Science in

The National Curriculum

Key Stage 1- Grade 2

Revised

NATIONAL
INSTITUTE OF
EDUCATION

Science in the National Curriculum

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Introduction

Science in the National Curriculum

Science in the National Curriculum along with other subjects contributes to the development of the student in all aspects outlined in the National Curriculum. The following highlight briefly how the science curriculum paves the road in developing students in various aspects outline in the National Curriculum.

The Vision

The Science curriculum is designed to facilitate to achieve the vision of the National Curriculum. Students are required to ask questions, explore, use and create knowledge in many concepts included in the syllabus. The syllabus gives ample opportunities where students are required to take actions relating to family, local community and contribute to global society with respect to sustainable use of resources, conserving and preserving the natural resources and other related aspects throughout. The syllabus also stresses upon skills, values and attitudes which enables students to become confident and competent citizens.

The Principles

The Science syllabus emphasizes linking Science with eight fundamental principles identified in the National Curriculum. The skills, values and attitudes such as being fair, just, having Islamic faith, appreciating the culture, uphold the traditions are some of the aspects that are integrated in the content and skills in the syllabus.

Likewise, the syllabus design has taken considerations in taking into account, various learning styles and differentiation such that every student has the opportunity to reach to personal excellence.

Similarly, in-depth understanding of scientific concepts and processes ensures that students develop holistically, and relating these concepts and processes to their real life context ensuring relevance to students and preparing them for life.

Values

The science syllabus is designed to integrate values in the four categories mentioned in the National Curriculum. The content and processes facilitate and promote the development of values mentioned in the National Curriculum to greater extent. A special focus is sought out to develop the values relating environment stewardships in the syllabus.

The Key Competencies

The Science curriculum provides a rich context in which the key competencies outlined in the National Curriculum can be developed. The eight key competencies included in the National Curriculum encompasses knowledge, skills, values and attitudes and dispositions to be explicitly taught in various key learning areas and through various school activities. The following highlights some of the opportunities where each key competency can be developed:

- **Creative and critical thinking**

  The syllabus involves a lot of opportunities for students to explore their surroundings, ask questions, use high order thinking to analyse and solve issues. In addition, the curriculum allows students to design and invent new things based on their prior knowledge and using their creative thinking. It asks students to understand abstract concepts which require high level of cognition.

- **Using Sustainable Practices**

  Using sustainable practices is very much part and parcel of the science curriculum. It encompasses many aspects to explore how human activities impact the environment and identify ways to take care of the environment. In addition, the syllabus includes many opportunities to understand issues from both developmental as well as environmental perspectives so that students are encouraged to develop stewardship towards the environment.

- **Using Media and Technology**

  The science curriculum provides many opportunities for students to relate with the technological advancement in various fields and how science has contributed to these advancements. In addition, student need to use technology in their learning and identify best sources to gather information; question the authenticity of the information gathered and also analyses, synthesises and evaluates the information.

- **Relating to people**

  The science curriculum requires students to carry out several investigations throughout the years and these investigations and other activities are required to do in a group. Hence, there would be many opportunities to develop the key competency, relating to people.

- **Understanding and managing self**

  The science curriculum requires students to carry out several investigations throughout the years and these investigations give ample opportunities for students to develop the key competency, understanding and managing self as they have to be carried out in a systematic and organised manner.

- **Living a healthy life.**

  Healthy life aspects are a big component in the science curriculum. Understanding of how the human body functions and how to take care of body etc. are some of the concepts covered which relates to human health. Taking care of equipment and precautionary measures in using chemicals and various equipment are some concepts explored in the curriculum. Hence opportunities are there in the science curriculum to develop the key competency, living a healthy life.

- **Making Meaning**

  Science curriculum requires students to engage in collaborative action-based scientific inquires rooted in issues that are of great importance to the students. Science curriculum also offers opportunities for students to engage in various context relevant to the concepts that they study such that making meaning is made.

- **Practicing Islam**

  The science curriculum provides a rich context to develop the key competency, practicing Islam. The process skills such as observation, inference, experimental knowledge are skills with which humanity can achieve goals laid out in the Quran and Sunnah. The modern Science has been developed by Muslims by highlighting the repeated calls of the Quran to observe and reflect upon the natural phenomena. The content, skills and values included in the science curriculum are very much aligned with this notion and hence many opportunities for developing the key competency.

Considerations for Planning, Teaching and Assessing Science

The Planning

Focus for Learning

The National Curriculum highly recommends that the focus for learning should promotes holistic approach to education, placing equal emphasis on the development of knowledge, understanding, skills, values and attitudes. Therefore, careful and systematic planning is essential for the success of Science teaching. To begin with, in order to ensure that children receive a rich learning experience, it is important that Science teachers become familiar with the outcomes and indicators at each level and have an understanding of how these are translated and implemented in the classroom. The following are some key features to consider in planning science education:

Content Selection

It is important to note that children should experience a broad and balanced programme. The science curriculum highly encourages to teach science concepts in content strand with the scientific processes. Thus, the strands 'Science and technology' and 'Scientific Inquiry Skills' need to be integrated with the content strands in order to maximize the learning of skills and values. Therefore, teachers should draw content from the four content areas and two process strands:

- Life and Living
- Earth and Beyond
- Matter and Materials
- Energy and Change
- Science and Technology
- Science Inquiry Skills

In situations, where the selected topic or theme can incorporate other content areas, it is advisable to do so.

