Year 1 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS

Year 1 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y1/SC 1 (8)		Y1/SC 2(16)				Y1/SC 3 (8)	
	SEASONS		**LIVING THINGS**				**MYSELF**	
	Identify the changes across the four seasons. Know that there are four seasons in a year. Name the four seasons. List the seasons in the correct order. State a few features of each season.		Know that animals and plants are living things. Differentiate between living and non living things. Learn how animals and plants change as they grow *Investigatng different habitats in and around the school.* *Investigate how plants grow from seed to a baby plant* *Activity : A visit to the vegetable garden to find different micro habitats.*				Know that humans need three important things to stay alive. Learn the five senses and five sense organs humans have. Identify the parts of the human body	

Year 1 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y1/SC 3 (8)		Y1/SC 4 (16)					
	MYSELF		**SORTING AND GROUPING MATERIALS**					
	Identify similarities and differences between humans. Describe how humans grow and change as they grow older. Find out which sense organ is most useful to differentiate between salt and sugar. **Assessment 1**		Know that objects can be made of different materials. Name and identify some common materials. Sort materials in different ways. Describe materials according to their different properties. *Sort and group the objects made of natural/man made materials.* *Create own key to sort different materials.* *Investigate different objects that can float/sink in water.* **Assessment / Nov report**				**REVISION FOR FIRST TERM EXAM**	

Year 1 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y1/SC 5 (16)				Y1/SC 6 (16)			
	PUSHES AND PULL				**ANIMALS**			
	Describe different ways of moving. Know that pushes and pulls can make objects start or stop moving. Pushes and pulls are forces. Identify examples of pushes and pulls. *Investigation – To find out which objects need a push or pull or both to start or stop motion. Project: Create a new toy that uses the push and/or pull force.*				Know how to observe and describe animal features. Sort and group vertebrates into five groups Describe how animals move, how they grow and change as they grow older. Know about the different types of food animals eat. *Use a key to identify different vertebrates.* *[Compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them]* *Activity: make a model on the life cycle of a reptile and an amphibian, highting similarities and differences.*			

Year 1 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y1/SC 7 (16)				Y1/SC 8 (8)			
	PLANTS				**LIGHT AND DARK**		**REVISION**	
	Know that plants grow from seeds and bulbs. Identify the parts of a plant. Identify and describe the basic structure of a variety of common flowering plants, including trees. Know the basic needs of a plant to grow well. Know that humans and animals eat plants for food. Compare and contrast different plants. [investigation] *Investigate if plants need all parts to grow.*				Know that light comes from a source. Identify light sources. Know that shiny objects are not light sources. Compare differences between night and day. Know that we need light to see. *Investigate the effect of different light sources on a darkened room.*		**REVISION FOR FINAL EXAMINATION**	

Year 2 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS

Year 2 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y2 /SC 1 (16)				Y2 / SC 2 (16)			
	HEALTH AND GROWTH				LIVING THINGS IN ENVIRONMENT			
	Know that humans need the correct amounts of food and water. Describe the many types of food and diets about the main food groups. Know what is a balanced diet and that we need to exercise to stay healthy. Know that human and animal babies need different parental care. Know about food hygiene and personal hygiene. Realise why humans take medicine. *Investigation- An activity designed to help students gain awareness about their sugar intake. Examine nutrition fact tables of various drinks to check the amount of sugar content. Suggest which drinks are safe for health.*				Know what is a habitat and a microhabitat. Observe adaptive features of living things that are suited in a habitat Describe how the environmental factors affect them. *Research: Any two animals and plants that are found in each of these habitats and how they have adapted to these habitats. Activity- Make a fun fact booklet. Investigating different habitats in and around the school. Activity : A visit to the vegetable garden to find different micro habitats Investigation- To find out how plants and animals depend on each other to survive in a habitat Activity- Make a model of food chain for different habitats (forest/ water/ grass land/ desert).*			

Year 2 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y2 / SC 3 (16)				Y2 / SC3 (8)			
	MATERIALS : PROPERTIES AND THEIR USES				INVESTIGATING MATERIALS AND ITS PROPERTIES		REVISION	
	Know the properties of materials and compare natural and different materials. Investigate properties of materials using fair tests. Investigate suitable materials to make a house. *Activity- Plan to make a model of the house using different materials.*				*Compare properties of variety of materials using comparative and fair test. Understand what is meant by a scientific question and use different types of enquiry to answer scientific questions*		REVISION FOR FIRST TERM EXAMINATION	

Year 2 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y2 / SC 4 (16)				Y2 /SC 5 (16)			
	INVERTEBRATES				SOUND			
	Sort, group and identify invertebrates using pictures and keys. Observe and describe key features of invertebrates. Group invertebrates with common features. Describe change in invertebrates as they grow using simple life cycles. *Make a Fact file about worms and crops. Activity- Create a model of classification key using any three invertebrates. Investigate about any invertebrate and write a report about it.(appearance/ food/ habitat) Activity: Visit to School Biology Lab.* **Assessment 4**				Know the source of a sound and how sounds travel from the source to our ears. Identify and describe different sounds. Describe how sounds can be made louder or quieter. *Investigate –Suitable material used for making a percussion instrument Activity- Make a percussion instrument of my own using the proper materials. Activity-To construct and investigate the working of string telephones. To explore how sound travels (string telephone)* **Assessment 5**			

Year 2 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y2 /SC 5(8)		Y2 / SC 6(16)					
	INVESTIGATING SOUND		SPACE					
	Investigate how sounds can be made louder or quiter by changing the distance from the source. Set up simple practical tests / understand fair testing and draw conclusion using scientific language.		Know about the Earth, Sun and moon in our Solar System. Understand and describe the shape of the moon appearing to change over time. Know about how stars form constellations, astronauts and space travel. *Activity- Make a model of any constellation*				REVISION FOR FINAL EXAMINATION	

Year 3 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS

Year 3 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y3/SC 1 (12)				Y3/SC 2 (12)			
	ANIMAL ADAPTATIONS				**FORCES AND FRICTION**			
	Group animals and use keys to identify them. Compare animals in contrasting habitats. Observe adaptive features and predict the habitat of animals *Observe and compare the features of some animals in contrasting habitats*				Describe and compare how objects move on different surfaces and slopes. Describe friction as a contact force and ways in which friction between surfaces can be increased or decreased. *Investigate how the force used has an effect on the distance a toy car moves.* *Investigate how objects move on different surfaces and slopes.*			

Year 3 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y3/SC3 (12)				Y3/SC4 (9)			
	MAGNETS				**TEETH**			**REVISION**
	Know the two poles of a magnet. Differentiate between attract and repel. Predict whether two magnets will attract or repel Identify magnetic and non magnetic materials *Investigate the strengths of different magnets by counting the number of paper clips it can hold.* *Investigate the strengths of different magnets by measuring the distance of magnet (cm) when paper clip moved.*				Know the main types of teeth. Link the shape of the tooth to its function. Compare the types of teeth in different animals. *Observe and compare the type of teeth in different animals.*			**REVISION FOR FIRST TERM EXAM**

Year 3 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y3/SC 5(12)				Y3/SC 6(12)			
	FEEDING RELATIONSHIPS				**ROCKS AND SOILS**			
	Know that living things need food . Understand how food supply affects animal population. Know how to draw and interpret foodchains and how to identify a producer, consumer, herbivore, predator and prey in a food chain and foodwebs.				Know different properties and features of rocks. Identify rocks using keys. Describe how sedimentary, igneous and metamorphic rocks are formed. *Observe and compare features of soils such as colour, texture and how water drains through them.* *Read and interpret the given data to compare the hardness of different rocks using Mohs' scale.*			

Year 3 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y3/SC 7 (9)			Y3/SC 8 (9)				
	LIGHT			**USING AND CHANGING MATERIALS**			**REVISION**	
	Know that we need light to see things. Identify and differentiate between light sources and reflectors. Identify opaque objects and explain how shadows are formed. Find patterns in the way that the sizes of shadows change. Differentiate between transparent, opaque and translucent objects. *Investigate patterns in the way that the size of shadows change.* *Ask questions and use scientific enquiries to answer them.* *Create a poster about sun safety.*			Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. *Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.* *Create a water cycle model*			**REVISION FOR FINAL EXAMINATION**	

Year 4 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS

Year 4 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	**Y4/SC 1 (12)**				**Y4/SC2 (12)**			
	VARIATION AND CLASSIFICATION				**GROWING PLANTS**			
	Know how living things can be classified according to shared features. Explore and use classification keys to help groups , identify and name living things. Describe how plants and animals are classified. Identify the observable features used to classify a specific plant or animal. *Work scientifically to research & explore a variety of living things from different environments and understand their characteristics.* *Project – Visit the school garden*				Identify and describe the functions of different parts of flowering plants. Know how to use a simple key to identify a variety of plants. Group plants using observable features. Understand how water is transported within plants. Know that plants need the correct amount of water and light to grow well. *Investigate the way in which water is transported in plants.(celery stem experiment)* *Project – Create a Herbarium*			

Year 4 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	**Y4/SC 3 (18)**						**REVISION**	
	ELECTRICITY							
	Know the use of electricity, identify appliances that use mains electricity or batteries. Know the dangers of electricity. *Design and construct simple complete circuits.* Identify the components in a circuit. Identify electrical conductors and insulators and know their use. *Investigate different materials to identify conductors and insulators.*						**REVISION FOR FIRST TERM EXAMINATION**	

Year 4 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	**Y4/SC 4 (12)**				**Y4/SC 5 (12)**			
	SOLIDS, LIQUIDS AND GASES				**MAKING AND CHANGING SOUNDS**			
	Identify materials as solids, liquids or gases. Describe common properties of solids, liquids or gases. Define temperature and how it is measured. Know that different substances change state at different temperatures. *Set up simple practical enquiries, comparative and fair tests to observe the melting of ice cubes at different temperatures.*				Know that sounds come from a source and can travel through solids, liquids and gases. Know that vibrations from sounds travel through a medium to the ear. Know that materials can prevent vibrations from a sound source reaching the ears. Identify high pitched and low pitched sounds. Find patterns between the pitch of a sound and features of the object that made it. *Investigate the sound that different lengths of a plastic ruler makes.* *Create own musical instruments by using the knowledge about pitch and volume.*			

Year 4 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	**Y4/SC 6 (15)**					**NC**		
	SKELETON AND MUSCLES					**RETRIEVAL PRACTICE (GL)**	**REVISION**	
	Know the four functions of the internal skeletons in humans. Identify and locate the skull and rib cage. Describe what pairs of muscles do. Explain the importance of exercise and diet for healthy muscles and bones *Create a poster about the importance of exercise and diet to stay healthy and strong.*					Magnets, Rocks & soil, Light and shadows, Forces, Human nutrition - Balanced diet and Digestive system.	**REVISION FOR FINAL EXAMINATION**	

Year 5 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS								
Year 5 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y5/SC 1 (12)				**Y5/SC 2 (12)**		**Y5/SC 3 (8)**	

	Y5/SC 1 (12)			Y5/SC 2 (12)			Y5/SC 3 (8)	
T E R M 1	**PLANT ADAPTATIONS**			**LIVING THINGS IN DANGER**			**SEEING AND REFLECTING**	
	Know that different habitats and microhabitats have different environmental conditions. Know that plant roots take in water and that the availability of water may affect root growth. Know that both plants and animals need oxygen from the air for respiration. Understand that plants need light for growth and that the availability of light can affect where they can grow. Describe how plants are adapted to their environment. Compare plant adaptations in two contrasting habitats. *Make your own dry garden.*			Know that environments can be changed in ways that harm or help living things. Recognise ways in which living things and environment need protection locally and globally. Know and describe the terms Conservation, endangered and extinct. Describe ways to reduce the effects of environmental damage. *Design a wildlife corridor using cardboard tubes and/or string and wood to ensure that fictitious or model animals could cross a road made from pieces of toy racetrack or similar.*			Know that light comes from a source and appears to travel in straight lines. We see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. Light can be reflected from shiny surfaces and can change direction.	

