SCIENCE EDUCATION
KEY LEARNING AREA

SCIENCE (PRIMARY 1 – 6)

Curriculum Framework (Final Version)

Curriculum Development Council

February 2024

(blank page)

1. Background

Science Education is one of the eight Key Learning Areas in the Hong Kong school curriculum. It aims to assist students in establishing a solid foundation of scientific knowledge, and cultivate their scientific literacy. With the rapid development of science and innovative technology, as well as the constant changes in society, the ways in which students live and learn have also changed. In order to keep up with the ongoing renewal of the school curriculum and the promotion of STEAM (Science, Technology, Engineering, Arts, and Mathematics) education, science education at the primary level also needs to keep pace with the times to make the curriculum more responsive to students' needs and social development, helping students better cope with future opportunities and challenges.

The Curriculum Development Council Committee on Science Education has established the "Ad Hoc Committee for the Development of the Science (Primary 1 – 6) Curriculum" (Ad Hoc Committee) to review the current primary science education and develop the Primary Science curriculum. The Ad Hoc Committee had made reference to the science-related parts of the General Studies subject, and had taken into account the development trends in local, national, and international science/STEM education, while fully considering the future development needs of Hong Kong students, in order to establish the key focus and content of the Primary Science curriculum. Throughout the process, the Ad Hoc Committee had also considered the opinions of various stakeholders collected by the Education Bureau (EDB) through multiple channels, including school visits and focus groups, as well as the teaching experiences gained from the pilot scheme "Enhancing Science and Technology Learning at Upper Primary Level" implemented in the 2022/23 school year. In February 2024, the Ad Hoc Committee submitted the

Science (Primary 1 – 6) Curriculum Framework (Final Version) to the Curriculum Development Council.

2. Reasons for Introduction of the Primary Science Subject

The Education Bureau has been reviewing the implementation of science education at the primary level; and presents the reasons for introducing the Primary Science subject as follows:

- **To align with the national direction of "Invigorating the country through science and education", inspiring students' creativity and potential in science from an early age**

  Strengthening the promotion of science education so as to cultivate students' curiosity, thirst for knowledge, and imagination, stimulate their interest and abilities in science, and develop their scientific thinking to meet the needs of social development and nurture future talents in scientific research and innovation.

- **To cultivate scientific literacy and deepen STEAM education**

  Helping students systematically grasp scientific knowledge and concepts, develop science process skills, and establish fundamental scientific attitudes. Through "hands-on and minds-on" STEAM learning activities, fostering students' spirit of inquiry and fundamental engineering thinking, and allowing them to understand the applications of science, technology and engineering in daily life, as well as integrate and apply what they have learnt in different learning areas to solve problems in real-life contexts, unleashing their creativity and innovative spirit.

- **To improve the interface of science education between primary and secondary levels in alignment with the overall development of primary education**

  Providing a clear positioning for primary science education, establishing the curriculum rationale for the Primary Science subject, reorganising the science and technology-related content within the General Studies subject, and introducing new topics in line with the development of the times, to enhance the interface between lower primary, upper primary, and junior secondary levels, implementing a coherent science education foundation spanning nine years. The Primary Science subject also aligns with the overall development of primary education, and promotes health education, life education, sex education, environmental education, national education, media and information literacy, etc. in a “life-oriented”, “interesting” and “diversified” way, to cultivate students’ positive values and attitudes.

3. Curriculum Rationale

The rationale of the Science (Primary 1 – 6) Curriculum is as follows:

(i) Explore with Curiosity

Science education values exploration and knowledge-seeking, emphasising the cultivation of students' curiosity and spirit of inquiry. Science is about the process of exploring the surrounding environment and things. By nurturing students' curiosity about the world and thirst for knowledge, their interest and motivation in learning can be ignited and their self-directed learning capabilities can be developed, enabling them to become active seekers of knowledge and problem solvers. Through the process of asking questions and seeking answers, students can understand the principles behind scientific phenomena, cultivate evidence-based scientific thinking, and enhance logical reasoning abilities.

(ii) Learn through Applying

The rationale of 'Learn through Applying' emphasises the "student-centered approach" and provision of opportunities for students to learn science joyfully and apply it in practical ways. Science learning should align with students' interests and needs. It should foster students' interest in science and innovative technology by employing engaging and interactive teaching methods and "hands-on and minds-on" inquiry activities, as well as diversified learning experience beyond the classroom. Furthermore, by connecting what students learn in class with their daily experiences and contexts, students can appreciate the applications of science and technology in daily life and apply their scientific knowledge to

solve real-world problems, cultivating practical skills and problem-solving abilities.

(iii) Innovate for Tomorrow

The rapid advancement of science and technology plays an active role in driving social development and improving people's quality of life. Through diversified science/STEAM learning activities that cultivate students' creativity and innovative thinking, we can nurture future scientists, engineers, and entrepreneurs in innovative technology who can propose innovative ideas, solve complex problems, and bring about positive changes to society, contributing to the nation and Hong Kong. The rapid development of society has also brought new challenges to everyone. We encourage students to care about sustainable development issues, such as environmental conservation and climate change, fostering a sense of social responsibility. By integrating creative thinking into science learning, students will be better prepared for the future.

4. Curriculum Aims

The aims of the Science (Primary 1 – 6) Curriculum is to enable students to:

- cultivate curiosity and interest in science
- develop the abilities to make inquiries about science and solve problems
- acquire basic scientific knowledge, science process skills, and generic skills
- develop the abilities to integrate and apply knowledge and skills of science and related disciplines
- gain a preliminary understanding of nature of science
- use basic scientific language to communicate science-related ideas
- make reasonable analysis and reasoning on the issues being explored based on data and logic, and put forward personal opinions
- develop preliminary engineering thinking and practical skills
- recognise the social, ethical, environmental and technological implications of science, and develop an attitude for responsible citizenship and a commitment to promote personal and community health
- cultivate self-directed learning capabilities and become lifelong learners of science for personal development
- prepare for further deepening of science learning at the secondary level and future engagement in scientific careers

5. Curriculum Design Principles

The following curriculum design principles of the Science (Primary 1 – 6) Curriculum are set out based on the existing "Primary Education Curriculum Guide" and "Science Education Key Learning Area Curriculum Guide (Primary 1 – Secondary 6)", and with reference to curriculum documents such as the "General Studies Curriculum Guide for Primary Schools (Primary 1 – Primary 6)".

- cultivate students' curiosity and interest in science
- connect with students' daily life experiences
- integrate learning experiences inside and beyond the classroom
- emphasise the importance of “hands-on and minds-on” learning to develop students' abilities in scientific inquiry and problem-solving
- clearly indicate the science learning content that students should master at the primary level, so as to facilitate the interface with science learning at the junior secondary level
- provide specific suggestions for science learning and teaching activities, including science inquiry, engineering and design activities
- cultivate students' proper scientific attitudes and values

6. Curriculum Structure

The structure of the Science (Primary 1 – 6) Curriculum consists of three interconnected components, including Learning Targets, Curriculum Emphases, and Essential Learning Content. The table below illustrates the relationship among these components.

<table>
<tr><td colspan="3">Learning Targets</td></tr>
<tr><td>Knowledge and Understanding</td><td>Skills and Processes</td><td>Values and Attitudes</td></tr>
<tr><td colspan="3">Curriculum Emphases</td></tr>
<tr><td colspan="2">Science Inquiry</td><td>Engineering Design and Innovation</td></tr>
<tr><td colspan="3">Essential Learning Content</td></tr>
<tr><td>Strand 1:
Life and Environment</td><td colspan="2">• Human Health
• Characteristics of Living Things
• Continuation of Life
• Inter-relationship between Living Things and the Natural Environment
• Ecosystem
• World under the Microscope</td></tr>
<tr><td>Strand 2:
Matter, Energy and Changes</td><td colspan="2">• Properties and Changes of Matter
• Forms of Energy and Energy Transfer
• Force and Motion</td></tr>
</table>

Strand 3: Earth and Space	• Earth's Characteristics and Resources • Climate and Seasons • Solar System in the Universe
Strand 4: Science, Technology, Engineering and Society	• Scientific Process and Spirit of Science • Aerospace and Innovative Technology • Engineering and Design

6.1 Learning Targets

The learning targets of this curriculum are to help students discover the scientific concepts and principles behind everyday phenomena, and understand how the application of science and technology can improve human life, through science inquiry and engineering design processes. In these processes, students can gain a preliminary understanding of nature of science, acquire scientific thinking and methods, develop scientific attitudes, and cultivate proper values and a sense of social responsibility.

6.1.1 Knowledge and Understanding

Students should be able to:

- acquire basic scientific knowledge, and understand some common scientific phenomena, facts and patterns, concepts and principles in everyday life
- begin applying scientific methods for inquiry and knowledge

construction

- use simple scientific vocabulary and expressions
- apply scientific knowledge and technological products to solve simple problems in daily life

6.1.2 Skills and Processes

Students should be able to:

- make informed decisions based on facts and scientific evidence
- design and conduct simple science inquiries, making observation, measuring and recording data, reporting results, providing simple explanations or reasonable inferences based on the results, and reflecting on the inquiry process
- present data/information using charts and graphic organisers
- communicate ideas using basic scientific language
- use appropriate tools and be familiar with the properties of materials.
- design and make various engineering models and products, considering both practicality and aesthetics
- apply interdisciplinary knowledge and skills (e.g. mathematics, programming) in the processes of science inquiry and engineering design

6.1.3 Values and Attitudes

Students should be able to:

- adopt a rational and objective attitude, as well as a spirit of truth-

seeking

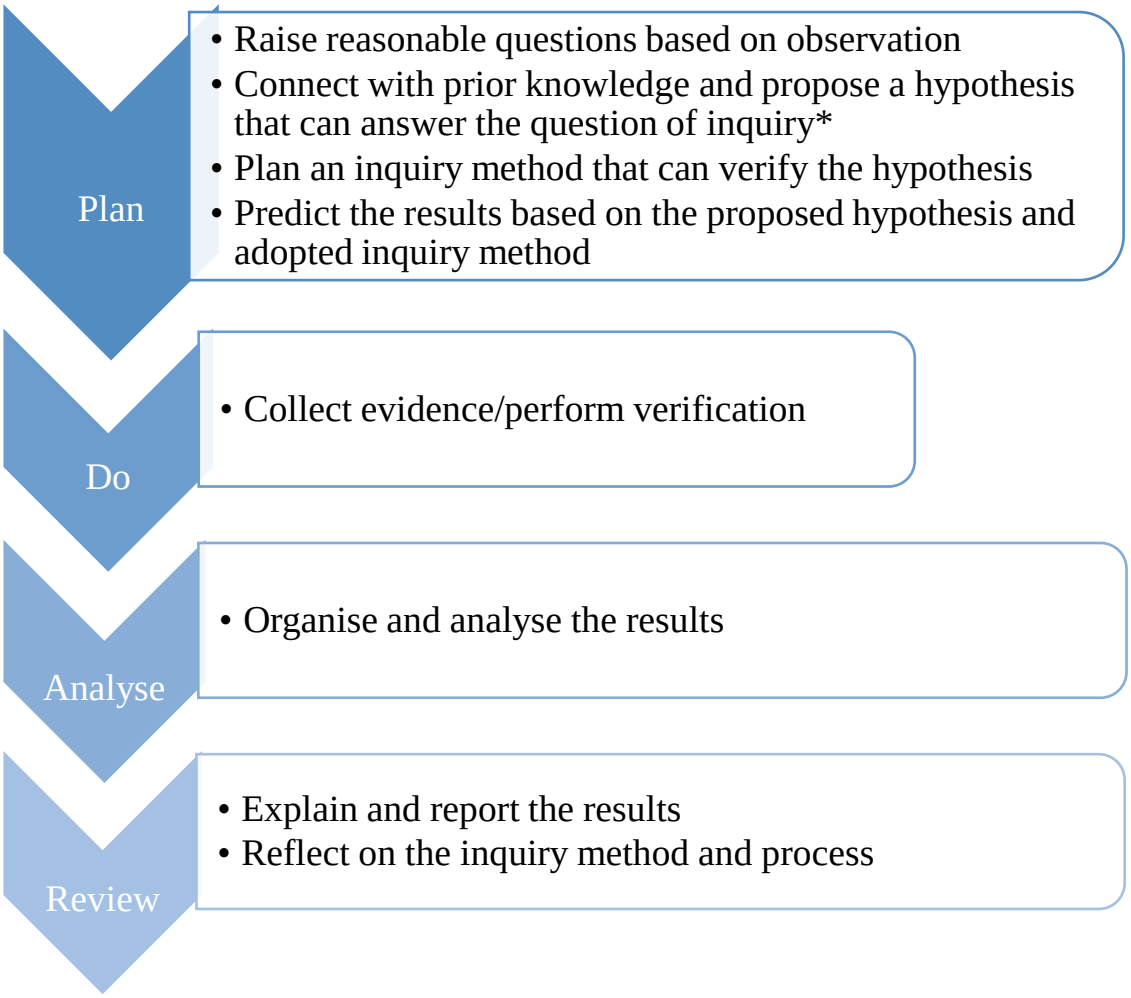
- develop healthy lifestyle
- cultivate curiosity and sustained interest in exploring science and technology
- respect and care for all forms of life and the environment
- show concern for environmental and climate changes, and recognise the importance of sustainable development
- appreciate the vastness of the universe and understand the importance of space exploration
- admire some significant figures who have contributed to the world's scientific and technological advancements, and learn from their perseverance in innovation and continuous experimentation
- realise that learning science and technology can improve people's quality of life
- discover the importance of practicality and aesthetics in engineering and design
- appreciate the achievements of the nation in the development of science, engineering, aerospace, and innovative technologies, enhancing technological confidence
- realise the importance of scientific and technological development to national interests and national security

6.2 Curriculum Emphases

The two curriculum emphases that span the entire Science (Primary 1 – 6) Curriculum are "Science Inquiry" and "Engineering Design and Innovation". These emphasis are interconnected with the Learning Targets and Essential Learning Content of the curriculum, and are reflected in the learning objectives and suggested learning and teaching activities in the various strands.

6.2.1 Science Inquiry

This curriculum emphasises allowing students to raise questions about some natural phenomena or objects, and seek answers and discover knowledge through exploration using scientific methods, thereby cultivating their curiosity and spirit of inquiry. Science inquiry is not limited to conducting experiments. Depending on the nature of different scientific questions, teachers can employ different inquiry methods, such as seeking patterns, classifying and conducting fair tests, to guide students in their exploration. At the primary level, teachers can guide students to explore natural phenomena or objects related to everyday life through four steps: "Plan", "Do", "Analyse" and "Review" (PDAR).



PDAR are sequential steps of inquiry. However, in the daily teaching process, teachers do not need to require students to complete all the steps of PDAR by themselves in every science inquiry activity. Teachers can flexibly arrange for students to participate in and experience different steps of science inquiry based on the learning topic, lesson design, and students' levels and abilities, letting students experience the entire inquiry process progressively. Please refer to Tables 1 to 3 for 'An Example Demonstrating the Science Inquiry Process', 'Examples of Topics for Science Inquiry at Different Levels', and the 'Vertical Development Framework of Science Process Skills at the Primary Level' respectively.

