

CURRICULUM INTENT**YEAR 7**

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AGE EXPECTED AND WORKING IN GREATER DEPTH**YEAR 7**

	KNOWLEDGE	SKILLS	UNDERSTANDING	ASSESSMENT
	The ideas, concepts, dates, times and other details that student will be able to recall.	The ways in which a student will be expected to apply their knowledge.	The depth in which a student understands and is able to articulate their ideas.	Details of hinge assignments and topics covered by two summative assessments.

AGE EXPECTED STANDARD - YEAR 7

	KNOWLEDGE	SKILLS	UNDERSTANDING	ASSESSMENT
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BIOLOGY

STUDENTS...

- Recall how parts of the human skeleton work as a system for support, protection, movement and the production of new blood cells.
- Know pairs of muscles create movement when one contracts and the other relaxes.
- Know that multicellular organisms are composed of cells which are organised into tissues, organs and systems to carry out life processes.
- Know that there are many types of cells. Each has a different structure or feature so it can do a specific job.
- Know that both plant and animal cells have a cell membrane, nucleus, cytoplasm and mitochondria.
- Know plant cells also have a cell wall, chloroplasts and usually a permanent vacuole.
- Know Organisms in a food web (decomposers, producers and consumers) depend on each other for nutrients. So, a change in one population leads to changes in others.
- Know The population of a species is affected by the number of its predators and prey, disease, pollution and competition between individuals for limited resources such as water and nutrients.
- Know Insects are needed to pollinate food crops.
- Know Plants have adaptations to disperse seeds using wind, water or animals.
- Know Plants reproduce sexually to produce seeds, which are formed following fertilisation in the ovary.
- Know that Flowers contain the plant's reproductive organs.

STUDENTS...

- Explain how a physical property of part of the skeleton relates to its function.
- Explain why some organs contain muscle tissue
- Explain how antagonistic muscles produce movement around joints.
- Use a diagram to predict the result of a muscle contraction or relaxation.
- Use a light microscope to observe and draw cells.
- Describe how a species' population changes as its predator or prey population changes.
- Explain effects of environmental changes and toxic materials on a species' population.
- Combine food chains to form a food web.
- Explain issues with human food supplies in terms of insect pollinators.
- Describe the main steps that take place when a plant reproduces successfully.
- Identify parts of the flower and link their structure to their function.
- Suggest how a plant carried out seed dispersal based on the features of its fruit or seed.
- Explain why seed dispersal is important to survival of the parent plant and its offspring.

STUDENTS...

- Explore how the skeletal system and muscular system in a chicken work together to cause movement.
- Can a show a clear understanding of principal features of cells and describe their functions.
- Can link cell's specialised features to its function.
- Can use a model to investigate the impact of changes in a population of one organism on others in the ecosystem
- Can use models to evaluate the features of various types of seed dispersal
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HINGE ASSIGNMENT

Explain using specific examples how the skeleton provides the body with physical protection and protection against infection. (6 marks)

LITERACY MARKING: 1 mark for correct use of 50% key words, 2 marks for correct use of all key words, 1 mark for correct spelling and 1 marks for correct grammar. Total= 4 marks

HINGE ASSIGNMENT

Give an example of one specialised animal cell and one specialised plant cell, explaining how each cell is specialised for its function. (6 marks)

LITERACY MARKING: 1 mark for correct use of 50% key words, 2 marks for correct use of all key words, 1 mark for correct spelling and 1 marks for correct grammar. Total= 4 marks

HINGE ASSIGNMENT

Ecosystems (20 Marks)

- Know that Pollen can be carried by the wind, pollinating insects or other animals.

WORKING IN GREATER DEPTH – YEAR 7

KNOWLEDGE

STUDENTS...

- Know the negative effects of damage to a joint, bone or muscle.
- Know the benefits and risks of technology that aids in movement.
- Understand how recreational drugs might affect different body systems.
- Know how medical treatments work based on cells, tissues, organs and systems.
- Know failure in one section of the organisms' organisation will affect the outcome.
- Know the effects of bioaccumulation
- Know the multifactorial effects of species introduction.
- Know favourable characteristics of selective plant breeding.

SKILLS

STUDENTS...

- Predict the consequences of damage to a joint, bone or muscle.
- Suggest factors that affect the force exerted by different muscles.
- Consider the benefits and risks of a technology or improving human movement.
- Make deductions about how medical treatment work based on cells, tissue, organ and systems.
- Suggest how damage to, or failure of, an organ would affect other body system.
- Deduce general patterns about how the structure of different cells is related to their function.
- Research how recreational drugs might affect different body systems.
- Suggest what might happen when an unfamiliar species is introduced into a food web. Develop an argument about how toxic substances can accumulate in human food.
- Make a deduction based on data about what caused a change in the population of a species.
- Describe similarities and differences between the structures of wind pollinated and insect pollinated plants.
- Suggest how plant breeders use knowledge of pollination to carry out selective breeding.
- Develop an argument why a particular plant structure increases

UNDERSTANDING

STUDENTS...

- Can effectively show the benefits and risks of two or more technological/medical advances in improving movement or treatment of other diseases
- Make links damage at a cellular level to effects of an organ system / organism.
- Make links between animal and plant selective breeding.
- Explore the process of bioaccumulation

the likelihood of successful
production of offspring.

CURRICULUM INTENT FOR YEAR GROUP

YEAR 7

AGE EXPECTED STANDARD - YEAR 7

KNOWLEDGE

SKILLS

UNDERSTANDING

ASSESSMENT

CHEMISTRY

STUDENTS...

- Know the properties of solids, liquids and gasses.
- Know that where substances change temperature or state can be described in terms of particles gaining or losing energy
- Know that A substance is a solid below its melting point, a liquid above it, and a gas above its boiling point.
- Know a pure substance consists of only one type of element or compound and has a fixed melting and boiling point. Mixtures may be separated due to differences in their physical properties.
- Know the method chosen to separate a mixture depends on which physical properties of the individual substances are different.
- Know metals and non-metals react with oxygen to form oxides which are either bases or acids.
- Know metals can be arranged as a reactivity series in order of how readily they react with other substances.
- Know some metals react with acids to produce salts and hydrogen.
- Know iron, nickel and cobalt are magnetic elements.
- Know mercury is a metal that is liquid at room temperature.
- Know bromine is a non-metal that is liquid at room temperature.
- Know the pH of a solution depends on the strength of the acid: strong acids have lower pH values than weak acids.
- Know mixing an acid and alkali produces a chemical reaction, neutralisation, forming a chemical called a salt and water.

STUDENTS...

- Describe the properties of solids, liquids and gases in terms of particles in motion but with differences in arrangement and movement of these same particles.
- Explain unfamiliar observations about gas pressure in terms of particles.
- Explain the properties of solids, liquids and gases based on the arrangement and movement of their particles.
- Explain changes in states in terms of changes to the energy of particles.
- Draw before and after diagrams of particles to explain observations about changes of state, gas pressure and diffusion.
- Explain how substances dissolve using the particle model.
- Use techniques to separate mixtures.
- Use the solubility curve of a solute to explain observations about solutions.
- Use evidence from chromatography to identify unknown substances in mixtures.
- Choose the most suitable technique to separate out a mixture of substances.
- Describe an oxidation, displacement, or metal- acid reaction with a word equation.
- Use particle diagrams to represent oxidation, displacement and metal-acid reactions.
- Identify an unknown element from its physical and chemical properties.
- Place an unfamiliar metal into the reactivity series based on information about its reactions.
- Identify the best indicator to distinguish between solutions of different pH, using data provided.

STUDENTS...

- Understand the features of the particle model to the properties of materials in different states
- Explore ways to separate mixtures, based on their properties
- Examine experimental results to suggest an order of reactivity of various metals
- Devise an enquiry to compare how well indigestion remedies work

HINGE ASSIGNMENT:

Matter 1 (20 marks)

SUMMATIVE ASSESSMENT 2

Chemical reactions 1
Reactions 1
(50 marks)

- Know acids have a pH below 7, neutral solutions have a pH of 7, alkalis have a pH above 7.
- Know acids and alkalis can be corrosive or irritant and require safe handling.
- Know hydrochloric, sulfuric and nitric acid are strong acids.
- Know acetic and citric acid are weak acids.