Year 5 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y5/SC 3 (8)		Y5/SC 4 (16)				REVISION	
	SEEING AND REFLECTING		**MIXING AND SEPARATING MIXTURES**				**REVISION**	
	Understand that smooth and shiny surfaces reflect light. Explain differences between shadows and reflections. *Investigate how the size of shadows can be changed using shadow puppets.* *Work scientifically by looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.*		Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. *Investigate what happens when water is added to powdered/granular solids with a comparative test. Record and present findings. Analyze data and derive causal relationships. Conduct an investigation leading to a line graph*				**REVISION FOR FIRST TERM EXAMINATION**	

Year 5 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y5/SC 5 (16)				Y5/SC 6 (16)			
	EARTH and SPACE				**DIET AND DIGESTION**			
	Describe the Sun, Earth and Moon as approximately spherical bodies. Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. Describe the movement of the Moon relative to the Earth Explain how shadow length changes at different times of the day. *Construct simple models of the Solar System . Create a fact file about any two planets (one inner planet and one outer planet) Research about James E.Webb and the James Webb Space Telescope.*				Know that humans need a balanced diet from a range of food groups. Relate between diet, lifestyle, exercise and health. Sequence the process of digestion in humans. Describe the functions of the basic parts of the digestive system in the sequence of digestion. *Create a balanced food plate or a food pyramid showing the different food groups. Make a model of the digestive system to understand its working.*			

Year 5 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y5/SC 7 (8)		Y5/SC 8 (8)		Y5/SC 9 (8)			
	PLANT LIFECYCLE		**ANIMAL & HUMAN LIFECYCLE**		**FORCES IN AIR & WATER**		**REVISION**	
	Know that a flowering plant has four stages. Describe the lifecycle of flowering and non flowering plants. Describe methods like growing plants from bulbs, tubers and stem cuttings. Know how seeds are dispersed by different mechanisms.		Describe differences in the lifecycles of reptiles, birds, insects, mammals and amphibians. Differentiate between complete and incomplete metamorphosis. Describe changes as humans develop to old age.		Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling objects. Identify the effects of air resistance, water resistance and friction acting between moving surfaces.		**REVISION FOR FINAL EXAMINATION**	

Year 6 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS

Year 6 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

	Y6/SC 1 (16)				Y6/SC 2 (16)			
T E R M 1	**PLANT LIFE CYCLES**				**MICROBES**			
	Describe the life process of reproduction in some flowering plants. Know the names of parts of a flower and their functions. Know the difference between pollination and fertilization; insect and wind pollination; dispersal of seeds and their methods and seed germination. Sequence the life cycle of flowering plants. *Project: Vegetable gardening in the school.* *WS: Plan an investigation to test the conditions that seeds need to germinate.*				Know the three different types of microbes. Understand that microbes are found everywhere; in different shapes and sizes. Know how microbes can grow and reproduce on food. Know examples of useful microbes and disease causing harmful microbes. Recognize the need for food hygiene precautions. Understand the role of decomposers in food chains and hhow decay can be useful and how compost is made and the recycling of materials. *WS – Planning and investigating mould growth.*			

Year 6 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

	Y6/SC 3 (16)				Y6/SC 4 (12)			
T E R M 1	**ELECTRICITY**				**HEART, LUNGS and CIRCULATION**			**REVISION**
	Use recognised symbols when representing a simple circuit in a diagram. Draw and identify recognized component symbols. Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches *WS: Investigate how components function.* *Project: Making a working quiz board or a wind mill or any other model running on electrical components.*				Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Describe the ways in which nutrients and water are transported within animals, including humans.. Know the main parts of the respiratory system and describe its functions. Know what happens to the air when we breathe in. Differentiate between breathing and respiration. *WS :Investigate pulse rate and exercise.* *Project: Make a model to show ventilation of lungs.*			**REVISION FOR FIRST TERM EXAM**

Year 6 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

	Y6/SC 5 (16)				Y6/SC 6 (12)			
T E R M 2	**FORCES IN AIR AND WATER**				**REVERSIBLE and IRREVERSIBLE CHANGE**			
	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object Identify the effects of air resistance, water resistance and friction, that act between moving surfaces Identify weight as a force and how forces are measured in newtons.(N) Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.(GL topic) *WS: Investigate streamlining.* *WS: Investigate the grip on some shoes.*				• Review methods of separating mixtures and know what are solutions. Demonstrate that dissolving, mixing and changes of state are reversible changes Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. *WS: Investigate action of acid on bicarbonate of soda.*			

Year 6 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

	RETRIEVAL PRACTICE (GL)				REVISION FOR FINAL EXAM			
T E R M	• LIGHT Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes Recognise that light appears to travel in straight lines Use the idea that light travels in straight lines to explain that objects are seen because they give out or				• Biology revision: Feeding relationships, Variation and classification • Biology revision: Growing plants, Plant adaptations, Plant life cycles • Biology revision: Micro-organisms • Biology revision: Heart, lungs and circulation • Chemistry revision: Solids, liquids and gases, Mixing and separating materials			

2	reflect light into the eye Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. *WS: Investigate shadows lengths and light source.*	• Chemistry revision: Reversible and irreversible change • Physics revision: Earth and space • Physics revision: Electricity: everyday uses and simple circuits, Changing circuits • Physics revision: Forces in air and water • Scientific enquiry revision

Year 7 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS

Year 7 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y7 /SC 1 (10)			Y7 /SC 2 (8)		Y7 /SC 3 (10)		Y7 /SC 4 (4)
	CELLS AND ORGANISATION			**THE PARTICLE MODEL**		**ENERGY**		**REPRODUCTION**
	Recall the life processes. Understand cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope. Know the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts. Describe the similarities and differences between plant and animal cells. Explain the role of diffusion in the movement of materials in and between cells. Identify some specialised cells and describe their functions Describe the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms. Identify the reactants in, and products of, photosynthesis. Describe the use of sunlight in photosynthesis to build organic molecules. Explain the adaptations of leaves for photosynthesis. **Assessment 1**			Describe the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure. Know the similarities and differences, including density differences, between solids, liquids and gases. Identify scientific questions, hypothesis and predictions. Know how evidence and observations are used to develop into a theory and evidence is used to support a theory. Explain how Brownian motion supports particle theory. Use particle theory to explain diffusion in liquids and gases. **Assessment 2**		Explain why different people need different amounts of energy from food. Comparing energy values of different foods (from labels) (kJ) Know the different ways in which energy is transferred and stored. Identify work done and energy changes on deformation of elastic maetrial. Recall the law of conservation of energy. Compare the starting with the final conditions of a system and describe changes in the amounts of energy associated. Explain why fossil fuels are described as nonrenewable. Give examples of fossil fuels.Give some examples of renewable energy resources. Know how sun is the original source of energy for most of our energy resources. Know the advantages and disadvantages of different energy resources. Know some ways of using less fossil fuels. Explain what is efficiency. **Assessment 3**		Describe the reproduction in humans, including the reproductive systems, menstrual cycle, gametes, fertilisation, gestation and birth and the effect of maternal lifestyle on foetus.

Year 7 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y7 /SC 5 (8)		Y7 /SC 6 (10)			Y7/SC 7 (10)		
	MUSCLES AND BONES		**MIXTURES AND SEPARATION**			**FORCES**		**REVISION**
	Know how muscles in the gas exchange system allow ventilation. Understand the mechanism of breathing to move air in and out of the lungs,using a pressure model to explain the movement of gases. Describe the role of muscles in the heart. Know the structure and functions of the human skeleton. Know some different types of joint. Explain how antagonistic pair of muscle operate and are controlled to allow movement. Recall how different drugs affect the body. **Assessment 4**		Know the concept of a pure substance and mixtures and explain dissolving. Know how Bunsen burner is used. Identify hazards and know how to reduce risks. Know and explain simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography. Know the effects of different variables on solubility. Understand conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving. Give examples of where chromatography and distillation is used. *Investigate the separartion of different dyes in ink using chromatography.* **Assessment 5**			Recall forces as pushes or pulls, arising from the interaction between two objects. <u>Use force arrows in diagrams, for adding forces in one dimension, balanced and unbalanced forces. Able to calculate the net force acting in objects.</u> Know the effects of forces on an object. Name forces and classify them as contact or non-contact forces. Describe how the extension of a spring depends on the force applied. Investigate force-extension linear relation-Hooke's Law. Know the effects of frictions. Explain some ways in which friction can be changed. Know the situation in which friction is helpful or not helpful. Know what is pressure and describe the effects of high and low pressure in simple situations. Explain effects of balanced and unbalanced forces. **Assessment 6**		**REVISION FOR FIRST TERM EXAM**

Year 7 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y7 /SC 8 (12)			Y7 /SC 9 (12)			Y7 /SC 10(4)	**WORKING SCIENTIFICALLY**
	ACIDS AND ALKALIES			**SOUND**			**ECOSYSTEM**	
	Know why hazard symbols are necessary. Know some common examples of acids and alkalis. Investigate how indicators can be used to test for acidic,			Know the cause of sounds and how to make louder sounds. Know link between frequency and pitch. Know how sound moves through materials.			Recall what a species is. Know continuous or	Ask questions and develop a line of enquiry

T E R M 2	alkaline or neutral solutions. Know the pH scale and how it is useful. Describe neutralizations. Explain the pH changes taking place during neutralization. Describe and explain every day neutralization reactions-reactions of acids with alkalis to produce a salt plus water **Assessment 7**			Explain why sounds get fainter further from their source. Know the part of the ear and their functions. Know how microphones convert sound into electric signals. Be aware of the auditory range of frequencies in humans and animals. Know some uses of ultrasound - use for cleaning and physiotherapy by ultra-sound; waves transferring information for conversion to electrical signals by microphone. Explain how sonar and eco location work. Compare longitudinal and transverse waves. Know that all waves can be reflected. Explain what super positions means. **Assessment 8**			discontinuous variation. Know how inherited variation is caused. Identify causes of environmental variation. Know the adaptation to daily and seasonal changes. Know ways in which organisms affect their habitat & communities. Use food web to make predictions Use pyramid of numbers to describe how energy is lost. Explain why pesticide needs to be used carefully.	based on observations of the real world,make predictions plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, use appropriate techniques apparatus & materials paying attention to health and safety.

Year 7 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y7 / SC 11 (12)			Y7 /SC 12 (12)			NC	
	ATOMS, ELEMENTS AND MOLECULES			**CURRENT ELECTRICITY**			**SIMPLE MACHINES**	**REVISION**
	Know what kinds of particles are found in air. Know why different elements are used for different purposes .Know what the difference between metals and non metals. Relate the use of an elements to its properties Know how do elements form compounds. Know how can we use chemical reactions. Use and understand word equations for chemicals reactions. Describe example and uses of decomposition reactions. **Assessment 9**			Define electric current. Measure current in series and parallel circuits. Know how switches can control different kinds of circuit. Know how changing the number or type of component in circuit affects the current. Define potential difference. Explain why the current increases when the voltage of supply is increased. Know the relationship between resistances as the ratio of potential difference (p.d.) to current. Know differences in resistance between conducting and insulating components(Quantitative). Understand the use of fuses and circuit breakers. Know how the different wires are connected in plug. *Investiagate current in series and parallel circuits.* **Assessment 10**			Understand that simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged. Describe moment as the turning effect of a force.	**REVISION FOR FINAL EXAM**

Year 8 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS								
Year 8 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y8 /SCI 1 (12)			Y8 /SCI 2 (12)			Y8 /SCI 3 (8)	
	FOOD AND NUTRITION			**COMBUSTION**			**ENERGY TRANSFER**	
	Know the the nutrients we need in our diets and its sources. Calculate energy requirements in a healthy daily diet. *Identify the types of nutrients present in food substances.* Describe what each nutrient does in the body. Realise the benefits of a balanced diet. Know the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. Identify organs of the human digestive system, including adaptations to function and describe how the digestive system digests food. Know that enzymes act as biological catalysts. Explain the importance of bacteria in the human digestive system. Understand the role of diffusion in the movement of materials in and between cells. **Assessment 1**			Know the reactions of hydrogen and hydrocarbons with oxygen. Know the oxidation reactions of metals and non-metals. Explain change in mass seen in oxidation reactions. Understand difference exothermic and endothermic reactions. Use the fire triangle to explain how to control a fire. Identify hazard symbols for substances likely to cause fires. Know the pollutant that are formed by burning fuels and how these pollutants cause problems and how their effects can be reduced. Describe the greenhouse effect and how it is caused. Realise how human activity may cause global warming. Describe example and uses of decomposition reactions. *Investigate the amount of oxygen needed for burning.* **Assessment 2**			Know how internal energy and temperature are different. Identify the direction in which energy will be transferred. Explain what happens to particles when a liquid evaporates. Know how energy is transferred by radiation, conduction and convection. Use the particle model to explain energy transfers in matter. Recall ways of reducing energy transfers.	

