Curriculum of MEP

Baan Sankamphaeng School

B.E. 2025

According to the core curriculum of basic education B.E. 2551

(Revised B.E. 2560)

Science

MEP (Mini English Program)

Baan Sankamphaeng School

Chiang Mai Primary Educational Service Area Office, Area 1

Preface

Baan Sankamphaeng School is a model school to use the core curriculum for basic education in 2551 B.E. Group of foreign language learning Primary school B.E. 2025 by bringing the vision, principles, objectives, performance, desirable characteristics Learning standard Indicators and guidelines for measuring and evaluating the core curriculum of basic education B.E. 2551 into a framework for directing curriculum and teaching management. In order to develop learners in Baan Sankamphaeng School to have quality of knowledge Skills / processes and desirable characteristics necessary for living in a changing society And seek knowledge for continuous self-development throughout the life of the year 2025 has improved the curriculum according to the structure of the curriculum to be in accordance with the changing conditions of economy, society, politics and technology and the national education plan Ministry of Education policy Emphasizing education towards the 21st century, New Age Thailand 4.0

Thank you, School Board of Baan Sankamphaeng School student's parent And all those involved who please advise and consult In the preparation of the curriculum of MEP Baan Sankamphaeng School learning Primary education level 2025, this time to develop the quality of students according to the spirit of the core curriculum of basic education B.E. 2551

Producers

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Vision

Our school lives up to international standards. Focuses on learning to generate creativity. Our students can communicate using the technology for virtue, art and culture.

Principles

Covers all target groups Can transfer learning outcomes. And experience Baan San Kamphaeng School 2023 (Updated 2017) Curriculum Based on Basic Core Curriculum 2008 are as follow.

1. The ultimate aim is attainment of national unity; learning standards and goals are therefore set with a view to enabling the children and youths to acquire knowledge, skills, attitude and morality to serve as a foundation for Thai-ness and universal values.
2. The curriculum facilitates education for all, who have equal access to education of high quality.
3. The curriculum facilitates decentralisation of authority by allowing society to participate in educational provision, which suits prevailing situations and serves local needs.
4. Structure of the curriculum enjoys flexibility regarding learning contents, time allotment and learning management.
5. The learner-centred approach is strongly advocated.
6. The curriculum is intended for education of all types—formal, non-formal and informal, covering all target groups and facilitating transfer of learning outcomes and experiences.

Goals

Baan San Kamphaeng School 2023 (Updated 2017) According to Core Curriculum, Basic Education 2008 aims to develop learners into good people with wisdom, happiness and potential for further study, and occupation. It is a destination for students. The following goals have consequently been set for achievement upon completing basic education:

1. Morality, ethics, desirable values, self-esteem, self-discipline, observance of Buddhist teachings or those of one's faith, and guiding principles of Sufficiency Economy;
2. Knowledge and skills for communication, thinking, problem-solving, technological know-how, and life skills;
3. Good physical and mental health, hygiene, and preference for physical exercise;

4. Patriotism, awareness of responsibilities and commitment as Thai citizens and members of the world community, and adherence to a democratic way of life and form of government under constitutional monarchy; and

5. Awareness of the need to preserve all aspects of Thai culture and Thai wisdom, protection and conservation of the environment, and public-mindedness with dedication to public service for peaceful and harmonious co-existence.

Key Competencies and Desirable Characteristics

In the development of learners according to the Baan San Kamphaeng School curriculum, 2023 (Update 2017), according to the core curriculum of Basic Education 2008, the students should focus on developing the learners to meet the quality standards. This will help learners to achieve key performance and desired attributes;

Learners' Key Competencies

Baan San Kamphaeng School 2023 (Updated 2017) According to Core Curriculum. The Basic Education Core Curriculum is aimed at inculcating among learners the following 5 key competencies:

1. **Communication Capacity**

Capacity to receive and transmit information; linguistic ability and skills in expressing one's thoughts, knowledge and understanding, feelings and opinions for exchanging information and experience, which will be beneficial to oneself and society; negotiation for solving or reducing problems and conflicts; ability to distinguish and choose whether to receive or avoid information through proper reasoning and sound judgement; and ability to choose efficient methods of communication, bearing in mind possible negative effects on oneself and society.

2. **Thinking Capacity**

Capacity for analytical, synthetic, constructive, critical and systematic thinking, leading to creation of bodies of knowledge or information for judicious decision-making regarding oneself and society.

3. **Problem–Solving Capacity**

Capacity to properly eliminate problems and obstacles, based on sound reasoning, moral principles and accurate information; appreciation of relationships and changes in various social situations; ability to seek and apply knowledge to prevent and solve problems; and ability

for judicious decision-making, bearing in mind possible negative effects on oneself, society and the environment.

4. Capacity for Applying Life Skills

Capacity for applying various processes in daily life; self-learning; continuous learning; working; and social harmony through strengthening of happy interpersonal relationships; elimination of problems and conflicts through proper means; ability for self-adjustment to keep pace with social and environmental changes; and capacity for avoiding undesirable behaviour with adverse effects on oneself and others.

5. Capacity for Technological Application

Ability to choose and apply different technologies; skills in application of technological processes for development of oneself and society in regard to learning, communication, working, and problem-solving through constructive, proper, appropriate and ethical means.

Desirable Characteristics

The Basic Education Core Curriculum focuses on learners' development for attainment of the following desirable characteristics, enabling learners to enjoy a life of harmony among others as Thai citizens and global citizens:

1. Love of nation, religion and king
2. Honesty and integrity
3. Self-discipline
4. Avidity for learning
5. Observance of principles of Sufficiency Economy Philosophy in one's way of life
6. Dedication and commitment to work
7. Cherishing Thai-ness
8. Public-mindedness

Learning Area of Science

Why it is necessary to learn science

Science plays an important role in our present and future world communities, as it concerns all of us in our daily lives and livelihoods. Science also involves technologies, instruments, devices and various products at our disposal, which facilitate our life and work. All these benefit from our scientific knowledge, which is combined with creativity as well as other disciplines. Science enables us to develop our thinking skills in various respects—logical, creative, analytical and critical. It also enables us to acquire essential investigative skills for seeking knowledge, and allows the ability for systematic problem-solving, and for verifiable decision-making based on diverse data and evidences. Science is essential to the modern world, which is intrinsically a knowledge society. All of us therefore need to be provided with scientific knowledge so as acquire knowledge and understanding of nature and man-made technologies that can be applied through logical, creative and moral approaches.

What is learned in science?

The learning area of science is aimed at enabling learners to learn this subject with emphasis on linking knowledge with processes, acquiring essential skills for investigation, building knowledge through investigative processes, seeking knowledge and solving various problems. Learners are allowed to participate in all stages of learning, with activities organized through diverse practical work suitable to their levels. The main content areas are prescribed as follows:

• **Biological Sciences:** life in the environment, elements of life, life of humans and animals, plant life, genetics, biodiversity and evolution of living things.

• **Physical Science:** nature of substances. change of substance motion, energy, and waves

• **Earth and Space:** the worlds in the universe, the global system, and humans and the changing world.

• **Design technology and technology:** how to develop students' knowledge and understanding of technology to survive in a rapidly changing society. Use your knowledge and skills in science, Science and other disciplines to solve problems or develop creative ideas through the engineering design process. Choose to use technology appropriately by considering the impact on life, society and the environment.

• **Computing Science:** scientific processes; investigation for seeking knowledge, problem-solving, and scientific min

Strands and Learning Standards

Strand 1: Biological Sciences

Standard Sc1.1: Understanding of the basic units of living things; relationship between structures and functions of various systems of living things which are interlinked; having investigative process for seeking knowledge; ability to communicate acquired knowledge, which could be applied to one's life and care for living things

Standard Sc1.2: Understanding properties of living things, basic unit of life, cells' substances transportation, structural relationship: functions of various systems and various organs of animals and humans, which could be applied to one's life for useful purpose.

Standard Sc1.3: Understanding of process and importance of genetic transmission; evolution of living things; biodiversity; application of biotechnology affecting humans and the environment; having investigative process for seeking knowledge and scientific reasoning; communicating acquired knowledge that could be applied for useful purposes

Strand 2: Physical Science

Standard Sc2.1: Understanding of properties of substances; relationship between properties of substances and structures and binding forces between particles; having investigative process for seeking knowledge and scientific reasoning; and communicating acquired knowledge that could be applied for useful purposes

Standard Sc2.2: Understanding of the nature every day. Effects of force acting on an object, move different types of objects and apply knowledge to good use.

Standard Sc2.3: Understanding the meaning of energy. Changes and transfer of energy. Interactions between matter and energy. Energy in everyday life, the nature of waves, phenomena related to sound, light and electromagnetic waves. as well as putting knowledge to good use

Strand 3: Earth and Space

Standard Sc3.1: understanding evolution of the universe galaxy, stars and solar system including interactions within the solar system affecting living things and application of space technology

Standard Sc3.2: Understanding of various processes on the Earth's surface and interior; relationship between various processes causing changes in climate, topography and form of the Earth; having investigative process for seeking knowledge and scientific reasoning; and communicating acquired knowledge that could be applied for useful purposes

Strand 4: Nature of Science and Technology

Standard Sc4.1: Understanding notion of technology for fast society living; apply knowledge and skills in science, Science and other sciences to solve problems or develop creative work with the engineering design process. Choose appropriate technology taking into account the impact on life, society and the environment

Standard Sc4.2 Understanding and use computational concepts to solve problems encountered in real life. Use information and communication technology to learn, work and solve problems efficiently, wisely and ethically.

Learners' Quality

Grade 3 graduates

• Understand types and some properties of materials used to make objects and changes in surrounding materials

• Understand pull, repulsion, magnetism and the effect of force on change. Motion of objects, electric energy and electricity generation, sound, light and vision.

• Understand the appearance of the sun, moon and stars, rising and setting phenomena of the sun. occurrence of day and night, orientation, rock characteristics, soil classification and utilization. Characteristics and importance of weather, occurrence of wind, benefits and harms of wind.

• Ask questions or formulate problems as given or based on observational interests. Conduct surveys using simple tools, collect data, record and explain survey results in writing or drawings and communicate what has been learned through storytelling or by gestures to make others understand

• Solve problems easily using troubleshooting steps. Have basic skills in using information technology and communications maintain personal information

• Show enthusiasm. interested to learn Be creative about the subject to study as assigned or based on interest. Participate in comments and accept the opinions of others

• Responsibility by performing assigned tasks with dedication, prudence, economy, honesty until the work is successfully accomplished. and work happily with others

• Realize the benefits of using knowledge and scientific processes in life. Learn more Do projects or tasks as assigned or based on interest.

Grade 6 graduates

• Understand the specific functional structure and the bottom of the following questions. The resource associations in the source code are requested to follow the following sections and the password of the digestive system following.

• Understand the classification properties of material groups. Presence and storage necessity of the substance Dissolution of soluble compounds presents definite, reversible and irreversible challenges and simple separation.

• Understand what should be done for everyone, resultant force, friction, electric force and their side effects. The effect of the impulse on the pressure regulator

• Understand the phenomenon of rise and fall Including changing the appearance of the moon. constituents of the solar system planetary orbital period differences between planets and stars. The rise and fall of the constellations. Using a star map eclipse Development and benefits of space technology

• Understand before coming here, water wat, water mist formation process, will receive, precipitation, stone formation process, stone cycle, collection of ancient rocks and minerals, land wind, sea breeze, monsoon, events and effects of natural disasters, hell.

• Search for information efficiently and evaluate. Make informed choices that use comparative reasoning to answer questions and ask everyone to understand their rights and obligations to respect the rights of others.

• Pose questions or formulate problems about what is being learned as assigned or based on interest. Predict multiple answers Make assumptions that are consistent with the question or problem being explored. Plan and conduct surveys using appropriate tools, equipment and information technology. to collect both quantitative and qualitative data

• Analysing the data, draw conclusions, and summarize the relationship of the survey data in an appropriate format. To communicate knowledge from survey results, validate with reason and reference evidence.

• Demonstrates interest and determination in what to learn. Be creative about the subject to study according to their own interests. express your own opinion accepting information with reference evidence and listen to the opinions of others

• Responsibility by performing assigned tasks with dedication, prudence, economy, honesty until the work is successfully accomplished. and working creatively with others

• Realize the value of science and technology knowledge. apply knowledge and scientific processes to life Show admiration, praise and respect for the rights of the inventor's work and to learn more. Do projects or tasks as assigned or based on interest.

• Show gratitude, concern, show behaviours about using. Preserving natural resources and the environment with appreciation

Strand 1: Biological Science

Standard Sc1.1: Understanding basic units of living things; relationship between structures an functions of living things and non- living things, relationship between of living things, ecosystem, energy flow, ecological succession. The meaning of population Problems and effects towards effect of natural resource and environment. To guide nature conservation and environment problem solving. Guidelines for the Conservation of Natural Resources environment problem as well as the knowledge to good use.

Grade level indicators					
Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
1. Identify the names of plants and animals that live in different areas of the information collected. 2. Describe the environment that suits the living of animals they live.	-	-	-	1. Describe the structure and characteristics of life that are suitable for living as a result of adaptation of living organisms in each location. 2. Explain the relationship between living things and living things. And the relationship between living things and 3. Write food chains and specify the roles and responsibilities of organisms that are producers and consumers in food chains.	-

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
				4. Realize the value of the environment to living life by participating in preserving the environment	

Strand 1: Biological Science

Standard Sc1.2: Understanding basic units of living things; relationship between structures a functions of living things and non- living things, relationship between of living things, Ecosystem, energy flow, ecological succession. The meaning of population Problems and effects towards effect of natural resource and environment. To guide nature conservation and environment problem solving. Guidelines for the Conservation of Natural Resources environment problem as well as the knowledge to good use.

Grade level indicators					
Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
1. Identify the names of plants and animals that live in different areas of the information collected. 2. Realize the importance of your body parts. by taking	1. Explain benefits of plants and animals in the local area. 2. Recognize the need for plants to have water and light to grow. by taking care of the plants to get them properly	1. Describe things necessary for life and the growth of humans and animals using the information gathered 2. Realize the benefits of food, water and air by taking care of yourself and	1. Describe the functions of roots, stems, leaves and flowers of flowering plants using data collected.	-	1. Identify nutrients and tell the benefits of each type of nutrient from the food you eat. 2. Tell guidelines for choosing food to get complete nutrients in proportions suitable for gender and age.

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
care of the difference Properly safe and always keep it clean.	3. Create a model that describes the life cycle of flowering plants.	your animals to get them properly. 3. Create a model that describes the life cycle of the animal. and compare the life cycles of some animals 4. Realize the value of animal life without changing the life cycle of the animal.		-	Including health safety 3. Realize the importance of nutrition by choosing foods that are full of nutrients in proportions appropriate to gender and age Including safe for health. 4. Model the digestive system. and describes the functions of the organs in the digestive system, including the digestion and absorption of nutrients. 5. Recognize the importance of the digestive system by providing guidelines for maintaining the normal functioning of the organs in the digestive system.

Strand 1: Biological science

Standard Sc 1.3: Understand the process and importance of inheritance of genetic material, genetic material, genetic changes affecting organisms Biodiversity and evolution of living things including applying knowledge.

Grade level indicators					
Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
-	1. Compare the characteristics of living things and non-living things. from the collected information	-	1. Classify organisms by using similarities and differences in lifestyle among plants, animals and not plants and animals. 2. Describe the functions of roots, stems, leaves and flowers of flowering plants using data collected. 3. Classify animals into vertebrates and invertebrates. By using spine as a basis By using the information collected.	1. Explain genetic traits that are transmitted from parents to children of plants, animals and humans. 2. Show curiosity by asking questions about similar characteristics of one's self to parents.	

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
			3. Classify animals into vertebrates and invertebrates. By using spine as a basis By using the information collected. 4. Describe the observed characteristics of vertebrates in the fish group. Amphibian group Reptile groups, birds and mammals. And give examples of organisms in each group		

Strand 2: Physical science

Standard Sc2.1: Understand the properties of matter composition of matter the relationship between the treasures of matter to the structure and the bonding force between the particles. The main and nature of changing the state of matter Solution and chemical reactions.

Grade level indicators					
Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
1.Describe the observed treasures of materials used to do objects made of single materials or different types of components are based on empirical evidence. 2. Specifies the type of material and grouping the material according to the observed treasure.	1. Compare the water properties of the absorption materials by use empirical evidence and identify the conductivity of the water absorbent properties of the material. And apply in making everyday objects. 2. Describe the observed properties of materials formed by mixing materials. using empirical evidence	1. Explain that an object is made up of small parts that can be separated and assembled into a new object. Using empirical evidence 2. Explain material changes when heating or cooling down Using empirical evidence.	1. Classify organisms by using similarities and differences in lifestyle among plants, animals and not plants and animals. 2. Describe the functions of roots, stems, leaves and flowers of flowerin plants using data collected. 3. Classify animals into vertebrates and invertebrates. By using spine as a basis By using the information collected.	1. Explain the changing status of matter When the substance heats or cools down Using empirical evidence 2. Explain dissolved substances in water Using empirical evidence 3. Analyze substance changes When chemical changes	1. Describe and compare the separation of mixtures. by picking, sifting, magnetization, pouring, filtration and sedimentation using empirical evidence as well as identify solutions to daily life problems related to separation.

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
	3. Compare the observed properties of the materials. to be used as an object for use according to its intended purpose and explain the reuse of used materials using empirical evidence 4. Recognize the benefits of reusing used materials. by reusing used materials		4. Describe the observed characteristics of vertebrates in the fish group. Amphibian group Reptile groups, birds and mammals And give examples of organisms in each group	occur Using empirical evidence 4. Analyze and identify irreversible changes and irreversible changes.	

Strand 2: Physical science

Standard Sc2.2: Understand the nature of force in daily life. The effect of force applied to an object various types of motion of objects, including the use of knowledge.

Grade level indicators					
Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
-	-	1. Identify the effect of force on change Motion of objects from empirical evidence 2. Compare and give examples of contact and non-contact forces that affect the motion of an object using empirical evidence. 3. Classify objects by using magnetism as evidence-based evidence. 4. Identify the magnetic poles and predict the effects of the poles when they	1 Identify the effect of gravity on objects from empirical evidence 2 Use a spring scale to measure the weight of the object 3. Describe the mass of an object that affects the motion of an object from evidence.	1. Explain how to find the net force of multiple forces in the same direction acting on an object in the event that the object is stationary from evidence 2. Write a diagram showing the forces acting on an object in the same direction and the net force acting on the object. 3. Use a spring scale to measure the force exerted on an object	1. Describe the occurrence and effect of electric forces generated by abrasive objects using empirical evidence.

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
		come close to each other from empirical evidence.		4. Specify the effect of friction on Changes in motion of objects from evidence 5. Write a diagram showing friction and force. In the same line that is acting on an object	

Strand 2: Physical science

Standard Sc2.3: Understand the meaning of energy change and energy transfer. The interaction between matter and energy daily energy nature of waves phenomenon is related to the sound of light. And electromagnetic wave and take your knowledge.

Grade level indicators					
Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
1. Describe the sound and direction of sound empirical evidence.	1. Describe the movement of light from a light source and explain the visualization of objects from empirical evidence. 2. Recognize the value of vision knowledge by offering guidance. protection against harm from looking at objects that are in an inappropriately bright area	1. Give examples of the conversion of one energy to another from empirical evidence. 2. Describe the operation of the generator and specify the energy source for generating electricity from the information gathered. 3. Recognize the benefits and harms of electricity by proposing safe and economical use of electricity.	1. Classify objects as a transparent medium Translucent media And opaque objects From the nature of seeing things through that object as criteria by using Empirical evidence.	1. Explain the sound heard through an intermediary From empirical evidence 2. Identify experimental variables and explain Characteristics and occurrence of highs and lows 3. Design the experiment and explain The appearance and occurrence of loud noises, gradually	1. Search for data and discuss sources of natural resources in each local area beneficial to living. 2. Analyse effects of population increase on utilization of natural resources. 3. Discuss effects on living things from environmental change both due to nature and due to human beings. 4. Discuss guidelines for taking care of and preserving natural resources and the environment.

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
				4. Measure sound levels using sound level meter 5. Realize the value of sound knowledge by suggesting ways to avoid and reduce noise pollution	5. Participate in providing care and preservation of natural resources in the local area. 6. Realize the benefits of knowledge of series and parallel connection of electrical lamps. by telling benefits, limitations and applications in daily life 7. Explain the occurrence of penumbra from empirical evidence. 8. Draw a light ray diagram showing shadows, penumbra.

Strand 3: earth science and space

Standard Sc3.1: Understand the characteristic elements of the process of birth and evolution of the stellar galaxy and the solar system. Including interaction within the solar system affecting the life and application of space technology.

Grade level indicators					
Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
1. Identify the stars that appear in the sky during daytime and night from the information collected. 2. Describe the cause to not see most stars in daytime from empirical evidence.	-	1. Explain the pattern of the rise and fall of the sun by using empirical evidence. 2. Explain the cause of the phenomenon The rise and sunset of the sun Daytime, nighttime, and direction determination using the model 3. Recognize the importance of the sun by describing the benefits of the sun to living things.	1. Explain patterns of moon rise and fall routes using empirical evidence. 2. Create a model that describes the change model The appearance of the moon And predict the the moon. 3. Create a model show element of the solar system and explain the comparison of the orbits of the planets Different from the model.	1. Compare the differences between planets and stars from models. 2. Use the star map to specify the location and route. Rise and fall of stars in the sky And explain the pattern of the rise and fall route Of stars in the sky during the year	1. Build a model that explains birth. and compare solar eclipse phenomena and lunar eclipse 2. Explain the development of space technology and give examples of the application of spacetechnology in daily life from the collected data

Strand 3: earth science and space

Standard Sc3.2: understanding the elements and the relationship of the Earth system process of changing within the world and on the earth surface Earth Shipwrecks Weather Change Process and earth climate As well as impact on living organisms and the environment.