* Note: Depending on the nature of science inquiry activities, it is not necessary to propose a hypothesis in all science inquiry activities. Teachers can progressively introduce this concept to students starting from Primary 3 to Primary 4, according to their learning abilities and progress.

Table 1. An Example Demonstrating the Science Inquiry Process

(Using the Primary 4 learning and teaching activity "Perform a test to find out whether surgical masks can help prevent droplet-borne diseases" under the topic "Communicable and non-communicable diseases" in Strand 1 "Life and Environment" as an example)

Science Inquiry Process		Example
Plan	Raise reasonable questions based on observation	Why are people encouraged to wear a surgical mask when having a cold or flu?
	Connect with prior knowledge and propose a hypothesis that can answer the question of inquiry	Colds/flu are respiratory infectious diseases that can be spread through droplets at close range.
		Wearing a surgical mask helps block droplets and thereby prevent diseases spread through droplets.
	Plan an inquiry method that can verify the hypothesis	Conduct a fair test: place a piece of white paper 100 cm away, use a water spray bottle containing a coloured solution to spray onto the white paper with and without a surgical mask as barrier respectively, and compare the amount of coloured solution splashed on the white papers. (Note: Use a coloured solution that is easily washable)
	Predict the results based on the proposed hypothesis and adopted inquiry method	There should be a larger amount of coloured solution splashed on the white paper when it is not blocked by a surgical mask.
Do	Collect evidence/perform verification	Take photos to record the splash effect obtained when it is and is not blocked by a surgical mask respectively
Analyse	Organise and analyse the results	The results are consistent with the prediction: when it is not blocked by a surgical mask, there is a larger amount of coloured solution splashed on the white paper. The results of

Science Inquiry Process		Example
		the inquiry support the proposed hypothesis.
Review	Explain and report the results	Colds/flu are respiratory infectious diseases that can be spread through droplets at close range. Wearing a mask helps reduce the risk of respiratory infectious diseases spreading through droplet transmission.
	Reflect on the inquiry method and process	● Using a water spray bottle of which spray intensity will be more representative of real-life conditions? ● How far should the nozzle of the water spray bottle be from the surgical mask so to be more representative of real-life conditions? ● Further investigate the impact of increasing the distance between the surgical mask and the water spray bottle on the protective efficacy of the surgical mask

Table 2. Examples of Topics for Science Inquiry at Different Levels

Level	Topic (Learning objective)	Example of inquiry activity	Suggested type of inquiry activity
P1	Properties of matter （1MA2）	Test the properties of everyday items, and classify them according to their properties	Classification
P2	Ecological environment （2LE1）	Conduct a mung bean planting activity, observe the growth process of the plants, and record the height of the plants and the number of leaves	Observation
P3	Some phenomena and patterns observed on the Earth caused by the movements of the Sun, Earth and Moon （3EC4）	Observe and record the shape of the Moon on different days of the month	Pattern seeking
P4	Changes in climate and seasons （4EB3）	Construct a simple model to stimulate the phenomenon of sea level rise caused by melting glaciers	Modelling
P5	Common microorganisms （5LF3）	Collect information on the benefits and negative impacts of microorganisms to humans	Research
P6	Properties of electricity and related phenomena （6MB6）	Perform tests on some factors affecting the magnetic effect of electric current (e.g. number of coils, magnitude of electric current)	Fair testing

Table 3. Vertical Development Framework of Science Process Skills at the Primary Level

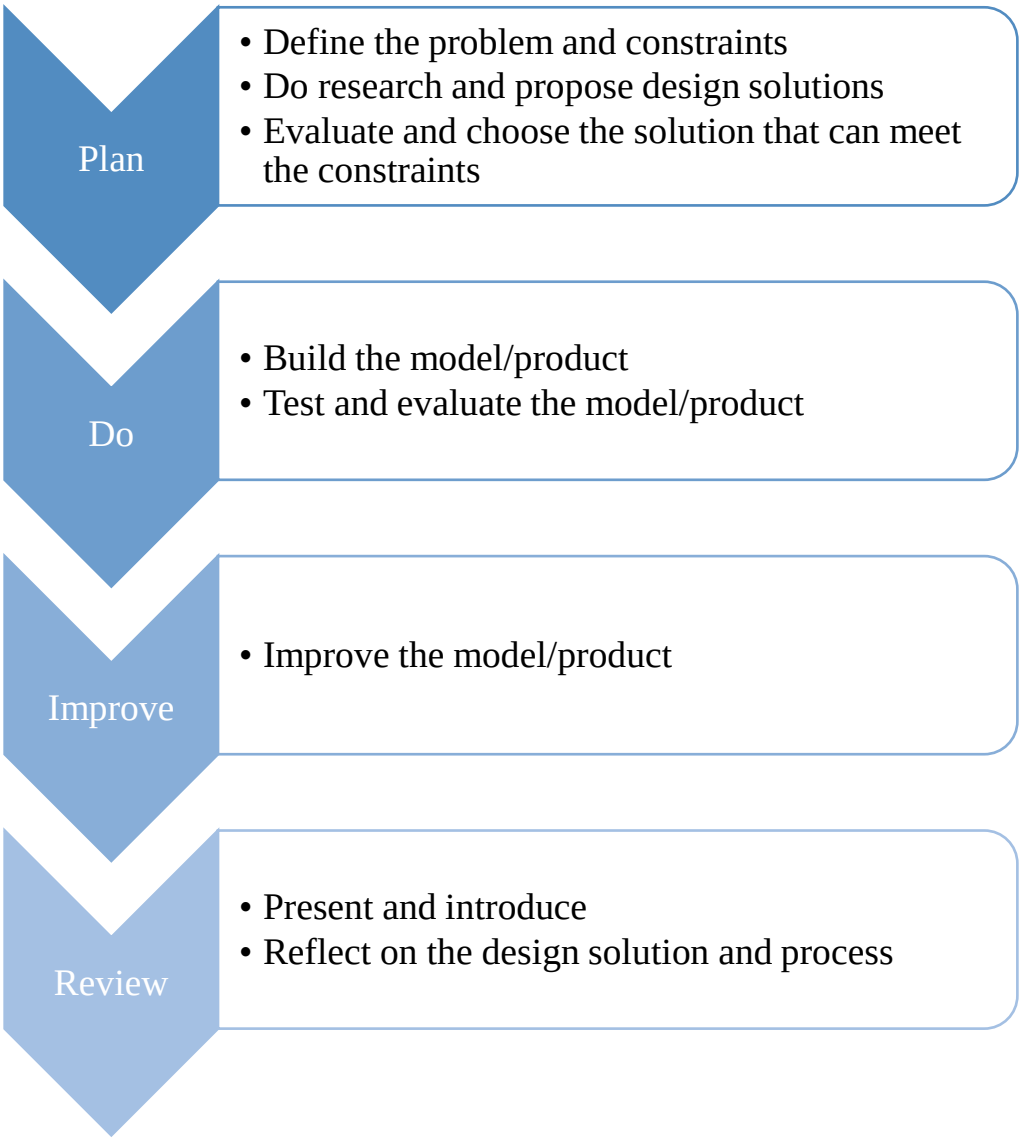
	Plan	Do	Analyse	Review
P1 – P2	● Observe common natural phenomena and objects in daily life, and raise simple questions about them ● Based on life experience, make simple predictions about the results of inquiry	● Conduct science inquiry activities using simple materials and tools ● Collect data by using senses and simple tools appropriately ● Record observations using simple methods (e.g. marking on pictures)	● Organise the information collected during the inquiry process through methods such as comparison and classification ● Compare if the results of inquiry are consistent with the predictions	● Share with others the inquiry process and results, as well as the impressive parts
P3 – P4	● Observe changes in natural phenomena and events, and raise scientific questions about them that can be inquired ● Utilise life experiences and prior knowledge to identify, among the variables listed by the teacher, the "factor which its impact is to be investigated", the "factor to be observed or measured" and the "factors to be kept constant" during the inquiry process ● Based on the hypothesis proposed by the teacher, make predictions about the results of inquiry	● Conduct science inquiry activities using suitable materials and tools ● Collect data by using senses, measuring tools and simple scientific instruments appropriately, and record the data in standard units ● Record evidence and data using tables, photos, videos, or simple text or images	● Organise the data/evidence collected into meaningful information through methods such as comparison, classification, analysis, and inference ● Represent the results of inquiry using various tools such as charts and mind maps ● Compare if the results of inquiry are consistent with the predictions, determine if the conclusion supports the proposed hypothesis and propose possible explanations	● In the form of oral presentation, describe the inquiry process and results, and provide a simple explanation ● Reflect on the inquiry process, point out areas that need attention, including whether the results are reasonable, whether any mistakes were made during the process
P5 – P6	● Observe changes in natural phenomena and events, and raise scientific questions about them that can be inquired	● Conduct science inquiry activities using suitable materials, tools and digital	● Organise the data/evidence collected into meaningful information through methods such as comparison,	● In the form of oral presentation, written report or others, provide a comprehensive description of

	Plan	Do	Analyse	Review
	● Utilise life experiences and prior knowledge to propose a hypothesis and inquiry method that can answer the question of inquiry, and identify the variables* involved in the inquiry process, including dependent variable, independent variable and control variables ● Based on the proposed hypothesis and the adopted inquiry method, make reasonable predictions regarding the relationships among various variables	devices (e.g. single board computers, microcontrollers) ● Collect data using measuring tools and scientific instruments, conduct repeated testing, and record the data in standard units ● Record data/evidence comprehensively using tables, photos, videos, text, images, and/or scientific symbols	classification, analysis, inference, and generalisation ● Represent the results of inquiry using various tools such as charts and mind maps, and express the relationships among various variables using scientific language and symbols ● Compare if the results of inquiry are consistent with the predictions, determine if the conclusion supports the proposed hypothesis and explain by applying prior scientific knowledge ● Identify the possible errors occurred during the inquiry process	the inquiry process and results, and construct scientific explanations using the evidence collected during the inquiry process ● Reflect on the inquiry process, suggest areas that need improvement, any alternative explanations to the question of inquiry, or areas that require further investigation

* Independent variable: factor which its impact is to be investigated; Dependent variable: factor to be observed or measured; Control variable: factor to be kept constant

6.2.2 Engineering Design and Innovation

This curriculum emphasises enabling students to understand the connection between science and technology and daily life, as well as the benefits they bring to improving human life, through designing models/products. In the process, students can also cultivate their creativity and innovative thinking. At the primary level, teachers can guide students in designing models/products through four steps: "Plan", "Do", "Improve" and "Review" (PDIR).



This curriculum recommends that teachers arrange for students to engage in engineering design activities at least twice a year. Teachers can design different scenarios and flexibly adjust the difficulty of the engineering design activities according to students' levels. Teachers can also connect with other STEAM-related subjects for cross-curricular project learning. Please refer to Tables 4 to 6 for “An Example Demonstrating the Engineering Design Process”, “Examples of Topics for Engineering Design at Different Levels”, and the “Vertical Development Framework of Engineering Design Process Skills at the Primary Level” respectively.

Table 4. An Example Demonstrating the Engineering Design Process

(Using the Primary 5 learning and teaching activity "Design and construct a soundproof device, improve its soundproofing effectiveness through design cycle" under the topic "Properties of sound and related phenomena" in Strand 2 "Matter, Energy and Changes" as an example)

Engineering Design Process		**Example**
Plan	Define the problem and constraints	● Scenario: Grandparents are getting old and often rest at home. However, due to the poor sound insulation of the old house, their rest is often disturbed by the noise from outside. ● Requirement: Design and make a lightweight and portable earmuff with good sound insulation. ● Problem and constraints: Use materials commonly available in daily life to make a soundproof earmuff that weighs no more than 200 g and can reduce the volume by at least 20 decibels. The cost of the earmuff should be within a budget of HK$50.
	Do research and propose design solutions	Learn about the basic structure and design features of a soundproof earmuff from daily observation or by conducting online research, and perform simple tests to learn about the soundproofing principles and effectiveness of different materials.
		Propose a design solution by considering factors such as the shape and size of the earmuff, the soundproofing effectiveness and weight of the filling material. Draw a design sketch that clearly shows the structure of the product, the functions of and the materials used for various parts.
	Evaluate and choose the solution that can meet the constraints	Each group member shows and explains the features of his/her design solution. The group then discusses together, by considering factors such as effectiveness and cost, to select the best solution that meets the constraints or develop a combined solution that combines the advantages of each design.
Do	Build the model/product	Each group makes the soundproof earmuff based on the selected design solution (e.g. make the cups using environmentally friendly materials or 3D-printing materials, and fill them with materials such as fabric, cotton, foam or Styrofoam).
	Test and evaluate the model/product	Test the soundproofing effectiveness of the earmuff using the testing instrument provided by the teacher, record the test data, and conduct repeated tests. Measure and record the weight of the soundproof earmuff.

Improve	Improve the model/product	Make improvements regarding the type and amount of filling materials used or other aspects based on the test results.
Review	Present and introduce	Present and introduce the product to the class, explaining its functions and features.
	Reflect on the design solution and process	Think about the modifications needed to transform the earmuff into a product for everyday use.