- Use data and observations to determine the pH of a solution and explain what this shows.
- Explain how neutralisation reactions are used in a range of situations.
- Describe a method for how to make a neutral solution from an acid and alkali.

WORKING IN GREATER DEPTH – YEAR 7

KNOWLEDGE

STUDENTS...

- Know not all materials fall into the category of solid, liquid and gas.
- Know tier 3 vocabulary and how to use them effectively.
- Know research and observations that support concept of particle theory.
- Know that several techniques can be used to separate more complex mixtures.
- Know the physical and chemical properties of metals and non-metals that make them suitable for difference uses.
- Know acids and alkalis of higher pH react more vigorously.
- Know the first section of a salt's name indicates its metal/alkali of origin and the last section the acid.

SKILLS

STUDENTS...

- Argue for how to classify substances which behave unusually as solids, liquids or gases.
- Evaluate observations that provide evidence for the existence of particles.
- Make predictions about what will happen during unfamiliar physical processes, in terms of particles and their energy.
- Analyse and interpret solubility curves.
- Suggest a combination of methods to separate a complex mixture and justify the choices.
- Evaluate the evidence for identifying an unknown substance using separating techniques.
- Deduce the physical or chemical changes a metal has undergone from its appearance.

UNDERSTANDING

STUDENTS...

- Understand the effects of physical environment on particle arrangement and energy.
- Explore physical properties of complex substances and how to use this to separate them into their pure entities.
- Use chemical equations to illustrate the strength of an acid.
- Examine observations from different acid reactions in determining pH.

		<ul style="list-style-type: none"> - Justify the use of specific metals and non-metals for different applications, using data provided. - Deduce a rule from data about which reactions will occur or not, based on the reactivity series. - Given the names of an acid and an alkali, work out the name of the salt produced when they react. - Deduce the hazards of different alkalis and acids using data about their concentration and pH. - Estimate the pH of an acid based on information from reactions. 		
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AGE EXPECTED STANDARD - YEAR 7

	KNOWLEDGE	SKILLS	UNDERSTANDING	ASSESSMENT
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PHYSICS

STUDENTS...

- If the overall, resultant force on an object is non-zero, its motion changes and it slows down, speeds up or changes direction.
- Know a straight line on a distance-time graph shows constant speed, a curving line shows acceleration.
- Know the higher the speed of an object, the shorter the time taken for a journey.
- Know mass and weight are different but related.
- Know mass is a property of the object; weight depends upon mass but also on gravitational field strength
- Know every object exerts a gravitational force on every other object.
- Know the force increases with mass and decreases with distance.
- Know gravity holds planets and moons in orbit around larger bodies.
- Know g on Earth = 10 N/kg. On the moon it is 1.6 N/kg.
- Know we can model voltage as an electrical push from the battery, or the amount of energy per unit of charge transferred through the electrical pathway.
- Know in a series circuit, voltage is shared between each component.
- Know in a parallel circuit, voltage is the same across each loop.
- Know components with resistance reduce the current flowing and shift energy to the surroundings.
- Know current is a movement of electrons and is the same everywhere in a series circuit.
- Know current divides between loops in a parallel circuit, combines when

STUDENTS...

- Use the formula: speed = distance (m)/time (s) or distance-time graphs, to calculate speed.
- Illustrate a journey with changing speed on a distance-time graph, and label changes in motion.
- Describe how the speed of an object varies when measured by observers who are not moving, or moving relative to the object.
- Use the formula: weight (N) = mass (kg) x gravitational field strength (N/kg).
- Explain unfamiliar observations where weight changes.
- Draw a force diagram for a problem involving gravity.
- Deduce how gravity varies for different masses and distances.
- Compare your weight on Earth with your weight on different planets using the formula.
- Calculate resistance using the formula: resistance (Ω) = potential difference (V) \div current (A).
- Draw a circuit diagram to show how voltage can be measured in a simple circuit.
- Use the idea of energy to explain how voltage and resistance affect the way components work.
- Given a table of voltage against current. Use the ratio of voltage to current to determine the resistance.
- Use an analogy like water in pipes to explain why part of a circuit has higher resistance.
- Describe how current changes in series and parallel circuits when components are changed.
- Turn circuit diagrams into real series and parallel circuits, and vice versa.

STUDENTS...

- Investigate variables that affect the speed of a toy car rolling down a slope
- Explore Explain the way in which an astronaut's weight varies on a journey to the moon
- Investigate the voltage drop across resistors connected in series in a circuit
- Investigate, compare and explain current flow in different parts of a parallel circuit
- Investigate the running costs of different appliances
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HINGE ASSIGNMENT:

SUMMATIVE ASSESSMENT 1

Forces 1 + Organisms 1 EOCA(50 Marks)

SUMMATIVE ASSESSMENT 2

Ecosystems 1 + Electromagnets 1 EOCA (50 Marks)

SUMMATIVE ASSESSMENT 1

Chemical reactions 1 + Energy EOCA (50 Marks)

<p>loops meet, lights up bulbs and makes components work.</p> <ul style="list-style-type: none"> - Know around a charged object, the electric field affects other charged objects, causing them to be attracted or repelled. The field strength decreases with distance. - Know two similarly charged objects repel, two differently charged objects attract. - Know we pay for our domestic electricity usage based on the amount of energy transferred. - Know electricity is generated by a combination of resources which each have advantages and disadvantages. - Know food labels list the energy content of food in kilojoules (kJ). - 	<ul style="list-style-type: none"> - Describe what happens when charged objects are placed near to each other or touching. - Use a sketch to describe how an object charged positively or negatively became charged up. - Calculate the cost of home energy usage, using the formula: cost = power (kW) x time (hours) x price (per kWh). - Compare the amounts of energy transferred by different foods and activities. - Compare the energy usage and cost of running different home devices. - Explain the advantages and disadvantages of different energy resources. - Represent the energy transfers from a renewable or non-renewable resource to an electrical device in the home. - 		
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WORKING IN GREATER DEPTH – YEAR 7

KNOWLEDGE	SKILLS	UNDERSTANDING	
<p>STUDENTS...</p> <ul style="list-style-type: none"> - Know that the perception of the speed differs in relation to the speed of the observer. - Know that magnitude of force applied to an object is directly proportional to its speed. - Know tier 3 vocabulary and how to use them effectively. - Know the amount of energy shifted from the battery to the moving charge, or from the charge to circuit components, in volts (V). 	<p>STUDENTS...</p> <ul style="list-style-type: none"> - Suggest how the motion of two objects moving at different speeds in the same direction would appear to the other. - Predict changes in an object’s speed when the forces on it change. - Compare and contrast gravity with other forces. - Draw conclusions from data about orbits, based on how gravity varies with mass and distance. 	<p>STUDENTS...</p> <ul style="list-style-type: none"> - Use force diagrams to illustrate the effects of force on speed. - Link voltage and energy - Explore the social, economic and environmental impacts of using different energy resources. 	

	<ul style="list-style-type: none"> - Know social, economic and environmental consequences of using different energy resources. 	<ul style="list-style-type: none"> - Suggest implications of how gravity varies for a space mission. - Predict the effect of changing the rating of a battery or a bulb on other components in a series or parallel circuit. - Justify the sizes of voltages in a circuit, using arguments based on energy. - Draw conclusions about safety risks, from data on voltage, resistance and current. - Compare the advantages of series and parallel circuits for particular uses. - Evaluate a model of current as electrons moving from the negative to the positive terminal of a battery, through the circuit. - Suggest ways to reduce the risk of getting electrostatic shocks. - Evaluate the social, economic and environmental consequences of using a resource to generate electricity, from data. - Suggest actions a government or communities could take in response to rising energy demand. Suggest ways to reduce costs, by examining data on a home energy bill. 		
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CURRICULUM INTENT FOR YEAR GROUP	YEAR 8

AGE EXPECTED STANDARD - YEAR 8				
	KNOWLEDGE	SKILLS	UNDERSTANDING	ASSESSMENT

BIOLOGY

STUDENTS...