For example, teachers may select our surrounding as a unit topic, where outcomes from the content areas of Life and Living and Earth and Beyond can be taken together

In selecting a theme or topic teachers should account for student needs, their local environment and familiarity. It should also ensure continuity and progression in student's learning. For smooth transition from each level requires teachers to be aware of the students past learning experiences.

Although it is encouraged that a thematic approach be used in teaching science, it needs to be understood that to achieve certain outcome may require specific teaching related to the selected outcomes and indicators.

In general, effective planning thus requires the teachers to initially identify the big ideas/concepts behind each of the outcomes and identify ways to collate outcomes and indicators together to ensure that students receive meaningful learning.

Development of Skills, Values and Attitudes

The NCF places great emphasis on encouraging children and young people to adopt deeply held values shared within our society. It identifies four main categories of shared values and schools need to adopt an integrated approach that allows children to apply general skills across the curriculum. Opportunities must be provided for students to apply these skills in a variety of active learning experiences where they learn through various tasks that allow them to move from concrete to more abstract levels of learning.

Literacy and Numeracy

Numeracy is about students having the confidence to choose and use mathematics skills they learn at school in everyday life, as well as the classroom and literacy is essential to a student's ability to learn and succeed in school and beyond.

Literacy capabilities need to be explicitly built as students' progress throughout the years in all the key learning areas. Teaching and learning in environment, Science and Technology, students may need to write science reports after undertaking investigations or experiments. This requires specialised text and language structures, vocabulary and graphics that are specific to constructing knowledge in Science and that may not be learnt in other areas of learning. If these literacy demands are not addressed in teaching and learning, it would hinder student learning in science.

In this regard, every classroom teacher needs to address in explicit teaching of numeracy skills in all the curriculum areas. In science class when students interpret a graph, in woodwork when they confidently measure a piece of wood, or in cooking when a student halves a recipe without being given specific instructions on what to do. So every classroom teacher has a role to play in helping students develop numeracy skills.

Consequently, all the teachers need to ensure that literacy and numeracy teaching and learning becomes part of their daily routine.

Integration

The use of well-planned integrated approaches, both within Science and between Science and other curricular areas plays an important role in the teaching/learning of Science at all levels.

Systematically planned integrated topics can provide contexts in which knowledge and skills may be developed in a range of areas. In this regard, the environments of the child, particularly those of a local nature, provide ideal contexts and an effective ground for the integration of learning.

Likewise, many elements from the Social studies, Mathematics and Language curricula may be explored in parallel with Science, and much of the work involved will contribute to the development of the child's oral language, literacy, numeracy and communication skills. Science is best approached in a holistic manner with younger children as this respect the wholeness of their view of the world.

As children grow old they begin to recognise that there are different ways or modes of looking at the world and of organising human knowledge, so teaching strategies may vary to include a holistic approach, some cross-curricular integration and a subject-centered focus. Such an approach utilises teaching and learning time efficiently and acknowledges that the social, emotional, attitudinal and moral development of the child is interwoven with the acquisition of knowledge and skills. It needs to be understood that each subject offers a distinctive perspective on the world and equips children with a particular range of skills; however, these divisions must not reverse the effective implementation of an integrated curriculum.

Teaching Approaches

The instructional approaches and learning activities need to be drawn in a way that reflects the five pedagogical dimensions mentioned in the National Curriculum:

- Creating a positive Learning Environment
- Connecting Prior Learning to New Learning
- Making Learning Meaningful
- Fostering Reflective Practices
- Catering to Individual differences

These dimensions are not stand alone dimensions. They are interwoven in nature and teachers need to carefully develop the lessons in a manner that these dimensions are addressed. Some of the ways these dimensions can be addressed are highlighted below:

When the activities in the lesson plans

- Are drawn on students' prior knowledge, capture their interest, encourage meaningful practice in various contexts, allows for students to construct their own learning.

- Engage students in a way that they make the connection between the scientific and technological concepts they are learning and their application in the world around them and in real-life situations.

- Offer opportunity for students to make sense of the world around them by critically reflecting and making sense and meaning of their experiences.

- Address the growing diversity of students in classrooms. The use of the one-size-fits-all lessons no longer meets the needs of the majority of learners and teachers need to adopt differentiated learning activities.

