

# **Science Syllabi**

## **Grade 10 and Grade 11**

This document contains the subject content to be covered from the grade 10 syllabus and the grade 11 syllabus by the students who sit for the G.C.E. (Ordinary Level) examination of the year 2021. The subject content to be covered in the first term of grade 10 have not been changed.

The content and the learning outcomes selected from grade 10 to be covered

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.	<ul style="list-style-type: none"> <li>• Chemical basis of life               <ul style="list-style-type: none"> <li>• Carbohydrates</li> <li>• proteins</li> <li>• lipids</li> <li>• Nucleic acids</li> <li>• Minerals</li> <li>• Vitamins</li> <li>• Water</li> </ul> </li> </ul>	<p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• state carbohydrates, proteins, lipids and nucleic acids as major bio molecules of living matter.</li> <li>• state that carbon, hydrogen, oxygen and nitrogen are most abundant elements in living matter.</li> <li>• state the composition and examples of carbohydrates, proteins, lipids and nucleic acids.</li> <li>• introduce enzymes as proteins which catalyze chemical reactions in the cell or body.</li> <li>• conduct simple activities to demonstrate the action of enzyme.</li> <li>• 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).</li> <li>• describe the roles of carbohydrates, proteins, lipids, nucleic acids, minerals, vitamins and water.</li> <li>• illustrate the importance of minerals and vitamins to the biological systems.</li> <li>• state the deficiencies of minerals and vitamins.</li> <li>• appreciate the nature of living matter.</li> <li>• accept that water is essential for life forms on the Earth.</li> </ul>	10	<ul style="list-style-type: none"> <li>• Conduct teacher demonstrations for practical sessions and use “Guru Gedara” lessons to teach lessons effectively.</li> </ul>

Competency	Competency level	Content	Learning outcomes	Time	Remarks
	1.2 Discovers the structure of plant and animal cells.	<ul style="list-style-type: none"> <li>• Basic unit of life               <ul style="list-style-type: none"> <li>• Concept of cell</li> <li>• Cell structure                   <ul style="list-style-type: none"> <li>• Plant cell</li> <li>• Animal cell</li> </ul> </li> <li>• Organelles and structures                   <ul style="list-style-type: none"> <li>• Plasma membrane</li> <li>• Nucleus</li> <li>• Cell wall</li> <li>• Mitochondria</li> <li>• Cytoplasm</li> <li>• Vacuoles</li> <li>• Golgi body</li> <li>• Endoplasmic reticulum</li> <li>• Ribosome</li> </ul> </li> <li>• Cell growth</li> <li>• Cell division</li> </ul> </li> </ul>	<p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• classify a set of given cells as plant and animal cells using specific features.</li> <li>• state the concept of a typical cell.</li> <li>• compare and contrast the structure of the animal and plant cells.</li> <li>• 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.</li> <li>• outline briefly the structure and functional relationship of cell organelles.</li> <li>• label organelles in a given diagram of cell.</li> <li>• explain cell growth and cell division.</li> <li>• state that mitosis and meiosis are the types of cell division.</li> <li>• compare mitosis and meiosis.</li> <li>• accept the microscopic nature of cell organelles.</li> <li>• appreciate cell as a structural and functional unit of life.</li> </ul>	07	<ul style="list-style-type: none"> <li>• Use “Guru Gedara” lessons to teach lessons effectively.</li> </ul>
	1.3 Uses characteristic s of living matter to differentiate the living from nonliving.	<ul style="list-style-type: none"> <li>• Characteristics of living things               <ul style="list-style-type: none"> <li>• Cellular organization</li> <li>• Nutrition</li> <li>• Respiration</li> <li>• Sensitivity</li> <li>• Excretion</li> <li>• Movement</li> <li>• Reproduction</li> </ul> </li> </ul>	<p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• explain cellular organization, nutrition, respiration, sensitivity, excretion, movement, reproduction, growth and development as characteristics of living matter.</li> <li>• evaluate evidences to classify living and non-living matter.</li> <li>• respect all living matter as life forms.</li> </ul>	03	<ul style="list-style-type: none"> <li>• Number of periods have been reduced from 5 to 3.</li> <li>• Some learning content and outcomes are reduced.</li> <li>• Use “Guru Gedara” lessons to teach lessons effectively.</li> </ul>

Competency	Competency level	Content	Learning outcomes	Time	Remarks
	1.4 Classifies organisms using suitable methods	<ul style="list-style-type: none"> <li>• Growth and development</li> <li>• The world of life</li> <li>• Classification               <ul style="list-style-type: none"> <li>• Natural classification                   <ul style="list-style-type: none"> <li>• Domains (introduction only)</li> </ul> </li> <li>• Kingdoms                   <ul style="list-style-type: none"> <li>• Protista</li> <li>• Fungi</li> <li>• Plantae</li> <li>• Animalia</li> </ul> </li> <li>• Nomenclature                   <ul style="list-style-type: none"> <li>• Binomical nomenclature</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• accept that some living forms are difficult to differentiate as living or non-living.</li> </ul> <p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• explain the importance of classification.</li> <li>• state that there are natural and artificial methods of classification.</li> <li>• state the domains as Archaea, bacteria and Eukarya.</li> <li>• classify the living organisms as major groups–bacteria, protista, fungi, plantae and animalia based on their specific features.</li> <li>• write scientific names using binomial nomenclature.</li> </ul>	05	<ul style="list-style-type: none"> <li>• Number of periods have been reduced from 12 to 5.</li> <li>• Classification can be given in a simple diagram.</li> <li>• Some learning content and outcomes are reduced.</li> </ul>
	1.5 Investigates the contribution of reproduction in maintaining the continuity of organisms.	<ul style="list-style-type: none"> <li>• Continuity of life- Reproduction</li> <li>• Reproduction               <ul style="list-style-type: none"> <li>• Sexual reproduction and asexual reproduction</li> <li>• Plant reproduction</li> </ul> </li> <li>• Sexual reproduction in plants               <ul style="list-style-type: none"> <li>• Seed formation</li> <li>• Dispersal of fruits and seeds</li> </ul> </li> <li>• Human reproduction               <ul style="list-style-type: none"> <li>• Process</li> </ul> </li> </ul>	<p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• differentiate sexual and asexual reproduction using suitable examples.</li> <li>• state the natural and artificial methods of plant reproduction.</li> <li>• explain sexual reproduction in plants.</li> <li>• identify the methods of dispersal of fruits and seeds, and their adaptations for it.</li> <li>• accept the concept of sustainable use of plant resources.</li> <li>• explain importance of menstrual cycle in human reproduction.</li> <li>• state sexually transmitted diseases.</li> </ul>	07	<ul style="list-style-type: none"> <li>• Number of periods have been reduced from 10 to 7.</li> <li>• Outcome 2 and 7 have been modified.</li> <li>• Not necessary to name parts of a flower.</li> </ul>

Competency	Competency level	Content	Learning outcomes	Time	Remarks
	1.6 Investigates the patterns of inheritance of traits in organisms	<ul style="list-style-type: none"> <li>• Hormonal control</li> <li>• Sexually transmitted Diseases</li> <li>• Continuity of life – Heredity</li> <li>• Hereditary variations among living world</li> </ul>	<ul style="list-style-type: none"> <li>• act as a responsible citizen with regard to sexual behavior.</li> </ul> <p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• collect and present some examples to show common heredity characteristics in living world.</li> <li>• conduct bead experiment to investigate patterns in heredity.</li> <li>• state genetic disorders such as Hemophilia, Color blindness, Thalasemia and Albinism.</li> <li>• accept the importance of avoiding marriages among blood relatives.</li> </ul>	02	<ul style="list-style-type: none"> <li>• Number of periods have been reduced from 11 to 2.</li> <li>• Conduct teacher demonstrations for practical sessions.</li> <li>• It is adequate to give basic knowledge about heredity in relation to day today life.</li> <li>• Some learning content and outcomes are reduced.</li> </ul>
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.	<ul style="list-style-type: none"> <li>• Planetary model of an atom</li> <li>• Electronic configuration (atomic number 1-20 only)</li> <li>• Modern periodic table <ul style="list-style-type: none"> <li>• Periods and groups</li> </ul> </li> <li>• Isotopes</li> <li>• Patterns in the periodic table across a period and down a group <ul style="list-style-type: none"> <li>• First ionization energy</li> <li>• Electronegativity</li> </ul> </li> </ul>	<p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• describe planetary model of atoms.</li> <li>• accept that electrons exist in energy levels and there is a maximum number of electrons that each energy level can occupy.</li> <li>• describe electronic configuration as a way of expressing the arrangement of electrons in energy levels.</li> <li>• write the electronic configuration of first 20 elements in the periodic table.</li> </ul>	12	<ul style="list-style-type: none"> <li>• Use “Guru Gedara” lessons to teach lessons effectively.</li> </ul>

