

## GRADE 1 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS

GRADE 1 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
<b>T E R M  1</b>	<b>G1/SC 1 (3)</b>			<b>G1/SC 2 (21)</b>				
	<b>Seasons I</b>			<b>Plants</b>				
	Identify the changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.	Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Use the local environment throughout the year to explore and answer questions about plants growing in their habitat. Pupils might work scientifically by observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar plants; describing how they were able to identify and group them, and drawing diagrams showing the parts of different plants including trees. Understand how plants have changed over time, for example the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants. <b>Assessment 1</b>			Identify and describe the basic structure of a variety of common flowering plants, including trees. Where possible, they should observe the growth of flowers and vegetables that they have planted. They should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem). <b>Assessment 2</b>			
GRADE 1 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
<b>T E R M  1</b>	<b>G1/SC 3 (24)</b>							
	<b>Animals, including humans</b>							
	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals, especially from the local habitat. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). They must know how to take care of animals taken from their local environment and the need to return them safely after study. Pupils might work scientifically by: using their observations to compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them; grouping animals according to what they eat; and using their senses to compare different textures, sounds and smells. <b>Assessment 3</b>	Identify, name, draw and label the basic parts of the human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth). Identify the five senses and the corresponding sense organs. Say which part of the body is associated with each sense. <b>Assessment 4</b>			Revision for First Term Examination			
GRADE 1 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
<b>T E R M  2</b>	<b>G1/SC 4 (24)</b>							
	<b>Everyday Materials</b>							
	Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.	Describe the simple physical properties of a variety of everyday materials. Pupils should explore, name, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent. Pupils should explore and experiment with a wide variety of materials, including for example: brick, paper, fabrics, elastic, foil etc.						
GRADE 1 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
<b>T E R M  2</b>	<b>G1/SC 4 (6)</b>		<b>G1/SC 5 (12)</b>					
	<b>Everyday Materials</b>		<b>Seasons II</b>			<b>Boosting thinking skills</b>		
	Compare and classify a variety of everyday materials on the basis of their physical properties. Work scientifically by: performing tests to explore questions, like 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains?'	Discuss changes in the weather and the seasons. They should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses. Pupils might work scientifically by: making tables and charts about the weather; and making displays of what happens in the			Passages related to unfamiliar contexts will be used for comprehension and to answer questions based on it. Questions include critical thinking and			Revision for Final Examination

2	...for a bookshelf? ...for a gymnast's leotard? <b>Assessment 4</b>	world around them, including day length, as the seasons change. <b>Assessment 4</b>	analysing data.
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## GRADE 2 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS

GRADE 2 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
<b>T E R M  1</b>	G2 / SC 1 (12)				G2 / SC 2 (12)			
	Living Things				Growing Plants			
	<p>Make comparisons between things that are alive, things that are not alive, and things that were once alive. Sort and compare animals, plants and non-living things and create a list of features of living things. Notice that living things have offspring which resemble their parents and that they themselves grow into adults which reproduce. Order the stages of growth of humans from birth to old age. Use observable features to identify and classify living and non-living things. Pupils work scientifically by classifying things and recording the findings using charts. Decide where to place things, with questions like: 'Is a flame alive? Is a deciduous tree dead in winter?' <b>Assessment 1</b></p>				<p>Explore how seeds and bulbs grow into mature plants. Investigate what plants need to grow and find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. Discover where seeds come from by investigating fruits and seeds in their local environment. Carefully observe and sort seeds and recognise how some plants are able to grow from bulbs. Plant seeds and describe how plants grow from seeds. Observe seeds and plants using simple equipment. Ask simple questions about what plants need to grow and perform simple tests recognising that their questions can be answered in different ways. Observe and measure the growth of the plants over time. <b>Assessment 2</b></p>			
GRADE 2 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
<b>T E R M  1</b>	G2 / SC 3 (24)							
	Uses of Everyday materials (24)							
	<p>Name, identify and hunt for everyday materials including wood, metal, plastic, glass, rubber, brick, rock, paper, fabric and card. List properties of different materials such as hardness, strength, flexibility and shininess. Learn that the properties of materials are important to the object they are made from. Identify suitable and unsuitable materials for different objects and will be able to explain why. Classify materials sorting them into groups in a variety of ways. Use reference materials to find out some fascinating facts about a type of material. Compare the strength of different types of paper predicting which will rip when pulled by their hands. Learn what absorbency means and explore the absorbency of different types of materials. Examine different ways to record results and select an appropriate way to record the results of an investigation about waterproof materials. Pupils might find out about people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam. Compare the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories and songs); observing closely, identifying and classifying the uses of different materials, and recording their observations. <b>Assessment 3</b></p>							Revision for First Term Exam
GRADE 2 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
<b>T E R M  2</b>	G2 / SC 4 (12)				G2 / SC 5 (12)			
	Changing Shape				Habitats			
	<p>Recognise that the shape of materials can be changed by squashing, bending, twisting and stretching. They will also explore how twisting can be used to make threads stronger and identify which materials bend or squash most easily. Investigate how materials can be grouped according to their properties. Perform simple tests to find the stretchiest material and observe how silly putty changes over time.</p>				<p>Recognise the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter). Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants and how they depend on each other for example, plants serving as a source of food and shelter for animals. Explore their immediate local environments. Identify local and global habitats and recognise, in simple terms, those which are similar in scale or diversity.</p>			
GRADE 2 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
G2 / SC 5(12)			G2 / SC 6(12)					
Habitats			Animals - Feeding and Exercise			Revising thinking skills		

	Habitats	Animals - Feeding and Exercise	Boosting thinking skills	
<b>T E R M  2</b>	<p>Recognise how differences between places close to each other result in a different range of plants and animals being found. Identify and name a variety of plants and animals in their habitats including micro-habitats and describe different habitats. Compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest. Work scientifically by observing plants and animals closely in their local environment. Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. Construct a simple food chain that includes humans (e.g. grass, cow, human).</p> <p style="text-align: center;"><b>Assessment 4</b></p>	<p>Describe the basic needs of animals, including humans, for survival and consider what humans need to live. Use observable features and research to identify and classify foods into those of plant or animal origin. Describe the importance of exercise, eating the right amounts of different types of food and hygiene. Use ideas about feeding and exercise to look after ourselves to stay healthy. Make a diet and exercise plan and consider food safety and hygiene guidelines. Consider how science is relevant to their personal health and to relate science to their everyday life (food, exercise, hygiene), and to recognise and control hazards and risks to themselves. <b>Assessment 5</b></p>	<p>Passages related to unfamiliar contexts will be used for comprehension and to answer questions based on it. Questions include critical thinking and analysing data.</p>	<p>Revision for Final Examination</p>

### GRADE 3 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS

GRADE 3 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
<b>T E R M  1</b>	<b>G3/SC 1 (24)</b>							
	<b>Plants</b>							
	<p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Know the relationship between structure and function: the idea that every part has a job to do. Explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction. Investigate the way in which water is transported within plants. Observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers. Know that plants can make their own food. <b>Assessment 1</b></p>				<p>Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Pupils work scientifically by comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser; discovering how seeds are formed by observing the different stages of plant life cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed. <b>Assessment 2</b></p>			
GRADE 3 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
<b>T E R M  1</b>	<b>G3/SC 2 (24)</b>							
	<b>Forces and Magnets</b>							
	<p>Compare how things move on different surfaces and carry out tests to test this. Pupils should observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door). Observe how magnets attract or repel each other and attract some materials and not others. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.</p>				<p>Explore the strengths of different magnets and find a fair way to compare them; looking for patterns, for example, the strength of the magnet or which pole faces another. They should explore the behaviour and everyday uses of different magnets ( for example, bar, ring, button and horseshoe). Identify how their properties make magnets useful in everyday items and suggest creative uses for different magnets. <b>Assessment 3</b></p>			<p>Revision for First Term Examination</p>
GRADE 3 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
<b>T E R M  2</b>	<b>G3/SC 3 (15)</b>					<b>G3/SC 4(9)</b>		
	<b>Light</b>					<b>Rocks</b>		
	<p>Recognise that they need light in order to see things and that dark is the absence of light. Recognise that light from the sun and other bright sources can be dangerous and that there are ways to protect their eyes. They explain why it is important to protect their eyes from bright lights. Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses. Notice that light is reflected from surfaces. Pupils</p>		<p>Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change. They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change. Pupils might work scientifically by looking for patterns in what happens to shadows when the light source moves or the distance between the light</p>			<p>Recognise that soils are made from rocks and organic matter and describe how they are formed. Explore different kinds of rocks and soils, including those in the local environment. Identify similarities and differences and investigate what happens when rocks are rubbed together or when they are in water. Compare different kinds of rocks on the basis of appearance and physical properties. Observe rocks, including those used in buildings and gravestones, and explore how and why they might have changed over time.</p>		

	should explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves.	source and the object changes.	Use a hand lens to to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. Describe how fossils are formed. Research and discuss the different kinds of living things whose fossils are found in rocks. <b>Assessment 4</b>					
GRADE 3 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  2	G3/SC 5 (18)							
	Animals, including humans					Earth Science and space		Revision for Final Examination
	Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their food and so get nutrition from what they eat. Know the importance of nutrition. Compare and contrast the diets of different animals (including pets) and group them according to what they eat. Research different food groups and how they keep us healthy and design meals.		Identify that humans and some other animals have skeletons and muscles for support, protection and movement. Know the main body parts associated with the skeleton and muscles and special functions of different parts of the body. Identify and group animals with and without skeletons and observe and compare their movement; exploring ideas about what would happen if humans did not have skeletons. <b>Assessment 5</b>			Describe structure of earth and features of different layers of earth. Know what solar system is and identify the major members.		Revision for Final Examination