Grade level indicators					
Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
1. Describe the exterior of the stones from the observed characteristics.	1. Identify the components of the soil. and classifying soil types using soil texture and coagulation criteria. 2. Describe the utilization of soil from the collected data.	1. Identify air components Describe the importance of air. And the impact of air pollution Towards living things from the information collected 2. Realize the importance of air By presenting a guideline for reducing air pollution 3. Explain the occurrence of wind from evidence. 4. Describe the benefits and disadvantages of wind from information gathered.	-	1. Compare the amount of water in each source. And specify the amount of water that humans can use from the information collected 2. Realize the value of water by proposing guidelines Economical water use and water conservation 3. Create a model that describes circulation. Of water in the water cycle	1. Compare the processes of igneous, sedimentary and metamorphic rocks and explain the rock cycle from the model. Explain substance changes affecting living things and the environment. 2. Describe and give examples of the use of Stones and minerals in everyday life from the information gathered.

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
	.			4. Compare the clouds, fog, dew and frost processes from the model. 5. Compare the process of precipitation, snow, and hail from the data collected.	3. Build a model that explains the occurrence of fossils and predicts the past environment of fossils. 4. Compare the occurrence of land breezes, sea breezes, and monsoons, and explain their effects on living creatures and animals. environment from model 5. Explain the effect of the monsoon on the occurrence of the season of Thailand from the data collected 6. Describe the characteristics and effects of floods, coastal erosion, landslides, earthquakes, and tsunamis.

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
					7. Be aware of the impact of natural disasters and earthquakes. by presenting guidelines for monitoring and behaving safe from natural disasters and earthquakes that may occur in the locality 8. Create a model explaining the greenhouse effect and the effect of the greenhouse effect on living things. 9. Realize the impact of the greenhouse effect by proposing guidelines to reduce activities that generate greenhouse gases.

Strand 4: technology

Standard Sc4.1: Understand the key concepts of technology for living in a rapidly changing society, using knowledge and skills in science, Science and other sciences. To solve problems or improve work Creatively with the engineering design process Choose technology like Appropriate, with regard to the impact on life, society and the environment

Grade level indicators					
Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
-	-	-	-	-	-

Strand 4: technology

Standard Sc4.2: Understand and computational concepts to solve problems encountered in real life is a process. And Systematic use of information technology And Communication, learning, working and solve the problem efficiently knowingly. And have ethics.

Grade level indicators					
Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
1. A simple solution by using a trial mistake was compared. 2. Show workflow steps or solution is simple, using pictures, symbols or text. 3. Simple programming using software or media.	1.Experiment and explain forces originating from a magnet. 2. Explain application of magnets for useful purposes	1. Show algorithms for operations or simple solutions using images, symbols, or text. 2. Write a simple program by using software or media and check for program errors 3. Use the internet to search for knowledge.	1. Use logical reasoning to solve problems Explanation of the work Forecasting results from a simple problem. 2. Simple design and programming by using software or media And check for errors and fix them	1. Use logical reasoning to solve problems Explanation of the work Forecasting results From a simple problem 2. Design and write programs that have simple logical reasoning. Check for errors and fix	1. Use logical reasoning to explain and design solutions to problems encountered in everyday life. 2. Simple design and programming to solve everyday problems Check for program errors and fix them.

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
4. Use technologies to create, store, Activate data according to purpose 5. Use of information technology safely comply with the computer terms of sharing, maintenance, basic equipment. Use appropriately.	3. Experiment and explain electrical forces resulting from rubbing some kinds of materials. 4. Safe use of information technology Comply with computer sharing agreements. basic equipment maintenance use it properly	4. Collect, process, and present information using software for purposes. 5. Use information technology safely Follow the internet usage agreement.	3. Use the internet to search for knowledge And assess the reliability of the information. 4. Collect, evaluate, present information and information by using a variety of software to solve everyday problems. 5. Use information technology safely, understand their rights and duties, respect the rights of others Notify relevant persons when finding inappropriate information or persons.	3. Use the internet to search for information. Communicate and work together. Assess data reliability 4. Collect, evaluate, present information and information According to the purpose by using various software or services on the internet to solve everyday problems 5. Use information technology safely, with manners, and understand their rights and duties. Respect the rights of others. Notify relevant persons when finding inappropriate information or persons	3. Use the Internet to search for information. 4. Use information technology to work together safely understand their rights and duties respect for the rights of others Notify relevant people when inappropriate information or persons are found.

school curriculum structure

Structure and Time Rate of Learning Management (Regular Classroom, Academic Year 2025)

Baansankamphaeng School Educational Institution Curriculum, 2025

According to the Basic Education Core Curriculum, B.E. 2551 (revised version B.E. 2560)

Learning subjects/activities	class time					
	elementary school					
	P.1	P.2	P.3	P.4	P.5	P.6
Learning subject group						
Thai language	200	200	200	160	160	160
Mathematics	200	200	200	160	160	160
science and technology	80	80	80	120	120	120
Social Studies, Religion and Culture	40	40	40	80	80	80
History	40	40	40	40	40	40
Health and Physical Education	80	80	80	80	80	80
Art	40	40	40	40	40	40
Career	40	40	40	40	40	40
foreign language	120	120	120	120	120	120
Total class time (basic)	**840**	**840**	**840**	**840**	**840**	**840**
additional courses	**120**	**120**	**120**	**80**	**80**	**80**
Knowledge Inquiry (KI) (Grade 4, 5, 6)	-	-	-	40	40	40
Chinese	40	40	40	40	40	40
English for Communication	80	80	80	-	-	-
Student development activities	**120**	**120**	**120**	**120**	**120**	**120**
1. Guidance activities	40	40	40	40	40	40
2. Student activities Boy Scouts – Girl Scouts	30	30	30	30	30	30
3. Assembly activities	40	40	40	40	40	40
4. Social activities and public interest	10	10	10	10	10	10
Extra-curricular activities	**120**	**120**	**120**	**160**	**160**	**160**
Learning activities to create with wisdom	40	40	40	80	80	80
Aesthetic promotion activities	40	40	40	40	40	40
Activities to promote skills in the use of technology media	40	40	40	40	40	40
total study time	**1,200 hours/year**					

school curriculum structure (regular classroom, academic year 2025)

Grade 1

course/activity	Study time (hours/year)
basic course	**840**
ท 11101 Thai language	200
ค 11101 Mathematics	200
ว 11101 Science and Technology	80
ส 11101 Social Studies, Religion and Culture	40
ส 11102 History	40
พ 11101 Health and Physical Education	80
ศ 11101 art	40
ง 11101 Occupation	40
อ 11101 English	120
additional courses	**120**
จ 11201 Chinese	40
อ 11202 English for Communication	80
Student development activities	**120**
1. Guidance	40
2. Scouts/ Scouts	30
3. Assembly activities	40
4. Social activities and public interest	10
total class time	**1200 hours/year**

school curriculum structure (regular classroom, academic year 2025)

Grade 2

course/activity	Study time (hours/year)
basic course	**840**
ท 12101 Thai language	200
ค 12101 Mathematics	200
ว 12101 Science and Technology	80
ส 12101 Social Studies, Religion and Culture	40
ส 12102 History	40
พ 12101 Health and Physical Education	80
ศ 12101 art	40
ง 12101 Occupation	40
อ 12101 English	120
additional courses	**120**
จ 12201 Chinese	40
อ 12202 English for Communication	80
Student development activities	**120**
1. Guidance	40
2. Scouts/ Scouts	30
3. Assembly activities	40
4. Social activities and public interest	10
total class time	**1,200 hours/year**

school curriculum structure (regular classroom, academic year 2025)

Grade 3

course/activity	Study time (hours/year)
basic course	**840**
ท 13101 Thai language	200
ค 13101 Mathematics	200
ว 13101 Science and Technology	80
ส 13101 Social Studies, Religion and Culture	40
ส 13102 History	40
พ 13101 Health and Physical Education	80
ศ 13101 art	40
ง 13101 Occupation	40
อ 13101 English	120
additional courses	**120**
EG 13201 Chinese	40
EG 13202 English for Communication	80
Student development activities	**120**
1. Guidance	40
2. Scouts/ Scouts	30
3. Assembly activities	40
4. Social activities and public interest	10
total class time	**1,200 hours/year**

school curriculum structure (regular classroom, academic year 2025)

Grade 4

Course/Activity	Learning time (hours/year)
Basic course	**850**
TH 14101 Thai languages	160
M 14101 Mathematics	160
SC 14101 Science and Technology	120
SO 14101 Social Studies, Religion, and Culture	80
SO 14102 History	40
HP 14101 Health and Physical Education	80
AR 14101 Art.	40
OT 14101 Occupations and Technology	40
FO 14101 English	120
Additional courses	**80**
I 14201 Knowledge Inquiry	40
CH 14202 Chinese	40
Student development activities	**120**
1 . Guidelines	40
2 . Scout	30
3 . Assembly activities	40
4 . Social and public benefit	10
Extra-curricular activities	**160**
Learning activities to create with wisdom	80
Aesthetic promotion activities	40
Activities to promote skills in the use of technology media	40
Total class time	**1, 200 hours /year**

school curriculum structure (regular classroom, academic year 2025)

Grade 5

Course / Activity	Study time (hrs./ year)
Basic course	**840**
TH 15101 Thai language	160
M 15101 Mathematics	160
SC 15101 Science and Technology	120
SO 15101 Social Studies, Religion, and Culture	80
SO 15102 History	40
HP 15101 Health and Physical Education	80
AR 15101 Art	40
OT 15101 Occupations and Technology	40
FO 15101 English	120
Additional courses	**80**
I 15201 Knowledge Inquiry	40
CH 15202 Chinese	40
Student development activities	**120**
1 . Guidelines	40
2 . Scout	30
3 . Assembly activities	40
4 . Social and public benefit	10
Extra-curricular activities	**160**
Learning activities to create with wisdom	80
Aesthetic promotion activities	40
Activities to promote skills in the use of technology media	40
total class time	**1, 200 hours/year**

school curriculum structure (regular classroom, academic year 2025)

Grade 6

Course / Activity	Study time (hrs./ year)
basic course	**840**
TH 16101 Thai language	160
M 16101 Mathematics	160
SC 16101 Science and Technology	120
SO 16101 Social Studies, Religion, and Culture	80
SO 16102 History	40
HP 16101 Health and Physical Education	80
AR16101 Art	40
OT 16101 Occupations and Technology	40
FO 16101 English	120
additional courses	**80**
I 16201 Knowledge Inquiry	40
CH 16202 Chinese	40
Student development activities	**120**
1 . Guidelines	40
2 . Scout	30
3 . Assembly activities	40
4 . Social and public benefits(To Be Edit)	10
Extra-curricular activities	**160**
Learning activities to create with wisdom	80
Aesthetic promotion activities	40
Activities to promote skills in the use of technology media	40
total class time	**1,200 hours/year**

Structure and Time Rate of Learning Management (MEP classroom, Academic Year 2025)

Baansankamphaeng School Educational Institution Curriculum, 2025

According to the Basic Education Core Curriculum, B.E. 2551 (revised version B.E. 2560)

Learning subjects/activities	class time					
	elementary school					
	P.1	P.2	P.3	P.4	P.5	P.6
Learning subject group						
Thai language	200	200	200	160	160	160
Mathematics	200	200	200	160	160	160
science and technology	80	80	80	120	120	120
Social Studies, Religion and Culture	40	40	40	80	80	80
History	40	40	40	40	40	40
Health and Physical Education	80	80	80	80	80	80
Art	40	40	40	40	40	40
Career	40	40	40	40	40	40
foreign language	120	120	120	120	120	120
Total class time (basic)	**840**	**840**	**840**	**840**	**840**	**840**
additional courses	**120**	**120**	**120**	**80**	**80**	**80**
Knowledge Inquiry (KI) (Grade 4, 5, 6)	-	-	-	40	40	40
Chinese	40	40	40	40	40	40
English for Communication	80	80	80	-	-	-
Student development activities	**120**	**120**	**120**	**120**	**120**	**120**
1. Guidance activities	40	40	40	40	40	40
2. Student activities Boy Scouts – Girl Scouts	30	30	30	30	30	30
3. Assembly activities	40	40	40	40	40	40
4. Social activities and public interest	10	10	10	10	10	10
Extra-curricular activities	**120**	**120**	**120**	**160**	**160**	**160**
Learning activities to create with wisdom	40	40	40	40	40	40
Aesthetic promotion activities	40	40	40	40	40	40
Activities to promote skills in the use of technology media	40	40	40	40	40	40
Activities to promote English communication skills	-	-	-	40	40	40
total study time	**1,200 hours/year**					

school curriculum structure (MEP classroom, academic year 2025)

Grade 1

course/activity	Study time (hours/year)
basic course	**840**
ท 11101 Thai language	200
ค 11101 Mathematics	200
ว 11101 Science and Technology	80
ส 11101 Social Studies, Religion and Culture	40
ส 11102 History	40
พ 11101 Health and Physical Education	80
ศ 11101 art	40
ง 11101 Occupation	40
อ 11101 English	120
additional courses	**120**
จ 11201 Chinese	40
อ 11202 English for Communication	80
Student development activities	**120**
1. Guidance	40
2. Scouts/ Scouts	30
3. Assembly activities	40
4. Social activities and public interest	10
total class time	**1200 hours/year**

school curriculum structure (MEP classroom, academic year 2025)

Grade 2

course/activity	Study time (hours/year)
basic course	**840**
ท 11101 Thai language	200
ค 11101 Mathematics	200
ว 11101 Science and Technology	80
ส 11101 Social Studies, Religion and Culture	40
ส 11102 History	40
พ 11101 Health and Physical Education	80
ศ 11101 art	40
ง 11101 Occupation	40
อ 11101 English	120
additional courses	**120**
จ 11201 Chinese	40
อ 11202 English for Communication	80
Student development activities	**120**
1. Guidance	40
2. Scouts/ Scouts	30
3. Assembly activities	40
4. Social activities and public interest	10
total class time	**1200 hours/year**

school curriculum structure (MEP classroom, academic year 2025)

Grade 3

course/activity	Study time (hours/year)
basic course	**840**
ท 11101 Thai language	200
ค 11101 Mathematics	200
ว 11101 Science and Technology	80
ส 11101 Social Studies, Religion and Culture	40
ส 11102 History	40
พ 11101 Health and Physical Education	80
ศ 11101 art	40
ง 11101 Occupation	40
อ 11101 English	120
additional courses	**120**
จ 11201 Chinese	40
อ 11202 English for Communication	80
Student development activities	**120**
1. Guidance	40
2. Scouts/ Scouts	30
3. Assembly activities	40
4. Social activities and public interest	10
total class time	**1200 hours/year**

school curriculum structure (MEP classroom, academic year 2025)

Grade 4

Course/Activity	Learning time (hours/year)
Basic course	**850**
TH 14101 Thai languages	160
M 14101 Mathematics	160
SC 14101 Science and Technology	120
SO 14101 Social Studies, Religion, and Culture	80
SO 14102 History	40
HP 14101 Health and Physical Education	80
AR 14101 Art.	40
OT 14101 Occupations and Technology	40
FO 14101 English	120
Additional courses	**80**
I 14201 Knowledge Inquiry	40
CH 14202 Chinese	40
Student development activities	**120**
1 . Guidelines	40
2 . Scout	30
3 . Assembly activities	40
4 . Social and public benefit	10
Extra-curricular activities	**160**
Learning activities to create with wisdom	40
Aesthetic promotion activities	40
Activities to promote skills in the use of technology media	40
Activities to promote English communication skills	40
Total class time	**1, 200 hours /year**

school curriculum structure (MEP classroom, academic year 2025)

Grade 5

Course/Activity	Learning time (hours/year)
Basic course	**850**
TH 14101 Thai languages	160
M 14101 Mathematics	160
SC 14101 Science and Technology	120
SO 14101 Social Studies, Religion, and Culture	80
SO 14102 History	40
HP 14101 Health and Physical Education	80
AR 14101 Art.	40
OT 14101 Occupations and Technology	40
FO 14101 English	120
Additional courses	**80**
I 14201 Knowledge Inquiry	40
CH 14202 Chinese	40
Student development activities	**120**
1 . Guidelines	40
2 . Scout	30
3 . Assembly activities	40
4 . Social and public benefit	10
Extra-curricular activities	**160**
Learning activities to create with wisdom	40
Aesthetic promotion activities	40
Activities to promote skills in the use of technology media	40
Activities to promote English communication skills	40
Total class time	**1, 200 hours /year**

school curriculum structure (MEP classroom, academic year 2025)

Grade 6

Course/Activity	Learning time (hours/year)
Basic course	**850**
TH 14101 Thai languages	160
M 14101 Mathematics	160
SC 14101 Science and Technology	120
SO 14101 Social Studies, Religion, and Culture	80
SO 14102 History	40
HP 14101 Health and Physical Education	80
AR 14101 Art.	40
OT 14101 Occupations and Technology	40
FO 14101 English	120
Additional courses	**80**
I 14201 Knowledge Inquiry	40
CH 14202 Chinese	40
Student development activities	**120**
1 . Guidelines	40
2 . Scout	30
3 . Assembly activities	40
4 . Social and public benefit	10
Extra-curricular activities	**160**
Learning activities to create with wisdom	40
Aesthetic promotion activities	40
Activities to promote skills in the use of technology media	40
Activities to promote English communication skills	40
Total class time	**1, 200 hours /year**

Structure and Time Rate of Learning Management (SME classroom, Academic Year 2025)

Baansankamphaeng School Educational Institution Curriculum, 2025

According to the Basic Education Core Curriculum, B.E. 2551 (revised version B.E. 2560)

Learning subjects/activities	class time					
	elementary school					
	P.1	P.2	P.3	P.4	P.5	P.6
Learning subject group						
Thai language	200	200	200	160	160	160
Mathematics	200	200	200	160	160	160
science and technology	80	80	80	120	120	120
Social Studies, Religion and Culture	40	40	40	80	80	80
History	40	40	40	40	40	40
Health and Physical Education	80	80	80	80	80	80
Art	40	40	40	40	40	40
Career	40	40	40	40	40	40
foreign language	120	120	120	120	120	120
Total class time (basic)	**840**	**840**	**840**	**840**	**840**	**840**
additional courses	**120**	**120**	**120**	**80**	**80**	**80**
Knowledge Inquiry (KI) (Grade 4, 5, 6)	-	-	-	40	40	40
Chinese	40	40	40	40	40	40
English for Communication	80	80	80	-	-	-
Student development activities	**120**	**120**	**120**	**120**	**120**	**120**
1. Guidance activities	40	40	40	40	40	40
2. Student activities Boy Scouts – Girl Scouts	30	30	30	30	30	30
3. Assembly activities	40	40	40	40	40	40
4. Social activities and public interest	10	10	10	10	10	10
Extra-curricular activities	**120**	**120**	**120**	**160**	**160**	**160**
Learning activities to create with wisdom	40	40	40	40	40	40
Aesthetic promotion activities	40	40	40	40	40	40
Activities to promote skills in the use of technology media	40	40	40	40	40	40
Activities to promote STEM skills	-	-	-	40	40	40
total study time	**1,200 hours/year**					

school curriculum structure (SME classroom, academic year 2025)

Grade 1

course/activity	Study time (hours/year)
basic course	**840**
ท 11101 Thai language	200
ค 11101 Mathematics	200
ว 11101 Science and Technology	80
ส 11101 Social Studies, Religion and Culture	40
ส 11102 History	40
พ 11101 Health and Physical Education	80
ศ 11101 art	40
ง 11101 Occupation	40
อ 11101 English	120
additional courses	**120**
จ 11201 Chinese	40
อ 11202 English for Communication	80
Student development activities	**120**
1. Guidance	40
2. Scouts/ Scouts	30
3. Assembly activities	40
4. Social activities and public interest	10
total class time	**1200 hours/year**

school curriculum structure (SME classroom, academic year 2025)

Grade 2

course/activity	Study time (hours/year)
basic course	**840**
ท 11101 Thai language	200
ค 11101 Mathematics	200
ว 11101 Science and Technology	80
ส 11101 Social Studies, Religion and Culture	40
ส 11102 History	40
พ 11101 Health and Physical Education	80
ศ 11101 art	40
ง 11101 Occupation	40
อ 11101 English	120
additional courses	**120**
จ 11201 Chinese	40
อ 11202 English for Communication	80
Student development activities	**120**
1. Guidance	40
2. Scouts/ Scouts	30
3. Assembly activities	40
4. Social activities and public interest	10
total class time	**1200 hours/year**

school curriculum structure (SME classroom, academic year 2025)

Grade 3

course/activity	Study time (hours/year)
basic course	**840**
ท 11101 Thai language	200
ค 11101 Mathematics	200
ว 11101 Science and Technology	80
ส 11101 Social Studies, Religion and Culture	40
ส 11102 History	40
พ 11101 Health and Physical Education	80
ศ 11101 art	40
ง 11101 Occupation	40
อ 11101 English	120
additional courses	**120**
จ 11201 Chinese	40
อ 11202 English for Communication	80
Student development activities	**120**
1. Guidance	40
2. Scouts/ Scouts	30
3. Assembly activities	40
4. Social activities and public interest	10
total class time	**1200 hours/year**

school curriculum structure (MEP classroom, academic year 2025)