Competency	Competency level	Content	Learning outcomes	Time	Remarks
		<ul style="list-style-type: none"> <li>• Metals <ul style="list-style-type: none"> <li>• sodium, magnesium</li> </ul> </li> <li>• Metalloids <ul style="list-style-type: none"> <li>• silicon, boron</li> </ul> </li> <li>• Non -metals <ul style="list-style-type: none"> <li>• carbon, sulphur, nitrogen</li> </ul> </li> <li>• Acidic, basic, amphoteric nature of oxides</li> <li>• Chemical formulae</li> <li>• Valency</li> </ul>	<ul style="list-style-type: none"> <li>• construct periodic table of first 20 elements based on their electronic configuration.</li> <li>• describe the terms group and period.</li> <li>• derive a relationship between the position of an element in the periodic table and its electronic configuration.</li> <li>• define the term 'isotope'.</li> <li>• denote isotopes of an element with the standard notation.</li> <li>• accept that classification of elements facilitates learning about elements.</li> <li>• describe the term first ionization energy.</li> <li>• describe the term electronegativity.</li> <li>• identify the variation pattern of first ionization energy and electronegativity of elements along the period and down the group.</li> <li>• accepts that there is a pattern in the variation of first ionization energy and electronegativity along the period and down the group.</li> <li>• describe the properties of metals, non metals and metalloids in relation to given examples.</li> <li>• state the acidic, basic and amphoteric nature of oxides of third period of elements.</li> <li>• define valency of an element.</li> <li>• deduce the valency of first twenty elements based on their positions in the periodic table.</li> <li>• formulate chemical formulae of</li> </ul>		

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	2.2 Uses mole to quantify elements and compounds.	<ul style="list-style-type: none"> <li>• Atomic mass unit</li> <li>• Relative atomic mass</li> <li>• Relative molecular mass</li> <li>• Avogadro constant</li> <li>• Mole</li> <li>• Molar mass</li> </ul>	<p>compounds using valency.</p> <p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• define the term atomic mass unit.</li> <li>• define the term relative atomic mass.</li> <li>• calculate relative atomic mass of a given atom.</li> <li>• define the term relative molecular mass.</li> <li>• calculate relative molecular mass of a compound using relative atomic mass of constituent elements.</li> <li>• define Avogadro constant.</li> <li>• describe mole as the unit of amount of substance.</li> <li>• state the definition of mole.</li> <li>• carry out calculations based on the relationship among mass, amount of substances and molar masses.</li> <li>• accept that relative atomic mass and relative molecular mass has no units while molar mass has unit.</li> </ul>	06	<ul style="list-style-type: none"> <li>• Number of periods have been reduced from 12 to 6.</li> <li>• Some learning outcomes are reduced.</li> <li>• Conduct teacher demonstrations for practical sessions and use “Guru Gedara” lessons to teach lessons effectively.</li> <li>• Use <math>n = m/M</math> to solve simple problems.</li> <li>• Calculations including number of atoms and number of molecules are not expected.</li> </ul>
	2.3 Relates properties of compounds with the	<ul style="list-style-type: none"> <li>• Chemical bonding</li> <li>• Ionic bonds</li> <li>• Covalent bonds</li> </ul>	<p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• express that electrons participate in the formation of chemical bonding.</li> <li>• describe that atoms form cations by losing electrons and anions by gaining electrons.</li> </ul>	05	<ul style="list-style-type: none"> <li>• Number of periods have been reduced from 10 to 5.</li> <li>• Use “Guru Gedara” lessons to teach lessons effectively.</li> </ul>

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	existing bonds.		<ul style="list-style-type: none"> <li>determine the charge of an ion formed by an atom based on its electronic configuration.</li> <li>state that electron transfer takes place during the formation of ionic bonds.</li> <li>accept ionic bond as a strong electrostatic attraction between cations and anions.</li> <li>describe that covalent bond is formed by sharing pairs of electrons between atoms.</li> <li>draw Lewis structures for simple covalent compounds.</li> <li>accept that elements form chemical bond to become stable.</li> </ul>		<ul style="list-style-type: none"> <li>Some learning content and outcomes are reduced.</li> <li>Illustrating the formation of ionic compounds diagrammatically is not required.</li> <li>Describing polarity of bonds is not required.</li> </ul>
	2.4 Uses chemical changes suitably to fulfill necessities in life.	<ul style="list-style-type: none"> <li>Chemical reactions <ul style="list-style-type: none"> <li>Types of chemical reactions <ul style="list-style-type: none"> <li>Combinations</li> <li>Disassociation</li> <li>Single displacement</li> <li>Double displacement</li> </ul> </li> <li>Chemical equation</li> <li>Air, water and dilute acids</li> <li>Activity series <ul style="list-style-type: none"> <li>Iron extraction</li> <li>Gold extraction</li> </ul> </li> <li>Physical properties of gases, applications and laboratory preparations, and test for gases <ul style="list-style-type: none"> <li>Hydrogen</li> </ul> </li> </ul> </li> </ul>	<p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>state type of reactions with examples.</li> <li>classify given reactions under each type.</li> <li>write balanced chemical equations using inspection method.</li> <li>appreciate the importance of chemical symbols, formulae and equations as a way of communication.</li> <li>demonstrate reactions of metal with air, water and dilute acids using simple activities.</li> <li>compare reactivity of given metals with air, water and dilute acids and construct the activity series for the given metals based on their reactivity.</li> <li>state that activity series is based on reactivity of metals.</li> </ul>	05	<ul style="list-style-type: none"> <li>Number of periods have been reduced from 13 to 5.</li> <li>Some learning content and outcomes are reduced.</li> <li>Conduct teacher demonstrations for practical sessions and use “Guru Gedara” lessons to teach lessons effectively.</li> </ul>

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	2.5 Takes necessary measures to control the rate of reaction as required in	<ul style="list-style-type: none"> <li>• Rate of reaction</li> <li>• Factors affecting the rate of reaction               <ul style="list-style-type: none"> <li>• Surface area/physical nature</li> <li>• Temperature</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• determine the position of given metals in the activity series based on displacement reactions.</li> <li>• state uses of activity series.</li> <li>• accept that there is a relationship between reactivity of the metal and its position in the activity series.</li> <li>• explain how the method of extraction of the metals is related to their positions in the activity series.</li> <li>• suggest a suitable extraction method for a given metal based on its position in the activity series.</li> <li>• name suitable chemicals that can be used to prepare hydrogen gas in school laboratory.</li> <li>• write relevant chemical reactions of the preparation of hydrogen gas in school laboratory.</li> <li>• collect samples of hydrogen gas using suitable apparatus.</li> <li>• state physical properties of hydrogen gas.</li> <li>• conduct simple tests to identify hydrogen gas.</li> <li>• list the uses of hydrogen gas.</li> </ul> <p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• give examples from day-to-day life for relatively fast and slow reactions.</li> <li>• define the term rate of reaction.</li> <li>• state the factors affecting the rate of reaction.</li> </ul>	02	<ul style="list-style-type: none"> <li>• Describing about iron and gold extraction process and involving chemical reactions are not required.</li> <li>• No need to discuss on oxygen and carbon dioxide gases.</li> </ul> <ul style="list-style-type: none"> <li>• Number of periods have been reduced from 5 to 2.</li> <li>• Some learning outcomes are reduced.</li> </ul>

