides, and in water behind hydroelectric dams ☐ geothermal resources ☐ nuclear fission ☐ heat and light from the Sun (solar cells and panels) ☐ wind energy 13.Give advantages and disadvantages of each method in terms of renewability, cost, reliability, scale and environmental impact 14. Understand that the Sun is the source of energy for all our energy resources except geothermal, nuclear and tidal 15. Understand that the source of tidal energy is mainly the moon 16. Show an understanding that energy is released by nuclear fusion in the Sun
14.1	Review	Reviewing difficult concepts in the term
15.1	Review	Practise questions

COMBINED SCIENCE SCHEME OF WORK

FORM 4 - TERM 2

WEEK	TOPIC	TOPIC DETAILS
1.1	Plant nutrition	1. Define photosynthesis as the process by which plants manufacture carbohydrates from raw materials using energy from light 2. State the word equation for photosynthesis carbon dioxide + water → glucose + oxygen, in the presence of light and chlorophyll 3. State the balanced equation for photosynthesis 6CO2+ 6H2O chlorophyll C6 H12 O6 + 6O2 light
1.2	Plant nutrition continue	4. Explain that chlorophyll transfers light energy into chemical energy in molecules, for the synthesis of carbohydrates 5. Outline the subsequent use and storage of the carbohydrates made in photosynthesis 6. Investigate the necessity for chlorophyll, light and carbon dioxide for photosynthesis, using appropriate controls 7. Investigate and describe the effect of varying light intensity and temperature on the rate of photosynthesis (e.g. in submerged aquatic plants)
1.3	Plant nutrition continue	8. Identify chloroplasts, cuticle, guard cells and stomata, upper and lower epidermis, palisade mesophyll, spongy mesophyll, vascular bundles, xylem and phloem in leaves of a dicotyledonous plant • xylem for transport and support • phloem for transport
1.4	Plant nutrition continue	9. Describe the significance of the features of a leaf in terms of functions, to include: ☐ palisade mesophyll and distribution of chloroplasts ☐ photosynthesis ☐ stomata, spongy mesophyll cells and guard cells ☐ gas exchange 10. Describe the importance of: ☐ nitrate ions for making amino acids ☐ magnesium ions for making chlorophyll 11. Explain the effects of nitrate ion and magnesium ion deficiency on plant growth

WEEK	TOPIC	TOPIC DETAILS
2.1	BONDING- Ions and ionic bonds	1. Describe the formation of ions by electron loss or gain 2. Use dot-and-cross diagrams to describe the formation of ionic bonds between Group I and Group VII 3. Describe the formation of ionic bonds between metallic and non-metallic elements to include the strong attraction between ions because of their opposite electrical charges 4. Describe the lattice structure of ionic compounds as a regular arrangement of alternating positive and negative ions, exemplified by the sodium chloride structure
2.2	Molecules and covalent bonds	5. State that non-metallic elements form simple molecules with covalent bonds between atoms 6. Describe the formation of single covalent bonds in H2, Cl2, H2O, CH4, NH3 and HCl as the sharing of pairs of electrons leading to the noble gas configuration including the use of dot-and-cross diagrams
2.3	Molecules and covalent bonds	7. Use and draw dot-and-cross diagrams to represent the bonding in the more complex covalent molecules such as N2, C2H4, CH3OH, and CO2 8. Describe the differences in volatility, solubility and electrical conductivity between ionic and covalent compounds 9. Explain the differences in melting point and boiling point of ionic and covalent compounds in terms of attractive forces
3.1	Diet, Alimentary canal and Digestion	1. State what is meant by the term balanced diet for humans 2. List the principal sources of, and describe the dietary importance of: ☐ carbohydrates ☐ fats ☐ proteins ☐ vitamins, limited to C and D ☐ mineral salts, limited to calcium and iron ☐ fibre (roughage) ☐ water
3.2	Diet, Alimentary canal and Digestion	3. Explain how age, gender and activity affect the dietary needs of humans including during pregnancy and whilst breast-feeding 4. Describe the effects of malnutrition in relation to starvation, constipation, coronary heart disease, obesity and scurvy 5. Explain the causes and effects of vitamin D and iron deficiencies 6. Define ingestion as the taking of substances, e.g. food and drink, into the body through the mouth
3.3	Diet, Alimentary canal and Digestion	

