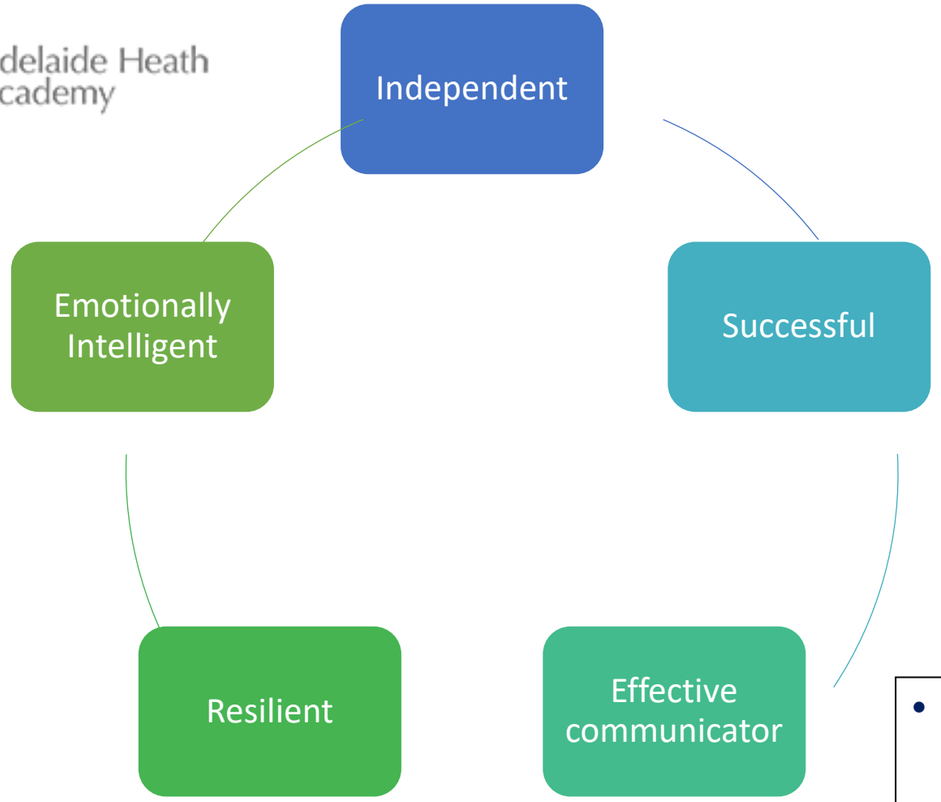
Whole School Intent



Subject Intent- (How does it link to the whole school intent)

The science curriculum at Adelaide Heath Academy aims to ensure that all pupils:

- Successfully develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- Develop independent enquiry skill that help them to answer scientific questions about the world around them
- Develop the emotional intelligence to be able to discuss and debate the implications of science, today and for the future.
- Effectively communicate their ideas and understanding about Science through various methods, including discussion, written work and presentation.
- Develop resilience to enable them to become capable problem solvers.

Implementation

We will foster a spirit of enquiry, nurturing our students' curiosity, and bring current, relevant and real world science into the classroom experience. Science enquiry skills will be developed throughout the pupils' time at Adelaide Heath, starting with basic investigation skills in KS2, pupils focusing on making predictions, filling in (and learning to draw their own) results tables as well as looking at results and drawing simple conclusions. These skills will be built on gradually to enable pupils to complete full investigations by KS4, taking into consideration dependent and independent variables, reliability of results and evaluating the investigation procedure. Investigation and enquiry skills will be intertwined within each topic as the pupils move through the school.

Subject Specific Pedagogy

- **Teaching in Science is pupil centred and taught through Practical and Theory Lessons** – A variation of teaching approaches will be used to motivate and engage students. Lessons will include, teacher demonstrations, whole class practical work, independent practical exercises, grouped investigations as well as data collecting and research. Teaching is flexible and lessons are adapted to ensure the curriculum is enhanced but accessible to meet the additional needs of all students.
- **Pupils clearly and timely build skills and knowledge** - the curriculum structure, high quality resources and pupil centred approach ensures progress is made through developing the principles of scientific inquiry.
- **The Curriculum Plan has been developed to provide a broad basis of all 3 sciences whilst developing key skills and concepts throughout** - It is closely linked to the Subject/School Intent
- **There are opportunities for collaboration and working together-** during selected practical's, effective communication is reinforced by working with others in groups and pairs.
- **Pupils develop independence and are well prepared for adulthood**- all pupils are given the opportunity to work independently; this will lead to pupil success. They will develop transferable skills, such as observation, accurate measuring, problem solving and analysis that will be useful in future study or employment.
- **In all lessons pupils will be supported to build Confidence and Resilience** – they are encouraged to learn new skills, develop communication skills, teamwork and resilience, gain a broad knowledge over time and become capable problem solvers.
- **Effective questioning in lessons is used to gain an understanding of where pupils are** – assessing knowledge and skills have been transferred, enabling staff to address gaps, the need for challenge and any other misconceptions.

Science pathways at Adelaide Heath Academy

Adelaide Heath Academy

Lower Primary

Upper Primary

Year 7 (KS3)

Year 8 (KS3)

Year 9
KS3 consolidation and introduction to KS4

Pathway 1

Pathway 2

Pathway 3

KS4 Year 10
Entry Level Certificate

KS4 Year 11
Entry Level Certificate

KS4 Year 10
Btec First Principles of Applied Science

KS4 Year 11
Btec First Principles of Applied Science

KS4 Year 10
Combined Science GCSE
Or
Single GCSE in either Chemistry, Physics or Biology

KS4 Year 11
Combined Science GCSE
Or
Single GCSE in either Chemistry, Physics or Biology

Adelaide Heath Academy is a specialist provision for social, emotional and mental health difficulties. This means that within each year group there is a range of additional needs. In order to ensure that the needs of all pupils are met bespoke packages are put in place where needed and lessons are differentiated.

Disciplinary Literacy

KS3

Tier 2 Academic Vocabulary	Biology (Tier 3)	Chemistry (Tier 3)	Physics (Tier 3)
Analyse	Cell	Atom	Force
Assess	Nucleus	Element	Gravity
Calculate	Cytoplasm	Compound	Friction
Categorise	Cell membrane	Molecule	Air resistance
Classify	Vacuole	Mixture	Water resistance
Compare	Chloroplast	Particle	Mass
Conclude	Mitochondria	Diffusion	Weight
Contrast	Tissue	Solid	Pressure
Deduce	Organ	Liquid	Balanced forces
Describe	Organ system	Gas	Unbalanced forces
Determine	Organism	Periodic table	Energy
Discuss	Reproduction	Group	Energy transfer
Evaluate	Fertilisation	Period	Energy store
Examine	Gamete	Metal	Kinetic
Explain	Ovary	Non-metal	Gravitational potential
Identify	Testis	Metalloid	Elastic potential
Infer	Embryo	Reactant	Thermal
Interpret	Foetus	Product	Conservation of energy
Investigate	Puberty	Chemical reaction	Efficiency
Justify	DNA	Combustion	Circuit
Observe	Gene	Oxidation	Current
Predict	Chromosome	Neutralisation	Voltage
Record	Inheritance	Corrosion	Resistance
Select	Variation	Catalyst	Conductor
Summarise	Adaptation	Exothermic	Insulator
Verify	Evolution	Endothermic	Series circuit
Accurate	Natural selection	Acid	Parallel circuit
Accuracy	Species	Alkali	Wave
Correlation	Ecosystem	Base	Frequency
Data	Habitat	Indicator	Amplitude
Evidence	Population	pH	Wavelength
Factor	Community	Neutral	Reflection
Method	Biodiversity	Atmosphere	Refraction
Pattern	Predator	Greenhouse gas	Absorption
Reliable	Prey	Climate change	Radiation
Reliability	Food chain	Carbon cycle	Universe
Relevant	Food web	Pollution	Galaxy
Repeatable	Decomposer		Solar system
Significant	Conservation		Planet
Trend	Skeleton		Satellite
Valid	Muscle		Orbit
Validity	Joint		Asteroid
Variable	Respiration		Comet

