

DRAF



KEMENTERIAN PENDIDIKAN MALAYSIA

KURIKULUM STANDARD SEKOLAH RENDAH

DOKUMEN STANDARD KURIKULUM DAN PENTAKSIRAN

MATEMATIK
TAHUN 6
(EDISI BAHASA INGGERIS)

DOKUMEN STANDARD

KURIKULUM STANDARD SEKOLAH RENDAH
(KSSR)

MATEMATIK

(EDISI BAHASA INGGERIS)

TAHUN ENAM



BAHAGIAN PEMBANGUNAN KURIKULUM

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RUKUN NEGARA

BAHAWASANYA negara kita Malaysia mendukung cita-cita untuk mencapai perpaduan yang lebih erat dalam kalangan seluruh masyarakatnya; memelihara satu cara hidup demokratik; mencipta masyarakat yang adil bagi kemakmuran negara yang akan dapat dinikmati bersama secara adil dan saksama; menjamin satu cara yang liberal terhadap tradisi-tradisi kebudayaannya yang kaya dan berbagai-bagai corak; membina satu masyarakat progresif yang akan menggunakan sains dan teknologi moden;

MAKA KAMI, rakyat Malaysia, berikrar akan menumpukan seluruh tenaga dan usaha kami untuk mencapai cita-cita tersebut berdasarkan atas prinsip-prinsip yang berikut:

- **KEPERCAYAAN KEPADA TUHAN**
- **KESETIAAN KEPADA RAJA DAN NEGARA**
- **KELUHURAN PERLEMBAGAAN**
- **KEDAULATAN UNDANG-UNDANG**
- **KESOPANAN DAN KESUSILAAN**



RUKUNEGARA DECLARATION

OUR NATION, MALAYSIA, being dedicated

- to achieving a greater unity of all her peoples;
- to maintaining a democratic way of life;
- to creating a just society in which the wealth of the nation shall be equitably shared;
- to ensuring a liberal approach to her rich and diverse cultural traditions;
- to building a progressive society which shall be orientated to modern science and technology;

WE, her peoples, pledge our united efforts to attain these ends guided by these principles:

- Belief in God
- Loyalty to King and Country
- Upholding the Constitution
- Rule of Law
- Good Behaviour and Morality

Falsafah Pendidikan Kebangsaan

Pendidikan di Malaysia adalah suatu usaha berterusan ke arah memperkembangkan lagi potensi individu secara menyeluruh dan bersepadu untuk mewujudkan insan yang seimbang dan harmonis dari segi intelek, rohani, emosi dan jasmani berdasarkan kepercayaan dan kepatuhan kepada Tuhan. Usaha ini adalah bagi melahirkan rakyat Malaysia yang berilmu pengetahuan, berketerampilan, berakhlak mulia, bertanggungjawab dan berkeupayaan mencapai kesejahteraan diri serta memberikan sumbangan terhadap keharmonian dan kemakmuran keluarga, masyarakat dan negara.

National Philosophy of Education

Education in Malaysia is an ongoing effort towards further developing the potential of individuals in a holistic and integrated manner so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious, based on a firm belief in God. Such an effort is designed to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards, and who are responsible and capable of achieving a high level of personal well-being as well as being able to contribute to the betterment of the family, the society and the nation at large.

INTRODUCTION

“Ideal Schools Generating an Illustrious Generation” (Sekolah Unggul Penjana Generasi Terbilang”) is the vision of the Malaysian Ministry of Education. The purpose of education in Malaysia is to develop individual’s potential through quality education by preparing committed citizens and generation who have the ability to think. The Ministry of Education continuously reviews the curriculum to ensure that the implementation of the curriculum in schools equips pupils with knowledge, skills and values to face the current and future challenges.

Mathematics is a discipline that trains the mind to think logically and systematically in problem solving and decision making. Inherently, mathematical nature promotes meaningful learning and challenges the mind. Therefore, Mathematics is one of the most important disciplines in any endeavor for human development. Based on the National Philosophy of Education and to ensure the relevancy of the curriculum, the Standard Based Curriculum for Primary School for Mathematics is adapted and restructured. This restructuring process takes into account the continuation to the next level. Measures taken are consistent with the need to provide the knowledge and mathematical skills to pupils from various backgrounds and abilities. With the knowledge and skills, they are able to explore the knowledge, make adaptations, modifications and innovations in managing changes and dealing with future challenges.

THE RATIONALE OF MATHEMATICS EDUCATION

Mathematics is the best platform to develop individual’s intellectual proficiency in making logical reasoning, space visualization, abstract thinking skills and analyzing. Pupils develop numeracy, reasoning, ways of thinking and problem solving skills through learning and application of mathematics.

Mathematics provides opportunities for students to perform creative tasks and experience the fun and excitement of learning something new. Such experiences increase interest and is the driving force for students to learn mathematics outside the classroom and at higher level of education.

AIMS

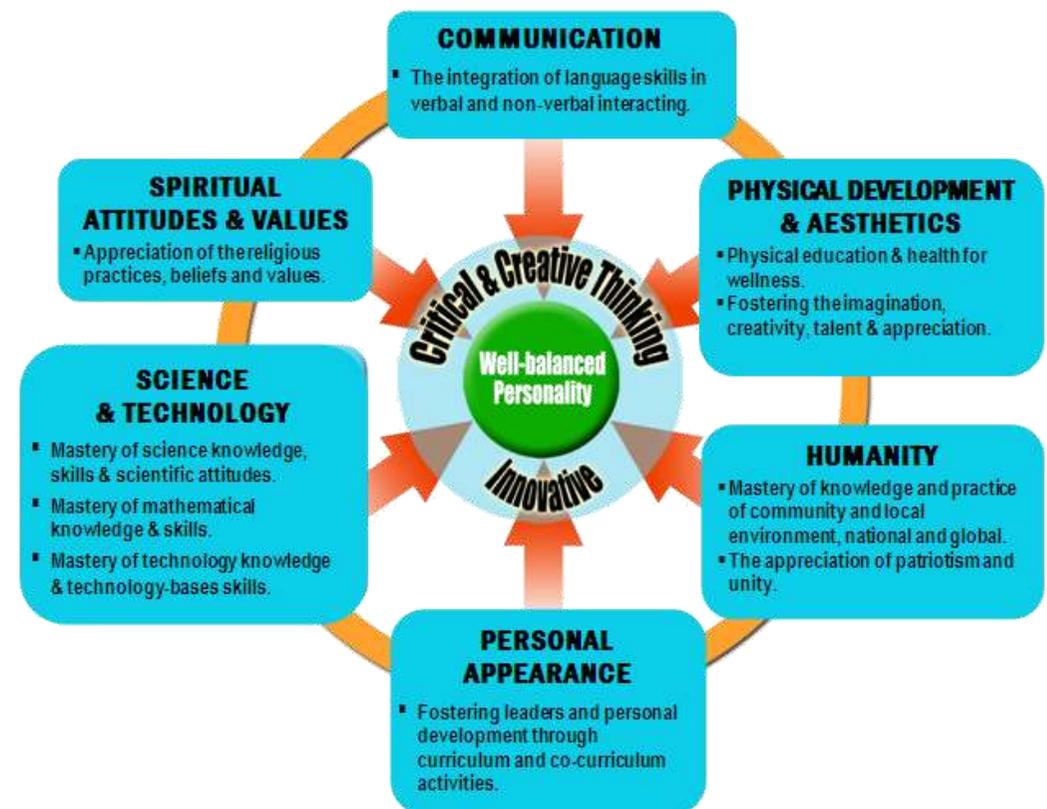
The aim of the Standard Based Curriculum For Primary School for Mathematics are to develop pupils’ understanding on the concept of numbers, basic calculation skills, understanding simple mathematical ideas and are competent in applying mathematical knowledge and skills effectively and responsibly in everyday life.

