Mathematics

in the

National Curriculum

Key Stage 2 (GRADES 4, 5 & 6)

Learning Numeracy
for a Better Future
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Introduction

Rationale
As we embark on to the information technology era, we require individuals, who are able to think critically about complex issues, analyze and adapt to new situations, solve problems of various kinds, and communicate their thinking and ideas effectively. The study of mathematics equips students with knowledge, skills and values that are essential for successful and rewarding participation in an information technology-based society.

Learning mathematics results in more than a mastery of basic skills. It equips students with a concise and powerful means of communication. Mathematical structures, operations, processes, and language provide students with a framework and tools for reasoning, justifying conclusions, and expressing ideas clearly. To learn mathematics in an effective way, students need classroom experiences that help them develop mathematical understanding; learn important facts, skills, and procedures; develop the ability to apply the processes of mathematics; and acquire a positive attitude towards mathematics.

Through mathematical activities that are practical and relevant to their lives, students develop mathematical understanding and problem-solving skills, that they can apply in their daily lives and, eventually, in the workplace.

Mathematics is a powerful learning tool which helps the students to develop the ability to use mathematics to extend and apply their knowledge in other curriculum areas, including sciences, arts and languages.

Overview
Mathematics is one of the main Key Learning Areas identified in the National Curriculum Framework. Knowledge, skills, values and attitudes taught through this subject would be a tool for the pupils to function and excel in all aspects of life. It also helps to think logically, be creative, solve problems and appreciate the aesthetics of Allah (SWT)'s creation. Mathematics is divided into many branches such as arithmetic, geometry, algebra, and trigonometry.

Primary
At this level students learn basic mathematical knowledge, skills and understanding. These include basic understanding of the number system, computational skills, and the ability to solve simple problems related to their day to day life. Emphasis is also given to practical understanding of the ways in which information is gathered and presented.
**Lower Secondary**
At this level students learn basic mathematical principles and its application for problem solving. Use mathematics as a mode of communication, with special attention on the use of clarity of expressing concepts, in acquiring a base that will assist students in their further study of mathematics and in other fields. Students’ confidence is developed by helping them to feel for numbers, patterns and relationships, and places a strong emphasis on solving problems and presenting and interpreting results. Students also learn how to communicate and reason using mathematical concepts.

**Higher Secondary**
At this level, students construct rigorous mathematical arguments and proofs through the use of precise statements, logical deduction and inference and by the manipulation of mathematical expressions, including the construction of extended arguments for handling substantial problems and hence acquiring a base that will assist students in their further study of mathematics and in other fields.

**Mathematics in the National Curriculum**
Along with the other subjects in the National Curriculum, mathematics curriculum contributes to the development of the student in all aspects. It aims to achieve the vision of the National Curriculum along with the eight principles identified, incorporating the key competencies and also relates to the effective pedagogical approaches emphasized in the National Curriculum.

**The Vision**
The Mathematics curriculum is structured in such a way that it paves the road to achieve the vision of the National Curriculum.

The National Curriculum envisions the development of:

- successful individuals who are motivated to learn and explore; who are inquisitive and eager to seek, use and create knowledge.
- confident and competent individuals who have a firm belief in Islam, a strong sense of self and cultural identity, and believe in their own capabilities; and
- responsible and productive contributors to their own family, their local community and the global society.

The main goals of mathematics education are to prepare students to

- use mathematics confidently to solve problems
- communicate and reason mathematically
- appreciate and value mathematics
- make connections between mathematics and its applications
- commit themselves to lifelong learning
- become mathematically literate adults, using mathematics to contribute to society

Mathematics learning experiences assist students to develop and understand mathematical concepts along with process skills and the pedagogical approaches, emphasize students to participate in practical hands-on experiences, to explore and find ways to solve real-life problems using mathematical knowledge and skills. During this process of solving problems, the students are required to pose questions, predict and find answers for themselves and develop themselves as successful learners who are eager to learn and explore more.

Mathematics provides ample opportunities for students to develop their critical thinking skill along with values that would build their self-confidence and self-esteem. Students will be given opportunities to relate learning beyond their classroom, such as working on authentic tasks. Engagement and involvement in these ensures that student acquire the knowledge, skills and values to be competent citizens in the society.

A blend of the above mentioned experiences ensure that students are fully equipped to as active participants in the ever changing world.

**The Principles**
The National Curriculum identifies eight fundamental principles that need to be taken into account when designing and implementing learning and other school activities. Mathematics curriculum is also designed to take into account these principles.

The teaching and learning of Mathematics highly emphasizes linking Mathematics and Islam. Essentially, mathematics provides the understanding of Allah’s creation and accepting the natural beauty of such creations through the study of inquiry, based on experiments and investigations. Facts, figures and theories contribute to the understanding of various mathematical concepts. Linking these to Islam strengthens the Islamic faith in students.

**The Principles underlying mathematics curriculum**
Mathematics curriculum recognizes that all students do not necessarily learn mathematics in the same way, using the same resources, and within the same time frames. It aims to challenge all students by including expectations that require them to use higher-order thinking skills and to make connections between related mathematical concepts and between mathematics, other disciplines, and the real world.
It is based on the belief that students learn mathematics most effectively when they are given opportunities to investigate ideas and concepts through problem solving, and are then guided carefully into an understanding of the mathematical principles involved. The acquisition of operational skills remains an important focus of the curriculum.

**Process Skills**

Attention to the processes that support effective learning of mathematics is also considered to be essential to a well organised mathematics program. Seven mathematical processes are identified: problem solving, reasoning and proving, reflecting, selecting tools and computational strategies, connecting, representing, and communicating. The mathematical processes can be seen as the processes through which students acquire and apply mathematical knowledge and skills. These processes are interconnected. Problem solving and communication in Mathematics have strong links to all the other processes. A problem-solving approach encourages students to reason their way to a solution or a new understanding. As students engage in reasoning, teachers further encourage them to make conjectures and justify solutions, orally and in writing. The communication and reflection that occur during and after the process of problem solving help students not only to articulate and refine their thinking, but also to see the problem they are solving from different perspectives. This opens the door to recognize the range of strategies that can be used to arrive at a solution. By seeing how others solve a problem, students can begin to reflect on their own thinking (a process known as “metacognition”) and the thinking of others, and to consciously adjust their own strategies in order to make their solutions as efficient and accurate as possible.

The mathematical processes cannot be separated from the knowledge and skills that students acquire throughout the year. Students must solve problem, communicate, reason, reflect, and so on, as they develop the knowledge, the understanding of concepts, and the skills required in all the strands in every grade.

The development of mathematical knowledge is a gradual process. A continuous, cohesive program throughout the grades is necessary to help students develop an understanding of the “big ideas” of mathematics – that is, the interrelated concepts that form a framework for learning mathematics in a coherent way. Similarly, in-depth understanding of Mathematical knowledge, concepts and skills ensure that students develop holistically, and relating these concepts and processes to their real life, ensuring relevance to students and preparing them for life and to reach for personal excellence.
The Key Competencies
The eight key competencies outlined 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 mathematics curriculum provides a rich context in which these key competencies can be developed. The strands in the syllabus involve a lot of opportunities for students to explore mathematical knowledge, ask questions, use higher 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 a high level of cognition.

The key competency, thinking critically and creatively is very much part and parcel of the mathematics curriculum which encompasses many of the aspects highlighted. Students are expected to be adaptable to change and be equipped with thinking and creative abilities to face the challenges of the future. These include a wide range of cognitive skills and intellectual dispositions such as using a wide range of techniques to create ideas, working creatively with others, reasoning effectively, solving problems, and making judgments and decisions.

In addition, students are given many opportunities to be creative and think critically; use broad in-depth analysis of evidence to make decisions and communicate their beliefs clearly and accurately. They also use skills such as comparing, classifying, reasoning, hypothesizing, analyzing, and synthesizing which help them gain confidence in their ability to learn and make judgments. These individuals are innovative, flexible and apply what they learn to new or different situations and solve problems in innovative ways.

At the same time, the mathematics curriculum provides many opportunities for students to understand and manage self by developing motivation and goal setting skills. They acquire the ability to plan, implement plans and evaluate one’s performances which are aspects of self-management and are essential in developing an enterprising attitude in students.

In addition, students get the opportunity to identify what is important to them and direct their attention and efforts towards those things, by setting personal goals. They also develop an eagerness to pursue personal excellence in all aspects of life.

Moreover, students are required to use language, symbols and text which is one of the most fundamental competencies individuals need to acquire in order to be active and contributing members of a society. In addition, students are required to explore and interpret symbolic representations as well as visual texts to make meaning in various contexts. Hence, there would be many opportunities to develop the key competency of making meaning.
How is Mathematics structured

In Mathematics students learn the process of enquiry, discovery and verification and to apply mathematical ideas, rules and procedures to particular situations and problems.

In this learning area, learning is structured and organized under FIVE MAIN STRANDS throughout all the key stages. They are namely, numbers, measurements, spatial sense & geometry, and chance and data.

From key stages 3 (lower secondary) onwards, an in-depth study of those strands and sub strands will be discussed with the students. In key stage 5 (higher secondary) students can choose a specific area of mathematics under 3 different branches, namely pure mathematics, statistics and mechanics.

*Strand 1: Numbers:* Students learn number concepts, four basic operations involving fractions, decimals, percentages, negative numbers and rate & ratio. Students will explore, estimate and manipulate numbers to carry out day to day activities.

*Strand 2: Measurement:* In this strand, students would learn mensuration, time and speed. This strand would equip the students to estimate, measure and calculate perimeter, area or volume of various things accurately.

*Strand 3: Shape and space:* Under this strand, students would master in 3D & 2D shapes, position and angles.

Geometry and trigonometry come under this strand. Students would be able to visualize spatial aspects of things and perceive them better.

*Strand 4: Chance and Data:* Students learn about handling data and probability under this strand. Statistics is a topic that comes under handling data. Students would be able to represent and interpret different data collected in a more meaningful manner.

*Strand 5: Patterning and Algebra:* Under patterning and algebra students would learn sequences, number properties, algebra and problem solving & puzzles. Students’ confidence is built by helping them to develop a feel for numbers, their properties, and the relationships. Algebra is one of the very important topics that students learn in their entire schooling, which broadens their thinking skills.

**Outcomes**

*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 behaviour that students may display as they work towards the achievement of the syllabus outcomes. Indicators reflect and describe aspects of knowledge, understanding, skills and values.

An indicator may describe part or all aspects of an outcome. Outcomes and indicators together assist teachers in identifying student’s current achievement and in planning future learning experiences.

**Planning, Teaching and Assessing Mathematics**

**The Planning Stage**

When planning a program in mathematics, teachers must take into account considerations in a number of important areas.

The following are some key features to consider in planning mathematics education:

**Teaching Approaches**

Students in a mathematics class typically demonstrate diversity in the ways they learn best.

It is important, therefore, that students have opportunities to learn in a variety of ways – individually, cooperatively, independently, with teacher’s direction, through hands-on experience, and through examples followed by practice. In addition, mathematics requires students to learn concepts and procedures, acquire skills, learn and apply mathematical processes.

These different areas of learning may involve different teaching and learning strategies. It is assumed, therefore, that the strategies teachers employ will vary according to both the object of the learning and the needs of the students.

In order to learn mathematics and to apply their knowledge effectively, students must develop a solid understanding of mathematical concepts. Research and successful classroom practice have shown that an investigative approach, with an emphasis on learning through problem solving and reasoning, best enables students to develop the conceptual foundation they need.

When planning mathematics programs, teachers will provide activities and assignments that encourage students to search for patterns and relationships and engage in logical inquiry.

Teachers need to use rich problems and present situations that provide a variety of opportunities for students to develop mathematical understanding through problem solving.

All learning, especially new learning should be embedded in well-chosen contexts for learning – that is, contexts that are broad enough to allow students to investigate initial understandings, identify and develop relevant supporting skills, and gain experience with varied and interesting applications of the new knowledge. Such rich contexts for learning open the door for students to see the “big
ideas”, or key principles and concepts of mathematics, such as a pattern or relationship. This understanding of key principles will enable and encourage students to use mathematical reasoning throughout their lives.

Effective instructional approaches and learning activities draw on students’ prior knowledge, capture their interest, and encourage meaningful practice both inside and outside the classroom. Students’ interest will be engaged when they are able to see the connections between the mathematical concepts they are learning and their application in the world around them and in real-life situations.

Students will investigate mathematical concepts using a variety of tools and strategies, both manual and technological. Manipulatives are necessary tools for supporting the effective learning of mathematics by all students. These concrete learning tools invite students to explore and represent abstract mathematical ideas in varied, concrete, tactile, and visually rich ways. Moreover, using a variety of manipulatives help deepen and extend students’ understanding of mathematical concepts. For example, students who have used only base ten materials to represent two-digit numbers may not have as strong a conceptual understanding of place value as students who have also bundled craft sticks into tens and hundreds and used an abacus.

Manipulatives are also a valuable aid to teachers. By analysing students’ concrete representations of mathematical concepts and listening carefully to their reasoning, teachers can gain useful insights into students’ thinking and provide support to help enhance their thinking.

Fostering students’ communication skills is an important part of the teacher’s role in the mathematics classroom. Through skillfully led classroom discussions, students build understanding and consolidate their learning. Discussions provide students with the opportunity to ask questions, make conjectures, share and clarify ideas, suggest and compare strategies, and explain their reasoning. As they discuss ideas with their peers, students learn to discriminate between effective and ineffective strategies for problem solving.

Students’ understanding is revealed through both oral communication and writing, but it is not necessary for all mathematics learning to involve a written communication component. Young students need opportunities to focus on their oral communication without the additional responsibility of writing. Whether students are talking or writing about their mathematical learning, teachers can prompt them to explain their thinking and the mathematical reasoning behind a solution or the use of a particular strategy by asking the question “How do you know?”. And because mathematical reasoning must be the primary focus of students’ communication, it is important for teachers to select instructional strategies that elicit mathematical reasoning from their students.
Promoting Positive Attitudes Towards Mathematics

Students’ attitudes have a significant effect on how they approach problem solving and how well they succeed in mathematics. Teachers can help students develop the confidence they need by demonstrating a positive disposition towards mathematics. Students need to understand that, for some mathematics problems, there may be several ways to arrive at the correct answer. They also need to believe that they are capable of finding solutions. It is common for people to think that if they cannot solve problems quickly and easily, they must be inadequate. Teachers can help students understand that problem solving of almost any kind often requires a considerable expenditure of time, energy and a good deal of perseverance. Once students have this understanding, teachers can encourage them to develop the willingness to persist, to investigate, to reason and explore alternative solutions, and to take the risks necessary to become successful problem solvers.

Cross-Curricular and Integrated Learning

The development of skills and knowledge in mathematics is often enhanced by learning in other subject areas. Teachers should ensure that all students have ample opportunities to explore a subject from multiple perspectives by emphasizing cross-curricular learning and integrated learning, as follows:

a) In cross-curricular learning, students are provided with opportunities to learn and use related content and/or skills in two or more subjects. Students can use the concepts and skills of mathematics in their science or social studies lessons. Similarly, students can use what they have learned in science to illustrate or develop mathematical understanding. For example, in Grade 6, concepts associated with the fulcrum of a lever can be used to develop a better understanding of the impact that changing a set of data can have on the mean.

b) In integrated learning, students are provided with opportunities to work towards meeting expectations from two or more subjects within a single unit, lesson, or activity. By linking expectations from different subject areas, teachers can provide students with multiple opportunities to reinforce and demonstrate their knowledge and skills in a range of settings. Also, the mathematical process expectation that focuses on connecting encourages students to make connections between mathematics and other subject areas. For example, students in Grade 2 could be given the opportunity to relate the study of location and movement in the Geometry and Spatial Sense strand of mathematics to the study of movement in the Structures and Mechanisms strand in science and technology. Similarly, the same students could link their study of the characteristics of symmetrical shapes in Visual Arts to the creation of symmetrical shapes in their work in Geometry and Spatial Sense.
Recommended time allocation for teaching Mathematics Syllabus

<table>
<thead>
<tr>
<th>Key Stage</th>
<th>Contact Time/Weeks</th>
<th>Minimum Contact Time/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Stage 1 (Grade 1, 2 &amp; 3)</td>
<td>225 minutes (5 periods/week)</td>
<td>137hrs (182 periods of 45 min)</td>
</tr>
<tr>
<td>Key Stage 2 (Grade 4, 5 &amp; 6)</td>
<td>225 minutes (5 periods/week)</td>
<td>137hrs (182 periods of 45 min)</td>
</tr>
</tbody>
</table>

The above table shows the allocated time for a week with 5 periods of 45 minutes for key stage 1 and 2. At key stage two, teachers need to organize learning activities by thematically connecting outcomes or indicators from various strands.

Assessment Practices
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 assessments used:

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 knows 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 Mathematics 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 the student’s needs.

Assessment as learning (formative assessment)
Assessment as learning is student driven whereby students are 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 the level of understanding of the students. 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
## Scope and Sequence

**Strand:** Numbers

<table>
<thead>
<tr>
<th>Sub-strand</th>
<th>Grade 4</th>
<th>Grade 5</th>
<th>Grade 6</th>
</tr>
</thead>
</table>
| Number Concept | - Count numbers up to 5-digits (99999) in Dhivehi and English and make and justify estimates of numbers and round off whole numbers.  
- Read and write Roman numerals. | - Recognise the value of numbers up to 6-digits (999999).  
- Use the vocabulary of estimation and approximation and round off whole numbers. | - Recognise the value of numbers up to 7-digits (999999).  
- Use the vocabulary of estimation and approximation. Round off whole numbers. |
| Addition and Subtraction | - Carry out the addition and subtraction using various strategies and solve simple word problems.  
- Derive and recall doubles of numbers and addition and subtraction facts up to 20.  
- Carry out mental calculations using various strategies.  
- Develop and refine written methods for addition and subtraction, building on mental methods. | - Carry out the addition and subtraction using various strategies and solve simple word problems.  
- Derive and recall doubles of numbers and number pairs that total 100.  
- Carry out mental calculations using various strategies and derive new facts using number facts already known. | - Carry out addition and subtraction using various strategies and use the related vocabulary to solve simple word problems.  
- Carry out mental calculations using various strategies and derive new facts using number facts already known.  
- Develop and refine written methods for addition and subtraction, building on mental methods. |
Multiplication & Division

- Carry out multiplication or division using various strategies and solve simple word problems involving four operations and explain the process.
- Derive multiplication facts and the related division facts from 2 to 10.
- Develop written methods for multiplication and division.

Money

- Carry out simple conversions and transactions and solve word problems by explaining the process.

Negative Numbers

- Recognise, order and carry out addition and subtraction using integers.
- Recognise equivalent fractions, compare them in practical contexts, relate fraction as a part of a whole and form word problems.
- Recognise fractions equivalent to 1. Carry out four operations involving simple fractions.
- Read, write and say decimal numbers using decimal notations, and recognise the relationship between decimals and fractions.
- Use the idea of simple proportion.