Affect	Digestion		Star
Cause	Nutrient		
Consequence	Enzyme		
Depend	Circulation		
Effect	Respiratory system		
Impact			
Influence			
Interaction			
Process			
Relationship			
Result			

KS4

Tier 2 Academic Vocabulary	Biology (Tier 3)	Chemistry (Tier 3)	Physics (Tier 3)
Analyse	Homeostasis	Mole	Velocity
Evaluate	Osmosis	Ionic bond	Acceleration
Justify	Mitosis	Covalent bond	Momentum
Interpret	Meiosis	Polymer	Resultant force
Predict	Allele	Hydrocarbon	Work done
Compare	Genotype	Alkane	Power
Contrast	Phenotype	Alkene	Efficiency
Explain	Variation	Electrolysis	Current
Assess	Evolution	Oxidation	Potential difference
Determine	Natural selection	Reduction	Resistance
Evidence	Ecosystem	Equilibrium	Transformer
Reliability	Biodiversity	Yield	Wavelength
Validity	Trophic level	Rate of reaction	Frequency
Variable	Photosynthesis	Catalyst	Electromagnetic spectrum
Correlation	Respiration	Exothermic	Refraction
Trend	Enzyme	Endothermic	Reflection
Significant	Pathogen	Neutralisation	Radiation
Method	Antibody	pH	Half-life
Conclusion	Vaccination	Periodic table	Radioactive decay
Inference	DNA	Isotope	Nuclear fission
Process	Chromosome	Crude oil	Nuclear fusion

Lower Primary (year 3 and 4)

Half Term	Topic	Assessment Objectives: Substantive	Assessment Objectives: Disciplinary	Links to whole school Intent	Links to Reading	Careers
Autumn 1	**Fossils and Rocks**	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties Describe in simple terms how fossils are formed when things that have lived are trapped within rock Recognise that soils are made from rocks and organic matter	Explore the world around them, leading them to ask some simple scientific questions about how and why things happen Begin to recognise ways in which they might answer scientific questions Using simple scientific words to explain ideas	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment	Reading extended questions throughout topic Guided research on effects of alcohol Topic specific literacy task	Look at the Role of: Doctor Nurse Care worker Nursery worker/assistant
Autumn 2	**Forces and Magnets**	Compare how things move on different surfaces Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance Observe how magnets attract or repel each other and attract some materials and not others Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials Describe magnets as having 2 poles Predict whether 2 magnets will attract or repel each other, depending on which poles are facing	Experience different types of scientific enquiries, including practical activities and observations Selecting the right equipment for a basic practical from a range of simple equipment provided Record findings from simple data, for example, how many paperclips does each magnet pick up? Possibly noticing links between cause and effect with support (like magnets will repel and opposite will attract)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Key words for each lesson provided for pupils to read and discuss meaning	Look at the Role of: Renewable energies developer
Spring 1	**Plants**	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant Investigate the way in which water is transported within plants Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	Observe the natural and humanly constructed world around them Observe changes over time of plants in the environment (differences between summer and winter of deciduous trees for example) as well as changes over shorter periods, observing plants grow in various conditions. Use simple measurements and equipment (ruler to measure the height of a plant)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Following a step by step method Key words Reading extended questions throughout topic Guided research on effects of alcohol Topic specific literacy task	Look at the Role of: Pharmacist Chemist Doctor Nurse

Spring	**Uses of Everyday Materials**	identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. find out about people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	Use simple features to compare objects, materials and living things Decide how to sort and classify objects into simple groups with some help Record and communicate findings in a range of ways with support	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Word wall Following a step by step method Key words given at the start of each lesson Reading extended questions throughout topic Topic specific literacy task	Look at the Role of: Physicist Astronaut Mechanic Design engineer Trainer designer Crane operator
Summer 1	**Light and sound**	recognise that they need light in order to see things and that dark is the absence of light notice that light is reflected from surfaces recognise that light from the sun can be dangerous and that there are ways to protect their eyes recognise that shadows are formed when the light from a light source is blocked by an opaque object find patterns in the way that the size of shadows change explore how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it	Notice links between cause and effect with support Begin to notice patterns and relationships with support Begin to draw simple conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	Look at the Role of: Optometrist
Summer 2	**Animals and Humans**	Describe the simple functions of the basic parts of the digestive system in humans Identify the different types of teeth in humans and their simple functions Construct and interpret a variety of food chains, identifying producers, predators and prey	Observe the natural and humanly constructed world around them Identify and discuss differences Use simple and scientific language Talk about their findings	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Key words Opportunities to read out questions and answers Following a step-by-step method Reading extended questions throughout topic Topic specific literacy task	Look at the Role of: Electrician Electrical plant operator National grid Renewable energies careers

Year 5/6 Year A

Half Term	Topic	Assessment Objectives: Substantive	Assessment Objectives: Disciplinary	Links to whole school Intent	Links to Reading	Careers
Autumn 1	Material changes	To understand what happens when materials dissolve and how to test solubility To know how to speed up dissolving To understand why dissolving stops if you keep adding materials To understand how to show dissolving is a reversible change To understand how to use filtering and sieving to separate mixtures To understand how magnets can be used to separate different metals To be able to safely use Bunsen Burners To understand how heating can cause irreversible changes like burning and cooking To understand how mixing materials can cause irreversible changes To be able to identify useful and not useful irreversible changes To know the properties of solids, liquids and gases To know all the reversible changes of state from solid to liquid to gas, and back again To understand how the water cycle works	Use a range of scientific equipment with precision investigate properties of materials Use a range of scientific equipment with precision to separate various mixtures	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	Look at the Role of: Electrician Electrical plant operator National grid Renewable energies careers
Autumn 2	**Classification**	To understand how living things are different To be able to group objects or living things using similarities and differences To be able to use keys to identify different objects or living things To be able to construct keys using questions based on the differences between objects or living things To be able to sensibly collect, study and classify local wildlife To know and describe the different groups of living things with backbones To know and describe the different groups of living things without backbones	Sort, group and gather information for a purpose Research skills developed	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	

		To know and describe the different types of plants To know and describe the different types of micro-organisms				
	Materials	To know the key properties of common materials To understand why we used certain materials so certain jobs To know which materials are magnetic To know which materials are electrical conductors and insulators To know which materials are thermal conductors and insulators To know the properties of rocks including permeability To be able to test materials for strength and hardness To be able to test which materials insulate or absorb heat effectively To be able to use thermometers accurately	They begin to notice patterns and relationships with support. use simple equipment safely with some independence independently draw conclusions from the evidence gathered Talk about how certain scientific ideas have developed over time (smart materials)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	
	Human body	To know the location and function of the major body organs and systems, including the digestive system To know how the heart functions The understand the functions of blood and the different blood vessels To know the types of teeth and their functions To know the important food nutrients To understand what makes a balanced diet To understand the benefits and effects of exercise on our bodies To understand the role of the skeleton and muscles in our body To understand the effects of drugs To understand what a healthy lifestyle is	With support, decide whether they need to take repeat measures, increase the sample size or adjust the observation (exercise and pulse rate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	
	Evolution and inheritance	To know a range of habitats and how they differ To know how plants and animals are linked together in food chains To describe and explain the adaptations that help animals and plants to survive To know how animals and plants cope with changes in their habitats To understand how living things produce offspring that are different from their parents	Discuss criteria for grouping, sorting and classifying Group and classify things living things Collect simple data from their own observations and measurements	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence	Following a step by step method Key words Reading extended questions throughout topic	Look at the Role of: Archaeologist Palaeontologist

		To understand how humans have controlled the features passed on in animals and plants To understand other factors that can affect the characteristics of living things To understand how variations can lead to evolution over long periods of time To understand how fossils are created To understand how fossils can give us evidence about life on Earth millions of years ago		Collecting resources, scientific equipment Successful	Guided research on effects of alcohol Topic specific literacy task	Nature conservation officer
	Light and sound	To know what a light source is and how other objects reflect light To understand the keys terms transparent, translucent and opaque To understand the properties of shadows To understand how to change the size of shadows To understand the properties and uses of mirrors To be able to draw the straight path of light into our eyes from light sources and mirrors To know some other light effects like colour and refraction To know how sounds are caused To understand how sound travels To understand what volume is and how to control it To understand what pitch is and how to control it	Take accurate measurements using standard units using a range of equipment such as a data logger Make predictions for experiments about light Suggest improvements to investigations Raise further questions which could be investigated	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Word wall Following a step by step method Key words given at the start of each lesson Reading extended questions throughout topic Topic specific literacy task	Look at the Role of: Optometrist Lighting technician