GRADE 4 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS								
GRADE 4 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  1	G4/SC 1 (24)				G4/SC 2 (21)			
	States of matter				Living things and their habitats			
	Compare and group materials as solids, liquids or gases. Explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). Group and classify a variety of different materials. Observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled. Observe that materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) for example, when iron melts or when oxygen condenses into a liquid. Explore the effect of temperature on substances like chocolate, butter, cream (for example, to make chocolate crispy cakes and ice-cream for a party). Observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on rate of evaporation or melting. Identify the part played by evaporation and condensation in the water cycle. <b>Assessment 1</b>				Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Explore possible ways of grouping a wide selection of living things that include animals and plants. Put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects. Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses. <b>Assessment 2</b>			
GRADE 4 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  1	G4/SC 2 (21)							
	Living things and their habitats							
	Work scientifically by using and making simple guides or keys to explore and identify local plants and animals; making a guide to local living things; recording their observations of animals and what they have found out about other animals that they have researched.			Recognise that environments can change and that this can sometimes pose dangers to living things. Use the local environment throughout the year to identify and study plants and animals in their habitat. Identify how the habitat changes throughout the year. Explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation. <b>Assessment 3</b>				Revision for First Term Examination
GRADE 4	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  2	G4/SC 3 (12)				G4/SC 4(12)			
	Electricity				Sound			
	Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. Identify whether or not a lamp will light in a simple series circuit. Recognise that a switch opens and closes a circuit. and associate this with whether or not a lamp lights in a simple series circuit. Use the terms current and voltage, but these should not be defined formally at this stage. Observe patterns, for example, that bulbs get brighter if more cells are added. Recognise some common conductors and insulators, and associate metals with being good conductors. Use their circuits to create simple devices. Realize the precautions for working safely with electricity. Know that metals tend to be conductors of electricity, and that only some materials can be used to connect across a gap in a circuit. <b>Assessment 4</b>				Identify how sounds are made, associating some of them with something vibrating. Explore and identify the way sound is made through vibration in different musical instruments. Recognise that vibrations from sounds travel through a medium to the ear. State how the pitch and volume of sounds can be changed in a variety of ways. Find patterns between the pitch of a sound and features of the object that produced it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Find patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. Recognise that sounds get fainter as the distance from the sound source increases. Compare earmuffs from a variety of different materials to investigate which provides the best insulation against sound. <b>Assessment 5</b>			

GRADE 4 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  2	G4/SC 5 (18)							
	Animals including humans					Earth Science and Energy		Revision
	Describe the simple functions of the basic parts of the digestive system in humans like, mouth, tongue, teeth, oesophagus, stomach and small and large intestine. Pupils should draw and discuss their ideas about the digestive system. Identify the different types of teeth in humans and their simple functions. Compare the teeth of carnivores and herbivores, and suggest reasons for differences; finding out what damages teeth and how to look after them. Construct and interpret a variety of food chains, identifying producers, predators and prey. <b>Assessment 6</b>					Describe structure of earth and features of different layers of earth. Identify different types of energy and methods of heat transfer.		Revision

### GRADE 5 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS

GRADE 5 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  1	G5/SC 1 (24)					G5/SC 2(8)		
	Living things and their habitats					Animals, including humans		
	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Study and raise questions about their local environment throughout the year. Observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment. Pupils work scientifically by observing and comparing the life cycles of plants and animals in their local environment with those around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), and suggesting reasons for similarities and differences. Grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. Find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall.				Describe the life process of reproduction in some plants and animals. Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow. <b>Assessment 1</b>		Describe the changes as humans develop to old age. Draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty. They could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows. <b>Assessment 2</b>	

GRADE 5 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M	G5/SC 2 (32)							
	Properties and changes of Materials							
	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. Explore and compare the			Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Know that dissolving, mixing and changes of state are reversible. Use knowledge of solids, liquids and gases to decide		Explain that some changes cause formation of new materials, and that this is not usually reversible, including burning and action of acid on bicarbonate of soda. Compare the changes during burning or baking. Read about Spencer Silver and		Revision for First Term Examination

1	properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4. Observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them. Compare materials in order to make a switch in a circuit.	how mixtures might be separated, including through filtering, sieving and evaporating. Explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes.	Ruth Benerito, who invented the glue for sticky notes and wrinkle-free cotton. Research how chemical changes have an impact on our lives, like cooking, and discuss the creative uses of polymers, super-sticky and super-thin materials. <b>Assessment 3</b>						
GRADE 5 SCI		WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	
T E R M  2	<b>G5/SC 3 (32)</b>								
	<b>Earth and Space</b>								
	Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. Introduce a model of the Sun and Earth that enables them to explain day and night. Learn that the Sun is a star at the centre of our solar system and that it has eight planets. Understand that a moon is a celestial body that orbits a planet. Describe the movement of the Moon relative to the Earth. Understand how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus. Know that it is not safe to look directly at the Sun, even with dark glasses.	Describe the Sun, Earth and Moon as approximately spherical bodies. Use Earth's rotation to explain day and night and the apparent movement of the sun across the sky. Compare the time of day at different places on the Earth. Create solar system models; shadow clocks and sundials, to show midday and the start and end of the school day. Explain use of Stonehenge as astronomical clocks. <b>Assessment 4</b>							
GRADE 5 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	
T E R M  2	<b>G5/SC 5 (32)</b>								
	<b>Forces</b>					<b>Earth Science and Energy</b>			
	Identify forces that make things begin to move, get faster or slow down. Explain that unsupported objects fall towards Earth because of force of gravity. Find out how scientists, like Galileo Galilei and Isaac Newton developed theory of gravitation. Identify the effects of air and water resistances and friction. Explore falling objects by observing how parachutes and sycamore seeds fall. Explore the effects of friction on movement and find out how it slows or stops moving objects, for example, brake on a bicycle wheel. Explore falling paper cones or cup-cake cases, and design and make parachutes. Carry out fair tests to determine which designs are the most effective. Explore resistance in water by making and testing boats of different shapes.	Know that levers, pulleys and gears, allow a smaller force to have a greater effect. Explore the effects of machines on movement. Design and make products that use levers, pulleys, gears and/or springs and explore their effects. <b>Assessment 5</b>			Describe structure of earth and features of different layers of earth. Understand plate tectonics. Describe water cycle, weathering, erosion and atmosphere. Identify different methods of heat transfer. Describe different types of energy resources and differentiate between renewable and non renewable sources.		Revision for Final Examination		
<b>GRADE 6 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS</b>									
GRADE 6 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	
T E R M  1	<b>G6/SC 1 (22)</b>					<b>G6/SC 2(10)</b>			
	<b>Living things and their habitats</b>					<b>Animals including humans</b>			
	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics. Pupils should build on their learning about grouping living things in year 4 by looking at the classification system in more detail. They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. They should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should explain why living things are placed in one group and not another. Pupils work scientifically by using classification systems and keys to identify some animals and plants in the immediate environment. They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system. Pupils find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification. <b>Assessment 1</b>					Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore how the circulatory system enables the body to function. Describe the ways in which nutrients and water are transported within animals, including humans.			