Year 8 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y8 /SCI 3 (6)		Y8 /SC 4 (10)		Y8 /SCI 5 (12)			
	ENERGY TRANSFER		**PLANTS AND THEIR REPRODUCTION**		**LIGHT**			**REVISION**

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Understand power and efficiency. Calculate efficiencies. Interpret Sankey diagrams. Explain how power companies charge for energy used. Describe and calculate payback time. State the meanings of accuracy and precision. Explain how to avoid random and systematic errors. **Assessment 3**	Interpret scientific organism names. Describe how organisms are classified. Explain the importance of biodiversity. Know the asexual and sexual reproduction in plants. Describe reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. Know about seed germination. Realise the importance of plant reproduction through insect pollination in human food security **Assessment 4**			Know the similarities and differences between light waves and waves in matter. Realise that light waves can travel through vaccuum. *Investigate laws of reflection using mirror.* Describe the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. Use of ray model to explain imaging in mirrors. Discuss some uses of lenses. Define refraction of light and describe action of convex lens in focusing. *Investigate refraction of light in glass slab.* List the parts and state their functions in human eye. Realise that light transfer energy from source to absorber, leading to chemical and electrical effects. Identify the colours and different frequencies of light when white light pass through a prism. Know the differential colour effects in absorption and diffuse reflection. **Assessment 5**			**REVISION FOR FIRST TERM EXAM**

Year 8 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

	Y8 /SCI 6 (12)			Y8 /SCI 7 (12)			Y8 /SCI 8 (8)	
	THE PERIODIC TABLE			**BREATHING AND RESPIRATION**			**METALS AND THEIR USES**	
T E R M 2	Describe Dalton's atomic model. Know difference between atoms and molecules. Identify elements, mixtures and compound from descriptions and particle diagrams. Know what kinds of particles are found in air. Know the differences between metal and non metals. Describe chemical changes and compound formation. Use and understand word equations for chemicals reactions. Use the periodic table to find some important elements including transition metals. Know some typical properties of alkali metals halogens and noble gases. Know melting, freezing and boiling points and use them to predict the state of a substance. Identify trends and position of metals and non metals in the periodic table by their properties. Describe the reactions of some elements with water and oxygen. Identify trends and make predictions about chemical properties using the periodic table. Investigate the chemical properties of metal and non-metal oxides with respect to acidity. **Assessment 6**			Know the structure and functions of the gas exchange system in humans, including adaptations to function. Understand the mechanism of breathing. Recognize the the impact of exercise, asthma and smoking on the human gas exchange system. Know the composition of air. State a word summary for aerobic respiration. Know the causes and effects of reduced oxygen supply on the body. Describe the process of anaerobic respiration and its effects during and after hard exercise. Explain the gas exchange in different organisms. **Assessment 7**			Know some common properties and uses of metals. Write word equations for the reactions of metals and non-metals. Describe what a catalyst is and some uses of catalysts. Know what happens during corrosion and rusting. Explain how metals can be protected from corrosion. Know the reactions of metals with water and acid. Place metals and carbon in order of reactivity. Describehow metals are extracted from their ores by heating with carbon or by electrolysis. Write word and symbol equations for reactions. *Explain how to improve the quality of data collected during an investigation.* **Assessment 8**	

Year 8 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

	Y8 /SCI 8 (4)	Y8 /SCI 9 (12)			NC	Y8 /SCI 10 (4)		
	METALS AND THEIR USES	**FLUIDS**			**MAGNETIC EFFECT OF CURRENT**	**UNICELLULAR ORGANISMS**	**REVISION**	
T E R M 2	Explain what alloys are and why they are used. Use models to explain the properties of alloys. Identify pure substances by their melting points and boiling points. Explain how to improve the quality of data collected during an investigation.	Recall the properties of matter in terms of particle model (the differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice-water transition). Measure the density of substance by different method. Know what is pressure and the effects of high and low pressure in simple situations. Realise that pressure is defined as ratio of force over area acting normal to any surface. Know that pressure in liquids increases with depth -upthrust effects, floating and sinking. Understand that atmospheric pressure decreases with increase of height as weight of air above decreases with height. Describe ways in which drag forces can be increasaed or reduced. Know the causes of drag forces and describe how drag changes with speed. **Assessment 9**			Explain the magnetic effect of a current. Describe the use electromagnets and the principle of D.C. motors. *Investigate the factors affecting the strength of electromagnets*	Know the functions of the parts of a bacterial and protoctist cells. Know how algae make their own food and explain its importance. Explain the importance of decomposers. Model the recycling of carbon in an ecosystem using carbon cycle.	**REVISION FOR FINAL EXAM**	

Year 9 BIOLOGY LONG TERM PLAN with CURRICULUM STANDARDS								
Year 9 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y9 /B1 (24)							

T E R M 1	Key Biological Concepts

TERM 1

Key Biological Concepts

Explain how the sub-cellular structures of eukaryotic and prokaryotic cells are related to their function-animal cells, plant cells & bacteria. Compare structure of animal, plant and bacteria. Draw & label drawings of a typical plant, animal & prokryote cell. Describe the adaptive features of specialised cells - Palisade cells, sperm cells, egg cell , ciliated cells and guard cells. **Assessment 1**

Understand how changes in microscope technology, including electron microscopy, have enabled us to see cell structures with more clarity and detail. Compare the use of light & electron microscope. Do calculations based on magnification & scale bar concept. Write measured length /diameter of measured objects in standard form. *CORE PRACTICAL 1: Produce labelled scientific drawings from observations of biological specimens using microscopes.* **Assessment 2**

Year 9 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

Y9/B1 (21)

Key Biological Concepts — **REVISION**

TERM 1

Explain the structure, properties and role of enzymes. Describe factors affecting enzyme activity. Plan experiments linked with factors affecting enzyme activity. Analyse & interpret graphs related to enzyme action. *CORE PRACTICAL 2: Factors affecting enzyme activity.*

Recall the parts of human digestive system, role of enzymes in digestion and how villi adapted for absotbtion. Explain various tests used to detect presence of starch, protein, fat & sugars. Understand how the energy in food can be measured using calorimetry. **Assessment 3**

Explain how substances are transported by diffusion, osmosis and active transport. Compare process of diffusion, osmosis & active transport. Enlist uses of diffusion,osmosis & active transport in living organisms. Interpret Ficks law & factors affecting diffusion. Comparison of Aerobic & anaerobic respiration, Use of fermentation Oxygen Debt & EPOC *Investigate: Diffusion in agar .*   **Assessment 4**

REVISION FOR FIRST TERM EXAM

Year 9 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

Y9/B2(24)

Cells & Control

TERM 2

Describe mitosis as part of the cell cycle including the stages interphase, prophase, metaphase, anaphase and telophase and cytokinesis.Understand the importance of mitosis in growth, repair and asexual reproduction. *CORE PRACTICAL 3: Investigate the use of chemical reagents to identify starch, reducing sugars, proteins and fats in food substances*

Describe cancer as the result of changes in cells that lead to uncontrolled cell division. Explain growth in organisms, including cell division and differentiation in animals & cell division, elongation and differentiation in plants. Demonstrate an understanding of the use of percentiles charts to monitor growth. Identify types of stem cells and its significance. **Assessment 5**

Explain the structure and function of sensory neurones, motor neurons and synapses in the transmission of electrical impulses including the axon, dendron, myelin sheath and the role of neurotransmitters. Differentiate between different types of neurones and their roles in reflex action. **Assessment 6**

Year 9 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

Y9/B2 (12) — **Y9/B3 (6)** — **NC** — **REVISION**

Cells & Control — **Genetics**

TERM 2

Describe the structures and functions of spinal cord and brain including the cerebellum, cerebral hemispheres and medulla oblongata. Understand various brain imaging techniques. Discuss some of the limitations in treating damage and diseases in the brain and other parts of the nervous system, including spinal injuries. **Assessment 7**

Explain the structure and function of the eye as a sensory receptor. Describe defects of the eye. Explain how cataracts, long-sightedness and short-sightedness can be corrected. *CORE PRACTICAL 4: Osmosis in potatoes.*

Discuss advantages and disadvantages of asexual reproduction and sexual reproduction. Explain the role of meiotic cell division in the formation of genetically different haploid gametes. **Assessment 8**

Components & interactions within Ecosystem. Photosynthesis- process chemical & word equation & use of products of photosynthesis Role of useful, harmful bacteria. Classification of organisms.

REVISION FOR FINAL EXAM

Year 9 CHEMISTRY LONG TERM PLAN with CURRICULUM STANDARDS

Year 9 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y9/ CHE 1 (9)			Y9/ CHE 2 (12)				**Analysis of risks and hazards in experiments**
	States of Matter (SC 1a-2a)			**Methods of Separating and Purifying Substances (SC 2a-d)**				
	Recall the arrangement, movement and the relative energy of particles in each of the three states of matter: solid, liquid and gas. Name the interconversions between the three states of matter. Explain the changes and conditions in arrangement, movement and energy of particles during these interconversions.State the meaning of the terms 'sublimation'and 'deposition'. Analyse the heating and the cooling curves. Identify melting point/boiling point from the graphs. **Assessment 1**			Identify the differences between a pure substance and a mixture. *Discuss and demonstrate the experimental techniques for separation of mixtures by simple distillation, fractional distillation, filtration, crystallisation, paper chromatography.* Draw a neat labelled diagram for simple distillation and fractional distillation. Describe an appropriate experimental technique to separate a mixture knowing the properties of the components of the mixture. Describe paper chromatography, interpret a paper chromatogram to distinguish between pure and impure substances, identify substances by comparison with known substances and identify substances by calculation and use of Rf values. *CORE PRACTICAL 1 : Investigate composition of inks using simple distillation and paper chromatography.* **Assessment 2**				Suggest general safety measures needed while working in laboratory. Recall the experiments such as filtration, distillation,crystallizatio n , chromatography and identify the hazards in each. List out the safety measure which has to adopted based on the hazards in an experiment. Identify the hazard symbols.

Year 9 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y9/ CHE 3 (9)			Y9/ CHE 4 (6)		Y9/ CHE 5 (6)		
	Atomic Structure (SC 3a-c)			**The Periodic Table (SC 4a-c)**		**Ionic bonds (Sc 5a)**		**REVISION**
	Describe the Dalton's model of atom, structure of atom in terms of protons, electrons, neutrons and nucleus. Predict the mass and the charge for the sub-atomic particles. Calculate the number of protons, electrons, neutrons in an atom of an elements and ions. Draw shell diagram for the structure of atom and ions. Define electronic configuration. Compare the relative mass and charge for proton, electron, neutron. Define isotopes as atoms of the same element with different number of neutrons and same number of protons. Calculate the RAM of elements based on their percentage abundance and relative masses. **Assessment 3**			Explain how Mendeleev arranged the elements in a periodic table by using properties of these elements and their compounds. Compare the similarities and the diferences between Mendeleev's and modern periodic tables.Spot out the pair reversals from the periodic table.Use the Periodic Table to obtain the names, symbols, relative atomic masses and proton numbers of elements. Predict the electronic configurations of the first 20 elements in the periodic table as diagrams and in the form 2.8.1. Explain how the electronic configuration of an element is related to its position in the periodic table. Identify the group and the period of an element using electronic configuration. **Assessment 4**		Define ions. Calculate the numbers of subatomic particles in an ion. Differentiate between cation and anion. Explain ionic bond. Write the formulae of ionic compounds. Use dot and cross diagrams to explain the formation of ionic compound **Assessment 5**		**REVISION FOR FIRST TERM EXAM**

Year 9 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y9/ CHE 5 (12)				Y9/ CHE 6 (12)			
	Ionic lattices (Sc5b – c)				**Covalent Bonding (SC 6a)**			
	Define ionic lattice. Write the formulae of different ionic compounds. Explain the use of the endings –ide and –ate in the names of compounds. Discuss which particles and forces are present in ionic lattices. Predict why ionic compounds have high melting points and boiling points. Predict the shapes of crystals are determined by the structure of the lattice. Identifying the compounds that have ionic bonding and explain your reasoning. Giving reasons why the other compounds do not have ionic bonding. **Assessment 6**				Explain how a covalent bond is formed when a pair of electrons is shared between two atoms.Write the names of some covalent molecules. Draw the dot cross diagrams for molecules.Use of dot and cross diagrams to explain the formation of covalent molecules.Discuss the bonding in a molecule of water,ammonia,methane,fluorine,carbon dioxide,oxygen,nitrogen, and carbon tetrachloride.Discuss the properties of covalent compounds like low boiling points and melting points, poor conductor of electricity. **Assessment 7**			

Year 9 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y9/ CHE 7 (15)							

	Types of substances and balancing equations (SC7a-d)		Reactivity series	REVISION
T E R M 2	Define polymers and explain how properties if propene molecules are added together to form a chain.Differentiate between simple molecular structures and giant covalent structures.Discuss the structure and properties of different allotropes of carbon-diamond,graphite,fullerenes and graphene. List the typical physical properties of metals and non metals.Discuss the arrangement of particles in a metal.Explain the bonding in metals and their properties.Explain most metals as shiny solids which have high melting points, high density and are good conductors of electricity whereas most nonmetals have low boiling points and are poor conductors. Predict the different types of structure and bonding models used to describe substances.Demonstrate the use of models like dot and cross,3D space filling,ball and stick to explain the properties of substances.List the limitations of bonding models to show structure and bonding. Write word and balanced chemical equations for the different types of neutralisation reactions. **Assessment 8-9**		Identify the similarities and differences in the way different metals react with water, acid and salt solutions. State order of reactivity of metals from exptal data. Suggest how the method of extraction of a metal is related to its position in reactivity series. Use reactivity series to predict whether a reaction will take place or not.	**REVISION FOR FINAL EXAM**

