Science

Syllabus

Grade 10

This includes the subject content to be covered by the Grade 9 syllabus for Grade 10 students and the syllabus to be covered by the Grade 10 syllabus. The relevant content of the first term of Grade 10 has not been changed.

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The syllabus for Grade 10 students of 2021 that should be covered in second and third terms of Grade 9 (the full content of the first term has already covered at school)

Competency	Competency level	Contents	Outcomes	Time (Periods)	Remarks

1.0 Explores life and life processes in order to improve productivity of biological systems.	1.3 Discloses the structure-function relationships related to the human blood.	• Blood circulatory system
		• Blood
		  • Components
		  • Function
		  • Blood groups
		  • Blood transfusion and agglutination·
		• Clotting of blood
		• Structure of the heart
		• Chambers of the heart, valves, walls, main arteries and veins, coronary artery.
		• Structure of arteries, veins and capillaries
			Student should be able to;
			• briefly explain about the blood circulatory system.
			• state the components of blood and their functions.
			• state transport and protection as the main functions of blood.
			• state that there are four blood groups A, B, AB and O depending on the protein components contained in blood cells.
			• state that blood transfusion is the transference of blood of one individual (the donor) to the body of another (the acceptor/recipient).
			• state that if incompatible blood types are mixed during transfusion, agglutination occurs.
			• illustrate the compatibility of blood groups in transfusion, by using a table.
			• state the qualification of a blood donor.
			• state that clotting of blood is an important protective event during bleeding.
			• differentiate the blood clotting from the coagulation.
				02	• Number of periods have been reduced from 8 to 2.
					• Some learning content and outcomes have been removed.
					• Explaining about structure of the human heart, its veins, arteries, and capillaries, with respect to their functions are not required.
					• Classifying the main blood groups further as positive and negative based on the Rhesus factor is not required.
					• Use "Guru Gedara" lessons to teach lessons effectively.

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Competency	Competency level	Contents	Outcomes	Time (Periods)	Remarks

	1.4 Reviews the plant growth substances.	• Plant growth substances
		  • Auxins
		  • Cytokinins
		  • Gibberellins
			Student should be able to;
			• state that plants contain chemical substances which control their physiological functions.
			• describe the effect of growth factors on plant growth.
			• explain the effects caused by various growth-promoting substances in plants.
			• accept that artificial growth-substances can induce physiological effects.
				02	• Number of periods have been reduced from 6 to 2.
					• Some learning outcomes have been removed.
					• Explaining about growth factors is adequate. Conducting simple activities are not required.
					• Use "Guru Gedara" lessons to teach lessons effectively.
					
					• Competency level 1.5: Reviews the mechanical support and movements in organisms; is not required to be discussed. It will be discussed in Grade 10 and 11.

	1.6 Explores the importance of the evolutionary process in biodiversity.	• Evolution of living organisms
		  • Origin of the Earth and life
		  • Evolution
		  • Evidence in support of evolution
		    • Importance of evolution in bio-diversity
			Student should be able to
			• state simply the notion about the origin of the planet Earth.
			• state that life originated as a result of a biochemical process.
			• state that evolution is the emergence of living beings at present from the simple organisms lived at the beginning.
			• describe the importance of fossils among other evidence which support evolution.
			• demonstrate how a fossil is created using a simple activity.
				03	• Number of periods have been reduced from 6 to 3.
					• Some learning content and outcomes have been removed.
					• Stating that bio-diversity is a result of evolution and accepting that the future of bio-diversity depends on the process of evolution are not required to discussed.
					• Conduct teacher demonstrations for practical sessions and use "Guru