Grade 4

Course/Activity	Learning time (hours/year)
Basic course	**850**
TH 14101 Thai languages	160
M 14101 Mathematics	160
SC 14101 Science and Technology	120
SO 14101 Social Studies, Religion, and Culture	80
SO 14102 History	40
HP 14101 Health and Physical Education	80
AR 14101 Art.	40
OT 14101 Occupations and Technology	40
FO 14101 English	120
Additional courses	**80**
I 14201 Knowledge Inquiry	40
CH 14202 Chinese	40
Student development activities	**120**
1 . Guidelines	40
2 . Scout	30
3 . Assembly activities	40
4 . Social and public benefit	10
Extra-curricular activities	**160**
Learning activities to create with wisdom	40
Aesthetic promotion activities	40
Activities to promote skills in the use of technology media	40
Activities to promote STEM skills	40
Total class time	**1, 200 hours /year**

school curriculum structure (MEP classroom, academic year 2025)

Grade 5

Course/Activity	Learning time (hours/year)
Basic course	**850**
TH 14101 Thai languages	160
M 14101 Mathematics	160
SC 14101 Science and Technology	120
SO 14101 Social Studies, Religion, and Culture	80
SO 14102 History	40
HP 14101 Health and Physical Education	80
AR 14101 Art.	40
OT 14101 Occupations and Technology	40
FO 14101 English	120
Additional courses	**80**
I 14201 Knowledge Inquiry	40
CH 14202 Chinese	40
Student development activities	**120**
1 . Guidelines	40
2 . Scout	30
3 . Assembly activities	40
4 . Social and public benefit	10
Extra-curricular activities	**160**
Learning activities to create with wisdom	40
Aesthetic promotion activities	40
Activities to promote skills in the use of technology media	40
Activities to promote STEM skills	40
Total class time	**1, 200 hours /year**

school curriculum structure (MEP classroom, academic year 2025)

Grade 6

Course/Activity	Learning time (hours/year)
Basic course	**850**
TH 14101 Thai languages	160
M 14101 Mathematics	160
SC 14101 Science and Technology	120
SO 14101 Social Studies, Religion, and Culture	80
SO 14102 History	40
HP 14101 Health and Physical Education	80
AR 14101 Art.	40
OT 14101 Occupations and Technology	40
FO 14101 English	120
Additional courses	**80**
I 14201 Knowledge Inquiry	40
CH 14202 Chinese	40
Student development activities	**120**
1 . Guidelines	40
2 . Scout	30
3 . Assembly activities	40
4 . Social and public benefit	10
Extra-curricular activities	**160**
Learning activities to create with wisdom	40
Aesthetic promotion activities	40
Activities to promote skills in the use of technology media	40
Activities to promote STEM skills	40
Total class time	**1, 200 hours /year**

Course Description

Course Description

Basic Science Course **Code : Sc11101**

Grade 1 **Time : 80 hours/Year**

A study of scientific learning, characteristics, duties and maintenance of various parts, human body, characteristics and functions of the various parts of animals and plants around us. The environment in which animals and plants live. Types and properties of materials used to make surrounding objects. Sound origin and direction of sound movement, rock formations, and stars in the sky during the day and night. Problem solving by trial-and-error Comparison Simple programming using software or basic technology equipment. basic software usage

Using inquiry, observation, surveying using simple tools, collecting data, recording and explaining survey results. To achieve understanding have basic scientific process skills and have 21st century learning skills in the use of technology Introduction to Information and Communication able to communicate what has been learned be creative able to work with others Shows simple troubleshooting steps. Write programs using the media, build them, store them and run them. file by purpose

Realize the benefits of applying knowledge and scientific processes to life. Safe use of information technology Comply with the terms of use. Equipment maintenance and use appropriate information technology have a scientific mind, ethics, morals and appropriate values

Total Learning Standards and Indicators: 15

Formative Indicators (6 indicators):

Sc1.1 Gr1/1

Sc1.2 Gr1/1

Sc2.1 Gr1/1

Sc3.1 Gr1/1

Sc3.2 Gr1/1

Sc4.2 Gr1/3

Summative Indicators (9 indicators):

Sc1.1 Gr1/2

Sc1.2 Gr1/2

Sc2.1 Gr1/2

Sc2.3 Gr1/1

Sc3.1 Gr1/2

Sc4.2 Gr1/1, Gr1/2, Gr1/4, Gr1/5

Course Description

Basic Science Course **Code : Sc12101**

Grade 2 **Time : 80 hours/Year**

Study and learn about living and non-living things. The life cycle of flowering plants. Water absorbing properties of materials and application of water absorbing properties of materials in making objects in daily life. Materials made by mixing materials together. Observable properties of materials to make objects for their intended use. Reusing used materials benefits of Reusing Used Materials.

The trajectory of light from a light source and visible object. value of vision Guidelines for preventing danger from looking at objects in areas with inappropriate lighting soil composition and classification of soil types using soil texture and coagulation as criteria and utilization of soil.

Using search for knowledge, observing, classifying, collecting data, recording and explaining survey results, in order to gain knowledge and understanding. Basic science process skills and 21st century learning skills in the use of basic information and communication technology. able to communicate what has been learned be creative able to work with others Shows simple troubleshooting steps. Write conditional programs using instruction cards and detect errors. use building software Categorize folders

Realize the benefits of applying knowledge and scientific processes to life. recognize the importance of protecting personal data Safe use of information technology take care of computer equipment have a scientific mind, ethics, morals and appropriate values

Total Learning Standards and Indicators: 16

Formative Indicators (8 indicators):

Sc1.2 Gr2/1, Gr2/2

Sc2.1 Gr2/1, Gr2/2, Gr2/3

Sc2.3 Gr2/1

Sc3.2 Gr2/1

Sc4.2 Gr2/2

Summative Indicators (8 indicators):

Sc1.2 Gr2/3

Sc1.3 Gr2/1

Sc2.1 Gr2/4

Sc2.3 Gr2/2

Sc3.2 Gr2/2

Sc4.2 Gr2/1, Gr2/3, Gr2/4

Course Description

Basic Science Course **Code : Sc13101**

Grade 3 **Time : 80 hours/Year**

Study about the essential to the life and growth of humans and animals, benefits of food, water and air, and how to take care of our own selves and animals to benefit from food, water and air properly. There'll be lessons about animals' life circles, comparison between life circles of some kinds of animals, and values of animals' lives.

Study about objects that are made up of small parts that can be separated and made up of new ones. Also, the students will learn how the material changes when it is heated or cooled, learn about the effect of force on the change in motion of an object, and about the contact and non-contact forces that affect the movement of objects. There'll be lessons learning how to classify objects using magnetism, and learning about the magnetic poles and the effect that occurs between the poles when they are brought close to each other. Moreover, the students will learn how to convert one energy into another and learn about operation of generators, and energy sources in electricity generation. Teacher will also teach the students benefits and harms of electricity by presenting ways to use electricity economically and safely. Apart from those lessons, the students will learn about air composition, importance of air, and the impact of air pollution on living organisms. Teacher will have to propose practical guidelines for reducing air pollution. There'll also be lessons about the occurrence of wind, its benefits and harms, the sunrise and sunset, the causes of the occurrence of the sunrise and sunset, the occurrence of day and night, and the importance of the sun by explaining the benefits of the sun to living creatures.

Using scientific processes, investigating knowledge, exploring, investigating, searching, classifying, and discussing knowledge, thinking, understanding, communicating what is learned. Have the ability to make decisions, apply knowledge to everyday life, have a scientific mind, moral, ethics and values are right.

The goal is to provide students with a love for learning science, skills in scientific processes, and development of knowledge, ideas and understanding. Students are able to convey what is being learned and able to make decisions. They will improve their life skills, and apply science knowledge as a tool to learn other subjects and apply it in daily life properly.

Total Learning Standards and Indicators: 25

Formative Indicators (12 indicators):

Sc1.2 Gr3/1, Gr3/2, Gr3/3

Sc2.2 Gr3/1, Gr3/3, Gr3/4

Sc2.3 Gr3/1

Sc3.1 Gr3/1, Gr3/3

Sc3.2 Gr3/1, Gr3/4

Sc4.2 Gr3/2

Summative Indicators (13 indicators):

Sc1.2 Gr3/4

Sc2.1 Gr3/1, Gr3/2

Sc2.2 Gr3/2

Sc2.3 Gr3/2, Gr3/3

Sc3.1 Gr3/2

Sc3.2 Gr3/2, Gr3/3

Sc4.2 Gr3/1, Gr3/3, Gr3/4, Gr3/5

Course Description

Basic Science Course **Code : Sc14101**

Grade 4 **Time : 80 hours/Year**

Analytical study about the function of roots, stem, leaves and flowers. Characteristics of organisms, plants, animals and non-plants. Study flowering and non-flowering plants, vertebrae and invertebrates. Observable characteristics of vertebrates in fish groups. amphibian group, group of reptiles, birds and mammals and give examples of organisms in the group.

Study the physical properties of hardness, elasticity, thermal conductivity and electrical conductivity of materials. Conduction properties of hardness, flexibility, thermal conductivity and electrical conductivity of materials for use in daily life through the design process Reasonable exchange of ideas with others about the physical properties of materials. Study the properties of all 3 states of matter from the observed data, mass, address requirement shape and volume of matter The use of instruments to measure the mass and volume of all 3 states of matter, the effect of gravity on objects. Using a spring balance to measure the weight of an object Describe the mass of an object affecting the change in the motion of the object and the nature of the transparent medium. Translucent medium and opaque material Study and explain the pattern of the moon's rise and fall paths. Lunar eclipse patterns and lunar eclipse predictions Elements of the solar system and the orbital periods of various planets from models, study, design and simple programming, and use information and communication technology to learn, work and solve problems efficiently, intelligently and ethically.

Using scientific processes, observations, surveys, experiments, queries, classifications, analytical thinking, synthesis, and discussion for knowledge retrieval and problem solving. By focusing on performance, communication skills, thinking, problem solving, using life skills and using technology creatively, and bringing knowledge to use in everyday life.

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Total Learning Standards and Indicators: 21

Formative Indicators (9 indicators):

Sc1.3 Gr4/1, Gr4/4

Sc2.1 Gr4/1, Gr4/3, Gr4/4

Sc2.2 Gr4/1, Gr4/2

Sc3.1 Gr4/1

Sc4.2 Gr4/2

Summative Indicators (12 indicators):

Sc1.2 Gr4/1

Sc1.3 Gr4/2, Gr4/3

Sc2.1 Gr4/2

Sc2.2 Gr4/3

Sc2.3 Gr4/1

Sc3.1 Gr4/2, Gr4/3

Sc4.2 Gr4/1, Gr4/3, Gr4/4, Gr4/5

Course Description

Basic Science Course **Code : Sc15101**

Grade 5 **Time : 120 hours/Year**

Study and learn about the structure and characteristics of organisms suitable for each habitat. Relationship between non-living things and living things. Food chains and functions of organisms that are producers and consumers in the food chain. Recognize the value of the environment towards the living of living beings. Genetic traits that are passed down from parents to offspring of plants, animals and humans. Finding the resultant force of several forces in the same direction acting on an object when the object is at rest. Drawing diagrams showing forces acting on aligned objects and resultant forces acting on objects Using a spring balance to measure the force acting on an object The effect of friction on changing the motion of an object Drawing a diagram showing friction and aligned forces acting on an object. hearing sound through a medium high-pitched, low-pitched, loud-pitched, low-pitched; sound level measurement using a sound level meter and suggest ways to avoid and reduce noise pollution

It aims for students to learn science that can be used to explain, solve problems, or create and develop works in real life. which emphasizes linking knowledge of science, Science and technology with engineering processes and to have important skills in researching and building knowledge by using the process of seeking knowledge and solving a variety of problems

To enable learners to gain knowledge, understanding, thinking skills and participate in learning every step of the way as well as encouraging students to have a scientific mind and have a good attitude towards science learning.

Total Learning Standards and Indicators: 32

Formative Indicators (19 indicators):

Sc1.1 Gr5/1, Gr5/3

Sc1.3 Gr5/2

Sc2.1 Gr5/1, Gr5/2, Gr5/3

Sc2.2 Gr5/1, Gr5/2, Gr5/3, Gr5/5

Sc2.3 Gr5/1, Gr5/2, Gr5/3, Gr5/4

Sc3.1 Gr5/1

Sc3.2 Gr5/1, Gr5/4, Gr5/5

Sc4.2 Gr5/2

Summative Indicators (13 indicators):

Sc1.1 Gr5/2, Gr5/4

Sc1.3 Gr5/1

Sc2.1 Gr5/4

Sc2.2 Gr5/4

Sc2.3 Gr5/5

Sc3.1 Gr5/2

Sc3.2 Gr5/2, Gr5/3

Sc4.2 Gr5/1, Gr5/3, Gr5/4, Gr5/5

Course Description

Basic Science Course **Code : Sc16101**

Grade 6 **Time : 120 hours/Year**

Study and learn about nutrients and the benefits of each type. Guidelines for choosing food to get complete nutrients in proportion appropriate to gender and age model the digestive system. Describe the functions of organs in the digestive system. Explain and compare the separation of mixtures by extraction, sieving, magnetization, pouring, filtration and sedimentation using empirical evidence. Describe the occurrence and effect of electric forces generated by abrasive objects using empirical evidence. Tell the components of a simple electric circuit from empirical evidence. Draw diagrams and connect simple electrical circuits. Experiment with series and parallel connection of electrical cells. Realize the benefits of series and parallel connection knowledge and apply them in daily life. Explain the occurrence of penumbra from empirical evidence. Draw a light ray diagram showing the formation of penumbral shadows. Create a model that explains the birth and compare solar and lunar eclipse phenomena Describe the development of space technology. Let's take advantage of everyday life. Compare the processes of igneous, sedimentary and metamorphic rocks and explain the rock cycle from models. Describe and compare the occurrence of land breezes, sea breezes and monsoons. Describe the occurrence of various disasters. And to be aware of the impact of natural disasters and earthquakes.

It aims for students to learn science that can be used to explain, solve problems, or create and develop works in real life. which emphasizes linking knowledge of science, Science and technology with engineering processes and to have important skills in researching and building knowledge by using the process of seeking knowledge and solving a variety of problems

To enable learners to gain knowledge, understanding, thinking skills and participate in learning every step of the way as well as encouraging students to have a scientific mind and have a good attitude towards science learning.

Total Learning Standards and Indicators: 30

Formative Indicators (12 indicators):

Sc1.2 Gr6/1, Gr6/2, Gr6/4

Sc2.3 Gr6/1, Gr6/2, Gr6/3, Gr6/5, Gr6/8

Sc3.2 Gr6/2, Gr6/6, Gr6/8

Sc4.2 Gr6/2

Summative Indicators (18 indicators):

Sc1.2 Gr6/3, Gr6/5

Sc2.1 Gr6/1

Sc2.2 Gr6/1

Sc2.3 Gr6/4, Gr6/6, Gr6/7

Sc3.1 Gr6/1, Gr6/2

Sc3.2 Gr6/1, Gr6/3, Gr6/4, Gr6/5, Gr6/7, Gr6/9

Sc4.2 Gr6/1, Gr6/3, Gr6/4

Course structure

Primary 1

Learning Time Structure Science

Grade 1: - Continuous assessment score 70 points **Time: 80 hours**

- Final examination 30 points

Chapter	Content	Standard of Science	Time (hours)	C.A.S Score	Final Examination
1	Learn things around us.	Sc1.1: Gr1/1, Gr1/2 Sc4.2: Gr1/4, Gr1/5	10	8	3
2	My body	Sc1.2: Gr1/1 - Gr1/2 Sc4.2: Gr1/4	10	9	4
3	Plants around us	Sc1.2: Gr1/1 Sc4.2: Gr1/1, Gr1/5	10	9	4
4	Animals around us.	Sc1.2: Gr1/1 Sc4.2: Gr1/1, Gr1/2	10	9	4
Total Semester: 1st			**40**	**35**	**15**
5	Materials around us.	Sc2.1: Gr1/1, Gr1/2 Sc4.2: Gr1/2, Gr1/3	12	10	5
6	The voice of everyday life	Sc2.3: Gr1/1 Sc4.2: Gr1/3, Gr1/4	9	8	3
7	Stone	Sc3.2: Gr1/1 Sc4.2: Gr1/5	7	7	2
8	Sky and stars	Sc3.1: Gr1/1, Gr1/2 Sc4.2: Gr1/5	12	10	5
Total Semester: 2nd				**35**	**15**
Total score all year				**70**	**30**

Table analysis indicators standard of Science with the chapter

Code: Sc11101 Grade 1

No.	Standard	Chapter								
		1	2	3	4	5	6	7	8	Total
1	Sc. 1.1 Gr. 1/1 Specify the names of plants and animals that live in various areas from the collected data.	3								3
2	Sc. 1.1 Gr. 1/2 Tell the environment suitable for the living of animals in the area they live.	3								3

No.	Standard	Chapter								
		1	2	3	4	5	6	7	8	Total
3	Sc. 1.2 Gr. 1/1 Specify names, describe characteristics and tell the functions of human body parts, animals and plants, as well as describe the synergies of the human body parts in performing various activities from the gathered information.		4	7	7					**18**

No.	Standard	Chapter								
		1	2	3	4	5	6	7	8	Total
4	Sc. 1.2 Gr. 1/2 Realize the importance of one's own body parts. by properly taking care of the parts to be safe and always keep them clean		4							4
5	Sc. 2.1 Gr. 1/1 Explain the observable properties of materials used to make objects. which is made of one or more materials using empirical evidence					4				4

No.	Standard	Chapter								
		1	2	3	4	5	6	7	8	Total
6	Sc. 2.1 Gr. 1/2 Identify the types of materials and group them according to their observed properties.					4				**4**
7	Sc. 2.3 Gr. 1/1 Describe the occurrence of sound and direction of sound from the evidence.						6			**6**
8	Sc. 3.1 Gr. 1/1 Identify the stars that appear in the sky during the day and night from the gathered data.								5	**5**

No.	Standard	Chapter								
		1	2	3	4	5	6	7	8	Total
9	Sc. 3.1 P. 1/2 explains why most stars are not visible during the day from empirical evidence.								4	**4**
10	Sc. 3.2 P. 1/1 Explain the appearance of the rock. from the observed characteristics							6		**6**
11	Sc.4.2 GR. 1/1 Simple problem solving by using trial and error Comparison.			1	1					**2**

No.	Standard	Chapter								
		1	2	3	4	5	6	7	8	Total
12	Sc. 4.2 Gr. 1/2 Show a sequence of steps or solve a simple problem by using pictures, symbols or text.				1	1				2
13	Sc. 4.2 Gr. 1/3 Write a simple program using software or media.					1	1			2
14	Sc. 4.2 Gr. 1/4 Use technology to create, store, retrieve data according to the objectives.	1	1							2

No.	Standard	Chapter								
		1	2	3	4	5	6	7	8	Total
15	Sc. 4.2 Gr. 1/5 Safe use of information technology Comply with the agreement on computer sharing, basic equipment maintenance. use it properly	1		1				1	1	4

Chapter 1

Science (Sc11101)

Content: Learn things around us. **Time: 10 hours**

Strand 1: Biological Science

Standard Sc1.1: Understanding basic units of living things; relationship between structures a functions of living things and non- living things, relationship between of living things, Ecosystem, energy flow, ecological succession. The meaning of population Problems and effects towards effect of natural resource and environment. To guide nature conservation and environment problem solving. Guidelines for the Conservation of Natural Resources environment problem as well as the knowledge to good use.

Standard 4: Technology

Standard Sc4.2: Understanding and using computational concepts to solve problems encountered in real life in a step-by-step and systematic way. Use information and communication technology to learn, work, and solve problems effectively. Knowledgeable and ethical.

Grade level indicators

Sc1.1 Gr1/1 Identify the names of plants and animals that live in different areas of the information collected.

Sc1.1 Gr1/2 Describe the environment that suits the living of animals they live.

Sc4.2 Gr1/4 Use technology to create, store, retrieve data according to the objectives.

Sc4.2 Gr1/5 Use information technology safely and obey the terms of use of computers. Together, take care of basic equipment. use it properly

<u>Learning Objectives</u>

Students will be able to:

1. Plant habitat
2. Habitats of animals
3. The right environment for plants and animals.

Concept:

Plants grow everywhere on the earth. From areas where the weather is very cold, hot, dry, in the middle of the desert, on the plains, high mountains or in the deep sea.

We can classify animals according to their habitats. Because each animal has a different habitat. We can divide animals into groups. According to habitat are terrestrial animals, aquatic animals and amphibians.

Teaching and Learning Activities

1. Notes and summaries of observation
2. Save Search Result
3. Worksheets

Competency:

1. Ability to think.
2. Ability to solve problems.
3. Ability to communicate
4. Ability to use life skills.
5. Ability to use technology

Chapter 2

Science (Sc11101)

Content: My body **Time: 10 hours**

Strand 1: Biological Science

Standard Sc1.2: Understanding the properties of the organism. The basic unit of life Incoming transport and out of the cell structure of the relationship and functions of the animal system and human relations work together relationship between structure and function of various organs. Relevance of the plant work. As well as the knowledge to good use.

Strand 4: Technology

Standard Sc4.2: Understand and use computational concepts to solve problems encountered in real life step by step, and systematic. Using information and communication technology in learning and working and problem solving effectively Knowledgeable and ethical.

Grade level indicators

Sc1.2 Gr1/1 Specify a descriptive name for the style and tell duty parts of the human body, animals and plants. As well as describing the common functions of human body parts for activities. Of information collected.

Sc1.2 Gr1/2 Recognizing the importance of different parts of their bodies. By taking care of them correctly to be safe and secure clean.

Sc4.2 Gr1/4 Use technology to create, store, retrieve data according to the objectives.

Learning Objectives

Students will be able to:

1. Body Composition.
2. Functional parts of the body.
3. The importance of body parts.

Concept:

The human body is made up of various organs. that perform different functions Our bodies are made up of organs that perform different functions: eyes, ears, nose, mouth and teeth, arms and hands, legs and feet.

Our body is made up of many organs. As for the external organs, they have different functions and importance. We should take care of each organ properly. Always safe and clean.