FOCUS

Mathematical teaching and learning process give priority in mastering the knowledge and understanding to enable pupils to apply concepts, principles and the mathematical processes they have learned. Emphasis on the development of mathematical thinking is built and developed through the teaching and learning in the classroom based on the following principles, which are, problem solving, communication, reasoning, making connections, making representations and the application of technology in mathematics.

NATIONAL CURRICULUM FRAMEWORK

The Standard Curriculum is based on six pillars, namely Communication; Spiritual, Attitudes and Values; Humanity; Personal Appearance; Physical Development and Aesthetics; and Science and Technology. The six pillars are the main domain that support each other and are integrated with critical, creative and innovative thinking. This integration aims to develop balanced, knowledgeable and competent human capital as shown in the diagram.



EDUCATION STRUCTURE OF PRIMARY SCHOOL MATHEMATICS

Each pupil in Malaysia is given the opportunity to go through at least six years of basic education in schools. This includes three years in level I and three years in level II. After which, pupils can pursue education at a higher level.

| LEVEL | AIMS |
|-------|---|
| I | Level I Primary School Mathematics Curriculum aims to build understanding, mathematical skills and basic application. |
| II | Level II Primary School Mathematics Curriculum aims to build understanding, mathematical skills and more complex application skills that can be used effectively to overcome the challenges in pupils' daily life. |

OBJECTIVES

The Standard Based Primary School Mathematics Curriculum will enable pupils to:

- Understand and apply the concepts mathematical and skills in various contexts.
- Expand the use of basic skills in addition, subtraction, multiplication and division related to Numbers and Operations, Measurement and Geometry, Relationship and Statistics and Probability.

- Identify and apply the relationship in mathematical ideas, between mathematical fields with other fields and in everyday life.
- Communicate using mathematical ideas clearly and use correct symbols and terminologies.
- Use mathematical knowledge and skills to be applied and adapted to various strategies to solve problems.
- Think, reason, and explore mathematically in everyday life.
- Use various representations to deliver mathematical ideas and relationships.
- Appreciate and internalise the beauty of mathematics.
- Use various mathematical tools effectively including ICT to build conceptual understanding and apply mathematical knowledge.

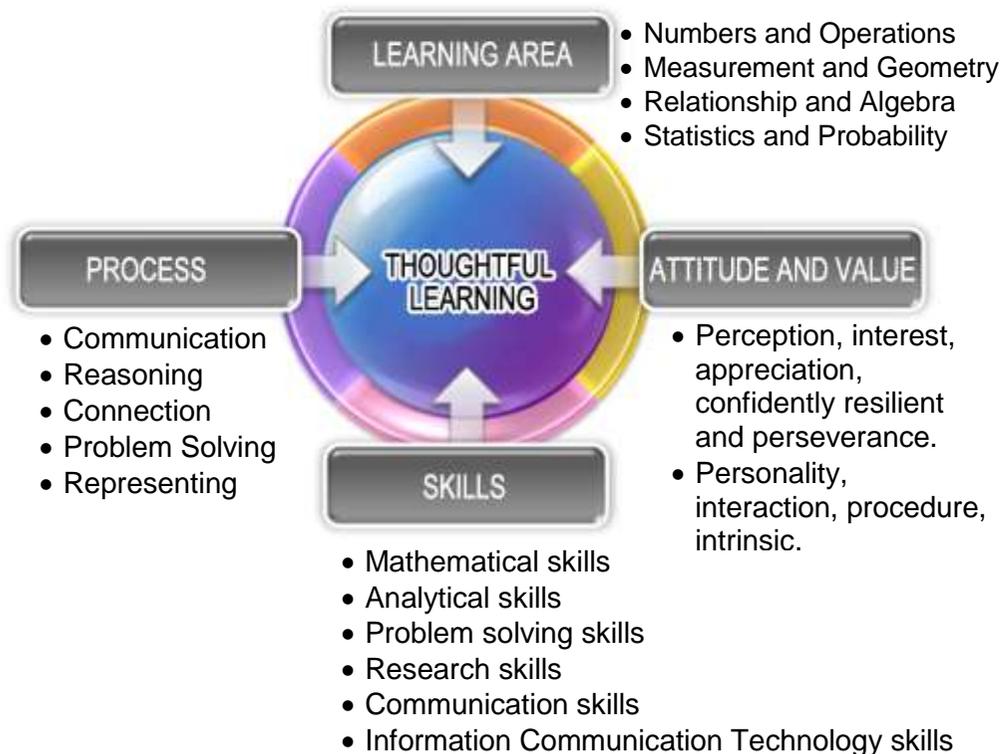
MATHEMATICS CURRICULUM FRAMEWORK

The Mathematics curriculum framework shows a mathematical programme utilized at the primary level. Mathematical learning is planned with the aim of moulding pupils' mathematical thoughtful learning.

MATHEMATICAL THOUGHTFUL LEARNING

The definition of "fikrah" according to the fourth edition of the Kamus Dewan (2005) has the same meaning with thinking and reasoning. In the context of mathematics education, thoughtful learning refers to the quality of pupils desired to be delivered through the national mathematics education system. Pupils who are mathematically inclined are those capable of doing mathematics and understanding mathematical ideas, and responsibly applying the mathematical knowledge and skills in their everyday life based on attitudes and values of mathematics.

MATHEMATICS CURRICULUM FRAMEWORK



LEARNING AREAS

The Mathematics Curriculum encompasses four learning areas:

- Numbers and Operations
- Measurement and Geometry
- Relationship and Algebra
- Statistics and Probability

The contents of the KSSR Mathematics are as follows:

| | |
|---|---|
| <p>NUMBERS AND OPERATIONS</p> <ul style="list-style-type: none"> • Whole Numbers • Addition • Subtraction • Multiplication • Division • Mixed Operations • Fractions • Decimals • Percentage • Money | <p>MEASUREMENT AND GEOMETRY</p> <ul style="list-style-type: none"> • Time • Length • Mass • Volume of Liquid • Three-Dimensional Shapes • Two-Dimensional Shapes |
| <p>RELATIONSHIP AND ALGEBRA</p> <ul style="list-style-type: none"> • Coordinate • Ratio and Proportion | <p>STATISTICS AND PROBABILITY</p> <ul style="list-style-type: none"> • Data Handling • Average |

Pupils should develop and explore mathematical ideas in depth through various learning opportunities and experiences. Awareness should be fostered and developed among pupils that mathematical ideas are intertwined, and mathematics is a comprehensive knowledge; not isolated fragment knowledge. With such awareness and understanding, comprehending of mathematical ideas become more meaningful, and thus can enhance the capability of pupils to apply mathematics.

Opportunities and a variety of learning experiences provided should actively engage the pupils in learning mathematics, help them to form a deep understanding of mathematical concepts, and establish a more meaningful understanding of various mathematical ideas. Based on the understanding and comprehension developed, pupils are able to relate and apply mathematical ideas, and subsequently, make pupils more confident in exploring and applying mathematics. The use of teaching aids, technological tools and the implementation of assignments/practical/project work should be encompassed in the learning experiences provided for pupils.

SKILLS

Skills in mathematics that should be developed and instilled in pupils include numeracy, measuring and constructing, data handling and interpretation, arithmetic manipulation, algebra manipulation, using algorithm, and using mathematical tools and ICT.

Mathematical Skills

Mathematical skills refer to the following abilities:

- Use correct standard mathematical language and apply logical reasoning.
- State mathematical ideas concisely.
- Create, test, and prove conjecture.
- Extract meaning from a mathematical word problem.
- Use mathematics to explain the physical world.

Analysing Skills

Analysing skills refer to the following abilities:

- Thinking clearly.
- Pay attention and details in each aspect.
- Manipulate ideas precisely, concisely and in detail.
- Understand complex reasoning.
- Construct and defend logical arguments.
- Debate illogical arguments.

Problem Solving Skills

Problem solving skills refer to the following abilities:

- Construct problems precisely and identify the main issues.
- Present solutions clearly and explicit assumptions made.
- Solve difficult problems by analysing simple and specific problems.
- Be open-minded and use different approaches in solving the same problem.
- Solve problems confidently even though the solutions are not envisioned
- Ask for assistance if required.

