



*To Serve with Quality*

# **FOUNDATION SCIENCE PRIMARY FIVE**

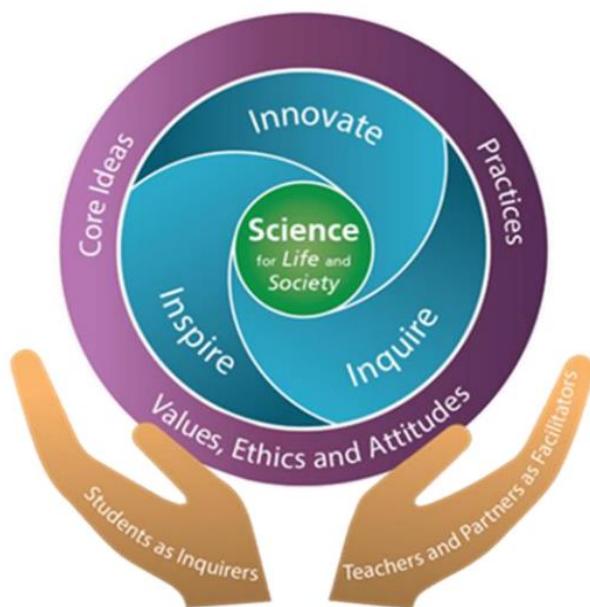
## SCIENCE DEPARTMENT VISION AND MISSION

Vision: Every Shuqunite a creative and effective thinker

Mission: To nurture effective and creative thinkers with a sense of inquiry and passion for the learning of science

## OVERVIEW OF THE SCIENCE CURRICULUM

The Primary Science Syllabus is based on the revised Science Curriculum Framework.



The Science Curriculum Framework (CPDD 2023)

*Science for Life and Society* in the centre circle captures the twin goals of Science education which are to:

1. Enthuse and nurture all students to be scientifically literate.
2. Provide strong Science fundamentals for students to innovate and pursue STEM for future learning and work.

The three main domains that make up the fundamentals of Science are:

1. Core Ideas of Science – The distilled core ideas are organised in five themes: **Diversity, Cycles, Systems, Energy** and **Interactions**. Fundamental concepts in life and physical sciences are broadly covered to provide a broad-based understanding of the environment, and it will help build a foundation upon which students can rely for further study.
2. Practices of Science -There are three components which are Demonstrating Ways of Thinking and Doing, Understanding the nature of Science and Relating Science, Technology, Society and Environment.
3. Values, Ethics & Attitudes in Science

## **SYLLABUS FRAMEWORK**

The Core Ideas in this syllabus are organised as themes, which students can relate to in their everyday experiences, and to the commonly observed phenomena in nature. The aim is to enable students to appreciate the links between different themes/topics and thus allow the integration of scientific ideas. A key feature of the syllabus is the spiral approach. Scientific concepts and process skills are revisited at different levels and with increasing depth to allow students to integrate newly acquired knowledge and skills with their existing schemas.

## PRACTICES

In Shuqun Primary, teachers engage students in Practices of Science through inquiry. One of the practices, Ways of Thinking and Doing supports development of various skills and processes. The development of skills and processes is progressive as students learn Science from Primary 3 to Primary 6.

The table below shows each Way of Thinking and Doing and what we hope students can achieve at the end of Primary 5.

| <b>By the end of P5, students should be able to:</b>        |  |
|---|--|
| Posing questions and defining problems                      | <ul style="list-style-type: none"><li>Ask questions out of curiosity or to deepen understanding.</li><li>Ask questions which can be investigated.</li></ul>  |
| Designing investigations                                    | Recognise a fair test (changed/ unchanged variables).  |
| Conducting investigations and testing solutions             | <ul style="list-style-type: none"><li>Use senses, apparatus, and equipment to gather data.</li><li>Investigate to find out answers to questions (guided and open investigations).</li><li>Record and/or compare observations/ data using notes, drawings and charts.</li></ul> |
| Analysing and interpreting data                             | <ul style="list-style-type: none"><li>Analysis of data and information in representations (e.g., tables, bar and line graphs, charts, and diagrams) to infer patterns and relationships or explain findings.</li></ul>   |
| Communicating, evaluating and defending ideas with evidence | Communicate (e.g., written, verbal, pictorial, tabular or graphical) clear explanation and reasoning.  |
| Making informed decisions and taking responsible actions    | State or select options based on appropriate criteria with reasons.  |
| Using and developing models                                 | Use multiple representations (e.g., pictures, charts, diagrams, tables, graphs) to explain concepts.   |
| Constructing explanations and designing solutions           | Construct possible explanations and generate ideas.  |