Teaching and Learning Activities

1. Notes and summaries of observation
2. Save Search Result
3. Worksheets

Competency:

1. Ability to think.
2. Ability to solve problems.
3. Ability to communicate
4. Ability to use life skills.
5. Ability to use technology

Chapter 3

Science (Sc11101)

Content: Plants around us **Time:10 hours**

Strand 1: Biological Science

Standard Sc1.2: Understanding the properties of the organism. The basic unit of life Incoming transport and out of the cell structure of the relationship and functions of the animal system and human relations work together relationship between structure and function of various organs. Relevance of the plant work. As well as the knowledge to good use.

Strand 4: Technology

Standard Sc4.2: Understand and use computational concepts to solve problems encountered in real life step by step, and systematic. Using information and communication technology in learning and working and problem solving effectively Knowledgeable and ethical.

Grade level indicators

Sc1.2 Gr1/1 Specify a descriptive name for the style. And tell duty parts of the human body, animals and plants. As well as describing the common functions of human body parts for activities. Of information collected

Sc4.2 Gr1/1 Solve simple problems by using trial and error comparisons.

Sc4.2 Gr1/5 Use information technology safely and obey the terms of use of computers. Together, take care of basic equipment. use it properly.

Learning Objectives

Students will be able to:

- functions of plant parts and habitats of plants.

Concept:

Plants are living things like humans and animals. And it is very useful for human beings because plants are both food and human medicine. And most importantly, provide oxygen air for human and animal respiration.

Terrestrial plants have roots that go deep into the ground to hold the stem, while aquatic plants have roots and stems that float in the water of every tree.

Both large and small types

Teaching and Learning Activities

1. Notes and summaries of observation.
2. Save Search Result.
3. Worksheets.

Competency:

1. Ability to think.
2. Ability to solve problems.
3. Ability to communicate
4. Ability to use life skills.
5. Ability to use technology

Chapter 4

Science (Sc11101)

Content: Animals around us. **Time: 10 hours**

Strand 1: Biological Science

Standard Sc1.2: Understanding the properties of the organism The basic unit of life Incoming transport and out of the cell structure of the relationship and functions of the animal system and human relations work together relationship between structure and function of various organs. Relevance of the plant work. As well as the knowledge to good use.

Strand 4: Technology

Standard Sc4.2: Understand and use computational concepts to solve problems encountered in real life step by step, and systematic. Using information and communication technology in learning and working and problem solving effectively Knowledgeable and ethical.

Grade level indicators

Sc1.2 Gr1/1 Specify a descriptive name for the style. And tell duty parts of the human body, animals and plants. As well as describing the common functions of human body parts for activities. Of information collected.

Sc4.2 Gr1/1 Solve simple problems by using trial and error comparisons.

Sc4.2 Gr1/2 shows a sequence of work steps or a simple problem solving by using images, symbols or message.

Learning Objectives

Students will be able to:

1. Functional organs and components in habitats and benefits of animals.

Concept:

- There are many kinds of animals Each type has different parts that look and act differently. To fit Life such as fish, frogs, turtles, finned plate the cat has 4 legs, legs and feet are used for movement.

Teaching and Learning Activities

1. Notes and summaries of observation.
2. Save Search Result.
3. Worksheets.

Competency:

1. Ability to think.
2. Ability to solve problems.
3. Ability to communicate
4. Ability to use life skills.
5. Ability to use technology

Chapter 5

Science (Sc11101)

Content: Materials around us. **Time: 12 hours**

Strand 2: Physical science

Standard Sc2.1: Understand the properties of matter composition of matter. The relationship between the treasures of matter to the structure and the bonding force between the particles. The main and nature of changing the state of matter. Solution and chemical reactions.

Strand 4: Technology

Standard Sc4.2: Understand and use computational concepts to solve problems encountered in real life step by step, and systematic. Using information and communication technology in learning and working and problem solving effectively Knowledgeable and ethical.

Grade level indicators

Sc2.1 Gr1/1 Describe the observed treasures of materials used to do objects made of single materials or different types of components are based on empirical evidence.

Sc2.1 Gr1/2 Specifies the type of material and grouping the material according to the observed treasure.

Sc4.2 Gr1/2 shows a sequence of work steps or a simple problem solving by using images, symbols or message.

Sc4.2 Gr1/3 Simple programming using software or media.

Learning Objectives

Students will be able to:

1. Toys and Articles.
2. Materials and properties of materials used to make the toys and Articles.
3. Group the toys using criteria from the material properties.
4. Some of the toys are made of the same material, or different kinds of combinations.

Concept:

1. Material objects that are used are the kinds of toys, fabric, glass, plastic, rubber, wood, paper, metal, brick, stone materials, each with different properties can be observed, such as color, soft, hard, rough, smooth, opaque, transparent elastic bending.

2. Observable properties of the same material this can be used as a criterion for grouping materials. Some materials can be assembled to be made of various objects such as fabric and buttons make a coat, wood and metal use to make pans.

Teaching and Learning Activities

1. Notes and summaries of observation.
2. Save Search Result.
3. Worksheets.

Competency:

1. Ability to think.
2. Ability to solve problems.
3. Ability to communicate
4. Ability to use life skills.
5. Ability to use technology.

Chapter 6

Science (Sc11101)

Content: The voice of everyday life **Time: 9 hours**

Strand 2: Physical science

Standard Sc2.3: Understand the meaning of energy change and energy transfer. The interaction between matter and energy daily energy nature of waves phenomenon is related to the sound of light. And electromagnetic wave and take your knowledge.

Strand 4: Technology

Standard Sc4.2: Understand and use computational concepts to solve problems encountered in real life step by step, and systematic. Using information and communication technology in learning and working and problem solving effectively Knowledgeable and ethical.

Grade level indicators

Sc2.3 Gr1/1 Describe the sound and direction of sound empirical evidence.

Sc4.2 Gr1/3 Simple programming using software or media.

Sc4.2 G1/4 Use technology to create, store, retrieve data according to the objectives.

Learning Objectives

Students will be able to:

1. The sound
2. The sound source
3. Movement of Sound

4 Sound on a daily basis.

Concept:

1. voice caused by vibration of an object. The object is sounding audio source, which is the source of the sounds of nature and A man-made voice source. Sound off in all directions from the sound source.

Teaching and Learning Activities

1. Notes and summaries of observation.
2. Save Search Result.
3. Worksheets.

Competency:

1. Ability to think.
2. Ability to solve problems.
3. Ability to communicate
4. Ability to use life skills.
5. Ability to use technology.

Chapter 7

Science (Sc11101)

Content: Stone **Time: 7 hours**

Strand 3: Earth science and space

Standard Sc3.2: Understanding the elements And the relationship of the Earth system process of changing within the world and On the earth surface Earth Shipwrecks Weather change Process and earth climate As well as impact on living organisms and the environment.

Strand 4: Technology

Standard Sc4.2: Understand and computational concepts to solve problems encountered in real life is a process. And Systematic use of information technology And Communication, learning, working and solve the problem efficiently knowingly. And have ethics.

Grade level indicators

Sc3.2 Gr1/1 Describe the exterior of the stones from the observed characteristics.

Sc4.2 Gr1/5 Use of information technology safely comply with the computer terms of sharing, maintenance, basic equipment. Use appropriately.

Learning Objectives

Students will be able to:

1. The occurrence of stone
2. The exterior of the stone.

Concept:

1. Natural stone is a unique appearance. Observed, such as color, pattern, texture, hardness and weight of the stone.

Teaching and Learning Activities

1. Notes and summaries of observation.
2. Save Search Result.
3. Worksheets.

Competency:

1. Ability to think.
2. Ability to solve problems.
3. Ability to communicate
4. Ability to use life skills.
5. Ability to use technology.

Chapter 8

Science (Sc11101)

Content: Sky and stars **Time: 12 hours**

Strand 3: Earth science and space

Standard Sc3.1: Understand the characteristic elements of the process of birth and evolution of the stellar galaxy and the solar system. Including interaction within the solar system affecting the life and application of space technology.

Strand 4: Technology

Standard Sc4.2: Understand and computational concepts to solve problems encountered in real life is a process. And Systematic use of information technology And Communication, learning, working and solve the problem efficiently knowingly. And have ethics.

Grade level indicators

Sc3.1 Gr1/1 Identify the stars that appear in the sky during daytime and night from the information collected.

Sc3.1 Gr1/2 Describe the cause to not see most stars in daytime from empirical evidence.

Sc4.2 Gr1/5 Use of information technology safely comply with the computer terms of sharing, maintenance, basic equipment. Use appropriately

Learning Objectives

Students will be able to:

1. The sun.
2. The moon.
3. Stars.

Concept:

1. Sky have the sun, moon and stars. The sun can be seen during the day. The moon may sometimes be seen in some days, but the stars cannot be seen.

2. In the daytime, most of the stars are not visible. Because the sun is brighter than the light of the stars drown. At night to see the stars and see the moon almost night.

Teaching and Learning Activities

1. Record Results and Conclusion
2. Search Result
3. Design workpiece
4. The mind map.

Competency:

1. Ability to think.
2. Ability to solve problems.
3. Ability to communicate
4. Ability to use life skills.
5. Ability to use technology.

Course structure

Primary 2

Learning Time Structure Science

Grade 2: **- Continuous assessment score 70 points** **Time: 80 hours**

- Final examination 30 points

Chapter	Content	Standard of Science	Time (hours)	C.A.S Score	Final Examination
1	Living things	Sc 1.3: Gr 2/1	13	14	5
2	plant life	Sc 4.2: Gr 2/1, Gr 2/3, Gr 2/4	27	21	10
Total Semester: 1st			**40**	**35**	**15**
3	Materials and uses	Sc 2.1 :Gr 2/1, Gr 2/2, Gr 2/3 Gr 2/4	16	15	6
4	Light in everyday life	Sc 4.2:Gr 2/1, Gr 2/2, Gr 2/3 Gr 2/4	14	14	6
5	our local soil	Sc 2.3 :Gr 2/1, Gr 2/2	10	6	3
Total Semester: 2nd				**35**	**15**
Total score all year				**70**	**35**

Table analysis indicators standard of science with the chapter

Code: Sc12101 Grade 2

No.	Standard	Chapter					
		1	2	3	4	5	Total
1	Sc1.1 Gr2/1 Experiment and explain that water and light are essential factors for plan life.		6				**6**
2	Sc1.1 Gr2/2 Explain that nutrients, water and air are essential factors for the life and growth of plants and animals, and apply acquired knowledge for useful purposes.		6				**6**
3	Sc1.1 Gr2/3 Explore and explain abilities of plants and animals to respond to light, temperature and touch.		5				**5**
4	Sc 1.3 Gr 2/1 Comparing the characteristics of living and non-living things. From the data that can be gathered • Living and non-living things (2) • Growth (3) • response to stimuli (3) • Genetics (3)	11					**11**

No.	Standard	Chapter					
		1	2	3	4	5	Total
5	Sc 2.1 Gr 2/1 Comparing the water absorption properties of materials using empirical evidence. and identifying the application of water absorbing properties of materials to be applied in making objects in everyday life			3			3
6	Sc 2.1 Gr 2/2 Explain the observed properties of materials resulting from mixing of materials using empirical evidence.			3			3
7	Sc 2.1 Gr 2/3 Comparing the observed properties of materials. To be made into objects for use according to their intended use and explain the reuse of used materials using empirical evidence			3			3
8	Sc 2.1 Gr 2/4 Realize the benefits of recycling materials by recycling materials.			3			3

No.	Standard	Chapter					
		1	2	3	4	5	Total
9	Sc 2.3 Gr 2/1 Describe the path of light from a light source. and explain the visualization of objects from empirical evidence			6			**6**
10	Sc 2.3 Gr 2/2 Recognizes the value of vision knowledge by suggesting ways to prevent the hazards of looking at objects in poorly lit areas.			5			**5**
11	Sc 3.2 Gr 2/1 Identify soil composition and classify soil types using soil texture and coagulation criteria.					2	**2**
12	Sc 3.2 Gr 2/2 Explain the use of soil. from the collected information					1	**1**
13	Sc4.1 Gr2/1 Experiment and explain forces originating from a magnet.	1	1	1	1	1	**5**
14	Sc 4.2 Gr 2/2 Simple programming using software or media and checking for program errors		1				**1**

No.	Standard	Chapter					
		1	2	3	4	5	Total
15	Sc 4.2 Gr 2/3 Use technology to create, categorize, search, store, and retrieve information according to its purpose.	1	1	1	1	1	**5**
16	Sc 4.2 Gr 2/4 Safe use of information technology Comply with computer sharing agreements. View and maintain basic equipment. use it properly.	1	1	1	1	1	**5**
Total		**14**	**21**	**15**	**14**	**6**	**70**

Chapter 1

Science (Sc12101)

Content: Living things **Time: 13 hours**

Strand 1: Living and Family

Standard Sc 1.3: Understand the process and importance of inheritance of hereditary traits Genetic material Genetic variation affects a variety of organisms. Biology and evolution of living things as well as putting knowledge to good use

Standard Sc 4.2: Understand and computational concepts to solve problems encountered in real life is a process. And Systematic use of information technology And Communication, learning, working and solve the problem efficiently knowingly, and have ethics.

Grade level indicators

Sc 1.3 Gr 2/1 Comparing the characteristics of living and non-living things. from the collected information

Sc 4.2 Gr 2/1 Show a sequence of work steps or simple solutions using images, symbols or text.

Sc 4.2 Gr 2/3 Use technology to create, classify, search, store, and retrieve information according to its purpose.

Sc 4.2 Gr 2/4 Safe use of information technology Comply with the agreement to use computers together. Take care of basic equipment, use it properly

Learning Objectives

Students will be able to:

- living and nonliving things
- response to stimuli
- reproduction
- genetics

Concept:

The things that surround us are both living and nonliving things. living things need food There is respiration, growth, excretion, movement, response to stimuli and reproduction of offspring that are similar to their parents. Non-living things have no such characteristics.

Competency:

1. Ability to think.
2. Ability to solve problems.
3. Ability to communicate
4. Ability to use life skills.
5. Ability to use technology

Desirable characteristics

- Integrity
- discipline
- eager to learn
- Live sufficiently.
- Commitment to work
- Love being Thai.
- have public mind

Chapter 2

Science (Sc12101)

Content: Plant life **Time: 27 hours**

Strand 1: Biological Science

Standard Sc1.2: understanding the properties of living things basic unit of life Transport of substances into and out of cells; relationship between structure and function of various systems of animals and humans that work in relation to each other; relationship between structure and function of plant organs that function in relation to each other.

Standard Sc.4.2 Understanding and use computational concepts to solve problems encountered in real life in a step-by-step and systematic way. Use information and communication technology to learn, work and solve problems efficiently, wisely and ethically.

Grade level indicators

Sc3.1 Gr2/1 Specify the kinds and compare properties of materials for making toys and articles of everyday use.

Sc 1.3 Gr2/1: Comparison of characteristics of living and non-living things from the collected information

Sc 4.2 Gr2/1: shows a sequence of work steps or simple problem solving by using pictures, symbols or text.

Sc 4.2 Gr2/3: Use technology to create, classify, search, store, retrieve data according to the purpose.

Sc 4.2 Gr2/4: Safe use of information technology Comply with computer sharing agreements. basic equipment maintenance uses it properly.

Learning Objectives

Students will be able to:

- Plants need water and light to grow.
- Factors in plant life.
- Benefits and care of plants.
- Components and functions of flowers.
- Reproduction of flowering plants.
- The cycle of flowering plants

Concept:

Plants are living things that grow and survive, relying on water and light to live. Plants need light to make food. If there is a lack of light, the plant will be stunted. The leaves will turn yellow or pale and eventually die. Not all plants need the same amount of light. Some plants may need a lot of light. But some plants need less light.

Water is very important to plant growth. Because water helps dissolve nutrients in the soil. in order for the roots of plants to absorb nutrients to feed the various parts of the stems.

Reproduction of flowering plants start with pollinators. When the pollen grains settle on the pistil tops, they feed on the pistil tops. and then grow a tube thrust into the stigma of the female ovary and mixes with the egg cell inside the ovule until fertilization occurs after fertilization The pistils and stamens wither, and the sepals, petals, stamens and pistils dry and fall off. The ovary develops into a fruit and contains a seed.

Flowering plants when fully grown will bloom. Once the flower has been fertilized, it will become the fruit. The fruit contains seeds which can sprout into new plants, circulating through the plant's life cycle.

There are many types of flowering plants. The flowers of each plant have different characteristics. In general, a plant flower consists of four parts: petals, sepals, stamens, and pistils.

Competency:

1. Ability to think.
2. Ability to solve problems.
3. Ability to communicate
4. Ability to use life skills.
5. Ability to use technology

Chapter 3

Science (Sc12101)

Content: Materials and uses **Time: 16 hours**

Strand 2 Physical Science

Standard Sc2.1: Understanding properties of matter. constituents of matter The relationship between the properties of matter and structure and the force of attraction between particles. Principles and nature of change of state of matter. solution generation and chemical reactions

Standard Sc.4.2 Understanding and use computational concepts to solve problems encountered in real life in a step-by-step and systematic way. Use information and communication technology to learn, work and solve problems efficiently, wisely and ethically.

Grade level indicators

Sc 2.1 Gr 2/1 Comparing the water absorption properties of materials using empirical evidence. and identifying the application of water absorbing properties of materials to be applied in making objects in everyday life.

Sc 2.1 Gr 2/2 Explain the observed properties of materials resulting from mixing of materials using empirical evidence.

Sc 2.1 Gr 2/3 Comparing the observed properties of materials. To be made into objects for use according to their intended use and explain the reuse of used materials using empirical evidence

Sc 2.1 Gr 2/4 Realize the benefits of recycling materials by recycling materials.

Sc 4.1 Gr2/1 Experiment and explain forces originating from a magnet.

Sc 4.2 Gr 2/2 Simple programming using software or media and checking for program errors

Sc 4.2 Gr 2/3 Use technology to create, categorize, search, store, and retrieve information according to its purpose.

Sc 4.2 Gr 2/4 Safe use of information technology Comply with computer sharing agreements. View and maintain basic equipment, use it properly.

Learning Objectives

Students will be able to:

1. Explore and classify objects by using properties of a magnetism as a criterion.
2. Conduct experiments and describe magnetic forces.
3. Conduct experiments and explain the concept of a magnetic field.
4. State the uses of magnets.

Concept:

Each type of material has different water absorbing properties, so it can be used to make objects for different purposes, for example:

Use a towel that absorbs a lot of water. Use plastic which does not absorb water to make umbrellas.

Some materials can be mixed to achieve the right properties. in order to take advantage as needed. For example, flour mixed with sugar and coconut milk is used to make Thai desserts, plaster mixed with paper pulp is used to make piggy banks, cement mixed with stone, sand and water is used to make concrete.

The use of materials as objects for their intended use depends on their properties. Used materials may be recycled, e.g., used paper may be used to make paper rockets. artificial flowers, bags.

Teaching and Learning Activities

1. Get a few magnets and show it to the class. Let them analyze the magnets and then inform them that that are many types of magnets of various shapes and sizes.
2. Teacher gives additional information that a magnet has two poles: a north pole and a south pole.
3. Ask some groups to find out and draw how to make the magnet attract other magnets as much as possible, and ask others group to find out and draw how to make the magnet repel other magnets as much as possible.

Competency:

1. Capacity for applying life skills
2. Thinking capacity

Chapter 4

Science (Sc12101)

Content: Light in everyday life **Time: 14 hours**

Strand 2 Physical Science

Standard Sc2.3: Understanding the meaning of energy. Transformation and energy transfer Interaction between matter and energy. Energy in daily life, the nature of waves, phenomena related to sound, light and electromagnetic waves, as well as applying knowledge to benefit.

Standard Sc 4.2: Understanding and use computational concepts to solve problems encountered in real life in a step-by-step and systematic way. Use information and communication technology to learn, work and solve problems efficiently, wisely and ethically.

Grade level indicators

Sc 2.3 Gr2/1 Describe the path of light from a light source. and explain the visualization of objects from empirical evidence

Sc 2.3 Gr 2/2 Recognizes the value of vision knowledge by suggesting ways to prevent the hazards of looking at objects in poorly lit areas.

Sc4.2 Gr2/1 shows a sequence of work steps or simple problem solving by using pictures, symbols or text.

Sc 4.2 Gr 2/2 Simple programming using software or media and checking for program errors

Sc 4.2 Gr 2/3 Use technology to create, categorize, search, store, and retrieve information according to its purpose.

Sc 4.2 Gr 2/4 Safe use of information technology Comply with computer sharing agreements. View and maintain basic equipment. use it properly.

Learning Objectives

Students will be able to:

- light source
- The movement of light.
- Preventing hazards caused by looking at objects in poorly lit areas.

Concept:

Light travels from the light source in all directions in a straight line. When the light from an object enters the eye, it will make the object visible. Seeing objects as light sources. The light from that object enters the eye directly, while the object that is not a light source is seen. There must be light from the light source hitting the object and then reflecting into the eye. If a very bright light enters the eyes, it can cause eye damage. Therefore, avoid looking at it or use a quality filter when necessary. And must adjust the brightness suitable for activities such as reading books, watching television screens using the phone mobile and tablet

Competency:

1. Thinking capacity
2. Capacity for technological application

Chapter 5

Science (Sc12101)

Content: Our Local Soil **Time: 10 hours**

Strand 3 Earth and Space Sciences

Standard Sc3.2: Understanding the components and relationships of the world system. The process of change within the Earth and on the Earth's surface. disaster weather change process and global climate Including the effect on living things and the environment.

Standard Sc 4.2: Understanding and use computational concepts to solve problems encountered in real life in a step-by-step and systematic way. Use information and communication technology to learn, work and solve problems efficiently, wisely and ethically.

Grade level indicators

Sc 3.2 Gr 2/1 Identify soil composition and classify soil types using soil texture and coagulation criteria.

