



INTEGRATION OF 21ST CENTURY SKILLS IN THE MALDIVES CURRICULUM

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ABOUT THE LEARNING CYCLE ON INTEGRATION OF 21ST CENTURY SKILLS IN CURRICULUM

From June to September 2021, the KIX EAP Hub, in partnership with the Australian Council for Educational Research (ACER), delivered two rounds of a four-week course focused on strengthening the link between policy and implementation regarding 21st century skills. 69 participants in 14 country teams participated in the course which addressed the steps required and the challenges faced by policy makers to implement systematic curriculum reform that further emphasizes 21st century skills within learning outcomes and ensures these are connected to relevant assessment measures and pedagogical strategies.



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LIST OF ACRONYMS AND ABBREVIATIONS

ACER	Australian Council for Educational Research
KIX	Knowledge Innovation Exchange
MoE	Ministry of Education
NIE	National Institute of Education

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EXECUTIVE SUMMARY

In this case study we review the extent to which 21st century skills have been integrated across the education system in Maldives so far and take a deeper look at coverage within elements of the curriculum for the subjects—Science and Mathematics of Key Stage, Grade 1 respectively.

We first conducted a needs analysis to review the 10 alignment steps for 21st-century skills integration. In the Maldivian context, all 10 alignment steps are currently undergoing review. When the curriculum was rolled out in the country in 2015, MoE ensured that schools were ready for the challenges posed by the introduction of the new era in education. Several professional development training sessions were carried out across the country to confirm that teachers had a sound understanding of the curriculum and were competent to deliver the curricular essentials to students. However this study identified a number of challenges that still hinder effective implementation of the curriculum.

Next, we carried out skills audit and mapping. This exercise brings together the information from individual subjects to identify which key skills are already well embedded in the learning area and which skills have been neglected to a greater or lesser extent. The initial skills audit and mapping of the indicators of the learning areas indicates several major benefits. The first is identifying that the level of embeddedness varies across the learning areas. It also provides an overview of the skills within the learning areas by identifying deficiencies, excesses, and expectations within the learning areas of the syllabus regarding the broader skills and skill aspects. The skills audit and mapping encourage an increase in the skill aspects of the broader skills.

Last, we brought all the elements of analysis together to form a strategic plan for further integrating skills into the curriculum and the system more broadly. The strategic plan consists of six phases. The first involved revising the core team to include a steering committee that oversees developments and formulates working groups for various alignment steps so that the work can be carried out simultaneously. Phase two is to review and revise the existing skills framework. The third phase, audit and mapping, involved a large-scale audit and mapping across the curriculum at all the key stages to provide an overall picture of strengths and weaknesses analysis in terms of the skills embedded. The aim of phase four is to embed the skills more explicitly in the learning outcomes, assessment strategies and teaching/ learning resources for better implementation and monitoring. Phase five, application and advocacy, is expected to refine changes to policy and carrying out advocacy campaigns for widespread dissemination of the information to the public. The final phase, capacity building, is to create a series of training programs, focusing on the integration of skills in teaching and learning as well as assessment and reporting for all the stakeholders, including heads of schools, teacher trainers, supervisors, leading teachers, and teachers.



INTRODUCTION

As policymakers, educators and employers have recognised the need for a skills revolution to advance societies in the 21st century, the abilities that students and employees require are emerging. These skills are deemed necessary for success in work and life. Consequently, education providers are giving increasing attention to integrating these skills and competencies in schools and educational settings.

It is vital to include 21st-century skills in curricula, pedagogy and assessment to transmit them through the formal education system. This necessitates a drive to reform curricula to integrate 21st-century skills and devise a clear agenda to propel the reform process. It is to this end that the GPE Knowledge Innovation Exchange (KIX) has collaborated with the Australian Council for Educational Research (ACER) to support countries embarking on and continuing curriculum reform and integrating 21st-century skills into their curricula.

The Republic of Maldives participated in ACER's Learning Cycle course on integrating 21st-century skills into curricula from 14 June through 9 July 2021 and produced this report as the final knowledge product. The report describes the key actions that the Maldives team need to take to start the reform process.

2

CORE STRATEGY TEAM

A core strategy team is fundamental to steering the reform process. The current team, which undertook the Learning Cycle course, consists of two teacher trainers, two curriculum subject specialists and one development partner who supports the National Institute of Education (NIE) in curriculum development.

Going forward, the core strategy team needs to include key policymakers at the Ministry of Education (MoE) and NIE (the political heads of MoE and NIE), the head of school curriculum, assessment designer specialists, pedagogy specialists, the Quality Assurance Department at MoE, key leads who carry out the monitoring and inspection functions, in-service specialists at NIE and subject leads in the Curriculum Department at MoE. To devise a practical strategic plan, the core team also needs teacher representatives to describe classroom-level challenges and realities.

Once this team is assembled, a clear remit and terms of reference will be developed. The members' capacities will be enhanced to provide them with a common understanding of competency-based curriculum development, teaching and assessment of competencies. The strategy team will be further divided into small working groups based on tasks in the strategic plan. Furthermore, agreed-upon working arrangements and communication protocols will be developed (e.g. a work schedule, task allocations and arrangements for communication and information sharing).

3

VISION AND MISSION STATEMENTS

From the beginning, Maldivian society has given utmost priority to education. In earlier times, education comprised mainly the home-based teaching of Dhivehi, the Arabic script and the Holy Quran. By the early years of the 20th century, the government had established two schools in Malé, and, in the mid-20th century, infrastructure had been built in the atolls. In 1980, specific subject syllabi were introduced for primary grades, which may be regarded as the first national curriculum. In 1984, a proper national curriculum was developed for the primary level (grades 1–5) and middle school (grades 6 and 7). This curriculum was revised in 2000, and a competency-based curriculum was introduced in 2015. The latter aimed to move away from content to competencies and adopted a learner-centered approach. It took five years for the new curriculum to be rolled out to all five key stages (K–12).