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Competency	Competency level	Contents	Outcomes	Time (Periods)	Remarks
					Gedara", textbooks to teach lessons effectively. • Competency 2: Explores properties and interactions of matter with the aim of promoting quality of life; is not required to discussed. Those parts will be discussed in Grade 10 and 11.
3.0 Utilizes various forms of energy, their interaction with matter and energy transforms at by maintain in efficiency and at an optimum level.	3.3 Applies effectively the principles of reflection and refraction of rays for day-to-day tasks.	• Reflection of sound • Echo • Reverberation	**Student should be able to** • engage in simple activities to show that sound can be reflected. • state that echo and reverberation are results of the reflection of sound. • state applications of the reflection of sound. • suggest methods to remove barriers for reflection of sound.	02	• Number of periods have been reduced from 12 to 2. • Some learning content and outcomes have been removed. • Principles of reflection and refraction of light will be discussed in Grade 10 and 11. • Conduct teacher demonstrations for practical sessions and use "Guru Gedara" lessons to teach lessons effectively.
	3.4 Uses simple machines effectively to facilitate day to day activities.	• Machines • Simple machines • Effort • Load • Fulcrum • Levers • Classes of levers	**Student should be able to** • explain a machine. • present examples to indicate how work is facilitated by machines. • state that lever, inclined plane, wheel and axle and pulleys are used as simple machines. • name the force applied on the lever as the effort, the force that is overcome	04	• Number of periods have been reduced from 12 to 4. • Some learning content and outcomes have been removed. • Calculations regarding the simple machines are not required. • Conduct teacher demonstrations for practical

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Competency	Competency level	Contents	Outcomes	Time (Periods)	Remarks
		• Inclined plane • Wheel and axel • Stationary pulleys	by the effort as the load and the point/axis around which the effort and the load tend to rotate as the fulcrum. • demonstrate through simple activities the instances where levers are used in relation to the placement of the fulcrum the effort and the load. • indicate advantages in using levers belonging to different classes and examples met in day-to-day life for them. • describe how levers can be used more profitably. • state that the inclined plane is a simple machine. • state the occasions where inclined planes are used in day-to-day life. • state that wheel and axle is a simple machine. • give examples for the instances of using wheel and axle more profitably. • state that the immovable pulley is a simple machine. • state that complex machine is made by the combination of a number of simple machines using an appropriate machine. • appreciate the contribution of machines for the technological development entailing a comfortable life.		sessions and use "Guru Gedara" lessons to teach lessons effectively. • Describing about the pulley system is not required.

Competency	Competency level	Contents	Outcomes	Time (Periods)	Remarks

	3.5 Uses the concept of density in day-to-day tasks effectively.	• Density
		  Density
		  =mass/volume
		• Hydrometer
			Student should be able to
			• explain the relationship between the mass and volume of a liquid through an activity.
			• introduce density as the mass per unit volume.
			• state that the unit of density is kg m^{-3}.
			• solve simple problems relating to density.
			• indicate examples for the instances where the concept of density is used in the events of everyday life.
			• create a simple hydrometer and uses it to compare the densities of various liquids.
			• appreciate the use of the concept of density in determining the quality of various liquids and solutions.
				02	• Number of periods have been reduced from 5 to 2.
					• Some learning content and outcomes have been removed.
					• Plan activities to measure the densities of various substances is not required.
					• Creating a simple hydrometer is not necessary.
					• Conduct teacher demonstrations for practical sessions and use "Guru Gedara" lessons to teach lessons effectively.

4.0 Explores nature, properties and processes of the Earth and space by understanding natural phenomena for intelligent and sustainable utilization.	4.1 Inquries into nanotechnology and its applications.	• Nanotechnology • Introduction of nanotechnology • Nanometer • Application of nanotechnology • Future of nanotechnology	**Student should be able to;** • state that the size 10^{-9}m is a nanometer. • accept that the nanometer is a very small unit of measurement. • state that nanotechnology is a process carried out using materials in the range of 1-100 nm. present examples for nano scale natural phenomena/ processes. • describe how lotus effect is brought about.	02	• Number of periods have been reduced from 10 to 2. • Some learning content and outcomes have been removed. • Explaining the adsorption process of activated carbon and predicting possible conditions in nanotechnology in the future; are not required. • Using "Guru Gedara" lessons to teach lessons effectively.

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Competency	Competency level	Contents	Outcomes	Time (Periods)	Remarks
			• describe the process happening in non – wettable clothes using the lotus effect. • give examples for other applications of nanotechnology.		• Competency level 4.2: Investigates into the prevention of accidents due to lightening; the basics are discussed in Grade 8 and explaining about it at this grade is not expected.
	4.3 Inquiries into the scientific background of natural disasters.	• Natural disasters • Whirl wind and storms • Earthquakes and earth tremors • Tsunami • Wild fires	**Student should be able to** • state that the depressions in the atmosphere is the cause for depressions whirl winds and storms. • explain simply the geological factors leading to earthquakes and earth tremors. • explain simply the causes leading to a tsunami state. • explain simply the conditions leading to wild fires. • accepts that natural disasters cannot be prevented but the loss can be minimized by awareness and preparedness.	02	• Number of periods have been reduced from 8 to 2. • Discussing only the fundamentals about each natural disaster is expected. • Using "Guru Gedara" lessons to teach lessons effectively.