Sc 3.2 Gr 2/2 Explain the use of soil. from the collected information.

Sc4.2 Gr2/1 shows a sequence of work steps or simple problem solving by using pictures, symbols or text.

Sc 4.2 Gr 2/3 Use technology to create, categorize, search, store, and retrieve information according to its purpose.

Sc 4.2 Gr 2/4 Safe use of information technology Comply with computer sharing agreements. View and maintain basic equipment. use it properly.

Learning Objectives

Students will be able to:

1. Conduct experiments and identify the characteristics of each type of soil.
2. Explore and present benefits of soil.

Concept:

Each kind of soil has different characteristics and properties. Soil can be classified into three main categories: clay soil, garden soil, and sandy soil, each of which is appropriate for different kinds of plants. Soil in the local area can be of use in various ways.

Teaching and Learning Activities

1. Teacher discuss the different types of soil have different physical properties.
2. Teacher explains additional information of three types of soil and their physical properties.
3. Teacher provides more additional information of water retention of each type of soil.
4. Teacher explains more information of uses of soils. Give examples of how we use soil.

Competency:

1. Capacity for applying life skills
2. Capacity for technological application

Course structure

Primary 3

Table analysis indicators standard of Science with the chapter

Code: Sc13101 Grade 3

No.	Standard	Chapter						
		1	2	3	4	5	6	Total
1.	Sc1.2 Gr3/1 Discuss various characteristics of living things and the growth of human and animal by using the collecting data.	2						**2**
2.	Sc1.2 Gr3/2 Realizing the advantage of food, water and air by taking care the living things for getting these appropriately	2						**2**
3.	Sc1.2 Gr3/3 Make model that explain the life cycle and compare the life cycle of some animals.	3						**3**
4.	Sc1.2 Gr3/4 Realizing the value of animal life by remain the animal life not affect their life	4						**4**
5.	Sc2.1 Gr3/1 Explain the objects that are made up of small parts that can be separated and made up of new ones by using empirical evidence			4				**4**

No.	Standard	Chapter						
		1	2	3	4	5	6	Total
6.	Sc2.1 Gr3/2 Explain the material changes when it is heated or cooled by using empirical evidence			4				**4**
7.	Sc2.2 Gr3/1 Specify the effect of force on the change in motion of an object from the empirical evidence		3					**3**
8.	Sc2.2 Gr3/2 Compare and give the examples of touch forces and non-touch forces that affect the movement of objects by using empirical evidence.		2					**2**
9.	Sc2.2 Gr3/3 Classify the objects by using the gravity with magnetism from empirical evidence.		3					**3**
10.	Sc2.4 Gr3/4 Specify magnetic poles and the effect that occurs between the poles when they are brought close to each other from empirical evidence.		3					**3**

No.	Standard	Chapter						
		1	2	3	4	5	6	Total
11.	Sc2.3 Gr3/1 Give the example of the convert one energy into another energy from empirical evidence.					4		**4**
12.	Sc2.3 Gr3/2 Describe the operation of generators, and specify energy sources in electricity generation from the collecting data.					3		**3**
13.	Sc2.3 Gr3/3 Realize of the benefits and harms of electricity by presenting ways to use electricity economically and safely					3		**3**
14.	Sc3.1 Gr3/1 Explain the cycle of the sunrise and sunset by using empirical evidence.						3	**3**
15.	Sc3.1 Gr3/2 Explain the phenomenon the causes of occurrence of the sun rise and sunset, day and night by using model						3	**3**

No.	Standard	Chapter						
		1	2	3	4	5	6	Total
16.	Sc3.1 Gr3/3 Realize the importance of the sun by explaining the benefits of the sun to living creatures.						2	**2**
17.	Sc3.2 Gr3/1 air composition, importance of air, and the impact of air pollution on living organisms.				3			**3**
18.	Sc3.2 Gr3/2 Realize the importance of air by present the practical guidelines for reducing air pollution.				3			**3**
19.	Sc3.2 Gr3/3 Explain the occurrence of wind from the empirical evidence.				3			**3**
20.	Sc3.2 Gr3/4 Describe the benefits and harms of the wind from the collecting data				3			**3**
21.	Sc4.2 Gr3/1Write the process of algorithm or solve the problem by using symbol picture or message	2						**2**

No.	Standard	Chapter						
		1	2	3	4	5	6	Total
22.	Sc4.2 Gr3/2 1Write the simple program by using software or media and check the error program.		1	2				**3**
23.	Sc4.2 Gr3/3 Use the internet for searching the information.				2			**2**
24.	Sc4.2 Gr3/4 Gather, processing and present the data by using software follow by the objectives.					1		**1**
25.	Sc4.2 Gr3/5 Use the information technology safely and practice follow by the agreement of using the internet.						2	**2**
Total		**13**	**12**	**10**	**14**	**11**	**10**	**70**

Table analysis indicators standard of Science with the chapter

Code: Sc13101 Grade 3

Standard	Points/Chapter						
	First semester			Second semester			Total
	1	2	3	4	5	6	
Sc 1.2 Gr. 3/1	2						2
Sc 1.2 Gr. 3/2	2						2
Sc 1.2 Gr. 3/3	1						1
Sc 1.2 Gr. 3/4	1						1
Sc 2.1 Gr. 3/1			1				1
Sc 2.1 Gr. 3/2			1				1
Sc 2.2 Gr. 3/1		1					1
Sc 2.2 Gr. 3/2		1					1
Sc 2.2 Gr. 3/3		1					1
Sc 2.2 Gr. 3/4		1					1
Sc 2.3 Gr. 3/1					1		1
Sc 2.3 Gr. 3/2					1		1
Sc 2.3 Gr. 3/3					1		1
Sc 3.1 Gr. 3/1						2	2
Sc 3.1 Gr. 3/2						1	1
Sc 3.1 Gr. 3/3						1	1
Sc 3.2 Gr. 3/1				2			2
Sc 3.2 Gr. 3/2				1			1
Sc 3.2 Gr. 3/3				1			1
Sc 3.2 Gr. 3/4				1			1

Standard	Points/Chapter						
	First semester			Second semester			Total
	1	2	3	4	5	6	
Sc 4.2 Gr. 3/1	1						**1**
Sc 4.2 Gr. 3/2		1	1				**2**
Sc 4.2 Gr. 3/3				1			**1**
Sc 4.2 Gr. 3/4					1		**1**
Sc 4.2 Gr. 3/5						1	**1**
Total	**7**	**5**	**3**	**6**	**4**	**5**	**30**
	15			**15**			**30**

Learning Time Structure Science

Code : Sc13101 **Science and technology**

Grade 3 **Time: 80 hours**

Chapter	Content	Standard of Science	Time (hours)	C.A.S Score	Final Examination
1	Related Life	Sc1.2: Gr3/1, Gr3/2, Gr3/3, Gr3/4 Sc4.2: Gr3/1	14	13	7
2	Forces and motion	Sc2.2: Gr3/1 Gr3/2, Gr3/3, Gr3/4 Sc4.2: Gr3/2	12	12	5
3	Objects and material around us	Sc2.1: Gr3/1, Gr3/2 Sc4.2: Gr3/2	14	10	3
Total Semester: 1st				**35**	**15**
4	Air	Sc3.2: Gr3/1, Gr3/2, Gr3/3, Gr3/4 Sc4.2: Gr3/3	15	14	6
5	Electricity	Sc2.3: Gr3/1, Gr3/2, Gr3/3 Sc4.2: Gr3/4	13	11	4
6	Sun Day Night and Direction	Sc3.1: Gr3/1, Gr3/2, Gr3/3 Sc4.2: Gr3/5	12	10	5
Total Semester: 2nd				**35**	**15**
Total score all year				**70**	**30**

Chapter 1

Science (Sc13101)

Content: Related Life **Time: 14 hours**

Strand 1: Biological science

Standard Sc1.2: Understanding of process and importance of genetic transmission; evolution of living things; biodiversity; application of biotechnology affecting humans and the environment; investigative process for seeking knowledge and scientific mind; communicating knowledge that could be applied for useful purpose.

Strand 4: Technology

Standard Sc 4.2: Understanding and use computational concepts to solve problems encountered in real life in a step-by-step and systematic way. Use information and communication technology to learn, work and solve problems efficiently, wisely and ethically.

Grade level indicators

Sc1.2 Gr3/1 Discuss various characteristics of living things in the immediate environment.

Sc1.2 Gr3/2 Compare and specify similar characteristics of parents and children.

Sc1.2 Gr3/3 Explain that the similar characteristics of parents and children originate from genetic transmission, and apply the knowledge gained for useful purposes.

Sc1.2 Gr3/4 Search for data and discuss kinds of extinct living things and kinds that exist in the present.

Sc4.2 Gr3/1 Write the process of algorithm or solve the problem by using symbol picture or message.

learning content

• Humans and animals need food, water and air to live and grow. Food helps the body to grow and grow. Water helps the body to function normally. Air is used to breathe.

• Food keeps the body healthy and growing, water helps the body function normally. air used to breathe

• An adult animal reproduces offspring. When the offspring grows to maturity, it reproduces further offspring. Continuous circulation is the life cycle of animals. Each animal such as butterfly, frog, chicken, human has a unique and different life cycle.

• Algorithms are steps used to solve problems.

• Algorithm representation. This can be done by writing, telling, drawing, or using symbols.

• Examples of problems such as Monopoly game, Snake and Ladder game, Tetris game, OX game, walking to the cafeteria, making classroom cleanliness.

Concept:

- All living things have the right characteristics for their natural habitat to survive and exist.
- Living things and the environment interrelate. Certain kinds of living things, having existed until now, must have the right characteristics for the environment, otherwise they will become extinct.

Teaching and Learning Activities

1. Lecture on things that are necessary for human life.
2. Concept map on recognizing the benefits of food, water and air.
3. Make a model animal life cycle.
4. Concept mapping about the realization of the value of animal life.
5. Algorithm demonstration activity sheet.

Competency:

1. Thinking capacity
2. Capacity for technological application

Chapter 2

Science (Sc13101)

Content: Forces and Motion **Time: 12 hours**

Strand 2: Physical science

Standard Sc2.2: Understanding of the nature of electromagnetic, gravitational and nuclear forces; investigative process of seeking knowledge and applying acquired knowledge for useful and ethical purposes.

Strand 4: Technology

Standard Sc 4.2: Understanding and use computational concepts to solve problems encountered in real life in a step-by-step and systematic way. Use information and communication technology to learn, work and solve problems efficiently, wisely and ethically.

Grade level indicators

Sc2.2 Gr3/1 Specify the effect of force on the change in motion of an object from the empirical evidence

Sc2.2 Gr3/2 Compare and give the examples of touch forces and non-touch forces that affect the movement of objects by

Sc2.2 Gr3/3 Classify the objects by using the gravity with magnetism from empirical evidence.

Sc4.2 Gr3/2 Write the simple program by using software or media and check the error. program.

Concept:

- Changing the movement of objects.
- Contact and non-contact force
- magnet
- Programming is the creation of a sequence of commands for the computer to perform tasks.
- Program examples, such as writing a program that instructs characters to repeat infinitely.
- Error detection You can do this by checking the command that gives you the error. Or if the results are not as desired, check the operation one command at a time.

Teaching and Learning Activities

1. Explain what force is including push and pull force.

2. Teacher gives more additional information about forces affect the movements of a stationary object and a moving object.

3. Explain gravitational force or force of gravity. Then explain how we measure gravitational force. Explain also the differences between weight and mass.

Competency:

1. Thinking capacity

2. Capacity for technological application

Chapter 3

Science (Sc13101)

Content: Objects and material around us **Time: 14 hours**

Strand 2: Physical science

Standard Sc2.1: Understanding of properties of substances; relationship between properties of substances and structures and binding forces between particles; investigative process for seeking knowledge and scientific mind; and communicating acquired knowledge for useful purposes.

Grade level indicators

Sc2.1 Gr3/1 Explain the objects that are made up of small parts that can be separated and made up of new ones by using empirical evidence

Sc2.1 Gr3/2 Explain the material changes when it is heated or cooled by using empirical evidence

Strand 4: Technology

Standard Sc4.2 : Understanding and using the computational concept to solve in daily life step by step. Also use the information technology for learning, searching and solving problem efficiently and ethical.

Grade level indicators

Sc4.2 Gr3/2 Write the simple program by using software or media and check the error program.

Learning Objectives

Students will be able to:

1. List the physical properties (hardness, color, size, shape, strength, buoyancy, flexibility) for metals, wood, rubber and plastics.

2. Conduct and explain how materials change when force or heat is applied.

3. Discuss and explain what are the benefits and harmful effects when material is changed.

Concept:

• Objects may be made up of smaller parts, each of which have the same characteristics, that when disassembled. Individual fragments of an object apart can take fragments. Those can be assembled into new objects, such as a wall of a house with many bricks assembled together. And can bring bricks from the wall of the house to assemble as a walkway.

• When heating or heating the material. and when reducing the heat or cooling the material The material will change, for example, the color will change, the shape will change.

• Programming is the creation of a sequence of commands for the computer to perform tasks.

• Program examples, for example, write a program that instructs the character to repeat infinite error detection. This can be done by checking the commands that give the error, or if the result is not as expected, check the operation one command at a time.

• Programming software or media, such as code cards, Code.org.

Teaching and Learning Activities

1. Explain more information of strength, hardness, buoyancy and flexibility of materials. Discuss and conclude about the physical properties of metals, wood, rubber and plastics.

2. Give more additional details of materials change when force or heat is applied.

Competency:

1. Problem-solving capacity

2. Capacity for applying life skills

Chapter 4

Science (Sc13101)

Content: Air **Time: 15 hours**

Strand 3 Earth and Space Sciences

Standard Sc3.2 Understanding Elements and relations of the world system, processes change within the world and on the earth's surface earthquake process, changes in the weather and global climate, including their effects on living organisms and environment

Strand 4 Technology

Standard 4.2 Understand and use computational concepts to solve problems encountered in real life in a step-by-step and systematic way, using information and communication technology in working learning. and solving problems efficiently and knowingly and ethical.

Grade level indicators

Sc3.2 Gr3/1 air composition, importance of air, and the impact of air pollution on living organisms.

Sc3.2 Gr3/2 Realize the importance of air by present the practical guidelines for reducing air pollution.

Sc3.2 Gr3/3 Explain the occurrence of wind from the empirical evidence.

Sc3.2 Gr3/4 Describe the benefits and harms of the wind from the collecting data

Sc4.2 Gr3/3 Use the internet for searching the information.

Learning Objectives

• The air is generally colorless and odorless. Composed of nitrogen, oxygen, carbon dioxide, other gases including water vapor and dust, air is essential to living things. If the air component is not suitable due to the presence of certain gases or dust in large quantities May harm various living organisms, classified as air pollutants.

• Wind is air that moves. Caused by the difference in air temperature near each other. The air in the area with high temperature will float higher. and the air in the lower temperature area will move in to replace

• Wind can be used as a renewable energy source to generate electricity. And utilized in various human activities if the wind moves at high speed can cause danger and damage to life and property.

• The Internet is a large network that allows communication easily and quickly and is a source of knowledge that helps in learning and life.

• A web browser is a program for reading documents on web pages.

• Searching for information on the Internet can be done by using websites for searching and having to set the right keywords to get the information you want.

• Knowledge information such as cooking methods, how to fold paper into different shapes, history information. Chat Thai (may be knowledge in other subjects or topics of interest at that time)

Concept:

- The energy sources including renewable and non-renewable energy are used to generate electricity. We should use electricity carefully and efficiently.

Teaching and Learning Activities

1. Conduct experiments and record experimental results on the components of air. describe the importance of weather.

2. Search for information and describe the importance of air to living things.

3. Search for information about air pollution to propose guidelines for conducting oneself in reducing air pollution.

4. Conduct experiments and record experimental results on observations and explanations of wind formation.

Competency:

1. Capacity for applying life skills

2. Capacity for technological application

Chapter 5

Science (Sc13101)

Content: Electricity **Time: 13 hours**

Strand 2: Physical science

Standard Sc2.3: Understanding of relationship between energy and life; energy transformation; interrelationship between substances and energy; effects of energy utilization on life and the environment; investigative process for seeking knowledge; and communication of acquired knowledge that could be applied for useful purposes.

Grade level indicators

Sc2.3 Gr3/1 Give the example of the convert one energy into another energy from empirical evidence.

Sc2.3 Gr3/2 Describe the operation of generators, and specify energy sources in electricity generation from the collecting data.

Sc2.3 Gr3/3 Realize of the benefits and harms of electricity by presenting ways to use electricity economically and safely

Strand 4: Technology

Standard Sc4.2 : Understanding and using the computational concept to solve in daily life step by step. Also use the information technology for learning, searching and solving problem efficiently and ethical.

Grade level indicators

Sc4.2 Gr3/4 Gather, processing and present the data by using software follow by the objectives.Sc8.1 Gr3/1 Pose questions about the matters to be studied as prescribed and in accord with their interests.

Learning Objectives

Students will be able to:

1. Explain how electrical energy is generated and list the energy sources to generate electricity.
2. Search for the information and list types of power stations and their sources to generate electricity.

3. Search for the information and generate ideas on how to conserve electricity.

4. List safety precautions when using electricity.

Concept:

- The energy sources including renewable and non-renewable energy are used to generate electricity. We should use electricity carefully and efficiently.

Teaching and Learning Activities

1. Explain what energy sources are. List the examples of energy sources.

2. Give more information that the energy sources can be categorized into renewable ones and non-renewable ones.

3. Explain more information about power stations. What do they use to generate electricity? How do they work?

Competency:

1. Capacity for applying life skills

2. Capacity for technological application

Chapter 6

Science (Sc13101)

Content: Sun/Day/Night and Direction (The rotation of earth) Time: 12 hours

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Strand 3: Astronomy and Space

Standard Sc3.1: Understanding of evolution of the solar system, galaxies and the universe; interrelationships within the solar system and their effects on living things on Earth; investigative process for seeking knowledge and scientific mind; and communication of acquired knowledge for useful purposes.

Grade level indicators

Sc3.1 Gr3/1 Explain the cycle of the sunrise and sunset by using empirical evidence.

Sc3.1 Gr3/2 Explain the phenomenon the causes of occurrence of the sun rise and sunset, day and night by using model

Sc3.1 Gr3/3 Realize the importance of the sun by explaining the benefits of the sun to living creatures.

Strand 4: Technology

Standard Sc4.2 : Understanding and using the computational concept to solve in daily life step by step. Also use the information technology for learning, searching and solving problem efficiently and ethical.

Grade level indicators

Sc4.2 Gr3/5 Use the information technology safely and practice follow by the agreement of using the internet.

Learning Objectives

Students will be able to:

1. Describe how day and night occur.
2. List the four cardinal directions – North, South, East and West.

Concept:

The Sun is a massive, self-illuminating star that is a vital source of energy for Earth. Because the sun provides heat and light energy to the world. Make living things use energy.

The Earth's rotation causes the Sun to appear in the daytime sky from one horizon and set on the other. make the world go into night time

The earth revolves around itself and revolves around the sun. cause the phenomenon of the rising and setting of the sun. And at the same time it sets up the time of day.

Information.

Technology (Information Technology) is the use of technology, storing, processing, exchanging or disseminating in various forms, the use of information technology safely. and the pros and cons of using information technology

Teaching and Learning Activities

1. Explain information of the rotation of the Earth.
2. Encourage students to answer before carry out Let's Try activity on page 115:

- Does the Sun rise and set in the same direction every day?
- In the sky is the Sun located on the same position all day long?
- Does the Sun disappear in the evening?
- Where is the Sun during at night?
- How can we prove that the sun is always rise the same direction every morning?

3. Teacher gives order to find out that the Sun rise and set in the same directions every day. Then, teacher gives more details that the Earth rotates around the Sun and at the same time spins around itself from the west to the east. Teacher then adds that the direction where the Sun rises and sets.

4. Teacher explains more details on how to find out the direction by using use the compass.

5. Explain how we can determine the four directions without using a compass but only based on the position of the Sun.

6. Let a student to stand under the Sun and ask him to determine the four directions. Ask students to remember always that the Sun rises from the East and sets in the West.