The new curriculum came with a clear, easily understood and seminal vision: 'Every child is prepared for life'. This vision encompasses 21st-century skills, as it aims to prepare children to live in the 21st century. The vision is further elaborated and explained below.

The national curriculum envisions the development of

- successful individuals who are **motivated to explore** and create knowledge,
- **confident and competent** individuals who have a **firm belief in Islam** and a strong sense of self and national identity as well as
- **responsible and productive** contributors to their own families, local communities and global society.

The new curriculum includes no specific, precise, and clear mission statement to guide stakeholders in achieving the vision of the curriculum. Instead of a clear mission statement, it describes important areas of focus for learning, shared values and, most importantly, the key competency outcomes that function as the main mission of the curriculum.

4

SKILLS DEFINITIONS AND FRAMEWORK

Skill may be defined as the ability to do something well (Oxford University Press, 1993). Thus, a skill is something that is teachable and accessible. The 21st-century skills—namely, critical thinking, creative thinking, collaboration and communication—are usually defined in a very broad manner that is difficult to implement in classrooms without teachers’ being rigorously trained to break them down to implementable outcomes. (Kim *et al.*, 2019)

Skills are embedded in the Maldivian national curriculum across all subjects. Skill documentation includes syllabus documents for various subjects (learning outcomes), teacher guides, a Pedagogy and Assessment Guide and, most importantly, the Key Competency Guide. Some skills are defined too broadly, and others seem too ambiguous for teachers to interpret at the classroom level (*Report of Curriculum Review of the Foundation and Key Stage 1*, Cambridge Assessment International Education, 2020). A detailed breakdown of key competencies is attached in Appendix 1.

A unique and useful element of the Learning Cycle course was learning the skill definition frameworks developed by ACER. The definitions and how they are classified into strands and aspects was a novel and important concept for all the team members to understand. On reflection, the Maldivian curriculum needs to classify the skills into identifiable indicators so that teachers can find it easy to implement with students and to strengthen the connection between demonstrated student behaviours and aspects of the skills. Currently, the curriculum comprises eight skill areas that are vital for children to learn to be prepared for a fulfilling life. These

eight skill areas are identified as eight key competencies that are the curriculum’s center of focus.

The eight key competencies depicted in Table 1 are highly related to 21st century skills, especially with critical thinking, creative thinking, collaboration, and communication. As explicated in the National Institute of Education’s Key Competency Guide (2017), these competencies represent skills that are essential for individuals to live and learn as active members of the nation and the world. They “provide the basis for lifelong learning and employability in a progressive and challenging world” (National Institute of Education, 2017, p.6). Some competencies are directly associated with critical thinking and creative thinking, while others such as ‘making meaning’ and ‘living a healthy life’ do not have a substantial association with all 21st century skills. For example, as explained in the Competency Guide (2017), skills related to ‘making meaning’ involve discovering in-depth meaning from different forms of representations and ideas. Through ‘making meaning’ students develop the ability to understand and use language, symbols, and text effectively for communicating information, experiences, feelings, and ideas (National Institute of Education, 2017, p.35). The eight key competencies are built on a combination of cognitive and practical skills, knowledge, values, attitudes, dispositions, and other social and behavioral components (Competency Guide, 2017). When the competencies are integrated into teaching, students have an active role in decision making related to their learning and life after school, which can be considered as skillsets subsumed under the general heading of 21st century competencies (Soland *et al.*, 2013).

Table 1. Key competencies and 21st-century skills

Key Competencies	21 st –Century Skills in the Key Competency
1. Practising Islam	Critical thinking, creative thinking, collaboration and communication
2. Understanding and managing self	Critical thinking, creative thinking, collaboration and communication
3. Thinking critically and creatively	Critical thinking, creative thinking, collaboration and communication
4. Relating to people	Critical thinking, creative thinking, collaboration and communication
5. Making meaning	Critical thinking, creative thinking, collaboration and communication
6. Living a healthy life	Critical thinking, creative thinking, collaboration and communication
7. Using sustainable practices	Critical thinking, creative thinking, collaboration and communication
8. Using technology and the media	Critical thinking, creative thinking, collaboration and communication

5

PRIORITISING ALIGNMENT COMPONENTS

Within the Learning Cycle course, we conducted a needs analysis to review the 10 alignment steps for 21st-century skills integration. In the Maldivian context, all 10 alignment steps are currently undergoing review. When we arrange the 10 steps according to their priorities, we believe that the first step needs to be *Auditing the existing curriculum*, as an overall audit of the whole curriculum and its learning areas is essential before conducting the rest of the steps, including identifying opportunities for the development of 21st-century skills and other teaching and assessment strategies.

Accordingly, Table 2 shows the specific steps in their order of priority. As seen in the table, some steps take place simultaneously, as some of the concepts must be conjointly implemented. In that regard, *Identifying opportunities for skills in the curriculum*, *Identifying opportunities for skills in assessment(s)*, and *Integrating and layering skills in the curriculum* need to be conducted concurrently. Similarly, we believe that *Developing assessment(s)* and *Developing teaching resources* must also take place simultaneously. As the table indicates, the final steps of the alignment are *Identifying pedagogical strategies for enhancing growth* and *Reviewing pedagogical training* (of teachers).