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3.0 Utilizes various forms of energy, their interaction with matter and energy transformations by maintaining efficiency and effectiveness at an optimum level.	day to-day life.  3.1 Investigates the quantities related to rectilinear motion and the use of graphs of motion to analyze the rectilinear motion.	<ul style="list-style-type: none"> <li>Concentration /pressure (only for gaseous system)</li> <li>Catalyst</li> </ul> <ul style="list-style-type: none"> <li>Rectilinear motion</li> <li>Physical quantities related to motion               <ul style="list-style-type: none"> <li>Average speed and average velocity</li> <li>Speed and velocity</li> <li>Acceleration                   <ul style="list-style-type: none"> <li>Acceleration due to gravity</li> </ul> </li> <li>Graphs of motion</li> <li>Displacement- time (<math>s-t</math>) graphs</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>conduct simple activities to demonstrate the factors affecting the rate of reaction.</li> <li>accept that the rate of reaction can be controlled as required.</li> </ul> <p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>describe physical quantities related to motion (distance, displacement, speed, velocity and acceleration).</li> <li>distinguish between average speed and speed, average velocity and velocity.</li> <li>solve problems using            average speed = distance travelled/time taken,            average velocity = displacement/time taken and            acceleration = change in velocity/time taken.</li> </ul>	09	<ul style="list-style-type: none"> <li>Conduct teacher demonstrations for practical sessions and use “Guru Gedara” lessons to teach lessons effectively.</li> <li>Explanations about factors affecting the rate of reaction is not required.</li> <li>Conducting simple activities as teacher demonstrations are adequate. Writing balanced chemical equations are not required.</li> </ul>

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	3.2 Uses Newton's laws of motion to describe the effects of a force.	<ul style="list-style-type: none"> <li>• Velocity- time (<math>v-t</math>) graphs</li> <li>• Force and its effects               <ul style="list-style-type: none"> <li>• Newton's laws of motion                   <ul style="list-style-type: none"> <li>• Newton's first law of motion</li> <li>• Newton's second law of motion</li> <li>• Newton's third law of motion</li> </ul> </li> <li>• Momentum</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• construct <math>s-t</math> graphs using given data and data obtained from a simple activity.</li> <li>• describe velocity from <math>s-t</math> graphs.</li> <li>• construct <math>v-t</math> graphs using given data.</li> <li>• explain that gradient obtained from <math>v-t</math> graph is the acceleration of motion.</li> <li>• state that the area under the curve of a <math>v-t</math> graph is the displacement of the object.</li> <li>• obtain relevant information from <math>s-t</math> and <math>v-t</math> graphs.</li> <li>• accept the importance of the information obtained from <math>s-t</math> and <math>v-t</math> graphs in describing the nature of rectilinear motion of a body (In <math>s-t</math> graphs, variation of the gradient is expected but no calculations are expected. In straight line <math>s-t</math> graphs, calculation of the gradient is expected. <math>v-t</math> 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.)</li> </ul> <p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• conduct simple activities to show the effect of a force.</li> <li>• state Newton's laws of motion.</li> <li>• describe the concept of force using Newton's first law of motion.</li> <li>• show experimentally that <math>a \propto F</math> (when <math>m</math> is constant)</li> </ul>	09	

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	3.3 Investigates the nature and uses of friction	<ul style="list-style-type: none"> <li>• Friction <ul style="list-style-type: none"> <li>• Nature of friction</li> <li>• Static friction</li> <li>• Limiting friction</li> </ul> </li> </ul>	<p><math>a \propto \frac{1}{m}</math> (when <math>F</math> is constant).</p> <ul style="list-style-type: none"> <li>• express Newton's second law of motion as <math>F=ma</math>.</li> <li>• define the SI unit of force.</li> <li>• express Newton's third law of motion.</li> <li>• 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.</li> <li>• use the relationship <math>F = ma</math> relevantly in appropriate situations to solve problems.</li> <li>• appreciate the importance of Newton's laws of motion to explain the applications of force in day-to-day life.</li> <li>• 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.</li> <li>• explain the concept of momentum using relevant examples from day-to-day life.</li> <li>• conduct simple activities to show the factors affecting momentum.</li> <li>• represent momentum as the product of mass and velocity.</li> <li>• accept that the concept of momentum can be used to explain the relevant day-to-day phenomena.</li> </ul> <p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• conduct simple activities to show the nature of friction.</li> <li>• explain the variation of static frictional</li> </ul>	03	

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	3.4 Makes jobs easy using resultant of forces.	<ul style="list-style-type: none"> <li>• The factors affecting the limiting frictional force</li> <li>• Dynamic friction</li> </ul> <p>Resultant of forces</p> <ul style="list-style-type: none"> <li>• Resultant of two collinear forces</li> <li>• Resultant of two parallel forces</li> </ul>	<p>force between two surfaces with the external force.</p> <ul style="list-style-type: none"> <li>• 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).</li> <li>• distinguish 'static friction', 'limiting friction' and 'dynamic friction'.</li> <li>• 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.</li> <li>• accept that friction always opposes relative motion between two surfaces; however, it is also utilized to produce motion.</li> <li>• appreciate the uses of friction in human activities.</li> </ul> <p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• describe the concept of the resultant of forces.</li> <li>• conduct simple activities to show the effect of resultant of forces.</li> <li>• conduct simple activities to find resultant of two collinear forces acting in the same direction and also in opposite directions.</li> <li>• conduct simple activities to find the resultant of two parallel forces acting in the same direction.</li> </ul>	03	<ul style="list-style-type: none"> <li>• Number of periods have been reduced from 5 to 3.</li> <li>• Conduct teacher demonstrations for practical sessions and use "Guru Gedara" lessons to teach lessons effectively.</li> </ul>

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	3.5 Estimates and calculates the turning effect of a force.	<ul style="list-style-type: none"> <li>• Turning effect of force</li> <li>• Moment of force</li> <li>• Moment of couple of forces</li> </ul>	<ul style="list-style-type: none"> <li>• 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).</li> <li>• accept that a large force can be obtained by a collection of small forces.</li> <li>• accept that there are ways of varying the magnitude and direction of a force according to the situation.</li> </ul> <p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• demonstrate simple activities to describe turning effect of a force.</li> <li>• describe the factors affecting the moment of force.</li> <li>• 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.</li> <li>• express the unit of the moment of a force as N m.</li> <li>• state that the turning effect of the moment of a force can be clockwise or anti-clockwise.</li> <li>• describe the moment of a couple of forces.</li> <li>• make a list of instances where moment of a couple of forces apply in day-to-day life.</li> <li>• make calculations involving the moment of force.</li> <li>• accept the importance of turning effect of a force in day-to-day activities.</li> </ul>	03	<ul style="list-style-type: none"> <li>• Number of periods have been reduced from 5 to 3.</li> <li>• Conduct teacher demonstrations for practical sessions and use “Guru Gedara” lessons to teach lessons effectively.</li> </ul>