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	4.4 Investigates on Biodiversity	• Introduction to biodiversity • Importance of biodiversity • Threats to biodiversity • Natural eco systems and built environment	**Student should be able to** • conduct a simple activity to demonstrate the concept of biodiversity. • state what is Bio diversity. • describe the importance of Bio diversity· • explain threats to Bio diversity • give examples for natural and artificial ecosystems.	01	• Number of periods have been reduced from 5 to 1. • Some learning content and outcomes have been removed. • Discussing about interactions in ecosystems is not expected. It will be discussed in Grade 11. • Explaining the importance and major characteristics of main eco- systems of Sri Lanka is not required. • Using "Guru Gedara" lessons to teach lessons effectively. • Competency level 4.5: Investigates on artificial environment and green concept is not required. Green concept will be discussed in Grade 11.

	4.6 Identification of natural resource distribution and sustainable use of natural resources.	• Natural resources
		  • Water
		  • Minerals and rocks (gems)
		  • Plants
		  • Wood
		• Sustainable use of natural resources
		  • Importance
		  • Strategies
			Student should be able to
			• explain characteristic features of gems.
			• present a report about adverse effects caused to the environment and to the human due to gem mining industry.
			• explain scientific basis of wood decomposition.
			• list out the methods used to prevent wood decomposition.
				02	• Number of periods have been reduced from 5 to 2.
					• Some learning content and outcomes have been removed.
					• Discussing only about the given learning outcomes is expected.
					• Discussing about unique characteristics of different types of gems is not required.

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Competency	Competency level	Contents	Outcomes	Time (Periods)	Remarks
			• accept the importance of sustainable use of natural resources.		• Using "Guru Gedara" lessons to teach lessons effectively.

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The syllabus for Grade 10 students of 2021 that should be covered in Grade 10 (full content of first term and chosen content from second and third term from Grade 10)

Competency	Competency level	Content	Learning outcomes	Time	Remarks

1.0 Explores life and life processes in order to improve productivity of biological systems.	1.1 Investigates the importance of chemical basis of life.	• Chemical basis of life
		  • Carbohydrates
		  • proteins
		  • lipids
		  • Nucleic acids
		  • Minerals
		  • Vitamins
		  • Water
			Student should be able to
			• state carbohydrates, proteins, lipids and nucleic acids as major bio molecules of living matter.
			• state that carbon, hydrogen, oxygen and nitrogen are most abundant elements in living matter.
			• state the composition and examples of carbohydrates, proteins, lipids and nucleic acids.
			• introduce enzymes as proteins which catalyze chemical reactions in the cell or body.
			• conduct simple activities to demonstrate the action of enzyme.
			• briefly explain unique characteristics of water related to life (respiratory medium, as a solvent, thermal regulation of body, as a medium of transport, and living medium).
			• describe the roles of carbohydrates, proteins, lipids, nucleic acids, minerals, vitamins and water.
			• illustrate the importance of minerals and vitamins to the biological systems.
			• state the deficiencies of minerals and vitamins.
			• appreciate the nature of living matter.
			• accept that water is essential for life forms on the Earth.
				10	• Conduct teacher demonstrations for practical sessions and use "Guru Gedara" lessons to teach lessons effectively.

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Competency	Competency level	Content	Learning outcomes	Time	Remarks

	1.2 Discovers the structure of plant and animal cells.	• Basic unit of life
		  • Concept of cell
		  • Cell structure
		    • Plant cell
		    • Animal cell
		    • Organelles and structures
		      • Plasma membrane
		      • Nucleus
		      • Cell wall
		      • Mitochondria
		      • Cytoplasm
		      • Vacuoles
		      • Golgi body
		      • Endoplasmic reticulum
		      • Ribosome
		    • Cell growth
		    • Cell division
			Student should be able to
			• classify a set of given cells as plant and animal cells using specific features.
			• state the concept of a typical cell.
			• compare and contrast the structure of the animal and plant cells.
			• state that the cell is structural and functional unit of life, all organisms are made up of one or more cells and all cells arise from pre-existing cells.
			• outline briefly the structure and functional relationship of cell organelles.
			• label organelles in a given diagram of cell.
			• explain cell growth and cell division.
			• state that mitosis and meiosis are the types of cell division.
			• compare mitosis and meiosis.
			• accept the microscopic nature of cell organelles.
			• appreciate cell as a structural and functional unit of life.
				07	• Use "Guru Gedara" lessons to teach lessons effectively.