Table 2. Order of alignment components

Priority number	Steps	Status
1	Auditing the existing curriculum	In progress
1	Auditing existing assessment(s)	In progress
2	Reviewing existing and potential classroom activities	In progress
3	Identifying opportunities for skills in the curriculum	In progress
3	Identifying opportunities for skills in assessment(s)	In progress
3	Integrating and layering skills in the curriculum	In progress
4	Developing assessment(s)	In progress
4	Developing teaching resources	In progress
5	Identifying pedagogical strategies for enhancing growth	In progress
6	Reviewing pedagogical training	In progress

Major Challenges

When the curriculum was rolled out in the country in 2015, MoE ensured that schools were ready for the challenges posed by the introduction of the new era in education. Several professional development training sessions were carried out across the country to confirm that teachers had a sound understanding of the curriculum and were competent to deliver the curricular essentials to students. However, we believe that several obstacles, listed below, still hinder effective implementation of the curriculum:

- an unrealistic time frame for rolling out the curriculum, leading to inadequate time for review and reflection between each key stage; furthermore, policy changes necessitated reducing the classroom time from the previously planned 45 minutes
- time constraints for reviewing the curriculum while also developing teaching and resource materials required for the implementation
- beginning the processing of all 10 alignment steps at the same time (all together)
- the lack of a quality assurance mechanism
- a limited range of technical expertise in the nation
- the lack of a proper (in-service) training mechanism
- an excessive teacher/student ratio

6

SKILLS AUDIT AND MAPPING

The skills audit and mapping exercise brings together the information from individual subjects to identify which key skills are already well embedded in the learning area and which skills have been neglected to a greater or lesser extent. Based on the skills audit and mapping, actions can be taken to address the imbalance of the skills embedded in the learning outcomes.

Initial skills audit and mapping

The first part of the initial skills audit involved selecting learning areas (subjects) while the second part involved mapping the skills within the selected subject area. The skills were identified from the subject syllabi, the National Curriculum Framework, student books and teacher guides. The skills addressed in the assessment include the three 'C's (creative thinking, critical thinking and collaboration) with various strands and aspects of the skills. Although the initial skills audit does not include all the learning areas, it provides a starting point to discover how the skills are articulated in the learning outcomes.

Development process

The aim of the skills audit was to provide information to ensure the development of skills in the learning outcomes. Due to the limited time, the team decided to select two learning areas (mathematics and science) at the grade 1

level. This would provide a clear picture of skills development within the learning area and would enable mapping the skills across the learning areas. The skills audit was based on the learning outcomes described in the syllabus. The learning outcomes indicate the focus of what learners are expected to do in terms of knowledge and abilities within the given period of learning. The indicators were given to clarify the intended meaning or scope of the learning outcomes. However, for this exercise, only the learning outcomes were used.

The outcome of the skills audit is presented below, showing not only the skills covered in each learning area but also the extent of the skills embedded within the learning outcomes. Table 3 details the criteria of the skills covered in the outcome:

Table 3: Criteria of the skills covered in the outcomes

Little to no coverage	0%–25%
Some coverage	26%–50%
A great deal of coverage	51%–100%

Findings

The number of learning outcomes found in the grade 1 mathematics syllabus was 23, and the number found in science was 14.

Figure 1. Description of skill aspects of mathematics and science in grade 1

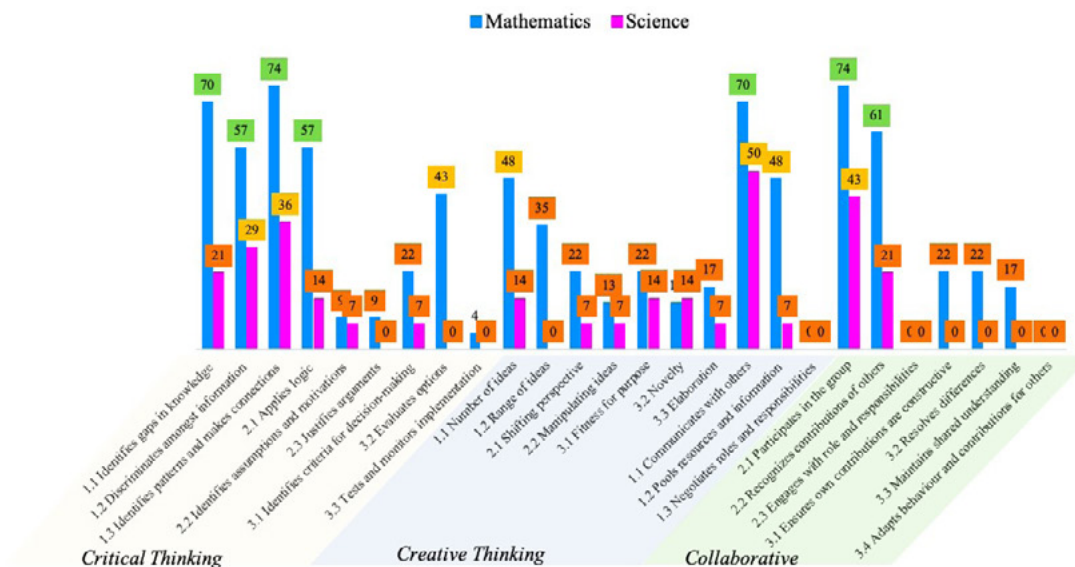


Table 4. Percentage of skill descriptions in mathematics and science

	Number of skills		Percentage	
	Mathematics	Science	Mathematics	Science
Critical thinking	23	12	100.0	52.2
Creative thinking	17	9	73.9	39.1
Collaboration	23	11	100.0	47.8

Figure 1 illustrates how the skill aspects are embedded in the math and science curricula of grade 1. It shows that, in critical thinking, the first four aspects are well embedded in mathematics while aspects such as *Identifies assumptions and motivations, justifies arguments, identifies criteria for decision-making, evaluates options and tests and monitors implementation* need to be given more emphasis in the next revision. In science, three aspects of critical thinking (*discriminates amongst information, identifies patterns and makes connections and evaluates options*) have some coverage while other aspects' coverage in the syllabus is considerably less.

