MINISTRY OF EDUCATION MALAYSIA

Integrated Curriculum For Secondary Schools

Curriculum Specifications

SCIENCE
Year 5

Curriculum Development Centre
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TABLE OF CONTENTS

		Page
The National Philosophy		v
National Philosophy of Education		vii
National Science Education Philosophy		ix
Preface		xi
Introduction		1
Aims and Objectives		1
Scientific Skills		2
Thinking Skills		3
Scientific Attitudes and Noble Values		7
Teaching and Learning Strategies		7
Content Organisation		9
Investigating Living Things		
Learning Area:	Microorganisms	13
	Survival of the species	17
Investigating Force and Energy		
Learning Area:	Energy	23
	Electricity	26
	Light	29
	Heat	32

Investigating Materials

Learning Area: States of matter 36

Acid and alkali 41

Investigating The Earth and The Universe

Learning Area: Constellation 42

The Earth, The Moon and The Sun 43

Investigating Technology

Learning Area: Strength and Stability 46

Acknowledgements 49

Panel of Writers 50

THE NATIONAL PHILOSOPHY

Our nation, Malaysia, is dedicated to achieving a greater unity of all her peoples; to maintaining a democratic way of life; to creating a just society in which the wealth of the nation shall be equitably shared; to ensuring a liberal approach to her rich and diverse cultural traditions; to building a progressive society which shall be oriented towards modern science and technology;

We, the people of Malaysia, pledge our united efforts to attain these ends guided by these principles:

BELIEF IN GOD
LOYALTY TO KING AND COUNTRY
SUPREMACY OF THE CONSTITUTION
RULE OF LAW
GOOD BEHAVIOUR AND MORALITY

NATIONAL PHILOSOPHY OF EDUCATION

Education in Malaysia is an on-going effort towards further developing the potential of individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious based on a firm belief in and devotion to God. Such an effort is designed to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards and who are responsible and capable of achieving a high level of personal well-being as well as being able to contribute to the betterment of the family, society and the nation at large.

NATIONAL SCIENCE EDUCATION PHILOSOPHY

In consonance with the National Education Philosophy, science education in Malaysia nurtures a
science and technology culture by focusing
on the development of individuals who are competitive, dynamic, robust and resilient and able to
master scientific knowledge and technological competency.

PREFACE

The aspiration of the nation to become an industrialised society depends on science and technology. It is envisaged that success in providing quality science education to Malaysians from an early age will serve to spearhead the nation into becoming a knowledge society and a competitive player in the global arena. Towards this end, the Malaysian education system is giving greater emphasis to science and mathematics education.

The Science curriculum has been designed not only to provide opportunities for pupils to acquire science knowledge and skills, develop thinking skills and thinking strategies, and to apply this knowledge and skills in everyday life, but also to inculcate in them noble values and the spirit of patriotism. It is hoped that the educational process en route to achieving these aims would produce well-balanced citizens capable of contributing to the harmony and prosperity of the nation and its people.

The Science curriculum aims at producing active learners. To this end, pupils are given ample opportunities to engage in scientific investigations through hands-on activities and experimentations. The inquiry approach, incorporating thinking skills, thinking strategies and thoughtful learning, should be emphasised throughout the teaching-learning process. The content and contexts suggested are chosen based on their relevance and appeal to pupils so that their interest in the subject is enhanced.

In a recent development, the Government has made a decision to introduce English as the medium of instruction in the teaching and learning of science and mathematics. This measure will enable pupils to keep abreast of developments in science and technology in contemporary society by enhancing their capability and know-how to tap the diverse sources of information on science written in the English language. At the same time, this move would also provide opportunities for pupils to use the English language and hence, increase their proficiency in the language. Thus, in implementing the science curriculum, attention is given to developing pupils' ability to use English for study and communication, especially in the early years of learning.

The development of this curriculum and the preparation of the corresponding Curriculum Specifications have been the work of many individuals over a period of time. To all those who have contributed in one way or another to this effort, may I, on behalf of the Ministry of Education, express my sincere gratitude and thanks for the time and labour expended.

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INTRODUCTION

As articulated in the National Education Policy, education in Malaysia is an on-going effort towards developing the potential of individuals in a holistic and integrated manner to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious. The primary and secondary school science curriculum is developed with the aim of producing such individuals.

The Level Two Primary School Science curriculum is designed to stimulate pupils' curiosity and develop their interest as well to enable pupils to learn more about themselves and the world around them through pupil-centered activities.

The curriculum is articulated in two documents: the syllabus and the curriculum specifications. The syllabus presents the aims, objectives and the outline of the curriculum content for a period of 3 years for Level Two Primary School Science. The curriculum specifications provides the details of the curriculum, which includes the aims and objectives of the curriculum, brief descriptions on thinking skills and thinking strategies, scientific skills, scientific attitudes and noble values, teaching and learning strategies, and curriculum content. The curriculum content covers the learning objectives, suggested learning activities, learning outcomes, notes and vocabulary.

AIMS

The aim of the primary school science curriculum is to develop pupils' interest and creativity through everyday experiences and investigations that promote the acquisition of scientific and thinking skills as well as the inculcation of scientific attitudes and values.

OBJECTIVES

The Level Two Primary School Science Curriculum aims to:

1. Stimulate pupils' curiosity and develop their interest about the world around them.
2. Provide pupils with opportunities to develop science process skills and thinking skills.
3. Develop pupils' creativity.
4. Provide pupils with basic science knowledge and concepts.
5. To provide learning opportunities for pupils to apply knowledge and skills in a creative, critical and analytical manner for problem solving and decision-making.
6. Inculcate scientific attitudes and positive values.
7. Foster the appreciation on the contributions of science and technology towards national development and well-being of mankind.
8. Be aware of the need to love and care for the environment.

SCIENTIFIC SKILLS

Science emphasises inquiry and problem solving. In inquiry and problem solving processes, scientific and thinking skills are utilised. Scientific skills are important in any scientific investigation such as conducting experiments and carrying out projects.

Scientific skills encompass science process skills and manipulative skills.

Science Process Skills

Science process skills enable pupils to formulate their questions and find out the answers systematically.

Descriptions of the science process skills are as follows:

Observing	Using the sense of hearing, touch, smell, taste and sight to find out about objects or events.
Classifying	Using observations to group objects or events according to similarities or differences.
Measuring and Using Numbers	Making quantitative observations by comparing to a conventional or non-conventional standard.
Making Inferences	Using past experiences or previously collected data to draw conclusions and explain events.
Predicting	Making a forecast about what will happen in the future based on prior knowledge gained through experiences or collected data.
Communicating	Using words or graphic symbols such as tables, graphs, figures or models to describe an action, object or event.
Using space-time relationship	Describing changes in parameter with time. Examples of parameters are location, direction, shape, size, volume, weight and mass.
Interpreting data	Giving rational explanations about an object, event or pattern derived from collected data.
Defining operationally	Defining concepts by describing what must be done and what should be observed.
Controlling variables	Naming the fixed variables, manipulated variable and responding variable in an investigation. The manipulated variable is changed to observe its relationship with the responding variable. At the same time, the fixed variables are kept constant.

