



# **YEARLY LESSON PLAN**

## **SCIENCE FORM 2**

### **2019**

### **KSSM**

### **(DLP)**

**SMK Perempuan Likas**

## Theme 1: MAINTENANCE AND CONTINUITY OF LIFE

WEEK	LEARNING AREA	CONTENT STANDARD	LEARNING STANDARD	NOTES
Week 1	BIODIVERSITY	1.1 Diversity of organism	A student is able to:	
			1.1.1 Elaborate and communicate about biodiversity.	Carry out a multimedia presentation to discuss: <ul style="list-style-type: none"> <li>The definition of biodiversity.</li> <li>How biodiversity exists.</li> </ul> The importance of biodiversity in terms of: <ul style="list-style-type: none"> <li>sources of food,</li> <li>balanced in nature,</li> <li>generating economy such as recreation, tourism, biotechnology, medicine, industrial raw materials.</li> <li>ecological sources.</li> <li>education.</li> </ul> Malaysia as one of the 12 Mega-biodiversity countries in the world needs to be preserved.
			1.1.2 Justify the needs to manage biodiversity effectively.	Carry out activities to discuss: <ul style="list-style-type: none"> <li>The effects of human activities on biodiversity,</li> <li>The methods to conserve and preserve biodiversity including endemic and endangered species.</li> </ul>
Week 2		1.2 Classification of organisms	1.2.1 Differentiate organisms using a dichotomous key based on common characteristics.	Carry out activities to construct the dichotomous key and classify organisms based on common characteristics.  Notes:  Animal: Vertebrate and invertebrate, Mammal, Reptile, Fish, Bird and Amphibian.  Plant: Flowering plant, Non-flowering plant, Monocotyledon and Dicotyledon.

WEEK	LEARNING AREA	CONTENT STANDARD	LEARNING STANDARD	NOTES
Week 3	2.0 ECOSYSTEM	2.1 Energy flow in ecosystem	2.1.1 Explain with examples of producer, consumer and decomposer.	Refer to various activities in <b>Module 1 HEBAT Science</b> (Ecosystem). Introduce the terms of primary carnivore and secondary carnivore.
			2.1.2 Interpret food chain and food web.	Carry out activities to show the relationship between organisms in food chains and food web to show the energy transferred from the producer to the consumer.
2.2 Nutrient cycle in the ecosystem		2.2.1 Elaborate and communicate about the role of living things in the oxygen and carbon cycles in the ecosystem.	Carry out multimedia presentation that relates the roles of living things to the water, oxygen and carbon cycle.	
		2.2.2 Justify the role of organisms in the water cycle of an ecosystem.		
		2.2.3 Solve problems when there are interferences to the cycles caused by human activities.		Interferences caused by human activities such as: <ul style="list-style-type: none"> <li>• Uncontrolled deforestation.</li> <li>• Burning of fossil fuels.</li> <li>• Excessive use of water resources for agriculture and domestic consumption</li> </ul>
Week 5		2.3 Interdependence and interaction among organisms and, between organisms and the environment.	2.3.1 Explain with examples the interdependence among living things and the environment to maintain a balanced ecosystem.	Gather information about: <ul style="list-style-type: none"> <li>• Species, population, community, habitat and ecosystem.</li> <li>• Balanced in nature.</li> </ul> Carry out field studies to investigate habitat, population, community in ecosystems. Discuss interdependence between living organisms and their environment to create a balanced ecosystem.
	2.3.3 Communicate examples of interactions between organisms and		Interaction between organisms are: <ol style="list-style-type: none"> <li>1) Prey-predator.</li> <li>2) Symbiosis: Commensalism, mutualism and</li> </ol>	

			apply these interactions in daily life.	<p>parasitism. 3) Competition.</p> <p>Gather information and do a multimedia presentation on how the interaction of prey-predator is used in biological control of pest.</p> <p>Discuss the advantages of biological control over chemical control, and the prolonged impact of biological control.</p>
			2.3.4 Separate the factors that affect the size of population in an ecosystem.	<p>Factors that affect the size of population are:</p> <ul style="list-style-type: none"> <li>• Diseases.</li> <li>• Predators.</li> <li>• Food resources.</li> <li>• Drought.</li> </ul>
Week 6	2.0 ECOSYSTEM	2.4 The role of human in maintaining a balanced nature	2.4.1 Justify and communicate that man needs a stable and productive ecosystem to sustain life.	<p>Carry out a role play to discuss the importance of man in managing nature to ensure the sustainability of life.</p> <p>Identify several agencies or stakeholders and the public to solve local or global issues:</p> <ul style="list-style-type: none"> <li>• Causes of environmental issues.</li> <li>• Impact on the local community.</li> <li>• Proposed methods to solve the problems.</li> </ul>
Week 7	3.0 NUTRITION	3.1 Classes of food	A student is able to:	
			3.1.1 Elaborate and communicate about classes of food.	<p>Discuss the classes of food; carbohydrates, protein, fats, vitamins, minerals, fibres and water and state their functions and sources through multimedia presentations.</p> <p>Only the major vitamins (A, B, C, D, E and K) and minerals (calcium, sodium, iron, iodine, phosphorus and potassium) are required.</p> <p>Vitamin B need not be classified into B1, B2 and so forth.</p>