For the creative thinking skill, satisfactory coverage was found in mathematics for the aspects *number of ideas, range of ideas, communicates with others and pools resources and information*. Hence, the other aspects of the creative thinking skill need to be given more weight in both the mathematics and science curricula in the next revision.

For collaboration, the aspects *Participates in the group and Recognises contributions of others* are embedded in mathematics while the other aspects of the skill need to be better covered in both the science and mathematics curricula. Overall, it is evident that the science syllabus focuses less on all aspects of the three skills than the mathematics syllabus.

Analysis

Audit of key skills and mapping

The audit and mapping provide evidence of the skills embraced by the learning outcomes. Table 1 shows that there is ample coverage of the broader skills in mathematics while creative thinking and collaborative skills are embedded to some extent in science.

The mapping identifies the strengths and weaknesses of the skill aspects in the syllabus of the learning areas. Some aspects of the skills were identified as having little or no coverage, and very few aspects are up to the level of expectations.

Conclusion of the audit

The initial skills audit and mapping of the indicators of the learning areas brings several major benefits. The first is identifying that the level of embeddedness varies across the learning areas. It also provides an overview of the skills within the learning areas by identifying deficiencies, excesses and expectations within the learning areas of the syllabus regarding the broader skills and skill aspects. The skills audit and mapping encourage an increase in the skill aspects of the broader skills.

8

STRATEGIC ACTIONS

The embedding of skills in the curriculum and the layering of skills across all key learning areas was of utmost importance throughout the Learning Cycle and supports an ongoing curriculum reform process. In this regard, the new national curriculum has made it mandatory to integrate key competencies that embed 21st-century skills across the key learning areas at all the key stages. The national curriculum further advocates the integration of key competencies into all school activities, such as extracurricular activities and related programs conducted in schools.

The KIX EAP/ACER Integration of 21st-Century Skills into the Curriculum Learning Cycle has made us recognise the urgent need to delineate the key competencies and include clear aspects to ensure a common understanding of them among all the stakeholders.

The strategic actions, comprising six components, are outlined below with the intention of strengthening skills in the curriculum, in teaching and learning and in assessment and reporting.

Planning

The core team needs to be revised to integrate the skills effectively into the curriculum and to undertake necessary activities that follow from that. The initial step is to reformulate the core team to include a steering committee to oversee developments and formulate working groups for various alignment steps so that the work can be carried out simultaneously.

Review and refinement

There is an urgent need to revisit the existing skill framework, which is the key competency guide, to include a common definition of each of the competencies to ensure more clarity, consistency and uniformity.

Audit and mapping

A large-scale audit and mapping must be conducted across the curriculum at all the key stages to provide an overall picture of strengths and weaknesses in terms of the skills embedded. This information needs to be shared with the stakeholders, and the training provided to in-service teachers needs to be upgraded in alignment with this information.

Development

The curriculum development process needs to be carried out with the intention of embedding the skills more explicitly in the learning outcomes, assessment strategies and teaching/learning resources for better implementation and monitoring. Similarly, the training modules for in-service teachers need to be modified accordingly to facilitate teachers' understanding of how to integrate the skills into lesson planning, teaching, and learning and assessment.

Application and advocacy

The existing policies on teaching and learning as well as those on assessment and reporting need to be refined to emphasise the skills advocated in the national curriculum. The refined changes to policies need to be disseminated among stakeholders, and advocacy campaigns must be carried out for widespread dissemination of the information to the public.

Capacity building

A series of training programs needs to be conducted, focusing on the integration of skills in teaching and learning as well as assessment and reporting for all the stakeholders, including heads of schools, teacher trainers, supervisors, leading teachers, and teachers.

9

LESSONS LEARNED

Having completed the Learning Cycle, the team has gained insights and learned lessons (both individually and collectively) about the skills agenda and the process, which will help us going forward. Some of the lessons learned are described below:

1. It is not unique to the Maldives that the skills and competencies are not fully conceptualised, defined and broken down into observable, measurable attributes. Detailing the skills is important so that all stakeholders may understand them in the same manner, especially students, parents, and teachers. The sub-strands within the skills of critical thinking, creative thinking and collaboration were a new experience for the team that enabled it to understand the importance of classifying the competencies in the national curriculum. This needs to be done by revising the competency guides and teacher guides as we continue the revision of textbooks and syllabi.

We also learned that the Maldives curriculum is aligned with international standards. The curriculum skills audit and mapping were a new experience for the team, and we recognise the audit's usefulness going forward.

2. For these skills to be taught by teachers, the teachers themselves need to be equipped with the skills. Hence, teacher training also needs to be competency based, and teacher training curricula and practices need to change. Teachers also need continual professional development to upgrade their knowledge and pedagogical skills in teaching competencies. We also realised that pre-service teacher training needs to be as highly valued as in-service training. Moreover, school management needs to keep abreast of current approaches to teaching and learning skills and competencies.
3. The standardisation of teacher training programs is important. For these programs to be accredited, they must include a good balance of content and competencies, and all teacher training programs must be evaluated for effectiveness and impact.
4. For the effective implementation of the skills through curricula, parents need to be sensitised as well. For

instance, when a child questions the status quo, inquiries about a decision made by a parent or tries to communicate openly, these skills must be recognised as important acquisitions for children. Oftentimes, however, these behavioural attributes are discouraged at home on the erroneous assumption that children are being 'rude', 'disrespectful' etc. Hence, schools need to continually have discussions and engagement with parents on skills development and seek their support to promote skills development at home and in schools.