Year 5/6 Year B

Half Term	Topic	Assessment Objectives:	Scientific skills	Links to school intent	Links to reading	Careers
Autumn 1	**Plants**	To know the 7 life processes of living things To know the parts of a plant and their functions To know how to keep plants healthy To understand what factors affect seed germination To know the parts of the flower and their functions	Make systematic and careful observations; Observe changes over time; Use a range of equipment, including thermometers and data loggers; Ask their own questions about what they observe	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking	Reading extended questions throughout topic Guided research on effects of alcohol Topic specific literacy task	Look at the Role of: Nature conservation officer Environmental consultant

		To understand the processes of pollination and fertilisation To understand the need for and how seeds are dispersed To understand how plants can reproduce asexually To fully understand the life cycle of plants		Independence Collecting resources, scientific equipment		Veterinary nurse
Autumn 2	**Animals**	To know the 7 life processes of living things To understand the changes that take place during adolescence To understand how new offspring are formed during fertilisation To understand the different ways that animals have offspring and affect their survival To understand why pregnancy [gestation] takes different times in different animals To understand the life cycle of humans To understand the life cycle of mammals To understand the life cycle of amphibians To understand the life cycle of birds To understand the life cycle of insects	Help decide how to set up a fair test into exercise and pulse rate, making decisions about what observations to make, how long to make them for and the type of simple equipment that might be used Set up and carry out simple experiment with support Make simple predictions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment	Key words for each lesson provided for pupils to read and discuss meaning	Look at the Role of: Doctor Nurse Care worker Dietitian
Spring 1	**Electricity**	To understand how to safely use electrical equipment To know the symbols used to draw circuits To know how to draw accurate circuit diagrams To be able to build working circuits To understand how changing battery voltage affects the brightness of bulbs To understand how different components affect how a circuit work To understand how changing the wire affects how a circuit works To understand and be able to build useful circuits	Help decide how to set up a fair test about how the number of batteries in a circuit affects the brightness of the bulbs Set up and carry out simple experiment with support. Make simple predictions about the number of bulbs in a circuit and the brightness of them.	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	Look at the Role of: Physicist Astronaut Mechanic Design engineer Trainer designer Crane operator
Spring 2	**Forces**	To understand what forces do To understand how to measure forces To understand gravity and how to test its effects To understand what upthrust is and how we can control it	Help to plan an investigation Begin to draw scientific diagrams of experiments Record results and analyse by drawing the appropriate chart / graph	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work	Key words Opportunities to read out questions and answers Following a step by step method	

		To understand friction and how we control it To understand how air and water resist movement and how it is controlled To know how to draw common forces using arrows of the correct size and direction To understand how levers, pulleys and gear make work easier To understand how to test which magnet has the most force To understand the poles of magnets and how they affect each other		Peer marking Independence Collecting resources, scientific equipment	Reading extended questions throughout topic Topic specific literacy task	
Summer 1	**Earth and space**	The Earth, Sun and Moon are Spheres, with the Sun being largest and the Moon being smallest Understanding the relative size of the Earth, Moon and Sun and being able to model them Understanding of evidence to prove the Earth is spherical Understanding what causes day and night Explain how the sun moves across the sky and how this affect shadow size and position Understand and explain the time periods of 1 Day and a 1 Year List the order of the Planets in the Solar System Explain why planets have different year lengths Explain how the appearance of the Moon changes over a 28 day period Explain how eclipses occur Understand the Geo- and Heliocentric Solar System Models Understand how our ideas about the solar system have changed based on evidence	With support, research a famous scientist Record simple data using photos, labelled diagrams and writing Create bar charts of features of planets, e.g. size comparisons or temperature	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try questions above their P step Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	
Summer 2	**Famous Scientists and thier discoveries (case studies)**					

Year 7 (2025)

Half Term	Topic	Assessment Objectives: Substantive	Assessment Objectives: Disciplinary	Links to whole school Intent	Links to Reading	Careers	Potential trips
Autumn 1	**The Human Body**	Know the main components of a balanced diet Identify the major organs of the digestive system and describe the role of some of them Investigate the amount of energy in different foods Know the basic structure of the lungs and describe how their structure helps them to perform their function Described the harmful effects that smoking has of the body Label the main parts of the heart and describe the path that blood takes through the heart Understand how exercise affects heart and breathing rate and be able to investigate this Describe short and long term effects of alcohol in the body Know the function of the skeleton and label some of the bones	Sort, group, gather and record data in a variety of ways. Sorting foods into carbohydrates, fats, proteins etc. Use secondary sources (provided) to obtain information. Research the affects of Alcohol on the body	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment	Reading extended questions throughout topic Guided research on effects of alcohol Topic specific literacy task	Look at the Role of: Doctor Nurse Care worker Nursery worker/assistant	MOSI – human body exhibition
Autumn 2	**Light and sound**	Know how light travels Identify materials that light can and cannot pass through; give the appropriate scientific name for these Describe how light is reflected using mirrors Describe how the eye works Know the term refraction and identify some real life situations where this occurs Know that a prism can split light into the spectrum Know that objects reflect and absorb different parts of the spectrum Know how sounds are formed and describe sound as a wave Know sound can only travel through a medium and investigate which materials sound travels fastest through Know the main feature of a sound wave Describe simply how the ear works Describe how and when to protect your ears	Take accurate measurements using standard units using a range of equipment; for example, measuring the angle of incidence and reflection and using data loggers to measure the volume of sound. Use straightforward scientific evidence and research to answer questions about the effects of smoking and alcohol abuse.	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment	Following a step by step method Key words Reading extended questions throughout topic Guided research on effects of alcohol Topic specific literacy task		

Spring 1	**Energy**	Identify the 9 energy stores and systems Describe energy transfers Draw energy transfer diagrams and understand the term efficiency Describe the difference between heat and temperature Describe how convection happens and identify where it happens in everyday life Describe how conduction happens and identify where it happens in everyday life Describe expansion and contraction and identify real world situations where it occurs	Take accurate measurements using thermometers and timers independently draw conclusions from the evidence gathered Consider the safety of an investigation Perform some basic calculations with support	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Following a step by step method Key words Reading extended questions throughout topic Guided research on effects of alcohol Topic specific literacy task	Look at the Role of: Pharmacist Chemist Doctor Nurse 	
Spring 2	**Rocks and the Earth**	Identify and describe the different layers of the Earth Know that rocks have different properties and give examples of properties of some common rock. Possibly link the properties of some rocks to their uses Investigate fairly which rock react most to acid rain Investigate fairly which rocks are permeable Discuss the formation of sedimentary, metamorphic and igneous rocks Describe the atmosphere of the earth and how it was formed Explain how fossil fuels were formed and describe them as a finite resource. Explain simply how humans are impacting the environment Describe the basics of the carbon cycle and its importance Describe climate change and outline simple changes people can made to reduce their impact on the climate.	Make links between their own science results and other scientific evidence, for example, how acid rain can affect statues and rocks. With support, make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions about the size of crystals in igneous rocks Follow a given method with some independence	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Key words for each lesson provided for pupils to read and discuss meaning	Look at the Role of: Renewable energies developer 	Peak district
Summer 1	**Forces**	Know the main forces and how to draw force diagrams Know that balanced forces cause objects to stay at a constant speed and unbalanced forces cause objects to change speed or direction Know what mass and weight are and how weight can change due to gravity Describe how friction can be useful and not useful and identify real world examples of where we control friction Investigate friction using different materials Describe resistant forces and explain how controlling resistant forces can be useful in everyday life Investigate air resistance Describe why static electricity occurs	Understand the discovery of gravity and appreciate how ideas and theories across the Sciences are always evolving With support, make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions about which material creates the most friction. Follow a given method with some independence	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment	Following a step by step method Key words Reading extended questions throughout topic Guided research on effects of alcohol Topic specific literacy task		

