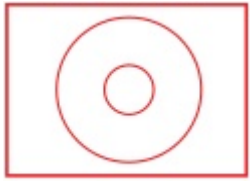
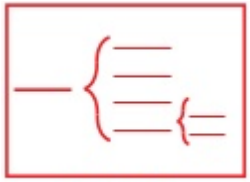
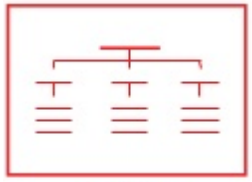
**YEARLY LESSON PLAN 2022**
**SCIENCE KSSM**
**FORM 2**

**Theme 1: MAINTENANCE AND CONTINUITY OF LIFE**
**Learning area: 1.0 BIODIVERSITY**

| WEEK | CONTENT STANDARD | LEARNING STANDARD | SUGGESTED ACTIVITIES | NOTES |
|---|---|---|---|---|
| 1 | 1.1 Diversity of organism<br>  <br>Circle Map<br>  <br>Brace Map | (Basic content)<br><br>A student is able to:<br>1.1.1 Elaborate and communicate about biodiversity. | +Carry out a **multimedia presentation** to discuss:<br>🎬 The definition of biodiversity.<br>🎬 How biodiversity exists.<br>🎬 The importance of biodiversity in terms of:<br>- sources of food,<br>- balanced in nature,<br>- generating economy such as recreation, tourism, biotechnology, medicine, industrial raw materials.<br>- ecological sources.<br>- education.<br>🎬 Malaysia as one of the 12 mega-biodiversity countries in the world needs to be preserved | |
| | | (Basic content)<br><br>1.1.2 Justify the needs to manage biodiversity effectively. | +Carry out activities to discuss:<br>🎬 The effects of human activities on biodiversity,<br>🎬 The methods to conserve and preserve biodiversity including endemic and endangered species. | |
| 2 | 1.2 Classification of organisms<br>  <br>Tree Map | (Basic content)<br><br>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.<br>**Notes:**<br>**Animal:** Vertebrate and Invertebrate, Mammal, Reptile, Fish, Bird and Amphibian.<br>**Plant:** Flowering plant, Non-flowering plant, Monocotyledon and Dicotyledon. | |

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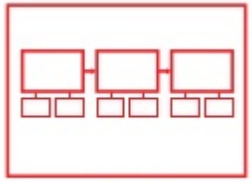
| | | (Basic content)<br><br>1.2.2 Characterize the major taxonomy group. | +Students use their prior knowledge to carry out activities to identify the characteristics which differentiate the major taxonomy groups.<br>**Examples:**<br>The characteristics that differentiate between plants, animals and fungi or the differences between Mammal, Reptile, Fish, Bird and Amphibian. | |

**THEME 1: MAINTENANCE AND CONTINUITY OF LIFE**
**Learning area: 2.0 ECOSYSTEM**

| WEEK | CONTENT STANDARD | LEARNING STANDARD | SUGGESTED ACTIVITIES | NOTES |
|---|---|---|---|---|
| **3** | 2.1 Energy flow in ecosystem<br><br>  <br> | A student is able to:<br>(Additional Content)<br><br>2.1.1 Explain with examples of producer, consumer and decomposer. | **Notes:**<br>Refer to various activities in **Module 1 HEBAT Science (Ecosystem)**<br>Introduce the terms of primary carnivore and secondary carnivore. | |
| | | (Additional Content)<br><br>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 | |

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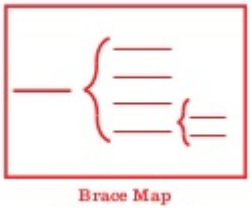
| **4** | 2.2 Nutrient cycle in the ecosystem<br>  <br>Brace Map | (Basic content)<br><br>2.2.1 Elaborate and communicate about the role of living things in the oxygen and carbon cycles in the ecosystem. | +Carry out a **multimedia presentation** that relates the roles of living things to the water, oxygen and carbon cycle. | |
| | | (Basic content)<br><br>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:<br>🎬 Uncontrolled deforestation.<br>🎬 Burning of fossil fuels.<br>🎬 Excessive use of water resources for agriculture and domestic consumption.<br><br>+Gather information and do a multimedia presentation on how the interaction of prey-predator is used in biological control of pest.<br><br>+Discuss the advantages of biological control over chemical control, and the prolonged impact of biological control. | |
| **5** | **7.1 Composition of air** | **(Basic content)**<br><br>**7.1.3 justify the importance of oxygen, nitrogen carbon dioxide and inert gases in daily life.**<br>**(Additional content)**<br>**7.1.4 appreciate the carbon cycle and the oxygen cycle in maintaining the composition of gases in the air.**<br>**(Basic content)**<br>**7.1.5 solve problems when there is/are interferences to the oxygen and the carbon cycle.** | **PENJAJARAN KURIKULUM** | |