Fractions, Decimals and Percentages

- Recognise equivalent fractions, compare them in practical contexts, relate fraction as a part of a whole, form word problems, order familiar fractions, convert one form of fraction to the other and express them in the simplest form.
- Find fractions that total 1. Carry out four operations involving simple fractions.
- Read, write and say decimal numbers using decimal notations, and recognise the relationship between decimals and fractions and order a set of decimal fractions.
- Identify percentage as the number of parts in every 100, recognise equivalent percentages, fractions, decimals, workout simple percentages and solves simple problems.

- Recognise equivalent fractions, compare them in practical contexts, relate fraction as a part of a whole, form word problems, order familiar fractions, convert one form of fraction to the other and express them in the simplest form.
- Find fractions that total 1. Carry out four operations involving simple fractions.
- Read, write and say decimal numbers using decimal notations, and recognise the relationship between decimals and fractions and order a set of decimal fractions.
- Identify percentage as the number of parts in every 100, recognise equivalent percentages, fractions, decimals, workout simple percentages and solves simple problems.

Ratio and Proportion

- Use ratios to compare two quantities, relate fractions to simple proportions and solve simple problems involving ratio and proportion.
- Use ratios to compare two quantities, relate fractions to simple proportions and solve simple problems involving ratio and proportion.
**Strand: Measurements**

<table>
<thead>
<tr>
<th>Sub-strand</th>
<th>Grade 4</th>
<th>Grade 5</th>
<th>Grade 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>- Recognise and use relationships between familiar units and draw lines and measure accurately using appropriate equipment, suitable units and solve problems.</td>
<td>- Recognise and use relationships between familiar units and draw lines and measure accurately using appropriate equipment, suitable units and solve problems. Estimate and record length/distance to a suitable degree of accuracy.</td>
<td>- Recognise and use relationships between familiar units and draw lines and measure accurately using appropriate equipment, suitable units and solve problems. Estimate and record length/distance to a suitable degree of accuracy.</td>
</tr>
<tr>
<td>Mass</td>
<td>- Recognise and use relationships between familiar units and measure objects with accuracy, using appropriate equipment, suitable units and solve problem.</td>
<td>- Recognise and use relationships between familiar units and measure objects with accuracy, using appropriate equipment, suitable units and solve problems. Estimate and record mass to a suitable degree of accuracy.</td>
<td>- Recognise and use relationships between familiar units and measure objects with accuracy, using appropriate equipment, suitable units and solve problems. Estimate and record mass to a suitable degree of accuracy.</td>
</tr>
<tr>
<td>Capacity</td>
<td>- Recognise and use relationships between familiar units and measure capacity with accuracy using appropriate equipment, suitable units and solve problem.</td>
<td>- Recognise and use relationships between familiar units and measure capacity with accuracy using appropriate equipment, suitable units and solve problem. Estimate and record capacity to a suitable degree of accuracy.</td>
<td>- Recognise and use relationships between familiar units and measure capacity with accuracy using appropriate equipment, suitable units and solve problem. Estimate and record capacity to a suitable degree of accuracy.</td>
</tr>
</tbody>
</table>
- **Perimeter, Area and Volume**
  - Recognise and use the vocabulary related to perimeter. Measure, calculate and solve problems involving the perimeter of simple shapes.
  - Recognise and use the vocabulary related to area. Measure and calculate the area of simple shapes using arbitrary or standard units. Explore the relationship between the area of rectangles and squares. Apply and use the appropriate formula to calculate area.
  - Use the vocabulary related to area. Measure and calculate the area of compound shapes. Explore the relationship between the area of rectangles and squares. Apply and use the appropriate formula to calculate area. Investigate and solve problems involving perimeter and area.
  - Know the meaning of volume. Understand and use the vocabulary related to volume. Estimate, measure or calculate the volume of regular and irregular objects.

- **Time**
  - Use vocabulary related to time. Estimate the duration of an event in time units. Read, tell and record time to the nearest minute; use appropriate notations. Read calendar and find the relationship between the units of time. Know the months of Hijri calendar. Solve word problems involving time.
  - Use vocabulary related to time. Estimate the duration of an event in time units. Read, tell and record time using a 24-hour clock. Read calendar and find the relationship between the units of time. Solve word problems involving time. Read and interpret time tables.
  - Use vocabulary related to time. Estimate the duration of an event in time units. Read, tell and record time using a 24-hour clock. Read calendar and find the relationship between the units of time. Solve word problems involving time. Reads and interprets time tables.
**Strand:** Shape and Space

<table>
<thead>
<tr>
<th>Sub-strand</th>
<th>Grade 4</th>
<th>Grade 5</th>
<th>Grade 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positions and Directions</td>
<td>- Describe positions and directions. Give directions and follow short paths, draw simple paths and informal maps. Recognise and describe location and direction using grid references and inter-mediate compass points. Describe movements, and understand angle as a measure of turn.</td>
<td>- Describe positions and directions. Give directions and follow short paths, draw simple paths and informal maps. Read and plot co-ordinates. Interpret and describe location and direction using grid references.</td>
<td>- Describe positions and directions. Give directions and follow short paths, draw simple paths and informal maps. Read and plot co-ordinates. Interpret and describe location and direction using grid references.</td>
</tr>
</tbody>
</table>
### Angles
- Make and describe turns; estimate, draw, order and measure angles. Know the units of angles. Recognise the relationship between 90° with whole turns or quarter turns. Know angles formed at rectangles, squares or triangles.
- Approximately measure angles using a paper protractor. Identify types of angles, estimate or measure to the nearest 5°. Calculate angles on a straight line. Rotate and make patterns. Bisect the given line.
- Estimate and measure angles to the nearest degree. Know and calculate the sum of the angles in a triangle. Calculate angles at a point. Explore a regular polygon. Sketch the position of a simple shape after a rotation about a vertex. Bisect the given angle.

### Strand: Chance and Handling Data

<table>
<thead>
<tr>
<th>Sub-strand</th>
<th>Grade 4</th>
<th>Grade 5</th>
<th>Grade 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handling Data</td>
<td>Solve a given problem by organising, representing and interpreting data in simple tables or diagrams. Construct and interpret pictographs and bar charts.</td>
<td>Solve a given problem by organising, representing and interpreting data in simple tables or diagrams. Construct and interpret bar charts, bar line charts or line graphs. Find the mode of a set of data, and begin to find the range.</td>
<td>Solve a given problem by organising, constructing and interpreting bar charts or bar line charts. Begin to interpret simple pie charts. Find the mode and range of a set of data. Begin to find the median and mean.</td>
</tr>
<tr>
<td>Probability</td>
<td>Use the language associated with probability to generate discussion. Order chance events and conduct simple experiments.</td>
<td></td>
<td>Use the language associated with probability to generate discussion. Identify and record all possible outcomes of an event.</td>
</tr>
</tbody>
</table>
**Strand:** Patterning and Algebra

<table>
<thead>
<tr>
<th>Sub-strand</th>
<th>Grade 4</th>
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</table>
| **Sequences and Properties of Numbers** | - Describe, copy, predict and extend simple patterns. Create simple patterns using familiar materials. Describe the term to term rule for a simple number sequence.  
- Recognise odd and even numbers and some of their properties. Recognise multiples. | - Describe, copy, predict and extend simple patterns. Create simple patterns using familiar materials. Describe the term to term rule for a simple number sequence.  
- Makes a general statement about odd and even numbers regarding some of their properties. Find prime numbers. Recognise square numbers. | - Describe, copy, predict and extend simple patterns. Create simple patterns using familiar materials. Describe the term to term rule for a simple number sequence.  
- Makes a general statement about odd and even numbers regarding some of their properties. Find prime numbers. Recognise square numbers. |
| **Algebraic Techniques** | - Model algebraic expressions and carry out addition and subtraction. | - Describe, solve simple mathematical problems and puzzles and explain the process. | - Model algebraic expressions and carry out operations. Write algebraic expressions and evaluate them by substitution. Simplify simple expressions. Solve simple linear equations. |
| **Investigations, Puzzles** | - Solve simple mathematical problems and puzzles and explain the process. | - Describe, solve simple mathematical problems and puzzles and explain the process. | - Solve simple mathematical problems and puzzles and explain the process with reasoning. |
GRADE 4 SYLLABUS DETAILS
GRADE 4

Strand: Numbers (N)

Sub-strand: Number Concept (N1)

**Topic:** Counting
**Outcome N1.1:**
*Count numbers up to 5-digits (99999) in Dhivehi and English. Count back through zero.*

**Indicators:**
*This is evident when the student:*

a. Skip-counts forwards or backwards by 1s, 2s, 3s, 4s, 5s, 6s, 7s 8s 9s, 10s, 100s and 1000s from a given number.
b. Counts back through zero in different steps. Eg: 1s, 2s, 3s, 4s, 5s, 6s, 7s 8s 9s, 10s, etc.

**Topic:** Place Value and Ordering
**Outcome N1.2:**
*Recognise the value of numbers up to 5-digits (99999).*

**Indicators:**
*This is evident when the student:*

a. Uses symbols correctly including less than (<), greater than (>) and equals (=).
b. Give one or more numbers lying between two given numbers.
c. Partitions 5-digit numbers in different ways, including into multiples of 1000, 100, 10 and 1.
d. Writes numbers presented orally up to 99,999 in figures.
e. Reads, writes and says numbers up to 5-digits in figures and words.
f. Records numbers up to five digits using expanded notation. (Eg: 48109 = 40000 + 8000 + 100 + 9)
g. Recognises that the position of a digit gives its value, in relation to 5-digit numbers and knows what each digit represents.

**Topic:** Estimating and Rounding
**Outcome N1.3:**
*Use the vocabulary of estimation; make and justify estimates of numbers. Round off whole numbers.*

**Indicators:**
*This is evident when the student:*

a. Makes and justify estimates up to about 250 and estimates a proportion.
b. Uses the appropriate vocabulary in estimation (Eg: nearest, guess, nearly, roughly).
c. Rounds any positive integer less than 1000 to nearest 10 or 100.
**Topic:** Other Numerals

**Outcome N1.4:**
Read and write Roman numerals.

**Indicators:**

*This is evident when the student:*

a. Reads and writes Roman numerals up to 20 (XX).

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**Sub-strand: Addition and Subtraction (N2)**

**Topic:** Understanding Addition and Subtraction

**Outcome N2.1:**
Carry out the operation of addition and subtraction using various strategies and use the related vocabulary to solve simple word problems.

**Indicators:**

*This is evident when the student:*

a. Uses appropriate vocabulary to support addition and subtraction.

b. Relates subtraction as finding the difference between and complementary addition.

c. Recognises that subtraction is the inverse of addition and uses this to check the results.

d. Recognises that adding and subtracting zero leaves a number unchanged.

e. Responds rapidly to oral or written questions explaining the strategy used. (*Eg: 654 add 50; add 68 to 74; 7 add 12 add 9, add 15, 6, 4, 15 and 1; what is the sum/total of 26 and 39 OR 13, 62 and 3; how many altogether are 121 and 35? and 61, 37 and 6? increase 48 by 22, which three numbers could have a total of 103? are there any others?)

f. Responds rapidly to oral or written questions explaining the strategy used. (*Eg: 93 take away 8; take 7 from 62; 63 subtract 46; Subtract 120 from 215; 170 less than 250; 1000 less than 5437; What must I take from 84 to leave 26? What is the difference between 28 and 65? How many more than 234 is 249? How many less than 68 is 42? What must I add to 54 to make 93? Decrease 72 by 34; 28 add a number is 43; What is the number? Find pairs of numbers with a difference of 79)

g. Finds the value of the missing term(s) in addition and subtraction sentences.

h. Records addition and subtraction sentences using +, – and =.

i. Recognises that addition can be done in any order but not subtraction.

j. Uses the principles (not the names) of the commutative and associative laws as they apply or not to addition and subtraction.
k. Uses associative principle in addition.
l. Creates simple addition and subtraction stories.
m. Solve word problems involving addition and subtraction.

**Topic:** Rapid recall of Addition and Subtraction facts

**Outcome N2.2:** Derive and recall: doubles of all numbers up to 50, and doubles of multiples of 10 or 100 up to 500 or 5000 respectively; number pairs that totals 100, and all pairs of multiples of 50 that totals 1000. Know by heart and recalls all addition and subtraction facts up to 20.

**Indicators:**

This is evident when the student:

a. Derives and recalls doubles of all numbers from 1+1 to 50+50.
b. Derives and recalls doubles of multiples of 10 from 10+10 to 500+500. (Eg: 280 +280=560)
c. Derives and recalls doubles of multiples of 100 from 100+100 to 5000+5000. (Eg: 1800+1800=3600)
d. Derives and recalls number pairs that total 100. (Eg: 36 + 64 = 100; 83 + 17 = 100)
e. Derives and recalls all pairs of multiples of 50 that total 1000. (Eg: 250 + 750 = 1000; 630 + 370 = 1000)
f. Derives quickly related facts such as 70+90=160; 700+900=1600; 160–90=70; 1600–900=700.
g. Knows by heart and recalls all addition and subtraction facts for all numbers up to 20.

**Topic:** Mental calculation strategies of Addition and Subtraction

**Outcome N2.3:** Carry out mental calculations using various strategies such as partitioning, finding small differences and using near doubles. Derive new facts using number facts already known.

**Indicators:**

This is evident when the student:

a. Adds mentally several small numbers. Eg: 7 + 12 + 9 or 4 + 7 + 9 + 1.
b. Partitions into tens and units, adds and subtracts the tens first. (TU±TU)
c. Finds a difference by counting up through the next multiple of 10 or 100. (Eg: 403 – 386, 4000 – 3993)
d. Identify near doubles using known doubles. (Eg: 150 + 160)
e. Adds/subtracts 9, 19, 29... or 11, 21, 31... by adding/subtracting 10, 20, 30... then adjusting by 1.
f. Given three or more numbers, say or write different sentences relating to these numbers. (Eg: using only the numbers 25, 37, 52, 77 and 87, write as many different addition or subtraction sentences as you can.)
g. Derives quickly related facts such as:
   
   70 + 90 = 160  
   160 – 90 = 70  
   700 + 900 = 1600  
   1600 – 900 = 700

h. Uses known number facts of addition and subtraction to derive new facts.
Topic: Pencil and paper procedures of Addition and Subtraction

Outcome N2.4:
Develop and refine written methods for addition and subtraction, building on mental methods.

Indicators:
This is evident when the student:

a. Uses the method ‘counting on’ in multiples of 100, 10 or 1 in adding HTU&TU, HTU&HTU.

b. Uses the method ‘adding the most significant digits first’ in adding HTU&TU, HTU&HTU. (Eg: 67+24=80+11=91; 205+176=300+70+11=381)

c. Uses the method adding the least significant digits first in adding HTU&TU, HTU&HTU (preparing for ‘carrying’). (Eg: 358+73=11+120+300=431)

d. Uses the method ‘carrying’ in adding HTU&TU, HTU&HTU.
   a. (Eg: 11+367)

e. Uses the method ‘carrying’ in adding HTU&TU, HTU&HTU. (Eg: 754+86=854–14=840)

f. Uses one of the above method to add two or more three-digit sums of money, (know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts such as MVR 3.59 ± 78 L). (Eg: MVR 4.21 + MVR 3.87 MVR 2.24 + MVR 5.23 + MVR 1.36)

g. Uses the method counting up from the smaller to the larger number (complementary addition) in subtracting HTU&TU, HTU&HT. (Eg: 84–56 is same as 56+4+20+4 = 84
783–356 =

383
–356 to 360
4
to 400
300 to 700
83 to 783
427

h. Uses the compensation (take too much, add back) method in subtracting HTU&TU, HTU&HTU
   i. Eg: 783–356 = 783–400+44–356
      1. = 383+44
         383 take 400
      2. = 427
          +44 add 44

   ii. Eg: 84–56 = 84–60+4
       1. = 24+4 = 28
          300
          120
          7
          427

i. Uses the decomposition method in subtracting HTU&TU, HTU&HTU (preparing for efficient standard method)
   [Eg: 81–57 = (80+1) – (50+7) = (70+11) – (50+7) = (20+4) = 24]
   [Eg: 754–286 = (700+50+4) – (200+80+6) =]
(700+40+14) – (200+80+6) = (600+140+14) – (200+80+6) = 468

j. Uses the standard method in subtracting HTU&TU, HTU&HTU
   (Eg: 754 – 286 = 468)

k. Uses one of the above methods to find the difference between two three-digit sums of money (know that decimal points should line up under each other). (Eg: MVR 8.95 – MVR 4.38
   MVR 7.50 – MVR 2.84)

Sub-strand: Multiplication & Division (N3)

Topic: Understanding Multiplication and Division

Outcome N3.1: Carry out the operation of multiplication or division using various strategies such as repeated addition, sharing, and modeling. Solve simple word problems involving four operations and explain the process.

Indicators: This is evident when the student:

a. Uses appropriate vocabulary to support multiplication and division.

b. Recognises that division is the inverse of multiplication and uses this to check the results.

c. Extends understanding of the operations of multiplication and division and their relationship to each other and to addition and subtraction.

d. Responds rapidly to oral or written questions, explaining the strategy used. (Eg: Two elevens, Double 16; 7 times 4... 9 multiplied by 3; Multiply 15 by 6... by zero... by 1, Is 40 a multiple of 5? How do you know? What is the product of 15 and 6? Find all the different products you can make by using two of these five numbers: 2, 3, 4, 5, 10.)

e. Responds to oral or written questions, explaining the strategy used. (Eg: Share 44 between 4; Divide 69 by 3. 69 divided by 3. Divide 3 into 69; How many groups of 6 can be made from 48? How many lengths of 10 cm can you cut from 183 cm? Is 72 divisible by 3? How do you know? What are the factors of 12? Tell me two numbers with a quotient of 5. Are there any other possibilities?)

f. Gives a remainder as a whole number. (Eg: 41 ÷ 4 is 10, remainder 1; 72 ÷ 5 is 14 remainder 2; 768 ÷ 100 is 7 remainder; 28 = (5 x 5) + r; 97 = (9 x 10) + r; 68 327 = (3 x 100) + r)

g. Finds the value of the missing term(s) in multiplication or division sentences. (Eg: 3 x 2 = r; r x 4 = 8; r x r = 16; 8 ÷ r = 4; r + 2 = 5)

h. Records multiplication and division sentences using x, ÷ and =.
Uses the principles (but not the names) of the commutative, associative and distributive laws as they apply to multiplication:

- Example of commutative law: $8 \times 15 = 15 \times 8$
- Example of associative law: $6 \times 15 = 6 \times (5 \times 3) = (6 \times 5) \times 3 = 30 \times 3 = 90$
- Example of distributive law: $18 \times 5 = (10 + 8) \times 5 = (10 \times 5) + (8 \times 5) = 50 + 40 = 90$

i. Relates division and fractions. Recognises that $1/2$ of 10 is the same as $10 \div 2$; $1/4$ of 3 is the same as $3 \div 4$.

j. Finds remainders by dividing a whole number of Rufiyaa by 2, 4, 5 or 10 to give Rufiyaa and Laari.

k. Rounds up and down after division depending on context.

l. Estimates and check by approximating (round to nearest 10 or 100).

m. Checks the result with the inverse operation or with an equivalent calculation.

n. Creates simple multiplication and division stories.

o. Solves word problems involving multiplication and division

p. Explains how an answer to a multiplication or division problem was obtained.

q. Uses all four operations to solve word problems involving numbers in ‘real life’, money and measures (including time), using one or more steps.