Making Hypotheses	Making a general statement about the relationship between a manipulated variable and a responding variable to explain an observation or event. The statement can be tested to determine its validity.
Experimenting (design a fair test)	Planning and conducting activities to test a hypothesis. These activities include collecting, analysing and interpreting data and making conclusions.

Manipulative Skills

Manipulative skills in scientific investigation are psychomotor skills that enable pupils to:

- Use and handle science apparatus and substances.
- Handle specimens correctly and carefully.
- Draw specimens and apparatus.
- Clean science apparatus.
- Store science apparatus.

THINKING SKILLS

Thinking is a mental process that requires an individual to integrate knowledge, skills and attitude in an effort to understand the environment.

One of the objectives of the national education system is to enhance the thinking ability of pupils. This objective can be achieved through a curriculum that emphasises thoughtful learning. Teaching and learning that emphasises thinking skills is a foundation for thoughtful learning.

Thoughtful learning is achieved if pupils are actively involved in the teaching and learning process. Activities should be organised to provide opportunities for pupils to apply thinking skills in conceptualisation, problem solving and decision-making.

Thinking skills can be categorised into critical and creative thinking skills. A person who thinks critically always evaluates an idea in a systematic manner before accepting it. A person who thinks creatively has a high level of imagination, is able to generate original and innovative ideas, and modify ideas and products.

Thinking strategies are higher order thinking processes that involve various steps. Each step involves various critical and creative thinking skills. The ability to formulate thinking strategies is the ultimate aim of introducing thinking activities in the teaching and learning process.

Critical Thinking Skills

A brief description of each critical thinking skill is as follows:

Attributing	Identifying characteristics, features, qualities and elements of a concept or an object.
Comparing and Contrasting	Finding similarities and differences based on criteria such as characteristics, features, qualities and elements of a concept or event.
Grouping and Classifying	Separating objects or phenomena into categories based on certain criteria such as common characteristics or features.
Sequencing	Arranging objects and information in order based on the quality or quantity of common characteristics or features such as size, time, shape or number.
Prioritising	Arranging objects and information in order based on their importance or priority.
Analysing	Examining information in detail by breaking it down into smaller parts to find implicit meanings and relationships.
Detecting Bias	Identifying views or opinions that have the tendency to support or oppose something in an unfair or misleading way.
Evaluating	Making judgements on the quality or value of something based on valid reasons or evidence.
Making Conclusions	Making a statement about the outcome of an investigation that is based on a hypothesis.

Creative Thinking Skills

A brief description of each creative thinking skill is as follows:

Generating Ideas	Producing or giving ideas in a discussion.
Relating	Making connections in a certain situation to determine a structure or pattern of relationship.
Making Inferences	Using past experiences or previously collected data to draw conclusions and explain events.
Predicting	Making a forecast about what will happen in the future based on prior knowledge gained through experiences or collected data.
Making Generalisations	Making a general conclusion about a group based on observations on, or information from, samples of the group.
Visualising	Recalling or forming mental images about a particular idea, concept, situation or vision.
Synthesising	Combining separate elements or parts to form a general picture in various forms such as writing, drawing or artefact.
Making Hypotheses	Making general statements about the relationship between manipulated variable and responding variable to explain an observation or event. The statements can be tested to determine their validity.
Making Analogies	Understanding an abstract or complex concepts by relating it to simpler or concrete concepts with similar characteristics.
Inventing	Producing something new or adapting something already in existence to overcome problems in a systematic manner.

Thinking Strategy

Description of each thinking strategy is as follows:

Conceptualising Making generalisations based on inter-related and common characteristics in order to construct meaning, concept or model.

Making Decisions Selecting the best solution from various alternatives based on specific criteria to achieve a specific aim.

Problem Solving Finding solutions to challenging or unfamiliar situations or unanticipated difficulties in a systematic manner.

Besides the above thinking skills and thinking strategies, another skill emphasised is reasoning. Reasoning is a skill used in making logical, just and rational judgements. Mastering of critical and creative thinking skills and thinking strategies is made simpler if an individual is able to reason in an inductive and deductive manner. Figure 1 gives a general picture of thinking skills and thinking strategies.

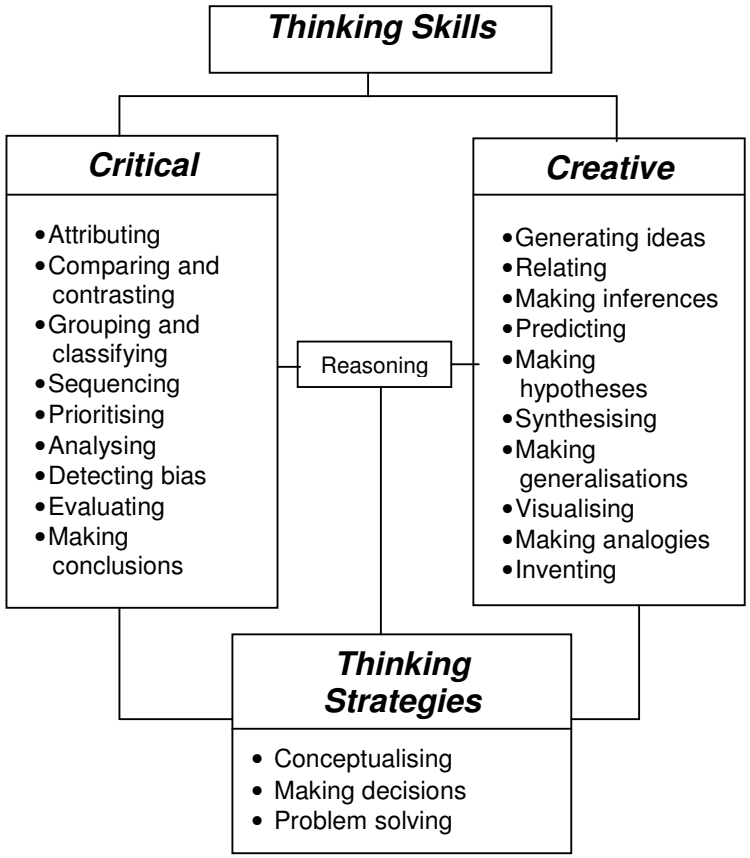

Figure 1: TSTS Model in Science

Mastering of thinking skills and thinking strategies (TSTS) through the teaching and learning of science can be developed through the following phases:

1. Introducing TSTS.
2. Practising TSTS with teacher's guidance.
3. Practising TSTS without teacher's guidance.
4. Applying TSTS in new situations with teacher's guidance.
5. Applying TSTS together with other skills to accomplish thinking tasks.