	1.3 Uses characteristics of living matter to differentiate the living from nonliving.	• Characteristics of living things
		  • Cellular organization
		  • Nutrition
		  • Respiration
		  • Sensitivity
		  • Excretion
		  • Movement
		  • Reproduction
			Student should be able to
			• explain cellular organization, nutrition, respiration, sensitivity, excretion, movement, reproduction, growth and development as characteristics of living matter.
			• evaluate evidences to classify living and non-living matter.
			• respect all living matter as life forms.
				03	• Number of periods have been reduced from 5 to 3.
					• Use "Guru Gedara" lessons to teach lessons effectively.

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Competency	Competency level	Content	Learning outcomes	Time	Remarks
		• Growth and development	• accept that some living forms are difficult to differentiate as living or non-living.		

	1.4 Classifies organisms using suitable methods	• The world of life
		  • Classification
		    • Natural classification
		      • Domains (introduction only)
		      • Kingdoms
		        • Protista
		        • Fungi
		        • Plantae
		        • Animalia
		      • Nomenclature
		        • Bionomical nomenclature
			Student should be able to
			• explain the importance of classification.
			• state that there are natural and artificial methods of classification.
			• state the domains as Archaea, bacteria and Eukarya.
			• classify the living organisms as major groups–bacteria, protista, fungi, plantae and animalia based on their specific features.
			• write scientific names using binomial nomenclature.
				05	• Number of periods have been reduced from 12 to 5.
					• Classification can be given in a simple diagram. Features are not required.
					• Some learning content and outcomes are reduced.

	1.5 Investigates the contribution of reproduction in maintaining the continuity of organisms	• Continuity of life-Reproduction
		  • Reproduction
		    • Sexual reproduction and asexual reproduction
		    • Plant reproduction
		  • Sexual reproduction in plants
		    • Seed formation
		    • Dispersal of fruits and seeds
		  • Human reproduction
		    • Process
			Student should be able to
			• differentiate sexual and asexual reproduction using suitable examples.
			• state the natural and artificial methods of plant reproduction.
			• explain sexual reproduction in plants.
			• identify the methods of dispersal of fruits and seeds, and their adaptations for it.
			• accept the concept of sustainable use of plant resources.
			• explain importance of menstrual cycle in human reproduction.
			• state sexually transmitted diseases.
				07	• Number of periods have been reduced from 10 to 7.
					• Outcome 2 and 7 have been modified.
					• Not necessary to name parts of a flower.
					• Use "Guru Gedara" lessons to teach lessons effectively.

Competency	Competency level	Content	Learning outcomes	Time	Remarks
		• Hormonal control • Sexually transmitted Diseases	• act as a responsible citizen with regard to sexual behavior.		• Number of periods have been reduced from 12 to 2.
	1.6 Investigates the patterns of inheritance of traits in organisms	• Continuity of life – Heredity • Hereditary variations among living world	**Student should be able to** • collect and present some examples to show common heredity characteristics in living world. • conduct bead experiment to investigate patterns in heredity. • state genetic disorders such as Hemophilia, Color blindness, Thalasemia and Albinism. • accept the importance of avoiding marriages among blood relatives.	02	• Conduct teacher demonstrations for practical sessions. • It is adequate to give basic knowledge about heredity in relation to day today life. • Some learning content and outcomes are reduced. • Use "Guru Gedara" lessons to teach lessons effectively.

2.0 Investigates matter, properties of matter and their interaction to enhance the quality of life.	2.1 Investigates scientific findings about structure of matter.	• Planetary model of an atom
		• Electronic configuration (atomic number 1-20 only)
		• Modern periodic table
		  • Periods and groups
		• Isotopes
		• Patterns in the periodic table across a period and down a group
		  • First ionization energy
		  • Electronegativity
			Student should be able to
			• describe planetary model of atoms.
			• accept that electrons exist in energy levels and there is a maximum number of electrons that each energy level can occupy.
			• describe electronic configuration as a way of expressing the arrangement of electrons in energy levels.
			• write the electronic configuration of first 20 elements in the periodic table.
				12	• Some learning content and outcomes are reduced.