WEEK	TOPIC	TOPIC DETAILS
4.1	Diet, Alimentary canal and Digestion	10. . Define absorption as the movement of small food molecules and ions through the wall of the intestine into the blood 11. . Define egestion as the passing out of food that has not been digested or absorbed, as faeces, through the anus
4.2	Diet, Alimentary canal and Digestion	. Identify the main regions of the alimentary canal and associated organs, limited to mouth, salivary glands, oesophagus, stomach, small intestine, pancreas, liver, gall bladder, large intestine and anus 13. Describe the functions of the regions of the alimentary canal listed above, in relation to ingestion, digestion, absorption and egestion of food 14. State the significance of chemical digestion in the alimentary canal in producing small, soluble molecules that can be absorbed
4.3	Diet, Alimentary canal and Digestion	. State the functions of enzymes as follows: ☐ amylase breaks down starch to simpler sugars ☐ protease breaks down protein to amino acids ☐ l ipase breaks down fats to fatty acids and glycerol 16. State where, in the alimentary canal, amylase, protease and lipase are secreted 17. State the functions of the hydrochloric acid in gastric juice, limited to killing bacteria in food and giving an acid pH for enzymes
5.1	Simple kinetic molecular model of matter	1. State the distinguishing properties of solids, liquids and gases 2. Relate the properties of solids, liquids and gases to the forces and distances between the molecules and to the motion of the molecules 3. Describe qualitatively the molecular structure of solids, liquids and gases in terms of the arrangement, separation, and motion of the molecules 4. Describe qualitatively the pressure of a gas and the temperature of a gas, liquid or solid in terms of the motion of its particles
5.2	Simple kinetic molecular model of matter	5. Use and describe the use of thermometers to measure temperature on the Celsius scale 6. State the meaning of melting point and boiling point, and recall the melting and boiling points for water 7. Describe evaporation in terms of the escape of more-energetic molecules from the surface of a liquid
5.3	Simple kinetic molecular model of matter	8. Relate evaporation to the consequent cooling of the liquid 9. Demonstrate an understanding of how temperature, surface area and draught over a surface influence evaporation

WEEK	TOPIC	TOPIC DETAILS
6.1	Transport in plants	1. State the functions of xylem and phloem 2. Identify the position of xylem as seen in sections of roots, stems and leaves, limited to non-woody dicotyledonous plants 3. Identify root hair cells, as seen under the light microscope, and state their functions 4. Explain that the large surface area of root hairs increases the rate of the absorption of water
6.2	Transport in plants	5. State the pathway taken by water through root, stem and leaf as root hair cell, root cortex cells, xylem and mesophyll cells 6. Investigate, using a suitable stain, the pathway of water through the above-ground parts of a plant 7. State that water is transported from the roots to leaves through the xylem vessels
6.3	Transport in plants	8. Define transpiration as loss of water vapour from plant leaves by evaporation of water at the surfaces of the mesophyll cells followed by diffusion of water vapour through the stomata 9. Investigate and describe the effects of variation of temperature and humidity on transpiration rate 10. Explain the effects of variation of temperature, and humidity on transpiration rate
7.1	Thermal processes-conduction	1. Recognise and name typical good and bad thermal conductors 2. Describe experiments to demonstrate the properties of good and bad thermal conductors 3. Explain conduction in solids in terms of molecular vibrations and transfer by electrons
7.2	Convection	1. Recognise convection as the main method of energy transfer in fluids 2. Relate convection in fluids to density changes 3. Interpret and describe experiments designed to illustrate convection in liquids and gases (fluids
7.3	radiation	1. Recognise radiation as the method of energy transfer that does not require a medium to travel through 2. Identify infra-red radiation as the part of the electromagnetic spectrum often involved in energy transfer by radiation 3. Describe the effect of surface colour (black or white) and texture (dull or shiny) on the emission, absorption and reflection of radiation 4. Interpret and describe experiments to investigate the properties of good and bad emitters and good and bad absorbers of infrared Radiation
8.1	Consequences of energy transfer	1. Identify and explain some of the everyday applications and consequences of conduction, convection and radiation