Further information about phases of implementing TSTS can be found in the guidebook *"Buku Panduan Penerapan Kemahiran Berfikir dan Strategi Berfikir dalam Pengajaran dan Pembelajaran Sains"* (Curriculum Development Centre, 1999).

Relationship between Thinking Skills and Science Process Skills

Science process skills are skills that are required in the process of finding solutions to a problem or making decisions in a systematic manner. It is a mental process that promotes critical, creative, analytical and systematic thinking. Mastering of science process skills and the possession of suitable attitudes and knowledge enable pupils to think effectively.

The mastering of science process skills involves the mastering of the relevant thinking skills. The thinking skills that are related to a particular science process skill are as follows:

Science Process Skills	Thinking Skills
Observing	Attributing Comparing and contrasting Relating
Classifying	Attributing Comparing and contrasting Grouping and classifying
Measuring and Using Numbers	Relating Comparing and contrasting
Making Inferences	Relating Comparing and contrasting Analysing Making inferences
Predicting	Relating Visualising
Using Space-Time Relationship	Sequencing Prioritising
Interpreting data	Comparing and contrasting Analysing Detecting bias Making conclusions Generalising Evaluating

Science Process Skills	Thinking Skills
Defining operationally	Relating Making analogy Visualising Analysing
Controlling variables	Attributing Comparing and contrasting Relating Analysing
Making hypotheses	Attributing Relating Comparing and contrasting Generating ideas Making hypotheses Predicting Synthesising
Experimenting	All thinking skills
Communicating	All thinking skills

Teaching and Learning based on Thinking Skills and Scientific Skills

This Level II Science curriculum emphasises thoughtful learning based on thinking skills and scientific skills. Mastery of thinking skills and scientific skills are integrated with the acquisition of knowledge in the intended learning outcomes. Thus, in teaching and learning, teachers need to emphasise the mastery of skills together with the acquisition of knowledge and the inculcation of noble values and scientific attitudes.

The following is an example and explanation of a learning outcome based on thinking skills and scientific skills.

Example*:*

Level	Year 4
Learning Outcome:	Differentiate the air that we inhale and the air that we exhale.
Thinking Skills:	Comparing and contrasting

Explanation:

To achieve the above learning outcome, knowledge on the composition of the air that we inhale and exhale is needed. The mastery of the skill of comparing and contrasting is as important as the acquisition of knowledge on humans and animal breathing. This would enable pupils to understand that breathing process in humans and animals

Example*:*

Level	Year 5
Learning Outcome:	Design a fair test to find out what cause the size of a shadow to change by deciding what to keep the same, what to change and what to observe.
Scientific Skills:	Experimenting

Explanation:

To achieve the above learning outcome, pupils plan and conduct investigation to test the hypothesis. This investigation should include collecting, analysing and interpreting data and making conclusion.

SCIENTIFIC ATTITUDES AND NOBLE VALUES

Science learning experiences can be used as a means to inculcate scientific attitudes and noble values in pupils. These attitudes and values encompass the following:

- Having an interest and curiosity towards the environment.
- Being honest and accurate in recording and validating data.
- Being diligent and persevering.
- Being responsible about the safety of oneself, others, and the environment.
- Realising that science is a means to understand nature.
- Appreciating and practising clean and healthy living.
- Appreciating the balance of nature.
- Being respectful and well-mannered.
- Appreciating the contribution of science and technology.
- Being thankful to God.
- Having critical and analytical thinking.
- Being flexible and open-minded.
- Being kind-hearted and caring.
- Being objective.
- Being systematic.
- Being cooperative.
- Being fair and just.
- Dare to try.
- Thinking rationally.
- Being confident and independent.

The inculcation of scientific attitudes and noble values generally occurs through the following stages:

- Being aware of the importance and the need for scientific attitudes and noble values.
- Giving emphasis to these attitudes and values.
- Practising and internalising these scientific attitudes and noble values.

When planning teaching and learning activities, teachers need to give due consideration to the above stages to ensure the continuous and effective inculcation of scientific attitudes and values. For example, during science practical work, the teacher should remind pupils and ensure that they carry out experiments in a careful, cooperative and honest manner.

Proper planning is required for effective inculcation of scientific attitudes and noble values during science lessons. Before the first lesson related to a learning objective, teachers should examine all related learning outcomes and suggested teaching-learning activities that provide opportunities for the inculcation of scientific attitudes and noble values.

The following is an example of a learning outcome pertaining to the inculcation of scientific attitudes and values.

Example*:*

Level: Year 4

Learning Area:	Properties of Materials
Learning Objective:	Knowing the importance of reuse, reduce and recycle of materials.
Learning Outcome:	Practise reusing, reducing and recycling to conserve materials.
Suggested Learning Activities	Pupils carry out activities about reusing, reducing and recycling of materials throughout the year.
Scientific attitudes and noble values	Being responsible about the safety of oneself, others and the environment. Having an intrest and curiosity towards the environment. Appreciating the balance of nature. Being cooperative.

Inculcating Patriotism

The science curriculum provides an opportunity for the development and strengthening of patriotism among pupils. For example, in learning about the earth's resources, the richness and variety of living things and the development of science and technology in the country, pupils will appreciate the diversity of natural and human resources of the country and deepen their love for the country.

TEACHING AND LEARNING STRATEGIES

Teaching and learning strategies in the science curriculum emphasise thoughtful learning. Thoughtful learning is a process that helps pupils acquire knowledge and master skills that will help them develop their minds to the optimum level. Thoughtful learning can occur through various learning approaches such as inquiry, constructivism, contextual learning, and mastery learning. Learning activities should therefore be geared towards activating pupils' critical and creative thinking skills and not be confined to routine or rote learning. Pupils should be made aware of the thinking skills and thinking strategies that they use in their learning. They should be challenged with higher order questions and problems and be required to solve problems utilising their creativity and critical thinking. The teaching and learning process should enable pupils to acquire knowledge, master skills and develop scientific attitudes and noble values in an integrated manner.

Inquiry-discovery emphasises learning through experiences. Inquiry generally means to find information, to question and to investigate a phenomenon that occurs in the environment. Discovery is the main characteristic of inquiry. Learning through discovery occurs when the main concepts and principles of science are investigated and discovered by pupils themselves. Through activities such as experiments, pupils investigate a phenomenon and draw conclusions by themselves. Teachers then lead pupils to understand the science concepts through the results of the inquiry. Thinking skills and scientific skills are thus developed further during the inquiry process. However, the inquiry approach may not be suitable for all teaching and learning situations. Sometimes, it may be more appropriate for teachers to present concepts and principles directly to pupils.