**Topic:** Rapid Recall of Multiplication and Division

**Outcome N3.2:**

*Derive multiplication facts and the related division facts from 2 to 10. Know by heart or derive doubles and halves.*

**Indicators:**

*This is evident when the student:*

a. Derives multiplication facts for 2, 3, 4, 5, 6, 7, 8, 9 and 10 times-tables and the related division facts.

b. Responds rapidly to oral or written questions like:

- Nine fives, 3 times 7… times 0, 4 multiplied by 8… by 0, Multiply 9 by 5… by 1, Divide 36 by 4, What is 24 shared between 3?, How many fives in 55?, Half of 17, One quarter of 3.

d. Derives:

- doubles of all numbers 1 to 50; doubles of multiples of 10 up to 500; doubles of multiples of 100 up to 5000; and all the corresponding halves.

e. Responds rapidly to oral or written questions like:

- Double 19… 75… 350… 4200…, Half of 38… of 150… of 700… of 8400…, 1/2 of 700… of 34…, Twice 95, Reema spent half of her MVR 2600 savings. How much did she spend? How many metres is half a kilometre? Knows by heart and recalls multiplication tables of 2, 3, 4, 5, 6, 7, 8, 9 and 10.
**Topic:** Mental Calculations Strategies of Multiplication and Division

**Outcome N3.3:**
Derive new facts, using closely related facts already known, and doubling or halving. Use known number facts and place value to multiply or divide mentally. Use the relationship between multiplication and addition, or multiplication and division.

**Indicators:**

This is evident when the student:

- a. Uses related facts and doubling or halving to derive new facts. 
  Eg: 
  To multiply by 4, double and double again.
  To multiply by 5, multiply by 10 and halve.
  Work out the 8 times-table facts by doubling the 4 times-table facts.
  To multiply by 20, multiply by 10 and then double.
  Work out some multiples of 15 by doubling: 1 x 15 = 15 so 2 x 15 = 30, 4 x 15 = 60, 8 x 15 = 120, 16 x 15 = 240.
  Uses combinations of these facts to work out other multiples of 15, ie: 11 x 15 = (8 x 15) + (2 x 15) + (1 x 15) = 165.
- b. Explains how to find quarters and eighths by halving. [Eg: one eighth of 64 is 8 (half of 64 is 32, half again is 16, half again is 8); one quarter of 600 is 150 (because one half of 600 is 300 and half again is 150)].
- c. Multiplies and divides any positive integer up to 1000 by 10 or 100 (whole number answers), and understand the effect (place value)
- d. Uses the relationship between multiplication and division.
- e. Multiplies by 10, then adjust: to multiply by 9 or 11.
- f. Uses the distributive law and partitioning to multiply. [Eg: 25 x 4 = (20 x 4) + (5 x 4)].
- g. Uses known number facts and place value to multiply or divide mentally. Eg: 
  Multiply a two- or three-digit number by 10 or 100. ie: 327 x 10, 54 x 100
  Divide a four-digit multiple of 1000 by 10 or 100. ie: 8000 ÷ 100 3000 ÷ 10
  Double any multiple of 5 up to 100
  Halve any multiple of 10 to 200
  Multiply a two-digit number by 2, 3, 4 or 5

**Topic:** Pencil and Paper Procedure of Multiplication and Division

**Outcome N3.4:**
Develop written methods for multiplication and division.

**Indicators:**

This is evident when the student:

- a. Approximates the answer first and uses the written methods to calculate the answer.
- b. Uses grid method in multiplying (TU x U) Eg: 23 x 8
- c. Uses partitioning method in multiplying (TU x U) Eg: 23 x 7
d. Uses partitioning method in multiplying \((TU \times U)\) Eg: \(23 \times 7\)

e. Uses Japanese method in multiplying.
Eg: \(23 \times 14\)

\[
\begin{array}{c|c|c}
20 \times 7 & 23 & 23 \\
3 \times 7 & \times 7 \text{ leading to } & \times 7 \\
140 & 161 & \\
21 & & \\
161 & & \\
\end{array}
\]

d. 72 ÷ 5

\[
\begin{align*}
72 & \div 5 \\
- 50 & \quad 10 \times 5 \\
22 & \quad 4 \times 5 \\
2 &
\end{align*}
\]

Answer: 14 remainder 2

g. Uses standard division method in dividing \((TU \div U)\) Eg: \(96 \div 6\)

\[
\begin{align*}
96 & \div 6 \\
- 60 & \quad 10 \times 6 \\
36 & \\
- 36 & \quad 6 \times 6 \\
0 &
\end{align*}
\]

Answer: 16
**Sub-strand: Money (N4)**

**Topic:** Money  
**Outcome N4.1:** Carry out simple conversions and transactions and solve word problems by explaining the process.  
**Indicators:**  
*This is evident when the student:*  
- Recognises that MVR 1 = 100 L  
- Works out how to pay an exact sum using smaller notes and coins.  
- Represents a sum of money by two or more combinations of notes and coins.  
- Uses the decimal notation and the appropriate unit to represent money amounts.  
- Pays appropriate amounts and determines appropriate change in shopping.  
- Converts amounts of money, Rufiyaa to Laari, and Laari to Rufiyaa.  
- Partitions money values written in the form of decimals into MVR and L. (*Eg: MVR 2.60 = MVR 2 + 60 L, MVR 2.60 = MVR 1 + 160 L etc.*)  
- Solves word problems in the context of money involving one or more steps, and explains how the problem was solved.

**Sub-strand: Negative Numbers (N5)**

**Topic:** Negative Numbers  
**Outcome N5.1:** Recognise, order and carry out addition and subtraction using integers.  
**Indicators:**  
*This is evident when the student:*  
- Recognises negative numbers in the context of a number line or a temperature scale.  
- Orders a set of integers (positive and negative numbers). (*Eg: on a number line, on a thermometer etc.*)  
- Compares two integers using the relation symbols (<, >).  
- Adds and subtractions integers using cards.

**Sub-strand: Fractions, Decimals and Percentages (N6)**

**Topic:** Fractions  
**Outcome N6.1:** Recognise the equivalence  
**Indicators:**  
*This is evident when the student:*  
- Recognises the equivalence
between fractions and compare them in practical contexts, relates fraction as a part of a whole, form fraction word problems.

- a. Uses fraction notation, recognises simple fractions that are several parts of a whole and mixed numbers.
- b. Recognises the equivalence of simple fractions. (Eg: fractions equivalent to 1/2, 1/4, 3/4.)
- c. Begins to relate fractions to division. (Eg: understand that finding one half is equivalent to dividing by 2, so that 1/2 of 16 is equivalent to 16 ÷ 2; recognise that when 1 whole cake is divided equally into 4, each person gets one quarter, or 1 ÷ 4 = 1/4.)
- d. Finds simple fractions of numbers or quantities. (Eg: 1/2 of 16, 3/4 of MVR 20.)
- e. Uses practical work to compare familiar fractions. (Eg: the number one half lies between one quarter and three quarters, which of these fractions are greater than one half: 3⁄4, 1⁄3, 5⁄8, 1⁄8, 2⁄3, 3⁄10.)
- f. Compares unit fractions up to one-tenth using fraction strips.
- g. Orders simple fractions such as: 1/2, 1/4, 3/4, 1/10, without converting to same denominator.
- h. Forms fractions to word problems such as:
  - What fraction of MVR 1 is 10 L?
  - What fraction of 1 metre is 25 cm?
  - What fraction of the larger shape is the smaller shape?

**Topic: Fraction Operations using Visualisation**

**Outcome N6.2:**
Recognise fractions equivalent to 1. Carry out four operations involving simple fractions.

**Indicators:**

- a. Recognises pairs of simple fractions with a total of 1 (using fraction strips or fraction circles).
- b. Adds and subtracts wholes, halves and quarters using paper cups and cards.
- c. Multiplies, halves and quarters by whole numbers using paper cups and cards.
- d. Divides whole numbers by halves and quarters using paper cups.

**Topic: Fractions and Decimals**

**Outcome N6.3:**
Reads, writes and says decimal numbers using decimal notations, and recognises the relationship between decimals and fractions.

**Indicators:**

- a. Renames fractions where the numerator and denominator are the same as 1. (Eg: 3/3 =1 (use paper cups/ plates)
- b. Recognises the place value of digits in a decimal number up to the hundredths place.
c. Reads, writes and says decimal numbers up to the hundredths place.
d. Relates decimal notation for tenths and hundredths to money and measurement.
e. Writes the decimal number equivalent to 1/10, 2/10, 3/10, 4/10 etc and 1/100, 2/100, 3/100, 4/100 etc.
f. Counts on or back in steps of 0.1 and 0.01.
g. Orders a set of decimal numbers with the same number of decimal places up to 2 decimal places. (Eg: 0.5, 0.2, 0.9 or 0.95, 0.03, 0.51, 0.09.)
h. Rounds a sum of money to the nearest Rufiyaa.
i. Investigates the equivalence between decimal numbers and fractions using base 10 apparatus, metre ruler and calculators.
j. Recognises the equivalence between the decimal numbers and fractions. Forms of one half and one quarter, and tenths. (Eg: 0.5 = 1/2, 0.25 = 1/4, 0.3 = 3/10.)

**Sub-strand: Ratio and Proportion (N7)**

**Topic: Proportion**

**Outcome N7.1:**

*Use the idea of simple proportion.*

**Indicators:**

*This is evident when the student:*

a. Begins to use ideas of simple proportion.
   a. *(Eg: ‘one for every...’ and ‘one in every...’). In every week I spend 5 days at school. So in every 2 weeks I spend 10 days at school, and in every 3 weeks I spend 15 days at school. OR*
   
b. *For every 2 bags of crisps you buy you get 1 sticker. For every 6 bags of crisps you get 3 stickers. To get 3 stickers you must buy 6 bags of crisps. OR*
   
c. *In this pattern 1 in every 3 squares is black. In every 6 squares 2 of them are black.*
   
d. *Work out a recipe for 8 people or 2 people by doubling or halving quantities in a simple recipe for 4 people.*
MEASUREMENT
**Strand: Measurement (M)**

**Sub-strand: Length (M1)**

**Topic: Length**
**Outcome M1.1:** Recognise and use relationships between familiar units and draw lines and measure them with accuracy using appropriate equipment, suitable units and solve problems.

**Indicators:**

This is evident when the student:

- Uses vocabulary related to measures (length)
- Estimates and checks, lengths and distances using standard units, measurements. *(Eg: how tall a friend is; how long/wide a playing card is)*
- Suggests suitable unit (km, m, cm, mm) and equipment to estimate or measure length.
- Measures and draws lines to the nearest centimeter, up to 1 decimal places *(Eg: 2.4, 1.5)*
- Recognises the mile as a unit for measuring distance. Know that a mile is longer than 1 km but less than 2 km.
- Recognises and uses the relationships between units km, m, cm and mm. *(Eg: 1 km = 1000 m, 1 m = 100 cm or 1000 mm, 1cm = 10 mm.)*
- Uses the abbreviations km, m, cm, mm correctly.
- Reads a scale to the nearest marked division.
- Records measures using decimal notation and mixed units.
- Recognises the equivalent of one half, one quarter, three quarters and one tenth of 1 km, 1 m, cm. *(Eg: 75 cm is three quarters of 1 m.)*
- Converts metres to centimetres and vice versa.
- Chooses appropriate number operations and calculation methods to solve measurement word problems and explains how the problem was solved.

**Sub-strand: Mass (M2)**

**Topic: Mass**
**Outcome M2.1:** Recognise and use relationships between familiar units and measure objects with accuracy using appropriate equipment, suitable units and solve problem.

**Indicators:**

This is evident when the student:

- Uses vocabulary related to measures (mass)
- Estimates and checks masses of objects using standard units, measurements such as how heavy a tennis ball is.
- Suggests suitable units and measuring equipment to estimate or measure mass.
d. Recognises and uses the relationship between units of mass. 
   *(Eg: 1 kg = 1000 g.)*

e. Uses the abbreviations kg and g correctly.

f. Reads and records a scale to the nearest marked division.

g. Records masses using decimal notation and mixed units.

h. Recognises the equivalent of one half, one quarter, three quarters and one tenth of 1 kg. *(Eg: 500 g is one half of 1 kg.)*

i. Weighs different amounts of water. *(Eg: 1 litre, half litre, 100 ml, 2 litres etc.)* and finds their relationship with mass.

j. Chooses appropriate number operations and calculation methods to solve measurement word problems and explains how the problem was solved.

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**Sub-strand: Capacity (M3)**

**Topic:** Capacity

**Outcome M3.1:**
Recognise and use relationships between familiar units and measure capacity with accuracy using appropriate equipment, suitable units and solve problem.

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**Indicators:**

*This is evident when the student:

a. Uses vocabulary related to measures (capacity)

b. Estimates and checks capacity of containers using standard units, measurements such as how much a big bucket holds.

c. Orders commercial products according to the capacity by interpreting the labels.

d. Suggests suitable units and measuring equipment to estimate or measure capacity.

e. Recognises and uses the relationship between units of capacity. *(Eg: 1 litre = 1000 ml =1000 cm³.)*

f. Uses the abbreviations l, ml and cm³ correctly.

g. Reads and records a scale to the nearest marked division.

h. Records and estimates readings from scales to a suitable degree of accuracy.

i. Investigates in which containers the water level rises most with small amounts of water and finds out which vessels allow for more accurate readings.

j. Recognises the equivalent of one half, one quarter, three quarters and one tenth of 1 litre in ml. *(Eg: 200 ml is 2 tenths of 1 litre.)*

k. Chooses appropriate number operations and calculation methods to solve measurement word problems and explains how the problem was solved.
Sub-strand: Perimeter, Area and Volume (M4)

**Topic: Perimeter**

**Outcome M4.1:**
Recognise and use the vocabulary related to perimeter. Measures and calculate the perimeter of simple shapes. Solve problems involving perimeter of simple shapes.

**Indicators:**

*This is evident when the student:*

- a. Uses vocabulary related to perimeter.
- b. Measures and calculates the perimeter of simple shapes and rectilinear figures.
- c. Draws two rectangles with the same perimeter.
- d. Solves problems involving perimeter of rectangles/squares and simple shapes. (*Eg: I have a rectangle with a perimeter of 24 cm. Each side is a whole number of cm. What might the length and width of the rectangle be?)

**Topic: Area and Perimeter**

**Outcome M4.2:**
Recognise and use the vocabulary related to area. Measure and calculate the area of simple shapes using arbitrary or standard units. Explore the relationship between the area of rectangles and squares. Apply and use the appropriate formula to calculate area.

**Indicators:**

*This is evident when the student:*

- a. Uses vocabulary related to area.
- b. Finds areas by counting squares.
- c. Forms different shapes of equal area.
- d. Measures and calculates the area of rectangles and other simple shapes, using counting methods and standard units (cm²).
- e. Identifies and explains the relationship between areas of rectangles and squares.
- f. Expresses the formula for the area of a rectangle/square first in words, then in letters.
- g. Uses the abbreviations km, m, cm, mm, km², m², cm², mm² correctly.
- h. Draws different rectangles with the same perimeter. Finds which has the largest/smallest area.
- i. Finds different ways of halving the area of different size pinboard. Justifies their results.
Sub-strand: Time (M5)

Topic: Time
Outcome M5.1:
Use vocabulary related to time. Estimate the duration of an event in time units. Read, tell and record time to the nearest minute; use appropriate notations. Read calendar and find the relationship between the units of time. Know the months of Hijri calendar. Solve word problems involving time.

Indicators:

This is evident when the student:

a. Uses vocabulary related to time.
b. Names and orders the months of the year (Islamic or Hijri).
c. Reads and tells time to the nearest minute using analogue clocks.
d. Reads and tells time using digital clocks.
e. Uses am and pm and the notation 9:53 correctly
f. Uses this year’s calendar (Hijri) and finds important days/dates (Eg: Islamic new year, National day, Beginning of Ramazan, Fitr Eid day, Hajj day, Al’haa Eid day, The day Maldives embraced Islam.)
g. Reads and writes the date of a particular day using Hijri calendar.
h. States the five prayer times of the day.
i. Recognises and use: 1 millennium = 1000 years, 1 century = 100 years, 1 year = 12 months or 52 weeks, 1 week = 7 days, 1 day = 24 hours, 1 hour = 60 minutes, 1 minute = 60 seconds
j. Estimates using standard units of time. (Eg: how long it takes to run around the island, or run across the school play ground etc, how long it takes the journey: from your island to Male’, from Male’ to Eydhafushi etc, how long it takes to fly to Colombo from Male’.)
k. Uses a stop watch or other timers to measure and compare times of events.
l. Suggests a unit to estimate or measure. (Eg: the time it will take to eat dinner; the time you watch TV each week; how long it is until the end of the year.)
m. Responds to oral and written questions. (Eg: Would you expect:
   a. to cook a soft boiled egg in 3 minutes or 30 minutes;
   b. to walk across the school compound in 1, 10 or 100 seconds?
   c. have you lived more or less than 500 weeks?)
n. Solves word problems involving time.
SHAPE and SPACE
Strand: Shape and Space (SS)

Sub-strand: 3D Shapes (SS1)

**Topic: 3D Shapes**

**Outcome SS1.1:**


**Indicators:**

*This is evident when the student:*

a. Uses mathematical vocabulary to some extent to describe 3D objects (cubes, cuboids, cylinders, spheres, hemisphere, cones, tetrahedron, prism, pyramid and polyhedron).

b. Collects examples of cubes, cuboids, cylinders, spheres, hemisphere, cones, tetrahedron, prism, pyramid and polyhedron and match them to name labels.

c. Recognises that in a polyhedron: each face is a flat surface and is a polygon: an edge is the straight line where two faces meet: a vertex is the point where three or more edges meet.

d. Classify solids according to properties such as: flat and curved faces: roles on a straight line.

e. Begins to recognise that a prism has two identical end faces and the same cross-section throughout its length.

f. Selects cubes, cuboids, cylinders, spheres, hemisphere, cones, tetrahedron, prism, pyramid and polyhedron from a collection of 3D objects.

g. Visualise 3-D shapes from 2-D drawings.

h. Finds the least number of cubes needed to build these shapes.

i. Makes skeleton models of cubes, cuboids and tetrahedron using eakles (iloshi) and modelling clay.

j. Describes what is seen and what is not seen of a simple 3D object from different positions.

k. Sketches top, front and side views of cubes, cuboids, cylinders cones and spheres.

l. Sketches 3D objects (cubes, cuboids and prisms) using isometric dot paper.

m. Makes cubes and cuboids from nets.
**Sub-strand: 2D Shapes (SS2)**

**Topic:** 2D Shapes  
**Outcome SS2.1:**


**Indicators:**

*This is evident when the student:*

a. Uses mathematical vocabulary to some extent to describe 2D shapes (circles, semi circles, triangles, equilateral triangles, isosceles triangles, quadrilaterals, rectangles, squares, oblongs, polygons, pentagons, hexagons, heptagons and octagons).

b. Recognises equilateral and isosceles triangles and its angle/side properties.

c. Classifies polygons using criteria and displays them on a Venn or Carroll diagram.
   - number of right angles
   - whether or not they are regular
   - line symmetry properties.

d. Arranges attribute blocks so that the next block has one or more difference in attribute to the previous one.

e. Builds up various shapes by using all seven pieces of tangram.

f. Puts two identical shapes together as many ways as possible and names the new shapes.