			3.1.2 Test the presence of starch, glucose, protein and fats in food.	Conduct a scientific investigation to test the presence of starch (iodine solution), glucose (Benedict solution), protein (Millon's reagent) and fats (alcohol-elmusion test).
Week 8	3.0 NUTRITION	3.2 Importance of a balanced diet	3.2.1 Elaborate and communicate about a balanced diet.	Refer balanced diet to food pyramid or plate portion.  Factors affecting calorific requirement are age, size,sex, occupation, climates and state of health.
<b>WEEK</b>	<b>LEARNING AREA</b>	<b>CONTENT STANDARD</b>	<b>LEARNING STANDARD</b>	<b>NOTES</b>
Week 8	3.0 NUTRITION	3.2 Importance of a balanced diet	3.2.2 Estimate calories of food intake in a meal and plan a balanced diet.	Carry out activities to estimate calorific value of food in a meal.  Energy stored in food can be measured in units such as joules or calories. Identify the calorific value or the energy value per gram of carbohydrates, protein and fats.  Collect food wrappers that show calorific value of food and make a list to show the calorific value for each type of food.  Plan a balanced diet for a day (breakfast, lunch and dinner) based on different factors.
			3.2.3 Conduct a research and justify the importance of a balanced diet, exercise and a healthy lifestyle in order to maintain a healthy body.	Carry out activities to create awareness and emphasise the importance of maintaining health in preventing diseases such as heart disease, hypertension, diabetes, skin cancer and lung cancer.  <b>Project-based learning:</b>  ○ Obesity among school children is on the rise in Malaysia. This is related to improper diet and lifestyle.

				<ul style="list-style-type: none"> <li>○ Conduct research on obesity among students in school.</li> <li>○ Relate to eating processed food as well as junk food.</li> <li>○ Suggest ways to solve this problem at the school's level</li> </ul>
Week 9 & Week 10	3.0 NUTRITION	3.3 Human's digestive system	3.3.1 Elaborate and communicate about digestion.	<ul style="list-style-type: none"> <li>• Digestion is the breakdown of large food molecules into smaller soluble molecules that can be readily absorbed by the body.</li> <li>• Compare the physical and chemical processes of digestion.</li> <li>• The flow of food particles in the alimentary canal involved mouth, oesophagus, stomach, small intestine, large intestine and anus. The functions of pancreas, liver and gall bladder need to be explained.</li> <li>• The end product of digestion of carbohydrates, protein and fats need to be discussed. Enzymes should only include amylase, protease and lipase.</li> <li>• Conduct scientific investigation to show the action of enzyme in saliva on starch.</li> </ul>
	<b>REVISION</b>			
Week 11		3.4 Process of absorption and transportation of digested food and defecation	3.4.1 Conduct an experiment to explain the absorption of the end products of digestion.	Study the process of absorption of digested food through a Visking tube to explain the absorption of the end products of digestion in the small intestine.
			3.4.2 Relate the function of digestive system, blood circulatory system and respiratory system.	<p>Do a multimedia presentation on the transport of the end products of digestion by blood to body cells for assimilation and respiration.</p> <p>Emphasise on how the systems work together in the digestion process.</p>