The use of a variety of teaching and learning methods can enhance pupils' interest in science. Science lessons that are not interesting will not motivate pupils to learn and subsequently will affect their performances. The choice of teaching methods should be based on the curriculum content, pupils' abilities, pupils' repertoire of intelligences, and the availability of resources and infrastructure. Different teaching and learning activities should be planned to cater for pupils with different learning styles and intelligences.
The following are brief descriptions of some teaching and learning methods.

Experiment

An experiment is a method commonly used in science lessons. In experiments, pupils test hypotheses through investigations to discover specific science concepts and principles. Conducting an experiment involves thinking skills, scientific skills, and manipulative skills.

In the implementation of this curriculum, besides guiding pupils to carry out experiments, where appropriate, teachers should provide pupils with the opportunities to design their own experiments. This involves pupils drawing up plans as to how to conduct experiments, how to measure and analyse data, and how to present the results of their experiment.

Discussion

A discussion is an activity in which pupils exchange questions and opinions based on valid reasons. Discussions can be conducted before**,** during or after an activity. Teachers should play the role of a facilitator and lead a discussion by asking questions that stimulate thinking and getting pupils to express themselves.

Simulation

In simulation, an activity that resembles the actual situation is carried out**.** Examples of simulation are role-play, games and the use of models. In role-play, pupils play out a particular role based on certain pre-determined conditions. Games require procedures that need to be followed. Pupils play games in order to learn a particular principle or to understand the process of decision-making. Models are used to represent objects or actual situations so that pupils can visualise the said objects or situations and thus understand the concepts and principles to be learned.

Project

A project is a learning activity that is generally undertaken by an individual or a group of pupils to achieve a particular learning objective. A project generally requires several lessons to complete. The outcome of the project either in the form of a report, an artefact or in other forms needs to be presented to the teacher and other pupils. Project work promotes the development of problem-solving skills, time management skills, and independent learning.

Visits and Use of External Resources

The learning of science is not limited to activities carried out in the school compound. Learning of science can be enhanced through the use of external resources such as zoos, museums, science centres, research institutes, mangrove swamps, and factories. Visits to these places make the learning of science more

interesting, meaningful and effective. To optimise learning opportunities, visits need to be carefully planned. Pupils may be involved in the planning process and specific educational tasks should be assigned during the visit. No educational visit is complete without a post-visit discussion.

Use of Technology

Technology is a powerful tool that has great potential in enhancing the learning of science. Through the use of technology such as television, radio, video, computer, and Internet, the teaching and learning of science can be made more interesting and effective. Computer simulation and animation are effective tools for the teaching and learning of abstract or difficult science concepts. Computer simulation and animation can be presented through courseware or Web page. Application tools such, as word processors, graphic presentation software and electronic spreadsheets are valuable tools for the analysis and presentation of data.

CONTENT ORGANISATION

The science curriculum is organised around themes. Each theme consists of various learning areas, each of which consists of a number of learning objectives. A learning objective has one or more learning outcomes.

Learning outcomes are written in the form of measurable behavioural terms. In general, the learning outcomes for a particular learning objective are organised in order of complexity. However, in the process of teaching and learning, learning activities should be planned in a holistic and integrated manner that enables the achievement of multiple learning outcomes according to needs and context. Teachers should avoid employing a teaching strategy that tries to achieve each learning outcome separately according to the order stated in the curriculum specifications.

The Suggested Learning Activities provide information on the scope and dimension of learning outcomes. The learning activities stated under the column Suggested Learning Activities are given with the intention of providing some guidance as to how learning outcomes can be achieved. A suggested activity may cover one or more learning outcomes. At the same time, more than one activity may be suggested for a particular learning outcome. Teachers may modify the suggested activity to suit the ability and style of learning of their pupils. Teachers are encouraged to design other innovative and effective learning activities to enhance the learning of science.

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
1. Microorganism				
1.1 Understanding that microorganism is a living thing	Pupils view video showing various types of microorganism, e.g. bacteria, virus, fungi and protozoa. Pupils make a qualitative comparison between the size of microorganism and that of human and conclude that microorganism is very tiny. Pupils discuss that yeast is a fungi, an example of microorganism. Pupils observe the effect of yeast on dough and infer that microorganism breathes and causes the dough to rise. Pupils carry out activity and observe the effect when a test tube filled with 2 teaspoon of dried yeast, 1 teaspoon of sugar and half test tube of water. The mouth of the test tube is attached to a balloon.	**Pupils** **Pupils** • state types of microorganisms. • state that yeast is an example of microorganism. • state that microorganism breathes. • state that microorganism grows.	Teacher uses the following recipe to make dough. *Ingredients:* 1 cup of flour ½ cup of warm water 1 teaspoon of dried yeast 1 teaspoon of sugar *Method:* 1.Mix all ingredients. 2.Cover the mixture with a damp cloth. 3.Leave it for 20 minutes. Ensure pupils use microscope or magnifying glass/hand lens.	yeast- *ragi* harmful- *berbahaya* magnifying glass- *kanta pembesar* uses- *kegunaan* sprinkling – *merenjis*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	Pupils carry out activity by sprinkling a few drops of water on a slice of bread. Pupils put the bread in a plastic bag and observe it for a few days. Pupils observe rotten oranges or mouldy rice using hand lens or microscope and record their observation for a few days. Pupils observe and record their findings by drawing. Pupils view video on the movement of microorganisms in water. Pupils collect samples of water from ponds, rivers or drains and observe the movement of microorganisms under a microscope. Pupils record their observation.	• state that microorganism moves.	Ensure pupils clean their hands after handling water samples.	

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	Pupils discuss and state that microorganisms are living things and most of them cannot be seen with naked eyes.	• conclude that microorganisms are living things and most of them cannot be seen with naked eyes.		
1.2 Understanding that some micro-organisms are harmful and some are useful.	Pupils gather information on the uses of microorganisms, e.g. a) making bread, b) making tapai, c) making tempe, d) making fertiliser. Pupils gather information on the harmful effects of microorganisms, e.g. a) causing illness, b) causing food poisoning, c) causing food to turn bad, d) causing tooth decay. Pupils gather information on diseases caused by microorganisms e.g. stomach upset, measles, cough, flu, chicken pox, dengue, conjunctivitis, mumps and AIDS.	**Pupils** • state examples of use of microorganisms. • state the harmful effects of microorganisms. • describe that diseases caused by microorganisms can spread from one person to another.	Pupils need not know the methods of making bread, tapai, tempe and fertiliser. Teacher just need to mention the common diseases.	contagious- *berjangkit* quarantine – *diasingkan* measles- *campak* chicken pox- *cacar* stomach upset- *sakit perut* cough- *batuk* harm- *kesan buruk* dengue – *denggi* sneezing – *bersin* flu - *selsema* mumps – *beguk* conjunctivitis – *sakit mata*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	Pupils discuss that diseases caused by microorganisms can spread from one person to another. Pupils discuss on how diseases caused by microorganisms can be prevented from spreading, e.g. a) by washing hands before handling food, b) by boiling water before drinking, c) by covering mouth and nose when coughing or sneezing, d) by washing hands after using the toilet, e) by putting patients who have chicken pox, conjunctivitis or mumps into quarantine. f) by covering wounds.	• explain ways to prevent diseases caused by microorganisms.		