- Know in gas exchange, oxygen and carbon dioxide move between alveoli and the blood.
- Know oxygen is transported to cells for aerobic respiration and carbon dioxide, a waste product of respiration, is removed from the body.
- Know breathing occurs through the action of muscles in the ribcage and diaphragm.
- Know the amount of oxygen required by body cells determines the rate of breathing.
- Know the body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells' energy, growth and maintenance.
- Know organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes.
- Know iron is a mineral important for red blood cells.
- Know calcium is a mineral needed for strong teeth and bones.
- Know vitamins and minerals are needed in small amounts to keep the body healthy.
- Know respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules.
- Know most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable.
- Know yeast fermentation is used in brewing and bread- making.

STUDENTS...

- Explain how exercise, smoking and asthma affect the gas exchange system.
- Explain how the parts of the gas exchange system are adapted to their function.
- Explain observations about changes to breathing rate and volume.
- Explain how changes in volume and pressure inside the chest move gases in and out of the lungs.
- Describe possible health effects of unbalanced diets from data provided.
- Calculate food requirements for a healthy diet, using information provided.
- Describe how organs and tissues involved in digestion are adapted for their role.
- Describe the events that take place in order to turn a meal into simple food molecules inside a cell.
- Use word equations to describe aerobic and anaerobic respiration.
- Explain how specific activities involve aerobic or anaerobic respiration.
- Plot bar charts or line graphs to show discontinuous or continuous variation data.
- Explain how variation helps a particular species in a changing environment.
- Explain how characteristics of a species are adapted to particular environmental conditions.
- Explain whether characteristics are inherited, environmental or both.
- Explain whether substances are passed from the mother to the foetus or not.

STUDENTS...

- Investigate a claim linking height to lung volume
- Evaluate how well a model represents key features of the digestive system
- Use data from investigating fermentation with yeast to explore respiration
- Graphically represent data relating to variation and explain how it may lead to the survival of a species
- Relate advice to pregnant women to ideas about transfer of substances to the embryo
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HINGE ASSIGNMENT:

HINGE ASSIGNMENT:
Organisms 2 (20 Marks)

HINGE ASSIGNMENT
Ecosystems 2 (20 Marks)

HINGE ASSIGNMENT
Genes 1 (20 Marks)

SUMMATIVE ASSESSMENT 1
Chemical Reactions 2 + Genes 1 (50 Marks)

SUMMATIVE ASSESSMENT 2
Organisms 2 + Forces 2 (50 Marks)

SUMMATIVE ASSESSMENT 3
Ecosystem 2 + Earth 1 (50 Marks)

<ul style="list-style-type: none"> - Know variation between individuals is important for the survival of a species, helping it to avoid extinction in an always changing environment. - Know there is variation between individuals of the same species. Some variation is inherited, some is a combination. - Know the menstrual cycle prepares the female for pregnancy and stops if the egg is fertilised by a sperm. - Know the developing foetus relies on the mother to provide it with oxygen and nutrients, to remove waste and protect it against harmful substances. - Know the menstrual cycle lasts approximately 28 days. - Know if an egg is fertilised it settles into the uterus lining. 	<ul style="list-style-type: none"> - Use a diagram to show stages in development of a foetus from the production of sex cells to birth. - Describe causes of low fertility in male and female reproductive systems. - Identify key events on a diagram of the menstrual cycle. - 		
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WORKING IN GREATER DEPTH – YEAR 8

KNOWLEDGE	SKILLS	UNDERSTANDING	
<p>STUDENTS...</p> <ul style="list-style-type: none"> - Know tier 3 vocabulary and how to use them effectively. - Know different types of lung disease and treatments. - Know how the bell-jar model is used to demonstrate the process of breathing. - Know diets of people differ according to their life style. - Know the chances of pregnancy changes at different stages of menstrual cycle. - Know that smoking, alcohol and drugs negatively affect foetus development. 	<p>STUDENTS...</p> <ul style="list-style-type: none"> - Evaluate a possible treatment for a lung disease. - Predict how a change in the gas exchange system could affect other processes in the body. - Evaluate a model for showing the mechanism of breathing. - Design a diet for a person with specific dietary needs. - Critique claims for a food product or diet by analysing nutritional information. - Make deductions from medical symptoms showing problems with the digestive system. 	<p>STUDENTS...</p> <ul style="list-style-type: none"> - Explore the negative effects of faults in the gaseous exchange system induced by natural causes and smoking. - Examine personalised diets and their necessity in the event of defects in the digestive system e.g. Crohn’s Disease - Link pregnancy chances with menstrual cycle - Link life style to fertility treatment success probability. 	

		<ul style="list-style-type: none"> - Suggest how organisms living in different conditions use respiration to get their energy. - Describe similarities and differences between aerobic and anaerobic respiration. - Predict implications of a change in the environment on a population. - Use the ideas of variation to explain why one species may adapt better than another to environmental change. - Critique a claim that a particular characteristic is inherited or environmental. - Explain why pregnancy is more or less likely at certain stages of the menstrual cycle. - Make deductions about how contraception and fertility treatments work. Predict the effect of cigarettes, alcohol or drugs on the developing foetus. 		
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AGE EXPECTED STANDARD - YEAR 8				
	KNOWLEDGE	SKILLS	UNDERSTANDING	ASSESSMENT

CHEMISTRY

STUDENTS...

- Know the elements in a group all react in a similar way and sometimes show a pattern in reactivity.
- Know as you go down a group and across a period the elements show patterns in physical properties.
- Know metals are generally found on the left side of the table, non-metals on the right.
- Know group 1 contains reactive metals called alkali metals.
- Know group 7 contains non-metals called halogens.
- Know group 0 contains unreactive gases called noble gases.
- Know most substances are not pure elements, but compounds or mixtures containing atoms of different elements. They have different properties to the elements they contain.
- Know the symbols of hydrogen, oxygen, nitrogen, carbon, hydrogen, iron, zinc, copper, sulfur, aluminium, iodine, bromine, chlorine, sodium, potassium and magnesium.
- Know during a chemical reaction bonds are broken (requiring energy) and new bonds formed (releasing energy). If the energy released is greater than the energy required, the reaction is exothermic. If the reverse, it is endothermic.
- Know combustion is a reaction with oxygen in which energy is transferred to the surroundings as heat and light.
- Know thermal decomposition is a reaction where a single reactant is broken down into simpler products by heating.

STUDENTS...

- Use data to describe a trend in physical properties.
- Describe the reaction of an unfamiliar Group 1 or 7 element.
- Use data showing a pattern in physical properties to estimate a missing value for an element.
- Use observations of a pattern in chemical reactions to predict the behaviour of an element in a group.
- Use particle diagrams to classify a substance as an element, mixture or compound and as molecules or atoms.
- Name simple compounds using rules: change non-metal to -ide; mono, di, tri prefixes; and symbols of hydroxide, nitrate, sulfate and carbonate.
- Name compounds using their chemical formulae.
- Given chemical formulae, name the elements present and their relative proportions.
- Represent atoms, molecules and elements, mixtures and compounds using particle diagrams.
- Use observations from chemical reactions to decide if an unknown substance is an element or a compound.
- Use experimental observations to distinguish exothermic and endothermic reactions.
- Use a diagram of relative energy levels of particles to explain energy changes observed during a change of state.
- Write word equations from information about chemical reactions.

STUDENTS...