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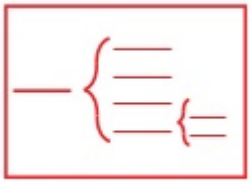
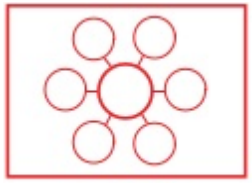
| **6** | 2.3 Interdependence and interaction among organisms and between organisms and the environment.<br>  <br>Brace Map<br>  <br>Bubble Map | (Basic content)<br><br>2.3.1 Explain with examples the interdependence among living things and the environment to maintain a balanced ecosystem. | +Gather information about:<br>▰ Species, population, community, habitat and ecosystem.<br>▰ Balanced in nature.<br><br>+Carry out field studies to investigate habitat, population, community in ecosystems.<br>+Discuss interdependence between living organisms and their environment to create a balanced ecosystem | |
| | | 2.3.2 Justify the importance of adaptations of living things to the environment. | +Conduct **scientific investigations** to study the effects of natural factors such as temperature, light and humidity on the distribution of animals and plants.<br><br>+Do a **multimedia presentation** on how animals and plants adapt to the desert, tundra and tropical climates of their habitats. | |
| | | 2.3.3 Communicate examples of interactions between organisms and apply these interactions in daily life. | +Interaction between organisms are:<br>1) Prey-predator.<br>2) Symbiosis: Commensalism, mutualism and parasitism.<br>3) Competition | |
| | | 2.3.4 Separate the factors that affect the size of population in an ecosystem. | +Factors that affect the size of population are:<br>▰ Diseases.<br>▰ Predators.<br>▰ Food resources.<br>▰ Drought. | |
| | | 2.3.5 Predict how the changes in ecosystem affect the existing resources and balance of the population. | +Changes in ecosystem such as:<br>▰ Water supply.<br>▰ Migration.<br>▰ Changes of population (effects of increasing and decreasing number of organisms towards a balanced nature).<br><br>+Refer to the Interactive problem solving in **Module 1 HEBAT Science (Ecosystem)** about interferences in an ecosystem. | |

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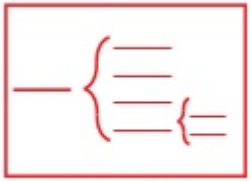
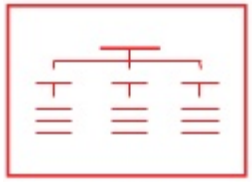
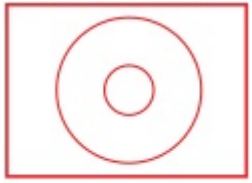
| | 2.4 The role of human in maintaining a balanced nature<br>  <br>Brace Map | (Basic content)<br><br>2.4.1 Justify and communicate that man needs a stable and productive ecosystem to sustain life. | +Carry out a **role play** to discuss the importance of man in managing nature to ensure the sustainability of life.<br><br>+Identify several agencies or stakeholders and the public to solve local or global issues:<br>🎬 Causes of environmental issues.<br>🎬 Impact on the local community.<br>🎬 Proposed methods to solve the problems. | |

**Theme 1: MAINTENANCE AND CONTINUITY OF LIFE**
**Learning area: 3.0 NUTRITION**

| WEEK | CONTENT STANDARD | LEARNING STANDARD | SUGGESTED ACTIVITIES | NOTES |
|---|---|---|---|---|
| 7 | 3.1 Classes of food<br>  <br>Tree Map<br>  <br>Circle Map | A student is able to:<br>(Basic content)<br><br>3.1.1 Elaborate and communicate about classes of food. | +Discuss the classes of food; carbohydrates, protein, fats, vitamins, minerals, fibers and water and state their functions and sources through multimedia presentations.<br><br>+Only the major vitamins (A, B, C, D, E and K) and minerals (calcium, sodium, iron, iodine, phosphorus and potassium) are required.<br><br>+Vitamin B need not be classified into B1, B2 and so forth. | |
| | | 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-emulsion test). | |

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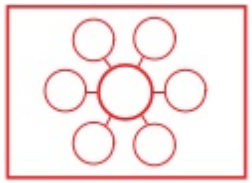
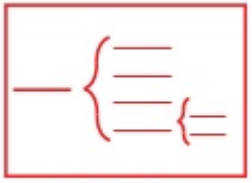
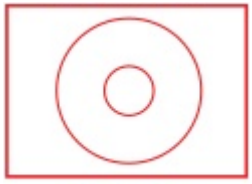
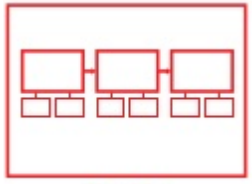
| **8** | 3.2 Importance of a balanced diet<br>  <br>Bubble Map<br>  <br>Brace Map<br>  <br>Circle Map | (Basic content)<br><br>3.2.1 Elaborate and communicate about a balanced diet. | +Refer balanced diet to food pyramid or plate portion.<br><br>+Factors affecting calorific requirement are age, size, sex, occupation, climates and state of health. | |
| | | 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.<br><br>+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.<br><br>+Collect food wrappers that show calorific value of food and make a list to show the calorific value for each type of food.<br><br>**+Plan a balanced diet for a day (breakfast, lunch and dinner) based on different factors.** | |
| | | (Additional content)<br><br>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 emphasize the importance of maintaining health in preventing diseases such as heart disease, hypertension, diabetes, skin cancer and lung cancer.<br><br>**+Project-based learning:**<br>Obesity among school children is on the rise in Malaysia. This is related to improper diet and lifestyle. Conduct research on obesity among students in school. Relate to eating processed food as well as junk food. Suggest ways to solve this problem at the school's level | |
| **9** | | MONTHLY TEST 1 | | |
| **10** | 3.3 Human digestive system<br>  <br>Flow Map | (Basic content)<br><br>3.3.1 Elaborate and communicate about digestion. | +Digestion is the breakdown of large food molecules into smaller soluble molecules that can be readily absorbed by the body.<br><br>+Compare the physical and chemical processes of digestion.<br><br>+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. | |