			<p>3.4.3 Elaborate and communicate about defecation.</p>	<p>Do a multimedia presentation or simulation on the transport and reabsorption of water by large intestine and the process of defecation.</p> <p>Discuss the following:</p> <ul style="list-style-type: none"> <li>• The importance of good eating habits to avoid constipation.</li> <li>• Implication to health if unbalanced diet is practised especially without or lacking in fibre.</li> </ul>
<p>Week 12</p>	<p>4.0 HUMAN HEALTH</p>	<p>4.1 Infectious and non-infectious diseases.</p>	<p>A student is able to:</p> <p>4.1.1 Differentiate and communicate about infectious and non-infectious diseases.</p> <p>4.1.2 Explain how infectious diseases are spread.</p> <p>4.1.3 Separate the cause and spread of infectious diseases.</p> <p>4.1.4 Generate ideas on the mechanism to prevent the spread of infectious diseases.</p>	<p>Infectious diseases:</p> <ol style="list-style-type: none"> <li>1) Water – cholera.</li> <li>2) Air – Tuberculosis, H1N1, SARS, Flu.</li> <li>3) Body contact - ringworm and fungal infection.</li> <li>4) Vectors – leptospirosis, dengue, malaria, Zika.</li> </ol> <p>Non- infectious diseases:</p> <ol style="list-style-type: none"> <li>1) Cancer</li> <li>2) Hypertension</li> <li>3) Diabetes</li> <li>4) Cardiovascular disease</li> </ol> <p><b>Project-based learning:</b></p> <p>Carry out a case study to discuss diseases among Malaysians based on statistics from the Ministry of Health:</p> <ul style="list-style-type: none"> <li>• Most common diseases in Malaysia,</li> <li>• Types of diseases that can be transmitted, the causes and ways to overcome the diseases.</li> <li>• Predict the progression of diseases based on the Ministry of Health statistical graph.</li> <li>• Suggest ways to solve the problems.</li> </ul> <p style="text-align: right;"><a href="http://www.moh.gov.my">http://www.moh.gov.my</a></p>

**MID TERM 1 HOLIDAY (23/03/2019-29/03/2019)**

Week 13	4.0 HUMAN HEALTH	4.2 Body defence system	4.2.1 Elaborate and communicate about the function of body defence system.	Carry out multimedia presentations on how body defence system fights against infections and promotes healing.  Refer to Module 25 HEBAT Science ( Human Health)
			4.2.2 Define ,antigens, antibodies and immunity.	Gather information on types of immunisation received by children.
			4.2.3 Justify the importance of immunisation.	Based on the children’s immunisation schedule, intepret the following: <ul style="list-style-type: none"> <li>• Relationship between antigens and antibodies.</li> <li>• Effects of repeated immunisation against body defence (introduce the graph of primary dan secondary immunisation responses).</li> </ul>
			4.2.4 Differentiate passive immunity and active immunity.	
			4.2.5 Justify good practices towards attaining strong immune system.	
			4.2.6 Justify and communicate about the importance of immunisation and health level of individuals to the family, social, economy and nation.	Brainstorm the following: <ul style="list-style-type: none"> <li>• Recurrence of controlled diseases such as leprosy, whooping cough dan tuberculosis.</li> <li>• The rise in the costs of health care.</li> <li>• Affecting the quality of work.</li> <li>• Insurance purchase.</li> <li>• Quality of life,</li> <li>• Labour force (migration).</li> </ul>

**Theme 2: EXPLORATION OF ELEMENTS IN NATURE**

Week 14	5.0 WATER AND SOLUTION	5.1 Physical characteristics of water	A student is able to:	
			5.1.1 Elaborate and communicate about water.	Collect information and create a multimedia presentation

				<p>about water:</p> <ul style="list-style-type: none"> <li>• As basic resources for survival of all living things.</li> <li>• As a compound.</li> <li>• Physical state of water i.e boiling point, freezing point, colour, density, surface tension, capillary action, effect of absorption and heat release on water.</li> </ul> <p>Conduct a scientific investigation on water:</p> <ul style="list-style-type: none"> <li>• Carry out electrolysis to determine the composition of elements in water molecule.</li> <li>• Effect of impurities in the melting point and boiling point of water.</li> </ul>
			<p>5.1.2 Carry out experiments and communicate about the water evaporation process in daily life.</p>	<p>Carry out an experiment to study the factors affecting the rate of water evaporation such as humidity, surrounding temperature, surface area and the movement of air.</p> <p>Create a multimedia presentation based on the following:</p> <ul style="list-style-type: none"> <li>• Relate the evaporation process to daily life activities.</li> <li>• How water loss through evaporation process can be reduced in agriculture.</li> <li>• Refrigerators uses evaporation process for cooling.</li> </ul>
Week 15	5.0 WATER AND SOLUTION	5.2 Solution and rate of solubility	5.2.1 Explain with example the meaning of solution and solubility.	<p>Carry out a scientific investigation to define:</p> <ul style="list-style-type: none"> <li>• Solute, solvent, solution and suspension.</li> <li>• Diluted solution, concentrated solution and saturated solution.</li> </ul>
			5.2.2 Carry out experiment to determine the factors affecting the rate of solubility.	<p>Carry out an experiment on the factors affecting the rate of solubility such as temperature of solvent, rate of stirring, size of solute.</p>