Competency	Competency level	Content	Learning outcomes	Time	Remarks
	3.6 Investigates the conditions of equilibrium of forces.	<ul style="list-style-type: none"> <li>• Equilibrium of forces <ul style="list-style-type: none"> <li>• Equilibrium under two forces</li> <li>• Equilibrium under three forces <ul style="list-style-type: none"> <li>• Parallel forces</li> <li>• Non-parallel forces</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• accept that moments appear in couples in many practical situations.</li> </ul> <p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• explain the equilibrium of forces on a body.</li> <li>• describe equilibrium of forces using the examples.</li> <li>• explain the conditions necessary for two forces to be in equilibrium.</li> <li>• explain the conditions necessary for three parallel forces to be in equilibrium.</li> <li>• describe practical applications of equilibrium of forces.</li> <li>• state the conditions necessary for three nonparallel forces to be in equilibrium (qualitatively).</li> <li>• accept that the equilibrium can exist under more than three forces too.</li> </ul>	02	<ul style="list-style-type: none"> <li>• Number of periods have been reduced from 4 to 2.</li> <li>• Conduct teacher demonstrations for practical sessions and use “Guru Gedara” lessons to teach lessons effectively.</li> </ul>
	3.7 Uses the principles and laws of hydrostatics to realize activities related to sinking, floating and pressure transmission.	<ul style="list-style-type: none"> <li>• Pressure and its effects <ul style="list-style-type: none"> <li>• Hydrostatic pressure <ul style="list-style-type: none"> <li>• Factors affecting the hydrostatic pressure</li> <li>• Expression for hydrostatic pressure, <math>p = h\rho g</math></li> </ul> </li> <li>• Atmospheric pressure</li> <li>• Measuring atmospheric pressure</li> <li>• Sinking and floating <ul style="list-style-type: none"> <li>• Up-thrust</li> </ul> </li> </ul> </li> </ul>	<p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• express hydrostatic pressure (<math>p</math>) in terms of height of liquid column (<math>h</math>), density of liquid (<math>\rho</math>) and gravitational acceleration (<math>g</math>).</li> <li>• calculate the pressure exerted by a liquid using the expression, <math>p = h\rho g</math>.</li> <li>• state instances where pressure exerted by liquids is productively used.</li> <li>• discuss the concept of transmission of pressure.</li> <li>• accept the importance of pressure to make work easier.</li> </ul>	04	<ul style="list-style-type: none"> <li>• Number of periods have been reduced from 8 to 4.</li> <li>• Some lesson content and outcomes have been removed.</li> <li>• Conduct teacher demonstrations for practical sessions and use “Guru Gedara” lessons to</li> </ul>

Competency	Competency level	Content	Learning outcomes	Time	Remarks
		<ul style="list-style-type: none"> <li>Archimedes' principle</li> </ul>	<ul style="list-style-type: none"> <li>accept that the transmission of pressure is very useful in modern technology.</li> <li>state that atmospheric pressure can be measured by using the mercury barometer and the aneroid barometer.</li> <li>state that atmospheric pressure varies with altitude.</li> <li>discuss the factors affecting up-thrust acting on a body due to a liquid by demonstrating a simple activity.</li> <li>demonstrate Archimedes' principle using a simple activity.</li> <li>use simple set-ups to show the conditions necessary for sinking and floating.</li> <li>explain the concepts of sinking and floating according to the weight of the object and the up-thrust.</li> <li>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.</li> </ul>		<ul style="list-style-type: none"> <li>teach lessons effectively.</li> <li>Calculations related to pressure transmission are not required.</li> <li>Calculations are not expected.</li> </ul>
	3.8 Quantifies the mechanical energy and power in mechanical processes.	<ul style="list-style-type: none"> <li>Work, Energy and Power</li> <li>Mechanical energy               <ul style="list-style-type: none"> <li>Kinetic energy, <math>E_K = \frac{1}{2}mv^2</math></li> <li>Potential energy                   <ul style="list-style-type: none"> <li>Gravitational potential energy, <math>E_P = mgh</math></li> </ul> </li> </ul> </li> </ul>	<p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>state that the work done by a force is the product of the magnitude of the force and the displacement in the direction of the force.</li> <li>explain the two forms of mechanical energy as kinetic energy and potential energy.</li> </ul>	02	<ul style="list-style-type: none"> <li>Number of periods have been reduced from 5 to 2.</li> <li>Some learning outcomes have been removed.</li> <li>Use "Guru Gedara" lessons to teach lessons effectively.</li> </ul>

Competency	Competency level	Content	Learning outcomes	Time	Remarks
	3.9 Uses fundamental principles and laws of current electricity to understand and control the action of simple circuits.	<ul style="list-style-type: none"> <li>• Elastic potential energy</li> <li>• Power</li> <li>• Current electricity               <ul style="list-style-type: none"> <li>• Electric current                   <ul style="list-style-type: none"> <li>• Electron flow and conventional current</li> <li>• Unit of current</li> <li>• Use of ammeter to measure the current</li> </ul> </li> <li>• Potential difference                   <ul style="list-style-type: none"> <li>• Unit of potential difference</li> <li>• Use of voltmeter to measure the potential difference</li> </ul> </li> <li>• Electric source and electromotive force (e.m.f)</li> <li>• Resistance and resistors                   <ul style="list-style-type: none"> <li>• Units of resistance</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• provide the expression for kinetic energy as <math>E_K = \frac{1}{2}mv^2</math></li> <li>• provide the expression for gravitational potential energy as <math>E_P = mgh</math> with reference to a zero potential level.</li> <li>• accept that kinetic energy, gravitational potential energy and elastic potential energy can be used for human energy requirements.</li> <li>• accept that energy is used to do work.</li> <li>• state power as the rate of doing work (work done /time taken).</li> </ul> <p><b>Student should be able to</b></p> <ul style="list-style-type: none"> <li>• state the direction of conventional current in relation to the direction of electron flow.</li> <li>• accept that a flow of current occurs due to a potential difference.</li> <li>• describe that an electric source is used to supply a potential difference to a circuit.</li> <li>• state that the e.m.f of a source is the potential difference between its terminals when no current flows from the source.</li> <li>• explain the resistance as a factor which opposes the flow of electric current.</li> <li>• conduct a simple activity to show the factors affecting the resistance of a conductor (length, cross-sectional area and resistivity).</li> <li>• conduct a simple experiment to show the relationship between <math>V</math> across a conductor and <math>I</math>.</li> </ul>	03	<ul style="list-style-type: none"> <li>• Calculations related to equation <math>E_K = \frac{1}{2}mv^2</math> and <math>E_P = mgh</math> are not required.</li> <li>• Calculations of power are not required.</li> <li>• Number of periods have been reduced from 10 to 3.</li> <li>• Some learning content and outcomes have been removed.</li> <li>• Conduct teacher demonstrations for practical sessions and use “Guru Gedara” lessons to teach lessons effectively.</li> <li>• Discussing about resistor colour codes are not required.</li> </ul>

Competency	Competency level	Content	Learning outcomes	Time	Remarks
		<ul style="list-style-type: none"> <li>• Factors affecting resistance</li> <li>• Length of the conductor</li> <li>• Cross sectional area of the conductor</li> <li>• Resistivity of the material</li> <li>• Ohm's law</li> </ul>	<ul style="list-style-type: none"> <li>• show graphically the variation of potential difference with current.</li> <li>• use the relationship between <math>V</math> and <math>I</math> to express Ohm's law as <math>V = IR</math>; state <math>R</math> as resistance of the conductor.</li> </ul>		<ul style="list-style-type: none"> <li>• Discussing about combination of resistors is not required.</li> </ul>