- Sort elements using chemical data and relate this to their position in the periodic table
- Compare the properties of elements with the properties of a compound formed from them
- Investigate a phenomenon that relies on an exothermic or endothermic reaction
- Investigate changes in mass for chemical and physical processes
- Model the processes that are responsible for rock formation and link these to the rock features
- Relate observations of changing day length to an appropriate model of the solar system
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HINGE ASSIGNMENT:

Matter 2 (20 Marks)

HINGE ASSIGNMENT:

Chemical reactions 2 (20 Marks)

HINGE ASSIGNMENT

Earth 1 (20 Marks)

SUMMATIVE ASSESSMENT 1

Chemical reactions 2 + Genes 1 (50 Marks)

SUMMATIVE ASSESSMENT 2

EP2 + Matter 2 (50 Marks)

SUMMATIVE ASSESSMENT 3

Ecosystems 2 + Earth 1 (50 Marks)

- Know chemical changes can be described by a model where atoms and molecules in reactants rearrange to make the products and the total number of atoms is conserved.
- Know sedimentary, igneous and metamorphic rocks can be inter converted over millions of years through weathering and erosion, heat and pressure, and melting and cooling.
- Know the three rock layers inside Earth are the crust, the mantle and the core.
- modelled as planets rotating on tilted axes while orbiting the Sun, moons orbiting planets and sunlight spreading out and being reflected. This explains day and year length, seasons and the visibility of objects from Earth.
- Know our solar system is a tiny part of a galaxy, one of many billions in the Universe. Light takes minutes to reach Earth from the Sun, four years from our nearest star and billions of years from other galaxies.
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- Explain why a reaction is an example of combustion or thermal decomposition.
- Predict the products of the combustion or thermal decomposition of a given reactant and show the reaction as a word equation.
- Explain observations about mass in a chemical or physical change.
- Use particle diagrams to show what happens in a reaction.
- Explain why a rock has a particular property based on how it was formed.
- Identify the causes of weathering and erosion and describe how they occur.
- Construct a labelled diagram to identify the processes of the rock cycle.
- Describe the appearance of planets or moons from diagrams showing their position in relation to the Earth and Sun.
- Explain why places on the Earth experience different daylight hours and amounts of sunlight during the year.
- Describe how space exploration and observations of stars are affected by the scale of the universe.
- Explain the choice of particular units for measuring distance.

WORKING IN GREATER DEPTH – YEAR 8

KNOWLEDGE

STUDENTS...

- Know the position of an elements in the periodic table depends on its physical and chemical properties.

SKILLS

STUDENTS...

- Predict the position of an element in the periodic table based on

UNDERSTANDING

STUDENTS...

- Link particle theory to physical properties of different elements.

	<ul style="list-style-type: none"> - Know tier 3 vocabulary and how to use them effectively. - Know mass is conserved during a chemical reaction. - Know rocks can be examined to predict the environment in which it was formed. - Know the difference between geocentric and heliocentric theories 	<p>information about its physical and chemical properties.</p> <ul style="list-style-type: none"> - Choose elements for different uses from their position in the periodic table. - Use data about the properties of elements to find similarities, patterns and anomalies. - Use particle diagrams to predict physical properties of elements and compounds. - Deduce a pattern in the formula of similar compounds and use it to suggest formulae for unfamiliar ones. - Compare and contrast the properties of elements and compounds and give a reason for their differences. - Describe and explain the properties of ceramics and composites. - Predict whether a chemical reaction will be exothermic or endothermic given data on bond strengths. - Use energy data to select a reaction for a chemical hand warmer or cool pack. - Compare the pros and cons of fuels in terms of their products of combustion. - Use known masses of reactants or products to calculate unknown masses of the remaining reactant or product. - Devise a general rule for how a set of compounds reacts with oxygen or thermally decomposes. - Balance a symbol equation. - Use mass of reactant in equation to determine mass of product eg magnesium and oxygen. - Identify circumstances that indicate fast processes of change on Earth and those that indicate slower processes. 	<ul style="list-style-type: none"> - Investigate conservation of mass through the combustion of magnesium. - Explore the properties of different rocks and how they were influenced by the environment in which they were formed. - Use data examine factors corresponding to stars, planets and galaxies. 	
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		<ul style="list-style-type: none"> - Predict planetary conditions from descriptions of rocks on other planets. - Describe similarities and differences between the rock cycle and everyday physical and chemical processes. - Suggest how ceramics might be similar to some types of rock. - Predict patterns in day length, the Sun's intensity or an object's shadow at different latitudes. - Make deductions from observation data of planets, stars and galaxies. - Compare explanations from different periods in history about the motion of objects and structure of the Universe. 		
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AGE EXPECTED STANDARD - YEAR 8				
	KNOWLEDGE	SKILLS	UNDERSTANDING	ASSESSMENT

PHYSICS

STUDENTS...

- Know when the resultant force on an object is zero, it is in equilibrium and does not move, or remains at constant speed in a straight line.
- Know one effect of a force is to change an object's form, causing it to be stretched or compressed. In some materials, the change is proportional to the force applied.
- Know pressure acts in a fluid in all directions. It increases with depth due to the increased weight of fluid, and results in an upthrust. Objects sink or float depending on whether the weight of the object is bigger or smaller than the upthrust.
- Know different stresses on a solid object can be used to explain observations where objects scratch, sink into or break surfaces.
- Know An electromagnet uses the principle that a current through a wire causes a magnetic field. Its strength depends on the current, the core and the number of coils in the solenoid.
- Know the magnetic field of an electromagnet decreases in strength with distance.
- Know magnetic materials, electromagnets and the Earth create magnetic fields which can be described by drawing field lines to show the strength and direction.
- Know the stronger the magnet, and the smaller the distance from it, the greater the force a magnetic object in the field experiences.
- Know two 'like' magnetic poles repel and two 'unlike' magnetic poles attract.

STUDENTS...

- Sketch the forces acting on an object, and label their size and direction.
- Explain whether an object in an unfamiliar situation is in equilibrium.
- Describe factors which affect the size of frictional and drag forces.
- Describe how materials behave as they are stretched or squashed.
- Describe what happens to the length of a spring when the force on it changes.
- Use diagrams to explain observations of fluids in terms of unequal pressure.
- Explain why objects either sink or float depending upon their weight and the upthrust acting on them.
- Explain observations where the effects of forces are different because of differences in the area over which they apply.
- Given unfamiliar situations, use the formula to calculate fluid pressure or stress on a surface.
- Use a diagram to explain how an electromagnet can be made and how to change its strength.
- Explain the choice of electromagnets or permanent magnets for a device in terms of their properties.
- Use the idea of field lines to show how the direction or strength of the field around a magnet varies.
- Explain observations about navigation using Earth's magnetic field.
- Draw a diagram to explain how a lever makes a job easier.
- Compare the work needed to move objects different distances.
- Use the formula: work done (J) = force (N) x distance moved (m) to

STUDENTS...

- Investigate factors that affect the size of frictional or drag forces
- Investigate how pressure from your foot onto the ground varies with different footwear
- Investigate how volume and density determines if an object will sink or float.
- Investigate Hooke's Law using springs and rubber bands.
- Investigate ways of varying strength of an electromagnet
- Explore the magnetic field pattern around different types or combinations of magnets
- Understand how an electric motor raising a weight is doing work
- Investigate how to prevent heat loss by conduction, convection and radiation
- Relate changes in the shape of an oscilloscope trace to changes in pitch and volume
- Use ray diagrams to model how light passes through lenses and transparent materials
-

HINGE ASSIGNMENT:

Forces 2 (20 Marks)

HINGE ASSIGNMENT:

Electromagnets 2 (20 Marks)

HINGE ASSIGNMENT

Energy 2 (20 Marks)

HINGE ASSIGNMENT

Waves 1(20 Marks)

SUMMATIVE ASSESSMENT 1

Electromagnets 2 + Waves 1 (50 Marks)

SUMMATIVE ASSESSMENT 2

Organisms 2 + Forces 2 (50 Marks)