Week 15	5.0 WATER AND SOLUTION	5.2 Solution and rate of solubility	5.2.3 Explain with examples the meaning of colloids in daily life.	Carry out activities to identify examples of colloid in daily life like emulsion and foam.
			5.2.4 Elaborate and communicate the uses of water as a universal solvent in daily life and manufacturing industry.	Gather information about water as a universal solvent and give examples on the uses of water as a universal solvent.
			5.2.5 Demonstrate examples of organic solvent and their uses in daily life	<p>Illustrate examples of organic solvents and their uses in daily life using thinking maps.</p> <ul style="list-style-type: none"> <li>• Alcohol.</li> <li>• Kerosene.</li> <li>• Acetone.</li> <li>• Turpentine.</li> <li>• Ether.</li> </ul> <p>Carry out scientific investigations such as:</p> <ul style="list-style-type: none"> <li>• Removing dirt caused by certain substance such as               <ul style="list-style-type: none"> <li>• lubricant and paint.</li> <li>• Preparation of paint and cosmetics.</li> </ul> </li> </ul>
Week 16	5.0 WATER AND SOLUTION	5.3 Water purification and water supply	5.3.1 Demonstrate the water purification method.	<p>Carry out activities to produce clean water using the methods of:</p> <ul style="list-style-type: none"> <li>• Boiling.</li> <li>• Filtration.</li> <li>• Purification.</li> <li>• Chlorination.</li> <li>• Distillation.</li> </ul>
			5.3.2 Solve problems in getting water supply for daily life usage.	<p>Find information or brainstorm and create a multimedia presentation on how a country without water can provide water supply by:</p> <ul style="list-style-type: none"> <li>• Recycling water.</li> <li>• Collecting water from fog.</li> <li>• Collecting water from the sea (Reverse osmosis).</li> </ul>
			5.3.3 Build a model and communicate about water	Find information about different stages involved in water

			supply system.	supply system: <ul style="list-style-type: none"> <li>• Filtration.</li> <li>• Oxidation.</li> <li>• Coagulation.</li> <li>• Sedimentation.</li> <li>• Filtration.</li> <li>• Chlorination.</li> <li>• Fluoridation.</li> </ul>
Week 16	5.0 WATER AND SOLUTION	5.3 Water purification and water supply	5.3.4 Justify water sustainability as a key to healthy living.	<p>Discussion and evaluation on the following:</p> <ul style="list-style-type: none"> <li>• Awareness about water content that is safe to consume.</li> <li>• The effect of water pollution on living things and environment based on real cases such as mercury poisoning in Minamata Bay, Japan.</li> <li>• River pollution and River Cleaning Method.</li> <li>• The individual role to ensure the sustainability of water.</li> </ul> <p><b><u>Project-based learning</u></b></p> <p>Carry out water audit activity to determine the amount of water consumed in home or school.</p> <p>Suggest water conservation steps or create a simple innovative method to conserve water and increase efficiency of water usage.</p>
Week 17	6.0 ACID AND ALKALI	6. 1 Properties of acid and alkali	<p>A student is able to:</p> <p>6.1.1 Defining operationally acid and alkali.</p>	<p>Physical properties of acid and alkali</p> <ul style="list-style-type: none"> <li>• The characteristic of acid in terms of pH value, taste, corrosiveness, effect on litmus paper, reaction with metals i.e: magnesium, zinc.</li> <li>• The characteristic of alkali in terms of pH value, taste, corrosiveness and effect on litmus paper.</li> </ul>

				The properties of acid and alkali are only shown in the presence of water.
			6.1.2 Explain with examples of acidic and alkaline substances.	Carry out activities to determine acidic and alkaline substances in daily life using: <ul style="list-style-type: none"> <li>• Litmus paper.</li> <li>• Universal indicator.</li> <li>• Methyl orange.</li> <li>• Phenolphthalein.</li> <li>• pH meter.</li> </ul>
Week 17 01/05/2018 LABOUR DAY	6.0 ACID AND ALKALI	6. 1 Properties of acid and alkali	6.1.3 Demonstrate the technique to determine the strength of acid and alkali based on pH value	Carry out activities to study the relationship between pH value and strength of acid and alkali.
			6.1.4 Identify the uses of acid and alkali in daily life.	Gather, interpret and present data about the uses of acid and alkali in daily life including the agricultural and industrial sectors.
Week 18	6.0 ACID AND ALKALI	6.2 Neutralisation	6.2.1 Explain the neutralization reaction.	Carry out titration experiment using acid and alkali to determine the end point using indicator.  Write word equation for neutralisation.
			6.2.2 Explain with examples the use of neutralisation reaction in daily life.	Application of neutralisation in daily life such as: <ul style="list-style-type: none"> <li>• The use of toothpaste.</li> <li>• Fabric softener and hair conditioner.</li> <li>• Regulate soil pH.</li> <li>• Neutralising industrial waste</li> </ul>
<b>Theme 3: ENERGY AND SUSTAINABILITY OF LIFE</b>				
Week 20	7.0 ELECTRICITY AND MAGNETISM	7.1 Electricity	A student is able to:	
			7.1.1 Describe and communicate about energy.	Discuss by using multimedia presentation on the following: <ul style="list-style-type: none"> <li>• Why energy is needed in daily life.</li> <li>• Types of energy.</li> </ul>