Summer 2	**Cells**	Know what a cell is and that they join together to make tissues Identify the sub-cellular structures in an animal cell and describe their functions Identify the sub-cellular structures in a plant cell and describe their functions Identify the main parts of a microscope Make a specimen slide and view the slide under a microscope. Identify a selection of specialised cells Link the structure of the specialised cell to its function Know that some organisms are only one cell big give examples of single celled organisms	Use a range of scientific equipment accurately (microscopes, thermometers) Discuss how scientific ideas have developed over time, for example, how more is known about cells due to the discovery and development of light and electron microscopes. Follow a given method with some independence	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment	Following a step by step method Key words Reading extended questions throughout topic Guided research on effects of alcohol Topic specific literacy task		

Year 8

Half Term	Topic	Assessment Objectives: substantive	Assessment Objectives: Disciplinary	Links to whole School Intent	Links to Reading	Careers	Potential Trips
Autumn 1	**Acids, alkalis and the periodic table**	Identify a range of household acids and alkali Identify and understand common chemical hazard symbols Safely extract red cabbage juice and use it to identify acids and alkalis Use universal indicator to identify a range of strengths of acid and alkali. Link the strengths to various points on the pH scale. Describe what happens when acid is added to alkali, possibly write a word equation for the reaction Describe how neutralisation can be used to counter environmental issues Use independent enquiry skills to Investigate which indigestion tables neutralised stomach acid the best Use the periodic table to identify a range of elements and define the term element Describe simply how the elements are arranged in the periodic table Know what a compound is Know examples of common compounds and recognise the chemical formula	Make a prediction and give reasons for it Identify ways of reducing potential danger of an experiment Select equipment to carry out an experiment Identify variables that will be changed, measured or kept the same Take measurements during an investigation Create simple results charts and record results Begin to draw conclusions from collected data Discuss why something happened	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Research on a particular animal Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	Look at the Role of: Ecologist Zoologist Environmental scientist Conservation careers Farming Zoo keeper WWF Canal trust	

Autumn 2	**Electricity and Magnetism**	Describe how to stay safe when using electricity Know circuit symbols and be able to draw simple circuit diagrams Explain simply what current is and use a model to describe how it flows Use an ammeter to measure current Identify series and parallel circuits Know that current is the same throughout a series circuit and use an ammeter to show this Know that current splits up in parallel circuits and use ammeters to show this Simply describe what voltage is and use a voltmeter to measure it Describe how voltage changes through series and parallel circuits Describe what happens than 2 magnets are put together Identify magnetic materials Know what a magnetic field is and describe how the earth's magnetic field can be useful Know what an electro magnet is Investigate how the change the strength of an electromagnet Identify the main part of the flower and describe the role of each part	Make a prediction and give reasons for it Identify ways of reducing potential danger of an experiment Select equipment to carry out an experiment Identify variables that will be changed, measured or kept the same Take measurements during an investigation Create simple results charts and record results Begin to draw conclusions from collected data Discuss why something happened	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	Look at the Role of: Electrician MRI technician Metal detector	
Spring 1	**Chemical reactions**	Investigate differences between reversible and irreversible changes Know what a chemical reaction is and how to spot one Know how metals react with acids Know that things need oxygen to burn and carry out an investigation to show this Use the term oxidation and write basic word equation for the oxidation of Copper Know that rusting is a chemical reaction and know the word equation for this Be able to accurately take measurements and record observations during chemical reactions Know the terms exothermic and endothermic and identify reaction for each Know that all reactions have reactants and products. Write basic word equations for reactions.	Make a prediction and give reasons for it Identify ways of reducing potential danger of an experiment Select equipment to carry out an experiment Identify variables that will be changed, measured or kept the same Take measurements during an investigation Create simple results charts and record results Begin to draw conclusions from collected data Discuss why something happened	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Key words Opportunities to read out questions and answers	Look at the Role of: Chemist Drugs developer Doctor Taste tester Household chemicals safety advisor Medical analysist	Catalyst museum

Spring 2	**The Environment**	know what a food chain is and what the arrows mean Be able to use terms like producer consumer, predator, prey Create examples of food chains and possibly link food chains to make a food web. Identify a range of different habitats Explain how conditions in different habitats support different living things, Describe how some animals are adapted to their habitat Describe how some plants are adapted to their habitat Know what variation means and collect and analyse data on variation Identify genetic and environmental variation Describe selective breeding and how it is used in everyday life Describe simply the steps involved in evolution Explain how extinction occurs Identify various fossils and describe how a fossil form	Make a prediction and give reasons for it Identify ways of reducing potential danger of an experiment Select equipment to carry out an experiment Identify variables that will be changed, measured or kept the same Take measurements during an investigation Create simple results charts and record results Begin to draw conclusions from collected data Discuss why something happened	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	Look at the Role of: Palaeontologist Geologist Geochemist Nurse Animal care work Vet Geneticist	Peak district
Summer 1	**Particles and solutions**	Identify solids, liquids and gases. Describe how particles are arranged in solids, liquids and gases Link the arrangement of particles to the properties of solids, liquids and gases Describe what boiling / condensing and melting / freezing points are Explain why dissolving does/does not occur using particle model and correct scientific terminology (solute, solvent, solution, soluble, insoluble) Be able to use a filter to separate an insoluble solid from a liquid Be able to use a Bunsen burner to evaporate water from salt solution link the processes of filtering and evaporating to salt purification Describe how simple distillation works to separate mixtures and identify uses in everyday life Describe how chromatography works to separate mixtures and identify real world uses Describe diffusion Investigate how to increase the speed of diffusion Describe how particles cause pressure	Make a prediction and give reasons for it Identify ways of reducing potential danger of an experiment Select equipment to carry out an experiment Identify variables that will be changed, measured or kept the same Take measurements during an investigation Create simple results charts and record results Begin to draw conclusions from collected data Discuss why something happened	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	Look at the Role of: Barista Chemist Forensic scientist 	

Summer 2	**Reproduction**	Use the terms pollination and fertilisation to describe how plants reproduce Describe the different ways that seeds can be dispersed Describe the physical changes that take place in males and females during puberty. know the parts and jobs of the male and female reproductive system. Have an understanding of what menopause is know basically what happens in sexual intercourse be able to explain what happens at fertilisation and where fertilisation happens Explain how some couples have difficulty having children and how scientists can assist using IVF treatment. Discuss the ethics of IVF, Surrogacy and sperm donation. Know how an embryo received nutrients during gestation and things that a mother can do (and avoid doing) to keep the embryo healthy	Make a prediction and give reasons for it Identify ways of reducing potential danger of an experiment Select equipment to carry out an experiment Identify variables that will be changed, measured or kept the same Take measurements during an investigation Create simple results charts and record results Begin to draw conclusions from collected data Discuss why something happened	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	Look at the Role of: Fertility consultant Farmer Doctor Nurse 	

Year 9 – Consolidation of KS3 and introduction to KS4

Half Term	**Topic**	**Assessment Objectives:**		**Links to Whole School Intent**	**Links to Reading**	**Potential Trips**
		Substantive	**Disciplinary**			

Autumn 1	**Energy**	**Physics – Energy transfers** Identify energy stores and transfers Know how to calculate Kinetic energy (higher ability) Know the calculation for Power (higher ability) Understand efficiency Investigate efficiency of different systems Understand convection and conduction Physics practical: Thermal insulation Describe how a PowerStation creates electricity Research national and global energy resources	Use knowledge to make predictions, giving an explanation Select equipment, use its scientific name Use equipment appropriately to perform an investigation Describe how to stay safe Identify variables that need to be controlled during an investigation Draw appropriate results tables and record results during an investigation Use a variety of methods to display information. E.g. graphs, diagrams, charts Give simple conclusion based on investigation results	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task 	MOSI
Autumn 2	**Atoms, elements and compounds**	**Chemistry – Atoms, elements and compounds** Discuss what an atom is and how it is arranged Define the term element and give examples Compare elements, mixtures and compounds Represent simple chemical reactions as word and possibly symbol equations Know what a mixture is and investigate different ways of separating mixtures, including distillation Discuss the history of the atom Describe how electrons are arranged in shells in an atom Describe the development of the periodic table and know the basic arrangement of the modern periodic table	Use knowledge to make predictions, giving an explanation Select equipment, use its scientific name Use equipment appropriately to perform an investigation Describe how to stay safe Identify variables that need to be controlled during an investigation Draw appropriate results tables and record results during an investigation Use a variety of methods to display information. E.g. graphs, diagrams, charts Give simple conclusion based on investigation results	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	

