Subject	Science	Year Group	10

	P3	C3	B3	C4
Scheme title	Particle models of matter	Quantative chemistry	Moving and Changing Materials	Chemical changes
Purpose of scheme	Students will be learn the behaviour of solids, liquids and gases based on the properties and arrangement of particles in each state of matter. Students will be develop an understanding of the links between changes of state, internal energy, thermal energy/specific heat and latent heat. Pupils will also examine how the particle model can be used to explain the density and pressure of a specific object or substance.	Use quantitative analysis to determine the formulae of compounds, relative formula mass of compounds, moles, masses of reactants and concentrations of reactants.	Pupils will learn about the organs involved in the digestive system and how they all work together. They will explore what enzymes are and the role that they play in digestion. They will investigate the factors that effect enzyme action. They will also look at how we test for different food nutrients in our food. Pupils will then explore how the digested food is transported around the body. They will learn the structure of the heart, blood vessels and circulatory system. Finally they will learn the causes and treatments of coronary heart disease.	Understanding a number of chemical changes , predicting the products formed and using the products for materials and processes.
Knowledge in sequence	This topic builds on a ks3 understanding of the states of matter (chemistry year 7 - matter) and pressure (physics year 8 - forces. Pupils will also use the knowledge from the P1 topic in year 9 to apply their understanding of internal energy and thermal energy with reference to specific heat.	The topic begins with balancing equations and calculating relative formula mass, building on their knowledge from C1. Pupils then begin to build on this further using different quantative methods which increase in difficulty.	Pupils recap diffusion, osmosis and active transport from B2. They also build on knowledge from the year 8 topic human digestion and nutrition. Pupils also look begin learning som non communicable diseases which will be covered in more detail in B4.	Pupils build on their knowledge of chemical reactions and acids and alkalis from year 7, using knowledge from C1 and C2 to explain some chemical reactions.
Skills	Interpretation of models, construction and analysis of graphs, calculation, rearranging equations, critical thinking, variables, practical skills, using correct measurements to record data.	Using apparatus to investigate mass loss, changing the subject of an equation.	Variables, using and manipulating equipment, writing a conclusion. Interpretating data + graphs, carrying out a heart dissection.	Produce a soluble salt, make order of magnitude calculations.
Key words	States of matter, solid, liquid, gas, melting, freezing, condensation, evaporation, sublimation, internal energy, specific heat capacity, specific latent heat, density, pressure, particle model.	Relative formula mass, moles, concentration, theoretical yield	Diffusion, osmosis, active transport, enzyme, substrate, active site, denatured, gas exchange, capillary, vein, artery, coronary heart disease, plasma, platelets, circulatory system.	Ore, reactivity, electrolysis, oxidation, reduction, acid, alkali, neutralisation, soluble salt
End point	Students will be able to predict the behaviour of solids, liquids and gases based on the properties and arrangement of particles in each state of matter. Students will be able to describe the particle model of matter and understand how it can be used to explain the density and pressure of a substance. Students will also be able to calculate the specific heat of an object using metal blocks and electrical appliances. Students will be able to calculate the density of a regular solid, an irregular solid and a liquid. Students will be able to calculate specific latent heat and explain the changes in a latent heat graph.	Pupils are able to calculate relative formula mass, moles, concentration and are able to balance equations. Pupils are able to use moles to calculate the theoretical yield of a reaction.	Pupils should be able to label all the parts of the digestive and cirulatory systems and explain how each organ is adapted to it's function. Pupils should be able to describe what enzymes are, how they work and the factors that effect them. They should be able to describe a method to investigate osmosis, to test foods for certain food nutrients and how to investigate the factors that effect the rate of enzyme activity.	Pupils are able to describe and explain some specific chemical changes and predict their products. Pupils should be able to identify acids and alkalis using universal indicator and describe the difference between strong and weak acids. Students should be able to write a method for and carry out the method for producing a soluble salt.