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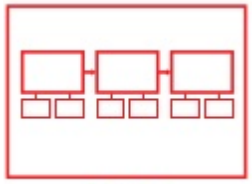
| | | | +The end product of digestion of carbohydrates, protein and fats need to be discussed. Enzymes should only include amylase, protease and lipase.<br><br>+Conduct scientific investigation to show the action of enzyme in saliva on starch. | |
| | | | FIRST MID TERM BREAK | |
| **11** | 3.4 Process of absorption and transportation of digested food and defecation<br>  <br>Flow Map | (Basic content)<br><br>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. | +Do a **multimedia presentation** on the transport of the end products of digestion by blood to body cells for assimilation and respiration.<br><br>+Emphasize on how the systems work together in the digestion process. | |
| | | (Basic content)<br><br>3.4.3 Elaborate and communicate about defecation. | +Do a **multimedia presentation or simulation** on the transport and reabsorption of water by large intestine and the process of defecation.<br><br>+Discuss the following:<br>🎬 The importance of good eating habits to avoid constipation.<br>🎬 Implication to health if unbalanced diet is practiced especially without or lacking in fibre. | |

**Theme 1: MAINTENANCE AND CONTINUITY OF LIFE**
**Learning area: 4.0 HUMAN HEALTH**

| WEEK | CONTENT STANDARD | LEARNING STANDARD | SUGGESTED ACTIVITIES | NOTES |
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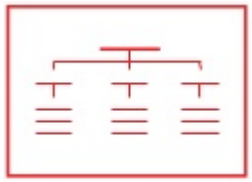
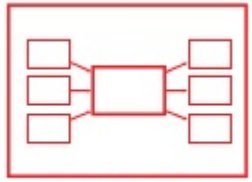
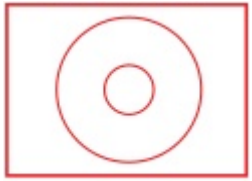
| **12** | 4.1Infectious and non-infectious diseases<br>  <br>Tree Map<br>  <br>Multi-Flow Map<br>  <br>Circle Map | A student is able to:<br>(Basic content)<br><br>4.1.1 Differentiate and communicate about infectious and non-infectious diseases<br>4.1.2 Explain how infectious diseases are spread.<br>4.1.3 Separate the cause and spread of infectious diseases.<br>4.1.4 Generate ideas on the mechanism to prevent the spread of infectious diseases. | +Infectious diseases:<br>1) Water – cholera.<br>2) Air – Tuberculosis, H1N1, SARS, Flu.<br>3) Body contact - ringworm and fungal infection.<br>4) Vectors – leptospirosis, dengue, malaria, Zika.<br><br>+Non- infectious diseases:<br>1) Cancer.<br>2) Hypertension.<br>3) Diabetes.<br>4) Cardiovascular diseases.<br><br>**+Project-based learning:**<br>Carry out a case study to discuss diseases among Malaysians based on statistics from the Ministry of Health:<br>🎬 Most common diseases in Malaysia,<br>🎬 Types of diseases that can be transmitted, the causes and ways to overcome the diseases. | |
| **13** | 4.2 Body defense system | A student is able to:<br>(Basic content)<br><br>4.2.1 Elaborate and communicate about the function of body defense system. | +Carry out multimedia presentations on how body defense system fights against infections and promotes healing.<br><br>**+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. Based on the children's immunisation schedule, interpret the following:<br>1) Relationship between antigens and antibodies.<br>2) Effects of repeated immunisation against body defence (introduce the graph of primary dan secondary immunisation responses). | |
| | | 4.2.3 Justify the importance of immunisation. | | |
| | | 4.2.4 Differentiate passive immunity and active immunity. | | |

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| | | 4.2.5 Justify good practices towards attaining strong immune system. | +List practices that can boost or weaken immunity in terms of:<br>🎬 Nutrition (local fruits, cooked food, vegetables).<br>🎬 Physical activities.<br>🎬 Lifestyle. | |
| | | 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:<br>🎬 Recurrence of controlled diseases such as leprosy, whooping cough and tuberculosis.<br>🎬 The rise in the costs of health care.<br>🎬 Affecting the quality of work.<br>🎬 Insurance purchase.<br>🎬 Quality of life,<br>🎬 Labour force (migration). | |