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Competency	Competency level	Content	Learning outcomes	Time	Remarks

		• Metals
		  • sodium, magnesium
		• Metalloids
		  • silicon, boron
		• Non -metals
		  • carbon, sulphur, nitrogen
		• Acidic, basic, amphoteric nature of oxides
		• Chemical formulae
		• Valency
			• construct periodic table of first 20 elements based on their electronic configuration.
			• describe the terms group and period.
			• derive a relationship between the position of an element in the periodic table and its electronic configuration.
			• define the term 'isotope'.
			• denote isotopes of an element with the standard notation.
			• accept that classification of elements facilitates learning about elements.
			• describe the term first ionization energy.
			• describe the term electronegativity.
			• identify the variation pattern of first ionization energy and electronegativity of elements along the period and down the group.
			• accepts that there is a pattern in the variation of first ionization energy and electronegativity along the period and down the group.
			• describe the properties of metals, non metals and metalloids in relation to given examples.
			• state the acidic, basic and amphoteric nature of oxides of third period of elements.
			• define valency of an element.
			• deduce the valency of first twenty elements based on their positions in the periodic table.
			• formulate chemical formulae of		

Competency	Competency level	Content	Learning outcomes	Time	Remarks
			compounds using valency.		
	2.2 Uses mole to quantify elements and compounds.	• Atomic mass unit • Relative atomic mass • Relative molecular mass • Avogadro constant • Mole • Molar mass	**Student should be able to** • define the term atomic mass unit. • define the term relative atomic mass. • calculate relative atomic mass of a given atom. • define the term relative molecular mass. • calculate relative molecular mass of a compound using relative atomic mass of constituent elements. • define Avogadro constant. • describe mole as the unit of amount of substance. • state the definition of mole. • carry out calculations based on the relationship among mass, amount of substances and molar masses. • accept that relative atomic mass and relative molecular mass has no units while molar mass has unit.	06	• Number of periods have been reduced from 12 to 6. • Use $n = m/M$ to solve simple problems. • Calculations including number of atoms and number of molecules are not expected. • Conduct teacher demonstrations for practical sessions and use "Guru Gedara" lessons to teach lessons effectively. • Some learning outcomes are reduced.

	2.3 Relates properties of compounds with the existing bonds.	• Chemical bonding
		  • Ionic bonds
		  • Covalent bonds
			Student should be able to
			• express that electrons participate in the formation of chemical bonding.
			• describe that atoms form cations by losing electrons and anions by gaining electrons.
				05	• Number of periods have been reduced from 10 to 5.
					• Illustrating the formation of ionic compounds diagrammatically is not required.

Competency	Competency level	Content	Learning outcomes	Time	Remarks
			• determine the charge of an ion formed by an atom based on its electronic configuration. • state that electron transfer takes place during the formation of ionic bonds. • accept ionic bond as a strong electrostatic attraction between cations and anions. • describe that covalent bond is formed by sharing pairs of electrons between atoms. • draw Lewis structures for simple covalent compounds. • accept that elements form chemical bond to become stable.		• Use "Guru Gedara" lessons to teach lessons effectively. • Describing polarity of bonds is not required. • Some learning content and outcomes are reduced.

	2.4 Uses chemical changes suitably to fulfill necessities in life.	• Chemical reactions
		  • Types of chemical reactions
		    • Combinations
		    • Disassociation
		    • Single displacement
		    • Double displacement
		  • Chemical equation
		  • Air, water and dilute acids
		  • Activity series
		    • Iron extraction
		    • Gold extraction
		  • Physical properties of gases, applications and laboratory preparations, and test for gases
		    • Hydrogen
			Student should be able to
			• state type of reactions with examples.
			• classify given reactions under each type.
			• write balanced chemical equations using inspection method.
			• appreciate the importance of chemical symbols, formulae and equations as a way of communication.
			• demonstrate reactions of metal with air, water and dilute acids using simple activities.
			• compare reactivity of given metals with air, water and dilute acids and construct the activity series for the given metals based on their reactivity.
			• state that activity series is based on reactivity of metals.
				05	• Number of periods have been reduced from 13 to 5.
					• Conduct teacher demonstrations for practical sessions and use "Guru Gedara" lessons to teach lessons effectively.