Table 5. Examples of Topics for Engineering Design at Different Levels

Level	Topic (Learning objective)	Example of engineering design
P1	Properties of matter （1MA2）	**Patterned lampshade** • Materials: cardboard, cellophane/ butter paper • Tools: scissors, glue • Aim: make a lampshade with patterns that allow light to pass through
P2	Daily weather phenomena （2EB1）	**Rainwater collector** • Materials: 3 paper cups • Tools: scissors • Aim: make a rainwater collector that can collect more rainwater than three unprocessed paper cups
P3	Engineering, design cycle and applications （3SC3）	**Paper bridge** • Materials: 40 sheets of A4 paper • Tools: scissors, glue • Aim: make a 40 cm long paper bridge that can support at least 20 kg of load
P4	Properties of matter （4MA3）	**Insulated container** • Materials: insulating materials • Tools: scissors, glue • Aim: Make an insulated container that can keep the temperature of water inside it from decreasing by more than 5 C within 15 minutes.
P5	Properties of sound and related phenomena （5MB3）	**Soundproof earmuff** • Materials: insulating materials • Tools: scissors, glue • Aim: Make a soundproof earmuff of weight less than 200 g that can reduce the volume by at least 20 decibels
P6	Properties of light and related phenomena （6MB3）	**Periscope** • Materials: 2 pieces of 7 cm 7 cm mirror paper, cardboard • Tools: scissors, glue • Aim: Make an extendable periscope with a total length of 40 cm when not extended

Table 6. Vertical Development Framework of Engineering Design Process Skills at the Primary Level

	Plan	Do	Improve	Review
P1 – P2	● Observe ready-made everyday items and propose simple processing methods in response to the problem defined by the teacher ● Draw the processed part on a picture of the original item	● Process the original item using the materials and simple tools provided by the teacher ● Test the effect of the item after processing or modifications using simple tools	● Evaluate whether the item can achieve the expected effect after processing or modifications	● Describe the process of making the item and the achievement, as well as the impressive parts
P3 – P4	● Utilise life experiences and prior knowledge to propose a design solution for the model/product in response to the problem, constraints and success criteria defined by the teacher ● Do a simple evaluation on the feasibility of the design solution ● Draw a design sketch that shows the structure of the model/product and the materials used for various parts	● Make the model/product using the materials and tools provided by the teacher as well as some self-selected materials ● Test the effectiveness of the model/product using measuring tools and simple scientific instruments, collect and record the test data in standard units ● Record the test data using tables, images, photos, videos or simple text	● Evaluate whether the model/product can solve the defined problem and meet the relevant constraints and success criteria based on the test data ● Propose reasonable and feasible improvement plans for the model/product that does not meet the success criteria	● In the form of oral presentation, describe the design and make process and the features of the model/product, and briefly explain its operation and working principles ● Reflect on the design and make process, point out the limitations or shortcomings of the model/product
P5 – P6	● Utilise life experiences and prior knowledge to propose design solutions for the model/product in response to the problem, constraints and success criteria defined by the teacher or students themselves	● Select suitable materials, tools or digital devices (e.g. single board computers, microcontrollers) to make the model/product ● Test the effectiveness of the model/product using	● Evaluate whether the model/product can solve the defined problem and meet the relevant constraints and success criteria based on the test data	● In the forms of oral presentation, written report or others, provide a comprehensive description of the design and make process and the features of the model/product, clearly

	Plan	Do	Improve	Review
	● Compare the different design solutions, and select the suitable design solution by considering various factors (e.g. cost, feasibility, aesthetics, effectiveness, environmental friendliness, etc.) comprehensively ● Draw a design sketch that clearly shows the structure of the model/product, including the dimensions and positions of the major parts, and the functions of and materials used for various parts	measuring tools and scientific instruments, collect and record the data in standard units, and conduct repeated testing ● Record the test data using tables, images, photos, videos or text	● Induce the factors affecting the effectiveness of the model/product based on test data, and propose targeted improvement plans to enhance its effectiveness	elaborate how the item operates, and explain its working principles using scientific language ● Reflect on the design and make process, point out the limitations or shortcomings of the model/product, as well as the possibilities for further improvement or development

6.3 Essential Learning Content

This curriculum document serves as a guideline for schools to ensure comprehensive and appropriate coverage of the essential learning content of the four strands "Life and Environment", "Matter, Energy and Changes", "Earth and Space" and "Science, Technology, Engineering and Society" in the Primary Science curriculum, thereby achieving the curriculum rationale and learning targets. The essential learning contents of the curriculum are as follows:

Strand	Theme
Life and Environment	• Human Health • Characteristics of Living Things • Continuation of Life • Inter-relationship between Living Things and the Natural Environment • Ecosystem • World under the Microscope
Matter, Energy and Changes	• Properties and Changes of Matter • Forms of Energy and Energy Transfer • Force and Motion
Earth and Space	• Earth's Characteristics and

	Resources • Climate and Seasons • Solar System in the Universe
Science, Technology, Engineering and Society	• Scientific Process and Spirit of Science • Aerospace and Innovative Technology • Engineering and Design

6.3.1 Topic sequence and recommended lesson time allocation

The Science (Primary 1 – 6) Curriculum covers four strands, consisting of 39 topics under 15 themes, distributed in a spiral manner across the six primary levels according to students' age, cognitive levels, learning interest, and prior knowledge. Schools should implement the curriculum according to the topic arrangement and the recommended lesson time for each level to facilitate student learning.

Recommended lesson time：

- The Primary Science curriculum should account for no less than 7% of the total lesson time for primary curriculum.
- The instruction of the four strands of this curriculum accounts for 90% of the lesson time, while the remaining 10% are flexible time.
  - Primary 1 – 2: No less than 64 periods per year (assuming 35 minutes per period and 2 periods per week, that is, no less than 37 hours per year)
  - Primary 3 – 6: No less than 96 periods per year (assuming 35 minutes per period and 3 periods per week, that is, no less than 56 hours per year)

Number of periods allocated for each strand:

Level	**Strand**				**Flexible Time** [~10%]	**Total Number of Lessons** [100%]
	(1) Life and Environment [~30%]	(2) Matter, Energy and Changes [~30%]	(3) Earth and Space [~15%]	(4) Science, Technology, Engineering and Society [~15%]		
P1 – P2 No. of lessons **per year**	18 periods	18 periods	10 periods	10 periods	8 periods	**64 periods**
P3 – P6 No. of lessons **per year**	28 periods	28 periods	14 periods	14 periods	12 periods	**96 periods**

Recommended number of periods for each theme at various levels:

Strand	Theme	P1	P2	P3	P4	P5	P6
Life and Environment	LA Human Health	7		8	7		6
	LB Characteristics of Living Things	8	6	12		8	7
	LC Continuation of Life	3		8	8	7	
	LD Inter-relationship between Living Things and the Natural Environment		5		5	6	3
	LE Ecosystem		7		8		5
	LF World under the Microscope					7	7
Matter, Energy and Changes	MA Properties and Changes of Matter	6	9	17	10	10	8
	MB Forms of Energy and Energy Transfer	6	4	7	12	12	12
	MC Force and Motion	6	5	4	6	6	8
Earth and Space	EA Earth's Characteristics and Resources	6		5	5	4	6
	EB Climate and Seasons		6	4	5	5	
	EC Solar System in the Universe	4	4	5	4	5	8
Science, Technology, Engineering and Society	SA Scientific Process and Spirit of Science		5	3	3	4	2
	SB Aerospace and Innovative Technology	5		5	6	4	6
	SC Engineering and Design	5	5	6	5	6	6
Flexible Time		8	8	12	12	12	12
Total Number of Lessons		**64**	**64**	**96**	**96**	**96**	**96**

6.3.2 Utilisation of the Flexible Time

Science learning should not be confined to science inquiry activities conducted in the classrooms. Schools should make good use of the flexible time allocated for Primary Science to provide students with diversified science learning experiences, including school-based science courses, subject-based/interdisciplinary project learning, science competitions, science-related experiential learning, science talks, field trips, or visits tailored to the different topics.

Learning experience	**Example**
Subject-based/ interdisciplinary project learning	• In alignment with the content under the topics "Physical change and chemical change" and "Daily weather phenomena", teachers can guide Primary 3 students to conduct a project learning related to designing a "Solar Still", applying knowledge about the water cycle to construct a simple device for desalinating seawater. • In alignment with the content under the topic "Impact of human behavior on the natural environment", teachers can guide Primary 5 students to conduct a project learning related to "Improving the School Environment", in which students have to collect and analyse data on campus pollution, investigate the main sources of pollution on campus, and propose improvement plans. • In alignment with the content under the topic "Engineering, design cycle and applications", teachers can guide Primary 6 students to conduct a project learning related to designing "Gerontechnology Products", where students need to apply

Learning experience	Example
	knowledge and skills in programming and engineering and design to construct products that address the needs of the elderly and enhance their lives.
Science competitions	• In alignment with the content under the topic "Force and motion-related phenomena", teachers can arrange a water rocket competition for Primary 5 students where they have to design a water rocket with the longest range under specific conditions and constraints. • Teachers can organise inter-class science quiz competition on a level basis to enhance students' science knowledge
Science-related experiential learning	• In alignment with the content under the topic "Structures of living things", teachers can arrange Primary 2 students to participate in hydroponic farming exploration activities, to understand the main structure and growth conditions of plants • In alignment with the content under the topic "The Sun and the eight planets", teachers can arrange Primary 5 students to participate in a stargazing activity, to observe some major constellations and bright stars using telescopes. • Teachers can organise a Science Week or STEAM Learning Week to enrich students' science knowledge through interesting booth games and simple science experiments.

Learning experience	Example
Science talks	• In alignment with the content under the topic "Changes in climate and seasons", teachers can arrange Primary 4 students to participate in science talks provided by tertiary institutions, government agencies, non-governmental organisations or various environmental organisations, to equip students with an understanding of the impacts of global warming and some methods to mitigate global warming. • In alignment with the content related to combustion under the topic "Physical change and chemical change", teachers can arrange Primary 6 students to participate in the "Community Emergency Preparedness Education Talk" provided by the Fire Services Department, to recognise the emergency response and survival skills in the event of a fire.
Field trips	• In alignment with the content under the topic "Diversity and classification of living things", teachers can arrange field trips to country parks for Primary 1 students to observe and take photos to record the common animals and plants in Hong Kong. • In alignment with the content under the topic "Earth's history", teachers can arrange field trips to the Hong Kong UNESCO Global Geopark for Primary 5 students to understand how some of Hong Kong's landforms were formed.

Learning experience	**Example**
Visits	• In alignment with the content under the topic "Earth's resources", teachers can arrange a visit to Water Resources Education Centre or a water treatment plant for Primary 3 students to learn about the water treatment process in Hong Kong. • In alignment with the content under the topic "The nation's and the world's aerospace technology development", teachers can arrange Primary 6 students to visit the Hong Kong Space Museum to learn about the latest development in aerospace technology and space exploration.

6.3.3 Learning objectives and suggested learning and teaching activities for each strand

Strand 1: Life and Environment

This strand aims at helping students explore the mysteries of life and the interrelationship between living things and the natural environment, and arousing their concern for the environment and sustainable living. It includes six themes, covering human health, characteristics of living things, continuation of life, interrelationships between living things and the natural environment, ecosystem, and the world under the microscope. Through studying this strand, students can acquire fundamental knowledge of life science and practice a healthy lifestyle, at the same time, understand the interdependent relationship between living things and the environment, and develop love and respect for life as well as an awareness of environmental conservation.

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
A. Human Health	• Healthy lifestyles • Communicable and non-communicable diseases	P1	1LA1 State the functions of various parts of the human body (e.g. eyes to see, teeth to chew food, spine to support the body) 1LA2 Be aware of the methods to protect various parts of the body (e.g. methods for protecting the eyes and teeth, proper standing and sitting postures) 1LA3 Give some examples of healthy living habits (e.g. having a balanced diet,	• Watch video clips to learn the proper ways to protect the eyes, brush the teeth, and the proper standing and sitting postures • Plan and practice a healthy daily schedule with suitable allocation of time for work and rest

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			exercising regularly, getting enough sleep, maintaining a relaxed and happy mood) 1LA4 Develop healthy living habits	
		P2		
		P3	3LA1 Be aware of the types of food commonly found in a balanced diet 3LA2 Recognise the healthy eating pyramid 3LA3 Recognise the nutrients in food (carbohydrates, proteins, fats, vitamins, minerals, dietary fiber, water) and their functions 3LA4 Recognise the correct methods of handling and preserving food 3LA5 Maintain healthy eating habits	• Collect nutrition labels of different food and compare the weight or volume of nutrients in different food • Design a healthy meal menu, indicating the types and portions of food required for a balanced diet • Perform a test to find out whether food rot more easily in a humid environment
		P4	4LA1 Recognise common communicable diseases (e.g. influenza, cholera) and their major causes and symptoms 4LA2 Recognise the transmission routes of communicable diseases (e.g. droplet	• Perform a test to find out whether surgical masks can help prevent droplet-borne diseases (e.g. spray a coloured solution with a spray bottle, compare the splashing effect with or without a mask)

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			transmission, vector transmission, contact transmission, food transmission, blood transmission) and their prevention 4LA3 Recognise common non-communicable diseases (e.g. heart diseases, cancer) and their main causes, symptoms and prevention 4LA4 Realise that scientific progress can help respond to large-scale communicable diseases (e.g. the COVID-19 pandemic), protect the lives and health of people, and promote biosecurity	• Perform a test to find out whether proper hand washing procedures can help remove the pathogens on hands (e.g. dye hands with a coloured solution, compare the amount of colour remaining on the hands after washing hands properly and casually) • Collect information on the major causes, symptoms and prevention of some common non-communicable diseases
		P5		
		P6	6LA1 Recognise simple first-aid for handling minor injuries or discomforts 6LA2 Recognise ways to handle household accidents (e.g. fire, leakage of electricity, gas leak) 6LA3 Be aware of the adverse effects of smoking, alcoholism, drug abuse and drug use on the body	• Observe teacher's demonstration to learn the uses and proper usages of various first-aid supplies • Carry out simulations under teacher guidance to practice simple first-aid steps or methods of handling accidents • Design posters about the hazards of smoking/hazards of alcoholism/anti-drug

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
B. Characteristics of Living Things	• Difference between living things and non-living things • Diversity and classification of living things • Structures of living things • Human body systems	P1	1LB1 Be aware that both animals and plants are living things 1LB2 Give examples of common animals and plants in Hong Kong 1LB3 List the survival conditions for animals and plants (e.g. air, water) 1LB4 Describe some simple common characteristics of animals (e.g. movement) 1LB5 Respect and care for animals and plants	• Visit country parks, observe and take photos to record the common animals and plants in Hong Kong
		P2	2LB1 Be aware of the differences between living things and non-living things (e.g. living things can reproduce, grow and develop, and respond to stimuli, while non-living things cannot) 2LB2 State the major structures in plants and their functions (leaves make food, roots absorb water and nutrients and anchor plants, stems support the plant and	• Observe the response of a Mimosa pudica to touch • Observe the characteristics of plants with a magnifying glass • Observe teachers' demonstration or watch video clips on the process of plants absorbing coloured solutions • Visit Hong Kong Park

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			transport water, food and nutrients)	
		P3	3LB1 Be aware that animals are classified into vertebrates and invertebrates 3LB2 Describe the key characteristics of some animal groups (insects, fish, amphibians, reptiles, birds, mammals) 3LB3 Classify animals according to their characteristics 3LB4 Using mammals as an example, be aware of the major structures of some animals, including bones, muscles, lungs, heart, and stomach, and their functions 3LB5 Be aware that plants are classified into flowering plants and non-flowering plants 3LB6 Be aware of the major parts in flowers, including sepals, corolla, stamens and pistils, and their functions 3LB7 Appreciate the diversity of life	• Examine pictures of vertebrates and invertebrates, and classify them • Examine pictures of different animals, classify the animals with similar characteristics and state the reasons • View pictures, three-dimensional simulations or physical models of mammals • Examine pictures of flowering plants and non-flowering plants, and classify them • Dissert flowers to examine and differentiate the major parts, including sepals, corolla, stamens and pistils, of a flower
		P4		

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
		P5	5LB1 Recognise the major parts of the human respiratory system (trachea, bronchi, lungs) and their functions 5LB2 Recognise the major parts of the human digestive system (stomach, small intestine, large intestine) and their functions 5LB3 Recognise the major parts of the human reproductive system (male: testes, sperm ducts, urethra, penis; female: ovaries, oviducts, uterus, vagina) and their functions	• View pictures or three-dimensional simulation models of the related human body systems • View or construct physical models of the related human body systems
		P6	6LB1 Recognise the major parts of the human circulatory system (heart, blood vessels) and their functions 6LB2 Recognise the major parts of the human urinary system (kidneys, ureters, urinary bladder, urethra) and their functions 6LB3 Recognise the major parts of the human nervous system (sensory organs, brain, spinal cord) and their functions	• View pictures or three-dimensional simulation models of the related human body systems • View or construct physical models of the related human body systems • Measure one's own heart rate and pulse • Observe teacher's demonstration on the knee-jerk reflex