GRADE 6 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  1	G6/SC 2 (8)		G6/SC 3 (24)					
	Animals including humans		Evolution and Inheritance					
	<p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body. Pupils work scientifically by exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health. <b>Assessment 2</b></p>		<p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Building on what they learned about fossils in the topic on rocks in year 3, pupils should find out more about how living things on earth have changed over time. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. They should know that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles. They should realise that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes’ necks got longer, or the development of insulating fur on the arctic fox. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. Research about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution. <b>Assessment 3</b></p>				Revision for First Term Examination	
GRADE 6 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  2	G6/SC 4 (16)				G6/SC 5 (16)			
	Light				Electricity			
	<p>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 reflect light into the eye. They 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. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. Build on the work on light in year 3, exploring the way that light behaves, including light sources, reflection and shadows. They should explain what happens and make predictions. Investigate the relationship between light sources, objects and shadows by using shadow puppets. Decide where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. Consider a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur). <b>Assessment 4</b></p>				<p>Pupils associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. They 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. Building on their work in year 4, pupils should construct simple series circuits, to explain what happens when they try different components, for example, switches, bulbs, buzzers and motors. Pupils work scientifically by systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit. They should learn how to represent a simple circuit in a diagram using recognised symbols. They use recognised symbols when representing a simple circuit in a diagram. Pupils are expected to learn only about series circuits, not parallel circuits. They should take the necessary precautions for working safely with electricity. <b>Assessment 5</b></p>			
GRADE 6 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  2	REVISION							
	Rocks and soils		Earth Science and Energy		Microbes	Magnets		Revision
	<p>Recognise that soils are made from rocks and organic matter and describe how they are formed. Identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. Revise the different kinds of living things whose fossils are found in sedimentary rocks. Pupils revise different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water.</p>		<p>Describe structure of earth and features of different layers of earth. Understand plate tectonics and seismic waves. Describe water cycle, precipitations, weathering, erosion and atmosphere. Identify different methods of heat transfer. Describe different types of energy resources and differentiate between renewable and non renewable sources.</p>		<p>Describe the uses and harmful effects of micro organisms. Explain immunisation techniques including vaccination.</p>	<p>Revise the strengths of different magnets and find a fair way to compare them; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another. Identify how their properties make magnets useful in everyday items and suggesting creative uses for different magnets. <b>Assessment 6</b></p>		

**GRADE 7 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS**

GRADE 7 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 1	G7 /SC 1 (12)			G7 /SC 2 (8)		G7 /SC 3 (12)		
	Cells, tissues,organs and system			Mixtures and seperation		Energy		
	Recall the life processes.Know the functions of important plant and animal organs.know the functions of different tissues in an organ.Know how to use a light microscope to examine a specimen.Identify the main parts of animal cells and plant cells and describe their functionsKnow that the cells are the fundamental units of living organisms. Know how to observe, interpret and record cell structure using a light microscope. Explain the role of diffusion in the movement of materials in and between cells. Describe the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms. <b>Assessment 1</b>			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. Give examples of where chromatography and distillation is used. <b>Assessment 2</b>		Explain why different people need different amounts of energy from food. Know the different ways in which energy is transferre and stored.Recall the law of conservation of energy. 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 efficiency. <b>Assessment 3</b>		
GRADE 7 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 1	G7 /SC 4 (8)		G7 /SC 5 (8)		G7 /SC 6 (12)			
	Muscles and bones		Acids and alkalis		Current electricity			Revision
	Know how muscles in the gas exchange system allow ventilation. Know what happens during gas exchange in the lungs. Describe the role of muscles in the heart. Know the structure and functions of the human skeleton, to include support, protection, movement and making blood cells. 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. <b>Assessment 4</b>		Know why hazard symbols are necessary. Know some common examples of acids and alkalis. Investigate how indicators can be used to test for acidic, 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. <b>Assessment 5</b>		Define electric current. Know current is measured in amperes. Use a physical model to help explain electric circuits 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, measured in volts. Explain why the current increases when the voltage of supply is increased. Know the relationship between resistance and current. Know the job the fuses and circuit breakers. Know how the different wires are connected in plug. <b>Assessment 6</b>			
GRADE 7 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 2	G7 /SC 7 (10)			G7 /SC 8 (10)		G7 /SC 9 (12)		
	Ecosystem			The particle Model		Forces		
	Recall what a species is. Know continuous or discontinuous variation. Know some adaptations for different habitats. 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 and communities. Use food web to make predictions.Use pyramid of numbers to describe how energy is lost. Explain why pesticide need to be used carefully. <b>Assessment 7</b>			Know what the three states of matter are like, based on their properties. 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 theotry. Use the particle theory to explain the properties of three states of matter. Explain how Brownian motion supports particle theory. Use particle theory to explain diffusion in liquids and gases. Know what causes gas pressure using particle theory. <b>Assessment 8</b>		Know the effects of forces on an object. Name forces and classify them as contact or non-contact forces. Measure forces and masses. Know how the extension of a spring depends on the force applied. 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 the effects of high and low pressure in simple situations. Explain effects of balanced and unbalanced forces. <b>Assessment 9</b>		
GRADE 7	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8



SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 2	G7 / SC 10 (12)		G7 / SC 11 (12)				G7 /SC 12(4)	
	Atoms, Elements and molecules		Sound			Earth Science and heat transfer	Reproduction	Revision
	<p>Know difference between atoms and molecules. Identify elements, mixtures and compound from descriptions and particle diagrams. Know the chemical symbols for common elements. Relate the use of an elements to its properties. Know the differences between metal and non metals. Describe chemical changes and compound formation. Know the name of some simple compounds. Use and understand word equations for chemicals reactions. Know the examples and uses of decomposition reactions. <b>Assessment 10</b></p>		<p>Know the cause of sounds and how to make louder sounds. Know link between frequency and pitch. Know how sound moves through materials. 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. Explain how sonar and eco location work. Compare longitudinal and transverse waves. Know that all waves can be reflected. Explain what super positions means. <b>Assessment 11</b></p>			<p>Describe different layers of earth. Understand plate tectonics and seismic waves. Describe water cycle, precipitations, weathering, erosion and atmosphere. Identify different methods of heat transfer.</p>	<p>Describe the reproduction in humans, including the reproductive systems, menstrual cycle, gametes, fertilisation, gestation and birth and the effect of maternal lifestyle on foetus. <b>Assessment 12.</b></p>	

### GRADE 8 SCIENCE LONG TERM PLAN with CURRICULUM STANDARDS

GRADE 8 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 1	G8 /SCI (8)		G8 /SCI 2 (4)	G8 /SCI 3 (8)		G8 /SCI 4 (8)		G8 /SCI 5 (4)
	Food and Nutrition		Classification	Combustion		Atoms, Elements and molecules		Pressure
	<p>Know the the nutrients we need in our diets and its sources. Calculate energy requirements in a healthy daily diet. Know the tests used to detect some nutrients. 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. Know the structure of a tooth. <b>Assessment 1</b></p>		<p>Interpret scientific organism names. Describe how organisms are classified. Explain the importance of biodiversity.</p>	<p>Know the reactions of hydrogen and hydrocarbons with oxygen. Know the oxidation reactions of metals and non-metals. 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. Know the greenhouse effect and how it is caused. Know how human activity may be cause global warming. <b>Assessment 2</b></p>		<p>Know difference between atoms and molecules. Identify elements, mixtures and compound from descriptions and particle diagrams. Know the chemical symbols for common elements. Relate the use of an elements to its properties. Know the differences between metal and non metals. Describe chemical changes and compound formation. Know the name of some simple compounds. Use and understand word equations for chemicals reactions. Know the examples and uses of decomposition reactions. <b>Assessment 3</b></p>		<p>Realise that pressure is defined as ratio of force over area acting normal to any surface. Know that pressure in liquids increases with depth. Realise that atmospheric pressure decreases with increase of height as weight of air above decreases with height. <b>Assessment 4</b></p>
GRADE 8 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM	G8 /SC 6 (8)		G8 /SCI 7 (10)			G8 /SCI 8 (10)		REVISION
	Ecosystems		Periodic Table			Light		
	<p>Recall what a species is. Know continuous or discontinuous variation. Know some adaptations for different habitats. 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 and communities.</p>		<p>Know Dalton's atomic theory. Use the periodic table to find elements with similar properties. 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 in physical properties within the periodic table. Identify the position of metals and non metals in the periodic table by their properties. Know the reactions of</p>			<p>Know the similarities and differences between light waves and waves in matter. Realise that light waves travel in straight line. 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. List the parts and state their</p>		

1	Use food web to make predictions. Use pyramid of numbers to describe how energy is lost. Explain why pesticide need to be used carefully <b>Assessment 5</b>		some elements with water and oxygen. Identify trends and make predictions about chemical properties using the periodic table. <b>Assessment-6</b>		functions in human eye. Realise that light transfer energy from source to absorber, leading to chemical and electrical effects. Identify the photo-sensitive material in the retina and in cameras. 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. <b>Assessment - 7</b>			
	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 2	G8 /SCI 9 (8)		G8 /SCI 10 (12)			G8 /SCI 11 (12)		
	Breathing and Respiration		Metals and their uses			Energy transfer		
	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. State a word summary for aerobic respiration. Know the causes and effects of reduced oxygen supply on the body. Know the process of anaerobic respiration and its effects during and after hard exercise. Know the gas exchange in different organisms. <b>Assessment -8</b>		Know some common properties and uses of metals. Write word equations for the reactions of metals and non-metals. Know 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 in order of reactivity. Write word and symbol equations for reactions. Explain how to improve the quality of data collected during an investigation. 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. <b>Assessment-9</b>			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. Know what power and efficiency mean. Calculate efficiencies. Interpret Sankey diagrams. Explain how power companies charge for energy used. Describe what a payback time tells you. Work out payback times. State the meanings of accuracy and precision. Explain how to avoid random and systematic errors. <b>Assessment-10</b>		
GRADE 8 SCI	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 2	G8 /SCI 12 (8)		G8 /SCI 13 (10)			G8 /SCI 14 (10)		
	Unicellular Organisms		Rocks		Earth Science and Energy	Sound		Revision
	Use cell features to identify members of different kingdoms. Differentiate between unicellular and multi cellular organisms. Explain how yeasts are used in brewing and baking. Describe how yeasts reproduce and the limiting factors. Know why anaerobic bacteria are used to make yoghurt and cheese. Know the functions of the parts of a bacterial and protoctist cells. Know how bacteria reproduce. Know how algae make their own food and explain its importance. Know the importance of decomposers. Model the recycling of carbon in an ecosystem using carbon cycle. <b>Assessment-11</b>		Know how some of the properties of rocks are related to their texture. Recall some uses of rocks. Know the structure of the Earth. Know how igneous, sedimentary and metamorphic rocks are formed. Explain how the grain size is evidence for the speed of cooling. Explain the rock cycle. Describe weathering and erosion. Know how metals are obtained and some advantages of recycling metals. <b>Assessment-12</b>		Describe plate tectonics in detail and consequences of different types of plate movement near the boundaries. Recall different types of energy resources, renewable and non renewable.	Know how sound is made and how to make louder sounds. Know link between frequency and pitch. Know how sound moves through materials. 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. Explain how sonar and eco location work. Compare longitudinal and transverse waves. Know that all waves can be reflected. Explain what super positions means. <b>Assessment 13</b>		