5. The connection between curricula, pedagogy and assessment became very clear during this Learning Cycle. The alignment needs to be strengthened. Education needs to be assessed for (1) what is taught (2) what is learned and (3) how well students learn what they are supposed to learn. This is more challenging for competencies than for content.
6. Equal focus needs to be given to curricula, pedagogy and the assessment of content and competencies.
7. The learning outcomes in the Maldives national curriculum need to be simplified and made clearer, particularly in relation to explicit 21st-century skills.

Conclusions

The Maldives curriculum has key 21st-century skills embedded in it. However, the skills need more conceptual clarity and specificity. The measurement of competencies needs to be further strengthened, and pedagogy needs to be aligned with the curriculum and assessment. To do this, a thorough mapping and skills audit is required to inform the reform plan and actions. The reform plan will be developed and implemented by a core team that has the proper mandate and expertise to direct and manage the process. The core team will also include the authors of this report, who will play a catalytic role in the reform process. The knowledge gained from this Learning Cycle and the lessons learned from this training will be used as the reform action plan is developed and implemented.

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APPENDICES

APPENDIX 1. BREAKDOWN OF KEY COMPETENCIES INTO OBSERVABLE, ASSESSABLE OUTCOMES IN THE KEY COMPETENCY GUIDE

Competency	Aspects
Practicing Islam	<ul style="list-style-type: none"> ● Think about the advantages and benefits gained while reading the chapters and verses of the Noble Quran and while pondering their meaning. ● Think about the knowledge and meaning revealed in the Noble Quran. ● Learn some sayings of the Prophet (pbuh) along with their meanings and apply them in real life. ● Understand the pillars supporting the building of one's faith. ● Learn to appropriately resolve issues arising in life ● Apply Islamic precepts and develop the ability to order one's life to live according to Islamic ideals and values. ● Recognise lessons from the Seerah of the Prophet (pbuh) and from Islamic history and civilisation. ● Learn to appreciate the beauty manifest in Allah's creation and consequently realise and demonstrate mercy, kindness and tolerance towards all creation.
Using technology and the media	<ul style="list-style-type: none"> ● Become familiar with commonly used technologies and understand visual and technological means of communication. ● Critically analyse messages presented through diverse forms of media for accuracy and coverage. ● Evaluate collected information to determine its accuracy, authority, validity, objectivity and coverage. ● Use appropriate tools and technological resources to complete tasks and solve problems. ● Communicate with others using appropriate technology (e.g. chat, instant messaging, blogs). ● Demonstrate ergonomically safe use of equipment. ● Value the intellectual property associated with technologies and demonstrate ethical principles.
Living a healthy life	<ul style="list-style-type: none"> ● Experiment with ideas. ● Take risks and face challenges. ● Generate questions. ● Make assumptions and judgements. ● Make decisions and solve problems. ● Seek opportunities from mistakes and failures. ● Monitor and evaluate one's progress. ● Analyse multiple perspectives. ● Understand relationships and patterns.
Relating to people	<ul style="list-style-type: none"> ● Work collaboratively. ● Communicate effectively with a diverse range of people. ● Listen actively, take turns and share ideas. ● Respect differing points of view. ● Be aware of how one's actions affect others. ● Adapt one's behaviour and language to suit various people and situations. ● Negotiate and resolve conflict. ● Be fair. ● Give feedback and respond to feedback from others.

Thinking critically and creatively	<ul style="list-style-type: none"> ● Experiment with ideas. ● Take risks and face challenges. ● Generate questions. ● Make assumptions and judgements. ● Make decisions and solve problems. ● Seek opportunities from mistakes and failures. ● Monitor and evaluate one's progress. ● Analyse multiple perspectives. ● Understand relationships and patterns.
Understanding and managing self	<ul style="list-style-type: none"> ● Understand oneself. ● Maintain a positive self-image. ● Manage one's behaviour in a range of situations. ● Set goals and review them. ● Organise and plan how to go about a task. ● Locate information from a range of sources. ● Manage time. ● Take responsibility for one's learning. ● Ask for help.
Making meaning	<ul style="list-style-type: none"> ● Communicate with diverse audiences. ● Organise information and ideas in order of priority. ● Use a variety of skills to access information and ideas from a variety of sources. ● Justify one's interpretation of ideas, information and events. ● Analyse and explain how features of text types are arranged to construct and communicate meaning in various contexts. ● Explore points of view and opinions presented in diverse information sources. ● Interpret communication in various forms and to diverse audiences. ● Demonstrate critical listening and observation skills and strategies.
Using sustainable practices	<ul style="list-style-type: none"> ● Understand the importance of taking personal responsibility. ● Make decisions that reflect social responsibility. ● Value the importance of natural and cultural diversity to the wellbeing of the community. ● Value and respect the participation of people in the development of the community. ● Appreciate the interconnectedness of people and nature. ● Recognise that our actions may have implications for current and future generations. ● Accept and use criticisms as ingredients for developing one's potential. ● Analyse one's individual consumption of resources and identify ways to reduce, reuse and recycle.