## SYLLABUS LEARNING OUTCOMES FOR PRIMARY 5 FOUNDATION SCIENCE

The Primary Science Syllabus (2023) is available online at

<https://www.moe.gov.sg/-/media/files/primary/syllabus/2023-primary-science.ashx?la=en&hash=ACABF4256B5F341428F59A346834E73CCD27CC39>



| Cycles in Plants and Animals (Reproduction)  |   |   |
|--|---|---|
| Learning Outcomes  |   |   |
| Core Ideas   | Practices   | Values, Ethics and Attitudes  |
| <ul style="list-style-type: none"> <li>State the processes in the sexual reproduction of flowering plants.             <ul style="list-style-type: none"> <li>- Pollination</li> <li>- Fertilisation (seed production)</li> <li>- Seed dispersal</li> <li>- Germination</li> </ul> </li> </ul> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>- <i>Fertilisation is the process that leads to the development of fruits and seeds.</i></li> <li>- <i>The use of specific terms (“self-pollination” and “cross-pollination”) to describe the pollination process is not required.</i></li> </ul> <ul style="list-style-type: none"> <li>State the process of fertilisation in the sexual reproduction of humans.</li> </ul> | <ul style="list-style-type: none"> <li>Observe and compare the ways in which plants reproduce.             <ul style="list-style-type: none"> <li>- Spores</li> <li>- Seeds</li> </ul> </li> </ul> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>- <i>Vegetative propagation methods, such as stem cutting, are not required.</i></li> </ul> | <ul style="list-style-type: none"> <li>Show curiosity by questioning and exploring the surrounding plants and animals.</li> <li>Show care and concern by being responsible towards plants and animals.</li> </ul> |

| Cycles in Plants and Animals (Reproduction)  |           |                              |
|--|-----------|------------------------------|
| Learning Outcomes  |           |                              |
| Core Ideas   | Practices | Values, Ethics and Attitudes |
| <p><i>Note:</i></p> <ul style="list-style-type: none"> <li>- <i>Fertilisation occurs when a sperm fuses with an egg.</i></li> <li>- <i>The fertilised egg develops in the womb.</i></li> <li>- <i>Students should know that ovaries produce eggs, and the testes produce sperms.</i></li> <li>- <i>Foetal development and the mechanism of obtaining air, food and water through the umbilical cord are not required.</i></li> </ul> |           |                              |

| <b>Cycles in Matter and Water (Water)</b>  |  |  |
|--|--|--|
| <b>Learning Outcomes</b>   |  |  |
| <b>Core Ideas</b>  | <b>Practices</b>   | <b>Values, Ethics and Attitudes</b>  |
| <ul style="list-style-type: none"> <li>• Recognise that water can exist in three interchangeable states of matter.</li> <li>• State how water changes from one state to another.             <ul style="list-style-type: none"> <li>- Melting (solid to liquid)</li> <li>- Freezing (liquid to solid)</li> <li>- Boiling/Evaporation (liquid to gas)</li> <li>- Condensation (gas to liquid)</li> </ul> </li> <li>• State the melting point of ice (or freezing point of water) and boiling point of water.</li> <li>• Recognise the changes in states of water in the water cycle.</li> <li>• Recognise the importance of the water cycle.</li> </ul> | <ul style="list-style-type: none"> <li>• Compare water in 3 states.</li> </ul> | <ul style="list-style-type: none"> <li>• Show concern for water as a limited natural resource and be responsible in conserving.</li> </ul> |