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
2. Survival of The Species				
2.1 Understanding that different animals have their own ways to ensure the survival of their species.	Pupils gather information to find examples of animals that take care of their eggs and young, e.g. a) cow, b) hen, c) cat, d) bird. Pupils view video on how animals ensure the survival of their eggs and young, e.g. a) keep their young in their mouths, e.g fish, b) feed their young, e.g. bird, c) attack in order to protect their eggs or young when they are disturbed, e.g. snake or tiger, d) lay slimy eggs, e.g frog, e) hide their eggs, e.g. turtle, f) carry their young in their pouches, e.g kangaroo, h) stay in herds e.g. elephant.	**Pupils** • give examples of animals that take care of their eggs and young. • explain how animals take care of their eggs and young.	Teacher may explain that species means similar types of living things that can breed among themselves	*kemandirian* adapt- *menyesuaikan* take care- *menjaga* protect- *melindungi* young – *anak* slimy – *berlendir* pouch – *kantong* herd – *kumpulan yang besar* disturbed- *diganggu* plenty – *banyak* attack- *menyerang* hide – *menyembunyikan* ensure- *memastikan* feed – *memberi makan*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	Pupils discuss and conclude that animals take care of their eggs and young to ensure the survival of their species.	• explain why animals take care of their eggs and young.		
2.2 Understanding that different plants have their own ways to ensure the survival of their species	Pupils study live specimens, view video or computer simulation to find out the on how plants ensure the survival of species, e.g. a) by water, b) by wind, c) by animal, d) by explosive mechanism. Pupils discuss and conclude that plants need to disperse their seeds or fruits to ensure the survival of their species. Pupils gather information to give examples of plants that disperse seeds and fruits by: a) water, b) wind, c) animal, d) explosive mechanism.	**Pupils** • state various ways plants disperse their seeds and fruits. • explain why plants need to disperse seeds or fruits. • give examples of plant that disperse seeds and fruits by water. • give examples of plant that disperse seeds and fruits by wind.	Examples of plants that disperse seeds and fruits by: a) water, e.g. coconut and pong-pong, b) wind, e.g. lallang and angsana, c) animals, e.g. watermelon, love grass	various – *pelbagai* waxy – *berlilin* husk – *sabut* shell – *tempurung* disperse – *pencaran* edible – *boleh dimakan* flame of the forest – *semarak api* chestnut – *buah berangan* balsam – *keembung* ocra – *kacang bendi* love grass- *kemuncup*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	Pupils study live specimens or view video and discuss the relationship between characteristics of seeds and fruits and their ways of dispersal : a) by water – light and have air space b) by wind – light, have wing-like structure, dry, have fine hairs and small c) by animals – fleshy, brightly coloured, edible, have smells or have hooks. d) explosive mechanism – dry when ripe.	• give examples of plant that disperse seeds and fruits by animals. • give examples of plant that disperse seeds by explosive mechanism. • relate characteristics of seeds and fruits to the ways they are dispersed.	and rambutan d) explosive mechanism, e.g. balsam, rubber, flame of the forest, chestnut and ocra.	
2.3 Realising the importance of survival of the species	Pupils discuss and predict the consequences if certain species of animals and plants become extinct, e.g. a) shortage of food resources, b) other species may also face extinction.	**Pupils** • predict what will happen if some species of animals or plants do not survive.		extinction – *kepupusan* shortage – *kekurangan*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
3. Food Chain and Food Web				
3.1 Understanding food chains	Pupils carry out a brainstorming session on animals and the food they eat. Pupils discuss and classify animals into the following groups according to the food they eat: a) herbivore b) carnivore c) omnivore Pupils build food chains to show the food relationship among organisms. From the food chains pupils identify the producers and the consumers.	**Pupils** • identify animals and the food they eat. • classify animals into herbivore, carnivore and omnivore. • construct food chain. • identify producer. • identify consumer.	Food chains must begin with plants as producers.	food chain-*rantai makanan* producer-*pengeluar* consumer-*pengguna*
3.2 Synthesizing food chains to construct food web.	Pupils construct a food web based on food chains given. Pupils walk around the school compound to study food webs in places such as field, science garden, pond or under flower pot.	**Pupils** • construct a food web • construct food webs of different habitats.		

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	Based on the organisms identified, pupils construct food chains and then food webs for the habitats they have studied. Pupils discuss and predict what will happen if there is a change in the population of a certain species in a food web. Pupils carry out simulation or play games based on food webs. Pupils view video to study various species that are facing extinction because they only eat one type of food. Pupils conclude that certain species of animals that eats one type of food only has difficulty to survive because their only source of food may run out, e.g.	• predict what will happen if there is a change in population of a certain species in a food web. • explain what will happen to certain species of animals if they eat only one type of food.		

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	a) panda eats bamboo shoots only, b) koala bear eats eucalyptus leaves only, c) pangolin eats ants only.			