Thus the role of students would be active learners who construct their own learning and teacher in such teaching would act as facilitators in teaching. The teacher need to:

- creating a classroom environment to support and challenge the learning and teaching of science
- designing effective learning experiences that help students to achieve designated outcomes
- stimulate and managing classroom discourse in support of student learning
- use student's motivations, interests, abilities and learning styles to improve learning and teaching
- analyze student learning, the scientific tasks and activities involved, and the learning environment to make ongoing instructional decisions

- select teaching strategies from a wide repertoire.

In addition to the above, the science curriculum emphasizes the need to get involved in practical activities such as field outings, projects, experiments and investigations. One of the main purposes of these is to provide rich context for students to develop Science Inquiry skills.

Research on successful classroom practice have shown that an inquiry approach, with emphasis on learning through concrete, hands-on experiences, best enables students to develop the conceptual understanding required. In such instructional settings and strategies, learning occurs not by passive absorption, but rather as students actively constructs their own meaning and assimilates new information to develop new understandings in terms of knowledge, skills and values and attitudes

Likewise, the development of scientific literacy in students is a function of the kinds of tasks they engage in, the discussions in which they participate, and the settings in which these activities occur. Students' disposition towards science is also shaped by these factors.

Consequently, the aim of developing scientific literacy requires careful attention to all of these facets of curriculum and instruction. Learning experiences in science education should vary and include opportunities for group and individual work, discussion among students, as well as between teacher and students, and hands-on/minds-on activities that allow students to construct and evaluate explanations for the phenomena under investigation. Such investigations, and the evaluation of the evidence accumulated, provide opportunities for students to develop their understanding of the nature of science and the nature and status of scientific knowledge.

Environmental Awareness and Care

The curriculum area of science is specifically founded on the student's relationship and interaction with the world around them. The environment, in its broadest sense, is the context for learning, and student's classroom experience will be deepened and extended by direct experience of their surroundings. The locality will provide the starting points for environmental education, and as student's knowledge and understanding grow and develop they will encompass other places and direct pupils to other global dimensions.

One of the key aims of Science education should be to inculcate the necessary skills and values to understand environmental vulnerabilities locally as well as globally, and be informed decision makers in deciding responsible actions in maintaining and protecting the environment.

The four content strands provide a rich context to include concepts related about the environment, and in the environment that provide a rich learning experiences in active manner and promote a love for learning and appreciation for the dynamic interactions. The positive and negative consequences, both intended and unintended, of the interactions between human-created and natural systems

The future of our country lies hand-in-hand with the future of our young people. They deserve a first-class education on the environmental challenges ahead, on the innovations and creativity where solutions can be found, and to understand the skills they will need to succeed in the low-impact and low-carbon industries of the future.

With an innovative and creative approach to sustainable development and environmental stewardship, schools can be a breeding ground of ideas and pathways to a sustainable future. This has become even more imperative in 2020.

Assessment Practices

The Science Syllabus outcomes contribute to a developmental sequence in which students are challenged to acquire new knowledge, understanding and skills.

Assessment is an integral part of teaching and learning. Assessment is the ongoing systematic process of gathering and using evidence of student learning to make informed decisions regarding student achievement. Thus, the main purpose of assessment is to improve student learning.

Three major types of assessment used in conjunction can be used to support student achievement: The Key stage 1 Science Syllabus particularly promote Assessment for Learning as an important component of good teaching.

Assessment for Learning (Formative Assessment)

It is used for purposes of greater achievement. Classroom assessment should provide opportunities for students to become actively involved in their learning and achievement. In this type of assessment student know what they need to do in order to be successful and know what is considered as 'good work'.

Assessment for learning is criterion referenced where students compare their work with a criterion. The criteria are based on the outcomes and indicators mentioned in the Science Syllabi.

In addition to this, students, peers and teachers provide appropriate and ongoing feedback. Through feedback students identify their strengths and areas for improvement. This helps students to redirect their efforts and energy in making plans on ways to improve learning.

As for teachers, this provides the opportunity to change instruction in accordance with student's needs.

Assessment as Learning (Formative Assessment)

Assessment as learning is student driven whereby students actively involved in their own learning. This is done through continuous self-assessments whereby students identify areas to improve. Students are required to reflect and critically evaluate their work.

Assessment of Learning (Summative Assessment)

This is usually addressed through summative assessment. This includes topic assessment at the end of a topic and term exams. (Note: for the foundation and key stage one there will be NO term exams or tests). However, students' summative assessment can be done to check students' level of understanding. The information gathered through the summative process should be used formatively to enhance student progress.

In order to gather evidence of student learning the following are some of the methods that can be used:

Informal assessment- student and teachers make judgments about their learning based on discussions.

Formal assessment- students and teachers making judgments based on success criteria that are shared by students and the teacher before the learning task is carried out.

- Observation – use of checklists, rating scales and rubrics
- Self and peer assessment
- Quizzes
- Tests
- Sample student work
- Projects
- Reports
- Journals/Logs
- Performance reviews
- Portfolios

Detailed guidance and advice on effective pedagogy and appropriate assessment practice is provided in the Pedagogy and Assessment Guide (PAG) available on the NIE website.