				<ul style="list-style-type: none"> <li>Sources of energy.</li> </ul>
			7.1.2 Explain and communicate about the existence of electrostatic charges.	<p>Carry out activities using materials such as polythene rod, acetate rod, glass rod, balloon to show the existence of electrostatic charges.</p> <p>Carry out activities to determine the existence of electrostatic charges, quantity of electrical charges and types of electrostatic charges using an electroscope.</p>
			7.1.3 Explain with examples on electrostatic in daily life.	<p>Carry out a simulation on lightning formation using a Van de Graff generator or Wimhurst machine.</p> <p>Collect information and solve problems in daily life such as:</p> <ul style="list-style-type: none"> <li>Choosing suitable fabric to be worn in low humidity weather.</li> <li>Prevent vehicle from fire while filling petrol.</li> <li>Looking for a shelter during thunderstorm. (Faraday's cage concept)</li> </ul>
Week 20	7.0 ELECTRICITY AND MAGNETISM	7.1 Electricity	7.1.4 Draw a conclusion that the flow of charges produce electric current.	Carry out a scientific investigation to relate the flow of charges in an electrical conductor with electric current by using a Van de Graff generator connected to an earthed galvanometer.
			7.1.5 Characterise current, voltage and resistance and their units.	<ul style="list-style-type: none"> <li>Gather information and carry out activities to discover units for current, voltage and resistance.</li> <li>Measure current and voltage in an electrical circuit using suitable measuring apparatus.</li> </ul>
			7.1.6 Draw a conclusion on the relationship between current, voltage and resistance.	<p>Design and carry out experiment to study the effects of changes in:</p> <ul style="list-style-type: none"> <li>Resistance on current,</li> <li>Voltage on current.</li> </ul> <p>Discussion on relationship between voltage, current and resistance using Ohm's Law.</p>
<b>MID YEAR 1 HOLIDAY (27/05/2019-09/06/2016)</b>				
Week 21	7.0 ELECTRICITY	7.2 The flow of electric current in	7.2.1 Elaborate and communicate about the	<p>Carry out a scientific investigation to study:</p> <ul style="list-style-type: none"> <li>The flow of current by building a complete</li> </ul>

	AND MAGNETISM	series circuit and parallel circuit	flow of electric current in series circuit and parallel circuit.	series circuit and parallel circuit, <ul style="list-style-type: none"> <li>Advantages and disadvantages of series circuit and parallel circuit,</li> <li>Electrical wiring at home,</li> </ul> Solve numerical problems related to current, voltage and resistance in series circuit and parallel circuit.
Week 22	7.0 ELECTRICITY AND MAGNETISM	7.3 Magnetism	7.3.1 Draw a conclusion about the characteristics of a magnet.	Carry out the following activities: <ul style="list-style-type: none"> <li>Using iron filings to study magnetic field of a bar magnet,</li> <li>Using compass to show the directions of the magnetic field.</li> </ul> Sketch and study the pattern of the magnetic field of various types of magnets such as bar magnet, horseshoe magnet and magnet magnet.
Week 23	7.0 ELECTRICITY AND MAGNETISM	7.3 Magnetism	7.3.2 Describe and communicate about electromagnet.	Carry out activities to show relationship between: <ul style="list-style-type: none"> <li>Magnetic field lines and the strength of magnetic field,</li> <li>The strength of magnetic force and distance between magnetic field lines.</li> </ul> Carry out investigation to study the pattern and direction of a magnetic field produced by a conductor carrying current, a coiled wire and a solenoid.
			7.3.3 Carry out an experiment and communicate about the uses of magnet and electromagnet in daily life.	Investigate the relationship between the strength of a magnetic field with <ul style="list-style-type: none"> <li>current flow,</li> <li>number of turns.</li> </ul> Gather information and make multimedia presentation

				on the uses of magnet and electromagnet in daily life such as in compasses and electric bells.
Week 24	8.0 FORCE AND MOTION	8.1 Force	8.1.1 Elaborate and communicate about force.	Carry out an indoor or outdoor activity to show the presence of different types of forces such as gravitational force, weight, normal force, frictional force, elastic force, buoyant force.  Refer to <b>Module 12 HEBAT Science (Force)</b> .
			8.1.2 Explain that force has magnitude, direction and point of application.	Sketch a diagram to show that force has magnitude, direction and point of application.
			8.1.3 Measure force in S.I. unit.	Carry out an activity using a spring balance to measure force for example, weight of object, frictional force.
			8.1.4 Explain with examples that every action force has an equal (same magnitude) reaction force but in the opposite direction.	Discussion may involve the following situations: <ul style="list-style-type: none"> <li>• A stationary object on a table, Weight (action force) is the same as normal force (reaction force),</li> <li>• An object floating on water, Weight (action force) is the same as buoyant force (reaction force),</li> <li>• Two trolleys placed on a horizontal runway with a compressed spring between them will move in opposite directions of the same distance when released. First trolley acts on the second trolley (action force) and at the same time the second trolley exerts a force of the same magnitude but in different direction (reaction force).</li> </ul>