**Theme 2: EXPLORATION OF ELEMENTS IN NATURE**
**Learning area: 5.0 WATER AND SOLUTION**

| WEEK | CONTENT STANDARD | LEARNING STANDARD | SUGGESTED ACTIVITIES | NOTES |
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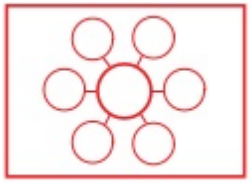
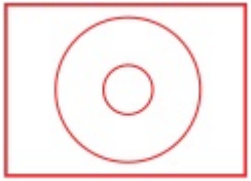
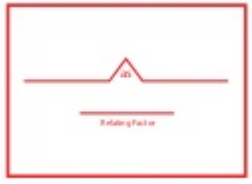
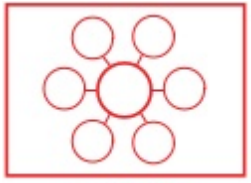
| **14** | 5.1 Physical characteristics of water<br>  <br>Bubble Map<br>  <br>Circle Map | A student is able to:<br>(Basic content)<br><br>5.1.1 Elaborate and communicate about water. | +Collect information and create a **multimedia presentation** about water:<br>🎬 As basic resources for survival of all living things.<br>🎬 As a compound.<br>🎬 Physical state of water i.e boiling point, freezing point, colour, density, surface tension, capillary action, effect of absorption and heat release on water.<br><br>+Conduct a **scientific investigation** on water:<br>🎬 Carry out electrolysis to determine the composition of elements in water molecule.<br>🎬 Effect of impurities in the melting point and boiling point of water. | |
| | | (Basic content)<br><br>5.1.2 Carry out experiments and communicate about the water evaporation process in daily life. | +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.<br><br>+Create a **multimedia presentation** based on the following:<br>🎬 Relate the evaporation process to daily life activities.<br>🎬 How water loss through evaporation process can be reduced in agriculture.<br>🎬 Refrigerators uses evaporation process for cooling. | |
| | 5.2 Solution and rate of solubility<br>  <br>Bridge Map<br>  <br>Bubble Map | (Basic content)<br><br>5.2.1 Explain with example the meaning of solution and solubility. | +Carry out a **scientific investigation** to define:<br>🎬 Solute, solvent, solution and suspension.<br>🎬 Diluted solution, concentrated solution and saturated solution. | |
| | | 5.2.2 Carry out experiment to determine the factors affecting the rate of solubility. | +Carry out **an experiment** on the factors affecting the rate of solubility such as temperature of solvent, rate of stirring, size of solute. | |
| | | 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. | |

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| | | (Basic content)<br><br>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. | |
| | | (Additional content)<br><br>5.2.5 Demonstrate examples of organic solvent and their uses in daily life. | +Illustrate examples of organic solvents and their uses in daily life using thinking maps.<br>🎬 Alcohol.<br>🎬 Kerosene.<br>🎬 Acetone.<br>🎬 Turpentine.<br>🎬 Ether.<br><br>+Carry out **scientific investigations** such as:<br>🎬 Removing dirt caused by certain substance such as lubricant and paint.<br>🎬 Preparation of paint and cosmetics. | |
| **15,16,17** | **MID YEAR EXAMINATION** | | | |

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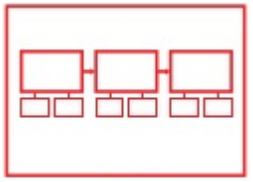
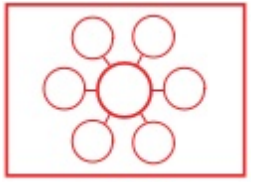
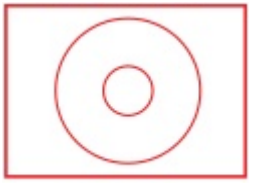
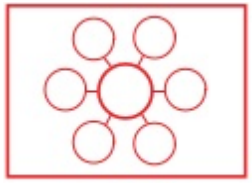
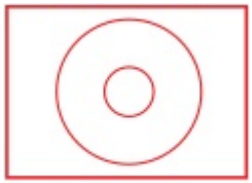
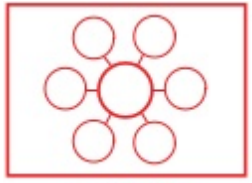
| **18** | 5.3 Water purification and water supply<br>  <br>Flow Map<br>  <br>Bubble Map<br>  <br>Circle Map | (Additional content)<br><br>5.3.1 Demonstrate the water purification method. | +Carry out activities to produce clean water using the methods of:<br>▰ Boiling.<br>▰ Filtration.<br>▰ Purification.<br>▰ Chlorination.<br>▰ Distillation. | |
| | | (Basic content)<br><br>5.3.2 Solve problems in getting water supply for daily life usage. | +Find information or **brainstorm** and create a multimedia presentation on how a country without water can provide water supply by:<br>▰ Recycling water.<br>▰ Collecting water from fog.<br>▰ Collecting water from the sea (Reverse osmosis). | |
| | | (Basic content)<br><br>5.3.3 Build a model and communicate about water supply system. | +Find information about different stages involved in water supply system:<br>▰ Filtration.<br>▰ Oxidation.<br>▰ Coagulation.<br>▰ Sedimentation.<br>▰ Filtration.<br>▰ Chlorination.<br>▰ Fluoridation. | |
| | | (Basic content)<br><br>5.3.4 Justify water sustainability as a key to healthy living. | +Discussion and evaluation on the following:<br>▰ Awareness about water content that is safe to consume.<br>▰ The effect of water pollution on living things and environment based on real cases such as mercury poisoning in Minamata Bay, Japan.<br>▰ River pollution and River Cleaning Method.<br>▰ The individual role to ensure the sustainability of water.<br>**+Project-based learning**<br>Carry out water audit activity to determine the amount of water consumed in home or school. Suggest water conservation steps or create a simple innovative method to conserve water and increase efficiency of water usage. | |

**Theme 2: EXPLORATION OF ELEMENTS IN NATURE**
**Learning area: 6.0 ACID AND ALKALI**

| WEEK | CONTENT STANDARD | LEARNING STANDARD | SUGGESTED ACTIVITIES | NOTES |
|---|---|---|---|---|
| **19** | 6.1 Properties of acid and alkali<br>  <br>Bubble Map<br>  <br>Circle Map | A student is able to:<br>(Basic content)<br><br>6.1.1 Defining operationally acid and alkali. | +Physical properties of acid and alkali<br>▰ The characteristic of acid in terms of pH value, taste, corrosiveness, effect on litmus paper, reaction with metals i.e: magnesium, zinc.<br>▰ The characteristic of alkali in terms of pH value, taste, corrosiveness and effect on litmus paper.<br><br>+The properties of acid and alkali are only shown in the presence of water. | |
| | | (Basic content)<br><br>6.1.2 Explain with examples of acidic and alkaline substances. | +Carry out activities to determine acidic and alkaline substances in daily life using:<br>▰ Litmus paper.<br>▰ Universal indicator.<br>▰ Methyl orange.<br>▰ Phenolphthalein.<br>▰ pH meter. | |
| | | (Additional content)<br><br>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. | |
| | | (Basic content)<br><br>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. | |
| **20** | 6.2 Neutralisation<br>  <br>Bubble Map | (Basic content)<br><br>6.2.1 Explain the neutralization reaction. | +Carry out **titration experiment** using acid and alkali to determine the end point using indicator.<br><br>+Write word equation for neutralisation. | |

