



KEMENTERIAN PENDIDIKAN MALAYSIA

KURIKULUM STANDARD SEKOLAH RENDAH

Matematik

Dokumen Standard Kurikulum dan Pentaksiran

TAHUN 2
(EDISI BAHASA INGGERIS)



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Bahagian Pembangunan Kurikulum

April 2016

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RUKUN NEGARA

BAHAWASANYA Negara kita Malaysia mendukung cita-cita hendak:
Mencapai perpaduan yang lebih erat dalam kalangan seluruh masyarakatnya;
Memelihara satu cara hidup demokratik;
Mencipta satu masyarakat yang adil di mana kemakmuran negara
akan dapat dinikmati bersama secara adil dan saksama;
Menjamin satu cara yang liberal terhadap tradisi-tradisi
kebudayaannya yang kaya dan berbagai 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 prinsip-prinsip yang berikut:

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

FALSAFAH PENDIDIKAN KEBANGSAAN

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

Sumber: Akta Pendidikan 1996 (Akta 550)

DEFINISI KURIKULUM KEBANGSAAN

3 Kurikulum Kebangsaan

(1) Kurikulum Kebangsaan ialah suatu program pendidikan yang termasuk kurikulum dan kegiatan kokurikulum yang merangkumi semua pengetahuan, kemahiran, norma, nilai, unsur kebudayaan dan kepercayaan untuk membantu perkembangan seseorang murid dengan sepenuhnya dari segi jasmani, rohani, mental dan emosi serta untuk menanam dan mempertingkatkan nilai moral yang diingini dan untuk menyampaikan pengetahuan.

Sumber: Peraturan-Peraturan Pendidikan (Kurikulum Kebangsaan) 1997
[PU(A)531/97]

KATA PENGANTAR

Kurikulum Standard Sekolah Rendah (KSSR) yang dilaksanakan secara berperingkat mulai tahun 2011 telah disemak semula bagi memenuhi dasar baharu di bawah Pelan Pembangunan Pendidikan Malaysia (PPPM) 2013-2025 supaya kualiti kurikulum yang dilaksanakan di sekolah rendah setanding dengan standard antarabangsa. Kurikulum berasaskan standard yang menjadi amalan antarabangsa telah dijelmakan dalam KSSR menerusi penggubalan Dokumen Standard Kurikulum dan Pentaksiran (DSKP) untuk semua mata pelajaran yang mengandungi Standard Kandungan, Standard Pembelajaran dan Standard Prestasi.

Usaha memasukkan Standard Pentaksiran di dalam dokumen kurikulum telah mengubah landskap sejarah sejak Kurikulum Kebangsaan dilaksanakan di bawah Sistem Pendidikan Kebangsaan. Menerusinya murid dapat ditaksir secara berterusan untuk mengenalpasti tahap penguasaannya dalam sesuatu mata pelajaran, serta membolehkan guru membuat tindakan susulan bagi mempertingkatkan pencapaian murid.

DSKP yang dihasilkan juga telah menyepadukan enam tunjang Kerangka KSSR, mengintegrasikan pengetahuan, kemahiran dan nilai, serta memasukkan secara eksplisit Kemahiran Abad Ke-21 dan Kemahiran Berfikir Aras Tinggi (KBAT). Penyepaduan tersebut dilakukan untuk melahirkan insan seimbang dan harmonis dari segi intelek, rohani, emosi dan jasmani sebagaimana tuntutan Falsafah Pendidikan Kebangsaan.

Bagi menjayakan pelaksanaan KSSR, pengajaran dan pembelajaran guru perlu memberi penekanan kepada KBAT dengan memberi fokus kepada pendekatan Pembelajaran Berasaskan Inkuiri dan Pembelajaran Berasaskan Projek, supaya murid dapat menguasai kemahiran yang diperlukan dalam abad ke-21.

Kementerian Pendidikan Malaysia merakamkan setinggi-tinggi penghargaan dan ucapan terima kasih kepada semua pihak yang terlibat dalam penggubalan KSSR. Semoga pelaksanaan KSSR akan mencapai hasrat dan matlamat Sistem Pendidikan Kebangsaan.

Dr. SARIAH BINTI ABD. JALIL
Pengarah
Bahagian Pembangunan Kurikulum

INTRODUCTION

Mathematics Standard-Based Curriculum for Primary School (KSSR) for is a core subject that must be undergone by all pupils who followed the National Education System. Each pupil in Malaysia has the opportunity to pass through at least six years of basic education in primary school and five years in secondary school. The Mathematics programme at secondary school level is divided into three programmes, namely, Mathematics in lower secondary, Mathematics in upper secondary and Additional Mathematics also at the upper secondary level.

Mathematics provides opportunities for pupils to perform the tasks that are fun, meaningful, useful and challenging as well as to increase their curiosity in learning something new. Such experiences raise interest and motivate pupils to learn mathematics outside the classroom and at the higher level of education.

The Primary School Mathematics Curriculum has been paraphrased and reorganized taking into consideration the continuity to the next level. The steps taken are in line with the need to provide Mathematical knowledge, skills and values for pupils from various backgrounds and abilities. Mathematics curriculum benchmarking was conducted in the high achieving

countries at the international assessment level to ensure that the mathematics curriculum in Malaysia is relevant to and comparable with other countries in the world.