YEAR 9 PHYSICS LONG TERM PLAN with CURRICULUM STANDARDS							

YEAR 9 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y9/P1 (3)	**Y9/P2 (12)**				**Y9/P3 (9)**		
	Key concepts of Physics	**Motion (SP 1a-d)**				**Forces and motion (SP 2a-e)**		
T E R M 1	Use of the SI unit for physical quantities. Use multiples and sub-multiples of units and conversions. Use of significant figures and standard form where appropriate. Use of excel sheets for drawing graphs.	Explain the difference between vector and scalar quantities Define displacement, speed, velocity and acceleration of an object. Draw and interpret d - t and Analyse distance/time graphs including determination of speed from gradient. Describe a range of laboratory methods for determining the speeds of objects such as the use of light gates. Use the equations $a = (v - u)/t$ and $v^2 - u^2 = 2 \times a \times x$ to determine acceleration. Analyse velocity/time graphs to compare acceleration from gradients qualitatively and to calculate acceleration and to determine the distance travelled. Recall some typical speeds encountered in everyday experience. **Assessment 1**				State and explain Newton's three laws of motion. Draw and interpret free body diagram and find resultant force. Explain that inertial mass is a measure of how difficult it is to change the velocity of an object. Use the equations $F = m \times a$ and $W = m \times g$. Introduce the term 'action-reaction' pairs. Explain how for motion in a circle there must be a resultant force known as a centripetal force that acts towards the centre of the circle. Explain that an object moving in a circular orbit at constant speed has a changing velocity (qualitative only)		

YEAR 9 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y9/P3(12)				**Y9/P4(6)**			
	Forces and motion (SP 2f-i)				**Waves (SP4 a-b)**		**REVISION**	
T E R M 1	Define momentum and use the equation $p = m \times v$. State and explain the conservation of linear momentum. Apply Newton's third law to collision interactions and relate it to the conservation of momentum in collisions. Define Newton's second law as rate of change of momentum. Use the concept of momentum to explain the role of crumple zone and other safety features of the car. Identify factors affecting stopping distance of a vehicle. Estimate how the distance required for a road vehicle to stoping an emergency varies over a range of typical speeds. Carry out calculations on work done to show the dependence of braking distance for a vehicle on initial velocity squared(qualitative). **Assessment 2** *CORE PRACTICAL 1: Investigate the relationship between force, mass and acceleration*				Explain that waves transfer energy and information without transferring matter. Use the terms frequency, wavelength, amplitude, period, wave velocity and wavefront as applied to waves. Explain the difference between longitudinal and transverse waves. Use the equations: wave velocity $v = f\lambda$ and $v = x/t$		**REVISION FOR FIRST TERM EXAM**	

YEAR 9 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y9/P4 (12)						**NC**	
	Sound waves (SP 4c-g)			Working Scientifically			Earth Science	

	Sound waves (SP 4c-g)			Working Scientifically		Earth science	

T E R M 2	Describe how to measure the velocity of sound in air and ripples on water surfaces. Calculate depth or distance from time and wave velocity. Describe the propagation of sound waves in different medium in terms of changes in velocity, frequency and wavelength. Explain the way the human ear works. Describe the features and uses of infra sound and ultra sound waves including sonar, fetal scanning and study of Earth's structure. **Assessment 3**		Analyse velocity/time graphs to compare acceleration from gradients qualitatively and to calculate acceleration and to determine the distance travelled. Recall some typical speeds encountered in everyday experience.	Identify control, independent and dependant variables in an experiment. Differentiate hypothesis and theory. Analyse and draw conclusions from graph. Identify the link between the variables in a graph. Explain accuracy and precsion in the measurements. *CORE PRACTICAL 2: Investigate the suitability of equipment to measure the speed, frequency and wavelength of a wave in a solid and a fluid*		Explain plate tectonics and consequences of different types of plate movements near the boundaries. Differentiate between types of seismic waves. Identify different layers of atmosphere.	

YEAR 9 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y9/P5 (12)				NC			
	Conservation of energy (SP3 a-f)				Motor effect	Working scientifically	REVISION	
T E R M 2	Use diagrams to represent energy transfers. Explain that there are energy transfers in a system and describe the concept of conservation of energy for different situations. Identify how energy become wasteful when there is rise in temperature leading to dissipating energy to the surroundings. Explain ways of reducing unwanted energy transfer. Calculate efficiency and explain how efficiency can be increased. Use the equation $\Delta GPE = m \times g \times \Delta h$ and $KE = 1/2 mv2$. **Recall weight = mass x gravitational field strength and also realise that the value of g is not same everywhere (NC)** Describe the main energy sources available for use on Earth (including fossil fuels, nuclear fuel, bio-fuel, wind, hydroelectricity, waves, tides and Sun) and compare the ways in which both renewable and non-renewable sources are used. **Assessment 4**				Recall electromagnetsim and state the functions of each part of an electric motor. Describe how an electric motor converts electric energy to kinetic energy .	*CORE PRACTICAL 4 - Investigate how the nature of a surface affects the amount of thermal energy radiated or absorbed.*	**REVISION FOR FINAL EXAM**	

YEAR 10 BIOLOGY LONG TERM PLAN with CURRICULUM STANDARDS

YEAR 10 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y10 /B3 (16)				Y10 /B3 (16)			
	DNA & Protein Synthesis				Genetics			
T E R M 1	Describe DNA as a polymer made up of two polynucleotide chains in the form of a double helix Differentiate gene & genome.Explain how the order of bases in a section of DNA decides the order of amino acids in the protein. Understand the stages of protein synthesis, including transcription and translation.Describe how genetic variants in the coding & non coding DNA of a gene can affect phenotype by influencing the binding of RNA polymerase , altering the quantity & activity of protein produced. Understand the significance of HGP & cause of gene mutation with specific examples. **Assessment 1** *CORE PRACTICAL 2: Factors affecting enzyme activity.*				Describe the work of Mendel in discovering the basis of genetics and recognize the difficulties of understanding inheritance before the mechanism was discovered.Understand that characteristic features are controlled by genes- dominant/recessive and homozygous/heterozygous. Analyse and interpret patterns of monohybrid inheritance using a genetic diagram, Punnet square and family pedigree. Describe the inheritance of the ABO blood groups with reference to codominance and multiple alleles.Understand the cause, symptoms and cure for sex linked diseases .Identify types and cause of variation in organisms. **Assessment 2** *Investigation : Variation in plants*			

YEAR 10 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y10 /B4 (24)							
T E R M 1	Natural Selection & Selective Breeding						REVISION	
	Explain work of Wallace& Darwin to explain theory of evolution by natural selection.Understand emergence of resistant organisms to support Darwin's theory. Describe the evidence of human evolution based on fossil records & stone tools.Interpret how pentadactyl limb provides evidence for evolution.Understand how genetic analysis had led to the suggestion of three domain rather than five kingdom method .Understand selective breeding & its impact on food plantsand domesticated animals. **Assessment 3** *Classifying organism into their respective groups and writing their heirarchy.*					*Investigation:*	**REVISION FOR FIRST TERM EXAM**	

YEAR 10 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y10/B4 (12)			Y10/ B5(20)				
	Cloning & Genetic modification			Health & Disease				
	Describe the process of tissue culture& genetic engineering and its advantages & disadvantages in medical research & plant breeding programmes.Evaluate the benefits & risks of selective breeding,tissue culture & genetic engineering in modern agriculture & medicine. **Assessment 4**			Differentiate infectious & non infectious disease in humans.Describe the cause, spread and control of infectious diseases in humans. Explain the lifecycle of a virus and spread & control of sexually transmitted viral infections.		Describe the link of non infectious disease with CVD,cancer,lung& liver disease and malnutrition.Explain the effect of lifestyle factors of non communicable diseases.Evaluate treatments for CVD. **Assessment 5** *CORE PRACTICAL 4 : Osmosis in potatoes.*		

YEAR 10 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y10/B5 (24)						NC	REVISION
	Health, Disease and the development of medicines							
	Describe the physical barriers & chemical defences of the human body. Explain the specific immune responses in the human body. Understand immunisation & evaluate the various immunisation techniques.		Understand the bacetricidal & bacteriostatic action of antibiotics.Explain the aseptic techniques used in culturing microorganisms .Identify and explain the various phases in drug trialling done in human. Evaluate each phase of drug trialling. Describe the production and uses of monoclonal anti bodies in medicine and scientific research. **Assessment 6**			Describe plant defence mechanisms.Evaluate the use of plant chemicals, antibiotics and antiseptics to favour cure and avoid spread of diseases. *CORE PRACTICAL 5 : Effect of antibiotics*	Prey predator cycle, Trophic level, Energy flow and ecological pyramid. Investigation skills –Describe and drawing conclusions of experiment data given.	**REVISION FOR FINAL EXAMINATION**

Year 10 CHEMISTRY LONG TERM PLAN with CURRICULUM STANDARDS

Year 10 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y10 /CHE 1 (16)				Y10 /CHE 2 (16)			
	Acids and Alkalies (SC 8a-g)				Calculations involving masses (SC 9a-c)			
	Differentiate acids as a source of H+ and alkalis as a source of OH-, strong and weak, concentrated and dilute acids. Explain how the changes in the H+ affects the pH of a solution. Explain the reactions of acids with metals, metal oxides, carbonates, hydroxides, tests for gases, salt preparation and solubility rules. Write the word and balanced chemical equations for the reactions of acids with metals, alkalis, metal carbonates and hydrogen carbonates. Identify the colour changes for the different acid base indicators.Carry out experiments for the titration and know how to use a pipette,burette and indicator solution while doing titration. Use the solubility rules to prepare insoluble salts.Write a word and a balanced chemical equation for the precipitation reactions including state symbols. *CORE PRACTICAL 2 : Investigate the change in pH on adding powdered calcium hydroxide or calcium oxide to a fixed volume of hydrochloric acid.* *CORE PRACTICAL 3 : Investigate the preparation of pure, dry hydrated copper sulfate crystals starting from copper oxide including the use of a water bath.* *CORE PRACTICAL 5: To fine the volume of hydrochloric acid needed to neutralise sodium hydroxide solution.* **Assessment 1**				Calculate relative formula mass given relative atomic masses.Define empirical formula and molecular formula of a compound. Deduce the empirical formula when percentage mass of each element is given and deduce molecular formula of a compound from emprical formula and the molecular mass. Calculate the concentration of solutions in gram per decimeter cube. Define limiting reactant. Deduce a balanced chemical equations from the masses of reactants and products. Define Avogadro's constant. Apply the law of conservation of mass to calculate the mass of reactants or products in a chemical reaction. Calculate loss in mass from the given data. Calculate moles from the mass of a substance and vice versa. **Assessment 2**			

Year 10 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y10 /CHE 3 (16)				Y10 / CHE 4 (12)			

T E R M 1	**Y10 / CHE 3 (16)**				**Y10 / CHE 4 (12)**		
	Electrolytic Processes (SC 10a-c)				**Obtaining and using metals (SC 11a- d)**		**REVISION**
	Explain the movement of the ions and predict the products formed during electrolysis of molten compounds like sodium chloride,potassium bromide,calcium oxide and aqueous solutions of copper(II) chloride,sodium chloride,sodium sulfate, acidified water, molten lead (II) bromide using inert electrodes.Define the terms oxidation and reduction in terms of electrons.Compare the electrolysis of aqueous copper (II) sulfate using inert and copper electrodes.Explain how copper can be purified using electrolysis using a neat labelled diagram. Predict how anode sludge is formed during the purification of copper.Write ionic half equations at cathode and anode. *CORE PRACTICAL 4: Investigate the electrolysis of copper (II) sulfate solution with inert electrodes and copper electrodes.* Assessment 3				Discuss the similarities and differences in the way different metals react with water, acids and salt solutions. *Explain and demonstrate displacement reactions as redox reactions.* Predict word and balanced chemical equations of displacement reactions.Write ionic equations with state symbols for displacement reactions. Suggest how the method of extraction of a metal is related to its position in the reactivity series. Summarize extraction of metals as reduction of ores by heating with carbon,biological methods like bacterial and phytoextraction, recycling of metals.List the factors to consider in a life cycle assessment of a product. Assessment 4		**REVISION FOR FIRST TERM EXAMINATION**