Assessment Methods	Formative assessment and EOTT	Formative assessment and EOTT	Formative assessment, exam questions and EOTT.	Formative assessment and EOTT

	P4	B4	C5	P5
Scheme title	Atomic structure	Health Matters	Energy changes	Forces
Purpose of scheme	Pupils will review the structure of the atom and identify how changes to atomic structure can lead to different forms of emitted radiation. Pupils will use nuclear equations to identify the formation of new elements due to radioactive decay. Pupils will also determine the half-life of a radioactive substance using existing measurements of rates of activity. Students will also understand the difference between contamination and irradiation.	To understand the difference between communicable and non communicable diseases and how they are transmittted. Pupils will then learn about the different types of pathogens and the ways in which plants and animals are designed to defend themselves. They will also learn how we develop new drugs to fight diseases.	Describing the energy changes involved in chemical reactions.	Students will be learning about the vector–scalar distinction as it applies to displacement, distance, velocity and speed. Pupils will learn about Newton's three laws and will establish links with the laws and the actions of forces and acceleration. Students will learn about the nature of forces and how forces apply to situations involving elasticity, work done and gravity. Students will learn about the relationship between distance/displacement and time and the subsequent relationship between speed/velocity and time. Students will develop an understanding of acceleration with reference to uniform acceleration and the motion of an object on a line. Students will also learn about the application of forces/work done to the real-world scenario of braking in a vehicle. HT students will understand the concept of momentum and the conservation of momentum.
Knowledge in sequence	Pupils build upon their understanding of the atom from chemistry, C1. They will recall the structure of the atom, the history of the development of the atomic model, how to interpret periodic tables and the definition of ions and isotopes. Radiation will be a new threshold concept that students will not have previously identified. They will transfer their understanding of this topic to P6 (Waves), with reference to the electromagnetic spectrum, and P8	Pupils build on knowledge of non communicable diseases from year 8 - 'exploring the effects of disease and lifestyle' and on knowledge from B1 which introduced tumours. They will have also learned about coronary heart disease in B3. Pupils will start to learn about communicable diseases, causes and treatments. They will then learn how the body defends itself against pathogens and how we have created vaccines to help fight disease. Pupils will then look at	Pupils build on knowledge from year 8 Matter and recap and expand on exothermic and endothermic reactions and energy level diagrams. Pupils move onto completing energy change calculations.	Pupils will have encountered forces previously in year 7 and 8. In year 7, students will have learned about speed, distance-time relationships, gravity/weight and contact/non-contact forces. In year 8, students will have looked at balanced and resultant forces, with an emphasis on upthrust, buoyancy and elasticity. A prior understanding of energy (P1, year 9) is also essential for this topic. In P1, students will have learned about pathways of energy transfer and work done - concepts which heavily link to forces. There is also a link with the biology lesson on reaction
Skills	Intepreting graphs, calculations/use of data, use of periodic tables, critical thinking, interpretation of models.	using and manipulating equipment, writing a conclusion. Interpretating data + graphs, making models to represent scientifc concepts	Drawing and interpreting graphs, calculating temperature change.	Practical skills, recording measurements, variables, drawing and interpreting graphs, interpreting models and diagrams, calculations/rearranging equations, use of scales.
Key words	Radiation, radioactivity, activity, half-life, alpha, beta, gamma, decay, irradiation, contamination, ion, isotope.	Pathogen, bacteria, virus, fungi, protist, malaria, disease, health, communicable, non communicable, antibodies, lymphocytes, phagocytosis, placebo, double blind trial, cancer, benign and malignant, vaccination, herd immunity,	Exothermic, endothermic, energy level diagram, activation energy, overall energy change	Scalar, vector, contact, non-contact, gravity, resultant forces, work done, elasticity, displacement, velocity, distance-time relationship, velocity-time, acceleration, Newton's laws, braking/stopping distance.