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
1. Energy				
1.1 Understanding the uses of energy	Pupils discuss and conclude that energy is needed: a) by living things to carry out life processes such as moving, breathing and growing, b) to move, boil, melt or bounce non-living things. Pupils gather information and give examples where and when energy is used. Pupils gather information about sources of energy, e.g. a) sun, b) food, c) wind, d) fuel, e) dry cell/ battery. Pupils discuss that the sun is the main source of energy.	**Pupils** • explain why energy is needed. • give examples where and when energy is used. • state various sources of energy.		sources- *sumber* energy- *tenaga* bounce-*melantun* fuel-*bahan api* boil-*mendidih*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
1.2 Understanding that energy can be transformed from one form to another	Pupils observe various events and identify the form of energy involved, e.g. a) a moving battery-operated toy car, b) a stretched rubber band, c) a burning candle, d) a ringing telephone. Pupils carry out activities to discuss the transformation of energy e.g. a) switching on the lights: electrical energy → light energy, b) lighting a candle: chemical energy → heat energy + light energy, c) using a solar powered calculator : solar energy → electrical energy → light energy. Pupils discuss that energy can be transformed. Pupils gather information and identify appliances that make use of energy transformation and state the form of energy involved,	**Pupils** • state the various forms of energy. • state that energy can be transformed. • give examples of appliances that make use of energy transformation.		transform-*berubah* principle-*prinsip* whistle- *wisel* appliances - *peralatan*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	e.g. a) electric iron : electrical energy→ heat energy b) radio: electrical energy→ sound energy c) ceiling fan: electical energy→ kinetic energy + sound energy, d) gas stove: chemical energy→heat energy + light energy.			
1.3 Understanding renewable and non-renewable energy	Pupils discuss that renewable energy is the energy that can be replenished when used up and non-renewable energy is the energy that cannot be replenished when used up. Pupils gather information on the following: a) renewable energy resources. e.g. solar, wind and biomass, b) non-renewable energy resources. e.g. natural gas, petroleum and coal.	**Pupils** • state what renewable energy is. • state what non-renewable energy is. • list renewable energy resources. • list non-renewable energy resources.	Provide real objects or substances such as crude oil, charcoal, coal, etc for pupils to observe and discuss.	renewable energy-*tenaga diperbaharui* non-renewable energy-*tenaga yang tidak dapat diperbaharui* replenished – *digantikan* used up- *habis digunakan* coal- *arang batu* charcoal- *arang kayu* wisely-*secara bijaksana* biomass-*biojisim*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	Pupils discuss and conclude why we need to use energy wisely e.g. a) some energy resources cannot be replenished when used up, b) to save cost, c) to avoid wastage, d) to reduce pollution.	• explain why we need to use energy wisely.		
	Pupils discuss why renewable energy is better than non-renewable energy.	• explain why renewable energy is better than non-renewable energy.		
	Pupils carry out brainstorming session on how to save energy in everyday life.	• give examples on how to save energy.		
	Pupils draw a list of do's and don'ts on how to save energy and use it as a guide to carry out daily activities.	• practise saving energy.		
2. Electricity				
2.1 Knowing the sources of electricity	Pupils carry out activity such as lighting up a bulb or ringing an electric bell to verify that the following sources produce electricity	**Pupils** • state the sources of electricity.	Provide real objects or substances such as dry cell, accumulator, rechargeable battery, solar cell etc for pupils to observe and discuss.	dry cell- *sel kering* hydroelectric power – *kuasa hidro elektrik*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	e.g. a) dry cell/ battery, b) accumulator, c) dynamo, d) solar cell.			
2.2 Understanding a series circuit and a parallel circuit	Pupils build as many different electric circuits as they can. Pupils are introduced the symbols of the components in an electric circuit, i.e battery, bulb, connecting wires and switch. Pupils draw circuit diagrams based on the circuits that they have built. Pupils observe various series circuits and parallel circuits. Based on observation, pupils discuss the differences in the arrangement of bulbs in series and parallel circuits.	**Pupils** • identify the symbols of various components in a simple electric circuit. • draw circuit diagrams. • identify the difference in the arrangement of bulbs in series and parallel circuits.	When comparing the brightness of the bulbs in series or parallel circuits the number of batteries and bulbs must be the same.	series circuit-*litar bersiri* parellel circuit – *litar selari* brightness- *kecerahan* arrangement-*susunan*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	Pupils draw circuit diagrams of series and parallel circuits and compare the arrangement of the bulbs in these circuits. Pupils are given batteries, bulbs, switches and connecting wires to build series and parallel circuits. Pupils observe and compare the brightness of the bulbs in: a) series circuits, b) parallel circuits, c) between series and parallel circuits. Pupils carry out activities and compare what happen to the bulbs in a series circuit and a parallel circuit when various switches in each circuit are off.	• build a series circuit. • build a parallel circuit. • compare the brightness of the bulbs in a series and a parallel circuit. • compare the effect on the bulbs when various switches in a series circuit and a parallel circuit are off.		
2.3 Understanding the safety precautions to be taken when handling electrical appliances	Pupils discuss the danger of mishandling electrical appliances, e.g. a) electric shock, b) fire,	**Pupils** • describe the danger of mishandling	Teacher can also discuss other general safety precautions, e.g. a) do not insert objects into power supply,	electric shock- *kejutan elektrik* appliances- *peralatan*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	c) burn, d) electrocution. Pupils discuss the safety precautions to be taken when using electrical appliances, e.g. a) do not touch electrical appliances with wet hands, b) do not use electrical appliances that are faulty or having broken insulation wires, c) do not repair electrical appliances on your own, d) do not connect too many electrical appliances to one power supply.	electrical appliances. • explain the safety precautions to be taken when using electrical appliances.	b) do not touch a switch with wet hands, c) do not touch victims of electric shock.	
3. Light				
3.1 Understanding that light travels in a straight line	Pupils carry out activities to observe that light travels in a straight line. Pupils gather information and give examples of events or phenomena that show light travels in straight line.	**Pupils** • state that light travels in a straight line. • give examples to verify that light		beam- *alur cahaya* travel- *bergerak* opaque – *legap*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
		travels in a straight line.		
	Pupils observe and discuss the formations of shadow to conclude that shadow is formed when light is blocked by an opaque or a translucent object.	• describe how shadow is formed.		
	Pupils carry out activities to investigate the factors that cause the shape and size of a shadow to change.	• design a fair test to find out what cause the size of a shadow to change by deciding what to keep the same, what to change and what to observe.		
	Pupils observe, discuss and conclude that: a) when the distance between an object and its light source decreases, the size of the shadow increases and when the distance between an object and the screen decreases the size of the shadow decreases.			
	b) the shape of the shadow changes according to the	• design a fair test to find out what factors cause the		

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	position of light source. and the shape of the shadow changes according to the position of an object.	shape of a shadow to change by deciding what to keep the same, what to change and what to observe.		
3.2 Understanding that light can be reflected	Pupils carry out activities to investigate reflection of light using: a) a mirror, b) an aluminium foil. Pupils draw ray diagrams to show the reflection of light in the above activities. Pupils gather information about the uses of reflection of light in everyday life, e.g. a) side mirror of a car, b) mirror at the sharp bend of a road, c) mirror in the barbershop, d) periscope. Pupils apply the principle of light reflection to design devices, e.g. a) periscope b) kaleidoscope.	**Pupils** • state that light can be reflected. • draw ray diagrams to show reflection of light. • give examples of uses of reflection of light in everyday life.		reflection- *pembalikan* sharp bend- *selekoh tajam* ray diagram- *gambarajah sinar*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
4. Heat				
4.1 Understanding that temperature is an indicator of degree of hotness	Pupils heat 250ml of water for 3 minutes and feel the water every few seconds while heating to feel the change of temperature. Pupils let the warm water cool down and feel the water every few seconds. Based on the above activities, pupils discuss and conclude that: a) heat gain causes the water to become warmer b) heat loss causes the water to become cooler. Pupils are guided to use and read thermometer correctly. Pupils gather information on the metric unit for measuring temperature. Pupils carry out activity to measure temperature, e.g. a) heat up water and record the temperature every few minutes,	**Pupils** • state that when a substance gains heat it will become warmer. • state that when a substance loses heat it will become cooler. • measure temperature using the correct technique. • state the metric unit for temperature.		