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			6LB4 Give some examples of reflex actions (e.g. blinking when wind blows into eyes, withdrawal reflex in response to heat)	
C. Continuation of Life	• Life cycle of living things • Heredity and reproduction	P1	1LC1 State the major body changes during infancy, early childhood and childhood (e.g. increase in height and weight, loss of primary teeth and growth of permanent teeth)	• Observe the birthday photos of oneself over the years and state the body changes
		P2		
		P3	3LC1 Be aware that living things go through the life cycle of birth, growth, reproduction and death 3LC2 Using frogs, butterflies, dogs and chickens as examples, recognise the changes in different animals at different stages of their life cycles 3LC3 Identify the different stages of the life cycle of flowering plants (germination, growth, reproduction, seed dispersal)	• Grow plants and regularly observe and record the different stages of the their life cycle • Watch video clips on animals experiencing different stages of life cycle • Visit Kadoorie Farm and Botanic Garden/Lion's Nature Education Centre

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			3LC4 Recognise the reproductive processes of live-bearing and egg-laying animals 3LC5 Respect and care for life	
		P4	4LC1 Recognise the reproductive process of flowering plants 4LC2 Be aware that some plants can reproduce through roots, stems or leaves (e.g. radish and sweet potato can reproduce through roots, onion and garlic can reproduce through stems, Echeveria and Kalanchoe pinnata can reproduce through leaves) 4LC3 Recognise the different ways living things increase the number of offspring and their chances of survival (e.g. plants produce a large number of seeds, mammals care for their young offspring) 4LC4 Be aware that offspring produced by reproduction of animals and plants have similar characteristics to their parents 4LC5 Identify characteristics that animals and	• Observe the photo of a whole plant and point out its reproductive parts • Examine pictures of parents and offspring of animals and plants, point out the similar characteristics in parent and offspring • Carry out group activities to attempt specific actions (e.g. rolling tongue, bending the thumb backward)

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			plants inherited from their parents (e.g. skin colour, eye colour and shape of earlobe in humans; colour and number of petals) as well as those that are not inherited from their parents (e.g. hair length in humans) 4LC6 Be aware that some human characteristics are inherited (e.g. ability to roll the tongue and bend the thumb backward) and cannot be changed through acquired learning	
		P5	5LC1 Describe the characteristics of different developmental stages in humans (infancy, childhood, adolescence, adulthood, and late adulthood) 5LC2 Recognise the physiological and psychological changes in males and females during adolescence 5LC3 Recognise the factors that influence growth and development during adolescence (e.g. heredity, nutrition,	• Collect information on physiological and psychological changes during adolescence

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			sleep and exercise, etc.) 5LC4 Accept individual differences in growth and development during adolescence	
		P6		
D. Inter-relationship between Living Things and the Natural Environment	• Biological forms and functions, and their adaptability to the environment • Impact of human behavior on the natural environment	P1		
		P2	2LD1 Recognise the impact of human behavior on the environment (e.g. causing air and water pollution) 2LD2 Give some examples of how pollution affect the survival of animals and plants 2LD3 Show concern for safeguarding and improving the environment, and take action accordingly	• Collect information and share with classmates the impact of a certain type of pollution on humans, plants and animals • Visit Y•PARK/T•PARK
		P3		
		P4	4LD1 Give some examples of features of plants that help them adapt to their environment 4LD2 Give some examples of features of animals that help them adapt to their environment	• Watch video clips about how animals and plants adapt to their habitats • Visit Hong Kong Wetland Park

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			4LD3 Recognise some behaviors of animals for surviving in their habitats (e.g. migration, hibernation)	
		P5	5LD1 Recognise some methods of pollution testing 5LD2 Give some approaches in the application of science and technology to address environmental issues 5LD3 Recognise the importance of sustainable development and environmental protection to maintaining ecological security	• Conduct simple pollution testing (e.g. use a decibel meter to measure sound level), compare the pollution levels in different locations, and record data using charts and graphs (Programming tools can be duly applied to construct the measuring instruments in the process) • Visit O•PARK1 (the first organic resources recovery centre)/Green@Community/Zero Carbon Park
		P6	6LD1 Recognise some endangered species 6LD2 Explain why endangered species are on the verge of extinction 6LD3 Recognise some methods of protecting endangered species 6LD4 Respect and care for life, and show concern for endangered species	• Visit the Agriculture, Fisheries and Conservation Department's Endangered Species Resource Centre/Lion's Nature Education Centre, to collect information on endangered species

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
E. Ecosystem	• Ecological environment • Food chain	P1		
		P2	2LE1 Be aware that plants need (sun) light, air and water to provide the energy required for life processes (growth, reproduction) 2LE2 Be aware that animals obtain the energy required for life processes (growth and repair, activity, reproduction) through feeding 2LE3 Be aware that animals respond to changes in environmental conditions (e.g. temperature, danger)	• Conduct a mung bean planting activity, observe the growth process of the plants, and record the height of the plants and the number of leaves • Interview classmates who have pets about the food and needs of their pets
		P3		
		P4	4LE1 Be aware of some different natural environments (e.g. tropical rainforest, temperate grassland, polar regions, desert) 4LE2 Relate common animals and plants to the natural environments 4LE3 Describe the role of each living thing in a simple food chain (e.g. plants produce their own food, some animals eat plants,	• Match common animals and plants with the natural environments • Visit wetlands, aquariums or nature education centers • Draw a simple food chain involving animals and plants from a specific natural environment, and describe the feeding relationships among the various living things

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			some animals eat other animals) 4LE4 Identify common predators and their prey, and describe their relationships 4LE5 Understand that some living things in an ecosystem compete with each other for resources (e.g. light, food, living space)	
		P5		
		P6	6LE1 Be aware that photosynthesis is the process by which plants produce food 6LE2 Be aware of the conditions necessary for photosynthesis in plants (sunlight, water, carbon dioxide, chlorophyll) 6LE3 State the importance of photosynthesis in plants to other living things	• Observe teacher's demonstration or watch video clips about tests on some of the conditions necessary for photosynthesis in plants (sunlight, chlorophyll)
F. World under the Microscope	• Common microorganisms • Cells and microscope	P1		
		P2		
		P3		
		P4		
		P5	5LF1 Recognise common types of microorganisms (including bacteria,	• View pictures and watch videos of common microorganisms

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			fungi, viruses) 5LF2 Recognise the uses of antibiotics and the effects of inappropriate use of antibiotics 5LF3 Recognise the benefits (e.g. probiotics inhibiting the growth of harmful bacteria, degrading pollutants) and negative impacts (e.g. causing diseases) of microorganisms to humans	• Make bread using yeast, and compare the difference between bread made with yeast and without yeast • Collect information on the benefits and negative impacts of microorganisms to humans
		P6	6LF1 Be aware that cells are the basic units of living things 6LF2 Use a microscope to observe animal cells and plant cells 6LF3 Identify the different parts of animal and plant cells, and compare the similarities and differences between animal and plant cells (plant cells have cell walls while animal cells do not, most plant cells have chloroplasts while most animal cells do not)	• Use a microscope to observe the basic structures of animal cells and plant cells, and compare the similarities and differences between them • Use a microscope to observe different plant tissues (e.g. onion epidermis, leaf epidermis) • Conduct field trips and observe plant tissues with a portable microscope • Draw simple diagrams of the structures of animal and plant cells

Strand 2: Matter, Energy and Changes

This strand aims at helping students understand the fundamental concepts of matter and energy, and explore their changes and related phenomena. It includes three themes, covering properties and changes of matter, different forms of energy and energy transfer, and force and motion. Through studying this strand, students can acquire foundational knowledge in physical science, including the different states and properties of matter, as well as the physical and chemical changes involved; the properties and transmission of different forms of energy (light, sound, electricity, heat) as well as the phenomena associated with them; force and motion-related phenomena as well as the working principles of simple machines. Students can gain insights into scientific phenomena and technological applications in daily life, fostering their curiosity about the world around them.

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
A. Properties and Changes of Matter	• States of matter • Properties of matter	P1	1MA1 Describe the properties of water and air (colourless, odourless, tasteless, and have no fixed shape) 1MA2 Describe the properties (e.g. weight, hardness, elasticity, transparency) of everyday items	• Observe the properties of water and air with five senses • Test the properties of everyday items, and classify them according to their properties • Construct a simple patterned lampshade
		P2	2MA1 Be aware that magnet can be used to attract some metallic objects 2MA2 Be aware that each magnet has two different magnetic poles which always exist in pairs 2MA3 Be aware of the phenomenon of ‘like poles	• Determine direction using a compass • Classify iron objects and non-metallic objects using a magnet • Construct a simple compass • Construct a simple magnet toy (e.. fishing game)

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			repel and unlike poles attract' 2MA4 Be aware that the magnetised needle in a compass can be used to indicate the south and the north 2MA5 Give some examples of daily application of magnet	
		P3	3MA1 Be aware that matter can be classified into solids, liquids and gases, and describe their properties (whether it has a fixed volume, whether it has a fixed shape) 3MA2 Compare some physical properties (e.g. weight, physical state under room temperature, whether it can be attracted by magnet, whether it can float in water) of different materials 3MA3 Give some examples of mixture (e.g. rocks and sand, sugar solution, sand and iron filings, air) 3MA4 Recognise some methods of separating mixtures (sieving, magnetic attraction, filtration, evaporation)	• Measure the physical properties of various materials with simple tools (e.g. measure the weight of an object with an electronic balance) • Separate simple mixtures using suitable methods (e.g. separate salt and water by evaporation)

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
		P4	4MA1 Compare some physical properties (electrical conductivity and thermal conductivity) of metals and non-metals 4MA2 Relate the properties of metals to their uses (e.g. copper which conducts electricity well can be used to make electrical wires; iron that conducts heat well can be used to make cooking utensils) 4MA3 Determine whether a material is suitable for thermal conduction or thermal insulation based on its properties	• Perform a test to compare the thermal conductivity of metals and non-metals (e.g. place rods of different materials but the same length and thickness in hot water, observe the order in which the wax on the tips of the rods falls) • Perform tests to compare the electrical conductivity of metals and non-metals (e.g. connect a closed circuit composed of battery, connecting wires and a light bulb, then connect different materials in between a connecting wire and the light bulb, observe whether the light bulb lights up) • Construct an insulated box/bag/bottle
		P5	5MA1 State the major components of air and their percentage of composition in air 5MA2 Be aware that air has weight and occupies space 5MA3 Give some examples of daily phenomena related to atmospheric pressure (e.g. suck air out through a straw will cause the beverage carton to cave in)	• Perform tests to verify that air has weight and occupies space • Construct a revolving lantern using a paper cup, cut out fan blades at the base and on the side of the cup, place the revolving lantern above a tungsten light bulb, let the heated air rise and push the fan blades, causing the lantern to spin • Construct a sky lantern (can use a hair dryer to

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			5MA4 Be aware that air rises when heated, and the movement of air forms wind	blow hot air into the sky lantern)
		P6	6MA1 Using water as an example, state that buoyancy is an upward force exerted by water on objects 6MA2 Recognise the phenomenon of floating and sinking of objects in water	• Perform tests on the factors (e.g. shape, material) affecting the floating of objects in water
	• Physical change and chemical change	P1		
		P2	2MA6 Be aware that some substances (e.g. salt, sugar) are soluble in water while others (e.g. sand, rock) are insoluble in water	• Perform tests to identify substances that are soluble in water
		P3	3MA5 Describe the processes (melting, boiling, freezing, condensation, evaporation) of the change in states of water 3MA6 Give examples of daily phenomena of evaporation and condensation (e.g. clothes drying in the sun, water droplets condensing on the surface of cold drink) 3MA7 Be aware of some factors that speed up the dissolving of substances in water (e.g.	• Observe the processes of the change in states of water (e.g. use an induction cooker to heat some ice or water in a container, observe the processes of ice melting into water and water evaporating into water vapour, measure and record the temperatures at which melting and boiling of water occur under normal conditions) • Construct a simple solar still • Perform tests on how to speed up the dissolving of

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			surface area of solute*, water temperature, stirring speed) 3MA8 Distinguish between high and low concentrations of solution (e.g. same volume of water with different amounts of sugar added) **Students are only required to compare the dissolving speed of sugar cubes and granulated sugar of the same volume, and do not need to recognise the concept of surface area.*	substances in water, measure and record the data
		P4	4MA4 Identify some visible changes that do not produce new matter (physical changes) (e.g. dissolving, evaporation, squeezing or stretching objects) 4MA5 Identify some visible changes that produce new matter (chemical changes) (e.g. rusting, burning, food rotting)	• Observe teacher's demonstration on some changes that produce new matter • Try squeezing and stretching objects to observe some changes that do not produce new matter
		P5	5MA5 Recognise the necessary conditions for corrosion of metals (using rusting as an example)	• Perform tests to find out whether water and air are the necessary conditions for rusting

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			5MA6 Explain ways to prevent corrosion of metals 5MA7 Be aware of some reversible changes (e.g. condensation and evaporation of water) and irreversible changes (e.g. burning)	
		P6	6MA3 Be aware that combustion requires oxygen, and produces carbon dioxide and water 6MA4 Recognise the necessary conditions for combustion, and the working principles of fire-fighting equipment (e.g. fire extinguishers, fire blankets, etc.) 6MA5 Recognise the occurrence, impact and prevention of hill fires	• Watch teacher's demonstrations showing carbon dioxide and water as the products of combustion (test for carbon dioxide using limewater or hydrogencarbonate indicator; test for water using dry cobalt chloride paper) • Watch teacher's demonstration on the use of carbon dioxide to extinguish fire (using baking soda, vinegar and candles) • Search information on the various types of fire-fighting equipment • Make posters about the methods to prevent hill fires
B. Forms of Energy and Energy	• Sources and uses of energy	P1		
		P2		
		P3	3MB1 Be aware that electrical energy can be converted to other forms of energy (e.g. thermal energy, light energy, sound energy)	• Observe and identify the energy conversion involved in electrical appliances used in daily life (e.g. lamps give out light and heat, television gives

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
Transfer			3MB2 Give examples of uses of electricity in daily life	out light, sound and heat)
		P4	4MB1 Identify the sources of energy (e.g. the Sun, moving water, wind, coal, crude oil, natural gas) 4MB2 Be aware that energy is needed for transportation, manufacturing, illumination, and powering electronic equipment 4MB3 Recognise the importance of energy saving	• Visit CLP Power Low Carbon Energy Education Centre/Hong Kong Electric Lamma Power Station or Lamma Winds/EMSD Gallery and Education Path • Construct a model car powered by renewable energy source (e.g. solar energy, wind power)
		P5	5MB1 Give examples of the different forms of energy (e.g. kinetic energy, potential energy, chemical energy) 5MB2 Be aware that energy can be converted from one form to another	• Observe the conversion of energy through simple investigations • Construct a small fan or vacuum cleaner using materials such as solar panels and small motors
		P6		
	• Properties of light and related phenomena • Properties of sound and	P1	1MB1 Be aware of the source of light 1MB2 Give examples of uses of light in daily life (e.g. for illumination and reading) 1MB3 Be aware that light shining on opaque objects will produce shadows 1MB4 Be aware that sunlight consists of light of	• Make various hand shadow puppets by shining light on one's hands using a flashlight. Move the hands towards or away from the light source and observe the changes in the size of the shadow • Watch 'Shadow Play' and pay attention to the changes in light and shadow