Research Skills

Research skills refer to the following abilities:

- Refer to notes, textbooks and other sources.
- Access books in the library.
- Use database.
- Gain information from various individuals.
- Think.

Communication Skills

Communication skills refer to the following abilities:

- Listen effectively/attentively.
- Write mathematical ideas precisely and clearly.
- Write essays and reports.
- Conduct presentations.

Information and Communication Technology Skills

Information and communication technology skills refer to the ability in using and handling mathematical tools such as abacus, calculators, computers, educational software, websites and educational packages to:

- Develop and have a deeper understanding of mathematical concepts.
- Create, test and prove conjecture.
- Explore mathematical ideas.
- Solve problems.

PROCESS

Communication

Communication about mathematical ideas can help pupils clarify and strengthen their understanding of mathematics. By sharing the understanding of mathematics through writing and orally with classmates, teachers and parents, pupils will be able to increase their confidence and enlighten the teachers in monitoring their progress of mathematical skills.

Communication plays a vital role in ensuring that learning mathematics is meaningful. Mathematical ideas can be expressed and understood better through communication. Mathematical communication, whether oral, written or in symbols and visual representations (using charts, graphs, diagrams etc), can help pupils to understand and apply mathematics more effectively.

Communication among themselves or with peers, parents, adults and teachers can help pupils to describe, clarify and strengthen their ideas and understanding on mathematics. To ensure the process of generating, sharing and increasing understanding, pupils should be given the opportunity to debate their mathematical ideas analytically and systematically. Communication involves a variety of perspectives and these points of view can help pupils to increase their understanding of mathematics better.

An important aspect of effective communication in mathematics is the ability to provide information effectively, understand and apply the correct mathematical notation. Pupils need to use mathematical language and symbols correctly to ensure that mathematical ideas are explained accurately. Mathematical communication also involves the use of various media such as charts, graphs, manipulatives, calculators, computers and others. Pupils should be able to use the various media to explain mathematical ideas and solve mathematical problems.

Effective communication requires an environment that is sensitive towards the pupils' needs to feel comfortable in a conversation, asking and answering questions, and explaining statements to classmates and teachers. Pupils should be given the opportunity to communicate actively in various situations, for example communicating while conducting activities in pairs, groups or providing explanations to the entire class.

Evaluation on the pupils' ability to communicate in mathematics effectively should show evidence that they are able to generate, explain and share their mathematical ideas through various forms of communication in various environment. Pupils, who are always given opportunities and encouragement to speak, read, write and listen during the teaching and learning of mathematics will be able to communicate in the learning of mathematics and learn to communicate mathematically.

Reasoning

Reasoning is fundamental in understanding mathematics effectively and making the understanding of mathematics meaningful. The development of mathematical reasoning is related to the intellectual development and communication of the pupils. Reasoning has the ability to expand not only the capacity of logical thinking but also increase the capacity of critical thinking, which is also the basis for a deeper and meaningful understanding of mathematics. To achieve this objective, pupils should be trained and guided to create a conjecture, prove the conjecture, provide a logical explanation, analyse, consider, evaluate and justify all mathematical activities. In addition, teachers need to provide space and opportunities for the discussion of mathematics that are not only engaging, but also allow each pupil to be involved.

Reasoning can be carried out inductively through mathematical activities that involve the identification of mathematical patterns and making conclusions based on the patterns.

Reasoning elements in teaching and learning helps understanding the true concepts of mathematics and prevents pupils from assuming that mathematics as only a set of procedure or algorithm that should be followed to obtain a solution. Reasoning does not only change the

paradigm of pupils from just learning to thinking, but also gives an intellectual empowerment when pupils are guided and trained to create a conjecture, prove the conjecture, provide a logical explanation, analyse, evaluate and justify all mathematical activities. This process will produce pupils who are self-confident and resilient in line with the aspiration to mould capable mathematical thinkers.

Connection

In implementing the Mathematics Curriculum, the opportunities for making connections need to be established so that pupils can link conceptual and procedural knowledge and be able to relate topics particularly in mathematics and with other areas in general. This will enhance pupils' understanding of mathematics and make mathematics clearer, meaningful and interesting.

Generally, Mathematics Curriculum consists of several areas such as calculation, geometry, algebra, measurement and problem solving. By connecting these areas, pupils will recognise how the concepts and skills in different areas are related. Therefore, pupils do not need to learn and remember too many concepts and skills separately. Thus, mathematics will be seen and studied as a holistic discipline that can be easily comprehended.

By connecting these mathematical ideas with everyday experience inside and outside the school, pupils will be more aware of the use, importance, strength and beauty of mathematics. In addition, pupils have the opportunity to use mathematics contextually in other fields and in their daily lives. Mathematical models are used to describe real life situations mathematically. Pupils will discover that this method can be used to solve problems or to predict the likelihood of a situation based on the mathematical model.

Problem Solving

Problem solving is the main focus in the teaching and learning of mathematics. Thus, teaching and learning need to incorporate problem solving skills comprehensively and across the curriculum. The development of problem solving skills needs proper emphasis so that pupils are able to solve various problems effectively. These skills involve the following steps:

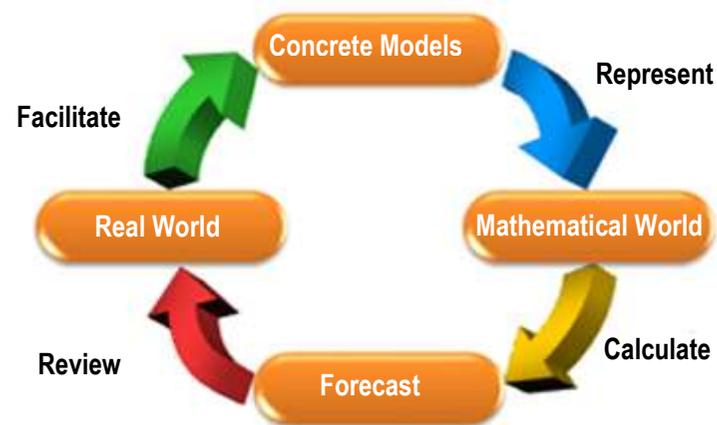
- Understanding and interpreting problems;
- Planning the strategy;
- Implementing the strategy; and
- Reviewing the strategy.

Various general strategies used in problem solving, including its steps should be widened in this subject. In carrying out learning activities to develop problem solving skills, problems related to real life situations should be integrated. Through these activities, pupils can use mathematics and reinforce themselves when dealing with various daily situations. Some of the problem solving strategies that can be considered are:

1. Trying simpler tasks
2. Trial and error
3. Drawing diagrams
4. Identifying patterns
5. Creating table, chart or a systematic lists
6. Conducting simulation
7. Using analogy
8. Working backwards
9. Logical reasoning
10. Using algebra

Representation

Mathematics is often used to represent the world that we live in. Therefore, there must be similarities between aspects of the represented world and aspects that are represented by the world. The abstract relationship between these two worlds can be depicted as follows:



Representation can be regarded as a facilitator that allows the relationship between the real world and the world of mathematics. Formulas, tables, graphs, equations etc are used to represent various ideas and real world relationships.

Representation can be defined as 'any configuration of letters, images or concrete objects that can reflect or represent others'. The representation system is naturally divided into two, internal and external. The internal representation of the system exists in the mind of individuals, whereas the external representation is easily shared and viewed by others.

Internal representation consists of ideas that help in describing the human process of learning and solving problems in mathematics, and external representation consists of items such as diagrams, the language, and notational symbols. Using multiple representations in order to show the same concept not only helps to develop better understanding and also to strengthen one's ability in solving problems.

Representation is necessary for pupils' understanding in mathematical conceptual relationship. Representation allows pupils to communicate approaches, debates and to understand mathematics for themselves and others. Representation also allows pupils to recognize the relationships between related concepts and apply mathematics to realistic problems.