Competency:

1. Capacity for applying life skills

Course structure

Primary 4

Learning Time Structure Science

Grade 4: **- Continuous assessment score 70 points** **Time: 80 hours**

- Final examination 30 points

Chapter	Content	Standard of Science	Time (hours)	C.A.S Score	Final Examination
1	classification of living thing	Sc1.2: Gr4/1 Sc1.3: Gr4/1, Gr4/2, Gr4/3 Gr4/4	24	18	8
2	Gravitational Force	Sc2.2: Gr4/1, Gr4/2, Gr4/3	12	9	3
3	light	Sc2.3: Gr4/1	4	2	1
4	The technology	Sc4.2: Gr4/1, Gr4/3, Gr4/5	20	6	3
Total Semester: 1st				**35**	**15**
4	States of matter	Sc2.1: Gr4/1, Gr4/2, Gr4/3, Gr4/4	25	20	10
5	Solar System	Sc3.1: Gr4/1, Gr4/2, Gr4/3	15	10	3
6	The technology	Sc4.2: Gr4/2, Gr4/4	20	5	2
Total Semester: 2nd				**35**	**15**
Total score all year				**70**	**30**

Table analysis indicators standard of Science with the chapter

Code: Sc14101 Grade 4

No.	Standard	Chapter						
		1	2	3	4	5	6	7
1.	Sc1.2 Gr4/1 Describe the functions of roots, stems, leaves and flowers of flowering plants using data collected.	4						
2.	Sc1.3 Gr4/1 Classification of organisms using similarities and differences of the nature of the creature into a plant group. Animal and non-plant groups and animals..	4						
3.	Sc1.3 Gr4/2 Classification of plants into flowering plants and flowering plants with no flowers are a threshold. Using data collected.	2						
4.	Sc1.3 Gr4/3 Classifying animals into animals vertebrates and invertebrates, using vertebrates as a criterion by using the information collected.	4						

No.	Standard	Chapter						
		1	2	3	4	5	6	7
5.	Sc1.3 Gr4/4 Describe the characteristics observed in the group of vertebrate fish. The amphibian animals, reptiles, birds and mammals group.	4						
6.	Sc2.1 Gr4/1 Comparison of physical properties on hardness Elastic conditions, thermal conductivity And electrical conductivity of materials using empirical evidence From the experiment and specifying the application of the properties of hardness, elasticity, heat conductivity and electrical conductivity of materials to daily life through the work piece design process.					10		
7.	Sc2.1 Gr4/2 Exchange ideas with others in discussion about the physical properties of the material logically from the trial.					2		

No.	Standard	Chapter						
		1	2	3	4	5	6	7
8.	Sc2.1 Gr4/3 Compare the properties of matter from the 3 status information from observing mass like that. The shape and volume of the substance.					5		
9.	Sc2.3 Gr4/1 Classified the object as a transparent medium translucent medium And an opaque object From the looks of seeing things through objects that are based on empirical evidence.					3		
10.	Sc2.2 Gr4/1 Identify the effect of gravity against objects from empirical evidence.		3					
11.	Sc2.2 Gr4/2 Use the spring balance to measure the weight of the subject.		3					

No.	Standard	Chapter						
		1	2	3	4	5	6	7
12.	Sc2.2 Gr4/3 Describe an object's mass changes that affect the movement of objects from empirical evidence.		3					
13.	Sc3.1 Gr4/1 Describe the moon rise and fall route pattern Using empirical evidence.			2				
14.	Sc3.1 Gr4/2 Create a model that describes the shape of the change of shape. The appearance of the moon and the predictions of the appearance of the moon.						4	
15.	Sc 3.1 Gr 4/2 Build a model describing the apparent deformation of the Moon. and forecast the appearance of the moon						3	
16.	Sc3.1 Gr4/3 Create a model showing the composition of the solar system and explain Compare periods of planetary orbits various from the model.						3	

No.	Standard	Chapter						
		1	2	3	4	5	6	7
17.	Sc4.2 Gr4/1 Use logical reasoning to solve problems Explanation of the work Predicting results from a simple problem.				2			
18.	Sc4.2 Gr4/2 Easy design and programming by using software or media And check for errors and fix.						3	
19.	Sc4.2Gr4/3 Use the internet to search for knowledge. And assess the reliability of the information.				2			
20.	Sc4.2 Gr4/4 Gather, evaluate, present data an information by using software to solve problems in daily life.						2	
21.	Sc4.2 Gr4/5 Use information technology safely understand their rights and duties, respect the rights of others Notify relevant persons when finding inappropriate information or persons.				2			

Chapter 1

Science (Sc14101)

Content: classification of living thing **Time: 24 hours**

Strand 1: Biological science

Standard Sc1.1: Understanding basic units of living things; relationship between structures an functions of living things, which are interlinked; investigative process for seeking knowledge; ability to communicate acquired knowledge that could be applied to one's life and care for living things.

Standard Sc3.1 : Build a model describing the apparent deformation of the Moon. and forecast the appearance of the moon.

Grade level indicators

Sc1.2 Gr4/1 Describe the functions of roots, stems, leaves and flowers of flowering plants using data collected.

Sc1.3 Gr4/1 Classification of organisms using similarities and differences of the nature of the creature into a plant group. Animal and non-plant groups and animals.

Sc1.3 Gr4/2 Classification of plants into flowering plants and flowering plants with no flowers are a threshold. Using data collected.

Sc1.3 Gr4/3 Classifying animals into animals' vertebrates and invertebrates, using vertebrates as a criterion by using the information collected.

Sc1.3 Gr4/4 Describe the characteristics observed in the group of vertebrate fish. The amphibian animals, reptiles, birds and mammals' group.

Learning Objectives

Students will be able to:

- Functions of roots, stems and leaves
- Functions and components of flowers of flowering plants.
- Characteristics of living things.
- Flowering and non-flowering plants
- Animals and invertebrates.
- Characteristics of Vertebrate Animals

Concept:

There are different types of organisms that can be grouped using similarities and differences in characteristics such as: Plant groups can make their own food and cannot move on their own. A group of omnivorous and mobile animals that are not plants and animals such as fungi, fungi, microorganisms.

Flowering can be used as a criterion to classify plants as flowering and non-flowering plants. Vertebrate classification can be used as a criterion to classify animals as vertebrates. and invertebrates.

There are several groups of vertebrates, including fish, amphibians, and amphibians. group of reptiles. Birds and mammal groups Each group has its own observable characteristics.

Teaching and Learning Activities

1. Students should conclude that there are tubes to carry water from the roots to other parts in a plant.

2. Teacher gives more additional details of plant transport system.

3. Plants also need adequate of water to grow healthily. Some plants need more water and some need less water. Ask students to design an experiment and predict. Students should conclude that plants need water to grow. Teacher explains more details about plants which need water to survive.

4. Teacher explains more additional details about effects of space, temperature, and minerals on plant growth.

5. Explain that green plants make their own food through photosynthesis.

6. Inform students that different animals respond differently to the same stimulus.

7. Ask students to give some examples of animals that are active at night. Some animals move away from light.

8. When the weather is hot, how do some animals respond? What happens when it is cold?

9. What happens when animals hear some sounds or noises? Give other examples of animals that give different responses to sound.

Competency:

1. Thinking capacity

2. Capacity for applying life skills

3. Capacity for technological application

4. Communication capacit

Chapter 2

Science (Sc14101)

Content: Gravitational Force **Time: 12 hours**

Strand 2: Physical science

Standard Sc2.2: Understand the nature of force in everyday life the effect of force applied to an object various type of motion of objects, including the use of knowledge.

Grade level indicators

Sc2.1 Gr4/1 Explore and explain soil formation.

Sc2.2 Gr4/2 Specify kinds and properties of soil used for growing plants in the local area.

Sc2.2 Gr4/3 Describe an object's mass changes that affect the movement of objects from empirical evidence.

Learning Objectives

Students will be able to:

- Earth's gravity
- The weight of the object.
- Mass of an object
- Mass and motion of an object.

Concept:

Earth's gravity is the gravitational force that the Earth exerts on an object directed toward the center of the Earth and is a non-contact force that the Earth exerts on an object. Makes the object fall to the earth and gives the object its weight. measure the weight of an object
Obtained from spring scales The weight of an object depends on its mass. An object with a high mass will have more weight than an object with a low mass will weigh less.

Mass is the total amount of matter that makes up an object. This affects how easy it is to change the motion of an object. High-mass objects are more difficult to change motion than low-mass objects. Therefore, the mass of an object not only refers to the entire body of the object, but also to its resistance to changes in its motion.

Teaching and Learning Activities

1. Students identify the effect of gravity on objects from empirical evidence.

2. Students use spring scales to measure the weight of objects.

3. Students describe the mass of an object that affects the change in its motion based on empirical evidence.

Competency:

1. Capacity for applying life skills

Chapter 3

Science (Sc14101)

Content: Light **Time: 3 hours**

Strand 2: Physical science

Standard Sc3.2: Understanding of principles and nature of change in the state of substances; solution formation; chemical reaction; having investigative process for seeking knowledge and scientific reasoning; and communicating acquired knowledge that could be applied for useful purposes.

Grade level indicators

Sc2.3 Gr4/1 Pose questions about the issues, matters or situations to be studied as prescribed and in accord with their interest.

Learning Objectives

Students will be able to:

1. Conduct experiment and describe how light travels and what happens when light hits an object.
2. Conduct experiment and describe reflection and refraction of light and how we make use of them.
3. Conduct experiment and describe how a rainbow is formed.
4. Conduct experiment and describe the colors in a rainbow in the correct order.
5. Conduct experiment and describe how we see colored objects.
6. Conduct experiment and describe how light energy is transformed into electrical energy.

Concept:

- Light travels from its origin in a straight line in all directions.
- When light strikes an object, the reflection of light appears. The angle of incidence is equal to the angle of reflection.
- Objects can be classified into three types (transparent object, translucent object, and opaque object) based on visual characteristics from sources of light.

- When white light passes through the prism, dispersion of white light appears as colored light.
- A device that changes light energy into electrical energy is called a solar cell.

Teaching and Learning Activities

1. Ask students to name things that give out light. They are known as luminous objects. What are things that do not give out light known as...?
2. Explain more information about how light travels.
3. Explain students more about umbra and penumbra shadow.
4. Ask and explain to students by showing some examples of how we use transparent, translucent and opaque objects in our daily life.
5. Explain reflection of light when light falls on smooth surface and rough surface.
6. Explain when light enters different media, the light is bent. Explain how this happen.
7. Explain that we can use prism to produce rainbow too. Rainbow is produced due to dispersion of Light.
8. Explain that by combining the colors of rainbow we will get white color.
9. Explain how we see colors. Ask them to think about:
    - Why do a leaf look green and a goose look white?
    - Why do some objects such as shoes look black?
10. Explain that there are devices that can change light energy into electrical energy.

Competency:

1. Capacity for applying life skills
2. Thinking capacity
3. Capacity for technological application

Chapter 4

Science (Sc14101)

Content: States of matter **Time: 22 hours**

Strand 4: the technology

Standard Sc4.2 Understand and use computational concepts to solve real life problems step by step and systematically use information and communication technology to learn, work, and solve problems efficiently, knowingly and ethically**.**

Grade level indicators

Sc4.2 Gr4/1 Use logical reasoning to solve problems Explanation of the work predicting results from a simple problem.

Sc4.2 Gr4/3 Select accurate and appropriate instruments for exploration and verification.

Sc4.2 Gr4/5 Pose new questions for subsequent exploration and verification.

verification.

Learning Objectives

- Logical problem solving.
- Internet use.
- Use of information technology.

Concept:

Logical reasoning is the use of rules or conditions that cover all cases to be considered in solving work description problems. or forecasting outcomes Assessing the credibility of information, such as considering the type of website (government agency, news agency, organization), author, date of publication, citation

When getting the required information from various websites. The content must be taken into account and compared and selected information that is consistent and related.

Making a report or presenting information must bring the information to be compiled. Summarize in your own language appropriate to your target audience and presentation methods. (Integrated with science and technology subjects). Safe use of information technology.

Understanding their rights and obligations, respect the rights of others, such as not creating false statements and sending them to others Do not cause trouble to others by sending spam chain message Forward posts containing other people's personal information Send invites play games no access to private data or other people's homework without permission. Do not use other people's computers/accounts. Courteous and tactful communication

Protecting personal information such as logging out when stop using don't say password, do not give identification number.

Teaching and Learning Activities

1. Use logical reasoning to solve problems. Describing work, forecasting results from simple problems.

2. Use the Internet to search for knowledge. and assess the credibility of the information

3. Safe use of information technology understand their rights and duties respect for the rights of others Notify relevant people when information or people are found inappropriate.

Competency:

1. Problem-solving capacity

2. Capacity for applying life skills

Chapter 5

Science (Sc14101)

Content: Material and matter **Time: 25 hours**

Strand 2 Physical Science

Standard Sc 2.1 Understanding properties of matter. constituents of matter. The relationship between the properties of matter and structure and the force of attraction between particles. Principles and nature of change of state of matter. solution generation and chemical reactions.

Grade level indicators

Sc2.1 Gr4/1 Comparison of physical properties on hardness Elastic conditions, thermal conductivity. And electrical conductivity of materials using empirical evidence From the experiment and specifying the application of the properties of hardness, elasticity, heat conductivity and electrical conductivity of materials to daily life through the work piece design process.

Sc2.1 Gr4/2 Exchange ideas with others in discussion about the physical properties of the material logically from the trial.

Sc2.1 Gr4/3 Compare the properties of matter from the 3 status information from observing mass like that. The shape and volume of the substance.

Sc2.3 Gr4/1 Classified the object as a transparent medium translucent medium And an opaque object From the looks of seeing things through objects that are based on empirical evidence.

Sc2.1 Gr4/4 Use instruments to measure the mass and volume of all 3 states of matter.

Learning Objectives

- Physical properties of materials.
- Part design
- Matter and states of matter
- Properties of matter
- Measurement of the mass and volume of matter.

Concept:

Different materials have different physical properties. Hard materials are resistant to abrasion. Elastic materials change shape when applied to force and revert to their original shape. Thermally conductive materials heat up quickly when heated. and conductive materials allow electric current to pass through them Therefore, various properties may be taken into consideration. to be used in the design process for use in daily life.

Teaching and Learning Activities

1. Students compare physical properties in hardness, elasticity, thermal conductivity and electrical conductivity of the material by using empirical evidence from experiments and identifying the properties of hardness, flexibility, thermal conductivity and electrical conductivity of materials used in daily life through the design process.

2. Students exchange ideas with others by rationally discussing the physical properties of materials from experiments.

3. Students compare the properties of the 3 states of matter from the data obtained from the mass observations. the need for address, shape, and volume of matter

4. Students use tools to measure mass and the volume of all three states of matter.

Competency:

1. Thinking capacity

2. Capacity for technological application

Chapter 5

Science (Sc14101)

Content: Solar System **Time: 15 hours**

Strand 3: Earth and Space Science

Standard Sc3.1: Understand the components, characteristics, birth processes And the evolution of the universe, galaxies, stars, and the solar system, including the interactions within the solar system that affect living things and the application of space technology.

Grade level indicators

Sc3.1 Gr4/2 Create a model that describes the shape of the change of shape. The appearance of the moon and the predictions of the appearance of the moon.

Sc 3.1 Gr 4/2 Build a model describing the apparent deformation of the Moon. and forecast the appearance of the moon

Sc3.1 Gr4/3 Create a model showing the composition of the solar system and explain compare periods of planetary orbits various from the model.

Learning Objectives

Students will be able to:

1. Search for the information and describe the Sun and the planets in the Solar System.
2. Describe the characteristics of planets.
3. Describe the natural satellites, asteroids, meteoroids, meteors, meteorites, and comets.

Concept:

- The Solar System consists of the Sun with planets in orbit around it. The planets are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.
- The other bodies in the Solar System include the natural satellites, numerous comets, asteroids, and meteoroids.

Teaching and Learning Activities

1. Show students a picture of our Solar System. Ask them to count the number of big objects in it. Tell them that the biggest object in the Solar System is our Sun. Emphasize that the Sun is a star, burning ball of hot gas.

2. Explain about gravitational force of the Sun.

3. Explain composition and size of the Sun, why the sun looks small, sunspots, prominences and solar flare of the Sun.

4. Enhance students to think about safety precautions when we observe the Sun and advantages of the Sun to living things.

5. Explain that there are 8 planets in the Solar System. Explain a planet does not give out light and heat but a star does.

6. Explain more scientific knowledge about why there were 9 stars in our Solar System. Teacher should emphasize nature of science as well that scientific knowledge can be changed when we have more and better technology to study or observe.

7. Explain students about how scientists study space science, and examples of some organizations or foundation which study space science.

8. Explain that besides planets, satellites and the Sun, there are other bodies in our Solar System. Explain that satellites are smaller objects that orbit a planet. Explain that our Moon is a satellite for our Earth. Some planets such as Jupiter and Saturn have more than 50 natural satellites each. Show pictures of the Moon and explain more believe of the Moon in Thailand and other countries. Teacher may explain more about why we see many shapes of the Moon on different nights. This is known as the Phases of the Moon.

9. Explain the differences between meteoroids, meteors and meteorites. They are actually referred to the same objects but at different locations. Give further information of asteroid hit the Earth 65 million years ago.

10. Explain about comets that are lumps of ice and dust and orbit around the Sun in huge orbit.

11. Explain more about the largest meteorite in Africa in 1920.

Competency:

1. Thinking capacity

2. Capacity for technological application

Chapter 7

Science (Sc14101)

Content: The Technology **Time: 20 hours**

Strand 4: the technology

Standard Sc4.2 Understand and use computational concepts to solve real life problems step by step and systematically use information and communication technology to learn, work, and solve problems efficiently, knowingly and ethically**.**

Grade level indicators

Sc4.2 Gr4/2 Plan for observation and propose methods for exploration, verification, study and research, and form expectations of what is to be found from the exploration and verification.

Sc4.2 Gr4/4 Make a record of quantitative data, and present conclusion of results, verification.

Learning Objectives

Students will be able to:

1. Explain how electrical energy is generated and list the energy sources to generate electricity.

2. Search for the information and list types of power stations and their sources to generate electricity.

3. Search for the information and generate ideas on how to conserve electricity.

4. List safety precautions when using electricity.

Concept:

Simple program design, such as storyboard design or algorithm design

Programming is the creation of a sequence of instructions that the computer performs. In order to get the desired results, if there is an error, check the operation one command at a time. When a point is found that makes the result inaccurate Keep editing until the correct result is obtained.

- Example programs with stories such as interactive storybooks with short cartoons tell daily routine animation.

- Practicing detecting errors in other people's programs will improve root cause skills better.

- Programming software such as Scratch, logo

- Use of relevant, concise keywords will result in quick and relevant results.

- data collection is possible by specifying the required topics Preparing equipment for taking notes.

- Simple operations such as comparison, grouping, sorting, summation

- Analyze the results and make possible alternatives. Evaluate alternatives (compare, judge)

- The presentation of information can be done in many ways as appropriate, such as telling, reports, posters, presentation programs.

Using software to solve everyday problems, such as exploring lunch menus using software create a questionnaire and collect data Use spreadsheet software to process the data. collect information about values. Use the software to present alternative food survey results and nutrition information.

Teaching and Learning Activities

1. Simple design and programming using software or media and check for errors and fix them.

2. Collect, evaluate, present data and information. Using a variety of software to solve everyday problems.

Competency:

1. Capacity for applying life skills

2. Capacity for technological application

Course structure

Primary 5

Course structure

Course Code: 15101 **Science Learning Substance Group**

Grade 5 **80 hours**

Unit	Learning unit name	Learning standards / indicators	Time (Hour) 80	Weight point (100)	
				Between sectors 70	final 30
1	Organisms and the environment	S 1.1 P. 5/1, P 5/2, P. 3/3, P. 5/4 S 1.3 P. 5/1, P. 5/2	14	10	5
2	Changes in matter	S 2.1 P. 5/1, P. 5/2, P. 3/3, P. 5/4	15	12	5
3	Sound and hearing	S.2.3 P. 5/1,P. 5/2, P. 3/3, P. 5/4, P. 5/5	11	8	3
4	Information Technology (Computational Science) 1	S4.2 P. 5/1, P. 5/2	20	5	2
Total term 1				**35**	**15**
4	Everyday force	S 2.2 Por. 5/1, P. 5/2, P. 5/3, P. 5/4, P. 5/5	13	10	4
5	Starry sky	S 3.1 P. 5/1, P. 5/2	13	10	4
6	Water source and weather	S3.2 P. 5/1, P. 5/2, P. 3/3, P. 5/4, P. 5/5	11	7	2
7	Information Technology (Computational Science) 2	S 4.2 Por. 5/1, P. 5/2, P. 3/3, P. 5/4, P. 5/5	16	12	6
Total term 2				**35**	**15**
Total throughout the academic year				**70**	**30**

Table analysis indicators standard of Science with the chapter

Code: Sc15101 Grade 5

No.	Standard	Chapter						
		1	2	3	4	5	6	7
1.	Sc1.1 Gr5/1 Describe the structure and characteristics Sc1.1 Gr5/1 Describe the structure and characteristics of living organisms that are suitable for living as a result of adaptation of living organisms in each location.	2						
2.	Sc1.1 Gr5/2 Explain the relationship between living things and living things. And the relationship between living things and non-living things for the benefit of living.	2						
3.	Sc1.1 Gr5/3 Write a food chain and identify the roles and responsibilities of organisms that are producers and consumers in the food chain.	2						

No.	Standard	Chapter						
		1	2	3	4	5	6	7
4.	Sc1.1 Gr5/4 Realize the value of the environment towards The existence of living things with Participate in protecting the environment.	1						
5.	Sc1.3 Gr5/1 Describe the genetic traits that are transmitted from parents to children of plants, animals. And humans.	2						
6.	Sc1.2 Gr5/2 Show curiosity by asking questions about your own similar characteristics to your parents.	1						
7.	Sc2.1 Gr5/1 Explain the status change of matter When the substance heats or cools down Using empirical evidence.		32					
8.	Sc2.1 Gr5/2 Describe the dissolution of substances in water Using empirical evidence.		3					

No.	Standard	Chapter						
		1	2	3	4	5	6	7
9.	Sc2.1 Gr5/3 Analyse changes in substances When chemical changes occur Using empirical evidence.		3					
10.	Sc2.1 Gr5/4 Analyse and identify irreversible changes and irreversible changes.		3					
11.	Sc2.2 Gr5/1 Explain how to find the net force of the same forces acting on an object in the event that the object is at rest from an empirical evidence.					2		
12.	Sc2.2 Gr5/2 Draw a diagram showing the force acting on an object that is aligned and the net force acting on the object.					2		
13.	Sc2.2 Gr5/3 Use a spring scale to measure the force exerted on an object.					2		
15.	Sc2.2 Gr5/5 Write a diagram showing friction and force. In the same line that is acting on an object.					2		

No.	Standard	Chapter						
		1	2	3	4	5	6	7
16.	Sc2.3 Gr5/1 Explain hearing through an intermediary From empirical evidence			2				
17.	Sc2.3 Gr5/2 Identify experimental variables and explain Characteristics and occurrence of highs and lows.			2				
18.	Sc2.3 Gr5/3 Design the experiment and explain The appearance and occurrence of loud noises, gradually.			2				
19.	Sc2.3 Gr5/4 Measure sound levels using sound level meter.			1				
20.	Sc2.3 Gr5/5 Aware of the value of sound knowledge by suggesting ways to avoid and reduce noise pollution.			1				
21.	Sc3.1 Gr5/1 Compare different planets and stars from models.						3	

No.	Standard	Chapter						
		1	2	3	4	5	6	7
22.	Sc3.1 Gr5/2 Use the star map to specify the location and route. Rise and fall of stars in the sky And explain the pattern of the rise and fall route Of stars in the sky during the year .						4	
23.	Sc3.2 Gr5/1 Compare the amount of water in each source. And specify the amount of water that humans can use From the information collected.						2	
24.	Sc3.2 Gr5/2 Recognizing the value of water by offering guidelines Economical water use and water conservation.						1	
25.	Sc3.2 Gr5/3 Create a model that describes circulation. Of water in the water cycle.						3	
26.	Sc3.2 Gr5/4 Compare the process of clouds, fog, dew and frost from the model.						3	

No.	Standard	Chapter						
		1	2	3	4	5	6	7
27.	Sc3.2 Gr5/5 Compare the process of precipitation, snow, and hail from the data collected.						3	
28.	Sc4.2 Gr5/1 Use logical reasoning to solve problems Explanation of the work Forecasting results From a simple problem.				2			
29.	Sc4.2 Gr5/2 Design and write programs that use simple logical reasoning. Check for errors and fix.				3			
30.	Sc4.2 Gr5/3 Use the internet to search for information. Communicate and work together. Assess data reliability.							2
31.	Sc4.2 Gr5/4 Gather, evaluate, present data and information According to the purpose by using various software or services on the internet To solve everyday problems.							2

No.	Standard	Chapter						
		1	2	3	4	5	6	7
32.	Sc4.2 Gr5/5 Use information technology safely, have manners, understand your rights and duties. Respect the rights of others. Notify relevant persons when finding inappropriate information or persons.							2

Chapter 1

Science (Sc15101)

Content: Organisms and the environment **Time: 14 hours**

Strand 1: Organisms and living processes

Standard Sc1.1: Understand the basic units of life Relationship of structure And functions of various systems Of living organisms that work together There is a process of searching for knowledge Communicate what is learned and apply knowledge to their own lives and take care of living things

Understand the process and importance of inheritance, evolution, life Biodiversity The process of biotechnology that affects humans and the environment There is a process of searching for knowledge and mental science. Communicate what is learned And apply knowledge to benefit

Standard Sc1.3: Understand the process and importance of inheritance, evolution, life Biodiversity The process of biotechnology that affects humans and the environment There is a process of searching for knowledge and mental science. Communicate what is learned And apply knowledge to semistandard

Grade level indicators

Sc1.1 Gr5/1 Describe the structure and characteristics of living organisms that are suitable for living as a result of adaptation of living organisms in each location.