![Illustration of shapes](image)

- g. Constructs triangles when the sides are given.

h. Recognise and draws more than one line of symmetry of a shape which has more than one line of symmetry.

i. Identifies whether designs, logos, advertisements, etc. have a line of symmetry.

j. Sketches the reflection of a simple shape in a mirror line parallel to one edge, where the edges of the shape or the lines of the pattern are parallel or perpendicular to the mirror line.

![Illustration](image)

- k. Makes patterns by repeatedly translating or reflecting a shape.

![Pattern](image)
**Sub-strand: Positions and Directions (SS3)**

**Topic:** Position and Direction

**Outcome SS3.1:** Describe positions and directions. Give directions and follow short paths, draw simple paths and informal maps. Interpret and describe location and direction using grid references and intermediate compass points. Describe movements, and understand angle as a measure of turn.

**Indicators:**

*This is evident when the student:*

a. Recognises and uses the eight compass directions N, S, E, W, NE, NW, SE, SW. *(Eg: Describes a south-east route from (1, 4) as going through the points (2, 3), (3, 2), (4, 1) and (5, 0); Describes a route from one point to other on an isometric grid using NE, NW, SE, SW.)*

b. Describes all the different routes from A to B, travelling only north-east or north-west.

c. Makes and measures clockwise and anticlockwise turns. *(Eg: from SW to N, or from 4 to 10 on a clock face.)*

d. Describes and find the position of a point on a grid of squares where the lines are numbered.

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Square B2 is shaded

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e. Recognise and identify simple examples of horizontal or vertical lines or edges in the environment. *(Eg: the edge of the table is horizontal, the edge of the door is vertical)*

f. Recognises that rows on a grid are described as horizontal, columns as vertical, and lines joining opposite corners as diagonals.

g. Draws a rough sketch of a path travelled.

h. Makes rough sketches of maps.

i. Uses regions on a grid to locate places. *(Eg: What is at A5 on the school map? The Prayer Room), (Where is the office? C2.)*

j. Writes a series of instructions for moving from one place to another *(Eg: from the classroom to the library).*

k. Tells a story which includes key words such as north, clockwise, left, horizontal, etc.
Sub-strand: Angles (SS4)

**Topic:** Angles

**Outcome SS4.1:**
*Make and describe turns; estimate, draw, order and measure angles. Know the units of angles. Recognise the relationship between 90° with whole turns or quarter turns. Know angles formed at rectangles, squares or triangles.*

**Indicators:**

*This is evident when the student:*

a. Begins to know that angles are measured in degrees.
b. Makes and measures clockwise and anti-clockwise turns, describing them in degrees.
c. Recognises that angles are measured in degrees and that: one whole turn is 360 degrees or four right angles; a quarter turn is 90 degrees or one right angle; half a right angle is 45 degrees.
d. Recognises that the angles at the corners of rectangles and squares are 90°, and that the angles of an equilateral triangle are 60°.
e. Makes a paper protractor which shows 15° divisions. Uses the angles 60° and 30° to find angles less than, greater than or same as a 60° and 30°.
f. Makes and describes turns of 30°, 60°, 90° using the hour hand on a clock. *(Eg: from 10 o’clock to 2 o’clock, or 5 o’clock to 7 o’clock, or 2 o’clock to 3 o’clock.)*

g. Orders a set of angles less than 180 degrees.
h. Uses a 45° or 60° set square to draw and measure angles of 90°, 60°, 45° and 30°.
CHANCE and HANDLING DATA
Strand: Chance and Handling Data (CH)

Sub-strand: Handling Data (CH1)

**Topic:** Handling Data

**Outcome CH1.1:**
Solve a given problem by organising, representing and interpreting data in simple tables or diagrams. Construct and interpret pictographs and bar charts.

**Indicators:**

*This is evident when the student:*

a. Uses two way Venn and Carroll diagrams to display information about shapes or numbers.

b. Makes a simple frequency table to organise data. (*Eg: Find out by asking neighbours who has had German measles, chicken pox, mumps, flu... Discuss the findings, such as the risk of catching measles, or flu.*)

c. Constructs pictographs where one symbol represents 2, 5, 10 or 20 units.

d. Responds to questions. (*Eg: How many thrushes? How many more sparrows than thrushes? How many birds altogether? Were there many thrushes compared with other birds? Why might this be? How might more accurate data be collected?*)

e. Constructs bar charts. Intervals labelled in 2s, 5s, 10s or 20s.

f. Discuss questions. (*Eg: 25 people were on the 1:00 ferry. Draw in the bar, On a Monday, which ferry is most likely to be full? Which ferry had the fewest people on it? Why? What might the graph for Friday look like? How often does the ferry ride? Do you think that the ferry timetable should change? How and why?*)
PATTERNING & ALGEBRA
Strand: Patterning and Algebra (PA)

Sub-strand: Sequences and Properties of Numbers (PA1)

**Topic:** Number Sequences  
**Outcome PA1.1:** Describe, copy, predict and extend simple patterns. Create simple patterns using familiar materials. Describe the term to term rule for a simple number sequence.

**Indicators:**

*This is evident when the student:*

1. Makes and records different dot patterns and predicts the number of dots needed for later terms. Eg

   ![Pattern](image)

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Dots</th>
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<tbody>
<tr>
<td>1</td>
<td>4</td>
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<tr>
<td>2</td>
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<td>10</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>14</td>
</tr>
</tbody>
</table>

2. Describes and extends simple number sequences beyond zero. Eg: 24, 30, __, 48, __, 60, The rule is: +6

   Complete the sequence and find the next two numbers.

   • 19, 15, 11, __, __, 3, –1, __, The rule is _____________

   Complete the sequence and find the next two numbers.

   • 746, 646, __, 446, 346, __, 146, The rule is _____________

   Complete the sequence and find the next two numbers.

   • 710, 610, 510, __, __, 310, 210, __, The rule is _____________

   Complete the sequence and find the next two numbers.

3. Corrects errors in simple number sequences.

4. Creates simple number sequences. Eg:

   • make a sequence, with five numbers, which has 6 and 12 in it? __, __, __, __

   • make a sequence, with five numbers, which has 5 and 20 in it? __, __, __, __

5. Creates as many numbers in a given sequence in one minute. Eg:

   • The first number of the sequence is 120. Numbers increase by 30.

   • The first number of the sequence is 510. Numbers decrease by 20

**Topic:** Properties of Numbers  
**Outcome PA1.2:** Recognise odd and even numbers and some of their properties. Recognise multiples.

**Indicators:**

*This is evident when the student:*

1. Recognises odd and even numbers up to 1000 and some of their properties, including the outcome of sums or differences
of pairs or odd/even numbers.

b. Recognises multiples of 6, 7, 8, 9 up to the 10th multiple.

c. Finds simple common multiples.

d. Finds all the pairs of factors of any number up to 50.

Sub-strand: Investigations, Puzzles and Problems (PA2)

**Topic:** Investigations, Puzzles and Problems

**Outcome PA2.1:**

Solve simple mathematical problems and puzzles and explain the process.

**Indicators:**

This is evident when the student:

a. Solves simple mathematical problems and puzzles. (Refer to: Mathematical investigations, puzzles and problems in the teacher’s guide)

b. Explains methods by reasoning how the problem was solved.
GRADE 5 SYLLABUS DETAILS
## GRADE 5

*Strand: Numbers (N)*

**Sub-strand: Number Concept (N1)**

**Topic: Place Value and Ordering**

**Outcome N1.1**: Recognise the value of numbers up to 6-digits (999,999).

**Indicators:**

- Uses the vocabulary of comparing and ordering numbers, including symbols such as <, >, ≤, ≥ and =.
- Partitions 6-digit numbers in different ways, including into multiples of 100,000, 10,000, 1,000, 100, 10 and 1.
- Writes numbers presented orally up to 999,999 in figures.
- Reads, writes and says number up to 6-digits in figures and words.
- Records numbers up to five digits using expanded notation. (Eg: 701428 = 700,000 + 1000 + 400 + 20 + 8)
- Recognises that the position of a digit gives its value, in relation to 6-digit numbers and knows what each digit represents.

**Topic: Estimating and Rounding**

**Outcome N1.2**: Use the vocabulary of estimation and approximation. Round off whole numbers.

**Indicators:**

- Use vocabulary of estimation and approximation.
- Rounds integers to the nearest 10, 100 or 1000.

**Sub-strand: Addition and Subtraction (N2)**

**Topic: Understanding Addition and Subtraction**

**Outcome N2.1**: Carry out the operation of addition and subtraction using various strategies and use the related vocabulary to solve simple word problems.

**Indicators:**

- Uses appropriate vocabulary to support addition and subtraction.
- Recognises that subtraction is the inverse of addition and uses this to check the results.
- Responds rapidly to oral or written questions, explaining the strategy used. (Eg: 3754 + 30...; Add 700 to 9764...; 18 + 30 +
29...; Add 250, 60, 40, 150 and 3...; What is the sum/total of 226 and 39? And of 13, 64 and 153? How many altogether are 121 and 345? And 61, 237 and 6? Increase 190 by 37, which three numbers could have a total of 450? Are there any others?)

d. Responds rapidly to oral or written questions, explaining the strategy used. (Eg: 127 take away 35...; Take 80 from 373...; 678 subtract 105...; Subtract 50 from 225...; 500 less than 720; What must I take from 220 to leave 55? What is the difference between 155 and 390? How many more than 952 is 1050? How many less than 305 is 94? What must I add to 720 to make 908? Decrease 92 by 78; 570 add a number is 620. What is the number? Find pairs of numbers with a difference of 599...)

e. Finds the value of the missing term(s) in addition and subtraction sentences.

f. Creates addition and subtraction stories.

g. Solve word problems involving addition and subtraction.

**Topic:** Rapid Recall of Addition and Subtraction facts

**Outcome N2.2:**

Derive and recall: doubles of all numbers up to 100, and doubles of multiples of 10 or 100 up to 1000 or 10000 respectively; number pairs that totals 100, and all pairs of multiples of 50 that totals 1000; decimals (ones or tenths) with a total of 1 or 100.

**Indicators:**

This is evident when the student:

a. Derives and recalls doubles of all numbers from 1+1 to 100+100.

b. Derives and recalls doubles of multiples of 10 from 10+10 to 1000+1000. (Eg: 680 +680=1360).

c. Derives and recalls doubles of multiples of 100 from 100+100 to 10,000+10,000. (Eg: 7900 +7900=15800).

d. Derives and recalls number pairs that total 100. (Eg: 36 + 64 = 100, 83 +  8 = 100).

e. Derives and recalls all pairs of multiples of 50 that total 1000. (Eg: 250 + 750 = 1000,  60 + 850 = 1000).

f. Derives and recalls decimals (tenths) with a total of 1. (Eg: 0.3 + 0.7 = 1,  0.1 + 0.9 = 1).

g. Derives and recalls decimals (ones and tenths) with a total of 10. (Eg: 3.7 + 6.3 = 10;  8.5 + 8.5 = 10).

h. Derives quickly related facts such as 70+90=160; 0.7+0.9=1.6; 160–90=70; 1.6–0.9=0.7

**Topic:** Mental Calculation Strategies of Addition and Subtraction

**Outcome N2.3:**

Carry out mental calculations using various strategies such as partitioning, finding small differences and using near doubles. Derive new facts using number facts already known.

**Indicators:**

This is evident when the student:

a. Adds mentally: (Eg: several small numbers, such as 3 + 5 + 7 + 2 + 9; three multiples of 10, such as 80 + 70 + 40).

b. Partitions into H, T and U, add and subtract the most significant digits first. (HTU±HTU).
known.

c. Finds a difference by counting up through the next multiple of 10, 100 or 1000. *(Eg: 705 – 287, 7005 – 2994).*

d. Identify near doubles, such as 1.5 + 1.6.

e. Adds/subtracts 9, 19, 29... or 11, 21, 31... by adding/subtracting 10, 20, 30... then adjusting by 1.

f. Given three or more numbers, say or write different sentences relating to these numbers. *(Eg: using only the numbers 125, 237, 352, 77, 202, 477, write as many different addition or subtraction sentences as you can).*

g. Derives quickly related facts such as: *(Eg: 70 + 90 = 160, 160 – 90 = 70, 700 + 900 = 1600, 1600 – 900 = 700, 0.7 + 0.9 = 1.6, 1.6 – 0.9 = 0.7).*

h. Uses known number facts of addition and subtraction to derive new facts.

**Topic:** *Pencil and Paper Procedures of Addition and Subtraction*

**Outcome N2.4:**

*Develop and refine written methods for addition and subtraction, building on mental methods.*

**Indicators:**

*This is evident when the student:*

a. Uses the method of adding the most significant digits first in adding HTU&HTU, ThHTU&HTU, ThHTU&ThHTU

\[
\begin{align*}
7587 \\
+ \phantom{0}675 \\
7000 \\
1100 \quad \text{add mentally} \\
150 \quad \text{from top} \\
-12 \\
8262
\end{align*}
\]

b. Uses the method 'carrying' in adding HTU&HTU, ThHTU&HTU, ThHTU&ThHTU

\[
\begin{align*}
3587 \\
+ \phantom{0}675 \\
4262
\end{align*}
\]

111

c. Uses compensation (add too much, take off) method in adding HTU&HTU, ThHTU&HTU, ThHTU&ThHTU

\[
\begin{align*}
654 \\
+ \phantom{0}286 \\
954 \\
(654 + 300) \\
-14 \quad (286 – 300) \\
940
\end{align*}
\]

d. Uses one of the above methods to add two or more decimal numbers with up to three digits and the same number of decimal places. *(know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts.*(Eg: 3.2 m ± 350 cm, MVR6.72 + MVR 8.56 + MVR2.30, 72.5 km + 54.6 km).)*
e. Uses the method counting up from the smaller to the larger number (complementary addition) in subtracting HTU&HTU, ThHTU&HTU, ThHTU&ThHTU

\[
\begin{array}{c}
754 \\
- 286 \\
14 \text{ to make } 300 \\
400 \text{ to make } 700 \\
54 \text{ to make } 754 \\
468
\end{array}
\]

f. Uses the standard method in subtracting HTU&HTU, ThHTU&HTU, ThHTU&ThHTU

\[
\begin{array}{c}
5135 \\
6467 \\
- 2684 \\
3783
\end{array}
\]

g. Uses the compensation (take too much, add back) method in subtracting HTU&HTU, ThHTU&HTU, ThHTU&ThHTU

\[
\begin{array}{c}
754 \\
- 286 \\
454 \text{ (754 – 300)} \\
+14 \text{ (since } 300 – 286 = 14) \\
468
\end{array}
\]

h. Uses one of the above methods to find the difference between two decimal numbers with up to three digits and the same number of decimal places. (know that decimal points should line up under each other). (Eg: MVR 9.42 – MVR 6.78 OR 72.5 km – 4.6 km).

Sub-strand: Multiplication & Division (N3)

Topic: Understanding Multiplication and Division

Outcome N3.1: Carry out the operation of multiplication or division using various strategies such as repeated addition, sharing, and modeling. Solve simple word problems involving four operations and explain the process.

Indicators: This is evident when the student:

a. Uses appropriate vocabulary to support multiplication and division.

b. Recognises that division is the inverse of multiplication and uses this to check the results.

c. Responds rapidly to oral or written questions, explaining the strategy used. (Eg: Two twelves, Double 32, 7 times 8... 9 multiplied by 7, Multiply 31 by 8... by zero... by 1, Is 81 a multiple of 3? How do you know?, What is the product of 25 and 4?, Find all the different products you can make by using three of these: 6, 7, 8, 9, 11.)
d. Responds to oral or written questions, explaining the strategy used. (Eg: Share 48 between 8; Divide 56 by 7. Divide 3 into 72. How many groups of 8 can be made from 73? What is the remainder when 74 is divided by 8? How many lengths of 20 cm can you cut from 270 cm? Is 156 divisible by 6? How do you know? What are the factors of 36? Tell me two numbers with a quotient of 100).

e. Gives a quotient as a fraction when dividing by a whole number. (Eg: 43 ÷ 9 = 47/9).

f. Gives a quotient as a decimal number when dividing by 10, 5, 4 or 2. (Eg: 351 ÷ 10 = 35; 161 ÷ 4 = 15.25).

g. Finds the value of the missing term(s) in multiplication or division sentences. (Eg: 3 × 2 = 6; 6 × 4 = 8; 6 × 6 = 16; 8 ÷ 2 = 4; 4 ÷ 2 = 5)

h. Uses the principles (but not the names) of the commutative, associative and distributive laws as they apply to multiplication:
   Example of commutative law: 8 × 65 = 65 × 8
   Example of associative law:
   14 × 12 = (2 × 7) × 12 = 2 × (7 × 12) = 2 × 84 = 168
   Example of distributive law:
   26 × 7 = (20 + 6) × 7 = (20 × 7) + (6 × 7) = 182, (6 × 15) + (4 × 15) = 10 × 15 = 150

i. Uses brackets: recognises that they determine the order of operations, and that their contents are worked out first. (Eg: 3 + (6 × 5) = 33, whereas (3 + 6) × 5 = 45.)

j. Relates division and fractions. Recognises that: 1⁄3 of 24 is equivalent to 24 ÷ 3 or 24⁄3; 16 ÷ 5 is equivalent to 16⁄5 or 15⁄5.

k. Knows and applies tests of divisibility by 2, 4, 5, 10 or 100.

l. Begins to express a quotient as a fraction or as a decimal when dividing a whole number by 2, 4, 5 or 10, or when dividing Rufiyaa and Laari.

m. Rounds up or down after division, depending on the context.

n. Estimates by approximating (round to nearest 10 or 100), then check result.

o. Checks the result with the inverse operation or with an equivalent calculation.

p. Creates multiplication and division stories.

q. Solves word problems involving multiplication and division.

r. Explains how an answer to a multiplication or division problem was obtained.

s. Uses all four operations to solve simple word problems involving numbers and quantities based on ‘real-life’ and money using one or more steps.
Topic: Rapid Recall of Multiplication and Division

Outcome N3.2:
Respond to oral or written questions and questions phrased differently. Know by heart or derive doubles and halves rapidly.

Indicators:
This is evident when the student:

a. Responds rapidly to oral or written questions: (Eg: Nine sevens; how many eights in 48? 6 times 7, 5 multiplied by 9; multiply 9 by 6; 7 multiplied by 0; Divide 38 by 9; what is 48 shared between 8? Three divided by 5; One seventh of 35).

b. Derives: doubles of all numbers 1 to 100; doubles of multiples of 10 up to 1000; doubles of multiples of 100 up to 10 000; and all the corresponding halves.

c. Responds rapidly to oral or written questions. (Eg: Double 71/2... 98... 680... 8500...; Half of 154... of 820... of 5600...; Twice 85, 1/2 of 920; Half of one half; What is half of Rf 162? How many millimetres is half a metre?)

d. Knows by heart and recalls multiplication tables of 2, 3, 4, 5, 6, 7, 8, 9 10, 11 and 12.

e. Knows by heart the squares of all numbers from 1 × 1 to 1 × 12.