Representation is an important component in the development of mathematical understanding and quantitative thinking. As a whole, without representation, mathematics is an abstract, mostly philosophic, and unapproachable by most of the population. With representation, mathematical notions can be formed into a model, important relationships can be elaborated, and understanding can be stimulated through construction and sequencing for suitable experiences and observations.

ATTITUDES AND VALUES

The aim of the nurturing of values and attitudes in Mathematics curriculum is to produce competent individuals with virtuous moral standards. In addition, the appreciation of attitudes and values can shape a well-mannered and noble younger generation. Understanding and awareness of the attitudes and values in the Malaysian society should be directly or indirectly ingrained in line with universal values.

Attitudes and values are instilled through learning experiences provided by teachers. It involves an element of trust, interest, appreciation, confidence, efficiency and endurance. Instilling of attitudes and values also include personal, interactions, procedures and intrinsic aspects.

In mathematics, attitudes and values need to be moulded through appropriate context. Attitudes in mathematics refer to the affective aspects of mathematical learning that covers:

- Positive perception towards mathematics and the usefulness of mathematics.
- Interest and joy in learning mathematics.
- Appreciation of the beauty and mathematical ability.
- Confidence in using and applying mathematics.
- Steadfast and perseverance in solving problems related to mathematics.

Personal values refer to the values that are related with the formation of individual traits and personality such as honesty, systematic, perseverance, hardworking and steadfast, creative, confidence, conscientious, good time managers, independent, trustworthy, efficient, responsible, patient and dedicated.

Interaction values are related with the instillation of good behavior in the classroom context. This value refers to the emphasized values in the interaction during mathematical activities such as appreciation for mathematics, teamwork, discussion and sharing of ideas, tolerance, fairness, open-minded, and respectful.

Procedural values are associated with specific activities in mathematics such as reasoning, making representations, solving problems, communication, making connections, and using technology.

Intrinsic values are associated with the formation of mathematical content and its discipline such as the epistemology, cultural and historical values.

CONTENT STANDARD AND LEARNING STANDARD

Standard Based Mathematics Curriculum For Primary School is drafted with emphasis on Content Standard and Learning Standard that should be known and can be done by pupils. This standard is presented in a modular form divided into topics, based on areas of learning.

Content Standard

General statements of the cognitive domain (knowledge) and affective (attitudes and values) can be achieved by pupils through subtopics.

Learning Standard

Specific statements of what pupils should know and do in terms of understanding knowledge or concepts and the ability to demonstrate their proficiency in knowledge acquisition, skills and values that are measurable.

Learning Standard does not show the steps of teaching and learning. It gives teachers space and opportunity to prepare a conducive learning environment creatively for pupils to form concepts and develop skills, attitudes and values in mathematics.

TEACHING AND LEARNING STRATEGIES

Mathematical thoughtful learning appears in the teaching and learning practices. Teaching and learning is implemented based on the principle of mastery learning and learning occurs in self-accessed, self-directed and self-paced.

Teaching and learning strategies should be pupil-centred to enable them to interact and master the learning skills through their own experiences. Pupil-centered inquiry or discovery approach with the aid of appropriate technology is comprehensively and effectively used to make the experience of learning mathematics fun, meaningful, useful and challenging.

The process of teaching and learning mathematics in the primary school encourages the use of diverse teaching methods. Teachers can choose appropriate teaching and learning approaches and methods that suit pupils' abilities. The effectiveness of teaching and learning depends on the processing techniques and the use of teaching aids as well as technology that can stimulate and encourage pupils to think critically and creatively, innovatively, to communicate and to interact.

The instilled attitudes and moral values should be considered when planning the teaching and learning of a distinctive skill. Moral values could be instilled appropriately in a well planned lesson.

Elements of history, patriotism, environment and science can be instilled accordingly to the appropriate topic to enable pupils to appreciate mathematics and to stimulate their interest on a particular topic. Elements of history can be on a specific event about a mathematician or a brief history of a concept or symbol.

To enhance pupils' analytical and creative thinking, problem solving is an important aspect that must be embedded in the teaching and learning of mathematics. Solutions given for problems should be appropriate to the pupils' level. In addition, pupils are also encouraged to communicate and courageously make decisions.

HIGHER ORDER THINKING SKILLS (HOTS)

The National Curriculum aims to produce pupils who are well balanced, resilient, curious, principled, well-informed and patriotic equipped with thinking and communication skills and able to work as a team. 21st century skills are in line with the six aspirations required by each pupil to enable them to compete at global level as outlined in the National Education Blueprint that every pupil will have leadership skills, bilingual proficiency, ethics and spiritual, social identity, knowledge and thinking skills.

Thinking skills were emphasised in the curriculum since 1994 through the introduction of Critical and Creative Thinking Skills (CCTS). Thinking skills are focused from lower level to higher level of thinking. Beginning 2011, the Standard Based Curriculum for Primary School (KSSR) has emphasis on Higher Order Thinking Skills (HOTS). Higher Order Thinking Skills (HOTS) is the ability to apply knowledge, skills and values in reasoning and reflection to solve problems, make decisions, being innovative and able to create something. HOTS refers to skills of applying, analyzing, evaluating and creating as the following table.

| HOTS | Description |
|-------------------|--|
| Applying | Using knowledge, skills and values in different situations to carry out a task |
| Analysing | Breaking down information into smaller parts in order to understand and make connections between these parts |
| Evaluating | Making considerations and decisions using knowledge, experience, skills, and values, and giving justifications |
| Creating | Producing an idea or products using creative and innovative methods |

Skills are written explicitly in the curriculum of each subject.

HOTS can be applied in the classroom through activities in the form of reasoning, inquiry learning, problem solving and projects. Teachers and pupils have to use their thinking tools such as thinking maps, mind maps and Thinking Hats as well as high level of questioning inside and outside of the classroom to encourage pupils to think. Pupils are given responsibility over their own learning.

Higher order questions promote learning because they require pupils to apply, analyse, synthesise and evaluate information, not merely memorising facts.

There are two kinds of questions in mathematics that is, the routine and non-routine questions.

Routine questions are problems that can be solved with methods that are commonly used by pupils through replicating the methods, step by step that were previously learned. Routine problem solving emphasises the use of a set of known or determined procedures (algorithm) to solve the problem.

Non-routine problems require analysis and mathematical reasoning; many non-routine problems can be solved by more than one way and there are more than one solution.

There should be a balance of mathematical problem solving implemented for both types of questions to ensure that every pupil is able to solve the problem well and effectively.

Routine and non-routine problems can be explained as follows:

| ROUTINE QUESTION | NON-ROUTINE QUESTION |
|---|--|
| <ul style="list-style-type: none"> • Does not require pupils to use higher order thinking skills. • Operation that should be used is clear. | <ul style="list-style-type: none"> • Requires higher order thinking skills. • Enhances reasoning skills. • Answers and procedures to be used are not immediately obvious. • Encourages more than one solution and strategy. • More than one answer. • More challenging. • Capable of producing pupils who are creative and innovative. • Solution requires more than just making decisions and choosing mathematical operations. • Needs ample time to resolve. • Encourages group discussion in finding solution. |

SKILLS AND VALUES for 21st CENTURY

A pupil needs to be equipped with skills, knowledge and values to succeed in life and career in the 21st century.

The Ministry of Education Malaysia (MOE) has identified the skills and values that each pupil needs to possess to face the 21st century. The skills and values are divided into 3 aspects:

Thinking skills: Prepare pupils to face life that is becoming more challenging as well as the current work environment. Among the skills are:

- creativity.
- critical thinking.
- reasoning.
- innovative.
- problem solving.
- decision making.

Career and Living Skills: Needs more than thinking skills and knowledge. Pupils develop life and career skills to face life that is complex and work environment in a world that is getting more challenging. Among the skills are:

- communication.
- Information and Communication Technology.
- cooperation.
- entrepreneurship.
- leadership.
- lifelong learning.
- flexibility.
- adaptability.
- initiative and self-directed.

Values: Guidelines for pupils to become individuals with noble characters and capable of making decisions and taking actions in carrying out responsibilities to family, society and nation which encompass:

- spirituality.
- humanity.
- patriotism.
- integrity.
- responsibility.
- unity.