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Competency	Competency level	Content	Learning outcomes	Time	Remarks
			• determine the position of given metals in the activity series based on displacement reactions. • state uses of activity series. • accept that there is a relationship between reactivity of the metal and its position in the activity series. • explain how the method of extraction of the metals is related to their positions in the activity series. • suggest a suitable extraction method for a given metal based on its position in the activity series. • name suitable chemicals that can be used to prepare hydrogen gas in school laboratory. • write relevant chemical reactions of the preparation of hydrogen gas in school laboratory. • collect samples of hydrogen gas using suitable apparatus. • state physical properties of hydrogen gas. • conduct simple tests to identify hydrogen gas. • list the uses of hydrogen gas.		• Describing about iron and gold extraction process and involving chemical reactions are not required. • No need to discuss on oxygen and carbon dioxide gases.

	2.5 Takes necessary measures to control the rate of reaction as required in	• Rate of reaction
		• Factors affecting the rate of reaction
		  • Surface area/physical nature
		  • Temperature
			Student should be able to
			• give examples from day-to-day life for relatively fast and slow reactions.
			• define the term rate of reaction.
			• state the factors affecting the rate of reaction.
				02	• Number of periods have been reduced from 5 to 2.

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Competency	Competency level	Content	Learning outcomes	Time	Remarks
	day to-day life.	• Concentration /pressure (only for gaseous system) • Catalyst	• conduct simple activities to demonstrate the factors affecting the rate of reaction. • accept that the rate of reaction can be controlled as required.		• Explanations about factors affecting the rate of reaction is not required. • Conduct teacher demonstrations for practical sessions and use "Guru Gedara" lessons to teach lessons effectively. • Conducting simple activities are adequate. Writing balanced chemical equations are not required.

3.0 Utilizes various forms of energy, their interaction with matter and energy transformations by maintaining efficiency and effectiveness at an optimum level.	3.1 Investigates the quantities related to rectilinear motion and the use of graphs of motion to analyze the rectilinear motion.	• Rectilinear motion
		• Physical quantities related to motion
		  • Average speed and average velocity
		  • Speed and velocity
		  • Acceleration
		    • Acceleration due to gravity
		• Graphs of motion
		  • Displacement- time (s-t) graphs
			Student should be able to
			• describe physical quantities related to motion (distance, displacement, speed, velocity and acceleration).
			• distinguish between average speed and speed, average velocity and velocity.
			• solve problems using
			average speed = distance travelled/time taken,
			average velocity = displacement/time taken and
			acceleration = change in velocity/time taken.
				09	• Some learning outcomes are reduced.
					
					• Use "Guru Gedara" lessons to teach lessons effectively.

Competency	Competency level	Content	Learning outcomes	Time	Remarks
		• Velocity- time (v-t) graphs	• construct *s-t* graphs using given data and data obtained from a simple activity. • describe velocity from *s-t* graphs. • construct *v-t* graphs using given data. • explain that gradient obtained from *v-t* graph is the acceleration of motion. • state that the area under the curve of a *v-t* graph is the displacement of the object. • obtain relevant information from *s-t* and *v-t* graphs. • accept the importance of the information obtained from *s-t* and *v-t* graphs in describing the nature of rectilinear motion of a body (In *s-t* graphs, variation of the gradient is expected but no calculations are expected. In straight line *s-t* graphs, calculation of the gradient is expected. *v-t* graphs are expected only for uniformly accelerated motions. Calculation of acceleration from the gradient of the curve and calculation of displacement from the area under the curve is expected.).		

	3.2 Uses Newton's laws of motion to describe the effects of a force.	• Force and its effects
		• Newton's laws of motion
		  • Newton's first law of motion
		  • Newton's second law of motion
		  • Newton's third law of motion
		• Momentum
			Student should be able to
			• conduct simple activities to show the effect of a force.
			• state Newton's laws of motion.
			• describe the concept of force using Newton's first law of motion.
			• show experimentally that $a \propto F$ (when *m* is constant)
				09	• Use "Guru Gedara" lessons to teach lessons effectively.

