

What are the aims and intentions of this curriculum?

AQA Combined Science Trilogy is taught at the Parkside Studio College as one of the core subjects at KS4. It equips students with skills and knowledge transferable to both educational and career settings, and provides a worthwhile course for students of various ages and from diverse backgrounds in terms of general education and lifelong learning. The units covered in this scheme of work are unit two: chemistry, biology and physics. The knowledge and skills ascertained throughout the study of the course will prepare students for careers in STEM.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	Atomic structure, the periodic table, structure and bonding, chemical calculation	<ul style="list-style-type: none"> Define atom, element, compound mixture Use scientific conventions to identify elements by chemical symbol Write word and chemical equations Theories of the atom and how new evidence may cause change or replacement of model State the relative mass and charge of the subatomic particles The electronic structure of an atom The arrangement of the periodic table Properties and trend of elements in groups and period of the periodic table Covalent, ionic and metallic bonding Electrostatic and intermolecular forces Giant ionic structures Giant covalent structures Law of conservation of mass Relative formula mass Relative formula mass Calculating masses of reactant and product Calculating concentration of a solution 	<p>Practical and enquiry skills: Make models of atoms, elements, compounds</p> <p>Practical and enquiry skills: Conduct experiments using separating techniques</p> <p>Scientific Communication: Make 2D or 3D model to represent past and present atomic model</p> <p>Scientific Communication: Make tables to represent the atomic mass and relative atomic mass of an elements</p> <p>Communication: Role play the electronic structure of an atom</p> <p>Scientific Communication: Make models showing giant covalent and ionic structures</p> <p>Practical and enquiry skills: Conduct experiment to react magnesium with oxygen</p> <p>Practical and enquiry skills: Measure out 1 mole of an element or a compound</p>	<p>Teacher: End of Unit test, kerboodle test and quiz</p> <p>Self: Past paper question, worksheet, project</p> <p>Peer: Class worksheet, portfolio, assignment, presentations, models</p>

Autumn 2

Chemical change, electrolysis and energy changes, cell structure and transport, cell division, organization and the digestive system, organizing animals and plants

- Reaction of metals with oxygen
- Oxidation and reduction reaction in terms of loss or gain of oxygen
- The reactivity series of metals
- Extraction of metals by reduction
- Electrolysis
- Extraction of metals by electrolysis
- Electrolysis of aqueous solution
- Acid, base and alkali
- Reactions of acids with metals, bases and alkali
- Neutralisation reaction
- The pH scale
- Strong and weak acids
- Structure of animal and plant cell
- Cell specialization
- Cell differentiation
- Stem cells
- Therapeutic cloning
- Meristem
- Prokaryotic and eukaryotic cell
- Mitosis and the cell cycle
- Diffusion
- Osmosis
- Active transport
- Principles of organizing plants and animals
- Cells, tissue, organs, organ system, organism
- Structure and function of the digestive system
- Enzymes
- Human digestive enzymes
- Chemistry of food
- The heart and blood vessels
- Artificial pacemaker
- Adaptation of the lungs for gaseous exchange
- Arteries, veins, capillaries
- Coronary heart disease
- Stents
- Statins
- Artificial heart
- Blood components
- cell, tissue, organ and organ system in plants

Teacher Demo of the reaction of metals with water to infer the order of reactivity

Practical and enquiry skills: Investigate the electrolysis of solution

Practical and enquiry skills: Investigate acid metal reaction

Practical and enquiry skills: investigate neutralization reactions

Practical and enquiry skills: observe prepared slides of specialised cells

Practical and enquiry skills: observe cells under the microscope

Practical and enquiry skills: Investigate osmosis and diffusion

Scientific Communication: Model osmosis, diffusion and active transport

Practical and enquiry skills: make 3D models of prokaryotic and eukaryotic cells

Scientific Communication: make models of mitosis

Practical and enquiry skills: conduct food test

Practical and enquiry skills: Observe prepared slides of smears, capillary, vein, artery

Communication: research coronary heart disease, stent, pacemaker, statin,

Practical and enquiry skills: investigate rate of transpiration in plants

Scientific Communication: make presentation on coronary heart disease

Teacher: End of Unit test, kerboodle test and quiz

Self: Past paper question, worksheet, project

Peer: Class worksheet, portfolio, assignment, presentations, models

Spring 1

Communicable diseases, preventing and treating diseases, non-communicable diseases, photosynthesis, respiration

- Communicable diseases
- Pathogens
- Human defense system
- The white blood cell role in fighting infection
- Vaccination
- Antibiotic
- Pain killers
- Drug development
- Double blind trial
- Health
- Non-communicable diseases
- Cause of non-communicable disease
- Risk factors
- Causal mechanism
- Cancers
- Photosynthetic reaction
- Equation of photosynthesis
- Rate of photosynthesis
- Limiting factors
- How plants use glucose
- Aerobic respiration
- Aerobic respiration as an exothermic reaction
- Organisms need for energy
- Equations for aerobic respiration
- Anaerobic respiration in animals, plants and yeast
- Equations for anaerobic respiration in animals, plants and yeast
- Response of the body to exercise
- Metabolism
- Metabolic reaction in plants and animals
- The liver and metabolism

Practical and enquiry skills:

Practical and enquiry skills:

Scientific Communication: Use models to represent phagocytosis and antibody

Scientific Communication: Carry out research and explain application of science and personal and social implications related to diseases.