PUPIL'S PROFILES

The critical factor that contributes to social, cultural and economic growth of a country is the development of human capital that are innovative and highly skilled. With that, each pupil that is produced should be physically, emotionally, spiritually and intellectually balanced as stated in the National Education Philosophy.

MOE has outlined 10 pupil's profiles needed for pupils to compete globally. Pupil's profiles are characteristics that each pupil has:

Balanced: They are physically, emotionally, spiritually and intellectually balanced to achieve personal well-being, as well as to show empathy, compassion, and respect for others. Able to contribute towards the harmony of family, society and nation.

Resilience: They are able to face and overcome difficulties, overcome challenges with wisdom, confidence, tolerance and empathy.

Thinker: They think critically, creatively and innovatively; able to resolve complex problems and make ethical decisions. They think about learning and themselves as pupils. They generate questions and are open to perspectives, values, and individual and societal traditions. They are confident and creative in handling new learning areas.

Skilled communicator: They can voice and express their thoughts, ideas and information confidently and creatively through verbal and written form by using various media and technology.

Teamwork: They can work together effectively and harmoniously with others. They take on responsibility together while respecting and appreciating the contributions given by each team member. They acquire interpersonal skills through collaborative activities, and this makes them better leaders and team members.

Curious: They develop innate curiosity to explore strategies and new ideas. They learn skills that are needed to carry out inquiry and research, as well as show independence in learning. They enjoy continuous lifelong learning experiences.

Principled: They are honest and have integrity, equality, fairness and respect the dignity of individuals, groups and communities. They are responsible for their actions, consequences and decisions.

Informative: They gain knowledge and form extensive and balanced understanding across various disciplines of knowledge. They explore knowledge effectively and efficiently in the context of local and global issues. They understand ethical issues/ laws related to the information that was gained.

Caring/ Attentive: They show empathy, compassion and respect towards needs and feelings of others. They are committed to serve the society and ensure the sustainability of nature.

Patriotism: They show love, support and respect towards the nation.

CROSS CURRICULAR ELEMENTS

CREATIVITY AND INNOVATION

There are many definitions of creativity. According to the Kamus Dewan, 1997; creativity means the capability or the ability to create. Whereas according to PPK, 1999 creativity means the ability to digest and produce new and original ideas. The idea is developed through the inspiration or combination of existing ideas.

Creativity should be embedded effectively in the teaching and learning where teachers need to be creative and innovative in their roles to trigger-ideas and to produce pupils who are knowledgeable, able to master and practise good attitudes and values as well as to expand pupils' creativity and innovation.

This is important as creativity and innovation need to be developed among pupils at an early stage of schooling. This is to enable them to know their potential and personal preferences as well as to trigger the hidden potential in themselves.

Creative and innovative teaching and learning can be instilled through problem solving, logical reasoning, communication, making connections and the use of technology, where pupils:

- Build a mathematical model through patterns and relationships.

- Apply mathematical skills in estimation, measurement and visualization of data in everyday situations.
- Make interconnections between mathematical skills with other disciplines of knowledge.
- Apply mathematical knowledge to find solutions for routine and non-routine problems.
- Create a conjecture (extrapolation, projections, cause and effect).

The process of building creative and innovative skills can be initiated from planning the teaching and learning phases starting from preparation, imagination, development and action, in the classroom. Through this process, pupil-centered teaching and learning is formed to instigate the creative skills among pupils.

ENTREPRENEURSHIP IN MATHEMATICS

An effort to build entrepreneurship characteristics and practice until it becomes a culture among pupils. The entrepreneurship characteristics and practices are formed by:

- Practicing the entrepreneurs' attitude.
- Applying the entrepreneur's thinking.
- Applying the knowledge and skills of business management.
- Formulating either entrepreneurship concept, process or product.
- Practicing moral values and good ethics in entrepreneurship.

Therefore, this element can be applied in the appropriate learning areas of mathematics in primary schools such as in numbers and operations, measurement and geometry as well as statistics and probability.

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

The development in various technologies now and in future make this element important in teaching and learning. Exposure of ICT applications in the teaching and learning of Mathematics can be applied successfully in:

- Learning about ICT
Pupils are taught about ICT knowledge and skills in handling hardware and software.
- Learning through ICT
Use ICT to access information and knowledge through media such as CD-Rom, DVD-Rom, Internet etc.
- Learning with ICT
Teachers and pupils use ICT as their teaching and learning aids.
- ICT teaching and learning
This can be as an access to make learning more interesting and fun. Pupils can be exposed to various kinds of latest communication information and the effective use will produce quality teaching and learning.

ASSESSMENT

Assessment is part of the teaching and learning process. It has to be well-planned and carried out continuously as part of classroom activities. By focusing on various mathematical activities, the strengths and weaknesses of pupils can be assessed. Different methods of assessment can be conducted using various assessment techniques including oral and written work as well as demonstrations. These may be carried out in the form of interviews, open-ended questions, observations and research. Based on the results, teachers can rectify the pupils' misconceptions and weaknesses and at the same time improve their teaching skills. As such, teachers can take subsequent effective measures in conducting remedial and enrichment activities to upgrade pupils' performance.

SCHOOL ASSESSMENT

School Assessment (SA) is a major component in the process of teaching and learning (T&L) as it serves to reinforce pupils' learning, enhance teaching and give valid information about what has been implemented or achieved in T&L.

SA is implemented entirely by teachers and school authorities starting from the aspect of planning, followed by constructing items and instruments of assessment, administering, inspecting, scoring, recording and reporting.

SA is very important to determine the effectiveness of teachers and school authorities in an effort to produce harmonious and balanced individuals. SA is an on-going activity which requires high commitment and clear direction from teachers and schools to develop pupils' potential to the maximum.

SA has the following characteristics:-

- Holistic which is able to provide overall information on knowledge and skills achievement and moral value practices.
- Continuity which is a continuous assessment that parallel with T&L process.
- Flexibility refers to various assessment methods based on pupils' compatibility and readiness.
- With reference to the performance standard developed based on curriculum standard.

SA can be implemented through:

- Formative assessment which is conducted during the T&L process.
- Summative assessment which is conducted at the end of a unit, semester or year.

STANDARD REFERENCE ASSESSMENT

Standard Reference Assessment was introduced, using Performance Standard to monitor the progress and growth of pupils' learning and achievement. It is a process of obtaining information about the extent of what pupils know, understand and able to do or have mastered what is learned based on the performance standards prescribed according to the levels in performance in Standard Based Curriculum and Assessment Document.

Standard Reference Assessment does not compare the performance of a pupil with others but report pupils' performance, progress and growth in learning with reference to the standard statement.

Pupils are assess fairly and impartially as individuals in society based on their abilities, capabilities, talents, skills and potentials without comparing with others. Schools are able to obtain full response in the form of qualitative and quantitative data that covers all aspects of a pupil to enable responsible parties to identify, understand, appreciate, recognise and honour pupils as individuals who are useful, important and has the potential to contribute to the development of the country and nation with respect to their capabilities and abilities.

PERFORMANCE STANDARD

Performance standard is a statement about pupils' level of learning development as measured based on standards and to indicate the level of pupils in the development or progress of learning. Development in the standard is divided into two, which are, horizontal development (construct) and vertical development (performance level). The performance of a pupil is described by one or more qualifiers that use/ using appropriate words or phrases to indicate the standards in learning outcomes.

PERFORMANCE STANDARD FRAMEWORK

| PERFORMANCE LEVEL | DESCRIPTOR |
|-------------------|--|
| 1 | Know |
| 2 | Know and understand |
| 3 | Know, understand and able to do. |
| 4 | Know, understand and able to do with good manner. |
| 5 | Know, understand and able to do with admirable manner. |
| 6 | Know, understand and able to do with exemplary manner. |

Performance level is a label used to indicate benchmark which is arranged hierarchically for individual reporting purposes.