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	b) turn off the Bunsen burner and record the temperature every few minutes while the water cools off. Pupils discuss and conclude that the temperature: a) increases when heat is gained, b) decreases when heat is lost. Pupils discuss and conclude that the temperature is an indicator to measure hotness.	• state that temperature of an object or material increases as it gains heat. • state that temperature of an object or material decreases as it loses heat. • conclude that the temperature is an indicator to measure hotness.		
4.2 Understanding the effects of heat on matter.	Pupils carry out activites to observe the effects of heat on matter, e.g. a) heating an iron ball and inserting it into an iron ring, b) cooling the heated iron ball and inserting it into the iron ring, c) heating some coloured water in a beaker with a glass tube dipped into it	Pupils • state that matter expands when heated. • state that matter contracts when cooled.		dent –*kemek* expand-*mengembang* contract-*mengecut* snap - *putus*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	and observing the water level in the glass tube, d) putting a dented ping pong ball in hot water, e) cooling some coloured water in a beaker with a glass tube dipped into it and observing the water level in the glass tube. Pupils discuss their observations of the activities and conclude that: a) matter expands when heated, b) matter contracts when cooled. Pupils view video or computer simulation on the expansion and contraction of matter in everyday life, e.g. a) an electric cable is installed loosely to prevent it from snapping when it contracts in cold weather,	• give examples of the application of the principle of expansion and contraction in everyday life.		

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	b) there are gaps at railway tracks to allow for expansion in hot weather, c) a tight bottle cap can be loosened by immersing it in hot water, d) concrete slabs on pavements have gaps to allow for expansion.			

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Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
1. States of Matter				
1.1 Understanding that matter exist in the form of solid, liquid or gas.	Pupils classify objects and materials into solid, liquid and gas. Pupils discuss and give reasons for their classification. Pupils study the properties of solid by: a) weighing various kinds of solids, b) measuring the volumes of various kinds of solids, c) putting various types of solids into containers of various shapes. Pupils discuss and conclude the properties of solids, i.e. a solid: a) has mass, b) has fixed volume, c) has fixed shape. Pupils study the properties of liquids by: a) weighing various kind of liquids, b) measuring the volumes of liquids, c) pouring liquid into containers of various	**Pupils** • classify objects and materials into three states of matter. • state the properties of solid. • state the properties of liquid.	Suggested objects and materials for pupils to classify are: Inflated balloon,deflated balloon, stone, cooking oil, milk, water, paper, paper clip, ruler, glue and bicycle pump.	solid – *pepejal* liquid – *cecair* gas – *gas* water vapour – *wap air* evaporation – *penyejatan* condensation – *kondensasi* water cycle – *kitar air* interchangeable – *boleh saling bertukar* syringe - *picagari*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	shapes. Pupils discuss and conclude the properties of liquids, i.e. a liquid: a) has mass, b) has fixed volume, c) has no permanent shape but takes the shape of its container. Pupils observe the flow of different liquids as they are poured into containers. Pupils discuss to conclude that some liquids flow faster than others. Pupils study the properties of gas by: a) balancing two inflated balloons on a stick and puncturing one of the balloons, b) inflating balloons of different shapes, c) observing smoke in a closed container then placing an inverted container on it. Removing the cover of the first	• state that some liquids flow faster than others. • state the properties of gas.	Examples of liquids: a) water b) milk c) condensed milk d) cooking oil e) tomato sauce f) cordial g) shampoo h) glue	

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	container and observe how smoke moves from a container to another inverted container placed directly over it, d) feeling the pressure of gas in a syringe when its plunges is pushed down with nozzle closed. Pupils discuss and conclude the properties of gas, i.e. gas a) has mass, b) has no fixed shape but takes the shape of its container, c) occupies space and has no fixed volume, d) can be compressed.			
1.2 Understanding that matter can change from one state to another	Pupils carry out the following activities to observe the change of the state of matter: a) allowing ice to melt, b) heating water until it boils, c) collecting water vapour, allowing it to cool and making it freeze.	**Pupils** • state that water can change its state.	Additional observation: a) melting butter, b) melting ice cream.	evaporation-*penyejatan* condensation-*kondensasi* freezing-*pembekuan* melting – *peleburan*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	Pupils discuss and conclude that: a) water can change from one state to another, b) water can exist as solid, liquid and gas.	• conclude that water can exist in any of the three states of matter.		
	Pupils discuss the process involved when a matter changes from one state to another, i.e. a) melting, b) boiling, c) evaporation, d) condensation, e) freezing.	• identify the processes involved when a matter changes from one state to another.	Evaporation occurs at the surface of a liquid at any temperature.	
	Pupils investigate and discuss the factors that affect how fast water evaporates e.g. a) hot weather b) windy	• identify factors that affect the rate of evaporation of water.		

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
1.3 Understanding the water cycle	Pupils view computer simulation to study the formation of clouds and rain. Pupils discuss and explain the changes in the state of matter in the water cycle. Pupils view computer simulation on how water is circulated in the environment. Pupils discuss the importance of water cycle.	**Pupils** • describe how clouds are formed. • describe how rain is formed. • explain how water is circulated in the environment. • explain the importance of water cycle.		cloud – *awan* water cycle – *kitaran air*
1.4 Appreciating the importance of water resources	Pupils view video about: a) the importance of water for living things, b) the effects of human activities on quality of water supply. Pupils gather information on how to keep our water resources clean and present it in the form of folio. Pupils draw posters to show appreciation that water is an important resource.	**Pupils** • give reasons why we need to keep our water resources clean. • describe ways to keep our water resources clean.		