Scientific Communication: research the development of vaccine by Jenner and discuss the ethical implication

Scientific Communication: use graph to analyze immunity

Scientific Communication: use model to explain herd immunity

Scientific Communication: research on tumor

Practical and enquiry skills: investigate photosynthesis and factors that affect the rate of photosynthesis

Practical and enquiry skills: investigate fatigue caused by anaerobic respiration

Practical and enquiry skills: investigate anaerobic respiration in yeast

Scientific Communication: investigate the effect of exercise on breathing and pulse rate

Teacher: End of Unit test, kerboodle test and quiz

Self: Past paper question, worksheet, project

Peer: Class worksheet, portfolio, assignment, presentations, models

<p>Spring 2</p>	<p>Conservation and dissipation of energy, energy transport by heating, energy resources, electric circuits,</p>	<ul style="list-style-type: none"> • Energy stores • Changes in energy store • Calculating work done by a force • Calculating kinetic energy, gravitational potential energy and kinetic energy • Calculating the change in distribution of energy in a system • The specific heat capacity of a substance • The power rating of an appliance • Calculate the power of a device • The law of conservation of energy • Useful and wasted energy • Efficiency • Calculating efficiency • Energy resources • Renewable and non-renewable energy resources • Circuit symbols • Electric current • Current in series • Resistance • Potential difference, resistance and current equation • Ohms law • Current potential difference graphs • Series and parallel circuits • Current, PD and resistance in series and parallel circuits 	<p>Scientific Communication: Plan experiments to investigate gravitational potential energy store, kinetic energy store and elastic potential energy store</p> <p>Practical and enquiry skills: Investigate the law of conservation of energy, closed and open system using PHET simulations</p> <p>Practical and enquiry skills: Investigate the specific heat capacity of a metal</p> <p>Scientific Communication: use scientific knowledge of specific heat capacity to design a building</p> <p>Scientific Communication: make posters and brochures on the advantages and disadvantages of energy resources</p> <p>Practical and enquiry skills: construct circuits using circuit kits and PHET simulation</p> <p>Practical and enquiry skills: Investigate current in series and parallel</p> <p>Scientific Communication: draw circuit diagrams to represent a circuit</p> <p>Practical and enquiry skills: Investigate current and resistance relationship</p>	<p>Teacher: End of Unit test, kerboodle test and quiz</p> <p>Self: Past paper question, worksheet, project</p> <p>Peer: Class worksheet, portfolio, assignment, presentations, models</p>
<p>Summer 1</p>	<p>Electricity in the home, Molecules and matter, radioactivity, forces in balance, motion</p>	<ul style="list-style-type: none"> • Direct current and alternating current • The mains electricity supply • The name and colour code for electric wires • Electrical power • Equation for electrical power • Energy transfer in everyday electrical appliance • Work done when charge flows • Equations to calculate electrical energy • The national grid • Density • Equation for density 	<p>Practical and enquiry skills: use an oscilloscope to investigate alternating and direct current</p> <p>Practical and enquiry skills: put together and electric plug and socket using the colour code</p> <p>Scientific Communication: make model of the national grid</p> <p>Practical and enquiry skills: investigate the density of regular and irregular objects</p>	<p>Teacher: End of Unit test, kerboodle test and quiz</p> <p>Self: Past paper question, worksheet, project</p> <p>Peer: Class worksheet, portfolio, assignment, presentations,</p>

- The particle model of matter
- Change of state
- Chemical and physical change
- Internal energy
- Heating and temperature
- Specific latent heat
- Particle model of matter and motion of gas
- Temperature and pressure
- Size and structure of an atom
- Proton, neutron and electron of an atom
- Scientific models of the atom
- Changes in scientific models of the atom
- Radioactive decay
- Types of nuclear radiation
- Penetrating power of alpha, beta and gamma radiation
- Nuclear decay equation
- Half life
- Irradiation
- Safety precaution when dealing with radioactivity
- Scalar and vector quantity
- Contact and non-contact forces
- Weight and gravitational field
- Calculating the weight of an object
- Resultant force
- Calculating resultant force for components acting at right angle
- Elastic and inelastic deformation
- Hooke's Law
- Distance and displacement
- Speed and velocity
- Calculating speed using formula
- Rearrange speed formula to find time or distance travelled
- Distance-Time graphs
- Acceleration
- Calculating acceleration using formula
- Velocity-Time graphs
- Equations of motion for uniform acceleration

Practical and enquiry skills: investigate chemical and physical change

Scientific Communication: use diagrams to explain states of matter and density

Practical and enquiry skills: investigate the heating curve of water

Practical and enquiry skills: investigate latent heat

Scientific Communication: make model of an atom

Scientific Communication: Make model to demonstrate the various theories proposed of an atom

Scientific Communication: Model the gold leaf electroscope experiment

Practical and enquiry skills: Flip coin to demonstrate the randomness of radioactive decay

Scientific Communication: simulate half life

Scientific Communication: use graphical models to determine half life

Scientific Communication: Evaluate the use of irradiation on fruits

Scientific Communication: Use models and graphs to describe vector and scalar

Practical and enquiry skills: investigate contact and non-contact forces

Practical and enquiry skills: measure the weight and mass of an object and convert from mass to weight and weight to mass.

Practical and enquiry skills: Plan experiment to calculate speed of an object

models

- Falling under gravity
- Newton first law of motion
- Newton second law of motion
- Equation for newton second law of motion
- Inertial Mass
- Newton's third law of motion
- Thinking distance, braking distance, stopping distance

Practical and enquiry skills: required practical on acceleration

Communication: represent forces using diagrams

Practical and enquiry skills: required practical on Hooke's law

Communication: represent the motion of objects on graphs

Practical and enquiry skills: Design a parachute for free falling object