Recommended Time

The following table shows the allocated time for teaching Science to Key Stage 1 (grades 1, 2 and 3) students:

Key Stage	Contact Time/Weeks	Minimum Contact Time/year
1 (Grades 1, 2 and 3	180 min (4 periods /week)	109 hrs (145 periods of 35 mins)

Place of the Science Syllabus in the K- 12 curriculum

Key stage 1-3 Science Compulsory

Key Stage 4	Key Stage 5
Science Stream- Optional **Core Subjects** • Biology • Chemistry • Physics **Elective** • Marine Science	**Science Stream-Optional** **Core Subjects** • Biology • Chemistry • Physics

Rationale

The aim of Science Education in Maldives is to develop scientific literacy. Scientific, Environmental and technological literacy is an evolving combination of the science-related attitudes, skills, and knowledge students need to develop inquiry, problem-solving, and decision-making abilities; to become lifelong learners; and to maintain a sense of wonder about the world around them.
To develop scientific, environment and technological literacy, students require diverse learning experiences which provide opportunity to explore, analyze, evaluate, synthesize, appreciate, and understand the interrelationships among science, technology, society, and the environment that will affect their personal lives, their careers, and their futures.

Aim

The purpose of this key learning area is for students to explore the natural world and its phenomena through systematic and organized inquiry. It provides the opportunity for students to question, investigate, predict and explain the events of the Earth and the universe.

The aims of Environment, Science and Technology are to:

- enable the student to acquire knowledge, skills and attitudes so as to develop an informed and critical understanding of, environment, science and technological issues
- reinforce and stimulate curiosity and imagination about local and wider environments
- enable the student to play a responsible role as an individual, as a family member and as a member of local, regional, national, global communities
- foster an understanding of, and concern for, the total interdependence of all humans, all living things and the Earth on which they live
- foster a sense of responsibility for the long-term care of the environment and a commitment to promote the sustainable use of the Earth's resources through personal life-style and participation in collective environmental decision-making
- Cultivate humane and responsible attitudes and an appreciation of the world in accordance with beliefs and values.

Structure of the Syllabus

The content of the Science key stage 1 syllabus is based on the outcomes and indicators in two broad areas. They are

- Knowledge and Understanding
- Skills

Outcomes

The outcomes are statements of knowledge, understanding, skills and values expected to be achieved by students at the end of a given stage. All outcomes are of equal importance. The presentation of the outcomes does not imply a sequence of teaching and learning activities.

Indicators

An indicator is an example of the behavior that students may display as they work towards the achievement of syllabus outcomes. Indicators reflect and describe aspects of knowledge, understanding, skills and values.

The outcome and indicators together make up the content. The indicators describe in more detail how the outcomes are to be interpreted and used, and the intended learning appropriate for the Stage. In considering the intended learning, teachers will make decisions about the sequence, the emphasis to be given to particular areas of content, and any adjustments required based on the needs, interests and abilities of their students.

The knowledge, understanding and skills described in the outcomes and indicators are organized into grades so that it provides a sound basis for students to successfully move to the next stage of learning.

Summaries of Strands

The knowledge and Understanding comprise of four content strands and Skills are presented in two process strands.

A summary of each strand included in the Syllabus is outlined below:

Strand 1: Life and Living

Life and living strand explore the living things and their interactions. It looks in to structure, function of living things. It includes the importance of diversity of life and their interdependence. It also explores the impact of environment on life and the effects of human intervention on the environment.

Strand 2: Matter and Materials

Matter and materials strand explore matter and its interactions. It looks into the composition and properties of matter. It also explores the changes that matter undergoes and the energy involved. This strand also includes the study of wide range of materials and substances which people use. It explores how uses are determined by the properties and structure of materials. Furthermore, it looks in to the use and management of materials and the influence of these uses on the environment.

Strand 3: Energy and Change

Energy and change strand explore matter, energy their interactions and the changes associated with those interactions. It explores the movement of objects and forces acting on it. This strand also looks in to forms of energy, energy transformation, law of conservation of energy, harnessing and storing of energy. Furthermore, it looks in to social implications of energy use including the effects of use of natural resources, a range of alternative energy sources and the implications of their use.

Strand 4: Earth and Beyond

Earth and beyond strand explore Earth's processes and features. It looks into understanding patterns in nature and natural cycles. It also includes a study of various parts of the solar system and the universe. In addition to this, it looks into the relationships of Earth's systems and their effects on living things. Furthermore, it highlights the uniqueness of the planet Earth, and the importance of protecting and preserving resources of Earth and its environment.

Strand 5: Science and Technology

Science and technology strand provide students to develop inquiry, investigation skills and the ability to solve problems in students.

This strand will be integrated in to content strands to provide opportunities to apply thinking skills, seek solutions to problems through collaboration, investigation, critical thinking and creative problem-solving. Through this strand emphasis will be laid to develop skills in designing and making products, to develop an appreciation of the processes that can be applied to solve problems related to unfamiliar information and new ideas.