	<ul style="list-style-type: none"> - Know field lines flow from the north-seeking pole to the south-seeking pole. - Know work is done and energy transferred when a force moves an object. - Know the bigger the force or distance, the greater the work. Machines make work easier by reducing the force needed. Levers and pulleys do this by increasing the distance moved, and wheels reduce friction. - Know the thermal energy of an object depends upon its mass, temperature and what it's made of. When there is a temperature difference, energy transfers from the hotter to the cooler object. - Know thermal energy is transferred through different pathways, by particles in conduction and convection, and by radiation. - Know sound consists of vibrations which travel as a longitudinal wave through substances. The denser the medium, the faster sound travels. - Know the greater the amplitude of the waveform, the louder the sound. The greater the frequency (and therefore the shorter the wavelength), the higher the pitch. - Know sound does not travel through a vacuum. - Know the speed of sound in air is 330 m/s, a million times slower than light. - Know When a light ray meets a different medium, some of it is absorbed and some reflected. For a mirror, the angle of incidence equals the angle of reflection. The ray model can describe the formation of an image in a mirror and how objects appear different colours. 	<p>compare energy transferred for objects moving horizontally.</p> <ul style="list-style-type: none"> - Explain observations about changing temperature in terms of energy transfer. - Describe how an object's temperature changes over time when heated or cooled. - Explain how a method of thermal insulation works in terms of conduction, convection and radiation. - Sketch diagrams to show convection currents in unfamiliar situations. - Sketch a graph to show the pattern of temperature change against time. - Explain observations where sound is reflected, transmitted or absorbed by different media. - Explain observations of how sound travels using the idea of a longitudinal wave. - Describe the amplitude and frequency of a wave from a diagram or oscilloscope picture. - Use drawings of waves to describe how sound waves change with volume or pitch. - Construct ray diagrams to show how light reflects off mirrors, forms images and refracts. - Light travels at 300 million metres per second in a vacuum. - Different colours of light have different frequencies. - Use ray diagrams of eclipses to describe what is seen by observers in different places. - Explain observations where coloured lights are mixed or objects are viewed in different lights. - Use ray diagrams to describe how light passes through lenses and transparent materials. 		
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- Know when light enters a denser medium it bends towards the normal; when it enters a less dense medium it bends away from the normal. Refraction through lenses and prisms can be described using a ray diagram as a model.
- Know light travels at 300 million metres per second in a vacuum.
- Know different colours of light have different frequencies.
-

- Describe how lenses may be used to correct vision.
-

WORKING IN GREATER DEPTH – YEAR 8

KNOWLEDGE

STUDENTS...

- Know tier 3 vocabulary and how to use them effectively.
- Know the force applied to a string is directly proportional to its extension.
- Know levers are simple machines, used to make work easier
- Know liquid fluid power can be used to perform work.
- Know electrical symbols and how to interpret electrical diagrams.
- Know different types of insulation are available for homes and their benefits.
- Know the structure of the ear
- Know sound can be reflected, transmitted and absorbed by different media
- Know oscillators are used to visualise sound waves.

SKILLS

STUDENTS...

- Evaluate how well sports or vehicle technology reduces frictional or drag forces.
- Describe the effects of drag and other forces on falling or accelerating objects as they move.
- Using force and extension data, compare the behaviour of different materials in deformation using the idea of proportionality.
- Explain how turning forces are used in levers.
- Use the formula: fluid pressure, or stress on a surface = force (N)/area (m²)
- Use the idea of pressure changing with depth to explain underwater effects.
- Carry out calculations involving pressure, force and area in hydraulics, where the effects of applied forces are increased.

UNDERSTANDING

STUDENTS...

- Explore the effects of drag on acceleration.
- Investigate how pressure from your foot onto the ground varies with different footwear
- Understand the properties of hydraulics systems and how they are effected by force.
- Explore the uses of electromagnets.
- Investigate the behaviour of a magnetic material within a magnetic field in terms of magnetic field lines.
- Explore the benefits and limitations of insulators and conductors
- Relate changes in the shape of an oscilloscope trace to changes in pitch and volume

- Use the idea of stress to deduce potential damage to one solid object by another.
- Critique the design of a device using an electromagnet and suggest improvements.
- Suggest how bells, circuit breakers and loudspeakers work, from diagrams.
- Predict the pattern of field lines and the force around two magnets placed near each other.
- Predict how an object made of a magnetic material will behave if placed in or rolled through a magnetic field.
- Compare and contrast the advantages of different levers in terms of the forces need and distance moved.
- Evaluate a claim about insulation in the home or for clothing technology.
- Compare and contrast the three ways that energy can be moved from one place to another by heating.
- Suggest the effects of particular ear problems on a person's hearing.
- Explain observations where sound is reflected, transmitted or absorbed by different media.
- Explain observations of how sound travels using the idea of a longitudinal wave.
- Describe the amplitude and frequency of a wave from a diagram or oscilloscope picture.
- Use drawings of waves to describe how sound waves change with volume or pitch.
- Evaluate the data behind a claim for a sound creation or blocking device, using the properties of sound waves.
- Use diagrams to compare the waveforms a musical instrument

- Investigate the behaviour of light when in contact with different materials.
- Investigate the journey of light through a periscope.

		<p>makes when playing different pitches or volumes.</p> <ul style="list-style-type: none"> - Use a ray diagram to predict how an image will change in different situations. - Predict whether light will reflect, refract or scatter when it hits the surface of a given material. - Use ray diagrams to explain how a device with multiple mirrors works. 		
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CURRICULUM INTENT FOR YEAR GROUP	YEAR 9

AGE EXPECTED STANDARD - YEAR 9			
KNOWLEDGE	SKILLS	UNDERSTANDING	ASSESSMENT

BIOLOGY

STUDENTS...

- Know natural selection is a theory that explains how species evolve and why extinction occurs.
- Know biodiversity is vital to maintaining populations. Within a species variation helps against environment changes, avoiding extinction. Within an ecosystem, having many different species ensures resources are available for other populations, like humans.
- Know inherited characteristics are the result of genetic information, in the form of sections of DNA called genes, being transferred from parents to offspring during reproduction.
- Know chromosomes are long pieces of DNA which contain many genes. Gametes, carrying half the total number of chromosomes of each parent, combine during fertilisation.
- Know the DNA of every individual is different, except for identical twins.
- Know there is more than one version of each gene e.g. different blood groups.
- Know cells are the basic unit of all forms of life. In this section we explore how structural differences between types of cells enables them to perform specific functions within the organism.
- Know these differences in cells are controlled by genes in the nucleus.
- Know for an organism to grow, cells must divide by mitosis producing two new identical cells.
- Know if cells are isolated at an early stage of growth before they have become too specialised, they can retain their ability to grow into a

STUDENTS...

- Use evidence to explain why a species has become extinct or adapted to changing conditions.
- Evaluate whether evidence for a species changing over time supports natural selection.
- Explain how a lack of biodiversity can affect an ecosystem.
- Describe how preserving biodiversity can provide useful products and services for humans.
- Use a diagram to show the relationship between DNA, chromosomes and genes.
- Use a diagram to show how genes are inherited.
- Explain how a change in the DNA (mutation) may affect an organism and its future offspring.
- Explain why offspring from the same parents look similar but are not usually identical.
- Compare eukaryotic and prokaryotic cells
- Explain how the main sub-cellular structures, including the nucleus, cell membranes, mitochondria, chloroplasts in plant cells and plasmids in bacterial cells are related to their functions.
- Use prefixes centi, milli, micro and nano.
- Recognise, draw and interpret images of cells.
- use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included.
- when provided with appropriate information, explain how the structure of different types of cell relate to their function in a tissue, an

STUDENTS...