The content and the learning outcomes selected from grade 11 to be covered

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
1.0 Explores life and life processes in order to improve the productivity of biological systems.	1.1 Discovers the characteristics of plant tissues.	<ul style="list-style-type: none"> <li>• Tissues               <ul style="list-style-type: none"> <li>• Plant tissues                   <ul style="list-style-type: none"> <li>• Meristematic tissue</li> <li>• Permanent tissue                       <ul style="list-style-type: none"> <li>• Simple permanent tissue</li> <li>• Complex permanent tissue</li> </ul> </li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• lists characteristics of meristematic and permanent tissues.</li> <li>• states parenchyma, collenchyma and sclerenchyma as simple permanent tissues.</li> <li>• states xylem and phloem as complex permanent tissues .</li> <li>• identifies xylem and phloem as complex permanent tissues using their specific characteristics.</li> <li>• states the functions of xylem and phloem tissues.</li> </ul>	03	<ul style="list-style-type: none"> <li>• The time allocated has been reduced from 4 to 3 periods.</li> <li>• Use the e-textbook and Gurugedara lessons to accelerate teaching.</li> </ul>
	1.2 Discovers the characteristics of animal tissues.	<ul style="list-style-type: none"> <li>• Animal tissues               <ul style="list-style-type: none"> <li>• Epithelial tissues</li> <li>• Connective tissue</li> <li>• Muscular tissue</li> <li>• Nervous tissue</li> </ul> </li> <li>• Functions and locations of major types of tissues in human body</li> </ul>	<ul style="list-style-type: none"> <li>• introduces epithelial, connective, muscular, and nervous tissues as major types of animal tissues.</li> <li>• states the functions and locations of epithelial tissues.</li> <li>• explains blood as a connective tissue.</li> <li>• states smooth, cardiac and skeletal muscles as muscular tissues.</li> <li>• states functions and locations of smooth, cardiac and skeletal muscles.</li> <li>• identifies muscular tissues by the shape of cell.</li> <li>• states the structure and</li> </ul>	03	<ul style="list-style-type: none"> <li>• The time allocated has been reduced from 4 to 3 periods.</li> <li>• Use the e-textbook and Gurugedara lessons to accelerate teaching.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
	1.3 Investigates the importance of photosynthesis.	<ul style="list-style-type: none"> <li>• Photosynthesis               <ul style="list-style-type: none"> <li>• Factors affecting photosynthesis                   <ul style="list-style-type: none"> <li>• Carbon dioxide</li> <li>• Water</li> <li>• Light energy</li> <li>• Chlorophyll</li> </ul> </li> <li>• Products of photosynthesis</li> <li>• Role of photosynthesis</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• states what photosynthesis is.</li> <li>• states factors affecting photosynthesis.</li> <li>• conducts simple activities to identify end products of photosynthesis.</li> <li>• conducts simple activities to prove the necessity of carbon dioxide, light energy and chlorophyll for photosynthesis.</li> <li>• states the balanced chemical equation for photosynthesis.</li> <li>• explains the importance of photosynthesis.</li> </ul>	05	
	1.4 Investigates the process of digestion in human.	<ul style="list-style-type: none"> <li>• Digestion               <ul style="list-style-type: none"> <li>• Process of human digestion</li> <li>• Role of liver, pancreas and salivary glands in digestion</li> <li>• Diseases and disorders related to the digestive system and their prevention                   <ul style="list-style-type: none"> <li>• Diarrhea</li> <li>• Constipation</li> <li>• Gastritis</li> <li>• Typhoid</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• states what digestion is.</li> <li>• describes the process of digestion and functions of the mouth, esophagus, stomach, small and large intestines and rectum.</li> <li>• states the role of the liver, pancreas and salivary glands.</li> <li>• presents information on diseases and disorders associated with the digestive system and their prevention.</li> </ul>	03	<ul style="list-style-type: none"> <li>• The time allocated has been reduced from 4 to 3 periods.</li> <li>• One learning out has been removed.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
	1.5 Investigates the process of respiration in human.	<ul style="list-style-type: none"> <li>• Respiration               <ul style="list-style-type: none"> <li>• Respiratory process/ breathing                   <ul style="list-style-type: none"> <li>• Inspiration/Inhaling</li> <li>• Expiration/Exhaling</li> </ul> </li> <li>• Characteristics of a respiratory surface</li> <li>• Types of respiration                   <ul style="list-style-type: none"> <li>• Aerobic respiration</li> <li>• Anaerobic respiration</li> </ul> </li> <li>• Energy storage</li> <li>• Diseases and disorders related to the respiratory system and their prevention(common cold, tuberculosis, pneumonia, asthma and bronchitis)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• describes the characteristics of a respiratory surface for efficient gaseous exchange and role of mucous membranes and cilia.</li> <li>• explains what external and cellular respiration are.</li> <li>• states the balanced chemical equation for aerobic respiration.</li> <li>• compares aerobic and anaerobic respiration in terms of oxygen and the amount of energy released.</li> <li>• presents information on diseases and disorders associated with the respiratory system and their prevention.</li> </ul>	03	<ul style="list-style-type: none"> <li>• The time allocated has been reduced from 5 to 3 periods.</li> <li>• Two learning outcomes have been removed.</li> </ul>
	1.6 Investigates the process of excretion in human.			0	<ul style="list-style-type: none"> <li>• The competency level has been removed.</li> </ul>
	1.7 Investigates the process of circulation in human			0	<ul style="list-style-type: none"> <li>• The competency level has been removed.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
	1.8 Investigates the process of co ordination and homeostasis in human.	<ul style="list-style-type: none"> <li>• Chemical co-ordination</li> <li>• Homeostasis</li> </ul>	<ul style="list-style-type: none"> <li>• explains the main endocrine glands, their locations and functions.</li> <li>• states what homeostasis is.</li> <li>• explains the homeostasis of body temperature, blood glucose and water content.</li> </ul>	01	<ul style="list-style-type: none"> <li>• The time allocated has been reduced from 5 periods to 1 period.</li> <li>• Some content and learning outcomes have been removed.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
2.0 Investigates matter, properties of matter and their interaction to enhance the quality of life.	2.1 Investigates different types of mixtures.	<ul style="list-style-type: none"> <li>• Mixtures               <ul style="list-style-type: none"> <li>• Types of mixtures                   <ul style="list-style-type: none"> <li>• Homogeneous mixtures</li> <li>• Heterogeneous mixtures</li> </ul> </li> <li>• Solubility                   <ul style="list-style-type: none"> <li>• Factors affecting solubility                       <ul style="list-style-type: none"> <li>• Nature of solute</li> <li>• Nature of solvent</li> <li>• Temperature</li> </ul> </li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• explains the term mixtures.</li> <li>• explains what homogeneous and heterogeneous mixtures are.</li> <li>• lists characteristics of homogeneous and heterogeneous mixtures.</li> <li>• prepares different types of mixtures.</li> <li>• differentiates given mixtures as homogeneous or heterogeneous based on observations.</li> <li>• defines the term 'solubility' .</li> <li>• states the factors affecting solubility</li> <li>• examines the factors affecting solubility.</li> <li>• shows awareness to control factors affecting solubility in day to day life.</li> </ul>	02	<ul style="list-style-type: none"> <li>• The allocated time has been reduced from 5 to 2 periods.</li> <li>• Proposed activities are recommended to perform as teacher demonstrations.</li> </ul>
	2.2 Uses different criteria to express the composition of mixtures.	<ul style="list-style-type: none"> <li>• Composition of mixtures               <ul style="list-style-type: none"> <li>• Mass fraction</li> <li>• Volume fraction</li> <li>• Composition by <math>m/v</math></li> <li>• Composition by <math>n/v</math> (concentration)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• expresses the composition of a mixture as a mass fraction.</li> <li>• expresses the composition of a mixture as a volume fraction.</li> <li>• expresses the composition of a solution in relation to mass and volume.</li> </ul>	03	<ul style="list-style-type: none"> <li>• The time allocated has been reduced from 5 to 3 periods.</li> <li>• Proposed activities are recommended to perform as teacher demonstrations.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
			<ul style="list-style-type: none"> <li>expresses the composition of a solution (concentration) in relation to mole and volume.</li> <li>names the composition expressed in terms of <math>n/v</math> as concentration.</li> <li>prepares a mixture of a given composition.</li> <li>solves simple problems related to the composition expressed in terms of <math>n/v</math>.</li> <li>names the instances of using standard solutions.</li> </ul>		<ul style="list-style-type: none"> <li>Some content and outcomes have been removed.</li> <li>The last two outcomes have been revised.</li> </ul>
	2.3 Uses different technique to separate mixtures.	<ul style="list-style-type: none"> <li>Separation techniques               <ul style="list-style-type: none"> <li>Evaporation</li> <li>Crystallization</li> <li>Solvent extraction</li> <li>Simple distillation</li> <li>Fractional distillation</li> <li>Steam distillation</li> <li>Chromatography</li> </ul> </li> <li>Application of separation technique               <ul style="list-style-type: none"> <li>Preparation of salt from sea water</li> <li>Extraction of essential oils</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>describes the given separation techniques.</li> <li>separates components of a mixture by using different separation techniques.</li> <li>gives examples for instances where given separation techniques are used.</li> <li>describes the process of salt production from sea water.</li> <li>points out the separation techniques that are being used in the salt industry.</li> </ul>	04	<ul style="list-style-type: none"> <li>The time allocated has been reduced from 5 to 4 periods.</li> <li>Some content have been removed.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
			<ul style="list-style-type: none"> <li>describes the process of extraction of essential oils from natural sources in Sri Lanka, e.g. cinnamon/ citronella.</li> </ul>		