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
	related phenomena		different colours	• Observe the spectrum projected on a wall as sunlight passes through a prism • Create an artificial rainbow using a spray bottle
		P2	2MB1 Be aware that sound is produced by the vibration of objects 2MB2 Be aware that the greater the vibration of an object, the louder the sound produced 2MB3 Be aware of some phenomena related to sound (e.g. echo)	• Construct a simple device for transmitting sound (e.g. connect two paper cups with a string, attach a paper strip in the middle of the string, then pull the string taut and start the conversation, observe the vibration of the paper strip) • Place several beans on a drumhead and strike the drum with different intensities, observe the vibration of the beans under different volumes
		P3		
		P4	4MB4 Differentiate the light coming from a light source (e.g. sunlight, light from a flashlight) from that reflected from objects (e.g. moonlight) 4MB5 Be aware of some examples of reflection of light (e.g. reflection on water surface, mirror) 4MB6 Recognise the changes in length and position of shadow under sunlight at	• Use or construct a sundial to observe the changes in length and position of shadow under sunlight at different times • Compare the differences between light reflecting on smooth and rough surfaces

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			different times	
		P5	5MB3 Be aware that sound can travel through different media 5MB4 Be aware that changes in pitch are caused by changes in vibration 5MB5 Recognise the causes of noise and ways to cope with it 5MB6 Recognise the ways to protect hearing 5MB7 Recognise ways to measure the loudness of sound, and the commonly used unit (decibel)	• Perform tests to find out if sound can travel through different media (e.g. prepare three zipper bags filled with sand, water and air respectively, have students cover one ear and press the zipper bags against the other ear to listen to music played by the teacher) • Construct a simple device that can produce different pitches (e.g. glasses filled with different amounts of water) or a simple musical instrument • Perform tests on the soundproofing effectiveness of different materials (e.g. cardboard, cotton fabric) • Design and construct a soundproof device, improve its soundproofing effectiveness through design cycle
		P6	6MB1 Recognise the mode of light propagation 6MB2 Recognise the characteristics of images formed by a plane mirror, including being the same size as the object and laterally inverted	• Perform test to verify that light travels in a straight line • Observe the image of an object formed by a plane mirror, draw it on a piece of paper and compare it with the object

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			6MB3 Give daily application of different types of mirrors, including plane, convex and concave mirrors 6MB4 Be aware that refraction occurs when light passes through different transparent materials 6MB5 Give examples of daily applications of refraction of light (e.g. glasses, magnifying glasses, microscopes)	• Compare the images of the same object formed by different types of mirrors, including plane, convex and concave mirrors • Construct a periscope or a pin-hole camera
	• Properties of electricity and related phenomena • Heat transfer	P1		
		P2		
		P3	3MB3 Recognise ways to measure temperature, and the commonly used unit (degree Celsius, symbol: *C*) 3MB4 Recognise the modes of heat transfer	• Measure the temperature of water with a thermometer and record it in standard unit • Perform tests to verify that heat transfers from object with a higher temperature to object with a lower temperature
		P4	4MB7 Recognise simple closed circuits 4MB8 Explain that a complete circuit is needed for the functioning of simple electrical appliances (e.g. light bulb)	• Find out the reasons why some simple electrical appliances (flashlights) cannot be used (e.g. the positive and negative terminals of the battery are connected in the incorrect direction) • Connect circuits using circuit components such as

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
				batteries, switches, connecting wires and light bulbs, to investigate the necessary conditions for forming a closed circuit
		P5	5MB8 Recognise how to use electricity safely 5MB9 Explain the reasons why different parts of household appliances are made from conductive and insulating materials respectively	• Design posters on electricity safety
		P6	6MB6 Be aware of the heating effect and magnetic effect of electric current 6MB7 Give examples of daily applications of the heating effect (e.g. electric heaters, hairdryers, toasters) and magnetic effect (e.g. electromagnetic cranes, electromagnetic locks) of electric current	• Watch teacher's demonstration on the heating effect of electric current (e.g. when electric current flows through a resistance wire, the wire heats up and glows) • Perform tests on some factors affecting the magnetic effect of electric current (e.g. number of coils, magnitude of electric current) • Apply electromagnetic effect to construct a simple electromagnetic crane or a small motor
C. Force and Motion	• Force and motion-related phenomena	P1	1MC1 State the relative position of an object to oneself (e.g. front, back, left, right, near, far) 1MC2 Be aware that the position of an object will be changed after motion	• Observe the motion of a ball and state its position in relation to oneself

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
	• Simple machines		1MC3 Give some examples of motion in everyday life (e.g. swinging on a swing, riding a bus, kicking a soccer ball) 1MC4 Describe how fast or slow an object moves	
		P2	2MC1 Be aware that force can cause objects to move 2MC2 Give some daily examples involving push and pull 2MC3 Be aware that force of gravity is the attractive force exerted by the Earth on other objects	• Compare the effect when different magnitudes of pushing force and pulling force are applied on an object from the same direction or opposite directions
		P3	3MC1 Recognise the functions of simple machines such as rollers, inclined planes and pulleys (fixed pulley) (e.g. reducing the force required, changing the direction of force) 3MC2 Give examples of daily applications of rollers, inclined planes and pulleys (e.g. wheels, ramps, elevators)	• Perform tests on the functions of simple machines such as rollers, inclined planes and pulleys (fixed pulley)
		P4	4MC1 Be aware that friction is the resistance that occurs when objects rub against each other 4MC2 Be aware that the direction of friction is	• Perform tests on some factors affecting the magnitude of friction (e.g. pull an object on different materials and measure the required

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			opposite to the direction of motion 4MC3 Give daily examples where friction is applied (e.g. walking, writing)	pulling force with a spring balance)
		P5	5MC1 Be aware that forces can change the state of motion of an object (forces can make a stationary object move or stop a moving object; forces can change the speed of a moving object; forces can change the direction of a moving object) 5MC2 Recognise that forces always work in action and reaction pairs 5MC3 Recognise methods to compare the speed* of moving objects (compare the distances travelled by two objects within the same period of time, or compare the time taken for two objects to travel the same distance) **Students are only required to recognise the methods to compare the speed of moving objects, the formula and calculation related to speed will be covered in the Primary 6 Mathematics curriculum.*	• Perform tests to verify that forces can change the state of motion of an object • Perform tests to verify the relationship between action and reaction • Design and construct a water rocket to investigate the relationship between force and motion, including action-and-reaction pair of forces and the effect of forces on the state of motion of an object

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
		P6	6MC1 Recognise the applications of three types of levers (the fulcrum located in between the effort and the load, the load located in between the fulcrum and the effort, the effort located in between the fulcrum and the load) 6MC2 Be aware of the difference between a lever that reduces the effort required and a lever that requires more effort 6MC3 Recognise the working principles of simple machines such as pulleys (fixed pulley, movable pulley, pulley system) and gears 6MC4 Give examples of daily applications of levers, pulleys and gears (e.g. chopsticks, cable cars, bicycles)	• Perform tests to verify the functions of tools such as screwdrivers, wrenches and pliers • Design and construct different mechanical devices (e.g. mini crane) that utilise levers, pulleys and gears

Strand 3: Earth and Space

This strand aims at guiding students to explore the mysteries of the Earth and space. It includes three themes, covering Earth's characteristics and resources, climate and seasons, and the solar system in the universe. Through studying this strand, students can acquire fundamental knowledge of earth science and space science, including Earth's characteristics, resources and history; daily weather phenomena, and changes in climate and seasons; the Sun and the eight planets in the solar system, as well as some astronomical phenomena and patterns caused by the movements of different celestial bodies that can be observed on the Earth. Students will develop an awareness to protect the Earth as the source of resources for human, as well as an appreciation and admiration for the vastness of the universe.

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
A. Earth's Characteristics and Resources	• Earth's characteristics • Earth's resources • Earth's history	P1	1EA1 Be aware that the surface of the Earth is covered by oceans and land, and that oceans cover more areas than land 1EA2 Be aware that the surface of the Earth is surrounded by the atmosphere (gases) 1EA3 Be aware that the Earth is the shared home for humans, animals and plants 1EA4 Understand the importance of caring for the Earth	• Construct a collage of the Earth with pictures of humans, animals and plants • Observe a model of the Earth or build a three-dimensional puzzle of the Earth
		P2		
		P3	3EA1 Be aware of the sources of salt water and	• Construct a water filter and improve its

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			fresh water, and their uses in daily life 3EA2 Be aware that drinking water needs to be filtered and purified 3EA3 Give some examples of Earth's resources that are renewable (e.g. water, wind, forests) and that are non-renewable (e.g. petroleum, natural gas, minerals) 3EA4 Be aware of the importance of responsible use of the Earth's resources	filtration efficiency through design cycle • Visit Water Resources Education Centre/reservoirs/water treatment works • Devise a personal action plan to conserve water and put it into practice
		P4	4EA1 State the structure of the Earth (crust, mantle, and core) and the physical characteristics of these distinct parts 4EA2 Be aware that the Earth's crust is composed of rocks, including igneous rocks, sedimentary rocks, metamorphic rocks 4EA3 Be aware of the main components of soil, classification of soil (sand, loam, clay) as well as the plants suitable for growing on each type of soil	• Construct a model using clay of three different colours to simulate the layered structure of the interior of the Earth • Observe specimens of or study information about different types of rocks (e.g. granite, sandstone, marble) • Use simple tools to compare the colour, hardness, grain and other characteristics of different rocks • Perform tests on the drainage capacity of soil samples, measure and record relevant data • Visit the Stephen Hui Geological Museum at

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
				The University of Hong Kong
		P5	5EA1 Recognise some different landforms (e.g. mountains, plains, valleys, plateaus, basins) 5EA2 Be aware that crustal movement, water and wind play an important role in shaping landforms 5EA3 Be aware that fossils are the remains of some ancient organisms preserved in rocks and ice 5EA4 Be aware that changes in the Earth's surface can be inferred from the location of fossils	• Visit the Hong Kong UNESCO Global Geopark
		P6	6EA1 Be aware of the formation processes of fossils and fossil fuels 6EA2 Be aware that some natural disasters (e.g. volcanic eruptions, earthquakes) are related to crustal activities 6EA3 Recognise some ways that human respond to natural disasters	• Watch video clips on the causes of natural disasters such as earthquakes, tsunamis, and volcanic eruptions • Collect information on how human respond to natural disasters

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
B. Climate and Seasons	• Daily weather phenomena • Changes in climate and seasons • Climate characteristics of different regions	P1		
		P2	2EB1 Be aware of some different weather conditions (e.g. cloudy, sunny, rainy, snowy, windy, temperature) 2EB2 Recognise the activities that people and animals engage in under different weather conditions	• Observe and record the weather conditions for a week • Draw pictures about the activities of people and other animals under different weather conditions • Construct a simple rainwater collector to recycle rainwater for other uses (e.g. watering plants)
		P3	3EB1 State the processes of water cycle (evaporation, condensation, precipitation) 3EB2 Relate some common weather phenomena (e.g. clouds, rain, snow, dew) to the three-state changes of water 3EB3 Be aware of some commonly used weather icons	• Simulate the processes of water cycle using tools like hot water, cups, and lids
		P4	4EB1 State the difference between weather and climate* 4EB2 Describe the weather characteristics (e.g. daily variations in temperature, rainfall, snowfall and humidity) in different	• Construct a simple model to stimulate the phenomenon of sea level rise caused by melting glaciers • Collect information on global warming • Develop a personal action plan to reduce carbon

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			places 4EB3 Show concern for the phenomenon of global warming and its impacts (e.g. glacier melting, rising sea levels, desertification) 4EB4 Recognise some methods to slow down global warming 4EB5 Show concern for environmental and climate change **Students are only required to recognise that climate refers to the average of the meteorological condition and pattern in a place over a longer period of time, the calculation of average will be covered in the Primary 6 Mathematics curriculum.*	footprint and put it into practice
		P5	5EB1 Describe Hong Kong's weather information such as temperature, wind speed, wind direction, relative humidity, rainfall, etc. based on weather data 5EB2 Recognise the causes of some common weather phenomena (e.g. fog, rain, snow,	• Use simple instruments (e.g. wind vane, rain gauge) to measure weather data (Programming tools can be duly applied to construct the measuring instruments in the process) • Collect and record weather data for a week, draw relevant statistical charts (e.g.

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			frost, hail)	temperature, relative humidity), and conduct a weather report activity • Visit the Hong Kong Observatory
		P6		
C. Solar System in the Universe	• The Sun and the eight planets • Some phenomena and patterns observed on the Earth caused by the movements of the Sun, Earth and Moon	P1	1EC1 Be aware that the Sun rises in the east and sets in the west 1EC2 Be aware of the phenomenon of day and night and its relation to the activities of humans and other animals	• Identify directions based on the position of the Sun • Draw pictures about the activities of people and other animals during the day and night
		P2	2EC1 Be aware of the relationship between seasonal changes and the activities of animals and plants	• Draw pictures about the activities of people and other animals in different seasons
		P3	3EC1 Be aware that the solar system is mainly made up of the Sun and eight planets 3EC2 Be aware that the eight planets, including the Earth, revolve around the Sun 3EC3 Be aware that the Moon is the Earth's only natural satellite and revolves around the Earth 3EC4 Be aware that the shape of the Moon appears different when observed from the	• Observe models of the solar system • Observe the revolution of the eight planets around the Sun using computer simulation software • Observe and record the shape of the Moon on different days of the month

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			Earth at different times	
		P4	4EC1 Explain the relationship between the changes of day and night and the rotation of the Earth 4EC2 Be aware that the Earth's axis is tilted 4EC3 Explain that the difference in seasons in the Earth's northern and southern hemispheres are related to the Earth's revolution around the Sun and tilted axis	• Simulate the Earth's rotation using a sun, earth and moon orbiter model, to explain the changes of day and night • Simulate the Earth's revolution around the Sun using a sun, earth and moon orbiter model, to explain the changes of seasons
		P5	5EC1 Be aware that the Sun is the star in the solar system and emits light and heat energy to other celestial bodies 5EC2 Explain why other celestial bodies in the solar system can be observed even they do not emit light 5EC3 Recognise the eight planets in the solar system and their basic characteristics (e.g. diameter*, number of discovered natural satellites, periods of revolution and rotation) 5EC4 Recognise the overview of the universe	• Collect information about the basic characteristics of the eight planets • Observe some major constellations and bright stars (e.g. Orion, Polaris, Altair, Vega) with telescopes • Observe the surface of the Moon with a telescope • Visit the Ho Koon Nature Education cum Astronomical Centre sponsored by Sik Sik Yuen

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			and be aware that the Milky Way is one of the many galaxies 5EC5 Appreciate the vastness of the universe **At primary level, students are only required to be aware that the longer the diameter of a planet, the larger its volume, and do not need to recognise the concept of diameter of a sphere and the calculation of volume of a sphere.*	
		P6	6EC1 Recognise the relative sizes, positions and movements of the Sun, Earth and Moon 6EC2 Be aware of the patterns of moon phases 6EC3 Be aware of the four moon phases: new moon, first quarter, full moon and third quarter 6EC4 Explain the causes of solar and lunar eclipses 6EC5 Be aware that tides are the rise and fall of sea levels caused by the gravitational pull of the Sun and the Moon	• Simulate the Earth's orbit around the Sun and the formation of solar and lunar eclipses using a planetary model or computer software

Strand 4: Science, Technology, Engineering and Society

This strand aims at helping students understand the close relationship between science, technology, engineering and society. It includes three themes, covering scientific process and spirit of science, aerospace and innovative technology, and engineering and design. Through studying this strand, students can design and make engineering models or products, begin to develop their engineering practice abilities, and apply their learning to solve authentic problems and engage in innovative design, cultivating their scientific thinking and foundational engineering thinking, as well as creativity and problem-solving abilities. Students can gain a preliminary understanding of the nature of science, be aware of science inquiry methods and processes, and develop an evidence-based scientific attitude and spirit. Students will also become acquainted with the development of science, technology and engineering, and how these three fields create value and bring about changes in human life, understanding that optimum use of science, technology and engineering can benefit the community and contribute to the nation and society.