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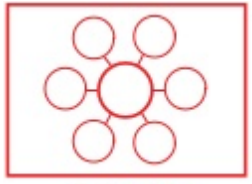
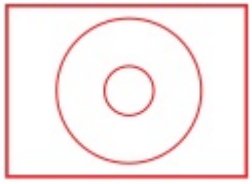
| | | 6.2.2 Explain with examples the use of neutralisation reaction in daily life. | +Application of neutralisation in daily life such as:<br>🎬 The use of toothpaste.<br>🎬 Fabric softener and hair conditioner.<br>🎬 Regulate soil pH.<br>🎬 Neutralising industrial waste. | |

**Theme 3: ENERGY AND SUSTAINABILITY OF LIFE**
**Learning area: 7.0 Electricity and Magnetism**

| WEEK | CONTENT STANDARD | LEARNING STANDARD | SUGGESTED ACTIVITIES | NOTES |
|---|---|---|---|---|
| **21** | 7.1 Electricity<br>  <br>Bubble Map<br>  <br>Circle Map | A student is able to:<br>(Basic content)<br><br>7.1.1 Describe and communicate about energy. | +Discuss by using **multimedia presentation** on the following:<br>🎬 Why energy is needed in daily life.<br>🎬 Types of energy.<br>🎬 Sources of energy. | |
| | | 7.1.2 Explain and communicate about the existence of electrostatic charges. | +**Carry out activities** using materials such as polythene rod, acetate rod, glass rod, balloon to show the existence of electrostatic charges.<br><br>+**Carry out activities** to determine the existence of electrostatic charges, quantity of electrical charges and types of electrostatic charges using an electroscope. | |

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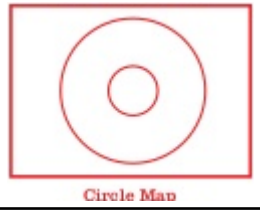
| | | 7.1.3 Explain with examples on electrostatic in daily life. | +**Carry out a simulation** on lightning formation using a Van de Graff generator or Wimhurst machine.<br><br>+Collect information and solve problems in daily life such as:<br>🎬 Choosing suitable fabric to be worn in low humidity weather.<br>🎬 Prevent vehicle from fire while filling petrol.<br>🎬 Looking for a shelter during thunderstorm (Faraday's cage concept) | |
| | | 7.1.4 Draw a conclusion that the flow of charges produces 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. | |
| **21** | | (Basic content)<br><br>7.1.5 Characterise current, voltage and resistance and their units. | +Gather information and carry out activities to discover units for current, voltage and resistance.<br><br>+Measure current and voltage in an electrical circuit using suitable measuring apparatus | |
| | | 7.1.6 Draw a conclusion on the relationship between current, voltage and resistance. | +Design and carry out experiment to study the effects of changes in:<br>🎬 Resistance on current and 🎬 Voltage on current.<br><br>+Discussion on relationship between voltage, current and resistance using Ohm's Law. | |
| **22** | 7.2 The flow of electric current in series circuit and parallel circuit<br>  <br>Circle Map | (Basic content)<br><br>7.2.1 Elaborate and communicate about the flow of electric current in series circuit and parallel circuit. | +Carry out a **scientific investigation** to study:<br>🎬 The flow of current by building a complete series circuit and parallel circuit,<br>🎬 Advantages and disadvantages of series circuit and parallel circuit,<br>🎬 Electrical wiring at home,<br><br>+Solve numerical problems related to current, voltage and resistance in series circuit and parallel circuit. | |

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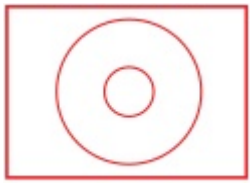
| **23** | 7.3 Magnetism<br>  <br>Circle Map | (Basic content)<br><br>7.3.1 Draw a conclusion about the characteristics of a magnet. | +Carry out the following activities:<br>🎬 Using iron filings to study magnetic field of a bar magnet,<br>🎬 Using compass to show the directions of the magnetic field.<br><br>+Sketch and study the pattern of the magnetic field of various types of magnets such as bar magnet, horseshoe magnet and magnadur magnet. | |
| | | 7.3.2 Describe and communicate about electromagnet. | +**Carry out activities** to show relationship between:<br>🎬 Magnetic field lines and the strength of magnetic field,<br>🎬 The strength of magnetic force and distance between magnetic field lines.<br><br>+**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.<br><br>+Draw the pattern and mark the direction of the 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<br>🎬 current flow,<br>🎬 number of turns.<br><br>+Gather information and make multimedia presentation on the uses of magnet and electromagnet in daily life such as in compasses and electric bells. | |