	2.4 Investigates properties of acid, bases and salts.	<ul style="list-style-type: none"> <li>Acids, bases and salts               <ul style="list-style-type: none"> <li>Strong acids and weak acids</li> <li>Physical properties, chemical properties and uses of acids</li> <li>Strong bases and weak bases</li> <li>Physical properties, chemical properties and uses of bases</li> <li>Neutralization of acids/bases</li> <li>Salts</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>lists the characteristic properties of acids, bases and salts.</li> <li>explains acids as a source of hydrogen ions and bases as a source of hydroxyl ions.</li> <li>states the difference between strong acids and weak acids.</li> <li>gives examples for strong and weak acids.</li> <li>states the difference between strong bases and weak bases.</li> <li>gives examples for strong and weak bases.</li> <li>explains the term 'neutralization'</li> <li>discusses the application of the neutralization process in day-to-day life.</li> <li>investigates and lists application of acids, bases and salts in day-to-day activities.</li> </ul>	06	<ul style="list-style-type: none"> <li>The time allocated has been reduced from 7 to 6 periods.</li> <li>One learning outcome has been removed.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
	2.5 Investigates heat changes associated with chemical reaction.	<ul style="list-style-type: none"> <li>Heat changes associated with reactions               <ul style="list-style-type: none"> <li>Exothermic and endothermic reactions</li> <li>Heat of reaction</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>expresses by experience that heat changes occur during chemical reactions.</li> <li>gives examples for endothermic and exothermic reactions.</li> <li>demonstrates a few endothermic and exothermic reactions.</li> <li>explains what endothermic and exothermic reactions are.</li> </ul>	04	<ul style="list-style-type: none"> <li>The time allocated has been reduced from 10 to 4 periods.</li> <li>Proposed demonstrations are recommended to conduct as teacher demonstrations.</li> <li>Some content and learning outcomes have been removed.</li> </ul>
	2.6 Investigates components of an electro chemical cell and relevant reactions.				<ul style="list-style-type: none"> <li>The competency level has been removed.</li> </ul>
	2.7 Investigates different electrolysis processes.	<ul style="list-style-type: none"> <li>Electrolysis               <ul style="list-style-type: none"> <li>Electrolysis of acidulated water</li> <li>Electrolysis of aqueous copper sulphate solution</li> <li>Electrolysis of aqueous sodium chloride solution</li> <li>Electroplating                   <ul style="list-style-type: none"> <li>Electroplating of copper on iron</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>distinguishes electrolytes and non electrolytes by testing for electrical conductivity.</li> <li>identifies the anode and cathode of an electrolysis process.</li> <li>identifies the electrode where oxidation takes place as anode.</li> <li>identifies the electrode where reduction takes place as cathode.</li> </ul>	04	<ul style="list-style-type: none"> <li>The third and fourth learning outcomes of this competency level have been taken from the competency level 2.6.</li> <li>Use the e-textbook and Gurugedara lessons to accelerate teaching.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
			<ul style="list-style-type: none"> <li>demonstrates electrolysis of sodium chloride solution, acidulated water and copper sulphate solution.</li> <li>writes anodic, cathodic and overall reactions of given electrolysis processes.</li> <li>explains what electroplating is.</li> <li>describes the process of electroplating of copper on iron with the relevant reactions.</li> <li>conducts simple activities to demonstrate copper on iron electroplating.</li> <li>states the uses of electroplating.</li> </ul>		<ul style="list-style-type: none"> <li>The proposed demonstrations and activities are recommended to conduct as teacher demonstrations.</li> </ul>
	2.8 Investigates the process of corrosion.	<ul style="list-style-type: none"> <li>Corrosion               <ul style="list-style-type: none"> <li>Rusting of iron</li> <li>Controlling rusting</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>describes what corrosion is.</li> <li>explores the factors affecting the rusting of iron.</li> <li>states the conditions needed for rusting .</li> <li>describes how the rusting of iron is controlled.</li> <li>explains the process of the sacrificial protection of iron.</li> <li>selects suitable metals for cathodic protection of iron by referring to the activity series.</li> </ul>	02	<ul style="list-style-type: none"> <li>The allocated time has been reduced from 3 periods to 2 period.</li> <li>Use the e-textbook and Gurugedara lessons to accelerate teaching.</li> <li>The proposed exploration is recommended to</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
			<ul style="list-style-type: none"> <li>shows an appreciation the importance controlling rusting.</li> </ul>		conduct as teacher demonstration.
	2.9 Investigates the nature and uses of hydrocarbons and their derivatives.				<ul style="list-style-type: none"> <li>The competency level has been removed.</li> </ul>
	2.10 Explores the diversity of polymers.	<ul style="list-style-type: none"> <li>Polymers               <ul style="list-style-type: none"> <li>Types of polymers                   <ul style="list-style-type: none"> <li>Based on origin (natural/ synthetic)</li> <li>Based on structure (linear/ branched/cross linked)</li> </ul> </li> <li>Monomers and polymerization</li> <li>Properties and uses of polymers</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>categorizes polymers based on their origin.</li> <li>gives examples for natural and synthetic polymers.</li> <li>states ethene as a hydrocarbon.</li> <li>identifies polythene as a polymer prepared from the polymerization of ethane.</li> </ul>	02	<ul style="list-style-type: none"> <li>The time allocated has been reduced from 3 to 2 periods.</li> <li>Explain the polymerization only by using ethene.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
3.0 Utilizes various forms of energy, their interaction with matter and energy transformation by maintaining efficiency and effectiveness at an optimum level.	3.1 Investigates the properties of mechanical waves and electromagnetic waves.	<ul style="list-style-type: none"> <li>• Waves               <ul style="list-style-type: none"> <li>• Mechanical waves                   <ul style="list-style-type: none"> <li>• Transverse waves</li> <li>• Longitudinal waves</li> </ul> </li> <li>• Physical quantities related to wave motion                   <ul style="list-style-type: none"> <li>• Frequency</li> <li>• Wavelength</li> <li>• Speed</li> <li>• Amplitude</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates the nature of mechanical wave motion through activities .</li> <li>• states that waves transfer energy without transferring matter.</li> <li>• distinguishes between transverse and longitudinal waves and gives suitable examples.</li> <li>• uses graphical representation of waves to explain the nature of mechanical wave motion and the physical quantities related to wave motion (frequency, wavelength, amplitude and speed of wave).</li> </ul>	04	<ul style="list-style-type: none"> <li>• Allocated time has been reduced from 7 to 4 periods.</li> <li>• Proposed activities are recommended to conduct as teacher demonstrations.</li> <li>• The content and the learning outcomes of Electromagnetic waves and Electromagnetic spectrum have been removed.</li> </ul>
	3.2 Uses the knowledge of sound waves in day-to-day activities and scientific works.	<ul style="list-style-type: none"> <li>• Sound waves               <ul style="list-style-type: none"> <li>• Propagation of sound waves</li> <li>• Speed of sound</li> <li>• Characteristics of sound</li> <li>• Audible range of sound and other frequency ranges.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• describes the longitudinal nature of sound waves.</li> <li>• describes that sound waves consist of a series of compressions and rarefactions.</li> <li>• states that a medium is needed to propagate sound waves.</li> </ul>	03	<ul style="list-style-type: none"> <li>• Allocated time has been reduced from 4 to 3 periods.</li> <li>• Proposed activities are recommended to conduct as teacher demonstrations.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
			<ul style="list-style-type: none"> <li>states the order of magnitude of the speed of sound in air, liquids and solids.</li> <li>states pitch, loudness and quality of sound as characteristics of sound.</li> <li>states that pitch depends on frequency, loudness on amplitude and quality of sound on the sound source.</li> <li>expresses audible range, infra-sound and ultra-sound frequencies.</li> </ul>		<ul style="list-style-type: none"> <li>The content and the learning outcome of Musical instrument have been removed.</li> </ul>
	3.3 Uses the principles and laws of geometrical optics in day-to-day activities and scientific work.	<ul style="list-style-type: none"> <li>Geometrical optics <ul style="list-style-type: none"> <li>Reflection <ul style="list-style-type: none"> <li>Curved mirrors (spherical)</li> <li>Terms related to curved mirrors</li> <li>Images formed by curved mirrors <ul style="list-style-type: none"> <li>Convex mirror</li> <li>Concave mirrors</li> </ul> </li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>carries out activities to investigate the nature of images of curved mirrors.</li> <li>identifies pole, center of curvature, focus and principal axis.</li> <li>uses the laws of reflection to explain the behavior of the rays incident on the convex and concave mirrors. <ul style="list-style-type: none"> <li>a ray parallel to principal axis</li> <li>a ray passing through the center of curvature</li> <li>a ray passing through the focus</li> </ul> </li> </ul>	06	<ul style="list-style-type: none"> <li>Allocated time has been reduced from 12 to 6 periods.</li> <li>Proposed activities are recommended to conduct as teacher demonstrations.</li> <li>Some content and learning outcomes under Refraction have been removed.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
		<ul style="list-style-type: none"> <li>• Refraction               <ul style="list-style-type: none"> <li>• Images formed by lenses                   <ul style="list-style-type: none"> <li>• Convex lens</li> <li>• Concave lens</li> <li>• Simple microscope</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• draws ray diagrams for images of convex mirrors.</li> <li>• draws ray diagrams for images of concave mirrors. (<math>u \rightarrow \infty, u &gt; r, u = r, f &lt; u &lt; r, u = f, u &lt; f</math>)</li> <li>• uses curved mirrors in relevant situations.</li> <li>• carries out activities to investigate the nature of images of convex lenses and concave lenses.</li> <li>• explains the 'terms' principal axis, focus, optical center.</li> <li>• explains the behavior of the following rays incident on a lens               <ul style="list-style-type: none"> <li>• a ray parallel to the principal axis</li> <li>• a ray through the optical center</li> <li>• a ray passing the focus</li> </ul> </li> <li>• states the principle of reversibility of light draws ray diagrams for images formed by concave lens.</li> <li>• draws ray diagrams for images formed by convex lenses. (<math>u \rightarrow \infty, u &gt; 2f, u = 2f, f &lt; u &lt; 2f, u = f, u &lt; f</math>)</li> </ul>		