Topic: Mental Calculations Strategies of Multiplication and Division

Outcome N3.3:
Derive new facts, using closely related facts already known, and doubling or halving. Use known number facts and place value to multiply or divide mentally.

Indicators:
This is evident when the student:

a. Uses related facts and doubling or halving to derive new facts. (Eg: Work out the 16 times-table facts by doubling the 8 times-table facts; double a number ending in 5, and halve the other number. ie: 16 × 5 = 8 × 10; halve an even number in the calculation; find the product, then double it. ie: 13 × 14 is equal to 13 × 7 = 91; 91 × 2 = 182; to multiply by 50; multiply by 100, then halve. ie: 36 × 50 is equal to 36 × 100 = 3600; 3600 ÷ 2 = 1800; Work out: 1 × 25 = 25 and so deduce that: 2 × 25 = 50; 4 × 25 = 100; 8 × 25 = 200, 16 × 25 = 400 ...; Use combinations of these facts to work out other multiples of 25, ie: 25 × 25 = (16 × 25) + (8 × 25) + (1 × 25) = 625).

b. Explains how to find sixths by halving thirds, or twentieths by halving tenths. (Eg: one sixth of 300 is 50, one third of 300 is 100, half of that is 50, one twentieth of 900 is 45, one tenth is 90, and half of that is 45).

c. Multiplies and divides any positive integer up to 10 000 by 10 or 100 and understand the effect. (place value)

d. Uses closely related facts. (Eg: multiply by 19 or 21 by multiplying by 20 and adjusting; develop the 12 times table from the 10 and the 2 times tables).
e. Uses the distributive law and partitioning to multiply. \([Eg: 47 \times 6 = (40 \times 6) + (7 \times 6)]\).

f. Uses known number facts and place value to multiply or divide mentally. \([Eg: \text{Multiply a two-digit multiple of 10 by a three-digit multiple of 100}. \text{ie: } 30 \times 400, 40 \times 700; \text{Divide a four-digit multiple of 100 by 1000, 100 or 10}. \text{ie: } 8200 \div 100, 3600 \div 10; \text{Double any multiple of 5 up to 500}; \text{Halve any three-digit multiple of 10}; \text{Multiply a two-digit multiple of 10 or a three-digit multiple of 100 by a single-digit number}; \text{Multiply a two-digit whole number by any single-digit number}].\)

**Topic:** Pencil and Paper Procedure of Multiplication and Division

**Outcome N3.4:**

*Develop and refine written methods for multiplication and division.*

**Indicators:**

*This is evident when the student:*

a. Approximates the answer first and uses the written methods to calculate the answer.

b. Uses grid method in multiplying (HTU × U and TU × TU). \([Eg: 346 \times 9, 72 \times 38]\).

\[
\begin{array}{c}
346 \times 9 \\
300 \times 9 & 2700 \\
40 \times 9 & 360 \\
6 \times 9 & 54 \\
\hline
9 & 2700 \\
360 & 54 \\
3114 & \text{= 3114}
\end{array}
\]

c. Uses partitioning method in multiplying (HTU × U and TU × TU) \([Eg: 346 \times 9, 72 \times 38]\).

\[
\begin{array}{c}
346 \\
300 \times 9 & 2700 \\
40 \times 9 & 360 \\
6 \times 9 & 54 \\
\hline
3114
\end{array}
\]

\[
\begin{array}{c}
346 \\
2700 & \text{leading to } 3114
\end{array}
\]

\[
\begin{array}{c}
72 \\
72 \times 30 & 2160 \\
72 \times 8 & 576 \\
\hline
2336
\end{array}
\]
d. Multiply one digit number by a decimal with one decimal place. *(Eg: 4.9 \times 3)*.

\[
\begin{array}{c}
4.9 \times 3 \\
4.0 \times 3 = 12.0 \\
0.9 \times 3 = 2.7 \\
14.7
\end{array}
\]


e. Uses multiples of the divisor method in dividing (HTU ÷ U). *(Eg: 256 ÷ 7)*

f. Uses standard division method in dividing (HTU ÷ U). *(Eg: 196 ÷ 6)*

\[
\begin{array}{c}
\underline{6)196} \\
- \underline{180} \\
\underline{16} \\
- \underline{12} \\
\underline{4}
\end{array} \quad \frac{32 \text{ R } 4}{6 \overline{196}}
\]

Answer: 32 R 4

\[
\begin{array}{c}
977 - 36 \\
- \underline{360} \\
- \underline{257} \\
- \underline{180} \\
\underline{72}
\end{array} \quad 977 \\
\begin{array}{c}
10 \times 36 \\
10 \times 36 \\
5 \times 36 \\
2 \times 36
\end{array}
\]

Answer: \(27\frac{3}{4}\)
Sub-strand: Money (N4)

**Topic: Money**

**Outcome N4.1:**

*Carry out simple conversions and transactions and solve word problems by explaining the process.*

**Indicators:**

*This is evident when the student:*

- a. Produces the fewest of notes and coins to express a given amount.
- b. Represents a sum of money by two or more combinations of notes and coins.
- c. Uses the decimal notation and the appropriate unit to represent money amounts.
- d. Pays appropriate amounts and determines appropriate change in shopping.
- e. Converts amounts of money, Rufiyaa to Laari, and Laari to Rufiyaa.
- f. Adds or subtracts money amounts.
- g. Makes simple conversions of Rufiyaa to foreign currency.
- h. Recognises which goods are cheaper. *(Eg. 3 fish for MVR 10 or 7 fish for MVR 20).*
- i. Makes bill for a given price list of items.
- j. Solves word problems in the context of money involving one or more steps, and explains how the problem was solved.

Sub-strand: Negative Numbers (N5)

**Topic: Negative Numbers**

**Outcome N5.1:**

*Orders and carry out addition and subtraction and do problem solving, using integers.*

**Indicators:**

*This is evident when the student:*

- a. Orders a set of integers.
- b. Compares two integers using the relation symbols (<, >).
- c. Adds, subtracts, multiplies and divides integers using cards.
- d. Solves problems involving (positive and negative) integers.
**Sub-strand:** Fractions, Decimals and Percentages (N6)

**Topic:** Fractions

**Outcome N6.1:**
Recognise the equivalence between fractions and compare them in practical contexts, relates fraction as a part of a whole, form fraction word problems and order familiar fractions and convert one form of fraction to the other and express them in the simplest form.

**Indicators:**

This is evident when the student:

a. Uses fraction notation, including mixed numbers, and the vocabulary numerator and denominator.
b. Recognises when two simple fractions are equivalent, including relating hundredths to tenths. (Eg. 70/100 = 7/10).
c. Relates fractions to division. (Eg: Understand that finding one third is equivalent to dividing by 3, so 1/3 of 15 is equivalent to 15 ÷ 3; when 3 whole cakes are divided equally into 4, each person gets three quarters, or 3 ÷ 4 = 3/4; recognise that 12/3 is another way of writing 12 ÷ 3).
d. Finds fractions of numbers or quantities and recognises from practical work. (Eg: one quarter is more than one eighth; one third is more than one ninth; two thirds is less than three quarters).
e. Places unit fractions in order and explains the order either in objects, diagrams or words.
f. Orders fractions by converting to a common denominator and positioning them on a number line. (Eg: Place these in order, smallest first: 1/2, 11/2, 2, 1/4, 13/4).
g. Forms fractions to word problems such as:
   - What fraction of Rf 2 is 65 L?
   - What fraction of 1 litre is 750 ml?
   - What fraction of 1 day is 6 hours?
   - I work for 8 hours and sleep for 10 hours. What fraction of the day do I sleep? What fraction of the day do I work?
h. Changes an improper fraction to a mixed number and vice versa.
i. Reduces a fraction to its simplest form by cancelling common factors in the numerator and denominator.
j. Solves word problems involving fraction of quantities. (Eg: Riza had 48 cars. He gave away 3/4 of them. How many does he have left)?

**Topic:** Fraction Operations using Visualisation

**Outcome N6.2:**
Find fractions that total 1. Carry out four operations involving simple fractions.

**Indicators:**

This is evident when the student:

a. Finds two or more simple fractions with a total of 1 (using fraction strips or fraction circles). Uses a calculator to check the answer. Categorise their answers to 'exact' and 'approximate'
answers. (Eg: 1/2+2/8+1/4 (exact), 1/2+1/5+2/12+1/8 approximation).

b. Adds and subtracts two proper fractions having the same denominators.

c. Adds and subtracts two simple fractions whose denominators are multiples. Eg: thirds and sixths, fifths and tenths.

d. Multiplies two simple fractions.

e. Divides two simple fractions.

**Topic:** Fractions and Decimals

**Outcome N6.3:**
Reads, writes and says decimal numbers using decimal notations, and recognises the relationship between decimals and fractions and orders a set of decimal fractions.

**Indicators:**

*This is evident when the student:*

a. Recognises the place value of digits in a decimal number up to the hundredths place.

b. Reads, writes and says decimal numbers up to the hundredths place.

c. Relates decimal notation for tenths and hundredths to money and measurement.

d. Writes the decimal number equivalent to 2/10, 5/100, 29/100, 15/100, 9/100 etc.

e. Counts on or back in steps of 0.1 and 0.01.

f. Positions one-place and two-place decimals on a number line.

g. Orders a set of numbers or measurements with up to two decimal places.

h. Gives a decimal number lying between two others Eg: between 3.4 and 3.5

i. Rounds a number with one or two decimal places to the nearest whole number.

j. Investigates the equivalence between decimal numbers and fractions using base 10 apparatus, metre ruler and calculators.

k. Recognises the equivalence between the decimal numbers and fractions. Forms of one half, one quarter, three quarters and tenths and hundredths. (Eg: 0.5 = 1⁄2, 0.25 = 1⁄4, 0.75 = 3⁄4, 0.3 = 3⁄10, 0.15 = 15⁄100)

**Topic:** Fractions, Decimals and Percentages

**Outcome N6.4:**
Identify percentage as the number of parts in every 100, recognise the equivalence between percentages, fractions and decimals and workout simple percentages and solve simple problems.

**Indicators:**

*This is evident when the student:*

a. Begins to understand percentage as the number of parts in every 100.

b. Expresses one half, one quarter, three quarters and tenths and hundredths, as percentages. (Eg: one whole = 100%, one half = 50%, one quarter = 25%, three quarters = 75%, one tenth = 10%)

c. Recognises the equivalence of percentages, fractions and
decimals. (Eg: 10% = 0.1 = 1/10, 25% = 0.25 = 1/4, 20% = 0.2 = 1/5, 50% = 0.5 = 1/2, 1% = 0.01 = 1/100, 75% = 0.75 = 3/4)
d. Expresses the shaded fraction of a shape as a percentage. Eg: What percentage of the shape is shaded?


e. Express simple fractions as percentages.
f. Finds simple percentages of small whole number quantities.
g. Finds percentages by doubling. (Eg: 10% of MVR 500 = MVR50, 20% of MVR 500 = MVR100, 40% of MVR 500 = MVR 200, 80% of MVR 500 = MVR 400)
h. Finds percentages by using halving and quartering. (Eg: To find 75% of MVR 300, 50% is one half = MVR 150, 25% is one quarter = MVR 75, 75% is three quarters = MVR 225)
i. Solves simple problems involving percentages. (Eg: 35% of the children in a class are boys. What percentage are girls?, Aisha got 40 marks out of 80 in her Maths test. Ali got 45%. Who did better: Aisha or Ali?)

Sub-strand: Ratio and Proportion (N7)

**Topic:** Proportion

**Outcome N7.1:**
Use ratios to compare two quantities, relate fractions to simple proportions and solve simple problems involving ratio and proportion.

**Indicators:**

This is evident when the student:

1. Uses ratios to compare two quantities.
2. Relates fractions to simple proportions.
3. Simplifies ratios with whole numbers.
4. Solve simple problems using ideas of ratio and proportion. (Do not use the cross multiplication method). (Eg: Fish must be cooked 25 minutes for every kg. How long does it take to cook a 4 kg fish? At the restaurant there are 2 men for every 3 women. There are 15 women at the restaurant. How many men are there? There are 12 men at the restaurant. How many women are there? Shiuna uses 3 tomatoes for every 1/2 litre of sauce. How many tomatoes does she need for 1 litre of sauce? How much sauce can she make from 15 tomatoes? A mother cat is fed 5 fish for every 2 fish for its kitten. Ali fed the mother cat 15 fish. How many fish did its baby kitten get? Ali fed the baby kitten 8 fish. How many fish did its mother get? For every MVR 50 note Mum gives to Dad, he gives her five MVR 10 notes. Dad gave Mum twenty-five MVR 10 notes. How many MVR 50 notes did Mum give him?)
MEASUREMENT
Strand: Measurement (M)

Sub-strand: Length (M1)

Topic: Length

Outcome M1.1:
Recognise and use relationships between familiar units and draw lines and measure them with accuracy using appropriate equipment, suitable units and solve problems. Estimate and record length/distance to a suitable degree of accuracy.

Indicators:

This is evident when the student:

a. Uses vocabulary related to measures (length).
b. Estimates and check lengths and distances using standard units of measurements. (Eg: how wide/high the front fence of the school is, the thickness of a set of playing cards)
c. Suggests suitable units and measuring equipment to estimate or measure length.
d. Measures and draws lines to the nearest millimetre.
e. Recognises that a mile is a bit more than 1.5 km (about 1600 metres).
f. Uses the abbreviations km, m, cm, mm correctly.
g. Reads a scale to the nearest marked division.
h. Records estimates and readings from scales to a suitable degree of accuracy.
i. Converts larger to smaller units and vice versa. (Eg: km to m, m to cm or mm).
j. Chooses appropriate number operations and calculation methods to solve measurement word problems and explains how the problem was solved.

Sub-strand: Mass (M2)

Topic: Mass

Outcome M2.1:
Recognise and use relationships between familiar units and measure objects with accuracy using appropriate equipment, suitable units and solve problem. Estimate and record mass to a suitable degree of accuracy.

Indicators:

This is evident when the student:

a. Uses vocabulary related to measures (mass).
b. Estimates and checks masses of objects using standard units of measurements such as the total weight of three similar parcels.
c. Suggests suitable units and measuring equipment to estimate or measure mass.
d. Recognises and uses the relationship between units of mass. (Eg: 1 kg = 1000 g).
e. Uses the abbreviations kg, g correctly.
f. Reads and records a scale to the nearest marked division.
g. Records estimates and readings from scales to a suitable degree of accuracy.
h. Converts larger units to smaller units. \((\text{Eg: kg to g})\).

i. Chooses appropriate number operations and calculation methods to solve measurement word problems and explains how the problem was solved.

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**Sub-strand: Capacity (M3)**

**Topic:** Capacity

**Outcome M3.1:**

Recognise and use relationships between familiar units and measure capacity with accuracy using appropriate equipment, suitable units and solve problems. Estimate and record mass to a suitable degree of accuracy.

**Indicators:**

*This is evident when the student:*

a. Uses vocabulary related to measures (capacity)

b. Estimates and checks, the capacity of containers using standard units, measurements such as the amount of rainfall collected in a week

c. Suggests suitable units and measuring equipment to estimate or measure capacity.

d. Recognises and uses the relationship between units of capacity. \((\text{Eg: 1 litre} = 1000 \text{ ml} = 1000 \text{ cm}^3)\).

e. Uses the abbreviations l, ml, cm³ correctly.

f. Reads and records a scale to the nearest marked division.

g. Records estimates and readings from scales to a suitable degree of accuracy.

h. Converts larger units to smaller units. \((\text{Eg: l to ml})\).

i. Chooses larger units to smaller units. \((\text{Eg: l to ml})\).

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**Sub-strand: Perimeter, Area and Volume (M4)**

**Topic:** Perimeter

**Outcome M4.1:**

Recognise and use the vocabulary related to perimeter. Calculate the perimeter of simple shapes using the formula. Solve problems involving perimeter of simple shapes.

**Indicators:**

*This is evident when the student:*

a. Uses vocabulary related to perimeter.

b. Measures and calculate perimeters of simple shapes and regular polygons.

c. Draws some shapes on squared paper. Measures the perimeters to the nearest mm.
d. Expresses the formula for the perimeter of a rectangle as ‘twice length, twice breadth’.
e. Solves problems involving perimeter of rectangles/squares and simple shapes. *(Eg: The perimeter of a rectangle is 72 cm. The shortest side is 9 cm. What is the length of the longest side?)*

**Topic: Area and Perimeter**

**Outcome M4.2:**
*Use the vocabulary related to area. Measure and calculate the area of compound shapes. Explore the relationship between the area of rectangles and squares. Apply and use the appropriate formula to calculate area. Investigate and solve problems involving perimeter and area.*

**Indicators:**

**This is evident when the student:**

a. Uses vocabulary related to area.
b. Makes a metre square using newspaper. Finds that 1 square metre is 10 000 cm².
c. Calculates the areas of compound shapes that can be split into simple shapes.
d. Identifies and explains the relationship between area of rectangles and right-angled triangles.
e. Uses formulae to calculate the areas of squares, rectangles and triangles.
f. Uses the abbreviations km, m, cm, mm, km², m², cm², mm² correctly.
g. Draws different shapes on dot paper that have the same area. Finds which shape has the longest perimeter.
h. Designs and makes a rectangle, and a square that has equal area.
i. Suggests areas you would measure in m², cm², mm²
ej. Uses knowledge of perimeter and area to investigate and solve a given problem. Explain methods and reasoning used to solve the problem.

**Topic: Volume**

**Outcome M4.3:**
*Know the meaning of volume. Understand and use the vocabulary related to volume. Estimate, measure or calculate the volume of*.

**Indicators:**

**This is evident when the student:**

a. Uses vocabulary related to volume.
b. Selects a cube with a volume of one centimetre cube from a collection of other cubes.
Sub-strand: Time (M5)

**Topic:** Time

**Outcome M5.1:**

*Use vocabulary related to time. Estimate the duration of an event in time units. Read, tell and record time using a 24-hour clock. Read calendar and find the relationship between the units of time. Solve word problems involving time. Read and interpret time tables.*

**Indicators:**

*This is evident when the student:*

- a. Uses vocabulary related to time.
- b. Uses units of time; read the time on a 24-hour digital clock and uses 24-hour clock notation, such as 19:53. Uses timetables.
- c. Converts between 24-hour notation and am/pm.
- d. Recognises and uses that 1 millennium = 1000 years, 1 century = 100 years, 1 decade = 10 years, 1 year = 12 months or 52 weeks or 365 days, 1 leap year = 366 days, 1 week = 7 days, 1 day = 24 hours, 1 hour = 60 minutes, 1 minute = 60 seconds
- e. Estimates using standard units of time. *(Eg: the total hours of darkness in a month, how long it takes to run a marathon, the time you spend on sleeping, eating, praying... etc).*
- f. Uses a stop watch or other timers to measure and compare the times of events.
- g. Suggests a unit to estimate or measure. *(Eg: how long does it take to grow a Banyan (Nika) tree, the age of an old Conifer (Fithuroanu) tree).*
- h. Responds to oral and written questions: *(Eg: Would you expect: to roast a chicken in 2 hours, 5 hours or 10 hours, to walk a kilometre in 10 min, 50 min or 90 min?, Have you lived more or less than 3650 days?/100 000 hours?)*
- i. Reads and interprets school time tables. *(Eg: What is the duration of a period? Which subject gets the most time? How many hours do you spend in school for a week? How much time you spend on Maths each day, each week, each term, each year?)*
- j. Carry out addition and subtraction of time. *(Hr, min and sec)*
- k. Solves word problems involving time.
SHAPE and SPACE
Strand: Shape and Space (SS)

Sub-strand: 3D Shapes (SS1)

**Topic:** 3D Shapes

**Outcome SS1.1:**

Recognise, name, sort, and make models of 3D objects. Describe them using everyday language. Identify 3D shapes from pictures of them. Sketch all faces of 3D shapes on paper. Make double layered solids as in pictures using cubes. Make skeleton models of 3D shapes. Begin to identify the cross section of prisms. Visualise 3 dimensions from 2D drawings. Identify and sketch different nets.