**Theme 3: ENERGY AND SUSTAINABILITY OF LIFE**
**Learning area: 8.0 FORCE AND MOTION**

| WEEK | CONTENT STANDARD | LEARNING STANDARD | SUGGESTED ACTIVITIES | NOTES |
|---|---|---|---|---|

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| **24** | 8.1 Force<br>  <br> | A student is able to:<br>(Basic content)<br><br>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.<br><br>+Refer to **Module 12 HEBAT Science (Force).** | |
| | | 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:<br>🎬 A stationary object on a table, Weight (action force) is the same as normal force (reaction force),<br>🎬 An object floating on water, Weight (action force) is the same as buoyant force (reaction force),<br>🎬 Two trolleys placed on a horizontal runway with a compressed spring between them will move in opposite directions of the same distance when released.<br><br>+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). | |
| **25** | 8.2 Effects of force<br>  <br> | (Basic content)<br><br>8.2.1 Elaborate and communicate about the effects of force. | +**Carry out an activity** to study the effects of force on change in shape, position, speed and direction such<br>🎬 moving a stationary toy car,<br>🎬 changing the speed of a moving toy car,<br>🎬 stopping a moving toy car,<br>🎬 changing the direction of a moving toy car,<br>🎬 changing the shape of plasticine. | |

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| | | (Basic content)<br><br>8.2.2 Explain and communicate the relationship between the differences in densities and the effects of buoyancy in daily life. | +Carry out **an activity to determine** the buoyant force using a spring balance.<br>**(Buoyant force = actual weight – apparent weight)**<br><br>+Carry out **an investigation** to prove that objects denser than water will submerge by using density cubes.<br><br>+Solve problems on how cargo ships can maintain afloat at a safe level when travelling in different oceans of different temperatures and densities using a Plimsoll line as guidance. | |
| | | 8.2.3 Classify and solve problems on levers based on the position of fulcrum, load and effort. | +Discuss various examples of levers according to the classes of lever in daily life.<br><br>+Solve numerical problems using the following formula:<br>**Load x Load arm = Effort x Effort arm**<br>*(Load arm –distance of load from fulcrum)<br>*(Effort arm – distance of effort from fulcrum) | |
| | | 8.2.4 Explain and communicate about the moment of force. | +When opening a door or loosening a nut using a spanner, we use a force that produces a turning effect.<br>The turning effect is known as the moment of force.<br><br>+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 loosing a nut.<br>**Moment of a force = force(N) x perpendicular distance(m)**<br><br>+Refer to **Module 12 HEBAT Science(Force)** | |
| | | 8.2.5 Carry out an experiment and communicate about pressure and its application in daily life. | +To investigate how the changes in surface area affects the pressure produced when a similar force is applied<br>Introduce formula: **Pressure = Force / Surface area**<br>+Make a multimedia presentation about the applications of pressure in daily life. | |

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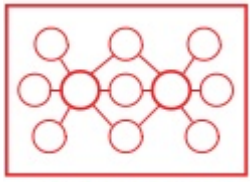
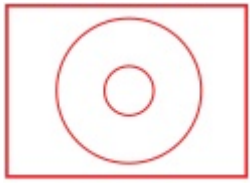
| | | (Basic content)<br><br>8.2.6 Elaborate and communicate about gas pressure based on the kinetic theory of gas. | +Carry out an activity to show that air exerts pressure.<br><br>+Carry out activities to show the factors that affect air pressure, that are; volume and temperature. | |
| | | 8.2.7 Explain and communicate about the existence of atmospheric pressure and the effects of altitude on the magnitude of pressure. | +Carry out activities to show the existence of atmospheric pressure by using Magdeburg hemisphere, suction pump, drinking straw, siphon, syringe, vacuum cleaner.<br><br>+Active reading, video or data analysist to show the relationship between altitude and atmospheric pressure.<br><br>+Solve problems related to air pressure and atmospheric pressure in daily life.<br><br>+Pupils need to use the term of air pressure and atmospheric pressure correctly.<br><br>+Refer to **Module 16 HEBAT Science (Atmosphere)** | |
| | | 8.2.8 Explain the effects of depth on liquid pressure. | +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 meter) glass tube containing water or oil.<br><br>+Explain with examples the effects of depth on fluid pressure in daily life such as the thickness of walls of the dam, design of the submarine. | |

**3: ENERGY AND SUSTAINABILITY OF LIFE**
**Learning area: 9.0 HEAT**

| WEEK | CONTENT STANDARD | LEARNING STANDARD | SUGGESTED ACTIVITIES | NOTES |
|---|---|---|---|---|
| **26** | 9.1 Temperature and heat<br>  <br>Double Bubble Map | A student is able to:<br>(Basic content)<br><br>9.1.1 Make a comparison between heat and temperature. | +Discuss and share about the following:<br>▬ Definition of temperature.<br>▬ Differences between temperature and heat.<br><br>+Refer to **Module 7 HEBAT Science (Heat).** | |
| | 9.2 Heat flow and thermal equilibrium<br>  <br>Circle Map | 9.2.1 Explain how heat flows from a hot region to a cold region. | +Carry out activities to show heat transfer by<br>▬ Conduction.<br>▬ Convection.<br>▬ Radiation. | |
| | | 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:<br>▬ Definition of heat conductor.<br>▬ Definition of heat insulator.<br>▬ Various uses of heat conductors and insulators in daily life.<br><br>+Carry out investigations to study the uses of different materials as heat insulators. | |
| **27** | **6.1 Classification of elements** | **A student is able to:**<br>**(Basic content)**<br><br>**6.1.3 identify the position of metal, nonmetal and inert gases in the periodic table.**<br>**A student is able to:** | **PENJAJARAN KURIKULUM** | |