Year 10 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	**Y10 /CHE 5 (12)**			**Y10/ CHE 6 (12)**			**Y10/ CHE 7 (8)**	
	Transition Metals, Corrosion (SC 13a-b)			**Electroplating & Alloying (SC 13c-d)**			**Qualitative Analysis, Nanoparticles (SC 25a-26c)**	
	Understand that most metals are transition metals, recall their typical physical and chemical properties. Cite some examples of transition metals from the periodic table. Discuss their position in the periodic table and what properties of iron make it a typical transition metal. Give the tests, observations for iron (II), iron(III) and write their chemical equations. Reason out why metals corrode. Explain rusting of iron and methods of preventing it by exclusion of oxygen and sacrificial protection. *Investigate the effect of the dissolved salt on the rate of rusting.* Evaluate the suitability of sodium for the sacrificial protection of an offshore oil rig. Assessment 5			Explain how electroplating can be used to improve the appearance and resistance to corrosion of metal objects.Define alloy.Reason out why iron is alloyed with other metals to produce alloy steels, relate uses of metals to their properties including aluminium, copper and gold and their alloys including magnalium and brass. Evaluate the use of electroplating for jewellery and for metal bathroom fittings. Suggest a reason that explains why a surgical instruments.Explain why wrought iron is an alloy. Evaluate the statement 'alloys are stronger than the individual metals they contain'. Reason out why car parts are made from alloy steels. *Investigate how electroplating can be done to improve the appearance of a coin.* Assessment 6			Discuss the tests and reactions to identify cations and anions. Explain what are nanoparticles, how they are different from bulk materials, their uses and the risks associated with these nanoparticles. *CORE PRACTICAL 7:Identify the ions in some unknown salts, using the tests for the specified cations and anions.* Assessment 7	

Year 10 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	**Y10 /CHE 8 (12)**			**Y10/ CHE 9 (12)/NC**				
	Fuels, Earth and Atmospheric Science (SC 20a - 21d)			**Heat energy changes in Chemical reactions(Sc19a -b)**			**REVISION**	
	Identify crude oil as a non renewable finite resource, names and uses of the main fractions of crude oil. Discuss the features of a homologous series and predict the products of complete & incomplete combustion of hydrocarbons. Predict the harmful effects of carbon monooxide and soot produced. Explain the advantages and disadvantages of hydogen and petrol as fuels. Compare early atmosphere and atmosphere today and explain how human activities influence the climate. Describe how scientist would collect evidence to support a casual link between carbon dioxide levels and global temperatures. Assessment 8			Define exothermic and endothermic reactions. Cite examples of exothermic and endothermic reactions. Investigate whether a reaction is exothermic or endothermic in nature. Draw reaction profile for exothermic and endothermic reaction. Calculate the energy changes in reactions from bond energy data.			**REVISION FOR FINAL EXAMINATION**	

YEAR 10 PHYSICS LONG TERM PLAN with CURRICULUM STANDARDS

YEAR 10 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E	**Y10/P1 (4)**	**Y10/P1 (8)**		**Y10/P2 (8)**		**Y10/P2 (12)**		
	Electromagnetic spectrum (SP5d,e,g)	Electromagnetic spectrum Uses and dangers (SP 5f, h, i)		Light (SP5 a)		Light (SP5 b-c)		
	Describe EM spectrum	Identify the harmful effects, to life, of excessive		Recall reflection and laws of reflection. Explain		Explain, with the aid of ray diagrams, reflection, refraction and total internal		

T E R M 1	in order of decreasing wavelength and increasing frequency. Identify common properties of electromagnetic waves. Describe the absorption and emission of thermal radiation.	exposure to the electromagnetic radiations. Describe characteristic properties and uses of each electromagnetic radiation. Identify the characteristic property of the radiation involved in each application or danger. Describe the effects of radiations on atoms. **Assessment 1**	how waves will be refracted at a boundary in terms of the change of speed and direction. Describe that different substances may absorb, transmit, refract or reflect waves in ways that vary with wavelength. *CORE PRACTICAL 3 - Investigate refraction in rectangular glass blocks in terms of the interaction of electromagnetic waves with matter*	reflection (TIR) of light, including the law of reflection and critical angle. Describe and explain differential absorption of light by different materials. Describe the transmission of light through filters.Describe the refraction of light by converging and diverging lenses. Explain the effects of different types of lens in producing real and virtual images. Relate the power of a lens to its shape. **Assessment 2**

YEAR 10 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y10/P3 (12)			Y10/P3 (12)				
	Radioactivity (SP 6 a-g)			Radioactivity(SP 6h-m)			REVISION	
T E R M 1	Describe an atom and nuclei of isotopes. Explain how ions are formed. Identify different types of ionising radiations and state their properties. Explain what is meant by background radiation. Describe methods for measuring and detecting radioactivity.	Describe the plum pudding model and Rutherford alpha particle scattering leading to the Bohr model. Describe the process of radioactive decays. Write balance nuclear equations for each decay. Describe the random and exponential decay of radioactive nuclei and define half life. Draw decay graphs and determine half life. Identify the suitability of different radioactive sources depending on half life and the type of emission.		Describe the uses and dangers of radioactivity. Describe the differences between contamination and irradiation effects. Explain some of the medical uses (PET and tracers). Describe nuclear fission and working of nuclear power stations. Discuss environmental and social impact of nuclear power stations. Describe nuclear fusion and discuss the difficulty in attaining the conditions for fusion. **Assessment 3**			REVISION FOR FIRST TERM EXAM	

YEAR 10 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y10/P3 (8)		Y10/P4 (12)			Y10/P5 (12)		
	Working Scientifically		Forces and their Effects (SP9 a-c)			Astronomy (SP7 a-c)		
T E R M 2	*Investigate the effects of different types of lens in producing real and virtual images.* Relate the power of a lens to its shape. Identify control, independent and dependant variables in an experiment. Differentiate hypothesis and theory. Analyse and draw conclusions from graph. Identify the link between the variables in a graph. Explain what is meant by accuracy and precsion. Analyse scientific ideas and observations in a given situation.		Describe, with examples, how objects can interact. Draw and use free body force diagrams and calculate resultant forces. Identify situations where forces can cause rotation. Recall and use the equation: moment of a force = force × distance normal to the direction of the force. Recall and use the principle of moments. Explain how levers and gears transmit the rotational effects of forces. **Assessment 4**			Explain how and why the value of g differs in different bodies in space. Recall our Solar System and describe the orbits of moons, planets, comets and artificial satellites. Explain centripetal force in circular orbits. Relate the radius and orbital speed. Describe the evolution of stars including star similar to Sun and massive stars.		

YEAR 10 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y10/P6 (8)		Y10/P7(12)					
	Energy- Forces doing work (SP8a)		Particle model (SP14 a-c)			REVISION		
T E R M 2	Define work as energy transferred. Define and calculate kinetic and potential energy of a body. Express power as the rate of doing work and identify the factors affecting power. Recall that one watt is equal to one joule per second, J/s .		Use a simple kinetic theory model to explain the different states of matter. Define density of a material. Explain how heating a system will change the energy stored within the system and raise its temperature or produce changes of state. Explain how heating a system will change the energy stored within the system and raise its temperature or produce changes of state. Define specific heat capacity and describe how to determine the specific heat capacity of materials including water and some solids. Use the equation $\Delta Q= m \times c \times \Delta \theta$. Define specific latent heat and use the equation Q			REVISION FOR FINAL EXAM		

= m × L.   **Assessment 6**
CORE PRACTICAL 6: Investigate the densities of solid and liquids
CORE PRACTICAL 7 :Investigate the properties of water by determining the specific heat capacity of water and obtaining a temperature-time graph for melting ice.

Year 11 BIOLOGY LONG TERM PLAN with CURRICULUM STANDARDS

Year 11 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y11/B6 (25)					Y11/B7 (15)		
	Plant structures and their functions					**Animal Coordination & Control**		
	Recall plant defence mechanisms,their role in curing diseases & methods to investigate plant diseases. Identify and describe how the various parts of the leaf adapted for photosynthesis. Explain the role of photosynthesis in plants, factors affecting photosynthesis and analyzing the limiting factors. Understand mechanisms of transport of nutrients in plants & factors affecting transpiration linked with transport. Know how plants are adapted to survive in extreme environments. Explain how plant hormones control & coordinate plant growth. Understand tropic responses involved in plant growth. Describe the commercial uses of auxins, gibberelins & ethene in plants.Explain how structure of root hair cell, xylem & phloem are adapted for transport in plants. **Assessment 1** *CORE PRACTICAL 6: Factors affecting photosynthesis.*					Identify various endocrine organs in human beings and explain their roles. Differentiate between type 1 and type 2 diabetes. Identify the cause and cure of diabetes. Recall and describe the stages of menstrual cycle. Interpret the role of hormones and negative feedback mechanism involved in menstrual cycle. Evaluate the advantages disadvantages of infertility treatment. **Assessment 2** *CORE PRACTICAL 4: Osmosis in potatoes*		

Year 11 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y11/B7 (18)				Y11/B8 (17)			**REVISION**
	Animal Coordination & Control				**Exchange & transport in organisms**			
	Describe the role of skin and negative feedback mechanism in thermoregulation. Understand the general structure and functions of urinary system. Describe the possible treatments for kidney failure. Role of nephron in urine formation. Demonstrate an understanding of the role of ADH and negative feedback mechanism. **Assessment 3**				Recall factors affecting diffusion .Interpret Ficks law.Identify and explain the structure and functions of blood, heart, blood vessels and describe its role in transport of nutrients and wastes in the human body.Explain Physical & chemical barriers in human.Describe the role of white blood cells in body defence .Evaluate the uses & production of monoclonal antibodies. Understand and differentiate aerobic and anaerobic respiration and its significance during exercise. Investigate changes taking place during exercise. Calculate breathing rate, pulse rate, cardiac output and stroke volume. **Assessment 4** *CORE PRACTICAL 7: Factors affecting the rate of respiration in living organisms. Investigation: Measuring pulse rate and BP using BP monitor and oxygen content in the blood using pulse oximeter*			**REVISION FOR FIRST TERM EXAM**

Year 11 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y11/B9 (15)			Y11/B9 (15)				
	Ecosystem & material cycles			**Ecosystem & material cycles**			**REVISION**	
	Demonstrate an understanding of how energy is transferred along a food chain and use of ecological pyramids. Explain biotic relationships of organisms in an ecosystem. Analyze, interpret and evaluate data related to air pollution and water pollution. Investigate effects of pollutants on germination and plant growth and describe remedial measures for air and water pollution. **Assessment 5** *CORE PRACTICAL 8: Investigate the relationship between organisms and their environment using field-work techniques, including quadrats and belt transects.*			Understand the various processes involved in cycling of water,carbon and nitrogen within an ecosystem and know the significance of carbon and nitrogen in living organisms. Identify &explain the various stages involved in water treatment. Discuss concepts of fish farming. Describe various food processing techniques. Evaluate ways of controlling biodiversity & maintaining sustainability. **Assessment 6**			**REVISION FOR MOCK EXAMINATION**	

Year 11 CHEMISTRY LONG TERM PLAN with CURRICULUM STANDARDS

Year 11 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y11/ CHE 1 (20)				Y11/ CHE 2 (20)			
	Rates of reaction (Sc 18a – 18c)				**Quantitative Analysis (SC 14 a-e)**			
	Suggest the conditions for a reaction to happen. Define catalyst. Explain methods to investigate rate of reactions and factors affecting the rates of reactions. Draw graphs to determine the rate of a reaction. Discuss how catalysts work to speed up reactions. List all the safety precautions adopted to carry out the investigation. Sketch graph to show how the factors affect rate of a reaction. Compare and contrast biological catalysts. *CORE PRACTICAL 6: Investigating the effects of changing the conditions of a reaction on the rates of chemical reactions.* **Assessment 1**				Calculate the concentration of solutions in mol dm^{-3} and convert concentration in g dm^{-3} into mol dm^{-3}. Calculations to find the concentration of an acid/ alkali solution titration, percentage yield, atom economy, molar volume of gases in a reaction, given the relevant equation. Give a reason that explains why it is desirable to have a high percentage yield in a reaction.Reason out why the actual yield is less than the theoretical yield in some cases. Explain how the data is used to decide on the best way to manufacture a product. Compare the two methods of making ethanol in terms of raw materials,atom economy and energy consumption. **Assessment 2**			

Year 11 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y11 /CHE 3 (15)			Y11 /CHE 4 (20)				
	Hydrocarbons and alcohols (Sc 22a – Sc23b)			**Carboxylic Acids and Polymers (Sc 23c- Sc 24d)**				**REVISION**
	Define and understand Homologous series. Represent saturated and unsaturated hydrocarbons using their molecular and structural formula together with their names. Define isomers. Write the isomers of a given organic compound. Identify functional groups present in alkanes, alkenes, alcohols and carboxylic acids. Describe the production of ethanol with glucose as well as ethane. Explain the chemical properties of alcohols. Write equations for the chemical reactions of alkanes, alkenes, alcohols **Assessment 3**			Explain the production of carboxylic acids from alcohols. Give the tests, observations and reactions to identify carboxylic acids. Predict reactions of carboxylic acids. Define monomers and polymers. Discuss the different types of polymers. Differentiate between addition and condensation polymerization. Draw the structure of polymers. Deduce the structure of monomer from a polymer. Define addition and condensation polymerisation with examples, problems with disposal of polymers. *CORE PRACTICAL 8: Investigate temperature rise in water by combustion of alcohols.* **Assessment 4**				**REVISION FOR FIRST TERM EXAM**