Week 25	8.0 FORCE AND MOTION	8.2 Effects of force	8.2.1 Elaborate and communicate about the effects of force.	<p>Carry out an activities to study the effects of force on change in shape, position, speed and direction such</p> <ul style="list-style-type: none"> <li>• moving a stationary toy car,</li> <li>• changing the speed of a moving toy car,</li> <li>• stopping a moving toy car,</li> <li>• changing the direction of a moving toy car,</li> <li>• changing the shape of plasticine.</li> </ul>
			8.2.2 Explain and communicate the relationship between the differences in densities and the effects of bouyancy in daily life.	<p>Carry out an activity to determine the buoyant force using a spring balance.</p> <p>(Buoyant force = actual weight – apparent weight)</p> <p>Carry out an investigation to prove that objects denser than water will submerge by using density cubes.</p> <p>Solve problems on how cargo ships are able to maintain afloat at a safe level when travelling in different oceans of different temperatures and densities using a Plimsoll line as a guidance.</p>
			8.2.3 Classify and solve problems on levers based on the position of fulcrum, load and effort.	<p>Discuss various examples of levers according to the classes of lever in daily life.</p> <p>Solve numerical problems using the following formula:</p> <p>Load x Load arm = Effort x Effort arm</p> <p>*(Load arm –distance of load from fulcrum) *(Effort arm – distance of effort from fulcrum)</p>
Week 25	8.0 FORCE AND MOTION	8.2 Effects of force	8.2.4 Explain and communicate about the moment of force.	<p>When opening a door or loosening a nut using a spanner, we use a force that produces a turning effect. The turning effect is known as the moment of force.</p> <p>Carry out activities to show the relationship between the moment of force and the lever arm length in situations such as opening a door or loosening a nut.</p>

				<p>Moment of a force = force (N) x perpendicular distance (m)</p> <p>Refer to Module 12 HEBAT Science(Force)</p>
			<p>8.2.5 Carry out an experiment and communicate about pressure and its application in daily life.</p>	<p>To investigate how the changes in surface area affects the pressure produced when a similar force is applied</p> <p>Introduce formula : Pressure = Force / Surface area</p> <p>Make a multimedia presentation about the applications of pressure in daily life.</p>
Week 26	8.0 FORCE AND MOTION	8.2 Effects of force	<p>8.2.6 Elaborate and communicate about gas pressure based on the kinetic theory of gas.</p>	<p>Carry out an activity to show that air exerts pressure.</p> <p>Carry out activities to show the factors that affect air pressure, that are; volume and temperature.</p>
			<p>8.2.7 Explain and communicate about the existance of atmospheric pressure and the effects of altitude on the magnitude of pressure.</p>	<p>Carry out activities to show the existance of atmospheric pressure by using Magdeburg hemisphere, suction pump, drinking straw, siphon, syringe, vacuum cleaner.</p> <p>Active reading, video or data analysist to show the relationship between altitude and atmospheric pressure.</p> <p>Solve problems related to air pressure and atmospheric pressure in daily life.</p> <p>Pupils need to use the term of air pressure and atmospheric pressure correctly.</p> <p>Refer to Module 16 HEBAT Science (Atmosphere)</p>
			<p>8.2.8 Explain the effects of depth on liquid pressure.</p>	<p>Carry out an activity to show the changes in the size of an air bubble when the depth of the liquid changes by using a (1 metre) glass tube containing water or oil.</p> <p>Explain with examples the effects of depth on fluid</p>