## 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(9)			Y9/P3(12)			
	Key concepts of Physics	Conservation of energy			Waves			

Key concepts of Physics		Conservation of Energy				Waves			
	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 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 $KE = \frac{1}{2} mv^2$ . 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. <b>Assessment 1</b>				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 $v = x/t$ . Describe how to measure the velocity of sound in air and ripples on water surfaces. Calculate depth or distance from time and wave velocity. <b>Assessment 2</b> Explain 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. 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. <b>Assessment 3</b> <b>CORE PRACTICAL 1: Investigate the suitability of equipment to measure the speed, frequency and wavelength of a wave in a solid and a fluid</b>			
YEAR 9 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	
TERM 1	Y9/P4(12)				Y9/P5(9)				
	Light				Electromagnetic Spectrum				Revision
	Explain, with the aid of ray diagrams, reflection, refraction and total internal 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. Identify common properties of electromagnetic waves. 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. <b>Assessment 4</b> <b>CORE PRACTICAL 2 - Investigate refraction in rectangular glass blocks in terms of the interaction of electromagnetic waves with matter</b>				Describe the continuous electromagnetic spectrum including (in order) radio waves, microwaves, infrared, visible (including the colours of the visible spectrum), ultraviolet, X-rays and gamma rays within it can be grouped in order of decreasing wavelength and increasing frequency. Identify common properties of electromagnetic waves. Describe the absorption and emission of thermal radiation. <b>Assessment 5</b> <b>CORE PRACTICAL 3 - Investigate how the nature of a surface affects the amount of thermal energy radiated or absorbed.</b>				Revision for First Term Exam
YEAR 9 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	
TERM 2	Y9/P6(9)				Y9/P7(15)				
	Electromagnetic spectrum -Uses and dangers				Forces and motion				
	Identify the harmful effects, to life, of excessive 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. <b>Assessment 5</b>				Explain the difference between vector and scalar quantities Define displacement, speed, velocity and acceleration of an object. Draw and interpret d - t and v - t graphs. 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. <b>Assessment 6</b> 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. <b>Assessment 7</b>				
YEAR 9 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	
TERM	Y9/P8 (9)				Y9/P9 (9)				
	Forces and Motion				Momentum		Earth Science	Revision	
	State and explain Newton's three laws of motion. Draw and interpret free body diagram and find resultant force. Investigate how force and mass can affect the acceleration of an object. Explain that inertial mass is a measure of how difficult it is to change the velocity of an object. Use the equations Resultant force = mass x acceleration and weight = mass x gravitational field strength. Introduce the term 'action-reaction' pairs. Explain how for				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.		Explain plate tectonics and consequences of different types of plate movements near the boundaries. Differentiate between types of seismic		

2	<p>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)</p> <p style="text-align: center;"><b>Assessment 8</b></p> <p><b>CORE PRACTICAL 4: Investigate the relationship between force, mass and acceleration</b></p>	<p>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). Estimate the forces involved [in large decelerations] in typical situations on a public road. <b>Assessment 9</b></p>	<p>waves. Identify different layers of atmosphere.</p>
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## GRADE 9 CHEMISTRY LONG TERM PLAN with CURRICULUM STANDARDS

GRADE 9 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
<b>T E R M  1</b>	G 9/ CHE 1 (9)			G 9/ CHE 2 (15)				
	States of Matter (SC 1a)			Methods of Separating and Purifying Substances (SC 2a-2d)				
	<p>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. <b>Assessment 1</b></p>			<p>Identify the differences between a pure substance and a mixture.Discuss 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 <math>R_f</math> values.</p> <p style="text-align: right;"><b>CORE PRACTICAL:Investigate composition of inks using simple distillation and paper chromatography. Assessment 2</b></p>				
GRADE 9 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
<b>T E R M  1</b>	G 9/ CHE 3 (9)			G 9/ CHE 4 (12)				<b>REVISION FOR FIRST TERM EXAMS</b>
	Atomic Structure (SC 3a-3c)			The Periodic Table (SC 4a-4c)				
	<p>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. <b>Assessment 3</b></p>			<p>Explain how Mendeleev arranged the elements in a periodic table by using properties of these elements and their compounds.Discuss how he used his table to predict theexistence and the properties of some elements not then discovered. Compare the similarities and the differences 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. <b>Assessment 4 and 5</b></p>				
GRADE 9 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
<b>T E R M  2</b>	G 9/ CHE 5 (9)			G 9/ CHE 6 (15)				
	Ionic Bonding (SC 5a-5c)			Covalent Bonding & Types of Substances (SC 6a- 7d)				
	<p>Demonstrate how ionic bonds are formed by the transfer of electrons to produce cations and anions. Define ion as a charged particle. Identifies protons,neutrons and electrons in a positive and a negative ion. Draw diagrams to explain how an atom donates / transfers electron to another atom to achieve noble gas electronic structure. Draw the dot and cross diagrams for the ionic compounds.Write the formulae of different ionic compounds.Explain the use of the endings –ide and –ate in the names of compounds. <b>Assessment 6</b></p>			<p>Explain how a covalent bond is formed when a pair of electrons is shared between two atoms. Draw the dot cross diagrams for molecules. Discuss the properties of covalent compounds like low boiling points and melting points, poor conductor of electricity. Define monomers and polymers. Reason out for the higher melting and boiling points of polymers.Demonstrate that elements and compounds can be classified as ionic, covalent, simple molecular covalent, giant molecular and metallic. Explain the properties of ionic compounds and covalent, simple molecular compounds. Analyse the structures and properties of graphite and diamond. 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. <b>Assessment 7 and 8</b></p>				
GRADE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

9 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  2	G 9/ CHE 7 (18)							
	Acids and Alkalis (SC 8a- 8g)							
	<p>Differentiate acids as a source of H<sup>+</sup> and alkalis as a source of OH<sup>-</sup>, strong and weak, concentrated and dilute acids. Explain how the changes in the H<sup>+</sup> 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 to prepare pure dry crystals of copper(II) sulphate and explain the different steps in the preparation. Carry out experiments for the titration and know how to use a pipette, burette and indicator solution while doing titration. Discuss the preparation of soluble salts from insoluble bases and alkalis (using titration). Use the solubility rules to prepare insoluble salts. Write a word and a balanced chemical equation for the precipitation reactions including state symbols.</p> <p>CORE PRACTICAL : Investigate the change in pH on adding powdered calcium hydroxide or calcium oxide to a fixed volume of hydrochloric acid. CORE PRACTICAL : Investigate the preparation of pure, dry hydrated copper sulfate crystals starting from copper oxide including the use of a water bath.</p> <p>Assessment 9 and 10</p>							REVISION FOR FINAL EXAM

### GRADE 9 BIOLOGY LONG TERM PLAN with CURRICULUM STANDARDS

GRADE 9 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  1	G9 /B1 (24)							
	Key Biological Concepts							
	<p>Explain how the sub-cellular structures of eukaryotic and prokaryotic cells are related to their function-animal cells, plant cells &amp; bacteria. Compare structure of animal, plant and bacteria. Draw &amp; label drawings of a typical plant, animal &amp; prokaryote cell.</p> <p style="text-align: center;">Assessment 1</p>			<p>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 &amp; electron microscope. Do calculations based on magnification &amp; scale bar concept. Write measured length /diameter of measured objects in standard form. Investigation 1: Produce labelled scientific drawings from observations of biological specimens using microscopes. Assessment 2</p>				
GRADE 9 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  1	G9/B1 (24)							
	Key Biological Concepts							
	<p>Explain the structure, properties and role of enzymes. Describe factors affecting enzyme activity. Plan experiments linked with factors affecting enzyme activity. Analyse &amp; interpret graphs related to enzyme action. Investigation 2: Factors affecting enzyme activity.</p>		<p>Explain various tests used to detect presence of starch, protein, fat &amp; sugars. Understand how the energy in food can be measured using calorimetry. Investigation 3: Use of chemical reagents to identify starch, reducing sugars, proteins and fats in food substances</p>			<p>Explain how substances are transported by diffusion, osmosis and active transport. Compare process of diffusion, osmosis &amp; active transport. Enlist uses of diffusion, osmosis &amp; active transport in living organisms. Investigation 4: Investigate diffusion in agar and osmosis in potatoes.</p> <p style="text-align: center;">Assessment 3</p>		
GRADE 9 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  2	G9/B2(24)							
	Cells & Control							
	<p>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.</p>		<p>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 &amp; 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.</p>			<p>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.</p> <p style="text-align: center;">Assessment 4</p>		