Standard is a statement about a domain which refers to a specific benchmark and generic in nature to reflect a holistic image of an individual .

THE GENERAL DESCRIPTOR OF PERFORMANCE LEVEL

| Performance Level | DESCRIPTOR |
|-------------------|--|
| 1 | Pupils know the basic knowledge or can carry out basic skills or respond to basic matters. |
| 2 | Pupils show understanding by changing the form of communication or interpreting and explaining what they have learned. |
| 3 | Pupils use knowledge to apply skills learnt in a given situation. |
| 4 | Pupils implement certain skills with good manners which is following procedures or systematically. |
| 5 | Pupils implement certain skills in new situations by following the procedures or systematically, consistently and with positive attitudes. |
| 6 | Pupils are able to use existing knowledge and skills in new situations systematically, with positive attitudes, creatively and innovatively as well as in an exemplary manner. |

INTERPRETATION OF PERFORMANCE LEVEL FOR MATHEMATICS

There are 3 groups that need to be evaluated to determine the performance level of pupils as follows:

1. Knowledge
2. Skills and Processes
3. Attitudes and Values in Mathematics.

1. KNOWLEDGE

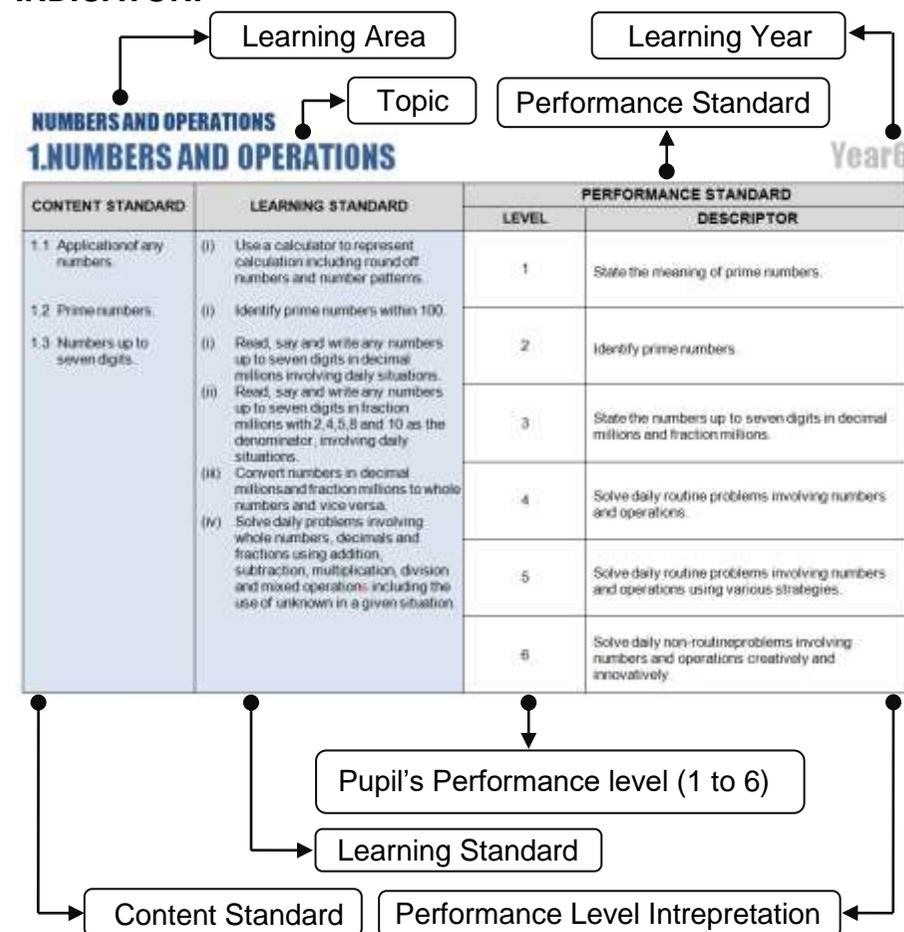
(Overall interpretation of performance level for mathematics)

| Performance Level | Interpretation |
|-------------------|---|
| 1 | Know basic mathematical knowledge. |
| 2 | Know and understand basic mathematical knowledge. |
| 3 | Know and understand basic mathematical knowledge to carry out basic mathematical operations and conversions. |
| 4 | Know and understand mathematical knowledge to carry out steps in calculation for daily routine problems. |
| 5 | Master and apply mathematical knowledge and skills in solving daily routine problems using various strategies. |
| 6 | Master and apply mathematical knowledge and skills in solving daily non-routine problems creatively and innovatively. |

Note:

There are 12 topics in Year Six. Each topic has its own interpretation of performance level. The indicators below are sample guidance which are designed for each title of group knowledge.

INDICATOR:



2. MATHEMATICAL SKILLS AND PROCESSES

a. Problem Solving

| Performance Level | DESCRIPTOR |
|-------------------|--|
| 1 | Able to state the steps of problem solving without carrying out the process. |
| 2 | Able to solve routine problems given with guidance. |
| 3 | Able to solve routine problems involving one step of calculation without guidance. |
| 4 | Able to solve more complex routine problems. |
| 5 | Able to solve more complex routine problems using various strategies. |
| 6 | Able to solve non-routine problems creatively and innovatively |

b. Reasoning

| Performance Level | DESCRIPTOR |
|-------------------|--|
| 1 | Able to give justification for mathematics activities logically with guidance. |
| 2 | Able to give justification for mathematics activities logically without guidance. |
| 3 | Able to show accurate justification for mathematics activities involving one step calculation. |
| 4 | Able to show accurate justification for mathematics activities involving more than one step calculation. |
| 5 | Able to show accurate justification for mathematics activities involving routine problem solving. |
| 6 | Able to explain accurate justification for mathematics activities involving non-routine problem solving creatively and innovatively. |

c. Relationship

| Performance Level | DESCRIPTOR |
|--------------------------|---|
| 1 | Able to relate skills learnt to other topics and daily life with guidance. |
| 2 | Able to relate skills learnt to other topics and daily life without guidance. |
| 3 | Able to relate concepts and procedures to solve number sentences. |
| 4 | Able to relate concepts and procedures to solve daily routine problems. |
| 5 | Able to relate concepts and procedures to solve daily routine problems using various strategies. |
| 6 | Able to relate concepts and procedures to solve daily non-routine problems creatively and innovatively. |

d. Representation

| Performance Level | DESCRIPTOR |
|--------------------------|--|
| 1 | Able to use representation with guidance. |
| 2 | Able to use representation to show mathematical understanding without guidance. |
| 3 | Able to explain mathematical concepts and procedures using representation. |
| 4 | Able to use representation to solve daily routine problems. |
| 5 | Able to use various representations to solve daily routine problems with various strategies. |
| 6 | Able to use representation to solve daily non-routine problems creatively and innovatively. |

e. Communication

| Performance Level | DESCRIPTOR |
|--------------------------|--|
| 1 | Able to state mathematical ideas verbally or in written form using mathematical symbols or visual representations. |
| 2 | Able to explain mathematical ideas verbally or in written form using mathematical symbols or visual representations. |
| 3 | Able to use mathematical language, symbols or visual representations correctly. |
| 4 | Able to explain mathematical idea systematically using correct mathematical language, symbols or visual representations. |
| 5 | Able to explain mathematical idea systematically using correct mathematical language, symbols or visual representations to solve routine problems. |
| 6 | Able to explain mathematical idea systematically using correct mathematical language, symbols or visual representations to solve non-routine problems creatively and innovatively. |

f. Thinking Skills

| Performance Level | DESCRIPTOR |
|--------------------------|---|
| 1 | Able to state mathematical knowledge and skills. |
| 2 | Able to explain mathematical knowledge and skills. |
| 3 | Able to use mathematical knowledge and skills in different situations to carry out a task. |
| 4 | Able to break down information into small parts for deeper understanding and relate them to each other. |
| 5 | Able to make considerations and decisions using the knowledge, experience and skills, and giving justification. |
| 6 | Able to produce creative and innovative ideas, products or methods. |

g. Soft skills

| Performance Level | DESCRIPTOR |
|-------------------|--|
| 1 | Show interest and willing to learn. |
| 2 | Try to understand a problem. |
| 3 | Can communicate and interested in learning. |
| 4 | Can work in team to solve problems. |
| 5 | Able to lead and guide peers. |
| 6 | Able to become mentor and role-model to peers. |