**Indicators:**

This is evident when the student:

a. Uses mathematical vocabulary to describe 3D objects (cubes, cuboids, cylinders, spheres, hemisphere, cones, tetrahedron, prism, pyramid and polyhedron).

b. Counts the number of faces and edges. Recognises properties such as that, all pyramids have an even number of edges; the number of straight edges in a prism is a multiple of 3; the number of faces of a pyramid is one more than the number of edges of the base; the number of faces of a prism is two more than the number of edges of an end face.

c. Recognises that in a polyhedron: each face is a flat surface and is a polygon: an edge is the straight line where two faces meet: a vertex is the point where three or more edges meet.

d. Classifies solids according to properties such as: the shapes of the faces; the number of faces, edges, vertices; whether or not any face is right-angled; whether the number of edges meeting at each vertex is the same or different.

e. Recognises that a prism has two identical end faces and the same cross-section throughout its length.

f. Visualises 3-D shapes from 2-D drawings.

h. Makes skeleton models of cubes, cuboids, tetrahedron, prism, pyramid and polyhedron using eakles (iloshi) and modelling clay.

i. Sketches top, front and side views of cuboids, cylinders, spheres, hemisphere, cones and tetrahedron.

j. Sketches 3D objects (cubes, cuboids, prisms and pyramids) using isometric dot paper.

k. Identifies and sketches different nets for closed cubes and cuboids.
**Sub-strand: 2D Shapes (SS2)**

**Topic: 2D Shapes**

**Outcome SS2.1:**

**Indicators:**

**This is evident when the student:**

a. Uses mathematical vocabulary to describe 2D shapes (circles, semi circles, triangles, equilateral triangles, isosceles triangles, scalene triangles, quadrilaterals, rectangles, squares, oblongs, polygons, pentagons, hexagons, heptagons and octagons).

b. Recognises that a diagonal is a straight line drawn from a vertex of a polygon to a non-adjacent vertex.

c. Recognises properties of rectangles such as:
   - all four angles are right angles
   - opposite sides are equal
   - the diagonals bisect one another.

d. Classifies triangles using criteria such as:
   - equal sides and equal angles
   - lines of symmetry.
   - Displays them on a Venn or Carroll diagram.

e. Builds up various shapes by using all seven pieces of tangram.

f. Uses a pin board to make shapes. (Eg: make different triangles on 3 × 3 pin board and different squares on a 5 × 5 pin board. Discusses properties such as which of these triangles are scalene, or which has the greatest area.)

![Image of triangles and squares](image-url)

g. Constructs parallel lines using setsquares and compasses.

h. Identifies and draws all lines of symmetry of given 2D shape.

i. Investigates the lines of symmetry in regular polygons.
   - Discovers that the number of lines of symmetry in a regular polygon is equal to the number of sides. Eg: a square has four lines of symmetry and an equilateral triangle has three.

j. Sketches the reflection of a simple shape in a mirror line parallel to one edge, where the edges of the shape are not all parallel or perpendicular to the mirror line.

![Image of reflection](image-url)

k. Completes symmetrical patterns with two lines of symmetry at right angles.
l. Sketch the position of a simple shape after it has been translated, say, 2 units to the left.

m. Recognises where a shape will be after a translation.

n. Makes and investigates a general statement about familiar shapes by finding examples that satisfy it.

**Sub-strand: Positions and Directions (SS3)**

**Topic:** Position and Direction

**Outcome SS3.1:**
Describe positions and directions. Give directions and follow short paths, draw simple paths and informal maps. Read and plot co-ordinates. Interpret and describe location and direction using grid references.

**Indicators:**

*This is evident when the student:*

a. Reads and plots co-ordinates in the first quadrant.

b. Responds to questions such as: *(Eg: These points are the co-ordinates of the vertices of a shape: (1, 5), (2, 5), (4, 3), (2, 1), (1, 1). What is the name of the shape?, Three of the vertices of a square are (2, 1), (2, 4) and (5, 4). What are the co-ordinates of the fourth vertex?)*

c. Recognises that: perpendicular lines are at right angles to each other, parallel lines are the same distance apart.

d. Recognises and identifies parallel and perpendicular lines in the environment and in regular polygons such as the square, hexagon and octagon.

e. Recognises that a diagonal is a straight line drawn from a vertex of a polygon to a non-adjacent vertex.

*Eg: Draw all the diagonals of a shape such as a pentagon or an octagon.*
Sub-strand: Angles (SS4)

**Topic: Angles**

**Outcome SS4.1:**

- Approximately measure angles using a paper protractor. Identify types of angles, estimate or measure to the nearest 5°. Calculate angles on a straight line. Rotate and make patterns. Bisect the given line.

**Indicators:**

*This is evident when the student:*

- a. Knows that angles are measured in degrees.
- b. Makes a paper protractor which shows 15° divisions. Uses the paper protractor to measure angles approximately.
- c. Says which of these angles are acute, and which are obtuse. Estimates the size of each angle to the nearest 5°.
- d. Use a protractor to measure and draw acute and obtuse angles to the nearest 5°.
- e. Calculate angles in a straight line.
- f. Make patterns by rotating shapes.
- g. Bisects a given line.
CHANCE and HANDLING DATA
Strand: Chance and Handling Data (CH)

Sub-strand: Handling Data (CH1)

**Topic:** Handling Data

**Outcome CH1.1:**
Solve a given problem by organising, representing and interpreting data in simple tables or diagrams. Construct and interpret bar charts, bar line charts or line graphs. Find the mode of a set of data, and begin to find the range.

**Indicators:**

*This is evident when the student:*

- a. Uses two way Venn and Carroll diagrams to display information about polygons, using criteria such as number of right angles, whether or not they are regular, symmetry properties.
- b. Solves a given problem by organising, representing and interpreting data in simple tables or diagrams. Constructs and interpret bar charts, bar line charts or line graphs. Find the mode of a set of data, and begin to find the range.
- c. Constructs bar graphs and bar line charts. Intervals labeled in 2s, 5s, 10s, 20s or 100s.
- d. Discusses questions such as: *(Eg: Which number was rolled most often? Was this what you would have expected? Why? Do you think the next time you roll the dice you are more likely to roll a 2 than a 6? Why? What do you think will happen if you roll the dice 50 more times? Now try it and see).*
- e. Draws and interprets a line graph. Understands that intermediate points may or may not have meaning. *(Eg: Temperature of an air-conditioned Hall).*
- f. Finds the mode of a set of data. Begins to find the range of a set of data.
**Sub-strand: Probability (CH2)**

**Topic:** Probability  
**Outcome CH2.1:**  
*Use the language associated with probability to generate discussion. Order chance events and conduct simple experiments.*

**Indicators:**

**This is evident when the student:**

a. Uses the language of chance eg certain, uncertain, likely, unlikely, possible, impossible, less/more likely, maybe.

b. Discusses the chance or likelihood of particular events. Eg:
   - Discuss statements like: I doubt whether I will catch the 7 o’clock ferry; Snakes and Ladders is not a fair game because the first player has the best chance of winning; There is high risk of catching a cold these days;
   
   Match one of these words to each of the statements below:
   
   CERTAIN LIKELY UNLIKELY IMPOSSIBLE
   
   I will watch television tonight.
   
   It will rain next July.
   
   I will grow taller than my mother.
   
   It will get dark tonight.
   
   I will see my father on my way home.

c. Makes simple predictive statements about everyday events using the language of chance. (Eg: ‘Maldivian National Football team has “good chance” of winning SAFF championship’).

   Place the statements on this scale:
   
   less likely | more likely
   no chance | poor chance | even chance | good chance | certain

d. Orders chance events from least likely to most likely. (Eg: for a die with faces 1, 1, 2, 2, 2, 3 state that a 2 is most likely, 1 is next and 3 is least likely).

e. Conducts simple experiments using a coin, a dice, or a spinner, and records the results. (Eg: How many heads and how many tails might turn up if a coin is tossed 10 times, 20 times, 30 times...?)
Strand: Patterning and Algebra (PA)

Sub-strand: Sequences and Properties of Numbers (PA1)

**Topic:** Number Sequences

**Outcome PA1.1:**
Describe, copy, predict and extend simple patterns.
Create simple patterns using familiar materials. Describe the term to term rule for a simple number sequence.

**Indicators:**
*This is evident when the student:*

a. Makes and records different stick patterns and predicts the number of sticks and corners for later terms. Eg:

<table>
<thead>
<tr>
<th>Squares</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sticks</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corners</td>
<td>4</td>
<td>7</td>
<td>10</td>
<td>13</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Triangles</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sticks</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corners</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b. Describes and extends number sequences such as. Eg:
• 24, 14, 4, –6, __, __, __
The rule is: – 10
• -5, 0, 5, __, __, __
  a. The rule is ____________
  b. The rule is ____________
  c. The rule is ____________
  d. The rule is ____________

b. Describes and extends number sequences such as. Eg:
• 13, 8, 3, –2, __, __, __
  a. The rule is ____________
  b. The rule is ____________
  c. The rule is ____________
  d. The rule is ____________

c. Describes and extends simple number involving decimal numbers. Eg:
• 0.1, 0.2, 0.3, 0.4, __, __, __
  a. The rule is ____________
  b. The rule is ____________
  c. The rule is ____________
  d. The rule is ____________

d. Makes three number sequences (one easy, one medium and one hard) for someone else to solve.

e. Creates as many numbers in a given sequence in one minute.
Eg:
• The first number of the sequence is 509. This increases by 16 and decreases by 9. Eg: 509, 525, 516, 532, 523, 539, ...
• The first number of the sequence is 295. This decreases by 11 and increases by 15. Eg: 295, 284, 299, 288, 303, 292, ..
**Topic:** Properties of Numbers

**Outcome PA1.2:**
*Makes a general statement about odd and even numbers regarding some of their properties. Find prime numbers. Recognises square numbers.*

**Indicators:**
*This is evident when the student:*

a. Makes general statements about odd or even numbers, including the outcome of sums and differences.
b. Finds the lowest common multiple of two small numbers.
c. Finds all the pairs of factors of any number up to 100.
d. Finds prime numbers less than 50 using Sieve of Eratosthenes method.
e. Recognises squares of numbers to at least 12×12.

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**Sub-strand: Algebraic Techniques (PA2)**

**Topic:** Algebraic Techniques

**Outcome PA2.1:**
*Model algebraic expressions and carryout addition and subtraction.*

**Indicators:**
*This is evident when the student:*

a. Models algebraic expressions using objects. Eg:
   
   \[ \% \% \% \% = 4 \%
   
   \[ ! ! ! ! ! ! ! ! ! = 8 ! \]

b. Uses objects to add and subtract simple algebraic expressions.
   
   Eg:
   
   \[ \text{ff + fff = 2f + 3f = 5f} \]
   
   \[ 11j - 7j = 4j \]

c. Adds and subtracts simple algebraic expressions. Eg:
   
   \[ b + b + b + b + b + b + b + b + b = 9b \]
   
   \[ 2a + 3a = 5a \]
   
   \[ 8x - 5x = 3x \]

d. Completes number sentences such as:
   
   \[ 12 + \square = 20 \]
   
   \[ \square \times 5 = 125 \]
   
   \[ 3 + \square = 5 + 3 \]
   
   \[ 48 \div 6 = \square \times 8 \]
   
   \[ 5 + \square = 12 - 4 \]
   
   \[ 3 + \square = -7 \]
Sub-strand: Investigations, Puzzles and Problems (PA3)

**Topic:** Investigations, Puzzles and Problems

**Outcome PA3.1:**

Describe and solve simple mathematical problems and puzzles and explain the process.

**Indicators:**

*This is evident when the student:*

a. Solves mathematical problems and puzzles, recognises and explains patterns and relationships, generalises and predicts.

b. Explains the method used by reasoning orally and in writing.

c. Suggests extensions by asking, What if?
GRADE 6 SYLLABUS DETAILS
GRADE 6

Strand: Numbers (N)

Sub-strand: Number Concept (N1)

**Topic:** Place Value and Ordering

**Outcome N1.1:**
Recognise the value of numbers up to 7-digits (999999).

**Indicators:**

This is evident when the student:

a. Writes numbers presented orally up to 9,999,999 in figures.
b. Reads, writes and says number up to 7-digits (millions) in figures and words.
c. Recognises that the position of a digit gives its value, in relation to 7-digit numbers and knows what each digit represents.

**Topic:** Estimating and Rounding

**Outcome N1.2:**
Use the vocabulary of estimation and approximation. Round off whole numbers.

**Indicators:**

This is evident when the student:

a. Uses vocabulary of estimation and approximation.
b. Rounds an integer to the nearest 10, 100 or 1000. (consolidation)

**Sub-strand:** Addition and Subtraction (N2)

**Topic:** Understanding Addition and Subtraction

**Outcome N2.1:**
Carry out the operation of addition and subtraction using various strategies and use the related vocabulary to solve simple word problems.

**Indicators:**

This is evident when the student:

a. Uses appropriate vocabulary to support addition and subtraction.
b. Responds rapidly to oral or written questions, explaining the strategy used. (Eg: Add 4250 to 3536... 66 add 314 add 750..., Add 1200, 400, 600, 1200 and 15; What is the sum/total of 753 and 227? And of 93, 62 and 25? How many altogether are 854 and 622? And 91, 88 and 6? Increase 250 by 420; Which three numbers could have a total of 1? Are there any others?)
c. Responds rapidly to oral or written questions, explaining the strategy used. (Eg: 750 take away 255... Take 300 from 1240..., 3500 subtract 2050...; Subtract 2250 from 8500...; 1700 less than 2500...; 3000 less than 10 220...; What must I take from
8.4 to leave 2.6? What is the difference between 2.2 and 6.5? How much more than 23.4 is 24.9? How much less than 6.8 is 4.2? What must I add to 5.4 to make 9.3? Decrease 5.6 by 1.9; 2.8 add a number is 4.3. What is the number? Find pairs of numbers with a difference of 13.5...)

d. Finds the value of the missing term(s) in addition and subtraction sentences.
e. Creates addition and subtraction stories.
f. Solve word problems involving addition and subtraction.

**Topic:** Mental calculation strategies of addition and subtraction

**Outcome N2.2:**

*Carry out mental calculations using various strategies such as partitioning, finding small differences and using near doubles. Derive new facts using number facts already known.*

### Indicators:

**This is evident when the student:**

a. Adds mentally three or more multiples of 10, such as 80 + 70 + 40 + 90.
b. Finds a difference by counting up through the next multiple of 10, 100 or 1000. *(Eg: 8000 – 2785)*
c. Adds/subtracts 0.9, 1.9, 2.9... or 1.1, 2.1, 3.1... by adding or subtracting 1, 2, 3... then adjusting by 0.1.

**Topic:** Pencil and paper procedures of Addition and Subtraction

**Outcome N2.3:**

*Develop and refine written methods for addition and subtraction, building on mental methods.*

### Indicators:

**This is evident when the student:**

a. Uses the method adding the most significant digits first in adding ThHTU&ThHTU, then numbers with any number of digits.

```
  6584
+ 5848
```

```
  11432
  13000 add mentally
  1200 from top
    12
```

b. Uses the method 'carrying' in adding ThHTU&ThHTU, then numbers with any number of digits.

```
  6584
+ 5848
```

```
12432 111
```

c. Uses compensation (add too much, take off) method in adding ThHTU&ThHTU, then numbers with any number of digits.
Sub-strand: Multiplication & Division (N3)

**Topic:** Understanding Multiplication and Division

**Outcome N3.1:** Carry out the operation of multiplication or division using various strategies such as repeated addition, sharing, and modeling. Solve simple

**Indicators:**

- Uses appropriate vocabulary to support multiplication and division.

---

\[ 6467 + 2684 = 9151 \]

\[ 6467 - 2684 = 3783 \]

- **d.** Uses one of the above methods to add two or more decimal numbers with up to four digits and either one or two decimal places. (Know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts such as 14.5 kg ± 750 g). (Eg: 124.9 + 7.25; 401.2 + 26.85 + 0.71)

- **e.** Uses the method counting up from the smaller to the larger number (complementary addition) in subtracting ThHTU&ThHTU, then numbers with any number of digits.

- **f.** Uses the compensation (take too much, add back) method in subtracting ThHTU&ThHTU, then numbers with any number of digits.

- **g.** Uses the standard method in subtracting ThHTU&ThHTU, then numbers with any number of digits.

- **h.** Uses one of the above method to subtract two or more decimal numbers with up to three digits and either one or two decimal places (know that decimal points should line up under each other). (Eg: 324.9 – 7.25; 14.24 – 8.7)
word problems involving four operations and explain the process.

b. Recognises that division is the inverse of multiplication and uses this to check the results.

c. Responds rapidly to oral or written questions, explaining the strategy used. (Eg: Two nineteens; Double 75; 11 times 8... 9 multiplied by 8; Multiply 25 by 8... by zero... by 1; Is 210 a multiple of 6? How do you know? What is the product of 125 and 4? Find all the different products you can make using two of these: 0.2, 1.4, 0.03, 1.5, 0.5.)

d. Responds to oral or written questions, explaining the strategy used. (Eg: Share 108 between 9; Divide 112 by 7. Divide 15 into 225; How many groups of 16 can be made from 100? What is the remainder when 104 is divided by 12? How many lengths of 25 cm can you cut from 625 cm? Is 156 divisible by 8? If so explain. What are the factors of 98? Tell me two numbers with a quotient of 0.5.)

e. Gives a quotient as a fraction when dividing by a whole number. (Eg: 90 ÷ 7 = 126/7)

f. Gives a quotient as a decimal number when dividing by a whole number. (Eg: 676 ÷ 8 = 84.5 612 ÷ 100 = 6.12; rounds where appropriate to 1 decimal place: 85 ÷ 7 = 12.1 to 1 decimal place).

g. Uses the principles (but not the names) of the commutative, associative and distributive laws as they apply to multiplication:
   a. Example of commutative law - 95 × 78 = 78 × 95
   b. Example of associative law - 10.4 × 40 = 10.4 × (10 × 4) or (10.4 × 10) × 4
   c. Example of distributive law - 46 × 98 = 46 × (100 – 2)

h. = (46 × 100) – (46 × 2) = 4600 – 92 = 4508

i. Uses brackets and recognises that they determine the order of operations, and that their contents are worked out first.
   a. (Eg: 3 + (6 × 5) = 33, whereas (3 + 6) × 5 = 45).

j. Relates division and fractions. Recognises that: 1/8 of 72 is equivalent to 72 ÷ 8 or 72/8; 4 ÷ 7 is equivalent to 4/7; 13 ÷ 7 is equivalent to 16/7.

k. Knows and applies tests of divisibility by 2, 3, 4, 5, 6, 9, 10 or 100.

l. Expresses a quotient as a fraction or as a decimal rounded to one decimal place.

m. Rounds up or down after division, depending on the context.

n. Estimates by approximating (round to the nearest 10, 100 or 1000), then checks result.

o. Checks the result with the inverse operation or with an equivalent calculation.

p. Creates multiplication and division stories.

q. Solves word problems involving multiplication and division

r. Explains how an answer to a multiplication or division problem
was obtained.
s. Uses appropriate operations (including combinations of operations) to solve word problems involving numbers and quantities.