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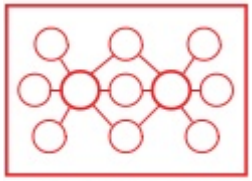
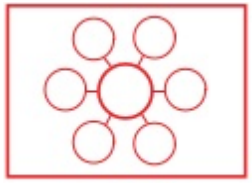
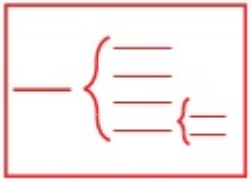
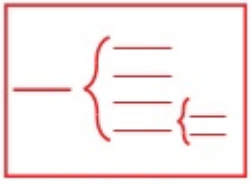
| | | **6.1.4 differentiate the characteristics of metals and non-metals.** | | |
| **28** | 9.3 Principle of expansion and contraction of matter | (Basic content)<br><br>9.3.1 Explain how heat can cause the expansion and contraction in solid, liquid and gas. | +Carry out activities to show heat can 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:<br>▬ Mercury in thermometers.<br>▬ Bimetallic strip in fire alarms.<br>▬ Gap between railway tracks.<br>▬ Roller on steel bridges.<br><br>+Discuss the uses of principle of expansion and contraction of matter in solving simple problems. | |
| **29** | 9.4 Relation between the types of surfaces of objects to heat absorption and emission.<br>  <br>Double Bubble Map | (Basic content)<br><br>9.4.1 Demonstrate how dark, dull objects absorb heat better than white, shiny objects. | +Carry out an activity to show:<br>▬ Dark and dull objects absorb heat better than white and shiny objects.<br>▬ Dark and dull objects radiate heat better than white and shiny objects. | |
| | | 9.4.2 Demonstrate how dark, dull objects radiate heat better than white, shiny objects. | | |
| | | 9.4.3 Conceptualise and design using the heat concept in daily life. | **+Project-based learning:**<br>The Green House Concept fulfills a few criteria such as energy efficiency, water efficiency, sustainable construction site, construction materials, innovation, and etcetera.<br>Design a 'Green Home' which uses minimum energy to keep the house cool or vice-versa.<br>**A pupil is able to design or make innovation in the local or global context.** | |

**Theme 3: ENERGY AND SUSTAINABILITY OF LIFE**
**Learning Area: 10.0 SOUND WAVE**

| WEEK | CONTENT STANDARD | LEARNING STANDARD | SUGGESTED ACTIVITIES | NOTES |
|---|---|---|---|---|
| **30** | 10.1 Characteristics of sound waves<br>  <br>Bubble Map | A student is able to:<br>(Basic content)<br><br>10.1. Communicate about the basic characteristics of sound waves. | +Carry out an activity to explain that sound waves:<br>🎬 Need a medium to travel.<br>🎬 Can be reflected.<br>🎬 Can be absorbed by different types of Surface.<br>🎬 Have different speed in different médium.<br><br>+Refer to **Module 28 HEBAT Science (Sound).** | |
| **31** | 10.2 Loudness and pitch of sound<br>  <br>Brace Map | 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). | |
| | | 10.2.1 Explain frequency and its unit, and amplitude of vibration. | | |
| | | 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. | |
| **32** | 10.3 Phenomena and applications of reflection of sound waves<br>  <br>Brace Map | (Basic content)<br><br>10.3.1 Explain with example phenomena related to reflection of sound waves such as echo and Doppler effect | +Explain **with example/video** on echo phenomena in daily life.<br><br>+Carry out an activity to compare the pitch of an ambulance siren/air horn/a fast moving motorcycle engine passes an observer.<br><br>+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. | |
| | | 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. | |

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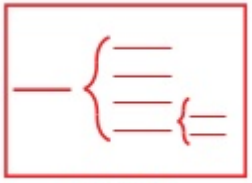
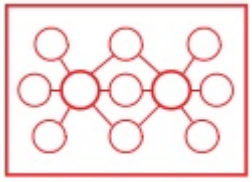
| | | 10.3.3 Elaborate and communicate about limitations of hearing for humans and animals<br>10.3.4 Explain with examples ways to overcome human limitations of hearing | +Make a **multimedia presentation** on the following:<br>🎬 The limitations of hearing for human and animals.<br>🎬 Ways to overcome human limitations of hearing. | |

**Theme 4: EARTH AND SPACE EXPLORATION**
**Learning area: 11.0 Stars and Galaxies in the Universe**

| WEEK | CONTENT STANDARD | LEARNING STANDARD | SUGGESTED ACTIVITIES | NOTES |
|---|---|---|---|---|
| **33** | 11.1 Stars and galaxies in the universe<br>  <br>Brace Map<br>  <br>Double Bubble Map | A student is able to:<br>(Basic content)<br><br>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:<br>- galaxies including the Milky Way,<br>- nebula,<br>- life cycle of stars (Nebula Hypothesis).<br><br>+Galaxies and types of galaxies, such as, elliptical, spiral and irregular galaxies.<br><br>+State the position of the Solar System in the Milky Way Galaxy.<br><br>+Compare the relative sizes between Earth, planets, Solar System, Milky Way Galaxy and the Universe.<br><br>+Amazed by the universe that God has created. | |