Note:

Soft skills include aspects of generic skills that involve the psychomotor and effective elements related to non-academic skills such as positive values, leadership, teamwork, communication, continuous learning, employability and pupils' readiness to face the working world later.

h. Skills In Using Technology

| Performance Level | DESCRIPTOR |
|-------------------|--|
| 1 | Know and can state mathematical tools. |
| 2 | Able to use and handle basic mathematical tools. |
| 3 | Able to use and handle basic mathematical tools, generate and understand mathematical concepts and explore mathematical ideas. |
| 4 | Able to use mathematical tools to solve routine problems. |
| 5 | Able to use mathematical tools to solve routine problems using various strategies. |
| 6 | Able to use mathematical tools to solve non-routine problems creatively and innovatively. |

3. ATTITUDE AND VALUES IN MATHEMATICS

| Performance Level | DESCRIPTOR |
|-------------------|--|
| 1 | Show one of the items of attitude and values in Mathematics with guidance. |
| 2 | Show one of the items of attitude and values in Mathematics. |
| 3 | Able to show attitude and values in Mathematics for a given situation with guidance. |
| 4 | Able to demonstrate attitude and values related to mathematics in various situations. |
| 5 | Pupils always practice attitude and values related to mathematics in teaching and learning process. |
| 6 | Pupils always practice attitude and values related to mathematics in daily life and become mentor and role-model to peers. |

Every Mathematics teacher should implement T&L process with reference to the Content Standard and Learning Standard. Teachers' wisdom is needed to determine that T&L process is implemented effectively and appropriately. In a similar situation, teachers should assess pupils' abilities and determine the performance level based on the list of Performance Standards which have been prepared in accordance to learning topics. Teachers should provide opportunities for every pupil to acquire better ability by carrying out guidance and reinforcement process.

4. OVERALL REPORT

The overall report is needed to determine pupils' performance level at the end of school session. This report includes the content, skills and mathematical processes to be emphasised in the curriculum, including higher order thinking skills. Therefore, teachers should assess pupils collectively and holistically, taking into account all pupils' activities on an on-going basis through a variety of media such as achievement in topical tests, observations, trainings, presentations, pupils' verbal responses, group work projects and so on. Therefore, teachers' reliance on their professional wisdom is also required in determining the pupils' final grades. In addition, a variety of tasks that contain elements that are emphasised in this general interpretation has to be expanded in the pupils through integrated and cross-learning activities.

OVERALL REPORT

| PERFORMANCE LEVEL | DESCRIPTOR |
|-------------------|---|
| 1 | <p>Pupils can:</p> <ol style="list-style-type: none"> 1. Recall the basic mathematical knowledge. 2. Use mathematical process skills to recall the basic knowledge of Mathematics with guidance. 3. Show one of the items of attitude and values in Mathematics with guidance. |
| 2 | <p>Pupils can:</p> <ol style="list-style-type: none"> 1. Explain basic mathematical knowledge. 2. Use mathematical process skills to explain basic mathematical knowledge. 3. Show one of the items of attitude and values in Mathematics. |
| 3 | <p>Pupils are able to:</p> <ol style="list-style-type: none"> 1. Apply basic mathematical knowledge. 2. Use mathematical process skills to apply basic mathematical knowledge. 3. Show attitude and values in Mathematics for a given situation. |

| PERFORMANCE LEVEL | DESCRIPTOR |
|-------------------|--|
| 4 | <p>Pupils are able to:</p> <ol style="list-style-type: none"> 1. Solve daily routine problems. 2. Use mathematical process skills to solve routine problems. 3. Demonstrate attitude and values related to Mathematics in various situations. |
| 5 | <p>Pupils are able to:</p> <ol style="list-style-type: none"> 1. Solve complex daily routine problems using various strategies. 2. Use mathematical process skills to solve complex routine problems. 3. Always practice attitude and values related to Mathematics in teaching and learning process. |
| 6 | <p>Pupils are able to:</p> <ol style="list-style-type: none"> 1. Solve daily non-routine problems. 2. Use mathematical process skills to solve non-routine problems 3. Always practice attitude and values related to Mathematics in daily life and become mentor and role-model to peers. |

NUMBERS AND OPERATIONS

1. NUMBERS AND OPERATIONS

Year 6

| CONTENT STANDARD | LEARNING STANDARD | PERFORMANCE STANDARD | |
|---------------------------------|---|----------------------|--|
| | | LEVEL | DESCRIPTOR |
| 1.1 Application of any numbers. | (i) Use a calculator to represent calculation including round off numbers and number patterns. | 1 | State the meaning of prime numbers. |
| 1.2 Prime numbers. | (i) Identify prime numbers within 100. | 2 | Identify prime numbers. |
| 1.3 Numbers up to seven digits. | (i) Read, say and write any numbers up to seven digits in decimal millions involving daily situations. | | |
| | (ii) Read, say and write any numbers up to seven digits in fraction millions with 2,4,5,8 and 10 as the denominator, involving daily situations. | 3 | State the numbers up to seven digits in decimal millions and fraction millions. |
| | (iii) Convert numbers in decimal millions and fraction millions to whole numbers and vice versa. | 4 | Solve daily routine problems involving numbers and operations. |
| | (iv) Solve daily problems involving whole numbers, decimals and fractions using addition, subtraction, multiplication, division and mixed operations including the use of unknown in a given situation. | 5 | Solve daily routine problems involving numbers and operations using various strategies. |
| | | 6 | Solve daily non-routine problems involving numbers and operations creatively and innovatively. |

NUMBERS AND OPERATIONS

2. FRACTIONS

Year 6

| CONTENT STANDARD | LEARNING STANDARD | PERFORMANCE STANDARD | |
|--|--|----------------------|---|
| | | LEVEL | DESCRIPTOR |
| 2.1 Multiplication of fractions. | (i) Multiply any proper fractions and mixed numbers by proper fractions and mixed numbers. | 1 | Read number sentences involving fractions. |
| 2.2 Division of fractions. | | 2 | State the steps to solve problems involving fractions. |
| 2.3 Problem solving involving fractions. | | 3 | Justify the answers for solving number sentences involving fractions. |
| | | 4 | Solve daily routine problems involving fractions. |
| | | 5 | Solve daily routine problems involving fractions using various strategies. |
| | | 6 | Solve daily non-routine problems involving fractions creatively and innovatively. |

NUMBERS AND OPERATIONS

3. DECIMALS

Year 6

| CONTENT STANDARD | LEARNING STANDARD | PERFORMANCE STANDARD | |
|---|--|----------------------|--|
| | | LEVEL | DESCRIPTOR |
| 3.1 Mixed operations of decimals. | (i) Multiply and divide decimals by whole numbers and decimals, the answer up to three decimal places, involving daily situations. | 1 | Read number sentences involving decimals. |
| | | 2 | Multiply and divide decimals with whole numbers and decimals. |
| 3.2 Problem solving involving decimals. | (i) Solve daily problems involving mixed operations of decimals and the answer up to three decimal places. | 3 | Justify the answers for solving number sentences involving decimals. |
| | | 4 | Solve daily routine problems involving decimals. |
| | | 5 | Solve daily routine problems involving decimals using various strategies. |
| | | 6 | Solve daily non-routine problems involving decimals creatively and innovatively. |