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
			<ul style="list-style-type: none"> <li>gives examples for the uses of convex and concave lenses .</li> <li>explains the action of the simple microscope using a ray diagram.</li> </ul>		
	3.4 Investigates thermal effects.	<ul style="list-style-type: none"> <li>Thermal energy and uses               <ul style="list-style-type: none"> <li>Temperature</li> <li>Thermometers</li> </ul> </li> <li>Heat exchange               <ul style="list-style-type: none"> <li>Heat capacity</li> <li>Specific heat capacity</li> <li>Amount of heat exchange, <math>Q = mc\theta</math></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>names various thermometers (mercury -glass, alcohol-glass, digital).</li> <li>explains briefly the action of mercury-glass thermometer.</li> <li>Identifies Celsius temperature scale.</li> <li>Identifies Kelvin temperature scale (absolute).</li> <li>states the relationship between Celsius and Kelvin scales.</li> <li>uses thermometers to measure various temperatures.</li> <li>states the condition that is needed for heat exchange from one object to another.</li> <li>defines heat capacity of a body.</li> <li>defines specific heat capacity of a substance.</li> <li>uses the relationship, <math>Q = mc\theta</math> to find the amount of heat exchange.</li> </ul>	06	<ul style="list-style-type: none"> <li>Allocated time has been reduced from 12 periods to 6 periods.</li> <li>Proposed activities are recommended to conduct as teacher demonstrations.</li> <li>The content and the learning outcomes of Change of state have been removed.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
		<ul style="list-style-type: none"> <li>• Expansion               <ul style="list-style-type: none"> <li>• Solids</li> <li>• Liquids</li> <li>• Gases</li> </ul> </li> <li>• Transfer of heat               <ul style="list-style-type: none"> <li>• Conduction</li> <li>• Convection</li> <li>• Radiation</li> </ul> </li> <li>• Applications of effects of thermal energy</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrates the expansion of solids, liquids and gases through activities.</li> <li>• describes the three methods of heat transfer.</li> <li>• gives examples for instances of use of heat transfer by conduction, convection and radiation.</li> </ul>		
	3.5 Quantifies electrical energy and power in electrical appliances.	<ul style="list-style-type: none"> <li>• Electrical energy and power</li> <li>• Energy dissipation of an electrical appliance, <math>E = VI t</math></li> <li>• Power of an electrical appliance <math>P = VI</math></li> <li>• House wiring circuit</li> </ul>	<ul style="list-style-type: none"> <li>• explains energy dissipation and power of an electrical appliance.</li> <li>• solves simple numerical problems involving energy and power.</li> <li>• compares power rating and energy consumption of various electrical appliances.</li> <li>• compares various electrical appliances in terms of efficient use of energy.</li> <li>• describes ways of increasing energy efficiency.</li> <li>• names components of house wiring circuit.</li> </ul>	05	