It will also enable students to participate responsibly in developing innovative ideas and solutions in response to questions and situations relevant to personal, social and environmental issues. Hence providing opportunities to make meaningful connections with the broader learnings through authentic application of relevant knowledge and acquired skills. Furthermore, this will also help to appreciate how science has contributed to the advancements in this world and to use technology wisely.

Strand 6: Science Inquiry Skills

Science Inquiry Skills Strand provide opportunities for applications of the processes, that are practised by the scientific community. It looks into ways of creating and nurturing students' natural curiosity and sense of wonder about their world.

This strand provides opportunities to pose questions, plan, conduct and critique investigations, collect, analyse and interpret evidence and communicate findings. Through this strand student will use evidence to make decisions and solve problems and recognise that scientific explanations change as new or different evidence becomes available.

Additionally, this strand gives ample opportunities for students to participate in discussions, inculcate intellectual honesty and skills to critically evaluate data. As students conduct scientific inquiries, through collaborative and individual work they learn to question, solve problems, draw logical, evidence-based conclusions, articulate ideas and work in ways that are ethical, fair and respectful.

Furthermore, this will also help students to appreciate the complexities of the world as they compare their current ideas and beliefs with those of scientists, and construct new understanding based on scientific thinking.

The Science Syllabus Key

The following codes are used in the Science KS 1-3 Syllabus.

Outcome Coding

Syllabus outcomes are coded in a consistent way. The code identifies the strand, grade, outcome number and the way the content is organized.

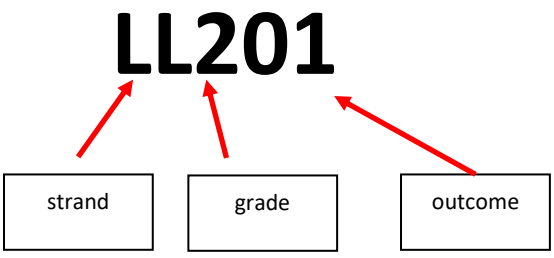
Strands are represented by the following codes:

Strands	Code
Life and Living	LL
Earth and Beyond	EB
Matter and Material	MM
Energy and Change	EC
Science Inquiry Skill	SIS
Science and technology	ST

Grade 1-3 outcomes are represented by the following codes:

Stage	Code
Grade 1	1
Grade 2	2
Grade 3	3

In the *Science KS1-3 Syllabus*, outcome codes indicate subject, strand, grade and outcome number, skill. For example:



Outcome code	Interpretation
LL201	Life and Living, Grade 1, Outcome 1

Scope and Sequence of content outcomes of each strand

Strands/Sub-strand	Grade 1	Grade 2	Grade 3
Life and Living			
Structure and function	LL101 Observe variety of living things to identify body shape, size and discuss the importance of diversity of living things	LL201Explore how each sense organ help us to gather information from the environment.	LL301Investigate observable characteristics of living things (living and nonliving)
	LL102Observe variety of living things and their external features and identify use of main external features	LL202Explore that living things grow and change	LL302Identify the importance of classification and classify living things using observable features
Interactions	LL103Identify that living things live in different places to meet their basics needs		LL303Identify that living things have external features which are used to meet their basic needs
Earth and Beyond			
Physical features of the Earth	EB101 Observe the changes that occur in the sky and land	EB201 Observe the changes that occur in the locality over time	EB301 Explore the changes that occur due to rotation of the Earth on its axis
Resources of the Earth		EB202 Recognise that living things use the resources of the Earth in a variety of ways	EB302 Identify that Earth's resources are limited and living things depend on them
Matter and Materials			
Matter and Materials	MM101 Identify that objects are made of particular material	MM201Classify objects according to their use and material types	MM301Identify that uses of materials are determined by their properties
	MM102Identify that materials have specific properties		
Changes in Matter		MM202Investigate that materials can be changed by different means	MM302Investigate that a change in state of material can happen by adding or removing heat
Energy and Change			
Force and Motion	EC101 Identify that push and pull can cause some objects to move		EC301Investigate that push and pull can change the movement of objects and their shape
Energy		EC201Identify that light can be produced by a range of sources and can be sensed	EC302Recognise that electricity needs to be used wisely
		EC202Identify that sound are produced by a range of sources and can be sensed	EC303Identify the safety measures that need to be taken while using electrical appliances