GRADE 9 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  2	G9/B2(15)					G9/B2(9)		
	Cells & Control					Genetics		
	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.			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. <b>Assessment 5</b>		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. <b>Assessment 6</b>		Revision for Final Exam

## 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 R M  1	Y10/P1 (4)	Y10/P2 (16)			Y10/P3 (12)			
	Mathematical Physics	Waves ( cont')			Light			
	Recall standard form, multiplication and division of numbers with indices. Revise changing the subject of a formula and substitution. Construct and interpret linear graphs.	Explain 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. 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. <b>Assessment 1</b> <b>CORE PRACTICAL 1 - Investigate the suitability of equipment to measure the speed/frequency/wavelength of a wave in a solids and fluid</b>			Explain, with the aid of ray diagrams, reflection, refraction and total internal 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. Identify common properties of electromagnetic waves. 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. <b>Assessment 2</b> <b>CORE PRACTICAL 2 - Investigate refraction in rectangular glass blocks in terms of the interaction of electromagnetic waves with matter</b>			
YEAR 10 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  1	Y10/P4 (12)			Y10/P5 (16)				
	Electromagnetic spectrum			Atom model( 6a-6c)		Radioactivity( 6d-6f)		Revision
	Describe the continuous electromagnetic spectrum including (in order) radio waves, microwaves, infrared, visible (including the colours of the visible spectrum), ultraviolet, X-rays and gamma rays. Describe the absorption and emission of thermal radiation. Identify the harmful effects, to life, of excessive 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. <b>Assessment 3</b> <b>CORE PRACTICAL 3 - Investigate how the nature of a surface affects the amount of thermal energy radiated or absorbed.</b>			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. <b>Assessment 4</b>		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. <b>Assessment 5</b>		Revision for First Term Exam
YEAR 10 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T	Y10/P6 (16)				Y10/P7 (16)			
	Radioactivity( 6a-6m)				Astronomy			

TERM 2	Radioactivity (Pg-011)				ASTRONOMY			
	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. <b>Assessment 6</b>				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. 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 the evolution of stars. Describe how methods of observing the Universe have changed over time. <b>Assessment 7</b>			
YEAR 10 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 2	Y10/P8 (24)							
	Energy- Force doing work		Forces and their effects		Static Electricity		Revision	
	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 . <b>Assessment 8</b> CORE PRACTICAL 4- Investigate the relationship between force, mass and acceleration.		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. <b>Assessment 9</b>		Explain how an insulator can be charged by friction. Recall that like charges repel and unlike charges attract. Explain how earthing removes excess charge. Explain some of the uses and dangers of electrostatic charges in everyday situations. Define an electric field Describe the shape and direction of the electric field around a point charge and between parallel plates and relate field strength to the concentration of lines. Explain static electricity using electric field. <b>Assessment 10</b>		Revision for the Final Exam	

GRADE 10 CHEMISTRY LONG TERM PLAN with CURRICULUM STANDARDS								
GRADE 10 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 1	G10 /CHE 1 (12)			G10/ CHE 2 (20)				
	Covalent Bonding & Types of substances (SC 6a- 7d)			Acids and Alkalis (SC 8a - 8g)				
	Explain how covalent bond is formed by the sharing of electrons in molecules like water, carbondioxide, ammonia and methane. Compare the different ways of representations like structural formulae, dot and cross diagrams, full dot and cross diagrams, ball and stick model and three dimensional space filling model. Explain why elements and compounds can be classified as: ionic, simple molecular (covalent), giant covalent, metallic, properties of ionic compounds such as high melting & boiling points, conduct electricity when molten and in aqueous solution, compare the structures of graphite and diamond. Define metallic bonding and summarize the properties of metal. <b>Assessment 1</b>			Differentiate acids as a source of H <sup>+</sup> and alkalis as a source of OH <sup>-</sup> , strong and weak, concentrated and dilute acids. Explain how the changes in the H <sup>+</sup> 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 : Investigate the change in pH on adding powdered calcium hydroxide or calcium oxide to a fixed volume of hydrochloric acid. CORE PRACTICAL : Investigate the preparation of pure, dry hydrated copper sulfate crystals starting from copper oxide including the use of a water bath. <b>Assessment 2 and 3</b>				
GRADE 10 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 1	G10 /CHE 3 (12)			G10 / CHE 4 (16)				
	Calculations involving masses (SC 9a-c)			Electrolytic Processes (SC 10a-c)				
	Calculate relative formula mass given relative atomic masses. Define empirical formula and molecular formula of a compound. Deduce the			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				

TERM 1	empirical formula when percentage mass of each element is given and deduce molecular formula of a compound from empirical formula and the molecular mass. Calculate the concentration of solutions in $\text{g dm}^{-3}$ . Deduce a balanced chemical equation 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 moles from the mass of a substance. <b>Assessment 4</b>			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. <b>CORE PRACTICAL:</b> Investigate the electrolysis of copper (II) sulfate solution with inert electrodes and copper electrodes. <b>Assessment 5</b>			TERM EXAMINATION
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GRADE 10 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
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TERM 2	G10 /CHE 5 (12)			G 10 / CHE 6 (8)		G10/ CHE 7 (12)		
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TERM 2	Obtaining and using metals (SC 11a- d)			Dynamic equilibrium (SC 12a)		Transition Metals, Corrosion (SC 13a-b)		
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TERM 2	Discuss the similarities and differences in the way different metals react with water, acids and salt solutions. Explain 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. <b>Assessment 6</b>			Define dynamic equilibrium. Use the symbol for reversible. Describe the formation of ammonia as a reversible reaction between nitrogen and hydrogen for Haber process. Predict how the position of an equilibrium is affected by change in temperature, pressure, concentration. Predict why ammonia is cooled and liquified as soon as it is formed. <b>Assessment 7</b>		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. <b>Assessment 8</b>		
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GRADE 10 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
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TERM 2	G10/ CHE 8 (8)		G10/ CHE 9 (16)					
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TERM 2	Electroplating & Alloying (SC 13c-d)		Quantitative Analysis, Calculations involving volumes of gases (SC 14a - e)					
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TERM 2	Explain how electroplating can be used to improve the appearance and resistance to corrosion of metal objects, 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. <b>Assessment 9</b>		Calculate the concentration of solutions in $\text{mol dm}^{-3}$ and convert concentration in $\text{g dm}^{-3}$ into $\text{mol dm}^{-3}$ , calculations to find the concentration of an acid/ alkali solution using acid-base titration, percentage yield, atom economy, molar volume of gases, use Avogadro's law to calculate volumes of gases involved in a gaseous reaction, given the relevant equation. 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. <b>CORE PRACTICAL:</b> Carry out an accurate acid-alkali titration, using burette, pipette and a suitable indicator. <b>Assessment 10</b>				REVISION FOR FINAL EXAMINATION	
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## GRADE 10 BIOLOGY LONG TERM PLAN with CURRICULUM STANDARDS

GRADE 10 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
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TERM 1	G10 /BIO 1 (24)					G10 /BIO 2 (12)		
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TERM 1	Genetics					Natural Selection		
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TERM 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		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, Punnett 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. Understand the significance of HGP & cause of gene mutation with			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		
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		protein produced. <b>Assessment 1</b>		examples. Investigation 1: Use of chemical reagents to identify starch, reducing sugars, proteins and fats in food substances			rather than five kingdom method. <b>Assessment 2</b>	
GRADE 10 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	G10/B2 (12)			G10/ B3(16)				
	Genetic modification			Health & Disease				
	Understand selective breeding & its impact on food plants and domesticated animals. 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. <b>Assessment 3</b>			Differentiate infectious & non infectious diseases in humans. Describe the cause, spread and control of infectious diseases. 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. Investigation 2 : Factors affecting enzyme activity. <b>Assessment 4</b>				Revision for First Term Exam
GRADE 10 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	G10/ B3 (28)							
	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 bactericidal & bacteriostatic action of antibiotics. Explain the aseptic techniques used in culturing microorganisms. Explain the various phases used in the development of drugs. Describe the stages involved in the production of monoclonal antibodies. Understand the use of monoclonal antibodies in pregnancy testing & detection of blood clots and cancer. <b>Assessment 5</b>			Describe plant defence mechanisms. Evaluate the use of plant chemicals, antibiotics and antiseptics to favour cure and avoid spread of diseases. Investigation 3 : Effect of antibiotics, antiseptics & plant extract on bacterial growth. <b>Assessment 6</b>		
GRADE 10 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 2	G10/B4(32)							
	Plant structures and their functions							
	Describe how the various parts of the leaf adapted for photosynthesis. Explain the role of photosynthesis in plants, factors affecting it and analyzing the limiting factors. Investigation 4: Factors affecting photosynthesis			Explain how structure of root hair cell, xylem & phloem are adapted for transport in plants. Understand mechanisms of transport of nutrients in plants & factors affecting transpiration linked with transport. Know how plants are adapted to survive in extreme environments. <b>Assessment 7</b>			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. <b>Assessment 8</b>	