| Human System (Respiratory and circulatory systems)  |  |  |
|---|--|--|
| Learning Outcomes   |  |  |
| Core Ideas  | Practices  | Values, Ethics and Attitudes   |
| <ul style="list-style-type: none"> <li>Recognise that air is made up of gases such as nitrogen, carbon dioxide, oxygen and water vapour.</li> <li>Identify the parts of the human respiratory (nose, windpipe, lungs) and circulatory systems (heart, blood, blood vessels) and state their functions.</li> </ul> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li><i>Detailed knowledge of respiratory system (e.g., alveoli) and circulatory system (e.g., heart chambers and valves) is not required.</i></li> </ul> | <ul style="list-style-type: none"> <li>Compare how plants and humans take in oxygen and give out carbon dioxide.</li> </ul> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li><i>The use of specific terms (xylem, phloem and stomata, artery, vein, capillary) is not required.</i></li> </ul> | <ul style="list-style-type: none"> <li>Show objectivity by seeking data and information to validate observations and explanations about the human body.</li> </ul> |

| Plant System (Respiratory and circulatory systems)   |  |   |
|--|--|---|
| Learning Outcomes  |  |   |
| Core Ideas   | Practices  | Values, Ethics and Attitudes  |
| <ul style="list-style-type: none"> <li>Recognise how water is transported from the roots to other parts of the plant and how food is transported from the leaves to other parts of the plant.</li> </ul> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li><i>Recall of the relative positions of water-carrying and food-carrying tubes is not required.</i></li> <li><i>The use of specific terms (xylem and phloem) is not required.</i></li> <li><i>The concept of transpiration pull is not required.</i></li> </ul> | <ul style="list-style-type: none"> <li>Observe how food and water are transported in the plant.</li> </ul> | <ul style="list-style-type: none"> <li>Show objectivity by seeking data and information to validate observations and explanations about plant parts and functions.</li> <li>Show care and concern by being responsible towards plants.</li> </ul> |

| Electrical System  |   |   |
|--|---|---|
| Learning Outcomes  |   |   |
| Core Ideas   | Practices   | Values, Ethics and Attitudes  |
| <ul style="list-style-type: none"> <li>• Recognise that an electric circuit consisting of an energy source (battery) and other circuit components (wire, bulb, switch) forms an electrical system.</li> <li>• State that a closed circuit allows current to flow.</li> <li>• Identify electrical conductors and insulators.</li> </ul> | <ul style="list-style-type: none"> <li>• Construct simple circuits from circuit diagrams.</li> <li>• Investigate the effect of some variables on the current in a circuit. <ul style="list-style-type: none"> <li>- Number of batteries (arranged in series)</li> <li>- Number of bulbs (arranged in series)</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Show concern for the need to conserve and to have proper use and handling of electricity.</li> </ul> |

## ASSESSMENT

The school-based formal assessment serves to assess students' attainment in Science with respect to the aims as stated in the primary syllabus. Each formal assessment is weighted and reflected in the students' result slips at the end of each semester.

The tables below show the formal assessment across Term 1 to Term 4.

### Primary 5 (Foundation Science)

| Term 2<br>15%         | Term 3<br>15%         | Term 4<br>70%           |
|-----------------------|-----------------------|-------------------------|
| Weighted Assessment 1 | Weighted Assessment 2 | End-of-Year Examination |
| 30 marks              | 30 marks              | 70 marks                |

### END-OF-YEAR EXAMINATION

For foundation paper, the examination consists of one written paper comprising two booklets, Booklet A and Booklet B.

| Booklet                | Item Type       | Number of Questions | Number of marks per questions | Marks |
|------------------------|-----------------|---------------------|-------------------------------|-------|
| A                      | Multiple-Choice | 20                  | 2                             | 40    |
| B                      | Structured      | 9 - 11              | 2, 3, 4                       | 30    |
| <b>Total: 70 marks</b> |                 |                     |                               |       |

The duration of the paper is 1 hour 15 minutes.

### Provision of Word List

A word list is provided for students taking Foundation Science Paper to allow them to display their knowledge and understanding without being unduly disadvantaged by their weakness in the English language. Do take note that the word list is not exhaustive.