				pressure in daily life such as the thickness of walls of the dam, design of the submarine.
Week 27	9.0 HEAT	9.1 Temperature and heat	A student is able to:	
			9.1.1 Make a comparison between heat and temperature.	Discuss and share about the following: Definition of temperature. Differences between temperature and heat. Refer to Module 7 HEBAT Science (Heat).
Week 28	9.0 HEAT	9.2 Heat flow and thermal equilibrium	9.2.1 Explain how heat flows from a hot region to a cold region.	Carry out activities to show heat transfer by <ul style="list-style-type: none"> <li>• Conduction.</li> <li>• Convection.</li> <li>• Radiation.</li> </ul>
			9.2.2 Explain and communicate about heat flow in natural phenomena.	Carry out group activities to discuss natural phenomena such as land breeze, sea breeze and warming of earth by the sun.
			9.2.3 Communicate about heat conductors and heat insulators and their uses in daily life.	Carry out group activities to discuss the following: <ul style="list-style-type: none"> <li>• Definition of heat conductor.</li> <li>• Definition of heat insulator.</li> <li>• Various uses of heat conductors and insulators in daily life.</li> </ul> Carry out investigations to study the uses of different materials as heat insulators.
<b>MID TERM II HOLIDAY (12/08/2019-16/08/2019)</b>				
Week 30	9.0 HEAT	9.3 Principle of expansion and contraction of matter	9.3.1 Explain how heat can cause the expansion and contraction in solid, liquid and gas.	Carry out activities to show heat can cause solid, liquid and gas to expand and contract.
			9.3.2 Communicate about the various uses of expansion and contraction of matter in daily life.	Discuss the uses of expansion and contraction of matter: <ul style="list-style-type: none"> <li>• Mercury in thermometers.</li> <li>• Bimetallic strip in fire alarms.</li> <li>• Gap between railway tracks.</li> <li>• Roller on steel bridges.</li> </ul> Discuss the uses of principle of expansion and contraction of matter in solving simple problems.
		9.4 Relation between	9.4.1 Demonstrate how	Carry out an activity to show:

		the types of surfaces of objects to heat absorption and emission.	dark, dull objects absorb heat better than white, shiny objects.	<ul style="list-style-type: none"> <li>Dark and dull objects absorb heat better than white and shiny objects.</li> </ul>
			9.4.2 Demonstrate how dark, dull objects radiate heat better than white, shiny objects.	<ul style="list-style-type: none"> <li>Dark and dull objects radiate heat better than white and shiny objects.</li> </ul>
			9.4.3 Conceptualise and design using the heat concept in daily life.	<p><b>Project-based learning:</b> The Green House Concept fulfills a few criteria such as energy efficiency, water efficiency, sustainable construction site, construction materials, innovation, etcetera.</p> <p>Design a ‘Green Home’ which uses minimum energy to keep the house cool or vice-versa. A pupil is able to design or make innovation in the local or global context.</p>
Week 31	10. SOUND WAVE	10.1 Characteristics of sound wave	A student is able to:	
			10.1.1 communicate about the basic characteristics of sound waves.	<p>Carry out an activity to explain that sound waves:</p> <ul style="list-style-type: none"> <li>Need a medium to travel.</li> <li>Can be reflected.</li> <li>Can be absorbed by different types of Surface.</li> <li>Have different speed in different médium.</li> </ul> <p>Refer to <b>Module 28 HEBAT Science (Sound)</b>.</p>
Week 32	10. SOUND WAVE	10.2 Loudness and pitch of sound	10.2.1 Explain frequency and its unit, and amplitude of vibration.	Carry out scientific investigations using audio generator, oscilloscope and amplifier to study the characteristics of sound waves where the oscilloscope shows the different patterns of sound waves (amplitude and frequency) and loudness of sound (amplitude).
			10.2.2 Relate frequency to pitch.	
			10.2.3. Relate amplitude to loudness.	
			10.2.4 Explain with examples loudness and pitch using musical instruments.	Carry out activities to show loudness and pitch using musical instruments such as piano, recorder, drum and guitar.
Week 33	10. SOUND	10.3 Phenomena and	10.3.1 Explain with	Explain with example/video on echo phenomena in

	WAVE	aplications of reflection of sound waves	example phenomena related to reflection of sound waves such as echo and Doppler effect	daily life.  Carry out an activity to compare the pitch of an ambulance siren/air horn/ a fast moving motorcycle engine passes an observer.  An increase (or decrease) in the frequency of sound as the moving source and observer move towards (or away from) each other is known as Doppler Effect.
Week 33	10. SOUND WAVE	10.3 Phenomena and aplications of reflection of sound waves	10.3.2 Explain with example the applications of reflection of sound waves	Conduct video simulation to show the uses of sonar in shipping industry and fisheries, sonogram in medical field and how bats estimate distance while flying.
			10.3.3 Elaborate and communicate about limitations of hearing for humans and animals	Make a multimedia presentation on the followingt:  • The limitations of hearing for human and animals.  • Ways to overcome human limitations of hearing.
			10.3.4 Explain with examples ways to overcome human limitations of hearing	
<b>Theme 4: EARTH AND SPACE EXPLORATION</b>				
Week 34	11.0 STARS AND GALAXIES IN THE UNIVERSE	11.1 Stars and galaxies in the universe	A student is able to:  11.1.1 Communicate about the characteristics of objects in space.	Gather information from technology devices such as the telescope to expand ideas about objects in space, for example: - galaxies including the Milky Way, - nebula, - life cycle of stars (Nebula Hypothesis).  Galaxies and types of galaxies, such as, eliptical, spiral and irregular galaxies.