**Topic:** Rapid Recall of Multiplication and Division

**Outcome N3.2:**
Respond to oral or written questions and questions phrased differently. Know by heart or derive rapidly doubles and halves.

**Indicators:**
This is evident when the student:

a. Responds rapidly to oral or written questions. (*Eg: Nine eights; How many sevens in 35? 8 times 8; 6 multiplied by 7; Multiply 11 by 8; 7 multiplied by 0.8... by 0; Multiply 0.9 by 0.6... by 0; Divide 3.6 by 9... by 1; What is 88 shared between 8? Divide 6 into 39; 9 divided by 4; 0.6 times 7... times 2; One twentieth of 360).  
b. Derives: (*Eg: doubles of two-digit whole numbers or decimals; doubles of multiples of 10 up to 1000; doubles of multiples of 100 up to 10 000; and all the corresponding halves).  
c. Responds rapidly to oral or written questions. (*Eg: Double 371/2... 3.7... 0.59...; Twice 2.6; 1/2 of 9.5; Half of one eighth; What is half of Rf 8.50? What fraction of 1 cm is half a millimeter?)  
d. Knows by heart and recalls multiplication tables of 2, 3, 4, 5, 6, 7, 8, 9 and 10.  
e. Knows by heart the squares of all numbers from 1 × 1 to 12 × 12.

**Topic:** Mental Calculations Strategies of Multiplication and Division

**Outcome N3.3:**
Derive new facts, using closely related facts already known, and doubling or halving. Use known number facts and place value to multiply or divide mentally.

**Indicators:**
This is evident when the student:

a. Uses related facts and doubling or halving to derive new facts. (*Eg: Work out the 24 times-table facts by doubling the 6 times-table facts and doubling again; Double a number ending in 5, and halve the other number; Halve/double one number in the calculation, find the product, then double/halve it; multiply by 25, multiply by 100, then divide by 4 ie: 39 × 25 is equal to 39 × 100 = 3900  3900 ÷ 4 = 975)

Work out:
1 × 32 = 32 and so deduce that  
2 × 32 = 64  
4 × 32 = 128  
6 × 32 = 256  
6 × 32 = 512...

Use combinations of these facts to work out other
multiples of 32.

b. Explains how to find sixths and twelfths by halving thirds, or twentieths by halving tenths. \( \text{Eg: one twelfth of 300 is 25 (one third of 300 is 100, half is 50, half again is 25); one twentieth of 150 is 7\frac{1}{2} (one tenth is 15, and half of that is 7\frac{1}{2}).} \)

c. Multiplies and divides decimals by 10 and 100, and integers by 1000, and explains the effect. (place value)

d. Uses closely related facts for example, multiply by 49 or 51 by multiplying by 50 and adjusting.

e. Uses the distributive law and partitioning to multiply. \( \text{Eg: } 87 \times 6 = (80 \times 6) + (7 \times 6), \ 3.4 \times 3 = (3 \times 3) + (0.4 \times 3). \)

f. Uses known number facts and place value to multiply or divide mentally. \( \text{Eg: Multiply a decimal number with one or two decimal places by 10 or 100. ie: 3.27 \times 10, 5.4 \times 100; Divide a one- or two-digit whole number by 100 or 10. ie: 84 \div 100, 3 \div 10, 7 \div 100; a decimal number less than 1 with one or two decimal places; Halve a decimal number less than 1 with one or two decimal places; Multiply a decimal number such as 0.6 by a single digit number; Multiply a two-digit whole number or decimal fraction by any single-digit number}. \)

**Topic:** Pencil and Paper Procedure of Multiplication and Division

**Outcome N3.4:**

*Develop and refine written methods for multiplication and division.*

**Indicators:**

*This is evident when the student:*

a. Approximates the answer first and uses the written methods to calculate the answer.

b. Uses grid method in multiplying (ThHTU × U and HTU × TU). \( \text{Eg: } 4346 \times 8, 372 \times 24 \)

\[
\begin{array}{c}
4346 \times 8 \\
\hline
4000 \times 8 \\
300 \times 8 \\
40 \times 8 \\
6 \times 8 \\
\hline
34768
\end{array}
\]

\[
\begin{array}{c}
32000 \\
2400 \\
320 \\
48 \\
\hline
34768
\end{array}
\]

\[
\begin{array}{c}
\text{leading to } 34768 \div 24 = 1444 \end{array}
\]

c. Uses partitioning method in multiplying (ThHTU × U and HTU × TU). \( \text{Eg: } 4346 \times 8, 372 \times 24 \)

d. Multiply one to two digit numbers by a decimal with up to two decimal place. \( \text{Eg: } 4.92 \times 3, 4.92 \times 73\)

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**K S 2 S Y L L A B U S**
e. Uses multiples of the divisor method in dividing (HTU ÷ TU) Eg: 972 ÷ 36
f. Uses standard division method in dividing (HTU ÷ TU) Eg: 972 ÷ 36

\[
\begin{array}{c|c}
36 & 972 \\
-72 & \hline 20 & 36 \\
252 & \hline 7 & 36 \\
252 & \hline 0 & 0 \\
\end{array}
\]

\[
\frac{27}{36} 972
\]

\[
\frac{972}{36} - 20 \times 36 \\
\quad - 252 \\
\quad - 252 \\
\quad 0
\]

Answer: 27

g. Divides decimal with up to two decimal places by a 1-digit divisor. Eg: 87.5 ÷ 7

\[
7 \) 87.5
- \quad 70.0 \\
\quad 17.5 \\
\quad 14.0 \\
\quad 3.5 \\
\quad 0.5 \\
\]

Answer: 12.5

Sub-strand: Money (N4)

Topic: Money
Outcome N4.1:
Carry out simple conversions, transactions and foreign exchange and solve word problems explaining the process.

Indicators:
This is evident when the student:

a. Produces the fewest of notes and coins to express a given amount.
b. Represents a sum of money by two or more combinations of notes and coins.
c. Uses the decimal notation and the appropriate unit to represent money amounts.
d. Pays appropriate amounts and determines appropriate change in shopping.
e. Converts amounts of money, Rufiyaa to Laari, and Laari to Rufiyaa.
f. Multiplies or divides money amounts.
g. Makes simple conversions from one currency to another.
h. Recognises which goods are cheaper. (Eg. 500 ml water for MVR 3 or 1500 ml water for MVR 5).
i. Makes bill for a given price list of items.

j. Solves word problems in the context of money involving one or more steps, and explains how the problem was solved.

**Sub-strand: Negative Numbers (N5)**

**Topic:** Negative Numbers

**Outcome N5.1:**
Order and carry out addition and subtraction and do problem solving, using integers.

**Indicators:**

*This is evident when the student:*

a. Orders a set of integers.
b. Compares two integers using the relation symbols (<, >).
c. Adds, subtracts, multiplies and divides integers.
d. Solves problems involving (positive and negative) integers.

**Sub-strand: Fractions, Decimals and Percentages**

**Topic:** Fractions

**Outcome N5.2:**
Recognise the equivalence between fractions and compare them in practical contexts, relate fraction as a part of a whole, form fraction word problems and order familiar fractions and convert one form of fraction to the other and express them in simplest form.

**Indicators:**

*This is evident when the student:*

a. Recognise relationships between fractions: for example, that 1/10 is ten times 1/100, and 1/16 is half of 1/8.
b. Relate fractions to division. *(Eg: understand that finding one tenth is equivalent to dividing by 10, so 1/10 of 95 is equivalent to 95 ÷ 10; when 9 whole cakes are divided equally into 4, each person gets nine quarters, or 9 ÷ 4 = 21/4; recognise that 60 ÷ 8 is another way of writing 60/8, which is the same as 74/8).*
c. Find fractions of numbers or quantities.
d. Compares and orders simple fractions by converting them to a common denominator.
e. Order fractions by converting to a common denominator and position them on a number line. *(Eg: Place these in order, smallest first: 21/10, 13/10, 21/2, 11/5, 13/4).*
f. Form fractions to word problems such as:
   - What fraction of MVR 18 is 95 L?
   - What fraction of 4 kg is 250 g?
   - What fraction of one year is: one week; one day; July?
I work for 8 hours and sleep for 10 hours. What fraction of the day do I sleep? What fraction of the day do I work?
g. Changes an improper fraction to a mixed number and vice
versa.
h. Reduces a fraction to its simplest form by cancelling common factors in the numerator and denominator.
i. Solves word problems involving fraction of quantities. *(Eg: Riza had 48 cars. He gave away 3/4 of them. How many had he left?)*

**Topic:** Fraction Operations using Visualisation

**Outcome N5.3:**

Find fractions that total 1.

Carry out four operations involving simple fractions.

**Indicators:**

This is evident when the student:

a. Finds two or more simple fractions with a total of 1 (using fraction strips or fraction circles). Uses a calculator to check the answer. Categorises their answers to 'exact' and 'approximate' answers. *(Eg: 1/2+2/8+1/4 (exact), 1/2+1/5+2/12+1/8 (approximation)).*
b. Adds and subtracts two simple fractions whose denominators are multiples. *(Eg: sevenths and fourteenths, ninths and eighteenths).*
c. Multiplies two simple fractions.
d. Divides two simple fractions.

**Topic:** Fractions and Decimals

**Outcome N5.4:**

Read, write and say decimal numbers using decimal notations, and recognise the relationship between decimals and fractions and order a set of decimal fractions.

**Indicators:**

This is evident when the student:

a. Recognises the place value of digits in a decimal number up to thousandths place.
b. Reads, writes and says decimal numbers up to thousandths place.
c. Writes the decimal number equivalent to: 2/10, 5/100, 9/1000, 7/100, 16/1000, 217/1000 etc.
d. Counts on or back in steps of 0.1, 0.01 and 0.001.
e. Positions one-place, two-place and three-place decimals on a number line.
f. Orders a mixed set of numbers or measurements with up to three decimal places.
g. Gives a decimal number lying between two others. *(Eg: between 4.16 and 4.17).*
h. Rounds a number with one to three decimal places to the nearest tenths, hundredths or to the nearest whole number.
i. Investigates the equivalence between decimal numbers and fractions using calculators. Predicts the result before confirming and describes their findings. *(Eg: 1/1000 = 0.001; 1/8 = 0.125; 1/3 = 0.333333; 2/3 = 0.6666666; 2/9 = 0.2222222; 7/9 = 0.7777777; 4/11 = 0.363636; 8/11 = 0.727272; 1/12 = 0.083333; 5/12 = 0.4166666).*
j. Recognises the equivalence between the decimal numbers and fractions. Forms of one half, one quarter, three quarters, one eighth and tenths, hundredths and thousandths. (Eg: 0.5 = 1/2; 0.25 = 1/4; 0.75 = 3/4; 0.125 = 1/8; 0.3 = 3/10; 0.15 = 15/100; 0.475 = 475/100).

k. Uses a calculator to compare fractions. Eg:
   Compare using >, <: 7/8 or 4/5, 3/4 or 11/14
   Place these fractions in order: 7/20, 6/15, 13/40, 8/25

l. Expresses a quotient as a fraction or as a decimal rounded to one decimal place.

m. Converts simple fractions to decimals using division.

**Topic:** Fractions, Decimals and Percentages

**Outcome N5.5:**

*Identify percentage as the number of parts in every 100, recognise the equivalence between percentages, fractions and decimals and workout simple percentages and solve simple problems.*

**Indicators:**

*This is evident when the student:*

a. Understands percentage as the number of parts in every 100.

b. Expresses simple fractions such as one half, one quarter, three quarters, one third, two thirds, and tenths and hundredths, as percentages.

c. Recognises that roughly. (Eg: one third = 33%, two thirds = 67%)

d. Recognises the equivalence of percentages, fractions and decimals. (Eg: 53% = 0.53 = 53/100; 36% = 0.36 = 9/25).

e. Express simple fractions as percentages.

f. Finds simple percentages of small whole number quantities.

g. Find percentages by using halving and quartering. (Eg: To find 12.5% of MVR 36 000, ie: 50% = MVR 18000 so 25% = MVR 9000, hence 12.5% = MVR 4500).

h. Solves simple problems involving percentages and percentage of quantities. (Eg: A school party of 50 is at a nearby island. 52% are girls. 10% are adults. How many are boys? A football team played 15 games. They won 60%. How many games did they lose? Niyaz scored 60 out of 80. Rashfa scored 148 out of 200. Who did better: Niyaz or Rashfa? A coat costs Rf 350. It has a 10% discount in a sale. What is its sale price? 10 red sweets are 25% of the total in a jar. How many sweets altogether are in the jar?)

**Sub-strand:** Ratio and Proportion (N6)

**Topic:** Proportion

**Outcome N6.1:**

**Indicators:**

- Recognises the equivalence between the decimal numbers and fractions. Forms of one half, one quarter, three quarters, one eighth and tenths, hundredths and thousandths. (Eg: 0.5 = 1/2; 0.25 = 1/4; 0.75 = 3/4; 0.125 = 1/8; 0.3 = 3/10; 0.15 = 15/100; 0.475 = 475/100).

- Uses a calculator to compare fractions. Eg:
  Compare using >, <: 7/8 or 4/5, 3/4 or 11/14
  Place these fractions in order: 7/20, 6/15, 13/40, 8/25

- Expresses a quotient as a fraction or as a decimal rounded to one decimal place.

- Converts simple fractions to decimals using division.

**Topic:** Fractions, Decimals and Percentages

**Outcome N5.5:**

*Identify percentage as the number of parts in every 100, recognise the equivalence between percentages, fractions and decimals and workout simple percentages and solve simple problems.*

**Indicators:**

*This is evident when the student:*

- Understands percentage as the number of parts in every 100.

- Expresses simple fractions such as one half, one quarter, three quarters, one third, two thirds, and tenths and hundredths, as percentages.

- Recognises that roughly. (Eg: one third = 33%, two thirds = 67%)

- Recognises the equivalence of percentages, fractions and decimals. (Eg: 53% = 0.53 = 53/100; 36% = 0.36 = 9/25).

- Express simple fractions as percentages.

- Finds simple percentages of small whole number quantities.

- Find percentages by using halving and quartering. (Eg: To find 12.5% of MVR 36 000, ie: 50% = MVR 18000 so 25% = MVR 9000, hence 12.5% = MVR 4500).

- Solves simple problems involving percentages and percentage of quantities. (Eg: A school party of 50 is at a nearby island. 52% are girls. 10% are adults. How many are boys? A football team played 15 games. They won 60%. How many games did they lose? Niyaz scored 60 out of 80. Rashfa scored 148 out of 200. Who did better: Niyaz or Rashfa? A coat costs Rf 350. It has a 10% discount in a sale. What is its sale price? 10 red sweets are 25% of the total in a jar. How many sweets altogether are in the jar?)

**Sub-strand:** Ratio and Proportion (N6)
Use ratios to compare two quantities, relates fractions to simple proportions and solve simple problems involving ratio and proportion.

This is evident when the student:

a. Uses ratios to compare two or more quantities.
b. Relates fractions to simple proportions.
c. Simplifies ratios with whole numbers.
d. Solve simple problems involving ratio and proportion. (do not use the cross multiplication method). 

(Eg: Rafa shares out 12 sweets. She gives Nufail 1 sweet for every 3 sweets she takes. How many sweets does Nufail get? At the Quran class there are 2 boys for every 3 girls. There are 30 children at the Quran class. How many boys are there? Ahmed mixes 1 tin of red paint with 2 tins of white. He needs 9 tins of paint altogether. How many tins of red paint does he need? There are 5 toffees to every 2 chocolates in a box of 28 sweets. How many chocolates are there in the box)?
MEASUREMENT
Strand: Measurement (M)

Sub-strand: Length (M1)

**Topic:** Length

**Outcome M1.1:** Recognise and use relationships between familiar units and draw lines and measure them with accuracy using appropriate equipment, suitable units and solve problems. Estimate and record length/distance to a suitable degree of accuracy.

**Indicators:**

This is evident when the student:

a. Uses vocabulary related to measures (length).

b. Estimates and check, lengths and distances using standard units, measurements. (Eg: the distance of longest road in the island or the perimeter; the thickness of a paper ream).

c. Suggests suitable units and measuring equipment to estimate or measure length.

d. Knows the approximate equivalence between commonly used imperial units and metric units.
   - 8 kilometres approximately equal to 5 miles
   - 1 litre approximately equal to 2 pints (more accurately, 1 3/4 pints)
   - 4.5 litres approximately equal to 1 gallon or 8 pints
   - 1 kilogram approximately equal to 2 lb (more accurately, 2.2 lb)

e. Uses, reads and writes standard metric units of length, km, m, cm and mm including their abbreviations.

f. Records, estimates and readings from scales to a suitable degree of accuracy.

g. Converts smaller to larger units Eg: m to km, cm or mm to m and vice versa.

h. Rounds a measurement to the nearest whole unit or tenth of a unit.

i. Chooses appropriate number operations and calculation methods to solve measurement word problems and explains how the problem was solved.
**Sub-strand: Mass (M2)**

**Topic:** Mass  
**Outcome M2.1:** Recognise and use relationships between familiar units and measure objects with accuracy using appropriate equipment, suitable units and solve problem. Estimates and record mass to a suitable degree of accuracy.

**Indicators:**

This is evident when the student:

a. Uses vocabulary related to measures ‘mass’ (weight). (Eg: heaviest, lightest).
b. Uses vocabulary related to measures (mass).
c. Estimates and checks, masses of objects using standard units, measurements such as: the weight of an egg.
d. Suggests suitable units and measuring equipment to estimate or measure mass.
e. Recognises and uses the relationship between units of mass. (Eg: 1 kg = 1000 g, 1 tonne = 1000 kg).
f. Uses, reads and writes standard metric units of mass; g, kg and tonne including their abbreviations.
g. Reads and records a scale to the nearest marked division.
h. Records, estimates and readings from scales to a suitable degree of accuracy.
i. Convert smaller to larger units. (Eg: g to kg, kg to t and vice versa).
j. Rounds a measurement to the nearest whole unit or tenth of a unit.
k. Chooses appropriate number operations and calculation methods to solve measurement word problems and explains how the problem was solved.