Sc1.1 Gr5/2 Explain the relationship between living things and living things. And the relationship between living things and non-living things for the benefit of living.

Sc1.1 Gr5/3 Write a food chain and identify the roles and responsibilities of organisms that are producers and consumers in the food chain.

Sc1.1 Gr5/4 Realize the value of the environment towards The existence of living things with Participate in protecting the environment.

Sc1.3 Gr5/1 Describe the genetic traits that are transmitted from parents to children of plants, animals and humans.

Sc1.3 Gr5/2 Show curiosity by asking questions about your own similar characteristics to your parents.

Learning Objectives

1.Students divide into groups to study different survey grid patterns.

2. Students design surveys. Organisms that live in the same place

3. Students survey and record data

4. Students summarize the findings of the creature survey and present it in front of the class.

5. Students watch a VCD about relationship between living things and living things.

6. Students share a discussion by watching a VCD. and summarize the discussion, record the results

7. Students apply their knowledge to design images to communicate and explain the relationship between living things and living things by writing food chains.

8. Students split into groups Search for information and draw a picture of the relationship between living organisms and living things and environment.

9. Students take natural resources and environment quizzes.

10. Searching for information and reporting the results of surveying and observing the genetic characteristics of oneself and their family members.

11. Searching for genetic inheritance and variation of living things.

Concept:

Plants are living things, including flowers and flowers. Which can reproduce both sex and non-sex, whereas animals are living things Which can reproduce both sexually and without sex.

Teaching and Learning Activities

1. Observe the characteristics of local flowering plants and non-flowering plants.

2. Discuss and present the observation results, draw a plant classification map.

3. Surveying double-cotyledon and monocotyledon plants.

4. Discuss and present survey results.

5. Write a mind map showing the classification of cotyledon plants, single cotyledon.

6. Observe the characteristics and components of flowers.

7. Discuss the components of flowers related to reproduction.

8. Record structures related to the reproduction of flowering plants.

9. Search for information and discussion about flowering plants that are sexual and non-sexual reproduction.

10. Experiment and observe about plant propagation, seeding, cuttings, graft, persistent graft, graft, shoot and tissue culture.

11. Searching for information and discussion.

12. Write a diagram of the life cycle of plants.

13. Explore local animals.

14. Search for information about animal types.

15. Write a mind map showing the classification of animals.

16. Searching for information and discussion.

17. Search and report the survey results and observe the genetic characteristics of yourself and the family.

18. Search for information on inheritance and variation in living organisms.

Competency:

1. Ability to think.

2. Ability to solve problems.

3. Ability to use technology.

Chapter 2

Science (Sc15101)

Content: Substances and Properties of Substances **Time: 15 hours**

Strand 3: Substances and Properties of Substances

Standard Sc2.1: Understanding of properties of substances; relationship between properties of substances and structures and binding forces between particles; investigative process for seeking knowledge and scientific mind; and communicating acquired knowledge for useful purposes.

Grade level indicators

Sc2.1 Gr5/1 compare different planets and stars from models.

Sc2.1 Gr5/2 Use the star map to specify the location and route. Rise and fall of stars in the sky and explain the pattern of the rise and fall route of stars in the sky during the year.

Sc2.1 Gr5/3 Analyse changes in substances When chemical changes occur Using empirical evidence.

Sc2.1 Gr5/4 Analyse and identify irreversible changes and irreversible changes.

Learning Objectives

Students will be able to:

1. Properties of materials with elasticity, hardness, toughness, thermal conductivity, electrical conductivity and density.

2. Use of materials in daily life.

Concept:

Each material has different properties such as flexibility, hardness, toughness, thermal conductivity. Electrical conductivity and density which these treasures can be utilized.

Teaching and Learning Activities

1. Surveying various materials within the classroom and separating the materials into categories

2. Surveying various materials within the home into categories.

3. Test the properties of various materials. Regarding flexibility, hardness, toughness, thermal conductivity, electrical conductivity.

4. Share the experience of the discoveries of scientists about density (Archimedes) inventing a simple mass scale.

5. Searching for information, discussion, summarizing the properties of various materials save as a mind map.

6. Searching for information and discussion on the use of materials in daily life and collect pictures about various materials in the scrapbook.

7. Take the test after studying.

Competency:

1. Ability to think.
2. Ability to solve problems.
3. Ability to use technology.

Chapter 3

Science (Sc15101)

Content: Forces and Motion **Time: 11 hours**

Strand 2:Forces and Motion

Standard Sc 2.3: understand the meaning of energy transformation and transfer Interactions between matter and energy daily life natural energy of phenomena related to sound, light and electromagnetic waves as well as putting knowledge to good use

Grade level indicators

Sc5.1 Gr5/1 Experiment and explain origin and propagation of sound.

Sc5.1 Gr5/2 Experiment and explain origin of high pitched and low-pitched sound.

Sc5.1 Gr5/3 Experiment and explain loud and soft sound.

Sc5.1 Gr5/4 Explore and discuss detrimental effects of listening to excessively loud sounds.

Learning Objectives

Students will be able to:

1. Sound generation and movement of sound
2. Highs, lows
3. Loud noises
4. Dangers that occur when listening to very loud sounds.

Concept:

The sound is caused by the vibration of the object. Helping living organisms communicate But if it is at a level that is too loud, it can be harmful to the receptors.

Teaching and Learning Activities

1. Observe the different sounds Everyday life Ask questions and give examples
2. Divide the experimental group into the occurrence of the sound, observe the results, record the discussion results and summarize the experiment results.
3. Divide the experimental group on the middle of the sound, high / low volume, loud / low level.
4. Observe, record, debate, conclude.

5. Searching for information about the ear (Ear components each part's duties and maintenance)

6. Write a diagram showing the process of hearing.

7. Surveying / studying various sounds at a noise level of more than 80 decibels, indicating a disadvantage and suggesting preventive measures.

8. Design and create sound toys.

9. Presentations.

10. Do exercises and tests.

Competency:

1. Ability to think.

2. Ability to solve problems.

3. Ability to use technology.

Chapter 4

Science (Sc15101)

Content: Information Technology (Computational Science) 1 **Time: 20 hours**

Standard 4 : Technology

Standard Sc 4.2 Understand and use computational concepts to solve problems encountered in real life in a step-by-step and systematic way; use information and communication technology in learning, working, and solving problems efficiently and wisely and ethical.

Grade level indicators

Sc4.2 Gr5/1 Use logical reasoning to solve problems Explanation of the work Forecasting results from a simple problem.

Sc4.2 Gr5/2 Design and write programs that use simple logical reasoning. Check for errors and fix.

Learning content

• Logical reasoning is the use of rules. or conditions that cover all cases to be considered in solving problems work description or predicting the initial state results of different operations will produce different results.

• Examples of problems such as Sudoku game, number prediction program geometry generator

• According to input data Prioritizing household chores during the holiday's placement in the kitchen

• Program design can be done by text or flowcharts.

• Designing and writing programs that have a comprehensive condition check in order to get the correct result that meets the requirements.

• If there is an error, check the operation one command at a time. When finding a point that makes the result inaccurate, make corrections until the correct result is obtained.

• Practice detecting errors from other people's programs. It will help develop the skills to find the cause of the problem better.

• Examples of programs such as programs to check even numbers, odd numbers, programs to receive weight or height data and show the results of the body's balance

• The program commands the characters to follow the conditions that are set by the software used for programming such as Scratch, logo.

Teaching and Learning Activities

1. Able to design solutions to daily life problems using logical reasoning
2. Explain work processes or solutions. using different concepts
3. Explain work processes or problem solving using various concepts.
4. Describe the process of program design by writing a flowchart.
5. Describe the sequence of programming steps with Scratch.
6. Explain how to properly detect program errors.

Competency:

1. Ability to think.
2. Ability to solve problems.
3. Ability to use technology.

Chapter 5

Science (Sc15101)

Content: Everyday force **Time: 13 hours**

Strand 2 Physical Science

Standard Sc 2.2 Understanding the nature of forces in everyday life. Effect of force acting on an object move different types of objects, including applying knowledge to benefit

Grade level indicators

Sc2.2 Gr5/1 Explain how to find the net force of the same forces acting on an object in the event that the object is at rest from empirical evidence.

Sc2.2 Gr5/2 Draw a diagram showing the force acting on an object that is aligned and the net force acting on the object.

Sc2.2 Gr5/3 Use a spring scale to measure the force exerted on an object.

Sc.2.2 Gr.5/4 Identify the effect of friction on changing the motion of an object from empirical evidence.

Sc2.2 Gr5/5 Write a diagram showing friction and force. In the same line that is acting on an object.

Learning Objectives

Students will be able to:

1. The diagram shows the force acting on aligned objects and the resultant force acting on the object.

2. Diagram showing friction and aligned forces acting on an object.

3. Conceptual diagram, advantages and disadvantages of friction.

4 Benefits of Friction and the potential dangers caused by friction

Concept:

Friction is useful in many everyday activities. To take advantage of friction, some activities must reduce friction. and in some activities to increase friction.

Teaching and Learning Activities

1. Experiment kicking football, opening the door, tug of war, and discussing the results of the activity.

2. The experiment of weighing an object using 1 scale and 2 scales and then combining the weights from 2 scales to compare with the value of 1 scale.

Competency:

1. Ability to think
2. Ability to solve problems
3. Ability to use technology

Chapter 6

Science (Sc15101)

Content: Starry sky **Time: 11 hours**

Strand 3: Astronomy and space

Standard Sc3.1: Understanding of evolution of the solar system, galaxies and the universe; interrelationships within the solar system and their effects on living things on Earth; investigative process for seeking knowledge and scientific mind; and communication of acquired knowledge for useful purposes.

Grade level indicators

Sc 3.1 Gr5/1 Compare the differences of planets and stars from the model.

Sc 3.2 Gr 5/2 Use star maps to identify locations and routes of rising and setting of stars in the sky and describe the pattern of the rising and setting paths of the stars in the sky during the year.

Learning Objectives

Students will be able to:

The occurrence of direction and phenomenon of stars using the star map.

Concept:

Phenomenon rise the stars can tell the direction

Teaching and Learning Activities

1. Sing "direction" and discuss.
2. Observe and discuss the 8 directions.
3. Discuss directions about using compass or stars.
4. Search basic information about stars, stars in the sky and discuss together.
5. Study the position of stars with elevation angles. From using the degrees of fingers and hands written to explain knowledge about stars.
6. Test the elevation angle of the peak of the school's top, from the field point in front of the flagpole.
7. Record comparative data, debate.
8. Study and try out the star map.

9. Observe and watch the stars in the sky at night, save the data to check with the star map.

10. Take the test.

Competency:

1. Ability to think

2. Ability to solve problems

3. Ability to use technology

Chapter 7

Science (Sc15101)

Content: Water source and weather **Time: 16 hours**

Strand 3: Astronomy and space

Standard Sc3.1: Understanding of evolution of the solar system, galaxies and the universe; interrelationships within the solar system and their effects on living things on Earth; investigative process for seeking knowledge and scientific mind; and communication of acquired knowledge for useful purposes.

Grade level indicators

Sc 3.1 Gr5/1 Compare the differences of planets and stars from the model.

Sc 3.2 Gr 5/2 Use star maps to identify locations and routes of rising and setting of stars in the sky and describe the pattern of the rising and setting paths of the stars in the sky during the year.

Sc3.2 Gr5/4 Compare the process of clouds, fog, dew and frost from the model.

Sc3.2 Gr5/5 Compare the process of precipitation, snow, and hail from the data collected.

Learning Objectives

Students will be able to:

The water cycle is the circulation of water that has a repeating pattern. And continuously between atmospheric water, surface water and ground water, where the behavior of plant and animal life will affect the water cycle.

Concept:

Our planet covers most of the surface of the earth with water. with both saltwater and freshwater sources which is important to the life of living beings The amount of fresh water available to humans is very small. We therefore use water sparingly and together conserve water.

Teaching and Learning Activities

1. Review the elements of air
2. Experiment with clouds, fog, rain, and record and present the experimental results.
3. Observe, draw, and write descriptions The nature of the clouds that appear in the sky

4. Study the types and characteristics of clouds, observe, discuss and show Comment on the type of clouds observed.

5. Discuss how to measure rainfall

6. Design and build measuring tools simple rainfall

7. Measure the amount of rain with a tool that Created in 1 week with results saved

8. Search for Hail, Dew, and Snow events

9. Design and build tools like Easy to measure temperature, humidity

10. Design and build measuring tools simple air pressure with local materials

11. Use built-in instruments to measure temperature, humidity, pressure

Competency:

1. Ability to think

2. Ability to solve problems

3. Ability to use technology

Chapter 8

Science (Sc15101)

Content: Information Technology (Computational Science) 2 **Time: 20 hours**

Standard 4 Technology

Standard Sc 4.2 Understand and use computational concepts to solve problems found in real life step by step and systematically, use information and communication technology to learn, work and solve problems efficiently, knowingly and ethically.

Grade level indicators

Sc4.2 Gr5/3 Use the internet to search for information. Communicate and work together. Assess data reliability.

Sc4.2 Gr5/4 Gather, evaluate, present data and information According to the purpose by using various software or services on the internet to solve everyday problems.

Sc4.2 Gr5/5 Use information technology safely, have manners, understand your rights and duties. Respect the rights of others. Notify relevant persons when finding inappropriate information or persons.

Learning Objectives

Students will be able to:

• Internet search and consideration of search results

• Evaluating the reliability of data, such as comparing the consistency. completeness of information from multiple sources. The source of the information, the author, the date of publication of the information, good information must be detailed in all aspects, such as pros and cons. benefit and penalty

• Gathering, processing, creating options, evaluating will enable information to be used in solving problems or making decisions effectively.

• Using a variety of software or Internet services to collect. Processing, creating options, evaluating, presenting, will help solve problems quickly, accurately and precisely.

• Examples of problems such as taking pictures and surveying local maps to present solutions for management.

Useful space Take an online poll and analyze the data Present information using a blog or web page.

• Internet search and consideration of search results

• Internet communication such as e-mail, blogs, chat programs.

• letter writing (Integrated with Thai subjects)

• Using the Internet to communicate and collaborate, such as making appointments in group meetings. public relations activities in the classroom exchange of knowledge Comments on learning under the supervision of teachers

• Evaluating the reliability of data, such as comparing the consistency. data integrity from multiple sources source of information author date of publication

• Gathering, processing, creating alternatives, and evaluating results will enable information to be used in solving problems or making decisions efficiently.

• The use of various software or Internet services for collecting, processing, generating options, evaluating, and presenting will help solve problems quickly, accurately and accurately.

• Sample problems such as taking pictures and surveying local maps to present guidelines for managing the area. idle to benefit Take an online poll and analyze data, present information by using blog or web page

• The dangers of use and Internet crime.

• Etiquette for communicating via the Internet. (Integrated with related subjects)

Concept:

Data is facts related to things, can be divided into 5 categories: character data, image data, numeric data, sound data, and other data. which has a lot of information that surrounds us Some information can be used immediately. And some data must be processed into information before being used. in order to bring the information to use conveniently and for the utmost benefit Nowadays, there is a fast search by using a website called Search Engine to search for information from various sources. Accuracy must be evaluated. Reliability of information to get the information that meets the needs.

Teaching and Learning Activities

1. Able to design solutions to daily life problems using logical reasoning
2. Explain work processes or solutions. using different concepts
3. Explain work processes or problem solving using various concepts.
4. Describe the process of program design by writing a flowchart.
5. Describe the sequence of programming steps with Scratch.
6. Explain how to properly detect program errors.
7. Describe different search techniques for finding information.
8. Describe the principles for evaluating the reliability of information.
9. Evaluate and be aware of internet usage.
10. Types of Malwares and Malware Detection and Prevention Guidelines

Competency:

1. Ability to think
2. Ability to solve problems
3. Ability to use technology

Course structure

Primary 6

Learning Time Structure Science

Grade 6: **- Continuous assessment score 70 points** **Time: 120 hours**

- Final examination 30 points

Chapter	Content	Standard of Science	Time (hours)	C.A.S Score	Final Examination
1	The Human Body	Sc1.2 Gr6/1 - Gr6/5	10	9	5
2	Electric Circuit and Matter	Sc2.1 Gr6/1 Sc2.3 Gr6/1 - Gr6/6	14	12	5
3	Light and Shade	Sc2.3 Gr6/7 - Gr6/8	8	3	2
4	Purification	Sc2.1 Gr6/1	8	3	1
5	Computing Science 1	Sc4.2 Gr6/1 - Gr6/2	20	8	2
Total Semester: 1st				**35**	**15**
6	Phenomena on Earth and Space Technology	Sc3.1 Gr6/1 - Gr6/2	10	5	3
7	Change Processes of the Earth	Sc3.2 Gr6/1 - Gr6/9	22	18	7
8	Weather	Sc3.2 Gr6/4 - Gr6/5	8	4	3
9	Computing Science 2	Sc4.2 Gr6/3 - Gr6/4	20	8	2
Total Semester: 2nd				**35**	**15**
Total score all year				**70**	**30**

Table analysis indicators standard of Science with the chapter

Code: Sc16101 Grade 6

No.	Standard	Chapter							
		1	2	3	4	5	6	7	8
1.	Sc1.2 Gr6/1 Identify nutrients and describe the benefits of each nutrient from the food you eat.	2							
2.	Sc1.2 Gr6/2 Provide guidelines for choosing foods that are full of nutrients In the right proportions with sex and age Including safety for health.	2							
3.	Sc1.2 Gr6/3 Analyse nutrients and discuss body requirements for nutrients in proportions suitable to gender and age.	2							
4.	Sc1.2 Gr6/4 Modelling the digestive system And describe the functions of the digestive organs As well as explains the digestion and absorption of nutrients.	2							

No.	Standard	Chapter							
		1	2	3	4	5	6	7	8
5.	Sc1.2 Gr6/5 Recognize the importance of the digestive system by providing guidance on maintaining the digestive organs in their normal functioning.	1							
6.	Sc2.1 Gr6/1 Explore and discuss relationship of groups of living things in various habitats.				3				
7.	Sc2.2 Gr6/1 Search for data and discuss sources of natural resources in each local area beneficial to living.		2						
8.	Sc2.3 Gr6/1 Identify the components and describe the functions of each component of the circuit simply from empirical evidence.		2						
9.	Sc2.3 Gr6/2 Write circuit diagrams and simple.		1						
10.	Sc2.3 Gr6/3 Design experiments and experiments with appropriate methods to		1						

No.	Standard	Chapter							
		1	2	3	4	5	6	7	8
	describe methods and effects of serial splicing.								
11.	Sc2.3 Gr6/4 Realize the benefits of the knowledge of serial cell splicing by providing benefits and applications in daily life.		2						
12.	Sc2.3 Gr6/5 Experiment design and test an appropriate way to describe the light bulb in series and parallel.		2						
13.	Sc2.3 Gr6/6 Realize the benefits of the knowledge of connecting lamps in series and parallel. By telling us the benefits, limitations and applications in daily life.		2						
14.	Sc2.3 Gr6/7 Describe the emergence of shadow and shadow from empirical evidence.			1					

No.	Standard	Chapter							
		1	2	3	4	5	6	7	8
15.	Sc2.3 Gr6/8 Write a diagram of the rays of light showing the occurrence of dark and light in everyday life.			2					
16.	Sc3.1 Gr6/1 Experiment and explain properties of solids, liquids and gases.					3			
17.	Sc3.1 Gr6/2 Categorise substances into groups by using their state or other student-prescribed criteria prescribed.					2			
18.	Sc3.1 Gr6/2 Categorise substances into groups by using their state or other student-prescribed criteria prescribed.						3		
19.	Sc3.2 Gr6/2 Analyse and explain the changes resulting in transition of substances to new substances with different properties.						3		

No.	Standard	Chapter							
		1	2	3	4	5	6	7	8
20.	Sc3.2 Gr6/3 Explain substance changes affecting living things and the environment.						3		
21.	Sc3.2 Gr6/4 Compare the occurrence of wind, sea breeze and monsoons and explain their effects on life and environment from the model.							2	
22.	Sc3.2 Gr6/5 Explain the effects of monsoons on the occurrence of the seasons in Thailand from the collected data.							2	
23.	Sc3.2 Gr6/6 Describe the nature and effects of floods, coastal erosion, landslides, earthquakes, tsunamis.						3		
24.	Sc3.2 Gr6/7 Recognizing the impact of natural disasters and tsunami. By offering guidelines to monitor and conduct						2		

No.	Standard	Chapter							
		1	2	3	4	5	6	7	8
	oneself to be safe from natural disasters and local disasters								
25.	Sc3.2 Gr6/8 Modeling described the greenhouse effect. And the effect of the greenhouse effect on living things						2		
26.	Sc3.2 Gr6/9 Recognizing the impact of the greenhouse effect. It offers practical guidelines to reduce activities that cause greenhouse gases.						2		
27.	Sc4.2 Gr6/1 Logical reasoning to explain and design a solution to the problems encountered in daily life.				4				
28.	Sc4.2 Gr6/2 Simple design and programming To solve everyday problems Check for program errors and fix them.				4				

No.	Standard	Chapter							
		1	2	3	4	5	6	7	8
29.	Sc4.2 Gr6/3 Use the Internet to find information more efficiently.								4
30.	Sc4.2 Gr6/4 Use information technology to work together safely. Understand their rights and duties Respect the rights of others Notify relevant people when finding inappropriate information or people.								4

Chapter 1

Science (Sc16101)

Content: The Human Body **Time: 14 hours**

Strand 1: Nature of Science and Technology

Standard Sc1.2 : Understanding of process and importance of genetic transmission; evolution of living things; biodiversity; application of biotechnology affecting humans and the environment; investigative process for seeking knowledge and scientific mind; communicating knowledge that could be applied for useful purposes

Grade level indicators

Sc1.2 Gr6/1 Identify nutrients and describe the benefits of each nutrient from the food you eat.