				<p>State the position of the Solar System in the Milky Way Galaxy.</p> <p>Compare the relative sizes between Earth , planets, Solar System, Milky Way Galaxy and the Universe.</p> <p>Amazed by the universe that God has created.</p>
			<p>11.1.2 Compare and contrast the characteristics of stars (including the Sun) and relate them to the observation of stars on the Earth.</p>	<p>Characteristics of stars include temperature, size, distance, colour and brightness.</p> <p>Surf Skychart, Stellarium (free astronomy software), and Earth Centred Universe (ECU) to get information about the similarities and differences on the characteristics of stars.</p> <p>Visit an Observatory or planetarium to observe objects in the sky during the day and night.</p>
Week 35	12.0 SOLAR SYSTEM	12.1 Solar system	<p>12.1.1 Compare distances between the Sun and the planets in the Solar System using astronomical units (a.u.) and light years.</p>	<p>a) Astronomical unit and light years as measures of distance in space.</p> <p>b) Carry out calculations by converting units between a.u or light years to kilometres.</p> <p>c) Refer to Modul 17 HEBAT Sains (Solar System).</p>
			<p>12.1.2 Construct a table to compare and contrast the planets in the Solar System with the Earth.</p>	<p>Characteristics used for comparisons: Size, distance, temperature, density, relative gravitational pull to the Earth, atmospheric layers, surface condition, direction and speed of planet rotation and revolvment of planets in their own orbits including natural satellites of each planet.</p>
			<p>12.1.3 Explore the possible relationship based on the planets' characteristics and explain the relationship including anomalies that may arise.</p>	<p>Examples of relationships between characteristics:</p> <ul style="list-style-type: none"> <li>• Temperature and distance from the Sun,</li> <li>• Density and gravitational pull,</li> <li>• Distance, time and speed,</li> <li>• Direction of rotation.</li> </ul>
			<p>12.1.4 Reason and make analogies in hypothetical</p>	<p><b>Problem-based learning:</b> Rotations, action forces and movement can be</p>

			situations related to the Solar System.	<p>predicted from data collected based on understanding of the Solar System.</p> <p>Discuss the example of hypothetical situations as follows:</p> <ul style="list-style-type: none"> <li>• What will happen if the Earth stops rotating? Rotates at a slower pace?</li> <li>• Why are there planets with two or more moons?</li> <li>• If you are on the Moon, explain your observation on the shape of the Earth?</li> <li>• Will you see phases of the Earth if you are on the Moon?</li> </ul>
			12.1.5 Justify the Earth as the most ideal planet for life based on data collected.	<p>Conduct brainstorming session on the following: Whether other planets can sustain life if natural sources on Earth have depleted – discussion is focused on sustainable living.</p> <p>Realise the role of each individual as a prudent consumer in managing nature and the importance of reducing ecological footprint.</p>
Week 36	13.0 METEOROID, ASTEROID, COMET	13.1 Other objects in the Solar System: Meteoroids, Asteroids and Comets	13.1.1 Communicate on other objects in the solar system, such as meteoroids, asteroids dan comets.	<p>Prepare and share a multimedia presentation to:</p> <p>(a) compare and contrast between meteoroid, asteroid and comet,</p> <p>(b) predict what will happen to the Earth if it is hit by meteoroid, asteroid and comet.</p>
			13.1.2 Discuss the movements of meteoroids, asteroids and comets and their effects on the Earth based on data.	<p>Make observations on meteors at night or visit a planetarium.</p> <p>Use multimedia presentations on the movements of meteoroids.</p>
			13.1.3 Generate ideas on how to reduce or prevent the possibility of asteroids colliding with the Earth.	<p>Collect information and carry out multimedia presentation on the phenomena of asteroids and other objects colliding with the Earth.</p> <p>Meteorites is introduced.</p>

Week 37 (07.10-11.10)	<b>REVISION</b>
Week 38 (14.10-18.10)	<b>REVISION</b>
Week 39 (21.10-25.10)	<b>END OF YEAR EXAMINATION</b>
Week 40 (28.10-01.11)	<b>PROGRAMME AFTER EXAMINATION</b>
Week 41 (04.11-08.11)	
Week 42 (11.11-15.11)	
Week 43 (18.11-22.11)	
<b>END OF YEAR HOLIDAY (23/11/2019 – 31/12/2019)</b>	