## 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 M	Y11/P1 (20)				Y11/P2 (20)			
	Astronomy				Energy- Force doing work		Forces and their effects	
	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. 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				Define work and energy transferred. Determine 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		Describe how objects can interact. Draw and use free body force diagrams and resultant forces. Identify situations where forces can cause rotation. Recall and use the equation: moment of a force =	

1	galaxies provides evidence for the Universe expanding. Describe the evolution of stars. Describe how methods of observing the Universe have changed over time. <b>Assessment 1</b>				equal to one joule per second, J/s . <b>Assessment 2</b> <b>CORE PRACTICAL 1- Investigate the relationship between force, mass and acceleration.</b>		force $\times$ 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. <b>Assessment 3</b>			
	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/P3 (20)			Y11/P4(25)						
	Static Electricity			Electricity and Circuits			Electrical Safety		Revision	
	Explain how an insulator can be charged by friction, through the transfer of electrons. Recall that like charges repel and unlike charges attract. Explain common electrostatic phenomena in terms of movement of electrons. Explain how earthing removes excess charge by movement of electrons. Explain some of the uses and dangers of electrostatic charges in everyday situations. Define an electric field 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. Explain the phenomena of static electricity with the help of electric field. <b>Assessment 4</b>			Draw and use electric circuit diagrams. Define voltage and current. State explain Ohm's law and define resistance. Analyse series and parallel circuits. Develop an understanding of components with changing resistances. Describe and explain how the resistance of filament lamp and thermistor vary with temperature and how the resistance of an LDR varies with light intensity. Investigate IV graphs of different ohmic and non-ohmic conductors like metal wire, filament lamp and semi conductor diode. Explain the energy transfer as the result of collisions between electrons and the ions in the lattice. Explain the heating effect of an electric current and calculate electrical power. Describe the advantages and disadvantages of the heating effect of an electric current. <b>Assessment 5</b> <b>CORE PRACTICAL 2 - Construct electrical circuits to:</b> a) a) investigate the relationship between potential difference, current and resistance for a resistor and a filament lamp b) test series and parallel circuits using resistors and filament lamps			Describe how, in different domestic devices, energy is transferred. Explain the difference between ac and dc. Explore different wires in three pin plug. Recall the potential differences between the live, neutral and earth mains wires Explain the function of an earth wire and of fuses or circuit breakers in ensuring safety. Explain the dangers of electricity. Describe the relationship between the power ratings for domestic electrical appliances and the changes in stored energy when they are in use. <b>Assessment 6</b>		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/P5 (25)					Y11/P6 (15)				
	Magnetism and motor effect		Electromagnetic induction		Particle model			Forces and Matter		
	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 field strength to the current and distance from the conductor. 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. <b>Assessment 7</b>		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. <b>Assessment 8</b> <b>Core Practical 3: Investigate the densities of solid and liquids</b>		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 $Q = m \times L$ . <b>Assessment 9</b> Explain what causes the pressure of a gas. Recognize absolute zero as the lowest possible temperature. Describe the effect of changing the temperature of a gas on the speed of its particles and pressure. Use equation $P_1 \times V_1 = P_2 \times V_2$ to calculate pressure or volume for gases of fixed mass at constant temperature. <b>Assessment 10</b> <b>Core Practical 4: Investigate the properties of water by determining the specific heat capacity of water and obtaining a temperature-time graph for melting ice.</b>			Describe the difference between elastic and inelastic distortion. Use the equation to calculate the spring constant: $F = kx$ . Use the equation $E = 1/2 kx^2$ 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, $P = F/A$ . Describe and explain how pressure in fluids increases with depth and density. Use the equation $P = h \times \rho \times g$ . 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. <b>Assessment 11</b> <b>Core Practical 5: Investigate the extension and work done when applying forces to a spring</b>		

## GRADE 11 CHEMISTRY LONG TERM PLAN with CURRICULUM STANDARDS

GRADE 11 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  1	G11 /CHE 1 (10)		G11 /CHE 2 (15)			G11/ CHE 3 (15)		
	Obtaining and using metals, reversible reactions (SC 11b -12a)		Transition metals, Alloys and Corrosion (SC 13a-c)			Quantitative Analysis (SC 14 a-e)		
	Explain displacement reactions as redox reactions, extraction of metals as reduction of ores by heating with carbon, electrolysis, biological methods like bacterial and phytoextraction, recycling of metals. Define dynamic equilibrium, predict how the position of a dynamic equilibrium is affected by changes in temperature, pressure, concentration. <b>Assessment 1</b>		Understand that most metals are transition metals, recall their typical physical and chemical properties. Site examples of transition metals in 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, sacrificial protection. Discuss electroplating and alloying of metals. Summarize the advantages of alloying. <b>Assessment 2</b>			Calculate the concentration of solutions in mol dm <sup>-3</sup> and convert concentration in g dm <sup>-3</sup> into mol dm <sup>-3</sup> . 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. 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. <b>CORE PRACTICAL:</b> Carry out an accurate acid-alkali titration, using burette, pipette and a suitable indicator. <b>Assessment 3</b>		
GRADE 11 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  1	G11 /CHE 4 (10)			G11 /CHE 5 (10)				
	Dynamic equilibria, Chemical cells and Fuel cell (SC 15a- 16a)			Groups in the Periodic Table (SC 17a- d)				
	Compare the similarities and differences of making fertiliser in laboratory and factory. Describe how ammonium nitrate is manufactured using Haber process and conditions are chosen for industrial chemical processes. Explain hydrogen-oxygen fuel cells and strengths/weaknesses of fuel cells. <b>Assessment 4</b>			Write the observations and equations for the reactions of group 1 metals with water. Observe the reactions of the halogens with metals to form metal halides and predict the observations. Explain the displacement reactions are redox reactions. Relate the uses of noble gases with their properties like inertness and low density. <b>Assessment 5</b>			REVISION FOR FIRST TERM EXAM	
GRADE 11 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  2	G11 /CHE 6 (15)		G11 /CHE 7 (15)		G11 /CHE 8 (10)	G11 /CHE 9 (10)		G11 /CHE 10 (10)
	Rates of Reaction, Heat Energy Changes in Chemical Reactions (SC18a-19b)		Fuels, Earth and Atmospheric Science (SC 20a - 21d)		Hydrocarbons, Alcohols and Carboxylic acids (SC 22a- 23c)	Polymers, Qualitative Analysis (SC 24a- 25c)		Bulk and Surface Properties of Matter (SC 26)
	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. Define exothermic and endothermic reactions. Suggest examples of endothermic and exothermic reactions. Calculate the energy changes in reactions from bond energy data. <b>CORE PRACTICAL:</b> Investigating the effects of changing the conditions of a reaction on the rates of chemical reactions. <b>Assessment 6</b>		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 monoxide and soot produced. Explain the advantages and disadvantages of hydrogen and petrol as fuels. Compare early atmosphere and atmosphere today and explain how human activities influence the climate. <b>Assessment 7</b>		Identify functional groups present in alkanes, alkenes, alcohols and carboxylic acids. Predict reactions of carboxylic acids. <b>CORE PRACTICAL:</b> Investigate temperature rise in water by combustion of alcohols. <b>Assessment 8</b>	Define monomers and polymers. Discuss the different types of polymers. Define addition and condensation polymerisation with examples, problems with disposal of polymers. Give the tests, observations and reactions to identify cations and anions. <b>CORE PRACTICAL:</b> Identify the ions in some unknown salts, using the tests for the specified cations and anions. <b>Assessment 9</b>		Discuss what are ceramics, polymers, composite materials and how these materials are chosen for a given use. Explain what are nanoparticles, how they are different from bulk materials, their size and the risks associated with them. Comment on the uses and properties of nanoparticles. Predict some uses of gold nanoparticles. <b>Assessment 10</b>

## GRADE 11 BIOLOGY LONG TERM PLAN with CURRICULUM STANDARDS

GRADE 11	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
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BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 1	G11/B1(25)					G11/B2(15)		
	Plant structures and their functions					Animal Coordination & Control		
	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. Investigation 1: Factors affecting photosynthesis. Explain how structure of root hair cell, xylem & phloem are adapted for transport in plants. 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. <b>Assessment 1</b>					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. Investigation 2 : Factors affecting enzyme activity. <b>Assessment 2</b>		
GRADE 11 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 1	G11/B2(20)				G11/B3(20)			
	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. Investigation 3 : Effect of antibiotics, antiseptics & plant extract on bacterial growth. <b>Assessment 3</b>				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. 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. Investigation 4: Factors the rate of respiration in living organisms. Revision for First term exam			
GRADE 11 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 2	G11/B4(40)							
	Ecosystem & material cycles							
	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. Investigation 5: Use of chemical reagents to identify starch, reducing sugars, proteins and fats in food substances . <b>Assessment 4</b>				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. Investigation 6: Investigate the relationship between organisms and their environment using field-work techniques, including quadrats and belt transects. <b>Assessment 5</b>			