NUMBERS AND OPERATIONS

4. PERCENTAGE

Year 6

| CONTENT STANDARD | LEARNING STANDARD | PERFORMANCE STANDARD | |
|---|---|----------------------|---|
| | | LEVEL | DESCRIPTOR |
| 4.1 Problem solving involving percentage. | (i) Solve daily problems involving savings and investments. | 1 | State the terms involving percentage for savings and investments. |
| | | 2 | Explain the advantages of savings and investments. |
| | | 3 | Justify the answers for solving number sentences involving savings and investments. |
| | | 4 | Solve daily routine problems involving percentage. |
| | | 5 | Solve daily routine problems involving percentage using various strategies. |
| | | 6 | Solve daily non-routine problems involving percentage creatively and innovatively. |

NUMBERS AND OPERATIONS

5. MONEY

Year 6

| CONTENT STANDARD | LEARNING STANDARD | PERFORMANCE STANDARD | |
|--------------------------------------|---|----------------------|--|
| | | LEVEL | DESCRIPTOR |
| 5.1 Problem solving involving money. | (i) State the meaning of profit and loss, discount, cost price, selling price, bill, invoice, rebate, asset and liability, interest and service tax. (ii) Solve daily problems involving profit and loss, discount, cost price, selling price, bill, invoice, rebate, asset and liability, interest and service tax. | 1 | State profit and loss, discount, cost price, selling price, bill, invoice, rebate, asset and liability, interests and service tax. |
| | | 2 | Solve number sentences involving money. |
| | | 3 | Justify the answers for solving number sentences involving money. |
| | | 4 | Solve daily routine problems involving money. |
| | | 5 | Solve daily routine problems involving money using various strategies. |
| | | 6 | Solve daily non-routine problems involving money creatively and innovatively. |

MEASUREMENT AND GEOMETRY

6. TIME

Year 6

| CONTENT STANDARD | LEARNING STANDARD | PERFORMANCE STANDARD | |
|-------------------------------------|---|----------------------|---|
| | | LEVEL | DESCRIPTOR |
| 6.1 24-hour system. | (i) State the relationship between 12-hour system and 24-hour system. | 1 | State and identify 12-hour system and 24-hour system. |
| 6.2 Time duration. | | 2 | State the relationship between 12-hour system and 24-hour system, and calculate the time duration in any units of time. |
| 6.3 Problem solving involving time. | | 3 | Justify the answers for solving number sentences involving time. |
| | | 4 | Solve daily routine problems involving time. |
| | | 5 | Solve daily routine problems involving time using various strategies. |
| | | 6 | Solve daily non-routine problems involving time creatively and innovatively. |

MEASUREMENT AND GEOMETRY

Year 6

7. LENGTH, MASS AND VOLUME OF LIQUID

| CONTENT STANDARD | LEARNING STANDARD | PERFORMANCE STANDARD | |
|---|---|----------------------|---|
| | | LEVEL | DESCRIPTOR |
| 7.1 Problem solving involving length, mass, and volume of liquid. | (i) Solve daily problems involving length, mass and volume of liquid. | 1 | State the measurements for any quantity. |
| | | 2 | State the number sentences involving length, mass and volume of liquid. |
| | | 3 | Justify the answers for solving number sentences involving length, mass and volume of liquid. |
| | | 4 | Solve daily routine problems involving length, mass and volume of liquid. |
| | | 5 | Solve daily routine problems involving length, mass and volume of liquid using various strategies. |
| | | 6 | Solve daily non-routine problems involving length, mass and volume of liquid creatively and innovatively. |

MEASUREMENT AND GEOMETRY

Year 6

8. SPACE

| CONTENT STANDARD | LEARNING STANDARD | PERFORMANCE STANDARD | |
|-------------------------------|---|----------------------|--|
| | | LEVEL | DESCRIPTOR |
| 8.1 Angles. | (i) Draw polygons up to eight sides on square grid and triangular grid, and measure the angles formed. (ii) State the characteristics of polygons. | 1 | State the shape of polygons. |
| | | 2 | Draw shape of polygons on square grid and triangular grid. |
| 8.2 Two-dimensional shapes. | (i) Solve daily problems involving perimeter and area of composite two-dimensional shapes. | 3 | Measure the angles in polygons accurately. |
| 8.3 Three-dimensional shapes. | (i) Solve daily problems involving surface area and volume of composite three-dimensional shapes. | 4 | Solve daily routine problems involving two-dimensional and three-dimensional shapes. |
| | | 5 | Solve daily routine problems involving two-dimensional and three-dimensional shapes using various strategies. |
| | | 6 | Solve daily non-routine problems involving two-dimensional and three-dimensional shapes creatively and innovatively. |

RELATIONSHIP AND ALGEBRA

9. COORDINATES

Year 6

| CONTENT STANDARD | LEARNING STANDARD | PERFORMANCE STANDARD | |
|---|--|----------------------|--|
| | | LEVEL | DESCRIPTOR |
| 9.1 Application of coordinates in the first quadrant. | (i) Determine the horizontal and vertical distance between two points. | 1 | State the position on x -axis and y -axis in the first quadrant. |
| | | 2 | State the distance of objects on x -axis and the distance of objects on y -axis. |
| | | 3 | Justify the answer involving horizontal and vertical distance between two points. |
| | | 4 | Solve daily routine problems involving coordinates. |
| | | 5 | Solve daily routine problems involving coordinates using various strategies. |
| | | 6 | Solve daily non-routine problems involving coordinate creatively and innovatively. |

RELATIONSHIP AND ALGEBRA

10. RATIO AND PROPORTION

Year 6

| CONTENT STANDARD | LEARNING STANDARD | PERFORMANCE STANDARD | |
|----------------------------|--|----------------------|--|
| | | LEVEL | DESCRIPTOR |
| 10.1 Ratio and proportion. | (i) Represent the ratio of two quantities in the form of $a : b$ or $\frac{a}{b}$, involving: <ul style="list-style-type: none"> a) part to part, b) part to whole, and c) whole to part. (ii) Solve daily problems involving simple ratio and proportion. | 1 | Read the ratio given. |
| | | 2 | Represent the ratio of two quantities. |
| | | 3 | Justify the answer for representation of ratio between two quantities. |
| | | 4 | Solve daily routine problems involving ratio and proportion. |
| | | 5 | Solve daily routine problems involving ratio and proportion using various strategies. |
| | | 6 | Solve daily non-routine problems involving ratio and proportion creatively and innovatively. |

STATISTICS AND PROBABILITY

11. DATA HANDLING

Year 6

| CONTENT STANDARD | LEARNING STANDARD | PERFORMANCE STANDARD | |
|------------------|--|----------------------|---|
| | | LEVEL | DESCRIPTOR |
| 11.1 Data. | (i) Interpret data from pictograph, bar chart and pie chart. (ii) Solve daily problems involving: a) mode, median, mean and range b) pictograph, bar chart and pie chart of a collection of data. | 1 | State the meaning of data interpretation. |
| | | 2 | Explain the steps needed to interpret data. |
| | | 3 | Justify the answer for data interpretation. |
| | | 4 | Solve daily routine problems involving data representation. |
| | | 5 | Solve daily routine problems involving data representation using various strategies. |
| | | 6 | Solve daily non-routine problems involving data representation creatively and innovatively. |

STATISTICS AND PROBABILITY

12. LIKELIHOOD

Year 6

| CONTENT STANDARD | LEARNING STANDARD | PERFORMANCE STANDARD | |
|------------------|---|----------------------|--|
| | | LEVEL | DESCRIPTOR |
| 12.1 Likelihood. | (i) State whether an event in daily life is likely or unlikely to occur. (ii) State the likelihood of the occurrence of an event as impossible, less likely, equally likely, more likely or certain. | 1 | State the meaning of likelihood. |
| | | 2 | State the likelihood of an event. |
| | | 3 | Justify likelihood of the occurrence of an event. |
| | | 4 | Solve daily routine problems involving likelihood. |
| | | 5 | Solve daily routine problems involving likelihood using various strategies. |
| | | 6 | Solve daily non-routine problems involving likelihood creatively and innovatively. |

This curriculum document is published in Bahasa Melayu and English language. If there is any conflict or inconsistency between the Bahasa Melayu version and the English version, the Bahasa Melayu version shall, to the extent of the conflict or inconsistency, prevail.



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