Spring 1	Cells	Cell structure Identify Eukaryotes and prokaryotes cells Compare animal and plant cells Biology practical 1: Microscopy Discuss cell specialisation and differentiation Cell division Identify Chromosomes in a nucleus Outline the steps of Mitosis and the cell cycle Know what Stem cells are and how they can be used in medicine Transport in cells Describe diffusion and give real life examples Describe Osmosis Biology practical 3: Osmosis Describe Active transport Animal tissues, organs and organ systems Identify and describe the organs human digestive system Discuss the role of enzymes in digestion Practical investigation - Food tests Describe the heart and blood vessels Outline the components of the Blood and what they do	Use knowledge to make predictions, giving an explanation Select equipment, use its scientific name Use equipment appropriately to perform an investigation Describe how to stay safe Identify variables that need to be controlled during an investigation Draw appropriate results tables and record results during an investigation Use a variety of methods to display information. E.g. graphs, diagrams, charts Give simple conclusion based on investigation results	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Reading extended questions throughout topic Guided research on effects of alcohol Topic specific literacy task	
Spring 2	**Electricity**	Current, potential difference and resistance Recognise standard circuit diagram symbols Use the equation Q=It Be able to measure potential difference and current in series circuits Be able to measure potential difference and current in parallel circuits Use the equation R=V÷I Investigate how resistance changes with the length of a piece of wire Domestic uses and safety Know the difference between direct and alternating current Understand the use of 3 core cables in keeping us safe Describe The National Grid structure	Use knowledge to make predictions, giving an explanation Select equipment, use its scientific name Use equipment appropriately to perform an investigation Describe how to stay safe Identify variables that need to be controlled during an investigation Draw appropriate results tables and record results during an investigation Use a variety of methods to display information. E.g. graphs, diagrams, charts Give simple conclusion based on investigation results	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	
Summer 1	**Bonding and Structure**	Chemical bonds, ionic, covalent and metallic Recap electron structure and ions Describe how ionic bonding occurs Describe properties of ionic compounds Describe how Covalent bonding occurs Describe the properties of covalent compounds	Use knowledge to make predictions, giving an explanation Select equipment, use its scientific name Use equipment appropriately to perform an investigation Describe how to stay safe Identify variables that need to be controlled during an investigation	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking	Key words Opportunities to read out questions and answers Reading extended questions throughout topic	

		Describe how Metallic bonding occurs and how this links to the properties of metals Polymer structures Giant covalent structures Properties of metals and alloys	Draw appropriate results tables and record results during an investigation Use a variety of methods to display information. E.g. graphs, diagrams, charts Give simple conclusion based on investigation results	Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Guided research on effects of alcohol Topic specific literacy task	
Summer 2	**Communicable and non communicable disease**	Communicable diseases Identify a range of Communicable (infectious) diseases Identify and Discuss Viral diseases Identify and Discuss Bacterial diseases Identify and Discuss Fungal diseases Identify and Discuss Protist diseases Describe the Human defence systems Outline the steps of Vaccinations Discover why Antibiotics and painkillers are used Research the Discovery and development of drugs Plant tissues, organs and systems Know the equation for Photosynthesis Describe the structure of a leaf Identify and describe plant tissues and organ system Know what transpiration is and factors that can affect it Health and disease Define a non-communicable disease Describe Coronary heart disease Outline some treatments for coronary heart disease Discuss the effect of lifestyle on some non-communicable diseases Explain simply what Cancer is and describe treatments for it	Use knowledge to make predictions, giving an explanation Select equipment, use its scientific name Use equipment appropriately to perform an investigation Describe how to stay safe Identify variables that need to be controlled during an investigation Draw appropriate results tables and record results during an investigation Use a variety of methods to display information. E.g. graphs, diagrams, charts Give simple conclusion based on investigation results	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Reading extended questions throughout topic Guided research on effects of alcohol Topic specific literacy task	

Year 10 - Entry Level Certificate (Pathway 1)

Half Term	Topic	Assessment Objectives:		Intent	Reading	Potential trips
		Substantive	Disciplinary			
Autumn 1	Energy	Energy, Forces and the Structure of Matter Know the changes involved in the way energy is stored when a system changes. Energy storage is limited to kinetic, gravitational potential, thermal, light, sound and elastic (strain). Energy can be transferred usefully, stored or dissipated, but cannot be created or destroyed. This is called the conservation of energy. Whenever there are energy transfers in a system only part of the energy is usefully transferred. The rest of the energy is dissipated so that it is stored in less useful ways. This energy is often described as being 'wasted'. Unwanted energy transfers can be reduced in a number of ways, eg through lubrication and the use of thermal insulation. The higher the thermal conductivity of a material the higher the rate of energy transfer by conduction across the material. The main energy resources on Earth include fossil fuels, nuclear, wind, hydroelectric, geothermal, tides and the sun. Distinguish between energy resources that are renewable and energy resources that are non-renewable.	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	MOSI
Autumn 2	Forces	Energy, Forces and the Structure of Matter continued A force is a push or pull that acts on an object due to the interaction with another object. All forces between objects are either contact (the objects are physically touching) or non-contact (the objects are physically separated) Examples of contact forces include friction, air resistance, tension and normal contact force. Examples of non-contact forces are gravitational force, electrostatic force and magnetic force. When a force causes an object to move through a distance, work is done on the object.	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic	Xplore! Wrexham – forces workshop

		Speed is measured by the distance travelled in a certain time. The stopping distance of a vehicle is the sum of the distance the vehicle travels during the driver's reaction time (thinking distance) and the distance it travels under the braking force (braking distance). Investigate how reaction times vary from person to person. Know that a driver's reaction time can be affected by tiredness, drugs, alcohol, and distractions. The braking distance of a vehicle can be affected by adverse road and weather conditions, and poor condition of the vehicle. Some atomic nuclei are unstable. The nucleus gives out ionising radiation. This is a random process called radioactive decay. Know that 3 types of nuclear radiation Know some uses and dangers of the three types of radiation.		Successful Topic summary questions to show understanding	Topic specific literacy task	
Spring 1	**Elements mixtures and compounds**	**Elements, Mixtures and Compounds** Know that all substances are made of atoms and that an atom is the smallest part of an element that can exist. Describe simply how elements are arranged on the periodic table Know that elements in the same group of the periodic table have similar chemical properties. Know that when elements react, their atoms join with other atoms to form compounds. Describe what a compound is and give examples of different types Use word equations to represent chemical reactions Describe the three states of matter; solid, liquid and gas. Use particle diagrams to show atom structure. Know that melting and freezing take place at the melting point Know that boiling and condensing take place at the boiling point. Discuss the energy changed that occur during changes of state Know that a mixture contains two or more substances not chemically combined together. Mixtures can be separated by physical processes, eg filtration, chromatography and distillation. Know what an ore is Describe how metals less reactive than carbon can be produced by heating the metal compounds in the ore with carbon. We should recycle metals to save resources and limit environmental impacts	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Reading out questions Reading out answers Research	
Spring 2	**Elements, mixtures and compounds**	Elements, Mixtures and Compounds Continued Metals have giant structures of atoms with strong bonds between the atoms and so most metals have high melting points. Investigate conduction of heat and electricity in metals. Link these properties to uses of metals Know what an alloy is and give examples of some alloys and their uses	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work	Write a persuasive argument about recycling 'We should recycle metals to save resources and limit environmental impacts'	