APPENDIX 2. KEY STAGE 1—GRADE 1 MATHEMATICS

Strands	Sub-branches	Topic	Learning Outcomes	Skills and Aspects		
				Critical Thinking	Creative Thinking	Collaboration
Numbers and algebra (NA)	Number concept (N)	Number sense and place value	Outcome NANI01 Connect number names, numerals and quantities up to 100 in English and Dhivehi and write numbers up to 100.	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.2 Discriminates amongst information 1.3 Identifies patterns and makes connections 2. Evaluating reasoning 2.1 Applies logic 2.2 Identifies assumptions and motivations 2.3 Justifies arguments 3. Decision-making 3.1 Identifies criteria for decision-making 3.2 Evaluates options 3.3 Tests and monitors implementation		2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others
			Outcome NANI02 Recognise the value of zero and the place value of numbers up to 100.	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.3 Identifies patterns and makes connections	1. Generation of ideas 1.1 Number of ideas 1.2 Range of ideas	1. Building shared understanding 1.1 Communicates with others 1.2 Pools resources and information 2. Collectively contributing 2.1 Participates in the group
			Outcome NANI03 Use ordinal numbers up to 10th.	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.3 Identifies patterns and makes connections		1. Building shared understanding 1.1 Communicates with others 1.2 Pools resources and information
		Patterns and sequences	Outcome NANI05 Recognise, copy, continue and create simple patterns using sounds, actions, colours, objects, numbers and pictures and explain the sorting rule (two or three elements).	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.2 Discriminates amongst information 1.3 Identifies patterns and makes connections 2. Evaluating reasoning 2.1 Applies logic 3. Decision-making 3.1 Identifies criteria for decision-making	2. Experimentation 2.1 Shifting perspective 2.2 Manipulating ideas 3. Quality of ideas 3.2 Novelty	2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others
			Outcome NANI06 Explore, identify and describe number patterns formed by skip counting (2s and 10s).	1. Knowledge construction 1.2 Discriminates amongst information 1.3 Identifies patterns and makes connections 2. Evaluating reasoning 2.1 Applies logic		1. Building shared understanding 1.1 Communicates with others 1.2 Pools resources and information

Strands	Sub-strands	Topic	Learning Outcomes	Skills and Aspects		
				Critical Thinking	Creative Thinking	Collaboration
Numbers and algebra (NA)	Addition and subtraction (N2)	Understanding addition and subtraction	Outcome NAA107 Explore and explain the connection between addition and subtraction using strategies such as combining two or more groups, taking group/s of things away from another, partitioning numbers and identifying the missing element in an addition problem.	1. Knowledge construction 1.2 Discriminates amongst information 1.3 Identifies patterns and makes connections 2. Evaluating reasoning 2.1 Applies logic	2. Evaluating reasoning 2.1 Applies logic 2.3 Justifies arguments	1. Building shared understanding 1.1 Communicates with others 1.2 Pools resources and information
			Outcome NAA108 Solve simple problems involving the addition and subtraction of whole numbers up to 100 using a variety of concrete materials, drawings and strategies (counting on, partitioning, rearranging parts), develop mental strategies and use estimation in addition and subtraction.	1. Knowledge construction 1.2 Discriminates amongst information 1.3 Identifies patterns and makes connections	2. Experimentation 2.2 Manipulating ideas 3. Quality of ideas 3.3 Elaboration	1. Building shared understanding 1.1 Communicates with others 1.2 Pools resources and information
		Money	Outcome NAMI09 Identify and order notes of different denominations up to MVR 100 and carry out simple transactions involving money up to MVR 100 and explain the process.	1. Knowledge construction 1.2 Discriminates amongst information 1.3 Identifies patterns and makes connections 2. Evaluating reasoning 2.1 Applies logic		2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others
	Understanding multiplication and division (M)	Understanding multiplication and division	Outcome NAMI10 Make equal groups of objects and describe them using 'number of groups', 'number in each group' and 'groups of'.	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.3 Identifies patterns and makes connections		1. Building shared understanding 1.1 Communicates with others 1.2 Pools resources and information
	Fractions, decimals and percentages (F)	Fractions	Outcome NAF11 Read, represent, write and model halves and quarters.	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.2 Discriminates amongst information 1.3 Identifies patterns and makes connections 2. Evaluating reasoning 2.1 Applies logic 3. Decision-making 3.2 Evaluates options	1. Generation of ideas 1.1 Number of ideas 2. Experimentation 2.1 Shifting perspective 3. Quality of ideas 3.1 Fitness for purpose	1. Building shared understanding 1.1 Communicates with others 2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others 3. Regulating 3.2 Resolves differences 3.3 Maintains shared understanding

Strands	Sub-strands	Topic	Learning Outcomes	Skills and Aspects		
				Critical Thinking	Creative Thinking	Collaboration
Measurement and geometry (MG)	Length, mass and capacity (L)	Length, mass and capacity	Outcome MGL112 Demonstrate an understanding of length, mass and capacity by comparing two or more objects using arbitrary units and using related vocabulary in the process.	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.2 Discriminates amongst information 1.3 Identifies patterns and makes connections	1. Generation of ideas 1.1 Number of ideas 2. Experimentation 2.1 Shifting perspective 3. Quality of ideas 3.1 Fitness for purpose	1. Building shared understanding 1.1 Communicates with others 1.2 Pools resources and information 2. Collectively contributing 2.1 Participates in the group 3. Regulating 3.1 Ensures that personal contributions are constructive
			Outcome MGL113 Use estimation in measuring length, mass and capacity.	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.2 Discriminates amongst information 1.3 Identifies patterns and makes connections 2. Evaluating reasoning 2.1 Applies logic 3. Decision-making 3.1 Identifies criteria for decision-making	2. Experimentation 2.2 Manipulating ideas 3. Quality of ideas 3.2 Novelty	2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others
	Time (T)	Time	Outcome MGT114 Use vocabulary related to time; read and tell time to the hour and half hour; describe duration using months, weeks, days and hours.	1. Knowledge construction 1.1 Identifies gaps in knowledge 2. Evaluating reasoning 2.1 Applies logic 3. Decision-making 3.2 Evaluates options	1. Generation of ideas 1.1 Number of ideas 1.2 Range of ideas 2. Experimentation 2.1 Shifting perspective 3. Quality of ideas 3.3 Elaboration	1. Building shared understanding 1.1 Communicates with others 1.2 Pools resources and information 2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others 3. Regulating 3.1 Ensures that personal contributions are constructive
			Outcome MGS115 Identify, compare, sort and describe shapes of diverse objects from the environment; recognise, name, sort, draw and model basic 2D shapes (circle, triangle, rectangle and square) and describe them using their properties.	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.2 Discriminates amongst information 1.3 Identifies patterns and makes connections	1. Generation of ideas 1.1 Number of ideas 1.2 Range of ideas 2. Experimentation 2.1 Shifting perspective 3. Quality of ideas 3.3 Elaboration	1. Building shared understanding 1.1 Communicates with others 2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others 3. Regulating 3.2 Resolves differences 3.3 Maintains shared understanding
	Shapes (S)	Shapes				