Scope and Sequence of process skills outcomes of each strand

Strands/Sub-strand	Grade 1	Grade 2	Grade 3
Science Inquiry Skills			
Formulating questions and making predictions	SIS101 Ask and respond to questions about familiar objects and events	SIS201 Ask questions and make predictions about familiar objects and events	SIS301 Formulate questions with guidance in familiar context that can be investigated and make and make predictions
Planning and conducting Investigations	SIS102Participate in guided investigations	SIS202 Follows instructions to carry out guided investigations	SIS302 Plan and carry out investigation with guidance, considering the safe use of equipment and materials
Recording and interpreting data and information	SIS103 Use non-standard measurements to collect data and make simple statements/generalisations based on the information	SIS203 Use non-standard /standard measurements to collect data, represent them and interpret data to find patterns	SIS303 Use standard measurements to collect, record data using tables/bar chart to interpret them to find trends and patterns
Evaluating and communicating	SSIS104 Talk about observations and share ideas in a variety of ways	SSIS204 Talk about the findings and share them in a variety of ways	SSIS304 Reflect on the procedure and discuss measures taken to make it a fair test
Science and Technology			
Science as a human endeavour	ST101 Recognise that science involves being curious, making observations, and asking questions about familiar objects and events	ST201 Recognise that science involves making observations, asking questions about events and describing them	ST301 Recognise that science involves making predictions, identifying and describing patterns
	ST102 Recognise that scientific inventions are used in our daily life	ST202 Identify that scientific knowledge helps people to make the right choices in daily life	ST302 Identify that scientific knowledge helps community to make the right decisions
Design and making	ST103 Discuss ideas and uses a range of objects and materials to make a product	ST203 Discuss ideas and present the design idea, select materials to make a product	ST303 Discuss ideas and present the design idea, select materials to make a product and evaluate the product

Grade 2 - Syllabus Details

Strand: Life and Living
Sub-strand: Structure and Function

Outcome	Indicators:
LL201Explore how each sense organs help us to gather information from the environment.	a *Identifying how each of the senses help us to recognize, describe and safely use a variety of materials* b *Appreciating Allah for the blessings specially for the senses*
Outcome	**Indicators:**
LL202Explore that living things grow and change	a *Illustrating the changes and personal development in oneself* b *Identifying the changes over time in living things and recognise that living things have stages in development* c *Identifying predictable changes in living things at different stages of development.*

Strand: Matter and Materials
Sub-strand: Materials and their Properties

Outcome	Indicators:
MM201Classify objects according to their use and material types	a *Exploring objects in the school and home environment to sort objects according to their use and material types* b *Recording and describing how objects are classified*

Sub-strand: Changes in Matter

Outcome	Indicators:
MM202Investigate that materials can be changed by different means	a *Exploring how the shapes of objects made from different materials can be physically changed through actions such as bending, squashing, stretching and twisting* b *Comparing and describing how materials such as water, butter or play dough change when warmed or cooled* c *Predicting and recording how materials found in the environment can be changed* d *Recognising that some durable materials such as plastic are harmful to the environment*

Strand: Energy and Change
Sub-strand: Force and Motion

Outcome	Indicators:
EC201 Identify that light can be produced by a range of sources and can be sensed	a *Exploring the traditional sources of light used at home* b *Recognising that our eyes which is a sense organ are used to detect light and help us to learn about the world around us* c *Identifying the sun as a source of light* d *Appreciating the creations of Allah*

Outcome	Indicators:
EC202 Identify that sound are produced by a range of sources and can be sensed	a *Exploring the traditional instruments that are used at home and community to produce sound* b *Exploring different ways to produce sound using familiar objects and actions such as striking, blowing, scraping and shaking* c *Recognising that our ears which is a sense organ are used to detect sound and help us to learn about the world around us* d *Recognising that loud sounds are harmful to human ears and a disturbance to other living things such as whales and dolphin that rely on sound to communicate*

Strand: Earth and Beyond
Sub-strand: Physical features of Earth

Outcome	Indicators:
EB201 Observe the changes that occur in the locality over time	a *Exploring the environment to observe the changes that occur to the locality overtime* b *Observing to identify that some changes in the locality are fast while others are slow such as changing of landscape, day and night* c *Discussing the human activities which affect the environment such as beach erosion*

Sub-strand: Resources of the Earth

Outcome	Indicators:
EB202 Recognise that living things use the resources of the Earth in a variety of ways	a *Recognising the Earth's resources such as water, soil, air* b *Identifying how resources are used by living things such as soil for agricultural purposes* c *Identifying actions that can be taken to conserve Earth's resources such as water*

Strand: Science Inquiry Skills

Sub-strand: Formulating questions and making predictions

Outcome	Indicators:
SIS201 Ask questions and make predictions about familiar objects and events	a *Discussing the possible questions that can be investigated* b *Formulate questions in familiar context with guidance and make predictions*

Sub-strand: Planning and conducting investigations

Outcome	Indicators:
SIS202 Follows instructions to carry out guided investigations	a *Measuring using appropriate tools* b *Classifying objects based on observable characteristics* c *Making inferences based on observations in relation to familiar objects and events* d *Manipulating objects and materials and making observation of the results*