**Sub-strand: Capacity (M3)**

**Topic:** Capacity  
**Outcome M3.1:** Recognise and use relationships between familiar units and measure capacity with accuracy using appropriate equipment, suitable units and solve problem. Estimates and record mass to a suitable degree of accuracy.

**Indicators:**

This is evident when the student:

a. Uses vocabulary related to measures (capacity).
b. Estimates and checks, capacity of containers using standard units, measurements such as: the quantity of droplet of water from a pipette.
c. Suggests suitable units and measuring equipment to estimate or measure capacity.
d. Recognises and uses the relationship between units of capacity. (Eg: 1 litre = 1000 ml = 1000 cm³).
e. Uses, reads and writes standard metric units of capacity. (Eg: l, ml or cm³ including their abbreviations).
Sub-strand: Perimeter, Area and Volume (M4)

Topic: Perimeter
Outcome M4.1:
Recognise and use the vocabulary related to perimeter. Calculate the perimeter of compound shapes. Solve problems involving perimeter of simple shapes.

Indicators:
This is evident when the student:

a. Uses vocabulary related to perimeter.
b. Calculates the perimeter of simple compound shapes that can be split into rectangles.
c. Understands and uses formula in words ‘length × breadth’ for the area of a rectangle.
d. Solves problems involving perimeter of rectangles/squares and compound shapes.

Topic: Area and Perimeter
Outcome M4.2:
Measure and calculate the area of compound shapes. Explore the relationship between the area of rectangles and squares. Apply and use the appropriate formula to calculate area. Investigate and solve problems involving perimeter and area.

Indicators:
This is evident when the student:

a. Uses vocabulary related to area.
b. Draws a centimetre square. Finds that: 1 square centimetre is 100 mm².
c. Calculates the area and perimeter of compound figures made up of squares, rectangles and triangles.
d. Uses correctly the abbreviations km, m, cm, mm, km², m², cm², mm².
e. Discovers and recognises that there is no relation between perimeter and area of shapes.
f. Designs and makes a rectangle, a square and a triangle that has equal area.
g. Measures and calculates surface area of different boxes (cuboids).
h. Suggests areas you would measure in km², m², cm², mm².
i. Uses knowledge of perimeter and area to investigate and solve...
a given problem. Explain methods and reasoning.

Topic: Volume
Outcome M4.3:
Know the meaning of volume. Understand and use the vocabulary related to volume. Estimate, measure or calculate the volume of regular and irregular objects.

Indicators:
This is evident when the student:

a. Uses vocabulary related to volume.
b. Estimates in cubic centimetres the volume of 3D objects represented in photographs and isometric drawings, and checks by building and counting.
c. Measures and calculates the volumes of boxes (cubes and cuboids).
d. Compares and orders objects by volume, using liquid displacement.
e. Uses formulae to calculate the volume of cubes and cuboids.
f. Records volume using the abbreviations cm\(^3\) and m\(^3\).
g. Designs and makes a cube and a cuboid to each hold 1000 cm\(^3\).

Sub-strand: Time (M5)

Topic: Time
Outcome M5.1:
Use vocabulary related to time. Estimate the duration of an event in time units. Read, tell and record time using a 24-hour clock. Read calendar and find the relationship between the units of time. Solve word problems involving time. Reads and interprets time tables.

Indicators:
This is evident when the student:

a. Uses vocabulary related to time.
b. Uses a world time chart to answer questions such as:
   - It is 12:00 noon in Maldives. What time is it in Colombo, Trivandrum, Kuala Lampur, Singapore, Mecca?
   - It is 4:36 am in Daka. What time is it in Katmandu?
c. Converts between 24-hour notation and am/pm.
d. Recognises and use: 1 millennium = 1000 years; 1 century = 100 years; 1 decade = 10 years; 1 year = 12 months or 52 weeks or 365 days; 1 leap year = 366 days; 1 week = 7 days; 1 day = 24 hours; 1 hour = 60 minutes; 1 minute = 60 seconds.
e. Uses a stop watch or other timers to measure and compare times of events.
f. Completes tables such as,

<table>
<thead>
<tr>
<th>seven o’clock in the morning</th>
<th>7:00 pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>quarter to ten in the morning</td>
<td>10:15 am</td>
</tr>
<tr>
<td>midnight</td>
<td>12:00 am</td>
</tr>
<tr>
<td>17 minutes past 4 in the afternoon</td>
<td>4:17 pm</td>
</tr>
</tbody>
</table>

g. Solves word problems involving time.
SHAPE and SPACE
**Strand: Shape and Space (SS)**

**Sub-strand: 3D Shapes (SS1)**

**Topic:** 3D Shapes

**Outcome SS1.1:**

**Indicators:**

This is evident when the student:

- a. Describes and visualises properties of solid shapes such as parallel or perpendicular faces or edges.
- b. Investigates the relation \((F+V–E=2)\) between faces, vertices and edges using 3D objects and verifies Euler’s formula \((F+V–E=2)\) for simple polyhedra.
- c. Recognises the cross-sectional face of a prism.
- d. Visualise 3-D shapes from 2-D drawings.
- e. Finds and justify the least number of cubes needed to cover and join the shaded faces.
- f. Sketches top, front and side views of cuboids, cylinders, spheres, hemisphere, cones, tetrahedron, prism, pyramid (square & rectangular based).
- g. Sketches 3D objects.
- h. Sketches different nets for cubes, cuboids and prisms.
- i. Make models of 3D shapes.

**Sub-strand: 2D Shapes (SS2)**

**Topic:** 2D Shapes

**Outcome SS2.1:**
Recognise, name, sort, and draw 2D shapes. Describe them using everyday language. Sketches the reflection of a simple 2-D shape. Identify and draw lines of symmetry. Know the position of a shape after translation. Investigate about familiar shapes.

**Indicators:**

This is evident when the student:

- a. Uses mathematical vocabulary to describe 2D shapes (circles, semi circles, oblongs, triangles; equilateral triangles, isosceles triangles, scalene triangles, right angled triangles, , polygons; pentagons, hexagons, heptagons and octagons, quadrilaterals; rectangles, squares, , parallelograms, trapezium, rhombus, , kite).
- b. Classifies quadrilaterals, using criteria such as:
  - parallel sides
  - equal angles, and equal sides.
• Lines of symmetry.
  Displays them on a Venn or Carroll diagram.

c. Investigates the different polygons that can be made using tangram pieces.

\[ \text{Images of tangram pieces.} \]

d. Makes polygons using pinboards, constructs polygons by paper folding and discuss properties such as lines of symmetry.

e. Constructs quadrilaterals (square, rectangle, parallelogram, trapezium, kite and rhombus) to given dimensions.

f. Identifies and draws all lines of symmetry of given 2D shape.

g. Sketches the reflection of a simple shape in a mirror line touching it at one point, where the edges of the shape are not necessarily parallel or perpendicular to the mirror line.

\[ \text{Image of a shape reflected in a mirror line.} \]

h. Sketches the reflection of a simple shape in two mirror lines at right angles, where the sides of the shape are parallel or perpendicular to the mirror line.

\[ \text{Graphs showing two mirror lines and a shape reflected.} \]

i. Sketch the position of a simple shape after it has been translated, say, 3 units to the right, and then 2 units down.

\[ \text{Graph showing translation of a shape.} \]

j. Recognises where a shape will be after two translations.

k. Makes and investigates a general statement about familiar shapes by finding examples that satisfy it.
Sub-strand: Positions and Directions (SS3)

**Topic:** Position and Direction  
**Outcome (SS3.1):** Describe positions and directions. Give directions and follow short paths, draw simple paths and informal maps. Read and plot co-ordinates. Interpret and describe location and direction using grid references.

**Indicators:**  
*This is evident when the student:*

a. Recognise Read and plot co-ordinates in all four quadrants.

b. Responds to questions such as:
   - The points (−1, 1), (2, 5) and (6, 2) are three of the four vertices of a square. What are the co-ordinates of the fourth vertex?
   - Draw a polygon with each vertex lying in the first quadrant. Plot its reflection in the y-axis, and name the co-ordinates of the reflected shape.

c. Recognises parallel and perpendicular lines in quadrilaterals.

d. Recognises that two lines that cross each other are called intersecting lines and the point at which they cross is an intersection. *(Eg: Identify all the intersections of lines drawn from 2 points to, say, 3, 4, 5... other points).*

3 intersections 6 intersections

e. Predict the number of intersections from 2 points to 10 points.

g. Describes the path from one place to another.

Sub-strand: Angles (SS4)

**Topic:** Angles  
**Outcome SS4.1:** Estimate and measure angles to the nearest degree. Know and calculate the sum of the angles in a triangle. Calculate angles at a point. Explore a

**Indicators:**  
*This is evident when the student:*

a. Estimates in degrees the size of each of a set of angles.

b. Uses a protractor to measure and draw angles less than $180^\circ$ to nearest degree.
regular polygon. Sketch the position of a simple shape after a rotation about a vertex. Bisect the given angle.

c. Check that the sum of the angles in a triangle is 180°. Eg: by measuring or paper folding.
d. Calculates the third angle of a triangle, given the other two.
e. Calculate angles around a point.
f. Explores the interior angles of some regular polygons (equilateral triangles, squares, hexagons, octagons) using tesselations.
g. Explores the external angle properties of regular polygons.
h. Sketches the position of a simple shape after a rotation of 90° or 180° about a vertex.
i. Bisects a given angle.
CHANCE and HANDLING DATA
Strand: Chance and Handling Data (CH)

Sub-strand: Handling Data (CH1)

**Topic:** Handling Data  
**Outcome H1.1:**  
Solve a given problem by organising, constructing and interpreting bar charts or bar line charts. Begin to interpret simple pie charts. Find the mode and range of a set of data. Begin to find the median and mean.

**Indicators:**

*This is evident when the student:*

a. Constructs bar graphs and bar line charts. Intervals labeled in 2s, 5s, 10s, 20s or 100s.

b. Discuss questions such as:
   - What was the most common score in the test?
   - How many children took the test? Estimate how many of them got fewer than half marks.
   - The children who took the tables test practise recalling their tables each day for a week. They then take the same test again. Sketch a graph showing how you think the marks in the second test will be distributed.

c. Begins to interpret simple pie charts. *(Eg: Ages of the population of an island).*

d. Answers questions such as:
   - What fraction (percentage) of the population of the island is 16 or under? 60 or over?
   - Why do you think there are more people aged 16 or under than aged 60 or over, living in the island?

e. Finds the mode and range of a set of data. Begins to find the median and mean of a set of data.

Sub-strand: Handling Data (CH1)

**Topic:** Probability  
**Outcome CH1.2:**  
Use the language associated with probability to generate discussion. Identify and record all possible outcomes of an event.

**Indicators:**

*This is evident when the student:*

a. Uses the language associated with probability to discuss events, including those with equally likely outcomes.

b. Discuss events which might have two equally likely outcomes. *(Eg: a new baby is equally likely to be a boy or a girl; if I drop a picture postcard there is an even chance it will land picture side up; if I roll a dice I am just as likely to roll an even number as an odd number).*

c. Discuss events with two or more equally likely outcomes. *(Eg: Consider a 1 to 6 dice. What is the probability of: a. rolling a 4; b. rolling an even number; c. rolling a number greater than 2; d.*
rolling zero; e. rolling a number lying between 0 and 7?
Place each probability on this scale).

\[ \begin{array}{ccc}
\text{impossible} & \frac{1}{2} & \text{certain} \\
0 & 1 & \text{even}
\end{array} \]

d. Places the chance of familiar events such as ‘raining tomorrow’ on a numerical scale from 0 to 1.
e. Makes simple predictive statements about everyday events using the language of chance. (Eg: ‘Maldivian National Football team has "good chance" of winning SAFF championship’).

\[ \begin{array}{ccc}
\text{no chance} & \text{poor chance} & \text{even chance} & \text{good chance} & \text{certain} \\
\text{less likely} & \text{more likely}
\end{array} \]

f. Identifies and records all possible outcomes when 2 dice are tossed.

**Strand: Patterning and Algebra (PA)**

**Sub-strand: Sequences and Properties of Numbers (PA1)**

**Topic: Number Sequences**

**Outcome PA1.1:**

Describe, copy, predict and extend simple patterns.

Create simple patterns using familiar materials. Describe the term to term rule for a simple number sequence.

**Indicators:**

This is evident when the student:

a. Makes and records different dot patterns and predicts the number of dots and other related 'items' for later terms. Eg:

<table>
<thead>
<tr>
<th>Pattern</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dots</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triangles</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ \begin{array}{cccc}
\bullet & \bullet & \bullet & \bullet \\
\bullet & \bullet & \bullet & \bullet \\
\bullet & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet
\end{array} \]

<table>
<thead>
<tr>
<th>Pattern</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total no. of dots</td>
<td>8</td>
<td>21</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of black dots</td>
<td>5</td>
<td>12</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of white dots</td>
<td>3</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b. Describes and extends number sequences such as. Eg:

- 2, 4, 8, 16, __, __, __ The rule is: \(\times 2\)
Sub-strand: Algebraic Techniques (PA2)

**Topic:** Algebraic Techniques  
**Outcome PA2.1:**  
Model algebraic expressions and carry out operations.  
Write algebraic expressions and evaluate them by substitution. Simplify simple expressions. Solve simple linear equations.  

**Indicators:**  
This is evident when the student:  

a. Uses objects to add and subtract simple algebraic expressions.  
(Eg: \( ff + fff = 2f + 3f = 5f; 11j - 7j = 4j; \mu \mu + \mu, = 2\mu + 3; \hat{E} + \hat{E} - 7 = 3\hat{E} - 7 \))  
b. Adds and subtracts algebraic expressions involving 1-3 terms (exclude terms with exponents). (Eg: \( w + 13 + w; 11s - 9t - 16s \)).
c. Multiplies algebraic expressions involving 1-2 terms (exclude terms with exponents). (Eg: \(3 \times m; -2b \times 3a; (8y) (-3z)\)).

d. Translates a simple word statement into an algebraic statement and vice versa. (Eg: 7 times \(m = 7m\); Divide 2 by \(k = \frac{2}{k}\); Subtract 8 from \(t = t - 8\); \(b + 10 = 10\) more than a number \(b\); \(q - 25 = a\) number \(q\) decreased by 25).

e. Evaluates simple algebraic expressions by substitution (exclude terms with exponents). (Eg: if \(a = 3\), find the value of \(5a\); if \(m = 5\) and \(n = 1\), find the values of: \(-2n\), \(6mn\); if \(x = 2\), \(y = 1\) and \(z = 3\), find the values of: \(y + z\), \(xyz\), \(-10xy\), \(z + y - x\)).

f. Simplifies simple expressions with parenthesis. (Eg: \(4(r - 3); 3x(5 - 2y); -p(-2s - 3t)\)).

g. Solves simple linear equations using concrete materials, such as balance, cup and counters, stressing the notation of doing the same thing to both sides of an equation.

h. Solves simple linear equations (using algebraic methods). (Eg: \(a + 2 = 3; 2c = 12; m/2 = 4; -2 + 2u = -6\)).

Sub-strand: Investigations, Puzzles and Problems (PA3)

**Topic:** Investigations Puzzles and Problems  
**Outcome PA3.1:** Solve simple mathematical problems and puzzles and explain the process with reasoning.

**Indicators:**

This is evident when the student:

a. Solves mathematical problems and puzzles, recognises and explains patterns and relationships, generalises and predicts.

b. Explains the method and reasoning orally and in writing.

c. Suggests extensions by asking, What if?.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>abacus</td>
<td>a simple device for calculating, consisting of a frame with rows of wires or grooves along which beads are slid</td>
</tr>
<tr>
<td>analogue clocks</td>
<td>a clock which has moving hands and hours marked from 1 to 12 to show you the time.</td>
</tr>
<tr>
<td>arbitrary</td>
<td>non standard</td>
</tr>
<tr>
<td>associative principle</td>
<td>4 + 1 + 5 is same as (4 +1) + 5 or (5 + 4) + 1</td>
</tr>
<tr>
<td>commutative principle of addition</td>
<td>3 + 4 is same as 4 + 3</td>
</tr>
<tr>
<td>complementary addition</td>
<td>10 – 4 =?, how much added to 4 will make 10; ie 6</td>
</tr>
<tr>
<td>decimals</td>
<td>relating to or using powers of 10 or base 10.</td>
</tr>
<tr>
<td>decomposition</td>
<td>breaking a number into smaller parts</td>
</tr>
<tr>
<td>fractions</td>
<td>a ratio of two integers, or any number that can be expressed as such a ratio, ( \frac{m}{n} ), where ( m ) is not a multiple of ( n ), and ( n ) is not zero or one.</td>
</tr>
<tr>
<td>geometry</td>
<td>the elementary study of the properties and relations of constructible plane figure.</td>
</tr>
<tr>
<td>half turn</td>
<td>refers to performing a 180 degree rotation</td>
</tr>
<tr>
<td>hefting</td>
<td>lift or carry (something heavy)</td>
</tr>
<tr>
<td>indicators</td>
<td>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.</td>
</tr>
<tr>
<td>journal</td>
<td>somebody’s written daily record of personal experiences, rather more elaborate and detailed than a diary.</td>
</tr>
<tr>
<td>logs</td>
<td>any detailed record of events.</td>
</tr>
<tr>
<td>negative numbers</td>
<td>all the real numbers which are less than 0.</td>
</tr>
<tr>
<td>ordinal numbers</td>
<td>a number defining the position of something in a series, such as ‘first’, ‘second’, or ‘third’. Ordinal numbers are used as adjectives, nouns, and pronouns.</td>
</tr>
<tr>
<td>outcomes</td>
<td>statements of knowledge, understanding, skills and values expected to be achieved by most students at the end of a given stage.</td>
</tr>
<tr>
<td>partitioning</td>
<td>divide into parts. Eg: partition 9 into 5 and a bit is same as 5 and 4</td>
</tr>
<tr>
<td>percentages</td>
<td>a proportion, ratio or rate expressed with a denominator of 100.</td>
</tr>
<tr>
<td>portfolios</td>
<td>a collection of drawings, paintings or other pieces of work by an artist, photographer etc.</td>
</tr>
<tr>
<td>positive numbers</td>
<td>all the real numbers which are greater than 0.</td>
</tr>
<tr>
<td>probability</td>
<td>the probability of an outcome (or event) is a measure of how likely that outcome is.</td>
</tr>
<tr>
<td>skip counting</td>
<td>counting with specific intervals, eg; 2, 4, 6</td>
</tr>
<tr>
<td>symmetrical</td>
<td>made up of exactly similar parts facing each other or around an axis; showing symmetry.</td>
</tr>
<tr>
<td>tangram</td>
<td>a Chinese geometrical puzzle consisting of a square cut into seven pieces which can be arranged to make various other shapes.</td>
</tr>
<tr>
<td>trigonometry</td>
<td>the branch of mathematics concerned with the properties of the <strong>trigonometric functions</strong> and their application to the determination of the sides and angles of triangles, used surveying navigation.</td>
</tr>
<tr>
<td>----------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>turn</td>
<td>move or cause to move in a circular direction wholly or partly around an axis or point. Eg; $360^\circ$</td>
</tr>
<tr>
<td>VCXV</td>
<td>vv</td>
</tr>
</tbody>
</table>