Year 11 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y11 /CHE 5 (15)			Y11 /CHE 6 (15)				
	Dynamic equilibrium and Cells(SC 15,16)			**Groups in the Periodic Table (SC 17a- d)**				**REVISION**
	Define dynamic equilibrium, describe the formation of ammonia as a reversible reaction between nitrogen and hydrogen for Haber process, predict how the position of a dynamic equilibrium is affected by changes in temperature, pressure, concentration. Compare the similarities and differences of making fertiliser in laboratory and factory. Describe how ammonium nitrate is manufactured using Haber process. **Assessment 5**			Write the observations and equations for the reactions of group 1 metals with water. Explain the displacement reactions as redox reactions. Relate uses of noble gases with their properties like inertness and low density. **Assessment 6**				**REVISION FOR MOCK EXAMINATION**

YEAR 11 PHYSICS LONG TERM PLAN with CURRICULUM STANDARDS

YEAR 11 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R	Y11/P1 (13)			Y11/P2 (15)			Y11/P3 (12)	
	Static Electricity (SP 11a-c)			**Electricity and Circuits (SP 10a-i)**			**Magnetism and motor effect (SP12a-c)**	
	Charges and Static electricity: Type of charges on the particles, different methods of charging an insulator, Dangers and uses of static electricity. Describe the shape and direction of the electric field around a point charge and between parallel plates and relate the strength of the field to the concentration of lines.			State explain Ohm's law and define resistance. Analyse series and parallel circuits. Develop an understanding of components with changing resistances. Investigate IV graphs of different ohmic and non-ohmic conductors. Explain the heating effect of an electric current and calculate electrical power. Describe the advantages and disadvantages of the heating			Differentiate between permanent and induced magnets. Describe the shape and direction of the magnetic field around bar magnets and for a uniform field. Relate field strength to the concentration of lines. Describe how a current can create a magnetic effect around a long straight conductor and relate the	

M	Explain how the concept of an electric field helps to explain the	effect of an electric current.	field strength to the current and distance from the conductor.
1	phenomena of static electricity Assessment 1	Electrical Safety : Explain the difference between ac and dc. Recall the p.d between the live, neutral and earth mains wires. Explain the function of an earth wire and of fuses or circuit breakers for safety. **Assessment 2** *CORE PRACTICAL 5a,b - Construct electrical circuits to investigate IV graphs and test series and parallel circuits using resistors and filament lamps*	Explain that magnetic forces are due to interactions between magnetic fields. Use Fleming's left-hand rule to show directions of the force, current and magnetic field. Use the equation F = BIl. Explain how the force on a conductor in a magnetic field is used to cause rotation in electric motors. **Assessment 3**

YEAR 11 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	Y11/P4 (15)			Y11/P5 (5)	Y11/P5 (10)		REVISION	
	Electromagnetic induction (SP13a-c)			Gas Laws(SP 14d,e)	Forces and Matter (SP 15a-b)		REVISION	
	Describe the production of electric current by the relative movement of a magnet and a conductor. Explain how electromagnetic induction is used in alternators (a.c.) and in dynamos (d.c.) Explain the action of the microphone in converting the pressure variations in sound waves into variations in current in electrical circuits, and the reverse effect as used in loudspeakers and headphones. Explain how a transformer can change the size of an alternating voltage. Use the turns ratio equation for transformers to calculate voltage. Explain where and why step-up and step-down transformers are used in the transmission of electricity in the national grid. **Assessment 4**			Explain what causes the pressure of a gas. Describe the effect of changing the temperature of a gas on the speed of its particles and pressure. Use eqn P1 ×V1 = P2 ×V2 to calculate pressure or volume for gases of fixed mass at constant temperature.	Describe the difference between elastic and inelastic distortion. Use the equation to calculate the spring constant: F = kx. Use the equation E = 1/2 kx2 to calculate the work done in stretching a spring. Describe the pressure in a fluid as being due to the fluid and atmospheric pressure. Explain how pressure is related to force and area, P = F/A **Assessment 5** *CORE PRACTICAL 8: Investigate the extension and work done when applying forces to a spring*		REVISION FOR FIRST TERM EXAM	

YEAR 11 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	Y11/P6 (10)		Working Scientifically	Y11/P7 (8)		REVISION		
	Forces and Matter (SP 15c-d)		Working Scientifically	Astronomy (SP7 d,e)		REVISION		
	Describe and explain how pressure in fluids increases with depth and density. Use the equation P = h× ϱ × g. Recognise that upthrust is equal to the weight of fluid displaced. Explain how the factors upthrust and weight determine whether an object will float or sink. **Assessment 6**		Identify control, independent and dependant variables in an experiment. Analyse and draw conclusions from graph. Identify the link between the variables in a graph. Explain what is meant by accuracy and precsion. Analyse scientific ideas and observations in a given situation.	Compare the Steady State and Big Bang theories. Describe evidence supporting the Big Bang theory-red shift and CMBR. Explain why the red-shift of galaxies provides evidence for the Universe expanding. Describe how methods of observing the Universe have changed over time. **Assessment 7**	REVISION FOR MOCK EXAMINATION			

Year 12 BIOLOGY LONG TERM PLAN with CURRICULUM STANDARDS								

Year 12 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R	Y12/B1 (18)			Y12/B2 (6)	Y12/B2 (24)			
	Biological Molecules			Mathematical skills	Cells, Viruses and Reproduction of Living Things			
	Identify, describe and explain the structure, properties, formation and role of carbohydrates, fats and proteins. Distinguish monosaccharide, disaccharide & polysaccharide. Distinguish between the primary, secondary, tertiary &			Magnification – use of scale bar. Drawing of appropriate graphs and	Identify and understand the ultra structure of organelles in prokaryotes and eukaryotes. Evaluate various techniques used in cell study . Describe structure, life cycle & harmfulness of virus particles. Identify various levels of organization in organisms - cells, tissues, organs& organ system with			

R M 1	quartenary structure. Discuss the physical & chemical properties of water. **Assessment 1** *Investigation : Detection of carbohydrates, fats & proteins using Iodine test, Benedict test, Biuret test & Emulsion test.*			table organization for results obtained. Calculation of Standard Deviation & drawing Error bar to represent variability in data . Differentiate Reliability and variability in data.	examples. **Assessment 2**			

Year 12 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	**Y12/B1 (24)**				**Y12/B2 (18)**			**REVISION**
	Biological Molecules				**Cells, Viruses and Reproduction of Living Things**			**REVISION FOR FIRST TERM EXAM**
	Describe properties of enzymes & explain factors affecting enzyme action. Interpret and explain the structure and roles of nucleic acids in a cell and DNA replication. Understand and describe the process of protein synthesis and significance of genetic code. Understand the role of inorganic ions in plants. **Assessment 3** *CORE PRACTICAL 1: Investigate a factor affecting the initial rate of an enzyme– controlled reaction.*				Explore stages of cell cycle, mitosis and meiosis and its role in sexual and asexual reproduction in animals and plants. Compare asexual reproduction to sexual reproduction **Assessment 4** *CORE PRACTICAL 3: Make a temporary squash preparation of a root tip to show stages of mitosis in the meristem under the light microscope*			

Year 12 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	**Y12/B4 (24)**				**Y12/B3 (24)**			
	Exchange and Transport				**Classification and Biodiversity**			
	Explain the structure of cell membrane, gas exchange surfaces and exchange of substances. Differentiate diffusion, active transport,osmosis & bulk transport of substances. Compare gas exchange in insects, fish ,plant & humans. **Assessment 5** *CORE PRACTICAL 2: Use of the light microscope, including simple stage and eyepiecemicrometers and drawing small numbers of cells from a specialised tissue. CORE PRACTICAL 5: Investigate the effect of temperature on beetroot membrane.*				Explain the hierarchy of classification & three domain concept. Describe how gel electrophoresis can be used to separate DNA fragments of different length. Recall evolution by natural selection and understand the types of natural selection, speciation and isolation mechanisms with examples. Explain old and new evidences of evolution. Evaluate ways of validating evidence collected by scientist and reseachers. **Assessment 6** *Investigation: Assess genetic diversity by gel electrophoresis* *CORE PRACTICAL 4: Investigate the effect of sucrose concentrations on pollen tube growth or germination.*			

Year 12 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	**Y12/B4 (18)**			**Y12/B4 (6)**	**Y12/B3 (18)**			**REVISION**
	Exchange and Transport			**Mathematical skills**	**Classification and Biodiversity**			**REVISION FOR FINAL EXAM**
	Identify and understand the ultra structure of human heart, blood vessels, blood and cardiac cycle. Analyze and interpret causes and correlation of heart diseases related to life style factors and diet. Identify the structural details of plant tissues (xylem & phloem) and its role in transport of nutrients. Corelate the role of transpiration in transport of nutrients. **Assessment 7** *CORE PRACTICAL 8: Investigate factors affecting water uptake by plant shoots using a potometer. Investigation: Measuring heart rate/pulse rate and BP using BP monitor*			Calculation of Mean, Median, Mode, Allele frequency, Lincoln index and Species diversity index Statistical test analysis – Student T-test, Spearmann correlation test & Chi square test	Recall three domain, five kingdom and six kingdom classification. Discuss and evaluate species concepts - biological, morphological, genetic, evolutionary and ecological species. Understand techniques in measuring biodiversity, concepts of niche and adaptation in organisms. Know the role of extinction in conservation of organisms and evaluate in situ and ex situ conservation techniques. **Assessment 8** *Investigation : Assess species diversity by calculating the simpsons diversity index of the area sampled. CORE PRACTICAL 6: Determine the water potential of a plant tissue.* *CORE PRACTICAL 7: Dissect an insect to show the structure of the gas exchange system, taking into account the safe and ethical use of organisms.*			

Year 13 BIOLOGY LONG TERM PLAN with CURRICULUM STANDARDS	

Year 13 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

Year 13 BIO	Y13/B7 (18)		Y13/B8 (15)		Y13/B5 (15)	
T E R M 1	**Modern Genetics**		**Origins of genetic variation**		**Energy for Biological processes**	
	Explain PCR technique, DNA fingerprinting, gel electrophoresis. Significance of cell determination and cell differentiation and evaluate the role and use of stem cell research. Understand interactions between genes and the environment in organisms. Discuss role of spliceosome & epigenetics. Describe the various techniques used in production of GMO. Evaluate the advantages & disadvantages in the production of GMO. **Assessment 1** *CORE PRACTICAL 16: Investigate the effect of one abiotic factor on the distribution or morphology of one species taking into account the safe and ethical use of organisms.*		Identify and explain that mutations are the source of new variations and that the processes of random assortment and crossing over during meiosis give rise to new combinations of alleles in gametes. Describe sex linkage on the X chromosome, including haemophilia in humans. Recall types of natural selection with examples. Explain Hardy Weingberg principle, Bottle neck effect and Genetic drift. Apply and analyse chi squared tests to test the significance of the difference between observed and expected results. **Assessment 2** *CORE PRACTICAL 15: Investigate the effect of different sampling methods on estimates of the size of a population taking into account the safe and ethical use of organisms.*		Recall structure of mitochondria. Distinguish aerobic and anaerobic respiration in living organisms. Describe glycolysis, kreb cycle & oxidative phosporylation. Distinguish yeast fermentation & lactate fermentation .Significance of EPOC. *CORE PRACTICAL 9: Investigate factors affecting the rate of aerobic or anaerobic respiration using a respirometer, taking into account the safe and ethical use of organisms.* **Assessment 3**	

Year 13 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

	Y13/B6 (27)		Y13/B5 (15)		
T E R M 1	**Microbiology and pathogens**		**Energy for Biological processes**		**REVISION**
	Identify the principles and techniques involved in culturing microorganisms. Understand the different methods of measuring the growth of a bacterial culture & the different phases of a bacterial growth curve and calculate exponential growth rate constants. Describe that bacteria can be agents of infection, invading and destroying host tissues and producing toxins. *CORE PRACTICAL 12: Investigate the rate of growth of bacteria in liquid culture taking into account the safe and ethical use of organisms.* Describe and explain the action of bactericidal and bacteriostatic antibiotics, the methods and difficulties of controlling the spread of antibiotic resistance in bacteria. Explain transmission, mode of infection and pathogenic effect of the stem rust fungus, influenza virus, the malarial parasite. Analyse the social and economic and ethical implications of different control methods for endemic malaria and the role of the scientific community in validating these methods. Explain the mode of action of macrophages, neutrophils and lymphocytes. Identify and explain the role of T and B memory cells in the secondary immune response, active and passive immunity. **Assessment 4** *CORE PRACTICAL 13: Isolate individual species from a mixed culture of bacteria using streak plating taking into account the safe and ethical use of organisms.*		Recall structure of chloroplast Discuss the role of photosynthetic pigments in plants. Analyse & interpret absorption spectra & action spectra . Explain the light and dark reactions of photosynthesis, concepts of limiting factors affecting photosynthesis. *CORE PRACTICAL 10: Investigate the effects of different wavelengths of light on the rate of photosynthesis.* *CORE PRACTICAL 11: Investigate presence of different chloroplast pigments using chromatography.* **Assessment 5**		**REVISION FOR FIRST TERM EXAM**