End point	Pupils are able to explain the differences between alpha, beta, gamma radiation and can explain how alpha and beta particles are formed using nuclear equations. Pupils will be able to explain the link between isotopes, radiation, activity and half-life. Pupils will understand how activity/count rate can be measured. Pupils will be able to calculate half-life by interpreting graphs. Pupils can explain what is meant by contamination and irradiation.	Pupils should be able to describe the difference between communicable and non communicable diseases. They should be able to give examples of each and explain how they are treated. They should be able to explain what pathogens are, how they cause disease and how they are treated. They should be able to explain how plants and animals defend themselves against disease. They should also be able to explain how we develop new drugs and treatments.	Pupils are able to identify exothermic and endothermic reactions and explain the energy changes involved through energy level diagrams and calculations.	Students should be able to explain the vector–scalar distinction as it applies to displacement, distance, velocity and speed. Pupils should be able to calculate the weight of an object. They should be able to calculate the velocity of an object. Pupils should be able to use their understanding of velocity to calculate acceleration. Pupils should be able to calculate displacement using a velocity-time graph (HT only). Students should use their understanding of velocity to calculate acceleration, uniform acceleration and to define terminal velocity. Pupils should be able to draw free body diagrams and to identify resultant forces using force diagrams. Students should be able to explain the relationship between force, mass and acceleration and carry out a practical using pulleys and a light gate to investigate this. Students should be able to use their understanding of forces to explain the factors affecting the breaking and stopping distance of a vehicle. Students should be able to state Newton's three laws and
Assessment Methods	Formative assessment and EOTT	Formative assessment, exam questions and EOTT.	Formative assessment and EOTT	Formative assessment, exam questions and EOTT.

	B5	C6	P7
Scheme title	Co-ordination and control	Rates of reaction	Electromagnetism
Purpose of scheme	Pupils learn about the nervous and endocrine systems. All the parts and their role in responding to changes in the environment, homeostasis and reproduction.	Pupils will learn about the variables which can be manipulated in order to speed up or slow down a chemical reaction.	Pupils will learn about magnetism, with specific emphasis on electromagnets. Students will learn how electromagnets can be used to create a motor effect. Pupils will develop an understanding of magnetic fields and Fleming's left hand rule.
Knowledge in sequence	Pupils build on knowledge from year 7 topic cells which introduced them to reproduction and menstrual cycle. They will learn about concentive methods and what possible treatments are available when people have fertillity problems. They will then learn about the nervous system including the parts and their function. Pupils will also learn about some of the organs in the endocrine system, the hormones that they release and the numerous different roles that they have.	Pupils will firstly define rates of reaction and learn about methods of measuring rates of reaction before explaining factors which affect particular rates of reaction.	Pupils build upon KS3 knowledge of magnets and electromagnets from the electromagnets topics. Pupils will need to use their existing understanding of forces from P5 and electricity from P2 to understand the motor effect. HT students will need to develop an understanding of electric motors.
Skills	Variables, using and manipulating equipment, writing a conclusion. Interpretating data + graphs	Drawing and interpreting graphs, drawing a tangent on a graph, drawing conclusions from data, measuring the volume of a gas	Model interpretaion, calculations, critical thinking.
Key words	refex arc, stimulous, receptor, effector, response, neurone, hormone, endocrine system, pituitary gland, glucose, diabetes, contraception, reproduction, homeostasis, IVF	Rate, tangents, collision theory, concentration, reversible reaction, equilibrium, closed system	Magnetism, permanent magnet, induced magnet, electromagnet, solenoid, Fleming's left hand rule, motor effect, magnetic flux density, magnetic field, conductor, force, current.
End point	Pupils should be able to describe the parts of the nervous and endocine systems. They should be able to explain what they do. They should be able to explain the reflex arc for different situations. They should be able to define what homeostasis is and explain how the body controls blood glucose, body temperature and water levels. They shoud also be able to explain what negative feedback is and give examples. They should be able to compare type 1 and type 2 diabetes and explain how the body prepares itself for fight or flight. Finally they should be able to evaluate the use of different contraceptives and fertillity treatments, including IVF.	Pupils are able to measure and calculate the rate of reaction and describe and explain factors affecting reactions. Students should be able to explain and describe factors affecting the position of equilibrium for reversible reactions.	Pupils should develop an understanding of magnets and magnetic fields. Pupils should be able to explain the difference between permanent and induced magnetism. Students should also be able to explain what an electromagnet is, how they can be made and how the strength of an electromagnet can be increased. Students should be able to use Fleming's left hand rule to identify the directions of the force, magnetic field and current of an electromagnet displaying the motor effect. Students should also be able to calculate the force of a conductor that carries a current and is at a right angle to a
Assessment Methods	Formative assessment, exam questions and EOTT.	Formative assessment and EOTT	Formative assessment and EOTT