Competency	Competency level	Content	Learning outcomes	Time	Remarks
			$a \propto \frac{1}{m}$ (when F is constant). • express Newton's second law of motion as $F=ma$. • define the SI unit of force. • express Newton's third law of motion. • explain that action and reaction are two mutual forces equal in magnitude and opposite in direction which are acting in the same straight-line on two bodies. • use the relationship $F = ma$ relevantly in appropriate situations to solve problems. • appreciate the importance of Newton's laws of motion to explain the applications of force in day-to-day life. • state that the weight of an object is the force attracting towards the Earth and its magnitude is equal to the product of the mass and acceleration due to gravity. • explain the concept of momentum using relevant examples from day-to-day life. • conduct simple activities to show the factors affecting momentum. • represent momentum as the product of mass and velocity. • accept that the concept of momentum can be used to explain the relevant day-to-day phenomena.		

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Competency	Competency level	Content	Learning outcomes	Time	Remarks
	3.3 Investigates the nature and uses of friction	• Friction • Nature of friction • Static friction • Limiting friction • The factors affecting the limiting frictional force • Dynamic friction	**Student should be able to** • conduct simple activities to show the nature of friction. • explain the variation of static frictional force between two surfaces with the external force. • conduct experiments to identify the factors affecting the limiting frictional force (It depends on the nature of the surfaces and the normal reaction. It does not depend on the area of the surfaces). • distinguish 'static friction', 'limiting friction' and 'dynamic friction'. • state that the dynamic frictional force acts on a moving object and it is constant, also it is slightly lower than the limiting frictional force. • accept that friction always opposes relative motion between two surfaces; however, it is also utilized to produce motion. • appreciate the uses of friction in human activities.	03	• Use "Guru Gedara" lessons to teach lessons effectively.
	3.4 Makes jobs easy using resultant of forces.	Resultant of forces • Resultant of two collinear forces • Resultant of two parallel forces	**Student should be able to** • describe the concept of the resultant of forces. • conduct simple activities to show the effect of resultant of forces. • conduct simple activities to find resultant of two collinear forces acting in the same direction and also in opposite directions.	03	• Number of periods have been reduced from 5 to 3. • Conduct teacher demonstrations for practical sessions and use "Guru Gedara" lessons to

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Competency	Competency level	Content	Learning outcomes	Time	Remarks
			• conduct simple activities to find the resultant of two parallel forces acting in the same direction. • solve simple numerical problems to find the resultant of two collinear forces and of two parallel forces (the line of action of resultant force is not necessary). • accept that a large force can be obtained by a collection of small forces. • accept that there are ways of varying the magnitude and direction of a force according to the situation.		teach lessons effectively.

	3.5 Estimates and calculates the turning effect of a force.	• Turning effect of force
		  • Moment of force
		  • Moment of couple of forces
			Student should be able to
			 • demonstrate simple activities to describe turning effect of a force.
			 • describe the factors affecting the moment of force.
			 • express the moment of a force about a point as the product of the force and the perpendicular distance from the point to the line of action of the force.
			 • express the unit of the moment of a force as N m.
			 • state that the turning effect of the moment of a force can be clockwise or anti-clockwise.
			 • describe the moment of a couple of forces.
			 • make a list of instances where moment of a couple of forces apply in day-to-day life.
				03	• Number of periods have been reduced from 5 to 3.
					 • Conduct teacher demonstrations for practical sessions and use "Guru Gedara" lessons to teach lessons effectively.

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Competency	Competency level	Content	Learning outcomes	Time	Remarks
			• make calculations involving the moment of force. • accept the importance of turning effect of a force in day-to-day activities. • accept that moments appear in couples in many practical situations.		

	3.6 Investigates the conditions of equilibrium of forces.	• Equilibrium of forces
		  • Equilibrium under two forces
		  • Equilibrium under three forces
		    • Parallel forces
		    • Non-parallel forces
			Student should be able to
			• explain the equilibrium of forces on a body.
			• describe equilibrium of forces using the examples.
			• explain the conditions necessary for two forces to be in equilibrium.
			• explain the conditions necessary for three parallel forces to be in equilibrium.
			• describe practical applications of equilibrium of forces.
			• state the conditions necessary for three nonparallel forces to be in equilibrium (qualitatively).
			• accept that the equilibrium can exist under more than three forces too.
				02	• Number of periods have been reduced from 4 to 2.
					• Conduct teacher demonstrations for practical sessions and use "Guru Gedara" lessons to teach lessons effectively.