Year 13 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

	Y13/B9 (21)		Y13/B10 (15)		
T E R M 2	**Control Systems**		**Ecosystems**		**REVISION**
	Understand the principles of homeostasis. Explain the mechanism of hormone action. Know photoreception and flowering in plants and details of human nervous system & nerve impulse transmission. Understand photoreception in animals & discuss effects of drugs in humans. Explain control of heart rate, osmoregulation & thermoregulation in humans. **Assessment 6 and 7** *CORE PRACTICAL 14: Investigate the effect of gibberellin on the production of amylase in germinating cereals using a starch agar assay.*		Identify, describe and explain the terms ecosystem, trophic level, pyramids, energy transfer and ecological techniques. Analyse and interpret the data using statistical tests.(t-test and spearman's test). Calculate the efficiency of energy transfer between trophic levels. Describe the process of succession, effects of biotic and abiotic factors. Explain and analyse the human effects on ecosystem, how scientific community validating evidences related to climate change. **Assessments 8 & 9**		**REVISION FOR MOCK EXAM**

Year 12 CHEMISTRY LONG TERM PLAN with CURRICULUM STANDARDS

Year 12 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

TERM 1

Y12 /CHE 1 (18)			Y12 /CHE 2 (18)			Y12 /CHE 3 (12)	
Atomic structure and periodic table			**Bonding and structure**			**Redox I**	

Define relative molecular mass and suggests why compared to an atom of Carbon 12. Analyse and interpret data from mass spectrometry to calculate relative atomic mass from relative abundance of isotopes. Reason out for the general increase in first ionization energy across the period. Predict the electronic configurations using 1s notation and electrons- in-boxes notation of atoms. Illustrate periodicity using data, atomic radii, melting and boiling points and first ionisation energies.
Assessment 1

Predict the properties of ionic compound and explains the idea of regular crystalline structure. Draw dot and cross diagrams to show electrons in covalent substances including molecules with single, double and triple bonds and for species exhibiting dative bonding. Predict the bond angles,shapes of simple molecules and ions using electron pair repulsion theory. Predict the nature of intermolecular forces resulting from London forces, permanent dipoles and hydrogen bonds. **Assessment 2**

Calculate the oxidation number in terms of electron transfer. Identify the disproportionation reaction. Apply that oxidation number is a useful concept in terms of the classification of reactions as redox and as disproportionation. Write ionic half equations and use them to construct full ionic equations.
Assessment 3

Year 12 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

TERM 1

Y12 /CHE 4 (18)			Y12 /CHE 5 (24)				
Inorganic Chemistry			**Formulae, Equations and amounts of substance**				**REVISION**

Predict the reactions of the elements magnesium to barium in group 2 with oxygen and chlorine. Interpret the trend in reactivity of group 2 and group 7 elements.Reason out the trends in thermal stability of the nitrates and carbonates of group 1 and 2.Understand, in terms of changes in oxidation number, the disproportionation reaction of chlorine with water and the use of chlorine in water treatment, the reaction of chlorine with cold, dilute aqueous sodium hydroxide, the disproportionation reaction of chlorine with hot alkali. **Assessment 4**   *CORE PRACTICAL 7: Analysis of inorganic and organic unknowns.*

Calculate moles in reactions involving mass, volume of gas, volume of solution, concentration of solutions in mol dm-3 and g dm^{-3}, including simple acid-base titrations using a range of acids, alkalis and indicators,percentage yields and percentage atom economies using chemical equations. Calculate measurement uncertainties, measurement errors in experimental results and comment on sources of error in experimental procedures and experimental results.
Assessment 5
CORE PRACTICAL 1: Measure the molar volume of a gas.
CORE PRACTICAL 2: Prepare a standard solution from a solid acid and find concentration.
CORE PRACTICAL 3: Find the concentration of a solution of hydrochloric acid.

REVISION FOR FIRST TERM EXAMINATION

Year 12 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

TERM 2

Y12 /CHE 6 (30)					Y12/ CHE 7 (18)		
Organic Chemistry					**Modern analytical techniques**		

Define hydrocarbons as compounds of carbon and hydrogen, the different types of formulae. Explain the terms homologous series, functional groups, apply the IUPAC rules to name compounds. Classify reactions as addition, elimination, substitution, oxidation, reduction, hydrolysis or polymerisation. Explain substitution reactions of alkanes and addition reactions of alkenes with mechanisms, substitution and hydrolysis reactions of halogenoalkanes, oxidation reactions of alcohols.
Assessment 6
CORE PRACTICAL 4: Investigation of the rates of hydrolysis of some halogenoalkanes.
CORE PRACTICAL 5: The oxidation of ethanol   *CORE*
PRACTICAL 6: Chlorination of 2-methylpropan-2-ol using concentrated hydrochloric acid.

Identify the species respnsible for the peaks for chlorine and bromine molecule. Predict possible structures of a simple organic compound from the mass/charge ratio of the molecular ion and fragmentation patterns from mass spectrum. Deduce functional groups for alcohols, carboxylic acids, aldehydes, ketones and esters present in organic compounds using infrared spectra. Predict the use of fingerprint region in an infrared spectra.
Assessment 7

Year 12 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

TERM 2

Y12 /CHE 8 (18)			Y12 /CHE 9 (12)		Y12 /CHE 10 (12)		
Chemical Energetics			**Reaction Kinetics**		**Chemical Equilibrium**		**REVISION**

Construct and interpret enthalpy level diagrams showing enthalpy change for exothermic and endothermic reactions. Define standard enthalpy changes of reaction, formation, combustion, neutralisation and do calculations from given experimental results. construct enthalpy cycles using Hess's Law. Calculate an enthalpy change of reaction using mean bond enthalpies and explain the limitations of this method of calculation.
CORE PRACTICAL 8: To determine the enthalpy change of a reaction using Hess's Law.   **Assessment 8**

Describe that reactions only take place when collisions take place with sufficient energy, known as activation energy, draw the reaction profiles for uncatalysed and catalysed reactions, interpret Maxwell-Boltzmann distribution of molecular energies, explain the economic benefits of the use of catalysts in industrial reactions.
Assessment 9

Predict and justify the qualitative effect of a change of a temperature,concentration, pressure on a homogenous system in equilibrium.Evaluate data to explain the necessity, for industrial processes, to reach a compromise between the yield and the rate of reaction. Deduce an expression for Kc in heterogenousequilibria.
Assessment 10

REVISION FOR FINAL EXAMINATION

Year 13 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y13/ CHE 1 (18)			Y13 / CHE 2 (12)		Y13 / CHE 3 (9)		Y13 / CHE 3 (9)
	Equilibrium II			Kinetics II		Organic Chemistry II		Organic Chemistry III
T E R M 1	Deduce an expression for Kp, for homogeneous and heterogeneous system.Calculate a value with units for Kc and Kp. Discuss the effect of temperature on the position of equilibrium. Understand that the value of K is unaffected by changes in concntration or pressure. Predict the direction of change by applying the concepts of rate and equilibrium. *CORE PRACTICAL 11: Redox titration.* **Assessment 1**			Describe experimental technique to obtain rate data by titration and volume of gas evolved. Define order of a reaction. Derive units for zero,first and second order reactions. Deduce rate equation by finding the order with respect to each reactant. *CORE PRACTICAL 13a -Follow the rate of the iodine-propanone reaction using a titrimetric method.* *CORE PRACTICAL 13b - Use a clock reaction to determine a rate equation.* *CORE PRACTICAL 14: Finding the activation energy of a reaction.* **Assessment 2**		Define the term 'chiral' and enantiomers. Draw the optical isomers of some compounds. Know that optical activity is the ability of a single optical isomer to rotate the plane of polarisation. Define 'racemic mixture' and its effect on the plane of polarised light. Discuss the reactions of aldehydes, ketones,carboxylic acids and esters. Discuss how polyesters are formed by polymerisation reactions. **Assessment 3**		Discuss bonding in benzene and its reactions. Explain the mechanism of the electrophilic substitution. Discuss the reactions of amines, amides. Discuss the techniques in preparation & purification of organic compounds. **Assessment 4** *CORE PRACTICAL 15: Analysis of some inorganic and organic unknowns.* *CORE PRACTICAL 16: The preparation of aspirin*

Year 13 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y13 / CHE 4 (24)				Y13 / CHE 5 (9)		Y13 / CHE 6 (9)	
	Acid - base equilibrium				Redox II		Energetics II	REVISION
T E R M 1	Identify Brønsted–Lowry conjugate acid-base pairs, define 'pH', do pH calculations with [H+], understand the difference between a strong acid and a weak acid in terms of degree of dissociation. Calculate the pH of a strong acid and a weak acid. Predict the equilibrium expression for the auto-ionisation of water. Define Kw, 'pKa' and 'pKw'.Calculate Ka for a weak acid from experimental data given the pH of a solution. Interpret titration curves for strong acid with strong base,weak acid with a strong base and strong acid with a weak base. Define the term 'buffer'. Explain the action of an acidic and an alkaline buffer. Calculate the pH of a buffer solution from the given data. **Assessment 5** *CORE PRACTICAL 9: Finding the Ka value for a weak acid.*				Define redox reactions in terms of oxidation number. Combining ionic half equations to get full equation. Explain 'standard electrode potential'. Discuss the term standard hydrogen electrode and explain how it is used. Use Eo to calculate the cell potential. Carry out titrations between Fe2+/MnO4− and I2/S2O32−with suitable indicator solution. Calculates the uncertainities in the measurements. Compare the advantages and disadvantages of different electrochemical cells. *CORE PRACTICAL 10: Investigating some electrochemical cells* **Assessment 6**		Define lattice energy.Compare experimental values with theoretical values.Construct Born-Haber cycles.Define the term polarisation as applied to ions. Define the terms 'enthalpy change of solution, and 'enthalpy change of hydration'. Use Gibb's free energy equations to find whether the reaction is thermodynamically feasible.Calculate Gibb's Free energy and find out whether the reaction is feasible or not **Assessment 7**	**REVISION FOR FIRST TERM EXAM**

Year 13 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y13 / CHE 7 (30)					Y13 / CHE 8 (9)		
	Transition metals					Modern Analytic Techniques II		REVISION
T	Explain transition metals are d-block elements and shows variable oxidation number. Define ligands and co- ordination numbers.Predict that transition metal ions form tetrahedral and octahedral complexes. Explain conversion of dichromate(VI) ion into chromate(VI). Write the observations and equations for the reactions of transition metal ions with aqueous NaOH and					Discuss the term nuclear magnetic resonance.Explain how mass spectra and NMR ^{1}H and ^{13}C data is used to		

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2</td><td>aqueous ammonia.Compare ligand substitution and disproportionation reactions.Describe how complexes show colour. Explain that transition metals and their compounds can act as heterogeneous and homogeneous catalysts.
Assessment 8
a transition metal complex.   *CORE PRACTICAL 12 : Preparation of*</td><td>find the structures of organic compounds.Deduce the splitting patterns of adjacent, non-equivalent protons using the (n+1) rule. Use of thin layer chromatography to identify the different aminoacids in a mixture. Explain high performance liquid chromatography and gas chromatography.
Assessment 9</td><td>**REVISION FOR MOCK EXAM**</td></tr>
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YEAR 12 PHYSICS LONG TERM PLAN with CURRICULUM STANDARDS

YEAR 12 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y12/PHY 1(6)	Y12/PHY 2(27)					Y12/PHY 3(15)	
T E R M 1	**Working as a Physicist**	**Mechanics I**					**Electric Circuits I**	
	Distinguish between base and derived quantities and their SI units. Understand the measurements and techniques for both familiar and unfamiliar experiments. Estimate values for physical quantities.	Use the equations for uniformly accelerated motion in one dimension. Draw and interpret displacement-time, velocity-time and acceleration-time graphs. Resolve a vector into two components at right angles to each other by drawing and by calculation. Find the resultant of two coplanar vectors at any angle to each other by drawing, and at right angles to each other by calculation. Draw and interpret free-body force diagrams to represent forces on a particle or on an extended but rigid body. Use the equation $\Sigma F = ma$ and Newton's first law of motion where a = 0, objects at rest or travelling at constant velocity. Use of the term terminal velocity is expected. Use the equations for gravitational field strength $mg = F$ and weight $W = mg$. Know and understand Newton's third law of motion and know the properties of pairs of forces in an interaction between two bodies. **Assessment 1** Understand how to make use of the independence of vertical and horizontal motion of a projectile moving freely under gravity. Understand that momentum is defined as $p = mv$. Know the principle of conservation of linear momentum and relate this to Newton's laws of motion and understand how to apply this to problems in one dimension. **Assessment 2** *CORE PRACTICAL 1: Determine the acceleration of a freely-falling object.*					Understand that electric current is the rate of flow of charged particles. Define Ohm's law. Interpret VI graphs of ohmic and non ohmic conductors. Define resistivity and investigate the electrical resistivity of a material. Use I = nqvA to explain the large range of resistivities of different materials. Analyse series and parallel circuits. Define electromotive force (e.m.f.) and internal resistance. Distinguish between e.m.f. and terminal potential difference. **Assessment 3** *CORE PRACTICAL 2: Determine the electrical resistivity of a material.*	