	Cells and the Human body	Know what a polymer is Describe properties of polymers and link this to their uses Describe how some polymers can be harmful to the environment **Cells and the Human Body** Identify parts of a microscope and describe how to use one correctly Know the main components of cells Describe how cells may be specialised to carry out a particular function. Identify the position of the major organs in the human body, eg brain, heart, lungs, liver and reproductive organs Describe the structure and function on the heart. Know that blood transports oxygen, proteins and other chemical substances around the body. Identify the main organs in the human digestive system Know that enzymes are used to convert food into soluble substances that can be absorbed into the bloodstream. Know that respiration releases the energy needed for living processes and be able to recall the word equation.	Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding		
Summer 1	**The Human Body**	Lifestyle can have an effect on people's health- eg diet and exercise are linked to obesity; smoking to cancer etc. A healthy diet contains the right balance of the different foods you need and the right amount of energy. Know that infectious diseases are caused by micro-organisms called pathogens. Know that viruses damage cells in which they reproduce. Describe how white blood cells help to defend against bacteria by ingesting them. Describe simply how a vaccination works Describe the steps in which medical drugs are developed and tested before being used to relieve illness or disease. Know that rugs change the chemical processes in people's bodies and that people may become dependent or addicted to the drugs and suffer withdrawal symptoms without them. Know that antibiotics are medicines that help to cure disease by killing bacteria inside the body, but can't kill viruses. Describe the human automatic control system Investigate reflex actions Hormones are secreted by glands and are transported to their target organs by the bloodstream. Know some of the hormones involved in the female menstrual cycle	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Reading out questions Reading out answers Research		
Summer 2	**Evolution and the environment**	Environment, Evolution and inheritance Know that radiation from the Sun is the source of energy for living organisms. Know what a producer is and the word equation for photosynthesis Describe how animals and plants may be adapted for survival in the conditions where they normally live.	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work	Key words Reading out questions Reading out answers Research	Peak district Chester zoo Peak wildlife park	

		Create food chains that show feeding relationships in certain habitats Describe how a food web can be used to understand the interdependence of species within an ecosystem Know that all materials in the living world are recycled to provide the building blocks for future organisms. Describe how during the Carbon Cycle decay of dead plants and animals by microorganisms returns carbon to the atmosphere so that carbon dioxide to be used by plants in photosynthesis. Plants often compete with each other for light and space, and for water and nutrients from the soil. Animals often compete with each other for: food, water, mates and territory. Animals and plants are subjected to environmental changes. Such changes may be caused by non-living (abiotic) or living (biotic) factors. Describe how the rapid growth in human population results in more resources used and more waste produced. Describe Darwin's theory of evolution Artificial selection (selective breeding) is the process by which humans breed plants and animals for particular genetic traits.	Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding			

Year 11 Entry Level Certificate (Pathway 1)

Half Term	Topic	Assessment Objectives:		Links to Whole School Intent	Links to Reading	Potential trips
		Substantive	Disciplinary			
Autumn 1	**Completion of Evolution and Environment**	There are 2 types of reproduction: -sexual, which involves male and female sex cells joining together (gametes). This creates genetic variation offspring. -asexual, only one parent cell needed. Creates genetically identical offspring. The genetic material in the nucleus of a cell is made of a chemical called DNA, which is contained in structures called chromosomes. Chromosomes carry genes that control the characteristics of the body. Humans have 23 pairs of chromosomes. Only one pair carries the genes that determine sex. Females have XX (the same sex chromosomes), Males have XY (two different sex chromosomes) In genetic engineering, genes from chromosomes of humans and other organisms can be 'cut out' using chemically produced enzymes, and transferred to the cells of other organisms. Genetic engineering produces unique set of genes. (Changing the DNA code for features). It's also a form of asexual reproduction.	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Reading out questions Reading out answers	

			Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)		Research	
Autumn 2	**Chemistry in our world**	Chemistry In Our World Acids react with some metals to produce salts and hydrogen. Hydrochloric acid produces chlorides and sulphuric acid produces sulphates. Know how to test for hydrogen gas Acids are neutralised by alkalis (eg sodium hydroxide) and bases (eg insoluble metal oxides) to produce salts and water. Salt solutions can be crystallised to produce solid salts. Investigate exothermic and endothermic reactions Investigate the different ways that the speed of a chemical reaction can be increased Compare relative rates by measuring the time for a reactant to be used up, the volume of a gas produced in a given time, the time for a solution to become opaque or coloured. Describe to composition of the early atmosphere and what caused it Describe how the atmosphere changed. Know that the current atmosphere is about 80% nitrogen, 20% Oxygen and small amounts of other gases eg carbon dioxide and argon Crude oil is a mixture of a very large number of compounds & found underground, eg under the North sea.	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Reading out questions Reading out answers Research	Catalyst museum
Spring 1	**Chemistry in our world continued** **Electricity**	Chemistry In Our World Continued Crude oil may be separated into fractions by fractional distillation. This process, which takes place in a refinery, can be used to produce a range of useful fuels and oils, ie petrol and diesel. When combustion of fuels happens, CO2 and H2O are released. If the fuel contains Sulphur, a gas called sulphur dioxide is also released. When incomplete combustion happens (when there's not enough Oxygen) carbon monoxide and solid particles are also produced. Sulphur dioxide causes acid rain, which dissolves limestone buildings. Carbon monoxide is colourless, odourless, toxic gas that causes death. More greenhouse gases in our atmosphere cause the temperature of Earth to increase. Water that is safe to drink has small amounts of dissolved substances and low levels of microbes. Most drinking water is produced by choosing a suitable source of fresh water, filtering to remove solids and sterilising to kill microbes. If supplies of fresh water are limited, salty water can be distilled to produce fresh water. This requires a large energy input. Electricity, Magnetism and Waves Most electrical appliances are connected to the mains using a three-core flex. The insulation covering each wire in the flex is colour-coded for easy identification: live wire – brown | neutral wire – blue | earth wire – green and yellow stripes	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Reading out questions Reading out answers Research	

		The earth wire is a safety wire to stop the appliance becoming live and the fuse contains a thin piece of wire, which melts if the current becomes too large, thereby cutting off the supply. Some appliances do not have an earth wire because they are double insulated. Everyday electrical appliances are designed to bring about energy transfers				
Spring 2	**Magnets and Waves**	Electricity, Magnetism and Waves – Continued Identify the poles of a magnet Describe where a magnetic field around a bar magnet is the strongest Know that when a current flows through a conducting wire, a magnetic field is produced around the wire. Investigate how to change the strength of a magnetic field Know that waves can be either transverse or longitudinal and be able to demonstrate this Know that in a transverse wave, the oscillations are perpendicular to the direction of energy transfer and in a longitudinal wave, the oscillations are parallel to the direction of energy transfer. Give examples of longitudinal and transverse waves Be able to describe waves using the words amplitude, wavelength and frequency. Use the equation wave speed (m/s) = frequency (Hz) x wavelength (m) Know that electromagnetic waves are transverse waves that transfer energy from the source of the waves to an absorber. The electromagnetic spectrum displays all groups of electromagnetic waves. Ultraviolet waves, X-rays and gamma rays can have hazardous effects on human body tissue. Know some practical uses for different electromagnetic waves.	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Reading out questions Reading out answers Research	MOSI
Summer 1		Project based task Use scientific understanding, enquiry skills and data analysis to perform a mini dissertation relating to a topic of interest	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Reading out questions Reading out answers Research	
Summer 2		Project based task Use scientific understanding, enquiry skills and data analysis to perform a mini dissertation relating to a topic of interest	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence		

			Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Collecting resources, scientific equipment Successful Topic summary questions to show understanding		

Year 10 – Btec First (Pathway 2)

Half Term	**Topic**	**Assessment Objectives:**		**Intent**	**Reading**
		Topic content (content in green is unit 1 and is assessed via an external exam)	**Skills being developed**		