## 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
T	YR 12/PHY 1(6)	YR 12/PHY 2(27)				YR 12/PHY 3(15)		
	Working as a Physicist	Mechanics I				Fluid and Solids		
	Distinguish between base and derived quantities and their SI units. Understand the measurements and techniques for both	Use the equations for uniformly accelerated motion in one dimension. Draw and interpret displacement-time, velocity-time and acceleration-time graphs. Know the physical quantities derived from the slopes and areas of displacement-time, velocity-time and acceleration-time graphs, including cases of non-uniform acceleration and understand how to use the quantities. Understand scalar and vector quantities and know examples of each type of quantity and recognise vector notation. 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				Use the equation density $\rho = m/V$ . Use the relationship upthrust = weight of fluid displaced. Use Stokes' Law, $F = 6\pi\eta rv$ . Understand that this equation applies only to small spherical objects moving at low speeds with laminar flow and that viscosity is temperature dependent. <b>Assessment 3</b> Use the Hooke's law equation, $\Delta F = k\Delta x$ , where k is the		

E R M 1	familiar and unfamiliar experiments. Estimate values for physical quantities.	<p>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 <math>\Sigma F = ma</math> and Newton's first law of motion where <math>a = 0</math>, objects at rest or travelling at constant velocity. Use of the term terminal velocity is expected. Use the equations for gravitational field strength <math>mg = F</math> and weight <math>W = mg</math>. Know and understand Newton's third law of motion and know the properties of pairs of forces in an interaction between two bodies.</p> <p><b>Assessment 1</b> 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 <math>p = mv</math>. Know the principle of conservation of linear momentum, understand how to relate this to Newton's laws of motion and understand how to apply this to problems in one dimension.</p> <p><b>Assessment 2</b> CORE PRACTICAL 1: Determine the acceleration of a freely-falling object.</p>						<p>stiffness of the object. Use the relationships <math>\text{stress} = F/A</math>, <math>\text{strain} = e/L</math> 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 in a deformed material sample and from the area under the force-extension graphs for both linear and non-linear force-extension graphs.</p> <p><b>Assessment 4</b> 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.</p>	
	YEAR 12 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M 1	YR 12/PHY 4(33)						YR 12/PHY 5(15)		
	Mechanics II						Electric Circuits I		
	<p>Use the equation for the moment of a force, moment of force = <math>Fx</math> where <math>x</math> 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 <math>\Delta W = F\Delta s</math>, including calculations when the force is not along the line of motion. Use the equation <math>k = 1/2 mv^2</math> for the kinetic energy of a body. Use the equation <math>\Delta E_{\text{grav}} = mg\Delta h</math> 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 <math>P = E/t</math> and efficiency = useful energy output/total energy input.</p> <p><b>Assessment 5</b></p>						<p>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 <math>I = nqvA</math> 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.</p> <p><b>Assessment 6</b> CORE PRACTICAL 2: Determine the electrical resistivity of a material.</p>		
YEAR 12 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	
T E R M 2	YR 12/PHY 6(33)						YR 12/PHY 7(15)		
	Waves						Electric Circuits II		
	<p>Define amplitude, frequency, period, speed and wavelength. Use the wave equation <math>v = f\lambda</math>. 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 <math>v = \sqrt{T/\mu}</math>.</p> <p><b>Assessment 7</b> 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 <math>n\lambda = d\sin\theta</math> for a diffraction grating.</p> <p><b>Assessment 8</b> 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.</p>						<p>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.</p> <p><b>Assessment 9</b> CORE PRACTICAL 3: Determine the e.m.f. and internal resistance of an electrical cell.</p>		
YEAR 12 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	
	YR 12/PHY 8(33)						YR 12/PHY 9(15)		
	Nature of Light						Refraction		

TERM 2	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 $hf = \phi + KE$ . 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. <b>Assessment 10</b>	Explain refraction and use $n_1 \sin \theta_1 = n_2 \sin \theta_2$ where $n$ is $n = c/v$ . 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 $P = P_1 + P_2 + P_3 + \dots$ . Use the lens equation with the real is positive convention. Understand that magnification = image height/object height and $m = v/u$ . <b>Assessment 11</b>
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## GRADE 13 PHYSICS LONG TERM PLAN with CURRICULUM STANDARDS

GRADE 13 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 1	GR 13/PHY 1 (22)					GR 13/PHY 2 (10)		
	Electric and Magnetic Fields					Further Mechanics		
	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 a resistor-capacitor circuit, $I = I_0 e^{(-t/RC)}$ , and $V = V_0 e^{(-t/RC)}$ and the corresponding log equations. <b>Assessment 1</b> 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. <b>Assessment 2</b> <b>CORE PRACTICAL 11:</b> 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.					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. <b>Assessment 3</b> <b>CORE PRACTICAL 9:</b> Investigate the relationship between force and its change of momentum. <b>CORE PRACTICAL 10:</b> Use ICT to analyse collisions between small spheres, e.g. ball bearings on a table top.		
YR 13 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 1	YR 13/PHY 3 (15)			YR 13/PHY 4 (9)				
	Thermodynamics			Nuclear radiations				
	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. Use the Stefan-Boltzmann law equation $L = \sigma AT^4$ for black body radiators. Use Wien's law equation $\lambda_{max} T = 2.898 \times 10^{-3} \text{ m K}$ for black body radiators. <b>Assessment 4</b> <b>CORE PRACTICAL 12:</b> Calibrate a thermistor in a potential divider circuit as a thermostat.			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. <b>Assessment 5</b> <b>CORE PRACTICAL 15:</b> 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. <b>Assessment 6</b>			Revision for the First Term Exam	

	CORE PRACTICAL 13: Determine the specific latent heat of a phase change.							
	CORE PRACTICAL 14: Investigate the relationship between pressure and volume of a gas at fixed temperature.							
YEAR 13 PHY	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  2	YR 13/PHY 5 (27)			YR 13/PHY 6 (6)	YR 13/PHY 7(6)		YR 13/PHY 8 (9)	
	Particles			Gravitational Field	Oscillations		Space	
	<p>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 <math>R = p/BQ</math> for a charged particle in a magnetic field. 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 <math>\Delta E = c^2 \Delta m</math> in situations involving the creation and annihilation of matter and antimatter particles. Use MeV and GeV (energy) and MeV/c<sup>2</sup>, GeV/c<sup>2</sup> (mass) and convert between these and SI units. Understand situations in which the relativistic increase in particle lifetime is significant (use of relativistic equations not required). Know that in the standard quark-lepton model particles can be classified as baryon, mesons, leptons and photons which are fundamental particles and that the symmetry of the model predicted the top quark. 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.</p> <p style="text-align: right;"><b>Assessment 7</b></p>			<p>Define gravitational field. Understand that gravitational field strength is defined as <math>g = F/m</math>. Define Newton's law of universal gravitation). Use the equation <math>V = Gm/r</math> for a radial gravitational field. Compare electric fields with gravitational fields. Apply Newton's laws of motion and universal gravitation to orbital motion.</p>	<p>Know that the condition for simple harmonic motion is <math>F = -kx</math>, and hence identify situations in which SHM will occur. Use the equations <math>a = -\omega^2 x</math>, <math>x = A \cos \omega t</math>, <math>v = -A\omega \sin \omega t</math>, <math>a = -A\omega^2 \cos \omega t</math>, and <math>\omega = 2\pi f</math>. 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.</p> <p style="text-align: center;"><b>Assessment 8</b></p> <p><b>CORE PRACTICAL 16: Determine the value of an unknown mass using the resonant frequencies of the oscillation of known masses.</b></p>	<p>Use the equation, intensity <math>I = L/4\pi d^2</math> where L is luminosity and d is distance from the source. 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 <math>v = H_0 d</math> 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. <b>Assessment 9</b></p>		

**GRADE 12 CHEMISTRY LONG TERM PLAN with CURRICULUM STANDARDS**

GRADE 12 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  1	G 12 /CHE 1 (18)			G 12 /CHE 2 (18)		G 12 /CHE 3 (12)		
	Atomic structure and periodic table			Bonding and structure		Redox I		
	<p>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.</p> <p style="text-align: right;"><b>Assessment 1</b></p>			<p>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. <b>Assessment 2</b></p>		<p>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. <b>Assessment 3</b></p>		
GRADE 12 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8