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
A. Scientific Process and Spirit of Science	• Science inquiry processes • Science and technology create value and change human life • Research and	P1		
		P2	2SA1 Be aware of some renowned scientists in history (e.g. Zhang Heng, Thomas Edison) and their achievements 2SA2 Be aware that science inquiry is derived from observation 2SA3 Be aware that science is evidence-based 2SA4 Admire some significant figures who have contributed to the world's scientific and	• Watch video clips about the lives of renowned scientists

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
	contributions of renowned scientists		technological advancements	
		P3	3SA1 Be aware of science inquiry processes and steps 3SA2 Be aware of the different types of science inquiry (e.g. classifying, pattern seeking, modeling) 3SA3 Be aware that some scientific discoveries have enhanced people's understanding of the world (e.g. Newton's research on forces and motion laid the foundation for people's understanding of the universe and the movement of celestial bodies)	• Conduct simple science inquiry activities relevant to the topics (e.g. activities relevant to "Observe and record the shape of the Moon on different days of the month" in the topic "Some phenomena and patterns observed on the Earth caused by the movements of the Sun, Earth and Moon" in Primary 3)
		P4	4SA1 Recognise that scientific knowledge is derived from systematic observation, testing and analysis, through which imagination and creativity are required 4SA2 Recognise the concept of fair testing* 4SA3 Be aware that scientific knowledge is subject to change as new evidence becomes available (e.g. the change from "Flat Earth Theory" to "Round Earth Theory")	• Conduct simple fair tests relevant to the topics (e.g. activities relevant to "Perform tests on some factors affecting the magnitude of friction" in the topic "Force and motion-related phenomena" in Primary 4) • Collect some examples of scientific knowledge changing as a result of new evidence

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			**Students are only required to recognise the concepts related to "factor which its impact is to be investigated", "factor to be observed or measured" and "factors to be kept constant" in the context of fair testing, and do not need to recite the definitions of independent variable, dependent variable and control variables.*	
		P5	5SA1 Be aware that scientific discoveries can foster technological development, and technological development can also drive scientific advancement 5SA2 Recognise some of the scientists from the nation and Hong Kong (e.g. Tu Youyou and Charles K. Kao) and their contributions 5SA3 Admire some significant figures who have contributed to the world's scientific and technological advancements	• Read biographies and life stories of some renowned scientists • Collect information about some of the scientists from the nation and Hong Kong
		P6	6SA1 Recognise the balance between scientific and technological development and ethics 6SA2 Be aware of the limitations of scientific	• Debate some issues related to the development of science and technology, and discuss the impacts they bring (e.g. nuclear research can be used to

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			knowledge	develop new energy sources, but also be employed to create devastating weapons)
B. Aerospace and Innovative Technology	• Technology in daily life • Innovation and technology development • The nation's and the world's aerospace technology development	P1	1SB1 Be aware of the importance of proper use of electronic products 1SB2 Be aware of the impacts of prolonged use of electronic products on personal health 1SB3 Be aware of the etiquette for using electronic products	• Refer to the recommendations of the Department of Health, set some rules for the use of electronic products (e.g. take short breaks every twenty minutes of using technology products, maintain an appropriate distance between the eyes and electronic screens) and practice them in daily life • Demonstrate the etiquette that should be observed when using electronic products through role-play (e.g. refrain from playing videos loudly on public transportation, seek consent from others before taking photos of them with electronic products)
		P2		
		P3	3SB1 Be aware that some important technological inventions in history (e.g. steam engine, electric light, telephone) have improved people's lives 3SB2 Recognise the evolution process of the design of some common products (e.g.	• Collect photos of the same type of products from different eras and state their differences

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			telephone, television, automobile) 3SB3 Give some examples of innovative technologies applied in everyday life (e.g. smart homes, electronic payments, new energy vehicles, autonomous driving)	
		P4	4SB1 Recognise the applications and impact of artificial satellites in daily life (e.g. satellite positioning, weather observations) 4SB2 Give some examples of everyday products that incorporate space technology (e.g. shoe insoles, scratch resistant lenses, drinks in squeeze pouch) 4SB3 Be aware of the achievements and contributions of some of the nation's astronauts 4SB4 Recognise the life of astronauts in space 4SB5 Appreciate the nation's contributions to the development of aerospace technology	• Watch interview clips or read articles featuring the nation's astronauts • Utilise the satellite positioning or satellite imaging function of tablet devices
		P5	5SB1 Be aware of the development of some innovative technologies (e.g. artificial intelligence, big data, the Internet of	• Collect information on some of the latest technological advancements and their applications

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			Things) and their applications in the society 5SB2 Recognise the impact of the development of innovative technologies on human life	• Debate some issues related to the development of innovative technologies, and discuss the benefits and drawbacks they bring (e.g. big data can facilitate data analysis, however it will also bring privacy implications)
		P6	6SB1 Be aware of the purpose of human exploration of space 6SB2 Be aware of the methods used by ancient people and modern scientists to conduct astronomical observations and space exploration 6SB3 Recognise the developmental milestones of human space exploration, including artificial satellites, moon landing, the International Space Station, and manned spaceflight 6SB4 Show concerns for the nation's significant achievements in space exploration (e.g. lunar and deep space exploration) and aerospace technology (e.g. Tiangong space station, BeiDou Navigation Satellite	• Collect information about the nation's and the world's significant achievements in space exploration and aerospace technology • Collect information about Hong Kong's involvement in the nation's aerospace technology development • Visit the Hong Kong Space Museum

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			System) 6SB5 Realise the importance of aerospace technology development to the nation's interests and security	
C. Engineering and Design	• Engineering, design cycle and applications	P1	1SC1 Be aware that some everyday items are designed and manufactured by humans 1SC2 Give examples of natural objects and man-made objects 1SC3 Be aware that good design can meet human needs and make life more convenient	• Conduct a 'Campus Treasure Hunt' game, find the designated items and categorise them into baskets for natural objects and man-made objects • Count the number of man-made objects on one's body
		P2	2SC1 Be aware of the structure and functions of common products in daily life 2SC2 Identify how some simple designs can enhance the functionality of products 2SC3 Describe the properties and uses of some common materials (e.g. plastic, wood, glass, metal) 2SC4 Realise the importance of practicality and aesthetics in engineering and design	• Observe some everyday items and state their design features (e.g. a water bottle with a wide bottom for stability and a narrow opening to prevent spills) • Observe the same type of everyday items (e.g. ordinary umbrellas, folding umbrellas, umbrellas with springs) and point out some design elements that enhance product functionality • Disassemble some simple products (e.g. ballpoint pen) and describe their structures and features
		P3	3SC1 Be aware that engineering projects can	• Conduct a project learning on "Ancient Chinese

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			improve people's lives 3SC2 Be aware that the foundation of engineering is science and technology 3SC3 Give some examples of ancient Chinese skills and engineering (e.g. Zhaozhou Bridge, mortise and tenon joints) 3SC4 Recognise some examples of the nation's and Hong Kong's major engineering projects (e.g. maglev train, Hong Kong-Zhuhai-Macao Bridge) 3SC5 Appreciate the nation's contributions to engineering development	Architectural Techniques" • Collect information about some of the nation's and Hong Kong's major engineering projects
		P4	4SC1 Be aware of the basic steps of the design process 4SC2 Apply design cycle to design engineering models or products - Identify needs and the problem - Collect information relevant to the problem, and briefly evaluate existing approaches - Propose a design solution that meets the constraints	• Based on the scenario created by the teacher, design and make some simple physical models (e.g. a hut model with a waterproof roof, a model car driven by renewable energy) or products with specific functions (e.g. non-slip slippers, small vacuum cleaner) under certain constraints (e.g. cost, material, and time). Programming tools can be duly applied in the process (e.g. adding a curtain to the hut model that can open and close

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			- Illustrate the design idea by a sketch - Use simple tools and materials to make the engineering model or product - Test and improve the engineering model or product by considering practicality and aesthetics - Communicate briefly the solutions to the problem	according to brightness) *Teachers can design different scenarios based on students' proficiency levels and flexibly adjust the difficulty of the activities. They can also duly connect with other STEAM-related subjects for conducting cross-curriculum project learning.*
		P5	5SC1 Apply design cycle to design engineering models or products - Identify needs and the problem - Collect information relevant to the problem, and evaluate existing approaches - Propose more than one design solution that meet the constraints - Compare various considerations, including practicality and aesthetics, to determine the feasibility of the design solutions - Illustrate the design idea by a sketch with text, diagrams, etc. - Use tools and materials to make the	

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			engineering model or product - Test and improve the engineering model or product - Communicate the solutions to the problem	
		P6	6SC1 Apply design cycle to design engineering models or products - Identify needs and the problem - Collect information relevant to the problem, and point out the shortcomings of the existing practices - Propose more than one design solution that meet the constraints - Compare various considerations, take into account practicality and aesthetics, to determine the feasibility of the design solutions - Give suggestions to others' design solutions - Illustrate design ideas through comprehensive use of text, icons, images, diagrams, etc. - Select and use appropriate tools and	

Theme	Topic	Level	Students should be able to	Suggested learning and teaching activities
			materials to make the engineering model or product - Test and improve the engineering model or product - Communicate the solutions to the problem, review and evaluate the effectiveness of the solutions	

6.3.4 Learning objectives for each level

In general, teachers can teach the topics of Strands 1 to 4 within the same level in a sequential manner. However, the order of learning and teaching is not absolute. Teachers can decide on the arrangements for learning and teaching based on students' interests, needs, prior knowledge, and foundations. Additionally, teachers can flexibly arrange the teaching of related learning objectives from different strands within the same level in consecutive periods.

Primary 1

Life and Environment	**Matter, Energy and Changes**	**Earth and Space**	**Science, Technology, Engineering and Society**
<u>Healthy lifestyles</u> **1LA1** State the functions of various parts of the human body (e.g. eyes to see, teeth to chew food, spine to support the body) **1LA2** Be aware of the methods to protect various parts of the body (e.g. methods for protecting the eyes and teeth, proper standing and sitting postures)	**<u>Properties of matter</u>** **1MA1** Describe the properties of water and air (colourless, odourless, tasteless, and have no fixed shape) **1MA2** Describe the properties (e.g. weight, hardness, elasticity, transparency) of everyday items	**<u>Earth's characteristics</u>** **1EA1** Be aware that the surface of the Earth is covered by oceans and land, and that oceans cover more areas than land **1EA2** Be aware that the surface of the Earth is surrounded by the atmosphere (gases) **1EA3** Be aware that the Earth is the shared home for humans, animals	**<u>Technology in daily life</u>** **1SB1** Be aware of the importance of proper use of electronic products **1SB2** Be aware of the impacts of prolonged use of electronic products on personal health **1SB3** Be aware of the etiquette for using electronic products

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
1LA3 Give some examples of healthy living habits (e.g. having a balanced diet, exercising regularly, getting enough sleep, maintaining a relaxed and happy mood) **1LA4** Develop healthy living habits		and plants **1EA4** Understand the importance of caring for the Earth	
Difference between living things and non-living things **1LB1** Be aware that both animals and plants are living things **1LB2** Give examples of common animals and plants found in Hong Kong **1LB3** List the survival conditions for animals and plants (e.g. air, water) **1LB4** Describe some simple common characteristics of animals (e.g. movement)	**Properties of light and related phenomena** **1MB1** Be aware of the source of light **1MB2** Give examples of uses of light in daily life (e.g. for illumination and reading) **1MB3** Be aware that light shining on opaque objects will produce shadows **1MB4** Be aware that sunlight consists of light of different colours	**Some phenomena and patterns observed on the Earth caused by the movements of the Sun, Earth and Moon** **1EC1** Be aware that the Sun rises in the east and sets in the west **1EC2** Be aware of the phenomenon of day and night and its relation to the activities of humans and other animals	**Engineering, design cycle and applications** **1SC1** Be aware that some everyday items are designed and manufactured by humans **1SC2** Give examples of natural objects and man-made objects **1SC3** Be aware that good design can meet human needs and make life more convenient

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
1LB5 Respect and care for animals and plants			
<u>Life cycle of living things</u> **1LC1** State the major body changes during infancy, early childhood and childhood (e.g. increase in height and weight, loss of primary teeth and growth of permanent teeth)	**<u>Force and motion-related phenomena</u>** **1MC1** State the relative position of an object to oneself (e.g. front, back, left, right, near, far) **1MC2** Be aware that the position of an object will be changed after motion **1MC3** Give some examples of motion in everyday life (e.g. swinging on a swing, riding a bus, kicking a soccer ball) **1MC4** Describe how fast or slow an object moves		

Primary 2

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
Difference between living things and non-living things **2LB1** Be aware of the differences between living things and non-living things (e.g. living things can reproduce, grow and develop, and respond to stimuli, while non-living things cannot) **Structures of living things** **2LB2** State the major structures in plants and their functions (leaves make food, roots absorb water and nutrients and anchor plants, stems support the plant and transport water, food and nutrients)	**Properties of matter** **2MA1** Be aware that magnet can be used to attract some metallic objects **2MA2** Be aware that each magnet has two different magnetic poles which always exist in pairs **2MA3** Be aware of the phenomenon of 'like poles repel and unlike poles attract' **2MA4** Be aware that the magnetised needle in a compass can be used to indicate the south and the north **2MA5** Give some examples of daily application of magnet **Physical change and chemical change**	**Daily weather phenomena** **2EB1** Be aware of some different weather conditions (e.g. cloudy, sunny, rainy, snowy, windy, temperature) **2EB2** Recognise the activities that people and animals engage in under different weather conditions	**Research and contributions of renowned scientists** **2SA1** Be aware of some renowned scientists in history (e.g. Zhang Heng, Thomas Edison) and their achievements **2SA4** Admire some significant figures who have contributed to the world's scientific and technological advancements **Science inquiry processes** **2SA2** Be aware that science inquiry is derived from observation **2SA3** Be aware that science is evidence-based