Strands	Sub-strands	Topic	Learning Outcomes	Skills and Aspects		
				Critical Thinking	Creative Thinking	Collaboration
Measurement and geometry (MG)	Positions and directions (P)	Positions and directions	Outcome MGP116 Describe clockwise and anticlockwise direction and positions and directions using everyday language.	1. Knowledge construction 1.1 Identifies gaps in knowledge 2. Evaluating reasoning 2.1 Applies logic 3. Decision-making 3.2 Evaluates options	1. Generation of ideas 1.1 Number of ideas 1.2 Range of ideas 2. Experimentation 2.1 Shifting perspective 3. Quality of ideas 3.3 Elaboration	1. Building shared understanding 1.1 Communicates with others 1.2 Pools resources and information 2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others 3. Regulating 3.1 Ensures that personal contributions are constructive
			Outcome MGP117 Give simple directions, follow short paths and build simple paths.	1. Knowledge construction 1.1 Identifies gaps in knowledge 2. Evaluating reasoning 2.1 Applies logic 3. Decision-making 3.2 Evaluates options	2. Experimentation 2.2 Manipulating ideas 3. Quality of ideas 3.2 Novelty	2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others
		Angles	Outcome MGA118 Recognise and discuss movements and demonstrate turns; turn about a point, lines, whole turns and half turns.	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.3 Identifies patterns and makes connections 2. Evaluating reasoning 2.2 Identifies assumptions and motivations	1. Generation of ideas 1.1 Number of ideas 1.2 Range of ideas 3. Quality of ideas 3.1 Fitness for purpose 3.3 Elaboration	1. Building shared understanding 1.1 Communicates with others 2. Collectively contributing 2.1 Participates in the group
Chance and handling data (CD)	Handling data (H)	Handling data	Outcome CDH119 Collect and sort data according to the attributes of various objects.	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.2 Discriminates amongst information 1.3 Identifies patterns and makes connections 2. Evaluating reasoning 2.1 Applies logic 3. Decision-making 3.2 Evaluates options	1. Generation of ideas 1.1 Number of ideas 1.2 Range of ideas 2. Experimentation 2.1 Shifting perspective 3. Quality of ideas 3.1 Fitness for purpose	1. Building shared understanding 1.1 Communicates with others 2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others 3. Regulating 3.2 Resolves differences 3.3 Maintains shared understanding
			Outcome CDH120 Display data in table form and interpret the information presented.	3. Decision-making 3.2 Evaluates options	1. Generation of ideas 1.1 Number of ideas 1.2 Range of ideas 3. Quality of ideas 3.1 Fitness for purpose	1. Building shared understanding 1.1 Communicates with others 1.2 Pools resources and information 2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others 3. Regulating 3.1 Ensures that personal contributions are constructive

Strands	Sub-strands	Topic	Learning Outcomes	Skills and Aspects		
				Critical Thinking	Creative Thinking	Collaboration
Mathematical process skills (MPS)	Mathematical processes		MPS1 Reasoning, communication and connection MPS 2 Problem solving and application	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.2 Discriminates amongst information 1.3 Identifies patterns and makes connections 2. Evaluating reasoning 2.1 Applies logic 3. Decision-making 3.1 Identifies criteria for decision-making 3.2 Evaluates options	2. Experimentation 2.2 Manipulating ideas 3. Quality of ideas 3.2 Novelty	2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others
			2. Evaluating reasoning 2.3 Justifies arguments 3. Decision-making 3.1 Identifies criteria for decision-making 3.2 Evaluates options	1. Generation of ideas 1.1 Number of ideas 1.2 Range of ideas 3. Quality of ideas 3.1 Fitness for purpose	1. Building shared understanding 1.1 Communicates with others 1.2 Pools resources and information 2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others 3. Regulating 3.1 Ensures that personal contributions are constructive 3.2 Resolves differences	
Mathematical process skills (MPS)	Mathematical processes		MPS 3 Mathematical thinking skills	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.2 Discriminates amongst information 1.3 Identifies patterns and makes connections 2. Evaluating reasoning 2.1 Applies logic 3. Decision-making 3.2 Evaluates options	1. Generation of ideas 1.1 Number of ideas 1.2 Range of ideas 2. Experimentation 2.1 Shifting perspective 3. Quality of ideas 3.1 Fitness for purpose	1. Building shared understanding 1.1 Communicates with others 2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others 3. Regulating 3.2 Resolves differences 3.3 Maintains shared understanding