- Review the evidence for theories about how a particular species went extinct
- Model the inheritance of a specific trait and explore the variation in the offspring produced
- Demonstrate understanding of scale and size and be able to make order of magnitude calculations, including use of standard form
- understand how microscopy techniques have developed over time
- express answers in standard form if appropriate.
- Use models and analogies to develop explanations of how cells divide.
- Evaluate the practical risks and benefits, as well as social and ethical issues, of the use of stem cells in medical research and treatments.
- Recognise, draw and interpret diagrams that model osmosis.
- investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.
- Relate knowledge of enzymes to Metabolism
- Use qualitative reagents to test for a range of carbohydrates, lipids and proteins.
- Investigate the effect of pH on the rate of reaction of amylase enzyme.
- understand the principles of sampling as applied to

HINGE ASSIGNMENT:

Genes 1 (20 Marks)

HINGE ASSIGNMENT:

Genes 2 (20 Marks)

SUMMATIVE ASSESSMENT 1

B1 Cell Biology EOCA (50 Marks)

SUMMATIVE ASSESSMENT 2

B2 Organisation EOCA (50 Marks)

	<p>range of different types of cells. This phenomenon has led to the development of stem cell technology. This is a new branch of medicine that allows doctors to repair damaged organs by growing new tissue from stem cells.</p> <ul style="list-style-type: none"> - Know Most animal cells have the following parts: a nucleus, cytoplasm, a cell membrane, mitochondria and ribosomes. - Know In addition to the parts found in animal cells, plant cells often have: chloroplasts, a permanent vacuole filled with cell sap. - Know Plant and algal cells also have a cell wall made of cellulose, which strengthens the cell. - Know cells may be specialised to carry out a particular function: perm cells, nerve cells and muscle cells in animals, root hair cells, xylem and phloem cells in plants. - Know As an organism develops, cells differentiate to form different types of cells. - Know In mature animals, cell division is mainly restricted to repair and replacement. As a cell differentiates it acquires different sub-cellular structures to enable it to carry out a certain function. It has become a specialised cell. - Know An electron microscope has much higher magnification and resolving power than a light microscope. This means that it can be used to study cells in much finer detail. This has enabled biologists to see and understand many more sub-cellular structures. - Know Cells divide in a series of stages called the cell cycle. 	<p>organ or organ system, or the whole organism.</p> <ul style="list-style-type: none"> - explain the importance of cell differentiation. - Compare magnification and resolution of a light microscope and electron microscope. - Carry out calculations involving magnification, real size and image size using the formula: Magnification = Size of image / Size of real object - Describe the stages of the cell cycle, including mitosis. - Recognise and describe situations in given contexts where mitosis is occurring. - Describe the function of stem cells in embryos, in adult animals and in the meristems in plants. - Recognise, draw and interpret diagrams that model diffusion. - Explore uses of isotonic drinks and high energy drinks in sport. - Explain how different factors affect the rate of diffusion. - Calculate and compare surface area to volume ratios. - Explain the need for exchange surfaces and a transport system in multicellular organisms in terms of surface area to volume ratio. - Explain how the small intestine and lungs in mammals, gills in fish, and the roots and leaves in plants, are adapted for exchanging materials. - Use simple compound measures of rate of water uptake - Use percentages - Calculate percentage gain and loss of mass of plant tissue. - plot, draw and interpret appropriate graphs. - Describe how substances are transported into and out of cells by 	<p>scientific data, including epidemiological data.</p> <ul style="list-style-type: none"> - Investigate the rate of transpiration by the uptake of water. - Investigate the distribution of stomata and guard cells. - Process data from investigations involving stomata and transpiration rates to find arithmetic means, understand the principles of sampling and calculate surface areas and volumes. - 	
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	<ul style="list-style-type: none"> - Know Substances may move into and out of cells across the cell membranes via diffusion. - Know the factors that affect the rate of diffusion. - Know Water may move across cell membranes via osmosis. - Know Active transport moves substances from a more dilute solution to a more concentrated solution (against a concentration gradient) - Know the digestive system which provides the body with nutrients and the respiratory system that provides it with oxygen and removes carbon dioxide. In each case they provide dissolved materials that need to be moved quickly around the body in the blood by the circulatory system. - Know Damage to any of these systems can be debilitating if not fatal. - Know life style is the main factor that contributes to COPD and CHD. - Know plant's transport system is dependent on environmental conditions to ensure that leaf cells are provided with the water and carbon dioxide that they need for photosynthesis. - know the structure and functioning of the human heart and lungs, including how lungs are adapted for gaseous exchange. - know the functions of each of these blood components. - 	<p>diffusion, osmosis and active transport</p> <ul style="list-style-type: none"> - Explain the differences between the three processes. - Develop an understanding of size and scale in relation to cells, tissues, organs and systems. - Describe the nature of enzyme molecules and relate their activity to temperature and pH changes - carry out rate calculations for chemical reactions. - Use the 'lock and key theory' as a simplified model to explain enzyme action. - Recall the sites of production and the action of amylase, proteases and lipases. - Use other models to explain enzyme action. - Explain how the structure of these vessels relates to their functions. - Use simple compound measures such as rate and carry out rate calculations for blood flow. - Observing and drawing blood cells seen under a microscope. - Evaluate risks related to use of blood products. - Recognise different types of blood cells in a photograph or diagram, and explain how they are adapted to their functions. - Evaluate the advantages and disadvantages of treating cardiovascular diseases by drugs, mechanical devices or transplant. - Describe the relationship between health and disease and the interactions between different types of disease. - Translate disease incidence information between graphical and numerical forms, construct and interpret frequency tables and 		
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diagrams, bar charts and histograms, and use a scatter diagram to identify a correlation between two variables.

- Discuss the human and financial cost of these non- communicable diseases to an individual, a local community, a nation or globally
- Explain the effect of lifestyle factors including diet, alcohol and smoking on the incidence of non-communicable diseases at local, national and global levels.
- Interpret data about risk factors for specified diseases.
- use a scatter diagram to identify a correlation between two variables in terms of risk factors.
- Describe cancer as the result of changes in cells that lead to uncontrolled growth and division.
- Explain how the structures of plant tissues are related to their functions.
- Observation and drawing of a transverse section of leaf.
- Explain how the structure of root hair cells, xylem and phloem are adapted to their functions.
- Explain the effect of changing temperature, humidity, air movement and light intensity on the rate of transpiration.
- Describe the process of transpiration and translocation, including the structure and function of the stomata.
- Extract and interpret information from graphs, charts and tables.
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	KNOWLEDGE	SKILLS	UNDERSTANDING	
	STUDENTS... <ul style="list-style-type: none"> - Know the process of natural selection. - Know tier 3 vocabulary and how to use them effectively. - Know the process of evolution. - Know the process of plant and animal conservation. - Know plants are genetically modified to produce crops with desired characteristics e.g. virus resistance, vibrancy, increase yield etc. - Know genome is all the genetic material of an organism. 	STUDENTS... <ul style="list-style-type: none"> - Predict and explain the changes in a population over time due to natural selection. - Suggest an explanation, based on data, for how a particular evolutionary change occurred. - Evaluate ways of preserving plant or animal material for future generations. - Suggest arguments for and against genetic modification. - Suggest benefits from scientists knowing all the genes in the human genome. - Determine how the number of chromosomes changes during cell division, production of sex cells and fertilisation. - Find out why scientists Watson, Crick and Franklin were so important. - 	STUDENTS... <ul style="list-style-type: none"> - Investigate the effects of natural selection and thus evolution using data. - Explore the importance of plant/animal conservation. - Explore the discovery of the DNA molecule. 	

AGE EXPECTED STANDARD - YEAR 9

	KNOWLEDGE	SKILLS	UNDERSTANDING	ASSESSMENT

CHEMISTRY

STUDENTS...

- Know Sedimentary, igneous and metamorphic rocks can be inter converted over millions of years through weathering and erosion, heat and pressure, and melting and cooling.
- Know The three rock layers inside Earth are the crust, the mantle and the core.
- Know the solar system can be modelled as planets rotating on tilted axes while orbiting the Sun, moons orbiting planets and sunlight spreading out and being reflected. This explains day and year length, seasons and the visibility of objects from Earth.
- Know our solar system is a tiny part of a galaxy, one of many billions in the Universe. Light takes minutes to reach Earth from the Sun, four years from our nearest star and billions of years from other galaxies.
- Know carbon is recycled through natural processes in the atmosphere, ecosystems, oceans and the Earth's crust (such as photosynthesis and respiration) as well as human activities (burning fuels).
- Know greenhouse gases reduce the amount of energy lost from the Earth through radiation and therefore the temperature has been rising as the concentration of those gases has risen.
- Know scientists have evidence that global warming caused by human activity is causing changes in climate.
- Know methane and carbon dioxide are greenhouse gases.
- Know earth's atmosphere contains around 78% nitrogen, 21% oxygen,

STUDENTS...