	3.7 Uses the principles and laws of hydrostatics to realize activities related to sinking, floating and	• Pressure and its effects
		  • Hydrostatic pressure
		    • Factors affecting the
		    • hydrostatic pressure
		    • Expression for hydrostatic pressure, $p = h\rho g$
		  • Atmospheric pressure
			Student should be able to
			• express hydrostatic pressure (p) in terms of height of liquid column (h), density of liquid (ρ) and gravitational acceleration (g).
			• calculate the pressure exerted by a liquid using the expression, $p = h\rho g$.
			• state instances where pressure exerted by liquids is productively used.
				04	• Number of periods have been reduced from 8 to 4.
					• Conduct teacher demonstrations for practical sessions and use "Guru Gedara" lessons to

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Competency	Competency level	Content	Learning outcomes	Time	Remarks

	pressure transmission.	• Measuring atmospheric pressure
		• Sinking and floating
		  • Up-thrust
		  • Archimedes' principle
			• discuss the concept of transmission of pressure.
			• accept the importance of pressure to make work easier.
			• accept that the transmission of pressure is very useful in modern technology.
			• state that atmospheric pressure can be measured by using the mercury barometer and the aneroid barometer.
			• state that atmospheric pressure varies with altitude.
			• discuss the factors affecting up-thrust acting on a body due to a liquid by demonstrating a simple activity.
			• demonstrate Archimedes' principle using a simple activity.
			• use simple set-ups to show the conditions necessary for sinking and floating.
			• explain the concepts of sinking and floating according to the weight of the object and the up-thrust.
			• accept that sinking and floating of objects in liquids is determined by the up-thrust exerted by the liquid and the weight of the object.
					teach lessons effectively.
					• Calculations related to pressure transmission are not required.
					
					• Calculations are not expected.
					
					• Some lesson content and outcomes have been removed.

	3.8 Quantifies the mechanical energy and power in	• Work, Energy and Power
		  • Mechanical energy
		    • Kinetic energy,
		    $E_K=\frac{1}{2}mv^2$
			Student should be able to
			• state that the work done by a force is the product of the magnitude of the force and
				02	• Number of periods have been reduced from 5 to 2.

Competency	Competency level	Content	Learning outcomes	Time	Remarks

	mechanical processes.	• Potential energy
		  • Gravitational potential energy, $E_P=mgh$
		  • Elastic potential energy
		• Power
			the displacement in the direction of the force.
			• explain the two forms of mechanical energy as kinetic energy and potential energy.
			• provide the expression for kinetic energy as $E_K=\frac{1}{2}mv^2$
			• provide the expression for gravitational potential energy as $E_P=mgh$ with reference to a zero potential level.
			• accept that kinetic energy, gravitational potential energy and elastic potential energy can be used for human energy requirements.
			• accept that energy is used to do work.
			• state power as the rate of doing work (work done /time taken).
					• Use "Guru Gedara" lessons to teach lessons effectively.
					• Calculations related to equation $E_K=\frac{1}{2}mv^2$ and $E_P=mgh$ are not required.
					• Calculations of power are not required.

	3.9 Uses fundamental principles and laws of current electricity to understand and control the action of simple circuits.	• Current electricity
		  • Electric current
		    • Electron flow and conventional current
		    • Unit of current
		    • Use of ammeter to measure the current
		  • Potential difference
		    • Unit of potential difference
		    • Use of voltmeter to measure the potential difference
			Student should be able to
			• state the direction of conventional current in relation to the direction of electron flow.
			• accept that a flow of current occurs due to a potential difference.
			• describe that an electric source is used to supply a potential difference to a circuit.
			• state that the e.m.f of a source is the potential difference between its terminals when no current flows from the source.
			• explain the resistance as a factor which opposes the flow of electric current.
			• conduct a simple activity to show the factors affecting the resistance of a
				03	• Number of periods have been reduced from 10 to 3.
					• Conduct teacher demonstrations for practical sessions and use "Guru Gedara" lessons to teach lessons effectively.

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Competency	Competency level	Content	Learning outcomes	Time	Remarks
		- Electric source and electromotive force (e.m.f) - Resistance and resistors - Units of resistance - Factors affecting resistance - Length of the conductor - Cross sectional area of the conductor - Resistivity of the material - Ohm's law	conductor (length, cross-sectional area and resistivity). • conduct a simple experiment to show the relationship between V across a conductor and I. • show graphically the variation of potential difference with current. • use the relationship between V and I to • express Ohm's law as $V = IR$; state R as resistance of the conductor.		- Discussing about resister colour codes are not required. - Discussing about combination of resistors is not required. - Some learning content and outcomes have been removed.