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
			<ul style="list-style-type: none"> <li>explains the connection of a house wiring circuit using a circuit diagram.</li> <li>explains safety precautions in using house wiring circuit.</li> <li>uses “kW h” as a unit of electrical energy consumption .</li> </ul>		
	3.6 Uses the knowledge of electronics in day-to-day life activities and scientific work.			0	<ul style="list-style-type: none"> <li>The competency level has been removed.</li> </ul>
	3.7. Investigates the nature of electromagnetic force and the uses of it.	<ul style="list-style-type: none"> <li>Magnetic force on a current carrying conductor placed in a magnetic field               <ul style="list-style-type: none"> <li>Factors affecting the magnitude of force                   <ul style="list-style-type: none"> <li>Length</li> <li>Current</li> <li>Strength of the magnetic field</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>carries out activities to demonstrate the magnetic force exerted on a current carrying conductor placed in a magnetic field.</li> </ul>	01	<ul style="list-style-type: none"> <li>The allocated time has been reduced from 5 periods to 1 period.</li> <li>Some content and learning outcomes of have been removed.</li> <li>Proposed activities are recommended to conduct as teacher</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
					demonstrations .
	3.8. Investigates the phenomenon of electromagnetic induction and the uses of it.			0	<ul style="list-style-type: none"> <li>The competency level has been removed.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
4.0 Explores nature, properties and processes of earth and space by understanding natural phenomena for intelligent and sustainable use.	4.1 Investigates the organizational levels of the biosphere and interactions existing within it.	<ul style="list-style-type: none"> <li>• Environmental equilibrium               <ul style="list-style-type: none"> <li>• Organizational levels of the biosphere                   <ul style="list-style-type: none"> <li>• Individual</li> <li>• Population</li> <li>• Community</li> <li>• Ecosystem</li> <li>• Biosphere</li> </ul> </li> <li>• Population growth and growth curve</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• states organizational levels of the biosphere in a hierarchical order.</li> <li>• describes organizational levels of the biosphere.</li> <li>• identifies the pattern of typical population growth curve.</li> <li>• identifies the pattern of change in human population growth curve.</li> <li>• explains the factors affecting human population growth.</li> </ul>	02	<ul style="list-style-type: none"> <li>• The allocated time has been reduced from 3 to 2 periods.</li> <li>• Use the e-textbook and Gurugedara lessons to accelerate teaching.</li> </ul>
	4.2 Investigates the mechanisms that contribute to maintaining the balance of eco systems.	<ul style="list-style-type: none"> <li>• Energy and nutrient flow               <ul style="list-style-type: none"> <li>• Energy flow in an ecosystem</li> </ul> </li> <li>• Cycling of matter in an eco system</li> <li>• Bio-geo chemical cycles               <ul style="list-style-type: none"> <li>• Nitrogen cycle</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• describes how energy and nutrients flow through food chains and food webs.</li> <li>• State the importance of the energy pyramid.</li> <li>• accepts that flow of energy in an eco system is unidirectional.</li> <li>• illustrates that matter flows cyclically within the natural environment.</li> <li>• describes what bio-geo chemical cycle is.</li> <li>• names Nitrogen and cycle as a bio-geo chemical cycle.</li> </ul>	01	<ul style="list-style-type: none"> <li>• Allocated time has been reduced from 5 period to 1 period.</li> <li>• Use the e-textbook and Gurugedara lessons to accelerate teaching.</li> <li>• Some content and learning outcomes have been removed.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
			<ul style="list-style-type: none"> <li>illustrates the Nitrogen cycle diagrammatically.</li> <li>describes the factors affecting the ecological balance.</li> <li>accepts that environmental balance depends on cycling of matter.</li> </ul>		
	4.3 Explores various types of pollutants and their adverse effects.	<ul style="list-style-type: none"> <li>Soil, water and air Pollution</li> <li>Factors affecting pollution               <ul style="list-style-type: none"> <li>Extensive use of agrochemicals and fertilizers</li> <li>Disposal of e-waste, nuclear waste, household waste and industrial waste</li> <li>Industrial effluents                   <ul style="list-style-type: none"> <li>Hydrocarbons, SO<sub>2</sub>, NO<sub>2</sub>, CFC, particulate matter, green house gases, heavy metals</li> </ul> </li> <li>Extensive use of household chemicals</li> <li>Burning of fossil fuels and disposals</li> </ul> </li> <li>Adverse effects of pollution</li> </ul>	<ul style="list-style-type: none"> <li>states what pollution is.</li> <li>explores the factors affecting soil, water and air pollution.</li> <li>presents a survey report on various pollutants emitted from different sources.</li> <li>names chemical substances that may occur in pollutants emitted from different sources.</li> <li>assesses the personal contribution to the environmental pollution.</li> <li>assesses the contribution of different institutions to the environmental pollution</li> <li>explains different phenomena associated with environmental pollution that lead to the listed adverse effects.</li> </ul>	03	<ul style="list-style-type: none"> <li>The allocated time has been reduced from 5 to 3 periods.</li> <li>Use the e-textbook and Gurugedara lessons to accelerate teaching.</li> <li>Some content have been removed.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
		<ul style="list-style-type: none"> <li>• Direct effects               <ul style="list-style-type: none"> <li>• Global warming</li> <li>• Acid rain</li> <li>• Ozone layer depletion</li> <li>• Biological magnification</li> <li>• Eutrophication</li> <li>• Increased level of radiations</li> </ul> </li> <li>• Indirect effects               <ul style="list-style-type: none"> <li>• Loss of habitats</li> <li>• Desertification</li> <li>• Loss of productivity of plants</li> <li>• Destruction and degradation of manmade structures and natural environment</li> <li>• Health hazards</li> <li>• Loss of biodiversity</li> <li>• Blooming invasive species</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• uses various methods to communicate adverse effects of pollution.</li> <li>• accepts that all types of environmental pollutants are hazardous.</li> <li>• accepts that pollution of one resource is interconnected with the pollution of other resources.</li> <li>• accept that human intervention is necessary to minimize environmental pollution.</li> </ul>		

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
		<ul style="list-style-type: none"> <li>• Damage to the economy</li> </ul>			
	4.4 Explores effects of change in life style.	<ul style="list-style-type: none"> <li>• Facts and effects of changing life style               <ul style="list-style-type: none"> <li>• Urbanization</li> <li>• Industrialization</li> </ul> </li> <li>• Commercialized agriculture</li> <li>• Man-made irrigation systems</li> <li>• Extensive and diverse use of materials and energy forms</li> <li>• Increase of non-communicable diseases and disorders               <ul style="list-style-type: none"> <li>• Unknown chronic kidney disease</li> <li>• Cancer</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• states the factors affecting the changing life style.</li> <li>• Accepts the change in lifestyle is a cause for some non-communicable diseases.</li> <li>• describes the interrelationship between non-communicable diseases and the life style/pollution.</li> <li>• explores the possible causes for unknown chronic kidney disease and its distribution pattern in the island.</li> <li>• values that the impact of man on environment returns negatively.</li> <li>• accepts the importance of re-change towards an environmental friendly life style.</li> </ul>	02	<ul style="list-style-type: none"> <li>• The allocated time has been reduced from 5 to 2 periods.</li> <li>• Use the e-textbook and Gurugedara lessons to accelerate teaching.</li> <li>• Some content have been removed.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
	4.5 Investigates on ways to contribute to sustainable development.	<ul style="list-style-type: none"> <li>• Environmental management and sustainable development               <ul style="list-style-type: none"> <li>• Poly-culture instead of mono-culture</li> <li>• Biological control of pests</li> <li>• Usage of organic fertilizers</li> <li>• Reforestation</li> <li>• Reducing of foot prints                   <ul style="list-style-type: none"> <li>• Carbon footprint</li> <li>• Food miles</li> </ul> </li> <li>• Waste management- reduce , reuse, recycle                   <ul style="list-style-type: none"> <li>• Solid</li> <li>• Water</li> <li>• Gases and air borne particles</li> </ul> </li> <li>• Thorough/proper implementation of legislative measures</li> </ul> </li> <li>• Energy management               <ul style="list-style-type: none"> <li>• Energy crisis and technological problems</li> <li>• Day-to-day monitoring of energy consumption</li> <li>• Energy efficiency</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• states what is meant by sustainable development and environment management.</li> <li>• explores poly-culture instead of monoculture, biological control of pests and usage of organic fertilizers as sustainable agricultural strategies.</li> <li>• describes reforestation as a recovery method to maintain the environmental balance.</li> <li>• explains food miles.</li> <li>• explains what a footprint is, with respect to Carbon.</li> <li>• values the importance of the reduction of foot prints and food miles.</li> <li>• explains what waste and garbage are.</li> <li>• describes and practices waste management techniques with respect to solid, water, gases and airborne particles.</li> <li>• accepts the implementation of related legislative measures and the importance of adhering to them.</li> </ul>	03	<ul style="list-style-type: none"> <li>• The allocated time has been reduced from 5 to 3 periods.</li> <li>• Use the e-textbook and Gurugedara lessons to accelerate teaching.</li> <li>• Some content and outcomes have been removed.</li> </ul>

Competency	Competency level	Content	Learning outcomes	No. of periods	Remarks
		<ul style="list-style-type: none"> <li>• Sustainable use of energy</li> <li>• Use of renewable energy resources               <ul style="list-style-type: none"> <li>• Hydro power</li> <li>• Wind power</li> <li>• Solar power</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• explains the energy crisis with respect to availability of energy sources and technology.</li> <li>• explains energy management as a remedy for energy crisis.</li> <li>• searches for the optimum use of energy with minimum waste.</li> </ul>		