- Explain why a rock has a particular property based on how it was formed.
- Identify the causes of weathering and erosion and describe how they occur.
- Construct a labelled diagram to identify the processes of the rock cycle.
- Describe the appearance of planets or moons from diagrams showing their position in relation to the Earth and Sun.
- Explain why places on the Earth experience different daylight hours and amounts of sunlight during the year.
- Describe how space exploration and observations of stars are affected by the scale of the universe.
- Explain the choice of particular units for measuring distance.
- Use a diagram to show how carbon is recycled in the environment and through living things.
- Describe how human activities affect the carbon cycle.
- Describe how global warming can impact on climate and local weather patterns.
- Explain why recycling of some materials is particularly important.
- Describe how Earth's resources are turned into useful materials or recycled.
- Justify the choice of extraction method for a metal, given data about reactivity.
- Suggest factors to take into account when deciding whether extraction of a metal is practical.

STUDENTS...

- Model the processes that are responsible for rock formation and link these to the rock features
- Relate observations of changing day length to an appropriate model of the solar system
- Investigate the contribution that natural and human chemical processes make to our carbon dioxide emissions
- Explore the method used for extracting metal based on its position in the reactivity series
- Demonstrate safe use of a range of equipment to separate chemical mixtures.
- understanding of why and describe how scientific methods and theories develop over time.
- Relate size and scale of atoms to objects in the physical world.
- Explain how testing a prediction can support or refute a new scientific idea.
-

HINGE ASSIGNMENT:

Earth 1 (20 Marks)

HINGE ASSIGNMENT:

Earth 2 (20 Marks)

SUMMATIVE ASSESSMENT 1

C1 Atomic structure and the periodic table
EOCA (50 Marks)

SUMMATIVE ASSESSMENT 2

C2 Bonding, structure and properties of matter
EOCA (50 Marks)

	<p><1% carbon dioxide, plus small amounts of other gases.</p> <ul style="list-style-type: none"> - Know there is only a certain quantity of any resource on Earth, so the faster it is extracted, the sooner it will run out. Recycling reduces the need to extract resources. - Know most metals are found combined with other elements, as a compound, in ores. The more reactive a metal, the more difficult it is to separate it from its compound. Carbon displaces less reactive metals, while electrolysis is needed for more reactive metals. - Know the periodic table provides chemists with a structured organisation of the known chemical elements from which they can make sense of their physical and chemical properties. - Know the historical development of the periodic table and models of atomic structure provide good examples of how scientific ideas and explanations develop over time as new evidence emerges. - Know the arrangement of elements in the modern periodic table can be explained in terms of atomic structure which provides evidence for the model of a nuclear atom with electrons in energy levels. - Know Chemists use theories of structure and bonding to explain the physical and chemical properties of materials. - Know analysis of structures shows that atoms can be arranged in a variety of ways, some of which are molecular while others are giant structures. - Know theories of bonding explain how atoms are held together in these structures. Scientists use this 	<ul style="list-style-type: none"> - use the names and symbols of the first 20 elements in the periodic table, the elements in Groups 1 and 7, and other elements in this specification - name compounds of these elements from given formulae or symbol equations - write word equations for the reactions in this specification - write formulae and balanced chemical equations for the reactions in this specification. - describe, explain and give examples of the specified processes of separation - suggest suitable separation and purification techniques for mixtures when given appropriate information. - Describe why the new evidence from the scattering experiment led to a change in the atomic model - Describe the difference between the plum pudding model of the atom and the nuclear model of the atom. - use the nuclear model to describe atoms. - Use SI units and the prefix nano. - Recognise expressions in standard form. - calculate the numbers of protons, neutrons and electrons in an atom or ion, given its atomic number and mass number. - calculate the relative atomic mass of an element given the percentage abundance of its isotopes. - Represent the electronic structures of the first twenty elements of the periodic table in both forms. - explain how the position of an element in the periodic table is related to the arrangement of electrons in its atoms and hence to its atomic number 		
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knowledge of structure and bonding to engineer new materials with desirable properties. The properties of these materials may offer new applications in a range of different technologies.

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- Predict possible reactions and probable reactivity of elements from their positions in the periodic table.
- Describe these steps in the development of the periodic table
- Explain the differences between metals and non-metals on the basis of their characteristic physical and chemical properties. This links to Group 0, Group 1, Group 7 and Bonding, structure and the properties of matter (page 75)
- Explain how the atomic structure of metals and non-metals relates to their position in the periodic table
- Explain how the reactions of elements are related to the arrangement of electrons in their atoms and hence to their atomic number.
- Explain chemical bonding in terms of electrostatic forces and the transfer or sharing of electrons.
- Draw dot and cross diagrams for ionic compounds formed by metals in Groups 1 and 2 with non-metals in Groups 6 and 7.
- Work out the charge on the ions of metals and non-metals from the group number of the element, limited to the metals in Groups 1 and 2, and non-metals in Groups 6 and 7.
- Deduce that a compound is ionic from a diagram of its structure in one of the specified forms
- Describe the limitations of using dot and cross, ball and stick, two and three-dimensional diagrams to represent a giant ionic structure
- Work out the empirical formula of an ionic compound from a given model or diagram that shows the ions in the structure.
- Recognise substances as small molecules, polymers or giant

structures from diagrams showing their bonding.

- Draw dot and cross diagrams for the molecules of hydrogen, chlorine, oxygen, nitrogen, hydrogen chloride, water, ammonia and methane
- Represent the covalent bonds in small molecules, in the repeating units of polymers and in part of giant covalent structures, using a line to represent a single bond
- Describe the limitations of using dot and cross, ball and stick, two and three-dimensional diagrams to represent molecules or giant structures
- Deduce the molecular formula of a substance from a given model or diagram in these forms showing the atoms and bonds in the molecule.
- Recognise substances as metallic giant structures from diagrams showing their bonding.
- Predict the states of substances at different temperatures given appropriate data
- Explain the different temperatures at which changes of state occur in terms of energy transfers and types of bonding
- Recognise that atoms themselves do not have the bulk properties of materials
- include appropriate state symbols in chemical equations
- Use the idea that intermolecular forces are weak compared with covalent bonds to explain the bulk properties of molecular substances.
- Recognise polymers from diagrams showing their bonding and structure.
- Recognise giant covalent structures from diagrams showing their bonding and structure.

- Explain why alloys are harder than pure metals in terms of distortion of the layers of atoms in the structure of a pure metal.
- Explain the properties of diamond in terms of its structure and bonding.
- Explain the properties of graphite in terms of its structure and bonding.
- Recognise graphene and fullerenes from diagrams and descriptions of their bonding and structure
- Give examples of the uses of fullerenes, including carbon nanotubes.
-

WORKING IN GREATER DEPTH – YEAR 9

KNOWLEDGE

STUDENTS...

- Know tier 3 vocabulary and how to use them effectively.
- Know rocks can be examined to predict the environment in which it was formed.
- Know the difference between geocentric and heliocentric theories
- Know the socio-economic implications of proposals to reduce carbon emissions.
- Know how to balance equations and write half equations

SKILLS

STUDENTS...

- Identify circumstances that indicate fast processes of change on Earth and those that indicate slower processes.
- Predict planetary conditions from descriptions of rocks on other planets.
- Describe similarities and differences between the rock cycle and everyday physical and chemical processes.
- Suggest how ceramics might be similar to some types of rock.
- Predict patterns in day length, the Sun's intensity or an object's shadow at different latitudes.
- Make deductions from observation data of planets, stars and galaxies.
- Compare explanations from different periods in history about the motion

UNDERSTANDING

STUDENTS...

- Explore the properties of different rocks and how they were influenced by the environment in which they were formed.
- Use data examine factors corresponding to stars, planets and galaxies.
- Scrutinise government policy regarding climate change.
- Investigate the effects of recycling and reusing on the consumption of natural resources.