Sc1.2 Gr6/2 Provide guidelines for choosing foods that are full of nutrients In the right proportions with sex and age Including safety for health.

Sc1.2 Gr6/3 Analyze nutrients and discuss body requirements for nutrients in proportions suitable to gender and age.

Sc1.2 Gr6/4 Modelling the digestive system And describe the functions of the digestive organs As well as explains the digestion and absorption of nutrients.

Sc1.2 Gr6/5 Recognize the importance of the digestive system by providing guidance on maintaining the digestive organs in their normal functioning.

Learning Objectives

Students will be able to:

1. State the stages in a human life cycle.
2. Explain the development in each stage in a human life cycle.
3. Describe the functions of the digestive system, respiratory system, circulatory system and excretory system.
4. Describe how these systems work.
5. Describe how body systems work together.
6. State the ways to keep the systems healthy.
7. Describe the five types of nutrients.
8. State the factors affecting our needs for energy.
9. Describe a balanced diet.

Concept:

• The human body is the entire structure of a human being. It is composed of many different types of cells that together create tissues and subsequently organ systems. They ensure homeostasis and the viability of the human body. It comprises head, neck, trunk (which includes the thorax and abdomen), arms and hands, legs and feet.

Teaching and Learning Activities

1. Guide students to understand that there are 5 stages in a human growth

2. Guide students to understand that our body is made up millions of cells. Similar cells work together to form a tissue. A few tissues work together to form an organ. A few organs work together to form a system. Give examples of cells, tissues, organs and systems.

3. Explain the breathing mechanisms we use to get the oxygen we need and get rid of the carbon dioxide from our body.

4. Explain the function of our blood. It is made up of red blood cells, white blood cells, platelets and plasma. Explain the functions of each component.

5. Explain the differences and functions of the three types of blood vessels.

6. What are nutrients? The five types of nutrients we need are carbohydrates, protein, fats, vitamins and minerals.

7. Explain what a balanced diet is and how the food guide pyramid can help us to have a balanced diet. Emphasize the food that we should eat more, and the food we should eat less.

Competency:

1. Thinking skill
2. Technological application skill
3. Applying life skills

Chapter 2

Science (Sc16101)

Content: Electric Circuit and Matter **Time: 18 hours**

Strand 2: Physical science

Standard Sc2.1: Understanding of local environment; relationship between the environment and living things; relationship between living things in the eco-system; investigative process for seeking knowledge and scientific mind; and communicating acquired knowledge that couldbe applied for useful purposes.

Standard Sc2.2: Appreciating the importance of natural resources; utilization of natural resources at local, national and global levels; and application of knowledge for management of natural resources and local environment on a sustainable basis.

Standard Sc2.3: Appreciating the importance of natural resources; utilization of natural resources at local, national and global levels; and application of knowledge for management of natural resources and local environment on a sustainable basis.

Grade level indicators

Sc2.1 Gr 6/1 Explain and compare the separation of mixtures by extraction, sieving, magnetization, pouring, filtration and sedimentation using empirical evidence. as well as identify solutions to daily life problems related to separation.

Sc 2.2 Gr 6/1 describes the generation and effect of an electric force generated by an abrasive object. using empirical evidence

Sc2.3 Gr 6/1 Identify the components and describe the functions of each component of an electrical circuit simply from empirical evidence.

Sc2.3 Gr 6/2 Write diagrams and connect simple electrical circuits.

Sc 2.3 Gr6/3 Design an experiment and experiment with an appropriate method to explain the methods and results of series cell connection.

Sc 2.3 Gr 6/4 realized the usefulness of knowledge of series electrical cell connection by giving usefulness and application in daily life.

Sc 2.3 Gr 6/5 Design experiments and experiment with suitable methods for describing series and parallel connection of electric lamps.

Sc 2.3 Gr6/6 Realize the benefits of knowledge of series and parallel connection of electrical lamps by giving benefits, limitations and applications in daily life.

Learning Objectives

A simple electrical circuit consists of electric power source and electrical appliances or electrical devices such as batteries or batteries serves to provide electrical energy Electrical cables are conductors. Acting as a connection between the electrical source and the electrical appliances One is connected in series, resulting in electric power suitable for electrical appliances, which can be used in daily life, such as connecting an electric cell in a flashlight.

Teaching and Learning Activities

1. Experiment with separation by filtration, sieving, and sedimentation.
2. Watch a video on separation and study from the worksheet.
3. Experiment with the electric force from rubbing two objects.
4. Students divided into groups to experiment with simple electrical circuits.
5. The students were divided into groups to experiment with a series of electrical connections.
6. The students were divided into groups to experiment with the parallel electrical.
7. Students take a test for Unit 2 on electricity and substance separation, 30 items.

Competency:

1. Thinking skill
2. Applying life skills

Chapter 3

Science (Sc16101)

Content: Light and Shade **Time: 8 hours**

Strand 2: Pphysical science

Standard Sc2.3: Understanding of relationship between energy and life; energy transformation; interrelationship between substances and energy; effects of energy utilization on life and the environment; investigative process for seeking knowledge; and communication of acquired knowledge that could be applied for useful purposes.

Grade level indicators

Sc2.3 Gr6/7 Describe the emergence of shadow and shadow from empirical evidence.

Sc2.3 Gr6/8 Write a diagram of the rays of light showing the occurrence of dark and light in everyday life.

Learning Objectives

Students will be able to:

1. Identify electric circuit and the components of a circuit.
2. Draw and set up simple open circuits and closed circuits.
3. Compare and contrast between a series circuit and a parallel circuit.
4. Set up series circuits and parallel circuits.
5. State the uses of electric circuits.
6. Identify electrical conductors and insulators.
7. Describe electromagnetism.
8. Give examples of uses of electromagnetism.

Concept:

- An electric circuit is a path in which electrons from a voltage or current source flow.

Teaching and Learning Activities

1. Show students some bulbs, connecting wires and switches. Ask three students to the symbols for the bulbs, connecting wires and switches.

2. Using the bulbs, connecting wires and switches, build a few complete circuits. Ensure the bulbs light up. Draw the diagrams for the circuits.

3. Identify electrical conductors and electrical insulators.

4. Explain electromagnetism. Using a compass and a circuit, show students that electricity has magnetic effect.

5. What happens to an electromagnet when the electricity supply is cut?.

6. How do we use electromagnet?.

Competency:

1. Thinking skill
2. Technological application skill
3. Applying life skills

Chapter 4

Science (Sc16101)

Content: Computing Science 1 **Time: 20 hours**

Strand 4 : Technology

Standard Sc4.2: Understand and use computational concepts to solve problems encountered in real life step by step and systematically. Use information and communication technology to learn, work, and solve problems efficiently be aware and ethical.

Grade level indicators

Sc4.2 Gr6/1 Use logical reasoning to describe and design solutions to problems encountered in daily life.

Sc4.2 Gr6/2 Design and write a simple program. To solve everyday problems, detect program errors and fix.

Learning Objectives

Students will be able to:

1. Able to design solutions to daily life problems using logical reasoning
2. Explain work processes or solutions. using different concepts
3. Describe the work process or problem solving. using different concepts
4. Describe the process of program design by writing a flowchart.
5. Describe the sequence of programming steps with Scratch.
6. Explain how to properly detect program errors.

Concept:

Scratch is a computer programming language. It looks like a program block (block) connected together to create a command code (Code) to order the Scratch program to work as it has been written. can be used to develop creative software by specifying a variable conditionally write a program write a recursive program. And write a program to find the LOC value to detect program errors. In writing any program, if an error occurs or the program does not meet the requirements Must check for any errors that have occurred. by checking the execution of each

command When finding a point that causes the program to not comply, the error must be corrected. until you get the desired program

Competency:

1. Thinking skill
2. Technological application skill
3. Applying life skills

Chapter 5

Science (Sc16101)

Content: Phenomena on Earth and Space Technology **Time: 10 hours**

Strand 3 : Earth sciences and space

Standard Sc3.1: Understand the components, characteristics, birth processes and the evolution of the universe, galaxies, stars, and the solar system, including the interactions within the solar system that affect living things and the application of space technology**.**

Grade level indicators

Sc3.1 Gr6/1 Experiment and explain properties of solids, liquids and gases.

Sc3.1 Gr6/2 Categories substances into groups by using their state or other student-prescribed criteria prescribed.

Learning Objectives

Students will be able to:

1. Describe different types of rocks.
2. State examples of rocks.
3. Compare and contrast the types of rocks and their transformation.
4. Describe the rock cycle.
5. State the uses of soil.

Concept:

When the earth and the moon orbits in a straight line with the sun at the right distance, causing the moon to block the sun. The shadow of the moon casts upon the earth. An observer in the shadow area will see the sun darken into a solar eclipse, including a total solar eclipse. Partial and Annular Solar Eclipses

If the moon and the earth orbit in a straight line with the sun. Then the moon moves through the shadow of the earth to see the dark moon to the lunar eclipse phenomenon. which includes total lunar eclipses and partial lunar eclipse.

Teaching and Learning Activities

1. Students record solar and lunar eclipse data in Thailand according to the specified criteria.

2. Students can model solar and lunar eclipses according to the specified criteria.

3. Students describe a solar eclipse. and lunar eclipse from the given picture according to the specified criteria

4. Students write a memoir of the use of space technology in daily life according to the specified criteria.

5. Students take the Unit 5 test on Earth Phenomena and Space Technology, 10 items.

Competency:

1. Thinking skill
2. Technological application skill
3. Applying life skills

Chapter 6

Science (Sc16101)

Content: Change Processes of the Earth **Time: 22 hours**

Strand 3: Earth sciences and space

Standard Sc3.2: Understand the composition and the relationship of the world system The process of change within the world and on the surface of the earth Climate change and climate change processes, including the effects on living things and the environment.

Grade level indicators

Sc3.2 Gr 6/1 Compare the formation processes of igneous, sedimentary and metamorphic rocks and explain the rock cycle from the model.

Sc3.2 Gr 6/2 Describe and give examples of the use of rocks and minerals in daily life from the collected information.

Sc3.2Gr6/3 Build a model that explains the occurrence of fossils and predicts the past environment of fossils.

Sc3.2 Gr 6/6 Describe characteristics and effects of floods, coastal erosion, landslides, earthquakes, tsunamis.

Sc3.2 Gr 6/7 aware of the impact of natural disasters and earthquakes. by presenting guidelines in Be vigilant and behave to be safe from natural disasters and earthquakes that may occur in the locality.

Sc3.2 Gr 6/8 Create a model explaining the greenhouse effect. and the effect of the greenhouse effect to living things

Sc3.2 Gr 6/9 Realizing the effect of the greenhouse effect by presenting practical guidelines to reduce activities that generate greenhouse gases

Learning Objectives

Students will be able to:

1. Describe the phases of the Moon.
2. Describe the lunar eclipse and solar eclipse.
3. Describe seasons.
4. Describe the contributions of the Father of Thai Science toward science in Thailand.
5. Describe the developments in space exploration.

Concept:

• Rock is a naturally occurring solid material consisting of one or more minerals Formation rocks can be classified into three types: igneous, sedimentary, and metamorphic. the densest planet in the Solar System and the largest of the four terrestrial planets.

Teaching and Learning Activities

1. record the classification of stone using the characteristics of Stone.

2. Write a rock cycle model, level 2 or higher

3. Stone's Benefits Picture Book is level 2 or higher.

4. Record the cause of the decay of the rock, level 2 or higher.

5. Record the cause of one type of earthquake, level 2 or higher.

6. Write how to behave safely in the event of natural disasters and various disasters at level 2 or higher.

7. Model explaining birth The Greenhouse effect is level 2 or higher.

8. Write a guideline for one's conduct To reduce activities that cause greenhouse gas emissions at level 2 or higher.

9. Students pass the test at level 2 or higher.

Competency:

1. Thinking skill

2. Technological application skill

3. Applying life skills

Chapter 7

Science (Sc16101)

Content: Weather **Time: 8 hours**

Strand 3: Earth sciences and space

Standard Sc3.2 Understand the composition And the relationship of the world system The process of change within the world and on the surface of the earth Climate change and climate change processes, including the effects on living things and the environment.

Grade level indicators

Sc3.2 Gr 6/1 Compare the occurrence of land breezes, sea breezes and monsoons and explain the effects on living beings and the environment from the model.

Sc 3.2 Gr 6/2 explains the effect of the monsoon on the occurrence of the seasons in Thailand from the collected data.

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Learning Objectives

Students will be able to:

1. The students were divided into experimental groups. air movement
2. Students divided into groups to experiment with land breezes and sea breezes.
3. Students divided into groups to write an explanation of the results. of the monsoon on the occurrence of the season in Thailand from the collected data

Concept:

Land breezes, sea breezes and monsoons arising from land and water. Hot and cold are not the same, causing the air temperature above the ground and the water surface to be different. Therefore, the movement of air from an area with low temperature to an area with high temperature.

Competency:

1. Thinking skill
2. Technological application skill
3. Applying life skills

Chapter 8

Science (Sc16101)

Content: Computing Science 2 **Time: 20 hours**

Strand 4 : Technology

Standard Sc4.2: Sc4.2: Understand and use computational concepts to solve problems encountered in real life step by step and systematically. Use information and communication technology to learn, work, and solve problems efficiently be aware and ethical.

Grade level indicators

Sc4.2 Gr6/1 Use logical reasoning to describe and design solutions to problems encountered in daily life.

Sc4.2 Gr6/2 Design and write a simple program. To solve everyday problems, detect program errors and fix.

Concept:

The Internet is a vast computer network that spans the entire world. we can use the internet in order to obtain information that meets the needs within a short period of time and searching for information each time The search engine displays a large amount of information from the search query. so that users can use the internet efficiently and get information that meets their needs as much as possible Users will need to learn how to rank results from search engines. Information that has been retrieved from various sources. The credibility of the information must be assessed in order to obtain accurate information. and meets the needs.

Installing software from the Internet may cause malware This is a software that is intended to harm computers, so users need to know how to detect and prevent malware in order to prevent various forms of harm. such as data theft, data deletion, system destruction, etc.

Teaching and Learning Activities

1.Students can explain the technique. Searching for different types of information to find information.

2. Students can explain the principles of assessment. reliability of information

3. Students can evaluate and know how to use the internet.

4. Students can explain the types of malware and how to detect and prevent it

Competency:

1. Thinking skill

2. Technological application skill

3. Applying life skill

Measurement and evaluation of learning outcomes

Assessment and Evaluation Guidelines for Science and Technology Subject

Bansankamphaeng School

Bansankamphaeng School has established assessment and evaluation criteria for the Science and Technology subject, under the Science and Technology Learning Area, covering knowledge, process skills, and desirable characteristics according to the curriculum's learning standards. The purpose of assessment and evaluation includes:

Enhancing student development

Determining learning outcomes

1. Types of Assessment and Evaluation

1.1 Pre-assessment

Assessing students' readiness and foundational knowledge

Evaluating prior knowledge before beginning instruction

1.2 Formative Assessment (During Learning)

One-on-one communication

Performance-based assessment

Authentic assessment

1.3 Summative Assessment (Post-Learning)

End-of-unit assessment

End-of-year evaluation

Assessment will be based on specified indicators with a scoring ratio of 70:30 for formative and summative assessments respectively.

2. Assessment Methods

To gather accurate data on students' abilities and characteristics, various tools and methods must be used:

2.1 Testing

Used to evaluate knowledge, thinking, and progress

Includes multiple choice, short answer, matching, true/false, fill-in-the-blank, and written responses

2.2 Observation

Evaluates behavior, emotions, interaction in group work, cooperation, planning, perseverance, problem-solving, dexterity, and equipment usage

May be formal (scheduled and specific) or informal

Tools: checklists, rating scales

2.3 Interviewing

Used to gather information not easily observed in group projects, daily activities, or individual work

Interviewees may include students, peers, or parents

Can be formal or informal; teachers should prepare questions in advance

2.4 Practical Assessment

Evaluates actions and outcomes, including product creation, demonstrations, and skill displays

Tools: scoring rubrics, rating scales, checklists

2.5 Scoring Rubric

Analyzes assessment components to describe levels of quality or proficiency

Helps teachers, parents, and stakeholders understand student progress and abilities

2.6 Portfolio Assessment

Evaluates student-produced work showing integration of knowledge, effort, opinions, and learning outcomes

Assesses management, creativity, and evidence of achievement in the learning area

3. Assessment Tasks

Observation forms

Interview forms

Activity sheets

Exercises and tests

4. Assessment Tools

Observation records

Interview logs

Activity sheet records

Exercise/test records

5. Evaluators

Teachers

Students (self-assessment)

Peers

Parents

6. Grading Criteria

Scores must combine knowledge, skills/processes, and characteristics:

Level 4: 80–100

Level 3.5: 75–79

Level 3: 70–74

Level 2.5: 65–69

Level 2: 60–64

Level 1.5: 55–59

Level 1: 50–54

Level 0: 0–49

7. Passing Criteria for Science and Technology Subject

7.1 Students must attend at least 80% of total class time

7.2 Students must pass at least 50% of the learning indicators, with at least 65% of total indicators passed

7.3 Students must receive a score of Level 1 or higher in the subject

7.4 Students must pass evaluation in reading, thinking, analyzing, and writing in Science and Technology

7.5 Students must meet the expected level in desirable characteristics for Science and Technology

Glossary

Glossary

Scientific Process

A process used to study and acquire scientific knowledge, consisting of key steps such as formulating questions or identifying problems, generating hypotheses or predicting answers, designing data collection methods, analyzing and interpreting data, drawing conclusions, and communicating results.

Problem Solving

The process of finding solutions to problems where the method is not previously known, including both science-related and everyday problems, by applying techniques, methods, or strategies.

Analyzing

A level of learning outcome in which learners are able to distinguish and classify information in order to identify relationships and connections.

Observation

A method of collecting data directly using the five senses: seeing, smelling, hearing, tasting, and touching.

Search

The act of looking for pre-existing information or data from various sources such as libraries, networks, the internet, or local wisdom.

Scientific Inquiry

The process of seeking scientific knowledge using the scientific process or other methods such as exploring, observing, measuring, classifying, experimenting, modeling, or information searching.

Exploration

The act of gathering information about objects or phenomena using various methods and techniques such as observation, interviews, or sample collection, for the purpose of analysis, classification, or identifying relationships.

Scientific Investigation

A method of acquiring scientific knowledge through data collection and logical reasoning for forming hypotheses, explaining, and interpreting data. Scientific investigation may involve observation, exploration, experimentation, etc.

Understanding

A level of learning outcome in which learners are able to explain, compare, categorize, give examples, draw diagrams, select, identify, or apply concepts appropriately.

Scientific Mind / Scientific Attitudes

Characteristics or habits developed from learning through the scientific process. Scientific attitudes include curiosity, determination, patience, carefulness, responsibility, honesty, thriftiness, the ability to express and accept opinions, rational thinking, and creative collaboration with others.

Attitudes Toward Sciences

An individual's feelings toward science, which result from engaging in various science learning activities. These attitudes may include interest, enjoyment, and appreciation of the importance and value of science.

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