WEEK	TOPIC	TOPIC DETAILS
9.1	Stoichiometry	1. Use the symbols of the elements and write the formulae of simple compounds 2. Determine the formula of an ionic compound from the charges on the ions present 3. Deduce the formula of a simple compound from the relative numbers of atoms present
9.2	Stoichiometry	Deduce the formula of a simple compound from a model or a diagrammatic representation 5. Construct and use word equations 6. Interpret and balance simple symbol equations 7. Construct and use symbol equations, with state symbols, including ionic equations

COMBINED SCIENCE SCHEME OF WORK

FORM 4 - TERM 3

WEEK	TOPIC	TOPIC DETAILS
1.1	REDOX	1. Describe oxidation and reduction in chemical reactions in terms of oxygen loss / gain (Oxidation state limited to its use to name ions, e.g. iron(II), iron(III), copper(II).)
1.2	REDOX	2. Define and identify an oxidising agent as a substance which oxidises another substance during a redox reaction and a reducing agent as a substance which reduces another substance during a redox reaction
2.1	Transport in mammals	1. Describe the circulatory system as a system of blood vessels with a pump and valves to ensure one-way flow of blood 2. Describe the double circulation in terms of circulation to the lungs and circulation to the body tissues in mammals 3. Explain the advantages of a double circulation 4. Name and identify the structures of the mammalian heart, limited to the muscular wall, the septum, the left and right ventricles and atria, one-way valves and coronary arteries
2.2	Transport in mammals	5. State that blood is pumped away from the heart into arteries and returns to the heart in veins 6. Describe the functioning of the heart in terms of the contraction of muscles of the atria and ventricles and the action of the valves 7. Name the main blood vessels to and from the: • heart, limited to vena cava, aorta, pulmonary artery and pulmonary vein • l ungs, limited to the pulmonary artery and pulmonary vein
2.3	Transport in mammals	8. Describe coronary heart disease in terms of the blockage of coronary arteries and state the possible risk factors as diet, stress, smoking, genetic predisposition, age and gender 9. Investigate and state the effect of physical activity on pulse rate 10. Explain the effect of physical activity on the heart rate 11. Describe the structure and functions of arteries, veins and capillaries 12. Explain how the structures of arteries, veins and capillaries are adapted for their function 13. List the components of blood as red blood cells, white blood cells, platelets and plasma 14. Identify red and white blood cells, as seen under the light microscope, on prepared slides and in diagrams and photomicrographs

WEEK	TOPIC	TOPIC DETAILS
2.4	Transport in mammals	15 State the functions of the following components of blood: ☐ red blood cells in transporting oxygen, including the role of haemoglobin ☐ white blood cells in phagocytosis and antibody production ☐ platelets in clotting (details are not required) ☐ plasma in the transport of blood cells, ions, soluble nutrients, hormones and carbondioxide
3.1	General wave properties	1. Demonstrate understanding that waves transfer energy without transferring matter 2. Describe what is meant by wave motion as illustrated by vibration in ropes and springs and by experiments using water waves 3. State the meaning of speed, frequency, wavelength and amplitude 4. Distinguish between transverse and longitudinal waves and give suitable examples
3.2	General wave properties	5. Describe how waves can undergo: ☐ reflection at a plane surface ☐ refraction due to a change of speed 6. Recall and use the equation $v = f \lambda$ 7. Understand that refraction is caused by a change in speed as a wave moves from one medium to another
4.1	Electricity and chemistry	1. Define electrolysis as the breakdown of an ionic compound when molten or in aqueous solution by the passage of electricity 2. Use the terms inert electrode, electrolyte, anode and cathode 3. Describe electrolysis in terms of the ions present and the reactions at the electrodes, in terms of gain of electrons by cations and loss of electrons by anions to form atoms
4.2	Electricity and chemistry	4. Describe the electrode products and the observations made, using inert electrodes (platinum or carbon), in the electrolysis of: – molten lead(II) bromide – concentrated aqueous sodium chloride – dilute sulfuric acid 5. Predict the products of the electrolysis of a specified molten binary compound
5.1	Gas exchange and respiration	1. Name and identify the lungs, diaphragm, ribs, intercostal muscles, larynx, trachea, bronchi, bronchioles, alveoli and associated capillaries 2. List the features of gas exchange surfaces in animals, limited to large surface area, thin surface, good blood supply and good ventilation with air 3. State the differences in composition between inspired and expired air limited to oxygen, carbon dioxide and water vapour 4. Explain the differences in composition between inspired and expired air