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
	2MA6 Be aware that some substances (e.g. salt, sugar) are soluble in water while others (e.g. sand, rock) are insoluble in water		
Impact of human behavior on the natural environment **2LD1** Recognise the impact of human behavior on the environment (e.g. causing air and water pollution) **2LD2** Give some examples of how pollution affect the survival of animals and plants **2LD3** Show concern for safeguarding and improving the environment, and take action accordingly	**Properties of sound and related phenomena** **2MB1** Be aware that sound is produced by the vibration of objects **2MB2** Be aware that the greater the vibration of an object, the louder the sound produced **2MB3** Be aware of some phenomena related to sound (e.g. echo)	**Some phenomena and patterns observed on the Earth caused by the movements of the Sun, Earth and Moon** **2EC1** Be aware of the relationship between seasonal changes and the activities of animals and plants	**Engineering, design cycle and applications** **2SC1** Be aware of the structure and functions of common products in daily life **2SC2** Identify how some simple designs can enhance the functionality of products **2SC3** Describe the properties and uses of some common materials (e.g. plastic, wood, glass, metal) **2SC4** Realise the importance of practicality and aesthetics in engineering and design

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
Ecological environment **2LE1** Be aware that plants need (sun) light, air and water to provide the energy required for life processes (growth, reproduction) **2LE3** Be aware that animals respond to changes in environmental conditions (e.g. temperature, danger) **Food chain** **2LE2** Be aware that animals obtain the energy required for life processes (growth and repair, activity, reproduction) through feeding	**Force and motion-related phenomena** **2MC1** Be aware that force can cause objects to move **2MC2** Give some daily examples involving push and pull **2MC3** Be aware that force of gravity is the attractive force exerted by the Earth on other objects		

Primary 3

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
Healthy lifestyles **3LA1** Be aware of the types of food commonly found in a balanced diet **3LA2** Recognise the healthy eating pyramid **3LA3** Recognise the nutrients in food (carbohydrates, proteins, fats, vitamins, minerals, dietary fiber, water) and their functions **3LA4** Recognise the correct methods of handling and preserving food **3LA5** Maintain healthy eating habits	**States of matter** **3MA1** Be aware that matter can be classified into solids, liquids and gases, and describe their properties (whether it has a fixed volume, whether it has a fixed shape) **Properties of matter** **3MA2** Compare some physical properties (e.g. weight, physical state under room temperature, whether it can be attracted by magnet, whether it can float in water) of different materials **3MA3** Give some examples of mixture (e.g. rocks and sand, sugar	**Earth's resources** **3EA1** Be aware of the sources of salt water and fresh water, and their uses in daily life **3EA2** Be aware that drinking water needs to be filtered and purified **3EA3** Give some examples of Earth's resources that are renewable (e.g. water, wind, forests) and that are non-renewable (e.g. petroleum, natural gas, minerals) **3EA4** Be aware of the importance of responsible use of the Earth's resources	**Science inquiry processes** **3SA1** Be aware of science inquiry processes and steps **3SA2** Be aware of the different types of science inquiry (e.g. classifying, pattern seeking, modeling) **Science and technology create value and change human life** **3SA3** Be aware that some scientific discoveries have enhanced people's understanding of the world (e.g. Newton's research on forces and motion laid the foundation for people's understanding of the

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
	solution, sand and iron filings, air) **3MA4** Recognise some methods of separating mixtures (sieving, magnetic attraction, filtration, evaporation)		universe and the movement of celestial bodies)
Diversity and classification of living things **3LB1** Be aware that animals are classified into vertebrates and invertebrates **3LB2** Describe the key characteristics of some animal groups (insects, fish, amphibians, reptiles, birds, mammals) **3LB3** Classify animals according to their characteristics **3LB5** Be aware that plants are classified into flowering plants and non-flowering plants	**Physical change and chemical change** **3MA5** Describe the processes (melting, boiling, freezing, condensation, evaporation) of the change in states of water **3MA6** Give examples of daily phenomena of evaporation and condensation (e.g. clothes drying in the sun, water droplets condensing on the surface of cold drink) **3MA7** Be aware of some factors that speed up the dissolving of substances in water (e.g. surface area	**Daily weather phenomena** **3EB1** State the processes of water cycle (evaporation, condensation, precipitation) **3EB2** Relate some common weather phenomena (e.g. clouds, rain, snow, dew) to the three-state changes of water **3EB3** Be aware of some commonly used weather icons	**Technology in daily life** **3SB1** Be aware that some important technological inventions in history (e.g. steam engine, electric light, telephone) have improved people's lives **3SB2** Recognise the evolution process of the design of some common products (e.g. telephone, television, automobile)

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
3LB7 Appreciate the diversity of life **<u>Structures of living things</u>** **3LB4** Using mammals as an example, be aware of the major structures of some animals, including bones, muscles, lungs, heart, and stomach, and their functions **3LB6** Be aware of the major parts in flowers, including sepals, corolla, stamens and pistils, and their functions	of solute, water temperature, stirring speed) **3MA8** Distinguish between high and low concentrations of solution (e.g. same volume of water with different amounts of sugar added)		**<u>Innovation and technology development</u>** **3SB3** Give some examples of innovative technologies applied in everyday life (e.g. smart homes, electronic payments, new energy vehicles, autonomous driving)
<u>Life cycle of living things</u> **3LC1** Be aware that living things go through the life cycle of birth, growth, reproduction and death **3LC2** Using frogs, butterflies, dogs	**<u>Sources and uses of energy</u>** **3MB1** Be aware that electrical energy can be converted to other forms of energy (e.g. thermal energy, light energy, sound energy)	**<u>The Sun and the eight planets</u>** **3EC1** Be aware that the solar system is mainly made up of the Sun and eight planets **3EC2** Be aware that the eight	**<u>Engineering, design cycle and applications</u>** **3SC1** Be aware that engineering projects can improve people's lives **3SC2** Be aware that the foundation

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
and chickens as examples, recognise the changes in different animals at different stages of their life cycles **3LC3** Identify the different stages of the life cycle of flowering plants (germination, growth, reproduction, seed dispersal) **3LC5** Respect and care for life **<u>Heredity and reproduction</u>** **3LC4** Recognise the reproductive processes of live-bearing and egg-laying animals	**3MB2** Give examples of uses of electricity in daily life **<u>Heat transfer</u>** **3MB3** Recognise ways to measure temperature, and the commonly used unit (degree Celsius, symbol: *C*) **3MB4** Recognise the modes of heat transfer	planets, including the Earth, revolve around the Sun **<u>Some phenomena and patterns observed on the Earth caused by the movements of the Sun, Earth and Moon</u>** **3EC3** Be aware that the Moon is the Earth's only natural satellite and revolves around the Earth **3EC4** Be aware that the shape of the Moon appears different when observed from the Earth at different times	of engineering is science and technology **3SC3** Give some examples of ancient Chinese skills and engineering (e.g. Zhaozhou Bridge, mortise and tenon joints) **3SC4** Recognise some examples of the nation's and Hong Kong's major engineering projects (e.g. maglev train, Hong Kong-Zhuhai-Macao Bridge) **3SC5** Appreciate the nation's contributions to engineering development
	<u>Simple machines</u> **3MC1** Recognise the functions of simple machines such as rollers, inclined planes and pulleys (fixed		

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
	pulley) (e.g. reducing the force required, changing the direction of force) **3MC2** Give examples of daily applications of rollers, inclined planes and pulleys (e.g. wheels, ramps, elevators)		

Primary 4

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
Communicable and non-communicable diseases **4LA1** Recognise common communicable diseases (e.g. influenza, cholera) and their major causes and symptoms **4LA2** Recognise the transmission routes of communicable diseases (e.g. droplet transmission, vector transmission, contact transmission, food transmission, blood transmission) and their prevention **4LA3** Recognise common non-communicable diseases (e.g. heart diseases, cancer) and their main causes, symptoms and prevention **4LA4** Realise that scientific	**Properties of matter** **4MA1** Compare some physical properties (electrical conductivity and thermal conductivity) of metals and non-metals **4MA2** Relate the properties of metals to their uses (e.g. copper which conducts electricity well can be used to make electrical wires; iron that conducts heat well can be used to make cooking utensils) **4MA3** Determine whether a material is suitable for thermal conduction or thermal insulation based on its properties	**Earth's characteristics** **4EA1** State the structure of the Earth (crust, mantle, and core) and the physical characteristics of these distinct parts **4EA2** Be aware that the Earth's crust is composed of rocks, including igneous rocks, sedimentary rocks, metamorphic rocks **4EA3** Be aware of the main components of soil, classification of soil (sand, loam, clay) as well as the plants suitable for growing on each type of soil	**Science inquiry processes** **4SA1** Recognise that scientific knowledge is derived from systematic observation, testing and analysis, through which imagination and creativity are required **4SA2** Recognise the concept of fair testing **4SA3** Be aware that scientific knowledge is subject to change as new evidence becomes available (e.g. the change from "Flat Earth Theory" to "Round Earth Theory")

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
progress can help respond to large-scale communicable diseases (e.g. the COVID-19 pandemic), protect the lives and health of people, and promote biosecurity	**Physical change and chemical change** **4MA4** Identify some visible changes that do not produce new matter (physical changes) (e.g. dissolving, evaporation, squeezing or stretching objects) **4MA5** Identify some visible changes that produce new matter (chemical changes) (e.g. rusting, burning, food rotting)		
Heredity and reproduction **4LC1** Recognise the reproductive process of flowering plants **4LC2** Be aware that some plants can reproduce through roots, stems or leaves (e.g. radish and sweet potato can reproduce through roots, onion	**Sources and uses of energy** **4MB1** Identify the sources of energy (e.g. the Sun, moving water, wind, coal, crude oil, natural gas) **4MB2** Be aware that energy is needed for transportation, manufacturing, illumination, and	**Climate characteristics of different regions** **4EB1** State the difference between weather and climate **4EB2** Describe the weather characteristics (e.g. daily variations in temperature, rainfall, snowfall and humidity) in	**The nation's and the world's aerospace technology development** **4SB1** Recognise the applications and impact of artificial satellites in daily life (e.g. satellite positioning, weather observations) **4SB2** Give some examples of

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
and garlic can reproduce through stems, Echeveria and Kalanchoe pinnata can reproduce through leaves) **4LC3** Recognise the different ways living things increase the number of offspring and their chances of survival (e.g. plants produce a large number of seeds, mammals care for their young offspring) **4LC4** Be aware that offspring produced by reproduction of animals and plants have similar characteristics to their parents **4LC5** Identify characteristics that animals and plants inherited from their parents (e.g. skin colour, eye colour and shape of earlobe in humans; colour and number of petals) as well as those that are not	powering electronic equipment **4MB3** Recognise the importance of energy saving **<u>Properties of light and related phenomena</u>** **4MB4** Differentiate the light coming from a light source (e.g. sunlight, light from a flashlight) from that reflected from objects (e.g. moonlight) **4MB5** Be aware of some examples of reflection of light (e.g. reflection on water surface, mirror) **4MB6** Recognise the changes in length and position of shadow under sunlight at different times	different places **<u>Changes in climate and seasons</u>** **4EB3** Show concern for the phenomenon of global warming and its impacts (e.g. glacier melting, rising sea levels, desertification) **4EB4** Recognise some methods to slow down global warming **4EB5** Show concern for environmental and climate change	everyday products that incorporate space technology (e.g. shoe insoles, scratch resistant lenses, drinks in squeeze pouch) **4SB3** Be aware of the achievements and contributions of some of the nation's astronauts **4SB4** Recognise the life of astronauts in space **4SB5** Appreciate the nation's contributions to the development of aerospace technology

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
inherited from their parents (e.g. hair length in humans) **4LC6** Be aware that some human characteristics are inherited (e.g. ability to roll the tongue and bend the thumb backward) and cannot be changed through acquired learning	**Properties of electricity and related phenomena** **4MB7** Recognise simple closed circuits **4MB8** Explain that a complete circuit is needed for the functioning of simple electrical appliances (e.g. light bulb)		
Biological forms and functions, and their adaptability to the environment **4LD1** Give some examples of features of plants that help them adapt to their environment **4LD2** Give some examples of features of animals that help them adapt to their environment **4LD3** Recognise some behaviors of	**Force and motion-related phenomena** **4MC1** Be aware that friction is the resistance that occurs when objects rub against each other **4MC2** Be aware that the direction of friction is opposite to the direction of motion **4MC3** Give daily examples where friction is applied (e.g. walking,	**Some phenomena and patterns observed on the Earth caused by the movements of the Sun, Earth and Moon** **4EC1** Explain the relationship between the changes of day and night and the rotation of the Earth **4EC2** Be aware that the Earth's axis is tilted **4EC3** Explain that the difference in	**Engineering, design cycle and applications** **4SC1** Be aware of the basic steps of the design process **4SC2** Apply design cycle to design engineering models or products - Identify needs and the problem - Collect information relevant to the problem, and briefly evaluate existing approaches

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
animals for surviving in their habitats (e.g. migration, hibernation)	writing)	seasons in the Earth's northern and southern hemispheres are related to the Earth's revolution around the Sun and tilted axis	- Propose a design solution that meets the constraints - Illustrate the design idea by a sketch - Use simple tools and materials to make the engineering model or product - Test and improve the engineering model or product by considering practicality and aesthetics - Communicate briefly the solutions to the problem
<u>Ecological environment</u> **4LE1** Be aware of some different natural environments (e.g. tropical rainforest, temperate grassland, polar regions, desert) **4LE2** Relate common animals and			

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
plants to the natural environments **4LE5** Understand that some living things in an ecosystem compete with each other for resources (e.g. light, food, living space) **<u>Food chain</u>** **4LE3** Describe the role of each living thing in a simple food chain (e.g. plants produce their own food, some animals eat plants, some animals eat other animals) **4LE4** Identify common predators and their prey, and describe their relationships			

Primary 5

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
Human body systems **5LB1** Recognise the major parts of the human respiratory system (trachea, bronchi, lungs) and their functions **5LB2** Recognise the major parts of the human digestive system (stomach, small intestine, large intestine) and their functions **5LB3** Recognise the major parts of the human reproductive system (male: testes, sperm ducts, urethra, penis; female: ovaries, oviducts, uterus, vagina) and their functions	**Properties of matter** **5MA1** State the major components of air and their percentage of composition in air **5MA2** Be aware that air has weight and occupies space **5MA3** Give some examples of daily phenomena related to atmospheric pressure (e.g. suck air out through a straw will cause the beverage carton to cave in) **5MA4** Be aware that air rises when heated, and the movement of air forms wind	**Earth's history** **5EA1** Recognise some different landforms (e.g. mountains, plains, valleys, plateaus, basins) **5EA2** Be aware that crustal movement, water and wind play an important role in shaping landforms **5EA3** Be aware that fossils are the remains of some ancient organisms preserved in rocks and ice **5EA4** Be aware that changes in the Earth's surface can be inferred from the location of fossils	**Science and technology create value and change human life** **5SA1** Be aware that scientific discoveries can foster technological development, and technological development can also drive scientific advancement **Research and contributions of renowned scientists** **5SA2** Recognise some of the scientists from the nation and Hong Kong (e.g. Tu Youyou and Charles K. Kao) and their contributions **5SA3** Admire some significant figures who have contributed to the