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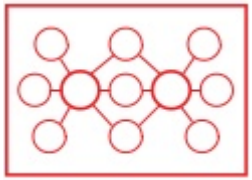
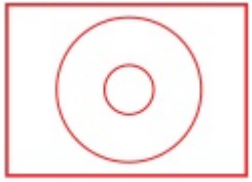
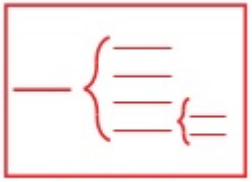
| | | 11.1.2 Compare and contrast the characteristics of stars (including the Sun) and relate them to the observation of stars on the Earth. | +Characteristics of stars include temperature, size, distance, color and brightness.<br><br>+Surf Sky chart, Stellarium (free astronomy software), and Earth Centered Universe (ECU) to get information about the similarities and differences on the characteristics of stars.<br><br>+Visit an Observatory or planetarium to observe object in the sky during the day and night. | |

**Theme 4: EARTH AND SPACE EXPLORATION**
**Learning area: 12.0 SOLAR SYSTEM**

| WEEK | CONTENT STANDARD | LEARNING STANDARD | SUGGESTED ACTIVITIES | NOTES |
|---|---|---|---|---|
| **34** | 12.1 Solar System<br>  <br>Double Bubble Map<br>  <br>Circle Map<br>  <br>Brace Map | A student is able to:<br>(Basic content)<br><br>12.1.1 Compare distances between the Sun and the planets in the Solar System using astronomical units (a.u.) and light years. | +Astronomical unit and light years as measures of distance in space.<br><br>+Carry out calculations by converting units between a.u and light years to kilometres.<br><br>+Refer to **Module 17 HEBAT Science (Solar System).** | |
| | | 12.1.2 Construct a table to compare and contrast the planets in the Solar System with the Earth. | +Characteristics used for comparisons:<br>Size, distance, temperature, density, relative gravitational pull to the Earth, atmospheric layers, surface condition, direction and speed of planet rotation and revolvement of planets in their own orbits including natural satellites of each planet. | |
| | | 12.1.3 Explore the possible relationship based on the planets' characteristics and explain the relationship including anomalies that may arise. | +Examples of relationships between characteristics:<br>🎬 Temperature and distance from the Sun,<br>🎬 Density and gravitational pull,<br>🎬 Distance, time and speed,<br>🎬 Direction of rotation. | |

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| **34** | | 12.1.4 Reason and make analogies in hypothetical situations related to the Solar System | **+Problem-based learning:**<br>Rotations, action forces and movement can be predicted from data collected based on understanding of the Solar System.<br><br>+Discuss the example of hypothetical situations as follows:<br>🎬 What will happen if the Earth stops rotating?<br>Rotates at a slower pace?<br>🎬 Why are there planets with two or more moons?<br>🎬 If you are on the Moon, explain your observation on the shape of the Earth?<br>🎬 Will you see phases of the Earth if you are on the Moon? | |
| | | (Additional content)<br><br>12.1.5 Justify the Earth as the most ideal planet for life based on data collected. | Conduct **brainstorming session** on the following:<br>=Whether other planets can sustain life if natural sources on Earth have depleted – discussion is focused on sustainable living.<br>=Realise the role of each individual as a prudent consumer in managing nature and the importance of reducing ecological footprint. | |

**Theme 4: EARTH AND SPACE EXPLORATION**
**Learning area: 13.0 METEOROID, ASTEROID, COMET**

| WEEK | CONTENT STANDARD | LEARNING STANDARD | SUGGESTED ACTIVITIES | |
|---|---|---|---|---|

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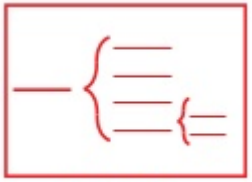
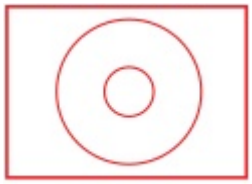
|---|---|---|---|---|
| **35** | 13.1 Other objects in the Solar System: Meteoroids, Asteroids and Comets<br>  <br>Brace Map<br>  <br>Circle Map | A student is able to:<br>(Basic content)<br><br>13.1.1 Communicate on other objects in the solar system, such as meteoroids, asteroids and comets. | +Prepare and share a **multimedia presentation** to:<br>(a) compare and contrast between meteoroid, asteroid and comet,<br>(b) predict what will happen to the Earth if it is hit by meteoroid, asteroid and comet. | |
| | | 13.1.2 Discuss the movements of meteoroids, asteroids and comets and their effects on the Earth based on data. | + Make observations on meteors at night or visit a planetarium.<br><br>+Use multimedia presentations on the movements of meteoroids. | |
| | | 13.1.3 Generate ideas on how to reduce or prevent the possibility of asteroids colliding with the Earth. | +Collect information and carry out multimedia presentation on the phenomena of asteroids and other objects colliding with the Earth.<br><br>+Meteorites are introduced. | |

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| **36** | **9.2**<br>**Substance of the Earth**<br>**9.3**<br>**Main processes of the Earth** | **A student is able to:**<br>**(Basic content)**<br>**9.2.1 explain type and characterictic of rocks.**<br><br>**9.2.2 communicate on how to differentiate the process of rock formation**<br>**A student is able to:**<br>**(Basic content)**<br>**9.3.1 explain the different Earth processes that effect the changes on Earth.**<br><br>**9.3.2 communicate about exogenic and endogenic processes.** | **PENJAJARAN KURIKULUM** | |
| **37** | **REVISION** | | | |
| **38-40** | **FINAL YEAR EXAMINATION** | | | |
| **41-42** | **SCIENCE ACTIVITY** | | | |
| | **FINAL YEAR BREAK** | | | |