		<p>of objects and structure of the Universe.</p> <ul style="list-style-type: none"> - Evaluate the implications of a proposal to reduce carbon emissions. - Evaluate claims that human activity is causing global warming or climate change. - Compare the relative effects of human-produced and natural global warming. - Suggest ways in which changes in behaviour and the use of alternative materials may limit the consumption of natural resources. - Suggest ways in which waste products from industrial processes could be reduced. - Use data to evaluate proposals for recycling materials. - write balanced half equations and ionic equations where appropriate. - Explain the limitations of the particle theory in relation to changes of state when particles are represented by solid inelastic spheres which have no forces between them. - 		
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AGE EXPECTED STANDARD - YEAR 9				
	KNOWLEDGE	SKILLS	UNDERSTANDING	ASSESSMENT

PHYSICS

	<p>STUDENTS...</p> <ul style="list-style-type: none"> - Know sound consists of vibrations which travel as a longitudinal wave through substances. The denser the medium, the faster sound travels. - Know the greater the amplitude of the waveform, the louder the sound. The greater the frequency (and therefore the shorter the wavelength), the higher the pitch. - Know sound does not travel through a vacuum. - Know the speed of sound in air is 330 m/s, a million times slower than light. - Know When a light ray meets a different medium, some of it is absorbed and some reflected. For a mirror, the angle of incidence equals the angle of reflection. The ray model can describe the formation of an image in a mirror and how objects appear different colours. - Know when light enters a denser medium it bends towards the normal; when it enters a less dense medium it bends away from the normal. Refraction through lenses and prisms can be described using a ray diagram as a model. - Know light travels at 300 million metres per second in a vacuum. - Know different colours of light have different frequencies. - Know when a wave travels through a substance, particles move to and fro. Energy is transferred in the direction of movement of the wave. Waves of higher amplitude or higher frequency transfer more energy. - Know A physical model of a transverse wave demonstrates it moves from place to place, while the 	<p>STUDENTS...</p> <ul style="list-style-type: none"> - Explain observations of how sound travels using the idea of a longitudinal wave. - Describe the amplitude and frequency of a wave from a diagram or oscilloscope picture. - Use drawings of waves to describe how sound waves change with volume or pitch. - Construct ray diagrams to show how light reflects off mirrors, forms images and refracts. - Light travels at 300 million metres per second in a vacuum. - Different colours of light have different frequencies. - Use ray diagrams of eclipses to describe what is seen by observers in different places. - Explain observations where coloured lights are mixed or objects are viewed in different lights. - Use ray diagrams to describe how light passes through lenses and transparent materials. - Describe how lenses may be used to correct vision. - Explain differences in the damage done to living cells by light and other waves, in terms of their frequency. - Explain how audio equipment converts sound into a changing pattern of electric current. - Describe the properties of different longitudinal and transverse waves. - Use the wave model to explain observations of the reflection, absorption and transmission of a wave. - Recall and apply the density equation to changes where mass is conserved. 	<p>STUDENTS...</p> <ul style="list-style-type: none"> - Relate changes in the shape of an oscilloscope trace to changes in pitch and volume - Use ray diagrams to model how light passes through lenses and transparent materials - Relate the impact of different types of waves on living cells to their frequency and the energy carried by the wave - Use the wave model to explain observations of the reflection, absorption and transmission of waves - Use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids. - Relate differences between isotopes to differences in conventional representations of their identities, charges and masses. - Show an understanding of why and describe how scientific methods and theories develop over time. - Understand that it is important for the findings of studies into the effects of radiation on humans to be published and shared with other scientists so that the findings can be checked by peer review. - 	<p>HINGE ASSIGNMENT: Waves 1 (20 MARKS)</p> <p>HINGE ASSIGNMENT: Waves 2 (20 Marks)</p> <p>SUMMATIVE ASSESSMENT 1 P4 Atomic structure EOCA (50 Marks)</p> <p>SUMMATIVE ASSESSMENT 2 P3 Particle model of matter EOCA (50 marks)</p>
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	<p>material it travels through does not, and describes the properties of speed, wavelength and reflection.</p> <ul style="list-style-type: none"> - Know the particle model is widely used to predict the behaviour of solids, liquids and gases and this has many applications in everyday life. - Know the particle model helps us to explain a wide range of observations and engineers use these principles when designing vessels to withstand high pressures and temperatures, such as submarines and spacecraft. - Know ionising radiation is hazardous but can be very useful. - Know although radioactivity was discovered over a century ago, it took many nuclear physicists several decades to understand the structure of atoms, nuclear forces and stability. - Know rules for radiological protection were first introduced in the 1930s and subsequently improved. - Know radioactive materials are widely used in medicine, industry, agriculture and electrical power generation. - 	<ul style="list-style-type: none"> - Recognise/draw simple diagrams to model the difference between solids, liquids and gases. - Explain the differences in density between the different states of matter in terms of the arrangement of atoms or molecules. - Describe how, when substances change state (melt, freeze, boil, evaporate, condense or sublimate), mass is conserved. - Apply the specific heat capacity equation, to calculate the energy change involved when the temperature of a material changes. - Apply the specific latent heat equation, which is given on the <i>Physics equation sheet</i>, to calculate the energy change involved in a change of state. - Perform an experiment to measure the latent heat of fusion of water. - Interpret heating and cooling graphs that include changes of state. - Distinguish between specific heat capacity and specific latent heat. - Explain how the motion of the molecules in a gas is related to both its temperature and its pressure - Explain qualitatively the relation between the temperature of a gas and its pressure at constant volume. - Recognise expressions given in standard form. - Describe why the new evidence from the scattering experiment led to a change in the atomic model - Describe the difference between the plum pudding model of the atom and the nuclear model of the atom. - Describe the properties of alpha particles, beta particles and gamma rays is limited to their penetration through materials, their range in air and ionising power. 		
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- Apply knowledge of properties of radioactive substances to the uses of radiation.
- Evaluate the best sources of radiation to use in a given situation.
- Use the names and symbols of common nuclei and particles to write balanced equations that show single alpha (α) and beta (β) decay
- Explain the concept of half-life and how it is related to the random nature of radioactive decay.
- Determine the half-life of a radioactive isotope from given information.
- compare the hazards associated with WS 1.5 contamination and irradiation.

WORKING IN GREATER DEPTH – YEAR 9

KNOWLEDGE

STUDENTS...

- Know tier 3 vocabulary and how to use them effectively.
- Know the structure of the ear
- Know sound can be reflected, transmitted and absorbed by different media
- Know oscillators are used to visualise sound waves.
- Know the effects of interfering waves are either constructive or destructive.

SKILLS

STUDENTS...

- Suggest the effects of particular ear problems on a person's hearing.
- Explain observations where sound is reflected, transmitted or absorbed by different media.
- Explain observations of how sound travels using the idea of a longitudinal wave.
- Describe the amplitude and frequency of a wave from a diagram or oscilloscope picture.
- Use drawings of waves to describe how sound waves change with volume or pitch.
- Evaluate the data behind a claim for a sound creation or blocking device, using the properties of sound waves.
- Use diagrams to compare the waveforms a musical instrument

UNDERSTANDING

STUDENTS...

- Relate changes in the shape of an oscilloscope trace to changes in pitch and volume
- Investigate the behaviour of light when in contact with different materials.
- Investigate the journey of light through a periscope.
- Link properties of sound with its ability sterilise objects and massage etc.
- Understand the phenomenon of wave interference.

		<p>makes when playing different pitches or volumes.</p> <ul style="list-style-type: none">- Use a ray diagram to predict how an image will change in different situations.- Predict whether light will reflect, refract or scatter when it hits the surface of a given material.- Use ray diagrams to explain how a device with multiple mirrors works.- Suggest reasons why sound waves can agitate a liquid for cleaning objects, or massage muscles for physiotherapy.- Evaluate electricity production by wave energy using data for different locations and weather conditions.- Compare and contrast the properties of sound and light waves.- Suggest what happens when two waves combine.- Calculate the net decline, (HT only) expressed as a ratio, in a radioactive emission after a given number of half-lives.-		
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