WEEK	TOPIC	TOPIC DETAILS
5.2	Gas exchange and respiration	5. Use limewater as a test for carbon dioxide to investigate the differences in composition between inspired and expired air 6. Investigate and describe the effects of physical activity on rate and depth of breathing 7. Explain the effects of physical activity on rate and depth of breathing in terms of the increased carbon dioxide concentration in the blood, causing an increased rate of breathing 8. Explain the role of goblet cells, mucus and ciliated cells in protecting the gas exchange system from pathogens and particles
5.3	Gas exchange and respiration	State that tobacco smoking can cause chronic obstructive pulmonary disease (COPD), lung cancer and coronary heart disease 10. Describe the effects on the gas exchange system of tobacco smoke and its major toxic components, limited to carbon monoxide, nicotine and tar 11. State the uses of energy in the body of humans limited to: muscle contraction, protein synthesis, growth and the maintenance of a constant body temperature
5.4	Gas exchange and respiration	• Define aerobic respiration as the chemical reactions in cells that use oxygen to break down nutrient molecules to release energy • State the word equation for aerobic respiration as glucose + oxygen → carbon dioxide + water • State the balanced chemical equation for aerobic respiration as $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$
6.1	Reflection of light	1. Describe the formation of an optical image by a plane mirror and give its characteristics 2. 2 Recall and use the law angle of incidence i = angle of reflection r recognising these angles are measured to the normal 3. Perform simple constructions, measurements and calculations for reflection by plane mirrors
6.2	Refraction of light	4. Interpret and describe an experimental demonstration of the refraction of light
6.3	Thin converging lens	5. Describe the action of a thin converging lens on a beam of light 6. Use the terms principal focus and focal length 7. Draw ray diagrams for the formation of a real image by a single lens 8. Use and describe the use of a single lens as a magnifying glass
7.1	Energy changes in chemical reactions	1. Describe the meaning of exothermic and endothermic reactions 2. Describe bond breaking as an endothermic process and bond forming as an exothermic process
7.2	Energy changes in chemical reactions	3. Draw and label energy level diagrams for exothermic and endothermic reactions using data provided 4. Interpret energy level diagrams showing exothermic and endothermic reactions and the activation energy of a reaction

WEEK	TOPIC	TOPIC DETAILS
8.1	Coordination and response- Hormones in humans	1. Define a hormone as a chemical substance, produced by a gland, carried by the blood, which alters the activity of one or more specific target organs 2. Describe adrenaline as the hormone secreted in 'fight or flight' situations and its effects, limited to increased breathing and pulse rate and widened pupils 3. Discuss the role of the hormone adrenaline in the chemical control of metabolic activity, including increasing the blood glucose concentration and pulse rate 4. Give examples of situations in which adrenaline secretion increases
8.2	☐ Tropic responses	5. Define gravitropism as a response in which parts of a plant grow towards or away from gravity 6. Define phototropism as a response in which parts of a plant grow towards or away from the direction from which light is coming 7. Explain phototropism and gravitropism of a shoot as examples of the chemical control of plant growth 8. Investigate gravitropism and phototropism in shoots and roots
8.3	Tropic responses	9. Explain the role of auxin in controlling shoot growth, limited to: ☐ auxin made in shoot tip (only) ☐ auxin spreads through the plant from the shoot tip ☐ auxin is unequally distributed in response to light and gravity ☐ auxin stimulates cell elongation
9.1	Electromagnetic spectrum	1. Describe the main features of the electromagnetic spectrum in order of frequency, from radio waves to gamma radiation (γ) 2. State that all electromagnetic waves travel with the same high speed in a vacuum and approximately the same in air 3. State that the speed of electromagnetic waves in a vacuum is 3.0 X. 108 m / s
9.2	Electromagnetic spectrum	4. Describe typical properties and uses of radiations in all the different regions of the electromagnetic spectrum including: ☐ radio and television communications (radio . waves) ☐ satellite television and telephones (microwaves) ☐ electrical appliances, remote controllers for . televisions and intruder alarms (infra-red) ☐ medicine and security (X-rays)
9.3	Electromagnetic spectrum	5. Demonstrate an understanding of safety issues regarding the use of microwaves and X-rays 6. State the dangers of ultraviolet radiation, from the Sun or from tanning lamps