Autumn 1	**Radiation**	Re cap atomic structure, atomic number and mass number Understand radiation, alpha, beta and gamma, Describe which is more ionizing Investigate half life and plot graphs Link the properties of Alpha Beta and Gamma to their uses Describe how nuclear power stations do nuclear **fission**, (the breakdown of large nuclei to form small nuclei) environmental impacts of storage of waste products, uncontrolled release of radioactive material Know that stars do nuclear **fusion,** the creation of larger nuclei from smaller nuclei, the difficulty in harnessing energy from nuclear fusion on Earth	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task
Autumn 2	**Reactivity and bonding**	Recap the definitions of Elements, mixtures and compounds Identify Acids, bases and alkalis using the pH scale and universal indicator. Perform neutralisation reactions with hydrochloric acid, nitric acid, and sulphuric acid with copper oxide, zinc oxide and sodium hydroxide Observe alkali metals in water and link to atomic structure and reactivity Carry out displacement reactions of halogens link to atomic structure and reactivity Describe reactivity of group 1 and 7 using the periodic table Describe covalent, ionic and metallic bonding and how it affects the properties, use dot and cross diagrams.	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task
Spring 1		Plant versus animal cells, functions of the organelles; nucleus, cytoplasm, cell membrane, chloroplasts, cell wall, vacuole, mitochondria Specialized cells, cross section of a leaf- transpiration is driven by loss of water, labelling plant organs; roots, xylem, phloem, leaf Cells form tissues which form organs which form organ systems which form organisms, look at cardiovascular and circulatory system Use Quadrats, pitfall traps, sweep nets, pooters, to find out who lives where, what specific features allows the animals to live in their particular habitat Describe how adaptations enable animals to survive in their habitat Construct and use keys to show how organisms can be identified. Construct food chains and understand how they link together to form food webs. Understand how plants and animals are classified Understand Darwin's theory of evolution	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Reading out questions Reading out answers Research

Spring 2	**Electricity**	Know some energy stores and systems Describe how thermal energy is transferred via Conduction, convection and radiation Construct simple series and parallel circuits Use circuit symbol and diagrams to represent circuits Measure current (A, mA) and voltage (V, mV) in circuits Use the equation: voltage (volts) = current (amps) x resistance (ohms) Difference between direct current (battery) and alternating current (generator) and how each is produced Generate electricity using a lemon Discuss rechargeable vs. non rechargeable batteries Discuss different ways of producing electricity, renewable vs. non-renewable comparing the environmental and efficiency of each Efficiency calculations: efficiency = useful energy (j) / total energy supplied (j) x100%; Storage of energy using batteries and fuel cells Describe the process of transferring energy along the National Grid and the use of step-up and step-down transformers in the to reduce energy losses	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Write a persuasive argument about recycling 'We should recycle metals to save resources and limit environmental impacts'
Summer 1	**Chemical and physical properties**	Recap physical versus chemical changes and signs of a chemical reaction Investigate metal and metal carbonates in acid testing for hydrogen and carbon dioxide Identify the main Hazard symbols Write balanced equations for simple reactions Research properties of specific materials and how they are linked to their uses	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Reading out questions Reading out answers Research
Summer 2	**Environment**	Identify the main parts of the nervous system Perform a skin sensitivity investigation Describe how the Reflex arc works Identify the key features of the endocrine system and where the main hormones are produced Investigate the effects of exercise on body temp Describe how the body stays in homeostasis. Link to blood glucose levels and temperature Research how human activities alter ecosystems; deforestation, agriculture to meet increasing demand for food/fuel, transportation of food and for travel Describe how pollutants produced by human activities affect ecosystems; fertilizers cause Eutrophication, toxic herbicides/pesticides, bioaccumulation and disrupt terrestrial and aquatic food chains (DDT in penguins) Identify ways in which we can detect pollution; limestone eroded buildings, lichens and sulphur dioxide, algae and freshwater shrimp, oxygen and nitrate levels in water Research and r=present findings on how we can reduce the impact of pollution; recycling, conservation – reforestation,	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Reading out questions Reading out answers Research

		replacement planting and breeding programmes, organic farms/ fertilizers and biological pest control			

Year 11 Btec First (Pathway 2)

Half Term	**Topic**	**Assessment Objectives: Skills/Knowledge**		**Links to Whole School Intent**	**Links to Reading**
		Topic content (content in green is unit 1 and is assessed via an external exam)	**Skills being developed**		

Autumn 1	**The solar system**	Describe the electromagnetic spectrum, its uses and dangers. Define: solar system, stars, galaxies, meteors, asteroids, natural satellites, comets, dwarf planets, Explain how the universe and solar system were made. Identify evidence for the big bang theory including red shift and cosmic microwave background radiation Describe different telescopes and other ways of observing the universe. optical, radio, infrared, UV, X-ray, gamma, reflecting, ground based and space based, space probes and robots	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task
Autumn 2	**Rates of reactions**	Rate of reaction How to calculate the rate of a chemical reaction Rates of reaction investigation Understand Collision theory and activation energy Explain why we use Catalysts know that some reactions are reversible Describe energy changes and reversible reactions Use the term equilibrium	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task
Spring 1	**Health and disease Genetics**	Know some common infectious diseases and how bacteria and virus affect the body. Describe some used to prevent and treat disease Understand antibiotic resistance Describe how a range of non infectious diseases can be causes by an unhealthy lifestyle Know the function of DNA. Understand the role of bases genes protein and chromosomes Show monohybrid inheritance Be able to apply terminology such as alleles, genotypes, phenotypes, homozygous, and heterozygous Use Punnett squares to look at the probability, percentage or ratio of offspring displaying inherited characteristics Genes on health: genetic disorders can affect human health; discuss how pedigree analysis can be used to	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task

		show the inheritance of genetic disease like cystic fibrosis and sickle cell anaemia identifying dominant and homozygous recessive disorders	Consider significance and limitations of own work (evaluate)		
Spring 2	**Environment**	Research a range of natural phenomena; volcanoes, tectonic plates, earthquake, tsunami, how they have influenced the surface and atmosphere of the Earth Research how man has affected the environment; chemical processing, using natural resources, extracting industries – from the air and land, the contamination of land as a result of industrial activity, global warming, ozone depletion Describe stainable development; look at human choices and human solutions to problems.	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task
Summer 1	**Unit 1 (external exam) recap of the year**	Cells – structure and function Specialised Cells Organs and organ systems DNA and Chromosomes Monohybrid inheritance Studying inheritance patterns Homeostasis How nerves carry information Atomic structure Isotopes and relative atomic mass The periodic table Electron configuration Elements, compounds and mixtures Neutralisation reactions Acids and salts Acids and metals Acids and carbonates Energy transfers Conduction, convection and radiation Measuring energy Sources of renewable energy Wave characteristics Electromagnetic spectrum	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task Rev

Summer 2	**Project**	Project based task Use scientific understanding, enquiry skills, data analysis, research to perform a mini dissertation relating to a topic of interest	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task

Year 10 - Pathway 3 (AQA Combined Science (2 x GCSE) or Single Science (either Chemistry, Physics or Biology)

Half Term	Topic	Assessment Objectives:		Links to Whole School Intent	Links to Reading	Potential trips
		Substantive	Disciplinary			
Autumn 1	Particle model of matter and atomic structure	Changes of state and the particle model Describe density of materials Physics practical: Density Describe Changes of state Describe Internal energy Understand temperature changes in a system and specific heat capacity Particle motion in gases Atoms and isotopes Describe the structure of an atom Identify Mass number, atomic number and isotopes The development of the model of the atom (common content with chemistry) Radioactive decay and nuclear radiation Nuclear equations Half-lives and the random nature of radioactive decay Describe Radioactive contamination	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	
Autumn 2	**Inheritance, variation and evolution**	**Inheritance, variation and evolution** Understand reproduction and meiosis Describe the structure of DNA and what the genome is Understand inheritance and sex determination Predict the likelihood of genetic disorders being inherited using punnet squares Investigate variation within a species Describe the process of evolution and evidence for this Describe how bacteria can become resistant to antibiotics Describe what selective breeding is an discuss the ethics of this Outline the steps of genetic engineering and discuss the ethics of this Learn how to classify plants and animals using taxonomy	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	

Spring 1	Quantitative chemistry And Chemical changes	Chemical measurements, conservation of mass and the quantitative interpretation of chemical equations Know how to calculate relative formula mass Describe conservation of mass and create balanced chemical equations Reactions of acids The pH scale and neutralisation Chemistry practical: Neutralisation Neutralisation of acids and salt production Reactions of acids with metals	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	Catalyst museum
Spring 2	**Forces**	Forces and their interactions Identify Scalar and vector quantities Discover Contact and non-contact forces Discuss the effect of Gravity Calculate Resultant forces Calculate Work done and energy transfer Forces and elasticity Investigate Force and extension Forces and motion Understand distance and displacement Know how to calculate speed Know what Velocity is Understand the distance–time relationship Know what acceleration is	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	Xplore! Wrexham – forces workshop Anderton boat lift