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
			world's scientific and technological advancements
Life cycle of living things **5LC1** Describe the characteristics of different developmental stages in humans (infancy, childhood, adolescence, adulthood, and late adulthood) **5LC2** Recognise the physiological and psychological changes in males and females during adolescence **5LC3** Recognise the factors that influence growth and development during adolescence (e.g. heredity, nutrition, sleep and exercise, etc.) **5LC4** Accept individual differences in growth and development during adolescence	**Physical change and chemical change** **5MA5** Recognise the necessary conditions for corrosion of metals (using rusting as an example) **5MA6** Explain ways to prevent corrosion of metals **5MA7** Be aware of some reversible changes (e.g. condensation and evaporation of water) and irreversible changes (e.g. burning)	**Climate characteristics of different regions** **5EB1** Describe Hong Kong's weather information such as temperature, wind speed, wind direction, relative humidity, rainfall, etc. based on weather data **Daily weather phenomena** **5EB2** Recognise the causes of some common weather phenomena (e.g. fog, rain, snow, frost, hail)	**Innovation and technology development** **5SB1** Be aware of the development of some innovative technologies (e.g. artificial intelligence, big data, the Internet of Things) and their applications in the society **5SB2** Recognise the impact of the development of innovative technologies on human life

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
Impact of human behavior on the natural environment **5LD1** Recognise some methods of pollution testing **5LD2** Give some approaches in the application of science and technology to address environmental issues **5LD3** Recognise the importance of sustainable development and environmental protection to maintaining ecological security	**Sources and uses of energy** **5MB1** Give examples of the different forms of energy (e.g. kinetic energy, potential energy, chemical energy) **5MB2** Be aware that energy can be converted from one form to another **Properties of sound and related phenomena** **5MB3** Be aware that sound can travel through different media **5MB4** Be aware that changes in pitch are caused by changes in vibration **5MB5** Recognise the causes of noise and ways to cope with it	**The Sun and the eight planets** **5EC1** Be aware that the Sun is the star in the solar system and emits light and heat energy to other celestial bodies **5EC2** Explain why other celestial bodies in the solar system can be observed even they do not emit light **5EC3** Recognise the eight planets in the solar system and their basic characteristics (e.g. diameter, number of discovered natural satellites, periods of revolution and rotation) **5EC4** Recognise the overview of the universe and be aware that the Milky Way is one of the many galaxies **5EC5** Appreciate the vastness of the	**Engineering, design cycle and applications** **5SC1** Apply design cycle to design engineering models or products - Identify needs and the problem - Collect information relevant to the problem, and evaluate existing approaches - Propose more than one design solution that meet the constraints - Compare various considerations, including practicality and aesthetics, to determine the feasibility of the design solutions - Illustrate the design idea by a sketch with text, diagrams, etc. - Use tools and materials to make the engineering model or

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
	5MB6 Recognise the ways to protect hearing **5MB7** Recognise ways to measure the loudness of sound, and the commonly used unit (decibel) **<u>Properties of electricity and related phenomena</u>** **5MB8** Recognise how to use electricity safely **5MB9** Explain the reasons why different parts of household appliances are made from conductive and insulating materials respectively	universe	product - Test and improve the engineering model or product - Communicate the solutions to the problem
<u>Common microorganisms</u> **5LF1** Recognise common types of	**<u>Force and motion-related phenomena</u>**		

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
microorganisms (including bacteria, fungi, viruses) **5LF2** Recognise the uses of antibiotics and the effects of inappropriate use of antibiotics **5LF3** Recognise the benefits (e.g. probiotics inhibiting the growth of harmful bacteria, degrading pollutants) and negative impacts (e.g. causing diseases) of microorganisms to humans	**5MC1** Be aware that forces can change the state of motion of an object (forces can make a stationary object move or stop a moving object; forces can change the speed of a moving object; forces can change the direction of a moving object) **5MC2** Recognise that forces always work in action and reaction pairs **5MC3** Recognise methods to compare the speed of moving objects (compare the distances travelled by two objects within the same period of time, or compare the time taken for two objects to travel the same distance)		

Primary 6

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
Healthy lifestyles **6LA1** Recognise simple first-aid for handling minor injuries or discomforts **6LA2** Recognise ways to handle household accidents (e.g. fire, leakage of electricity, gas leak) **6LA3** Be aware of the adverse effects of smoking, alcoholism, drug abuse and drug use on the body	**Properties of matter** **6MA1** Using water as an example, state that buoyancy is an upward force exerted by water on objects **6MA2** Recognise the phenomenon of floating and sinking of objects in water	**Earth's history** **6EA1** Be aware of the formation processes of fossils and fossil fuels **6EA2** Be aware that some natural disasters (e.g. volcanic eruptions, earthquakes) are related to crustal activities **6EA3** Recognise some ways that human respond to natural disasters	**Science and technology create value and change human life** **6SA1** Recognise the balance between scientific and technological development and ethics **6SA2** Be aware of the limitations of scientific knowledge
Human body systems **6LB1** Recognise the major parts of the human circulatory system (heart, blood vessels) and their functions **6LB2** Recognise the major parts of the human urinary system (kidneys,	**Physical change and chemical change** **6MA3** Be aware that combustion requires oxygen, and produces carbon dioxide and water **6MA4** Recognise the necessary	**Some phenomena and patterns observed on the Earth caused by the movements of the Sun, Earth and Moon** **6EC1** Recognise the relative sizes, positions and movements of the Sun,	**The nation's and the world's aerospace technology development** **6SB1** Be aware of the purpose of human exploration of space **6SB2** Be aware of the methods used by ancient people and modern

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
ureters, urinary bladder, urethra) and their functions **6LB3** Recognise the major parts of the human nervous system (sensory organs, brain, spinal cord) and their functions **6LB4** Give some examples of reflex actions (e.g. blinking when wind blows into eyes, withdrawal reflex in response to heat)	conditions for combustion, and the working principles of fire-fighting equipment (e.g. fire extinguishers, fire blankets, etc.) **6MA5** Recognise the occurrence, impact and prevention of hill fires	Earth and Moon **6EC2** Be aware of the patterns of moon phases **6EC3** Be aware of the four moon phases: new moon, first quarter, full moon and third quarter **6EC4** Explain the causes of solar and lunar eclipses **6EC5** Be aware that tides are the rise and fall of sea levels caused by the gravitational pull of the Sun and the Moon	scientists to conduct astronomical observations and space exploration **6SB3** Recognise the developmental milestones of human space exploration, including artificial satellites, moon landing, the International Space Station, and manned spaceflight **6SB4** Show concerns for the nation's significant achievements in space exploration (e.g. lunar and deep space exploration) and aerospace technology (e.g. Tiangong space station, BeiDou Navigation Satellite System) **6SB5** Realise the importance of aerospace technology development to the nation's interests and security

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
Impact of human behavior on the natural environment **6LD1** Recognise some endangered species **6LD2** Explain why endangered species are on the verge of extinction **6LD3** Recognise some methods of protecting endangered species **6LD4** Respect and care for life, and show concern for endangered species	**Properties of light and related phenomena** **6MB1** Recognise the mode of light propagation **6MB2** Recognise the characteristics of images formed by a plane mirror, including being the same size as the object and laterally inverted **6MB3** Give daily application of different types of mirrors, including plane, convex and concave mirrors **6MB4** Be aware that refraction occurs when light passes through different transparent materials **6MB5** Give examples of daily applications of refraction of light (e.g. glasses, magnifying glasses, microscopes)		**Engineering, design cycle and applications** **6SC1** Apply design cycle to design engineering models or products - Identify needs and the problem - Collect information relevant to the problem, and point out the shortcomings of the existing practices - Propose more than one design solution that meet the constraints - Compare various considerations, take into account practicality and aesthetics, to determine the feasibility of the design solutions - Give suggestions to others' design solutions - Illustrate design ideas through comprehensive use of text,

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
	Properties of electricity and related phenomena **6MB6** Be aware of the heating effect and magnetic effect of electric current **6MB7** Give examples of daily applications of the heating effect (e.g. electric heaters, hairdryers, toasters) and magnetic effect (e.g. electromagnetic cranes, electromagnetic locks) of electric current		icons, images, diagrams, etc. - Select and use appropriate tools and materials to make the engineering model or product - Test and improve the engineering model or product - Communicate the solutions to the problem, review and evaluate the effectiveness of the solutions
Food chain **6LE1** Be aware that photosynthesis is the process by which plants produce food **6LE2** Be aware of the conditions	**Simple machines** **6MC1** Recognise the applications of three types of levers (the fulcrum located in between the effort and the load, the load located in between the		

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
necessary for photosynthesis in plants (sunlight, water, carbon dioxide, chlorophyll) **6LE3** State the importance of photosynthesis in plants to other living things	fulcrum and the effort, the effort located in between the fulcrum and the load) **6MC2** Be aware of the difference between a lever that reduces the effort required and a lever that requires more effort **6MC3** Recognise the working principles of simple machines such as pulleys (fixed pulley, movable pulley, pulley system) and gears **6MC4** Give examples of daily applications of levers, pulleys and gears (e.g. chopsticks, cable cars, bicycles)		
<u>Cells and microscope</u> **6LF1** Be aware that cells are the basic units of living things **6LF2** Use a microscope to observe			

Life and Environment	Matter, Energy and Changes	Earth and Space	Science, Technology, Engineering and Society
animal cells and plant cells **6LF3** Identify the different parts of animal and plant cells, and compare the similarities and differences between animal and plant cells (plant cells have cell walls while animal cells do not, most plant cells have chloroplasts while most animal cells do not)			

7. Learning and Teaching

This curriculum emphasises the importance of providing students with diverse and engaging learning experiences that enable them to observe common scientific phenomena in their daily lives and understand the underlying scientific concepts. At the primary level, students are not required to delve into complex scientific theories or memorise scientific facts and terms through rote learning. Such approach not only hinders the cultivation of students' curiosity but may result in counterproductive effects. Therefore, the acquisitions of scientific knowledge is no longer solely dependent on one-way teaching by the teachers. Instead, a 'student-centered' inquiry-based learning approach should be adopted, where students explore and discover knowledge under the guidance of teachers, and apply what they have learnt to solve problems in authentic scenarios. In this process, teachers need to play different roles, such as resource persons, facilitators, counsellors, assessors, role models, and co-learners, or a combination thereof. Students, on the other hand, can be listeners in some situations, but more often, they play a more active role in learning, becoming co-constructors of knowledge, information seekers or problem-solvers.

Teachers can refer to the following guiding principles for learning and teaching that are applicable to this curriculum:

- Giving clear and explicit learning targets
- Stimulating students' curiosity and fostering learning interest
- Building upon students' prior knowledge and experiences

- Connecting with students' everyday life experiences
- Employing diversified learning and teaching activities
- Facilitating quality classroom interaction and student engagement
- Promoting students' self-directed learning capabilities
- Encouraging exploration and facilitating student learning from experience
- Providing opportunities for students to apply their scientific knowledge
- Providing effective feedback and evaluation
- Utilising various learning and teaching resources flexibly
- Leveraging information technology for learning
- Embracing learner diversity

Teachers should be flexible in their choice of learning and teaching strategies to maximise the learning effectiveness among students with different abilities and needs, in accordance with the various learning content and contexts. These strategies include:

- Self-directed learning
- Thought-provoking questioning
- Group learning and discussion
- Science inquiry activities and simple experiments
- Design and make activities
- Project learning
- Life-wide learning
- Reading across the curriculum

8. Assessment

Assessment is an integral part of the curriculum, learning and teaching, and assessment cycle. It serves as a means to gather evidence of students' learning outcomes. Its purpose is not only to reflect students' learning performance but, more importantly, to provide effective feedback that enables students to track their learning progress, modify their learning strategies, and improve or extend their learning. At the same time, teachers can analyse assessment data to identify students' learning difficulties and needs, thereby improving teaching methods and optimising curriculum planning. As stated in the section "Curriculum Rationale" of this curriculum framework, the Primary Science curriculum aims to cultivate students' curiosity and interest in science, and encourage students' application of knowledge and creativity in the learning process. Schools should follow these rationales when designing assessment activities for the Primary Science subject.

Teachers can consider the following assessment design principles that are applicable to this curriculum:

- Aligning with the curriculum learning objectives
- Adopting a variety of assessment modes
- Embracing individual differences in student abilities
- Emphasising both the learning process and outcomes
- Providing precise and concrete feedback and encouragement
- Providing opportunities for students to showcase their learning achievements

- Encouraging peer and self-assessment
- Leveraging assessment data to enhance teaching strategies

Assessment modes can generally be categorised into the following three types:

- **Assessment of learning**: This type of assessment aims to summarise students' learning outcomes at specific stages, reflecting their overall learning performance. (Examples: written examinations and tests)
- **Assessment for learning:** This type of assessment is achieved by reviewing students' learning progress on a continuous basis. It aims at providing assistance and improvement suggestions for students through effective feedback. It also enables teachers to adjust learning and teaching strategies to promote effective learning. (Examples: project learning, practical assessment and product design)
- **Assessment as learning:** This type of assessment requires students to continuously review their own and their peers' learning performance during the learning process, and reflect and adjust learning strategies, to develop self-directed learning abilities. (Examples: science journals and learning portfolios)

Different modes of assessment serve different purposes. Schools should adopt a variety of modes of assessment that align with the assessment priorities and objectives, and students' cognitive development, allowing students with different learning styles to demonstrate their learning achievements. It is worth mentioning that pen and paper assessment is only one of many modes of assessment, the assessments of Primary Science

should not be limited to this. To create space for students and reduce their academic pressure, schools should avoid, as much as possible, using written examinations to evaluate students' learning performance, especially in Primary 1 and Primary 2. Furthermore, schools should free up more time for students to engage in science inquiries or field trips, nurturing their curiosity and spirit of inquiry.

Teachers can consider the following modes of assessment that are applicable to this curriculum:

- Questioning
- Oral presentation
- Practical assessment
- Engineering model/product design
- Science journals
- Learning portfolios
- Project learning
- Exhibition
- Reading across the curriculum
- Pen and paper assessment

Ad Hoc Committee for the Development of the Science (Primary 1 - 6) Curriculum
Membership List

(Since August 2023)

Chairperson:	Dr. LI Wai-chin
Convenor:	Mr. CHENG Chung-ki (Education Bureau)
Member:	Ms. CHAN Mei-kuen
	Mr. CHAN Shui-leung
	Mr. CHAN Shiu-tung
	Dr. CHAN To
	Mr. CHIU Pit-nam
	Mr. CHOY Sai-hung
	Ms. IP Wan-ting, Belinda
	Ms. LAI Yuet-wah, Michelle
	Mr. LI Chi-man
	Dr. PUN Chun-sing, Jason
	Mr. YEUNG Yu-san
Secretary:	Dr. CHEUNG Kam-wah, Thomas (Education Bureau)