**QUESTION TYPES**

1. Knowledge with Understanding (AOI) - 50%

- Demonstrate knowledge and understanding of scientific facts, concepts and principles

2. Application of Knowledge and Process Skills (AOII) - 50%

- Apply scientific facts, concepts and principles to new situations
- Use one or a combination of basic process skills

## Glossary of Science Terms

Below is the list of common scientific terms used in questions.

| No. | Term                   | Description of meaning  |
|-----|------------------------|---|
| 1   | analyse                | to identify the parts of objects, information or processes, and the patterns and relationships between these parts  |
| 2   | classify               | to group objects or events based on common characteristics  |
| 3   | communicate            | to transmit and receive information which is presented in various forms – written, verbal, pictorial, tabular or graphical  |
| 4   | compare                | to identify similarities and differences between objects, concepts or processes   |
| 5   | construct              | to put a set of components together, based on a given plan  |
| 6   | describe               | to write (using diagrams where appropriate) the main points of a topic  |
| 7   | differentiate          | to identify the differences between objects, concepts or processes  |
| 8   | evaluate               | to assess the reasonableness, accuracy and quality of information, processes or ideas   |
| 9   | formulate hypothesis   | to make a general explanation for a related set of observations or events. It is an extension of inferring  |
| 10  | generate possibilities | to explore all the alternatives, possibilities and choices beyond the obvious or preferred one  |
| 11  | identify               | to select and/or name the object, event, concept or process   |
| 12  | infer                  | to explain or draw a conclusion based on observations, data or information  |
| 13  | investigate            | to find out answers to the questions or to verify the hypotheses  |
| 14  | list                   | to give a number of points or items without elaboration   |
| 15  | make decisions         | to establish and apply criteria to select from among seemingly equal alternatives. The process of establishing criteria involves consideration of the consequences and values |
| 16  | measure                | to obtain a reading from a suitable measuring instrument  |
| 17  | observe                | to obtain information through the use of the senses   |
| 18  | predict                | to assess the likelihood of an outcome based on prior knowledge of how things usually turn out  |
| 19  | recognise              | to identify facts, characteristics or concepts that are critical to the understanding of a situation, event, process or phenomenon  |
| 20  | relate                 | to identify and explain the relationships between objects, concepts or processes  |
| 21  | show an understanding  | to recall information (facts, concepts, models, data), translate information from one form to another, explain information and apply information                              |
| 22  | state                  | to give a concise answer with little or no supporting argument  |

## EXAMINATION PREPARATION AND STRATEGIES

- Develop a daily routine for revision and homework.
- Organise and link scientific concepts.
  - Make and organise notes by using any form of graphic organisers such as concept maps and mind maps.
- Use acrostics or mnemonics to remember science facts and concepts.
  - Acrostics involve the formation of a sentence or a story using the first letters of key words.

### Example: Factors required for seed germination

Water

Oxygen

Warmth

- Encourage your child to ask questions and observe things, phenomena or changes around us. Observation is an important step leading to scientific explanations.
- Learn spelling of key words.
- Practise by attempting questions in topical worksheets and practice papers. Correct mistakes and re-learn the erroneous concepts.

## R.I.S.E Strategy to Answering Science Questions

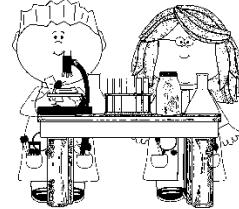
### Multiple-Choice Questions:

**R** – Read the question carefully. Study given diagrams, tables or graphs. Make comparisons if there is more than one diagram, tables of graphs.

**I** – Identify key words and topic(s)/concept(s) tested.

**S** – Study all options carefully.

**E** - Eliminate distractors to arrive at the best possible answer.



### Open-ended Questions:

**R** – Read the question carefully. Study given diagrams, tables or graphs. Make comparisons if there is more than one diagram, tables of graphs.

**I** – Identify key words and topic(s)/concept(s) tested.

**S** – Select relevant concepts to answer the question. Check the mark allocation and answer to the point.

**E** – Express and explain answers clearly. Avoid adding unnecessary and unrelated information in your answer.

## SUGGESTED SCIENCE WEBSITES

Student Learning Space: <https://vle.learning.moe.edu.sg/home>

Young Scientist Badges Portal: <https://youngscientist.sscglobal.com.sg/>

National Geographic Kids: <https://kids.nationalgeographic.com/>