Sub-strand: Recording and interpreting data and information

Outcome	Indicators:
SIS203 Use non-standard /standard measurements to collect data, represent them and interpret data to find patterns	a *Measuring using non-standard and standard units* b *Discussing a suitable way to show the data collected in a tabulated form* c *Comparing results with predictions to suggest possible reasons for findings* d *Comparing the data collected to find similarities and differences*

Sub-strand: Evaluating and Communicating

Outcome	Indicators:
SIS204 Talk about the findings and share them in a variety of ways	a *Discussing and sharing the information gathered in different ways* b *Discussing about investigation carried out to identify ways to improve*

Strand: Science and Technology
Sub-strand: Science as a human endeavour

Outcome	Indicators:
ST201 Recognise that science involves making observations, asking questions about events and describing them	a *Formulating questions with guidance and making observations in relation to features and events in local environment and recognizing that observations are used to identify changes such as changes in weather, harvesting* b *Making observations in relation to everyday events and changes in nature and describing them.*
Outcome	**Indicators:**
ST202 Identify that scientific knowledge helps people to make the right choices in daily life	a *Recognising inventions that contribute to quality of life such as various equipment, gadgets and machineries used by us.*

Sub-strand: Design and Making

Outcome	Indicators: This is evident when the student
ST203 Discuss ideas and present the design idea, select materials to make a product	a *Discussing ideas to present the design idea* b *Selecting tools and materials to make a product*

Planning, Teaching and Assessment Example

Sample Lesson Plan

Subject: Science	Grade 2	Duration: 4-5 lessons of 35 mins.
Strand **(Earth and Beyond)**	Sub-strand	
Key competencies Thinking critically and creatively Relating to people Using technology and media	**Shared Values** Values related to the environment	
Prior Knowledge	Materials needed Video clips on changes in the surrounding Photos of changes in the surrounding Newspaper articles Resources sheets from he teachers guide	

Content Strand (Earth and Beyond)

SEB201: Observe the changes that occur in the locality over time.

- Exploring the environment to observe the changes that occur to the locality over time
- Observing to identify that some changes in the locality are fast while others are slow such as changing of landscape and day and night

SSIS201: Ask questions and make predictions about familiar objects and events.

- Discussing the possible questions that can be investigated
- Formulate questions in familiar context with guidance and make predictions.

SSIS202: Follows instructions to carry out guided investigations

- Classifying objects based on observable characteristics
- Making inferences based on observations in relation to familiar objects and events

SSIS204: Talk about the findings and share them in a variety of ways.

- Discussing and sharing the information gathered in different ways

SST201: Recognises that science involves making observations, asking questions about events, and describing them

- Formulating questions with guidance and making observations in relation to features and events in a local environment and recognizing that observations are used to identify changes such as changes in weather, harvesting
- Making observations in relation to everyday events and changes in nature and describing them

Suggested Sequence of Teaching Ideas

Duration	Teaching and Learning	Resources and Materials Needed	Differentiated Teaching
35 mins	**Minds on** **Introductory** The teacher could start the lesson by checking on students' prior knowledge by asking questions about changes that they see every day such as day and night, growing up etc. Gear the questions to changes to their immediate surroundings, ask if there are any students whose house (specific parts of the house e.g., kitchen a room etc.) is being renovated lately of the house: what are changes brought during renovation		
	Get the students to do think pair share activity. Ask them to observe the image on page 22 of the text book. Read out the questions below and explain what it ask for and let them think about the answers, brainstorm (think on their own) on the following questions. What do you think about the changes that occur around you? What are some of the changes you have observed in your surroundings? (Road, neigbhourhood etc.) What are some of the changes you have observed in your island? How do these changes affect the people living in the area? Are these changes good or bad? Ask them to share their answers with each other.		Teacher can adapt the activity using different photos of familiar surroundings, help them to identify the places and ask them to observe the changes and discuss them

	Get them in to groups of four and let them discuss their answers in the group. Teacher can ask for examples of changes from different groups and discuss their answers. Explain to the students that some non-living things in our surroundings also change with time. We may be responsible for these changes either for good or bad. Let the students carry out the discussion in the groups and share their views with the whole class.		
35 mins	**Action** **Developmental Activity 1** Talk about the task by explaining them about the video clip/photos or new paper articles. Tell them to look for changes that have taken place and make notes of the changes. Play the video clip focused on the changes in the island. After the video ask them to think about the good or bad impact of these changes on the people living there. Discuss some of the changes seen in the video include good and bad changes in the discussion. Get the students to attempt Get Busy 3a. Provide an observation sheet (Appendix 3-Ai in teachers guide) and instruct the students to complete it focusing on the following questions. What are the changes that you have observed (in trees, population, places, etc.)? Have these changes increased or decreased from the last year? What is the reason for each change? Are they useful or harmful for people living there? What are the actions we can take to minimise the negative effects on the environment? Let the students to summerise their observations in the table in page 23 of their student book. (they can use	Student book Teachers guide video clip newspaper articles photos of developments in places Appendix 3-Ai in teachers guide	The developmental activities are articulated to reflect various types of learning such as auditory, visual, and kinaesthetic (For example, discussion, drawing, and observation, watching the video and presenting). Teachers should keep in mind that their planned activities must include a variety of strategies to cater to different learners'/learning abilities. (This activity can be varied using pictures of various developments taking place in the islands or news articles based on the developments, for example, construction of a harbour, schools, airport. No need to use the full article. Teacher can use pictures and one or two lines from the article.) Get Busy 3a can be adapted by identifying familiar changes that have taken place in a specific place in the sheet or providing pictures of changes in a specific place.