APPENDIX 3. KEY STAGE 1—GRADE 1 SCIENCE

Strands	Sub-branches	Learning Outcomes	Skills and Aspects		
			Critical Thinking	Creative Thinking	Collaboration
Life and living	Structure and function	Outcome LL101 Observe the variety of living things to identify body shape and size and discuss the importance of the diversity of living things.	1. Knowledge construction 1.1 Identifies gaps in knowledge		1. Building shared understanding 1.1 Communicates with others Collectively contributing 2.1 Participates in the group
		Outcome LL102 Observe the variety of living things and their external features and identify the use of the main external features.	1.2 Discriminates among information	3 Quality of ideas 3.1 Fitness for purpose	1. Building shared understanding 1.1 Communicates with others Collectively contributing 2.1 Participates in the group
	Interactions	Outcome LL103 Identify that living things live in diverse places to meet their basic needs.	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.2 Discriminates among information		1. Building shared understanding 1.2 Pools resources and information
Matter and materials	Materials and their properties	Outcome MM101 Identify that objects are made of particular materials.	1. Knowledge construction 1.2 Discriminates among information	3 Quality of ideas 3.3 Elaboration	1. Building shared understanding 1.1 Communicates with others 2. Collectively contributing 2.1 Participates in the group
		Outcome MM102 Identify that materials have specific properties.	1. Knowledge construction 1.2 Discriminates among information	3. Quality of ideas 3.2 Novelty	
Energy change	Force and motion	Outcome EC101 Identify that pushing and pulling can cause some objects to move.	1. Knowledge construction 3.1 Identifies patterns and makes connections		
Earth and beyond	Physical features of the Earth	Outcome EB101 Observe the patterns that occur in the sky and on land.	1. Knowledge construction 1.3 Identifies patterns and makes connections	1 Generation of ideas 1.1 Number of ideas	

Strands	Sub-strands	Learning Outcomes	Skills and Aspects		
			Critical Thinking	Creative Thinking	Collaboration
Scientific inquiry skills	Formulating questions and making predictions	Outcome SIS101 Ask and respond to questions about familiar objects and events.			1. Building shared understanding 1.1 Communicates with others
	Planning and conducting investigations	Outcome SIS102 Participate in guided investigations.	1. Knowledge construction 1.1 Identifies gaps in knowledge 1.3 Identifies patterns and makes connections 2. Evaluating reasoning 2.1 Applies logic 2.2 Identifies assumptions and motivations.		1. Building shared understanding 1.1 Communicates with others 2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others
	Recording and interpreting data and information	Outcome SIS103 Use nonstandard measurements to collect data and make simple statements/generalisations based on the information.	2. Evaluating reasoning 2.1 Applies logic		
	Evaluating and communicating	Outcome SSIS104 Talk about observations and share ideas in a variety of ways.	1 Knowledge construction 1.3 Identifies patterns and makes connections		1. Building shared understanding 1.1 Communicates with others 2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others
Science and technology	Science as a human endeavour	Outcome ST101 Recognise that science involves being curious, making observations and asking questions about familiar objects and events.	1 Knowledge construction 1.3 Identifies patterns and makes connections		
		Outcome ST102 Recognise that scientific inventions are used in our daily lives.	1. Knowledge construction 1.3 Identifies patterns and makes connections		
	Design and making	Outcome ST103 Discuss ideas and use a range of objects and materials to make a product.		1. Generation of ideas 1.1 Number of ideas 2. Experimentation 2.1 Shifting perspective 2.2 Manipulating ideas 3. Quality of ideas 3.1 Fitness for purpose 3.2 Novelty	1. Building shared understanding 1.1 Communicates with others 2. Collectively contributing 2.1 Participates in the group 2.2 Recognises contributions of others

APPENDIX 4. DESCRIPTION OF SKILL ASPECTS OF MATHEMATICS AND SCIENCE IN PERCENTAGES

NUMBER OF OUTCOMES: MATHEMATICS, 23; SCIENCE, 14

Skill	Strand	Aspect	Number of Skill Aspects		Percentage	
			Mathematics	Science	Mathematics	Science
Critical thinking	1. Knowledge construction	1.1 Identifies gaps in knowledge	16	3	70	21
		1.2 Discriminates amongst information	13	4	57	29
		1.3 Identifies patterns and makes connections	17	5	74	36
	2. Evaluating reasoning	2.1 Applies logic	13	2	57	14
		2.2 Identifies assumptions and motivations	2	1	9	7
		2.3 Justifies arguments	2	0	9	0
	3. Decision-making	3.1 Identifies criteria for decision-making	5	1	22	7
		3.2 Evaluates options	10	0	43	0
		3.3 Tests and monitors implementation	1	0	4	0
Creative thinking	1. Generation of ideas	1.1 Number of ideas	11	2	48	14
		1.2 Range of ideas	8	0	35	0
	2. Experimentation	2.1 Shifting perspective	5	1	22	7
		2.2 Manipulating ideas	3	1	13	7
	3. Quality of ideas	3.1 Fitness for purpose	5	2	22	14
		3.2 Novelty	3	2	13	14
		3.3 Elaboration	4	1	17	7
Collaboration	1. Building shared understanding	1.1 Communicates with others	16	7	70	50
		1.2 Pools resources and information	11	1	48	7
		1.3 Negotiates roles and responsibilities	0	0	0	0
	2. Collectively contributing	2.1 Participates in the group	17	6	74	43
		2.2 Recognises contributions of others	14	3	61	21
		2.3 Engages with role and responsibilities	0	0	0	0
	3. Regulating	3.1 Ensures that personal contributions are constructive	5	0	22	0
		3.2 Resolves differences	5	0	22	0
		3.3 Maintains shared understanding	4	0	17	0
		3.4 Adapts behaviour and contributions for others	0	0	0	0

KEY

Little to no coverage	0–25
Some coverage	26–50
A great deal of coverage	51–100

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