YEAR 12 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y12/PHY 4(27)				Y12/PHY 5(15)			
T E R M 1	**Mechanics II**				**Electric Circuits II**			**REVISION**
	Use the equation for the moment of a force, *moment of force = Fx* where x is the perpendicular distance between the line of action of the force and the axis of rotation. Use the concept of centre of gravity of an extended body and apply the principle of moments to an extended body in equilibrium. Use the equation for work $\Delta W = F\Delta s$, including calculations when the force is not along the line of motion. Use the equation $kE = 1/2\, mv^2$ for the kinetic energy of a body. Use the equation $\Delta Egrav = mg\Delta h$ for the difference in gravitational potential energy near the Earth's surface. Know, and understand how to apply, the principle of conservation of energy including use of work done, gravitational potential energy and kinetic energy. Use the equations relating power, time and energy transferred or work done $P = E/t$ and *efficiency = useful energy output/total energy input*. **Assessment 4**				Analyse complex voltage divider circuits involving LDRs and thermistors to design heat and light sensors. Know the definition of electromotive force (e.m.f.) and internal resistance and know how to distinguish between e.m.f. and terminal potential difference. Explain semi - conductor theory and use transport equation. Understand how changes of resistance with temperature and illumination may be modelled in terms of lattice vibrations and number of conduction electrons and understand how to apply this model to metallic conductors, negative temperature coefficient thermistors and LDR. **Assessment 5** *CORE PRACTICAL 3: Determine the e.m.f. and internal resistance of an electrical cell.*			**REVISION FOR FIRST TERM EXAM**

YEAR 12 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y12/PHY 6(33)					Y12/PHY 7(15)		

	Waves					Fluid and Solids	

Waves

Define amplitude, frequency, period, speed and wavelength. Use the wave equation $v = f\lambda$. Describe longitudinal waves in terms of pressure variation and the displacement of molecules. Describe transverse waves. Draw and interpret graphs representing transverse and longitudinal waves including stationary waves. Know and understand what is meant by wavefront, coherence, path difference, superposition, interference and phase. Relate phase difference and path difference. Know what is meant by a standing/stationary wave and understand how such a wave is formed, know how to identify nodes and antinodes. Use the equation for the speed of a transverse wave on a string $v = \sqrt{T/\mu}$.
Assessment 6   Understand that waves can be transmitted and reflected at an interface between media. Understand how a pulse-echo technique can provide information about the position of an object and how the amount of information is limited by the wavelength or by the duration of pulses. Understand what is meant by plane polarisation, diffraction and use Huygens' construction to explain what happens to a wave when it meets a slit or an obstacle. Use $n\lambda = d\sin\theta$ for a diffraction grating.
Assessment 7
CORE PRACTICAL 6: Determine the speed of sound in air using an oscilloscope, signal generator, speaker and microphone.
CORE PRACTICAL 7: Investigate the effects of length, tension and mass per unit length on the frequency of a vibrating string
CORE PRACTICAL 8: Determine the wavelength of light from a laser or other light source using a diffraction grating.

Fluid and Solids

Use the equation density $\varrho = m/V$. Use the relationship upthrust = weight of fluid displaced. Use Stokes' Law, $F = 6\pi\eta rv$. **Assessment 8**
Use the Hooke's law equation, $\Delta F = k\Delta x$. Use the relationships stress = F/A, strain = e/L and Young modulus = stress/strain. Draw and interpret force-extension and force-compression graphs. Define limit of proportionality, elastic limit, yield point, elastic deformation and plastic deformation and apply them to graphs. Draw and interpret tensile or compressive stress-strain graphs, and define breaking stress. Calculate the elastic strain energy from the area under the force-extension graphs for both linear and non-linear force-extension graphs.
Assessment 9
CORE PRACTICAL 4: Use a falling-ball method to determine the viscosity of a liquid.
CORE PRACTICAL 5: Determine the Young modulus of a material.

YEAR 12 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y12/PHY 8 (27)				Y12/PHY 9(15)			
	Nature of Light				Refraction			REVISION

T E R M 2

Nature of Light

Use the equation intensity of radiation $I = P/A$. Understand how the behaviour of electromagnetic radiation can be described in terms of a wave model and a photon model, and how these models developed over time. Use the equation $E = hf$, that relates the photon energy to the wave frequency. Understand that the absorption of a photon can result in the emission of a photoelectron. Understand the terms threshold frequency and work function and use the photoelectric equation $hf = \varphi + KE$. Use the electronvolt (eV) to express small energies. Understand how the photoelectric effect provides evidence for the particle nature of electromagnetic radiation. Understand atomic line spectra in terms of transitions between discrete energy levels and understand how to calculate the frequency of radiation that could be emitted or absorbed in a transition between energy levels. Use de Broglie equation $\lambda = h/p$. Understand how diffraction experiments provide evidence for the wave nature of electrons.   **Assessment 10**

Refraction

Explain refraction and use $n_1 \sin\theta_1 = n_2 \sin\theta_2$ where n is the refractive index of the material. $n = c/v$. Calculate critical angle using $n = 1/\sin C$. Understand how to measure the refractive index of a solid material. Use ray diagrams to trace the path of light through a lens and locate the position of an image. Use the equation power of a lens $f = 1/P$. Understand that for thin lenses in combination $P = P1+P2+P3+..$ Use the lens equation with the real is positive convention. Understand that $magnification = image\ height/object\ height$ and $m = v/u$.
Assessment 11

REVISION FOR FINAL EXAM

Year 13 PHYSICS LONG TERM PLAN with CURRICULUM STANDARDS

Year 13 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
	Y13/PHY 1 (18)			Y13/PHY 2 (15)			Y13/PHY 3 (15)	
	Thermodynamics			Nuclear radiations			Further Mechanics	

T E R M 1

Thermodynamics

Define specific heat capacity. State, explain and use kinetic theory of gases. Use the equations $\Delta E = mc\Delta\theta$ and $\Delta E = L\Delta m$. Define internal energy. Understand the concept of absolute zero and how the average kinetic energy of molecules is related to the absolute temperature. State, explain and use gas laws. Derive and use the equation $PV = 1/3\ Nmc^2$ using the kinetic theory model. Use the equation $pV = NkT$ for an ideal gas. Derive and use the equation $1/2\ mc^2 = 3/2\ kT$. Understand what is meant by a black body radiator and be able to interpret radiation curves for such a radiator.
Assessment 1
CORE PRACTICAL 12: Calibrate a thermistor in a potential divider circuit as a thermostat.
CORE PRACTICAL 13: Determine the specific latent heat of a phase change.

Nuclear radiations

Describe the properties and uses of nuclear radiations. Define half life, decay constant and activity of a source. Investigate decay graphs. Determine the half-lives of radioactive isotopes graphically and use the equations for radioactive decay. Derive and use the corresponding log equations.
Assessment 2
CORE PRACTICAL 15: Investigate the absorption of gamma radiation by lead.
Define binding energy and use it to describe stability of nuclei. Investigate nuclear fission and fusion in detail. Define binding energy and use it to describe stability of nuclei. Understand the processes of nuclear fusion and fission with reference to the binding energy per nucleon curve.

Further Mechanics

Define Impulse. Apply conservation of momentum in two dimensions, and analyse elastic and inelastic collisions. Define angular displacement and angular velocity. Understand that a resultant force (centripetal force) is required to produce and maintain circular motion. Recognize the forces involved in circular motion of different objects and investigate different applications of examples of circular motion.   **Assessment 4**
CORE PRACTICAL 10: Use ICT to analyse collisions between small spheres, e.g. ball bearings on a table top.

	CORE PRACTICAL 14: Investigate the relationship between pressure and volume of a gas at fixed temperature.			**Assessment 3**				

YEAR 13 PHY	**WEEK 1**	**WEEK 2**	**WEEK 3**	**WEEK 4**	**WEEK 5**	**WEEK 6**	**WEEK 7**	**WEEK 8**
T E R M 1	**Y13/PHY 4 (30)**					**Y13/PHY 5 (9)**		
	Electric and Magnetic Fields					**Particles**		**REVISION**
	Use Coulomb's law, define electric field strength. Draw and interpret diagrams using field lines and equipotentials to describe radial and uniform electric fields. Know and understand the relation between electric field and electric potential. Define capacitance, determine the energy and charge stored, analyse series and parallel combinations of capacitors. Able to draw and interpret charge and discharge curves for resistor capacitor circuits and understand the significance of the time constant RC. Use related equations for exponential discharge in resistor-capacitor circuit, $I = I_0 e^{(-t/RC)}$, and $V = V_0 e^{(-t/RC)}$ and the corresponding log equations. **Assessment 1** Define the terms magnetic flux density, flux and flux linkage. Describe magnetic effect of current and describe the working of a motor. Explain electromagnetic induction and describe working of generator and transformer. Understand what is meant by the terms frequency, period, peak value and root mean square value when applied to alternating currents and potential differences. *Assessment 2* *CORE PRACTICAL 11: Use an oscilloscope or data logger to display and analyse the potential difference (p.d.) across a capacitor as it charges and discharges through a resistor.*					Understand what is meant by nucleon number and proton number. Understand how large-angle alpha particle scattering gives evidence for a nuclear model of the atom and how our understanding of atomic structure has changed over time. Understand that electrons are released in the process of thermionic emission and how they can be accelerated by electric and magnetic fields. Understand the role of electric and magnetic fields in particle accelerators (linac and cyclotron) and detectors (general principles of ionisation and deflection only). Derive and use the equation r=p/Bq for a charged particle in a magnetic field.		**REVISION FOR FIRST TERM EXAM**

YEAR 13 PHY	**WEEK 1**	**WEEK 2**	**WEEK 3**	**WEEK 4**	**WEEK 5**	**WEEK 6**	**WEEK 7**	**WEEK 8**
T E R M 2	**Y13/PHY 5 (15)**		**Y13/PHY 6 (6)**		**Y13/PHY 7(12)**		**Y13/PHY 8 (9)**	
	Particles		**Gravitational Field**		**Oscillations**		**Space**	**REVISION**
	Apply conservation of charge, energy and momentum to interactions between particles and interpret particle tracks. Understand why high energies are required to investigate the structure of nucleons. Use the equation $\Delta E = c^2 \Delta m$ in situations involving the creation and annihilation of matter and antimatter particles. Use MeV and GeV (energy) and MeV/c2, GeV/c2 (mass) and convert between these and SI units. Know that in the standard quark-lepton model particles can be classified as baryon, mesons, leptons and photons which are fundamental particles. Know that every particle has a corresponding antiparticle and be able to use the properties of a particle to deduce the properties of its antiparticle and vice versa. Understand how to use laws of conservation of charge, baryon number and lepton number to determine whether a particle interaction is possible. Write and interpret particle equations given the relevant particle symbols. **Assessment 7**		Define gravitational field. Understand that gravitational field strength is defined as $g=F/m$. Define Newton's law of universal gravitation). Use the equation $V= Gm/r$ for a radial gravitational field. Compare electric fields with gravitational fields. Apply Newton's laws of motion and universal gravitation to orbital motion.		Know that the condition for simple harmonic motion is $F = -kx$, and hence identify situations in which SHM will occur. Use the equations $a = -\omega^2 x$, $x = A\cos\omega t$, $v = -A\omega \sin \omega t$, $a = -A\omega^2 \cos \omega t$, and $\omega = 2\pi f$. Use equations for a loaded spring and a simple pendulum. Draw and interpret d–t and v–t graphs. Define resonance. Understand how to apply conservation of energy to damped and undamped oscillating systems. Understand the distinction between free and forced oscillations. State how the amplitude of a forced oscillation changes at and around the natural frequency of a system and know how damping affects resonance. Explain how damping and the plastic deformation of ductile materials reduce the amplitude of oscillation. **Assessment 8** *CORE PRACTICAL 16: Determine the value of an unknown mass using the resonant frequencies of the oscillation of known masses.*		Use the Stefan-Boltzmann law equation L = σAT4 for black body radiators. Use Wien's law equation $\lambda_{max} T = 2.898 \times 10^{-3}$ m K for black body radiators.Use the equation, intensity $I = L/4\pi d^2$. Understand how astronomical distances can be determined using trigonometric parallax and using intensity received from standard candles. Sketch and interpret a Hertzsprung-Russell diagram. Understand how to relate the HR diagram to the life cycle of stars. Understand how the movement of a source of waves relative to an observer/detector gives rise to a shift in frequency. Use the equations for redshift and $v = H_0 d$ for objects at cosmological distances. Understand the controversy over the age and ultimate fate of the universe associated with the value of the Hubble constant and the possible existence of dark matter. **Assessment 9**	**REVISION FOR MOCK EXAMINATION**