TERM 1	G 12 /CHE 4 (18)			G 12 /CHE 5 (24)				
	Inorganic Chemistry			Formulae, Equations and amounts of substance				
	<p>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.</p> <p style="text-align: center;">Assessment 4</p>			<p>Calculate moles in reactions involving mass, volume of gas, volume of solution, concentration of solutions in mol dm<sup>-3</sup> and g dm<sup>-3</sup>, 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.</p> <p style="text-align: center;">CORE PRACTICAL 1: Measure the molar volume of a gas.</p> <p style="text-align: center;">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. Assessment 5</p>				REVISION FOR FIRST TERM EXAMINATION

GRADE 12 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
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TERM 2	G12 /CHE 6 (30)				G12/ CHE 7 (18)			
	Organic Chemistry				Modern analytical techniques			
	<p>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. CORE PRACTICAL 4: Investigation of the rates of hydrolysis of some halogenoalkanes.</p> <p style="text-align: center;">of ethanol</p> <p style="text-align: center;">Chlorination of 2-methylpropan-2-ol using concentrated hydrochloric acid. Assessment 6</p>				<p>Identify the species responsible 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.</p> <p style="text-align: center;">Assessment 7</p> <p style="text-align: center;">CORE PRACTICAL 7: Analysis of inorganic and organic unknowns.</p>			

GRADE 12 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
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TERM 2	G 12 /CHE 8 (18)			G 12 /CHE 9 (12)		G 12 /CHE 10 (12)		
	Chemical Energetics			Reaction Kinetics		Chemical Equilibrium		
	<p>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.</p> <p style="text-align: center;">CORE PRACTICAL 8: To determine the enthalpy change of a reaction using Hess's Law. Assessment 8</p>			<p>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</p>		<p>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 K<sub>c</sub> in heterogenous equilibria. Assessment 10</p>		REVISION FOR FINAL EXAMINATION

### GRADE 13 CHEMISTRY LONG TERM PLAN with CURRICULUM STANDARDS

GRADE 13 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
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TERM 1	G 13/ CHE 1 (12)		G 13 / CHE 2 (24)			G 13 / CHE 3 (12)		
	Equilibrium II		Acid - base equilibrium			Energetics II		
	<p>Deduce an expression for K<sub>p</sub>, for homogeneous and heterogeneous system. Calculate a value with units for K<sub>c</sub> and K<sub>p</sub>. Discuss the effect of temperature on the position of equilibrium. Understand that the value of K is unaffected by changes in concentration or pressure. Predict the</p>		<p>Identify Brønsted-Lowry conjugate acid-base pairs, define 'pH', do pH calculations with [H<sup>+</sup>], 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 K<sub>w</sub>, 'pK<sub>a</sub>' and 'pK<sub>w</sub>'. Calculate K<sub>a</sub> 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</p>			<p>Define lattice energy. Construct Born-Haber cycles to calculate the lattice energy with proper units and conventions. 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</p>		



	direction of change by applying the concepts of rate and equilibrium. <b>Assessment 1</b>	and an alkaline buffer. Calculate the pH of a buffer solution from the given data. CORE PRACTICAL 9: Finding the Ka value for a weak acid. <b>Assessment 2 and 3</b>					the reaction is thermodynamically feasible. <b>Assessment 4</b>		
GRADE 13 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	
T E R M  1	G 13/ CHE 4 (24)								
	Redox II								
	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 $E^{\circ}$ to calculate the cell potential. Carry out titrations between $Fe^{2+}/MnO_4^-$ and $I_2/S_2O_3^{2-}$ with suitable indicator solution. Calculates the uncertainties in the measurements. Compare the advantages and disadvantages of different electrochemical cells. Investigating some electrochemical cells  titration. <b>Assessment 5</b>						CORE PRACTICAL 10: CORE PRACTICAL 11: Redox		
GRADE 13 CHE	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	
T E R M  2	G 13 / CHE 5 (12)		G 13 / CHE 6 (24)		G 13 / CHE 7 (12)		G 13 / CHE 8 (12)		
	Kinetics II		Transition metals		Organic Chemistry II		Organic Chemistry III		
	Describe experimental technique to obtain rate data by titration and volume of gas evolved. Deduce rate equation by finding the order with respect to each reactant. CORE PRACTICAL 13a and 13b: Rates of reaction : iodine-propanone reaction by a titrimetric method and 'clock reaction' CORE PRACTICAL 14: Finding the activation energy of a reaction. <b>Assessment 6</b>		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, $Cr_2O_7^{2-}$ into chromate(VI). Write the observations and equations for the reactions of transition metal ions with aqueous NaOH and 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. CORE PRACTICAL 12: Preparation of a transition metal complex. <b>Assessment 7</b>		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. <b>Assessment 8</b>		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. CORE PRACTICAL 15: Analysis of some inorganic and organic unknowns. CORE PRACTICAL 16: The preparation of aspirin <b>Assessment 9</b>		Discuss the term nuclear magnetic resonance. Explain how mass spectra and NMR $^1H$ and $^{13}C$ data is used to 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. <b>Assessment 10</b>
<b>GRADE 12 BIOLOGY LONG TERM PLAN with CURRICULUM STANDARDS</b>									
GRADE 12 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	
T E R M  1	AL/B1(24)				AL/B1(24)				
	Biological Molecules				Biological Molecules				
	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 & quaternary structure. Discuss the physical & chemical properties of water. <b>Investigation</b> : Detection of carbohydrates, fats & proteins using Iodine test, Benedict test, Biuret test & Emulsion test. <b>Assessment 1</b>				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. CORE PRACTICAL 1: Investigate a factor affecting the initial rate of an enzyme- controlled reaction. <b>Assessment 2</b>				
GRADE 12 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	
	AL /B2(24)				AL /B3(24)				

TERM 1	AL/B2(24)				AL/B3(24)			
	Cells, Viruses and Reproduction of Living Things				Cells, Viruses and Reproduction of Living Things			
	Identify and understand the ultra structure of organelles in prokaryotes and eukaryotes. Describe structure, life cycle & harmfulness of virus particles. Identify various levels of organization in organisms - cells, tissues, organs & organ system with examples. CORE PRACTICAL 2: Use of the light microscope, including simple stage and eyepiece micrometers and drawing small numbers of cells from a specialised tissue. <b>Assessment 3</b>				Explore stages of cell cycle, mitosis and meiosis and its role in sexual and asexual reproduction in animals and plants. CORE PRACTICAL 3: Make a temporary squash preparation of a root tip to show stages of mitosis in the meristem under the light microscope. CORE PRACTICAL 4: Investigate the effect of sucrose concentrations on pollen tube growth or germination. <b>Assessment 4</b> <span style="float: right;">REVISION</span>			
GRADE 12 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 2	AL/B4(24)				AL/B4(24)			
	Exchange and Transport				Exchange and Transport			
	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. CORE PRACTICAL 5: Investigate the effect of temperature on beetroot membrane. CORE 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. <b>Assessment 5.</b>				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. Correlate the role of transpiration in transport of nutrients. CORE PRACTICAL 8: Investigate factors affecting water uptake by plant shoots using a potometer. <b>Assessment 6</b>			
GRADE 12 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 2	AL/B5(30)				AL/B5(18)			
	Classification and Biodiversity				Energy for Biological Processes			
	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. 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. <b>Assessment 7</b>				Recall structure of mitochondria. Distinguish aerobic and anaerobic respiration in living organisms. Describe glycolysis, kreb cycle & oxidative phosphorylation. 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. <b>Assessment 8 .</b>			
<b>GRADE 13 BIOLOGY LONG TERM PLAN with CURRICULUM STANDARDS</b>								
GRADE 13 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
TERM 1	AL/B1(30)				AL/B2(18)			
	Energy for Biological processes				Modern Genetics			
	Recall structure of mitochondria. Distinguish aerobic and anaerobic respiration in living organisms. Describe glycolysis, kreb cycle & oxidative phosphorylation. 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. <b>Assessment 1.</b> 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 the presence of different chloroplast pigments using chromatography. <b>Assessment 2</b>				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. <b>Assessment 3</b>			

GRADE 13 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  1	AL/B3(33)					AL/B4(15)		
	Microbiology and pathogens					Origins of genetic variation		
	<p>Identify the principles and techniques involved in culturing microorganisms. Understand the different methods of measuring the growth of a bacterial culture &amp; 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.</p> <p>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.</p> <p>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. <b>Assessment 4</b></p>					<p>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. Apply and analyse chi squared tests to test the significance of the difference between observed and expected results. <b>Assessment 5</b></p>		
GRADE 13 BIO	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8
T E R M  2	AL/B5(24)				AL/B6 (24)			
	Control Systems				Ecosystems			
	<p>Understand the principles of homeostasis. Explain the mechanism of hormone action. Know photoreception and flowering in plants and details of human nervous system &amp; nerve impulse transmission. Understand photoreception in animals &amp; discuss effects of drugs in humans. Explain control of heart rate, osmoregulation &amp; thermoregulation in humans.</p> <p>CORE PRACTICAL 14: Investigate the effect of gibberellin on the production of amylase in germinating cereals using a starch agar assay. <b>Assessment 6 and 7</b></p>				<p>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. 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. 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. <b>Assessment 8 &amp; 9</b></p>			