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
2. Acid and Alkali				
2.1 Understanding the properties of acidic, alkaline and neutral substances.	Pupils test substances to determine whether they are acidic, alkaline or neutral substances based on the change of wet litmus papers colour. Pupils determine whether food samples are acidic or alkaline by tasting the food samples and testing with litmus paper. Pupils carry out discussion and conclude the properties of acidic, alkaline and neutral substances in terms of taste and colour changes of litmus paper.	**Pupils** • identify acidic, alkaline and neutral substances using litmus paper • identify the taste of acidic and alkaline food. • conclude the properties of acidic alkaline and neutral substances.	Pupils should taste the food samples provided only and not any other substances.	litmus paper – *kertas litmus* sour – *masam* bitter – *pahit* neutral – *neutral* acidic – *keasidan* alkaline-*kealkalian* property-*sifat*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
1. Constellation				
1.1 Understanding the constellation	Pupils view video or computer simulation or visit planetarium to observe various constellations. Pupils discuss that constellation is a group of stars that form a certain pattern in the sky. Pupils observe the Orion, Scorpion, Big Dipper and Southern Cross in the sky. Pupils build a model to study the pattern of Orion, Scorpion, Big Dipper and Southern Cross. Pupils gather information on the importance of constellations, e.g. a) to show directions, b) to indicate the time to carry out certain activities, e.g planting season.	**Pupils** • state what constellation is. • identify constellations. • state the importance of constellations.	Big Dipper and Southern Cross can be seen between April – June around 8.00pm to 10.00pm. Orion can be seen between December – February around 8.00pm to 10.00pm. Scorpion can be seen between June to August around 8.00pm to 10.00pm.	constellation - *buruj* Orion - *Belantik* Scorpion - *Skorpio* Big Dipper - *Biduk* Southern Cross –*Pari* pattern – *corak* direction – *arah* season - *musim*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
2. The Earth, The Moon and The Sun				
2.1 Understanding the movements of the Earth, the Moon and the Sun	Pupils view video, computer simulation or model about the movement of the Earth, the Moon and the Sun. Pupils discuss and explain the rotation of the Earth and the Moon and their movements around the Sun. Pupils observe and record the length and position of the shadow of a pole at different time of the day (pole as the object and the Sun as the source of light).	**Pupils** • state that the Earth rotates on its axis. • state that the Earth rotates and at the same time moves round the Sun. • state that the Moon rotates on its axis. • state that the Moon rotates and at the same time moves round the Earth. • state that the Moon and the Earth move round the Sun at the same time. • describe the changes in length and position of the shadow throughout the day.	The Earth rotates on its axis from west to east and completes one rotation every 24 hours.	rotate – *berputar* sundial – j*am matahari* axis - *paksi* west – *barat* east – *timur* movement – *pergerakan* position – *kedudukan* throughout – *sepanjang* shadow – *bayang-bayang*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	Pupils fix a toothpick vertically on the surface of a globe. Pupils observe the length and position of the shadow formed when the globe is rotated at its axis over a fixed light source. Pupils build a sundial. Pupils discuss and conclude that the Earth rotates on its axis from west to east.	• conclude that the Earth rotates on its axis from west to east.		
2.2 Understanding the occurrence of day and night.	Pupils view video or computer simulation on how days and nights are formed or carry out a simulation by illuminating a rotating globe to observe the occurrence of day and night. Based on the above activity, pupils discuss how day and night occur. Pupils draw diagrams to show the occurrence of day and night.	Pupils • state that it is day time for the part of the Earth facing the Sun. • state it is night time for the part of the Earth facing away from the Sun. • explain that day and night occur due to the rotation of the earth on its axis.		illuminating – *menyuluh* facing – *menghadap* rotating globe – *glob yang berputar* day – *siang* night– *malam* occurrence- *kejadian*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
2.3 Understanding the phases of the Moon	Pupils view video or computer simulation and discuss that the Moon does not emit light but reflects the sunlight. Pupils view video on the phases of the Moon. Pupils use a ping-pong ball and light source to simulate the following phases of the moon: a) new moon, b) crescent, c) half moon, d) full moon. Pupils carry out a project to observe and record the phases of the Moon for a month and relate them to the dates of the lunar calendar.	**Pupils** • state that the Moon does not emit light. • explain that the Moon appears bright when it reflects sunlight. • describe the phases of the Moon.		new moon – a*nak bulan* crescent - *bulan sabit* half moon -*bulan separa* full moon – *bulan purnama* reflect - *memantulkan* phase - *fasa* lunar calendar – *Takwim Qamari* emit - *memancarkan*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
1. Strength and Stability				
1.1 Knowing the shapes of objects in structures.	Pupils carry out activity to recognise the shapes of objects, i.e. a) cube, b) cuboid, c) sphere, d) cone, e) cylinder, f) pyramid, g) hemisphere. Pupils walk around the school compound and identify shapes mentioned above.	**Pupils** • state the shapes of objects. • identify shapes in structure.		shape – b*entuk* cube - *kubus* cuboid - *kuboid* sphere - *sfera* cone - *kon* cylinder - *silinder* pyramid - *piramid* hemisphere - *hemisfera* structure - *struktur*
1.2 Understanding the strength and stability of a structure.	Pupils carry out activities to identify the shapes of objects that are stable. Pupils carry out activities to investigate factors that affect the stability of a structure, e.g. a) pushing a bottle standing upright and a bottle standing upside down, b) pushing a high chair and a low chair,	**Pupils** • identify shapes of objects that are stable. • identify the factors that affect stability of objects.		strength – k*ekuatan / kekukuhan.* stability – k*estabilan* base area – l*uas tapak* affect - *mempengaruhi* stand at ease – *senang diri* stand at attention - *bersedia*

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	Pupils discuss and conclude that the stability of an object is affected by: a) base area, b) height.			
	Pupils carry out activity to investigate how base area affects the stability of an object, i.e. the bigger the base area, the more stable the object is.	• explain how base area affects stability.		
	Pupils carry out activity to investigate how height affects the stability of an object, i.e. the higher the object, the less stable the object is.	• explain how height affects stability.		
	Pupils carry out activities to study the factors that affect the strength of a structure, e.g. a) suspend a weight on a straw and then on a pencil, b) make two bridges, one using a piece of flat paper and the other using a folded paper. Then put objects of the	• identify the factors that affect the strength of a structure.		

Learning Objectives	Suggested Learning Activities	Learning Outcomes	Notes	Vocabulary
	same mass on each bridge. Pupils discuss and conclude that the strength of a structure is affected by: a) types of materials used, b) how the structure is placed. Pupils design the strongest and most stable structure using materials of their choice.	• design a model that is strong and stable.	Suggestion: use recycled materials.	

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HASANOR SAID MOHD SABRI	SK TAMAN MELATI, KL
IBRAHIM ABDULLAH	Sk PENGHULU AHMAD, KEDAH
INDON SULONG	sk MERGONG II, KEDAH
JAGAJOTHY A/P SELVARASAH	sk CONVENT GREEN LANE,
JAFFRI JOHAN ZANUDIN	sk BATU HAMPAR, KEDAH
KU NORGAYAH KU SULONG	SK TASIK APONG, KEDAH
ROSNAH JOHARI	MP BATU RAKIT , TERENGGANU
SITI NORFARIDAH CHAI ABDULLAH	SK AGAMA MIRI, SARAWAK
SHAMSURIA EBNI	SK ST ANNES, WP LABUAN
SURIAKUMARI A/LP PALANIYANDI	SJKT PAYA RUMPUT, MELAKA
SAAT ARIFFIN	SK PULAU KUNDUR, KELANTAN
SITI FAUZIAH RIDZUAN	SK BATU HAMPAR, KEDAH
TEH MALIHAH HUSSAIN	SK SIMPANG EMPAT, PERAK
VENANCY ANGELA SUIMEN	SRK ST. ALOYSIUS LIMBANAK, SABAH
WONG POH TECK	SK SEMABOK, MELAKA
ZAINUDDIN ABDULLAH	SK BATANG MELAKA, MELAKA

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