Summer 1	**Chemical changes continued And Energy Changes**	Electrolysis Outline the process of electrolysis Electrolysis of molten ionic compounds Describe how we could use electrolysis to extract metals Electrolysis of aqueous solutions Chemistry practical: Electrolysis Exothermic and endothermic reactions Energy transfer during exothermic and endothermic reactions Chemistry practical: Temperature changes Draw and interpret reaction profiles Describe the energy change reactions Chemical cells and fuel cells Research Cells and batteries Research Fuel cells	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	
Summer 2	**Bioenergetics And Homeostasis and response**	Photosynthesis The Photosynthetic reaction Rate of photosynthesis Investigation in to how light affects Photosynthesis Uses of glucose from photosynthesis Respiration Aerobic and anaerobic respiration Response to exercise Metabolism The Human Nervous System Structure and function of the human nervous system Investigation into Reaction time Hormonal coordination in humans Human endocrine system Control of blood glucose concentration Hormones in human reproduction Contraception	Use knowledge and research to make predictions Use a range of equipment safely Identify risks and how to reduce them Identify variables that need to be controlled during an investigation Draw appropriate results tables allowing for and experiment to be repeated Describe why an investigation is fair/not fair Use a variety of methods to display information. E.g. graphs, diagrams, charts Describe patterns in results and give conclusions	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	Local parks

Year 11 Pathway 3 (AQA Combined Science (2 x GCSE) or Single Science (either Chemistry, Physics or Biology)

Half Term	Topic	Assessment Objectives: Substantive	Assessment Objectives: Disciplinary	Links to Whole School Intent	Links to Reading	Potential trips
Autumn 1	**Forces** **The rate and extent of chemical change**	Forces, accelerations and Newton's Laws of motion Describe Newton's First Law Describe Newton's Second Law Physics practical: Acceleration Describe Newton's Third Law Forces and braking Describe what Stopping distance is Investigate Reaction times Discuss factors affecting braking distance Rate of reaction How to calculate the rate of a chemical reaction Chemistry practical: Rates of reaction investigation Understand Collision theory and activation energy Explain why we use Catalysts Reversible reactions and dynamic equilibrium Reversible reactions – know that some reactions are reversible Describe energy changes and reversible reactions Describe equilibrium	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	Anderton boat lift

Autumn 2	**Waves** **Ecosystems**	Waves in air, fluids and solids Identify Transverse and longitudinal waves Describe properties of waves Perform an investigation into Waves Perform and investigation into Light Identify types of electromagnetic waves Describe properties of electromagnetic waves Organisation of an ecosystem Identify the levels of organisation in an ecosystem Perform a field investigation using quadrats Research how materials are cycled (Carbon cycle)	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	
Spring 1	**Ecosystems** **Magnetism**	Biodiversity and the effect of human interaction on ecosystems Discuss what Biodiversity means Discuss Waste management Research and debate Land use, Deforestation, Global warming Suggest how to maintain biodiversity Magnetism and electromagnetism Describe the forces magnets exert on each other. Identify 3 magnetic materials Know differences between permanent and induced magnets Explain what is meant by the magnetic field of a magnet Draw the magnetic field pattern of a bar magnet and describe how to plot the magnetic field pattern using a compass. Describe how the strength of a magnet varies with distance from the magnet. Know that a wire carrying an electric current has its own magnetic field (motor affect) Describe how solenoids are formed and explain the advantages of them	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	Peak district Local parks MOSI

Spring 2	**Exam prep and revision**	. Revision of previous year's topics and exam practice	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	
Summer 1		Revision of previous year's topics and exam practice	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	
Summer 2	**Project**	Project based task Use scientific understanding, enquiry skills, data analysis and research to perform investigations relating to topics of interest.	Use previous knowledge and research to make predictions/ give hypothesis Select appropriate equipment and provide a method Use equipment appropriately to perform an investigation Identify hazards and describe how to reduce the risks Use the terms dependent and independent variable when planning and investigation Identify variables that need to be controlled during an investigation Draw appropriate results tables (putting units in the headings) and record results Discuss anomalous results Identify trends and describe patterns in results Draw line graphs when appropriate (including graphs with line of best fit) Use observations, measurements and data to draw conclusions Consider significance and limitations of own work (evaluate)	Effective communicator Create a presentation and deliver to the class Resilience Encourage pupils to try challenge questions Emotionally Intelligent Paired work, group work Peer marking Independence Collecting resources, scientific equipment Successful Topic summary questions to show understanding	Key words Opportunities to read out questions and answers Following a step by step method Reading extended questions throughout topic Topic specific literacy task	

Assessment

Assessment in Science is designed to evaluate both substantive knowledge (what pupils know) and disciplinary knowledge (how pupils work scientifically).

Substantive Knowledge Assessment

Pupils will be assessed on their ability to:

Emerging

- Recall key scientific vocabulary.
- Identify simple scientific concepts.
- Recognise examples related to the topic.

Developing

- Explain scientific ideas using appropriate scientific language.
- Describe processes and relationships within the topic.
- Apply knowledge to familiar situations.

Secure

- Explain concepts in detail.
- Make links between current and previous learning.
- Apply scientific knowledge to unfamiliar contexts.
- Answer extended response questions using scientific terminology.

Assessment Methods

- Retrieval quizzes
- Knowledge recall tasks
- Vocabulary checks
- Topic summary assessments
- Extended written responses
- Verbal questioning
- Presentation tasks

Disciplinary Knowledge Assessment

Pupils will be assessed on their ability to:

Emerging

- Follow a simple scientific method.
- Make observations.
- Record simple results.

Developing

- Identify variables.
- Make predictions using scientific knowledge.
- Collect and present findings in an appropriate format.
- Draw simple conclusions.

Secure

- Plan investigations with increasing independence.
- Analyse data and identify patterns.
- Evaluate methods and suggest improvements.
- Justify conclusions using evidence.

Assessment Methods

- Practical observations
- Investigation write-ups
- Data analysis activities
- Scientific discussions
- Presentation of findings
- Practical competency checklists

Impact

Through the science curriculum at Adelaide Heath Academy, pupils will develop a secure body of scientific knowledge and a deep conceptual understanding of Biology, Chemistry and Physics. They will progressively acquire and retain the substantive knowledge and disciplinary skills required to think, work and communicate as scientists.

Pupils will develop curiosity about the world around them and become increasingly confident in asking questions, making predictions, planning investigations, analysing evidence and drawing conclusions. Over time, they will become independent learners who can apply scientific understanding to both familiar and unfamiliar contexts.

As a specialist SEMH provision, the science curriculum also contributes significantly to pupils' personal development. Pupils will develop resilience, confidence and self-belief through practical enquiry, problem-solving and collaborative learning opportunities. They will learn to communicate effectively using appropriate scientific vocabulary, present findings to a range of audiences and engage respectfully in discussion and debate around scientific, ethical, environmental and societal issues.

The curriculum supports pupils in becoming emotionally intelligent individuals who can reflect on how science impacts their lives, communities and wider society. Through meaningful careers education and real-world applications, pupils will recognise the relevance of science beyond the classroom and be well prepared for further education, employment and adult life.

By the end of their journey at Adelaide Heath Academy, pupils will be able to:

- Recall and apply scientific knowledge with increasing accuracy and confidence.
- Use scientific vocabulary appropriately in spoken and written communication.
- Plan, conduct and evaluate investigations with increasing independence.
- Analyse data, identify patterns and draw evidence-based conclusions.
- Demonstrate resilience when faced with challenge and unfamiliar problems.
- Work collaboratively and communicate effectively with others.
- Make informed decisions using scientific evidence and reasoning.
- Understand the contribution science makes to society, technological advancement and future careers.
- Transfer scientific understanding across subjects and into everyday life.
- Develop the confidence, independence and aspiration required for their next stage of education, training or employment.