	Appendix 3-Ai in teachers guide as a reference) Ask the students to present their observations in groups of three-four students. Carry out an extended discussion about the questions mentioned in the SB and the observations students have recorded. Based on discussion and observations, get the students to attempt Get Busy 3b. Ask them to record some predictions on the changes that would occur in the future. Ask prompting questions while discussing some future scenario of some expected changes in the environment.		
35 mins	**Developmental Activity 2** Talk about some of the changes that have taken place in students from birth to till to date. Let them think about the process of change and the time taken for some of the changes to occur in them. Ask them to think of a change that does not take much time to happen Using examples from the answers they have given explain that some changes, as we have discussed takes time while others don't. Discuss and describe the slow and fast changes in the surroundings with the help of examples. Get the students to attempt Get Busy 3c. Provide an observation sheet (see Appendix 3-Aii) and instruct the students to sort the changes as slow and fast. Ask students to think about the changes that they have discussed so far. In pairs let them recall and discuss whether the changes that they recall are fast or slow Show the flashcards in the class. Instruct the students to estimate the expected time of change shown in the card and on the basis of that, sort them.	flash cards showing slow and fast changes Appendix 3-Aii Teachers Guide	This activity can be varied by using pictures and by guiding the group discussion by asking prompting questions and asking students to draw fast and slow changes or by making them identify it from pictures
35 mins	**Consolidation and Connection Follow-up Activity** Summarise the concept by discussing the changes in their surroundings,		This activity already has the differentiation embedded in it as

	explain that some of these changes are fast while others are slow. Get students to respond in groups to the following points on changes • What are the changes that they get to see more often? • Are all the changes that take place good changes? • Do all changes take same amount of time to occur? Divide the students into groups of three students. Instruct the students to prepare a podcast or skit (about 1-2 minutes) focusing on the changes around us. Ask the students to focus on the following points in the podcast. • Occurrence of change (slow/fast) • Reason of change • Impact of change (good/bad) if it is good, how we can maintain it? And, if it is bad, how we can reduce it? • Discuss the changes presented by the students in detail. Conclude the concept by explaining why some changes are good while others are bad. Also, ask them to promote good changes that are beneficial for our Earth. • Record the rehearsed skit or podcast. • Let others see the skit or listen to the podcast ask students to identify two good points and one point to improve in their skit or podcast.		students can either act or record the podcast The teacher can further vary it by allowing students to draw or represent their ideas using a ppt

Assessment

The introductory 'Minds-on' activities are to elicit students' prior knowledge so that the teacher can take account of this when planning how the developmental activities in the lessons will be implemented. So, in this stage mostly diagnostic assessment takes place. So, the Think, Pair and Share activity done to check on prior knowledge would show students' understanding and their level of understanding and readiness.

Formative assessment takes place in the developmental activities. This enables the teacher to monitor students' understanding and provide feedback that can extend and deepen students' learning through various Get Busy activities. (Use the rubrics Appendix 3C and 3E).

The follow-up activities can be used for summative assessment of the students' achievement throughout the concept development, and it can be used for formative purposes too. The follow up activities done at the consolidation phase would provide information about students' level of understanding and the filled sheets and students work can be used to assess them. The rehearsed skit and the podcast done by students can also be used to gather information about students' level of understanding.

PROCESS SKILLS, KEY COMPETENCIES, VALUES AND ATTITUDES

The completed observation sheet can be used to assess the level of students' development of process skills, values and attitudes in detail. Use the observation sheet for the assessment based on the scoring rubric (See Appendix 3C and 3E).

Key Competency addressed in the lesson

Using technology and the media

Teacher can instruct to search for more information from the internet about the changes in the land scape of different islands or their own island with the help of an elder. Furthermore here students are required to prepare a podcast and record it

Thinking critically and creatively

Students are required to think and discuss about ways on how the surroundings/island is changing and what they can do to minimise the negative impact.

Relating to people

Most of the activities are planned to be carried out in pairs or in groups where they have to work in collaboration with their peers.

Making meaning

Students will be relating the changes to their lives and they will be trying to understand how these changes affect their life.

Values addressed in the lesson

Relating to the Environment

The discussions in this lesson will be based on the changes in their surrounding weather they are good or bad how these changes affect the environment hence they will be able to appreciate the variety of changes in the area through the developmental activities

Links to Other Key Learning Areas

Creative Arts, English, Dhivehi

Reflection