In the effort to develop the potential and intellectual proficiency of individual and human development, mathematics is the best receptacle due to its natural properties that encourage logical and systematic thinking. Thus, the formulation of the Mathematics curriculum, other than based on the needs of developing countries, also takes into account the factors which contribute to the development of individuals who are logical minded, critical, analytical, creative and innovative. This step is consistent with the need to provide adequate knowledge and mathematical skills to ensure the country is able to compete globally and meet the challenges of the 21st century. The background and various abilities of pupils are given specific attention in order to determine the knowledge and skills learned in this subject.

AIMS

The aim of the Primary School Standard Curriculum for Mathematics is to develop pupils' understanding on the concept of numbers, basic calculation skills, simple mathematical ideas and competency in applying Mathematical knowledge and Mathematical skills effectively and responsibly, to solve problems and make decisions based on attitude and values in order to overcome challenges faced in daily life in line with development in science and technology and the 21st century challenges.

OBJECTIVES

The Mathematics Standard-Based Curriculum for Primary School enables pupils to achieve the following objectives:

1. Develop mathematical thoughtful learning.
2. Develop understanding and apply the concepts and mathematical skills in various contexts
3. Expand the use of basic operation skills; addition, subtraction, multiplication and division related to Numbers and Operations, Measurement and Geometry, Relationship and Algebra and Statistics and Probability.
4. Identify and use the relationships in mathematical ideas, between the field of mathematics and other fields and with daily life.
5. Communicate using mathematical ideas clearly and use symbols and terms correctly;
6. Use mathematical knowledge and skills to apply and make adjustments to various strategies in solving problems;
7. Develop higher order thinking, critical thinking, creative thinking , innovative thinking , reasoning and explore daily life in mathematical ways.
8. Use various representations to present mathematical ideas and relationships;
9. Appreciate and value the beauty of mathematics.
10. Use various mathematical tools effectively including ICT to build conceptual understanding and apply mathematical knowledge.

THE FRAMEWORK OF PRIMARY SCHOOL STANDARD-BASED CURRICULUM

KSSR Framework is built on the basis of six fundamental strands: communication, spiritual, attitude and values, humanities, personal competence, physical development and aesthetics and science and technology. These six strands are the main domain that support one another and are integrated with critical, creative and innovative thinking.

The integration aims to produce human capital who appreciate values based on spirituality, knowledge, personal competence, critical and creative thinking as well as innovative thinking as shown in Figure 1. The Mathematics curriculum is developed based on the six strands of the KSSR Framework.

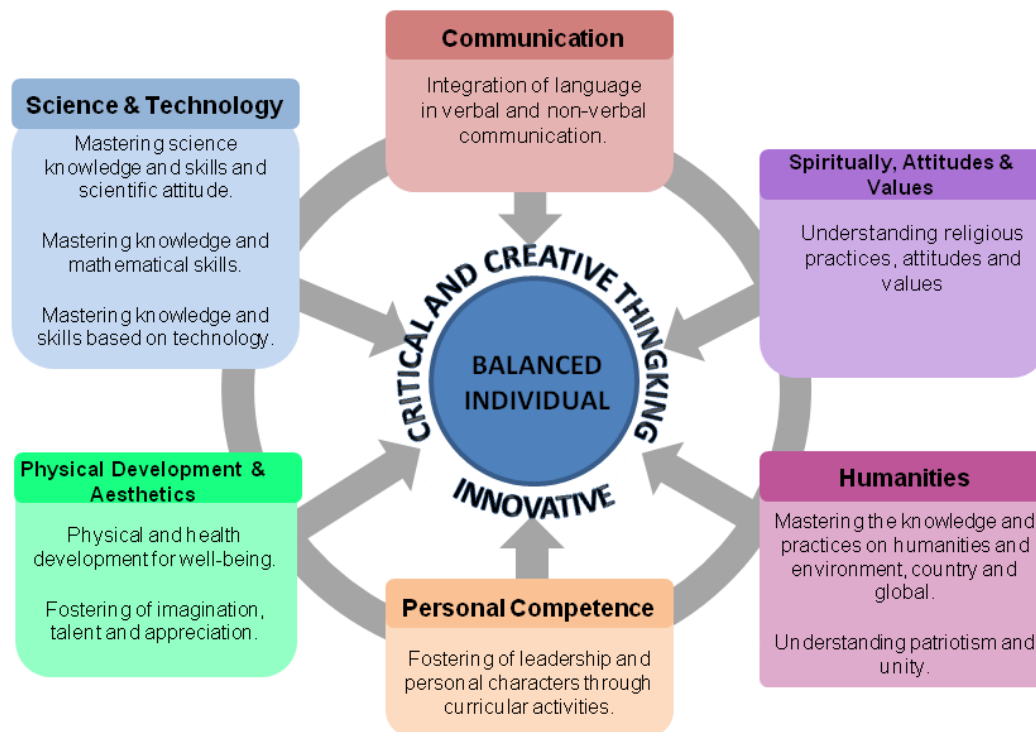


Figure 1: The Framework for Standard-Based Primary School Curriculum

FOCUS

The Mathematics Standard-Based Curriculum for Primary School focuses on the mastery of knowledge and understanding which enables pupils to apply concepts, principles and the mathematical processes learnt.

Emphasis on the aspects of 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, relationship, making representations and using of technology in mathematics.

Mathematics curriculum framework as in figure 2 is an important fundamental aspect in the implementation of the Mathematics curriculum in the classroom. The four important elements that contribute to the Mathematical thoughtful learning of human development are:

1. Learning Area;
2. Attitude and Value;
3. Mathematical Skills; and
4. Mathematical Process.

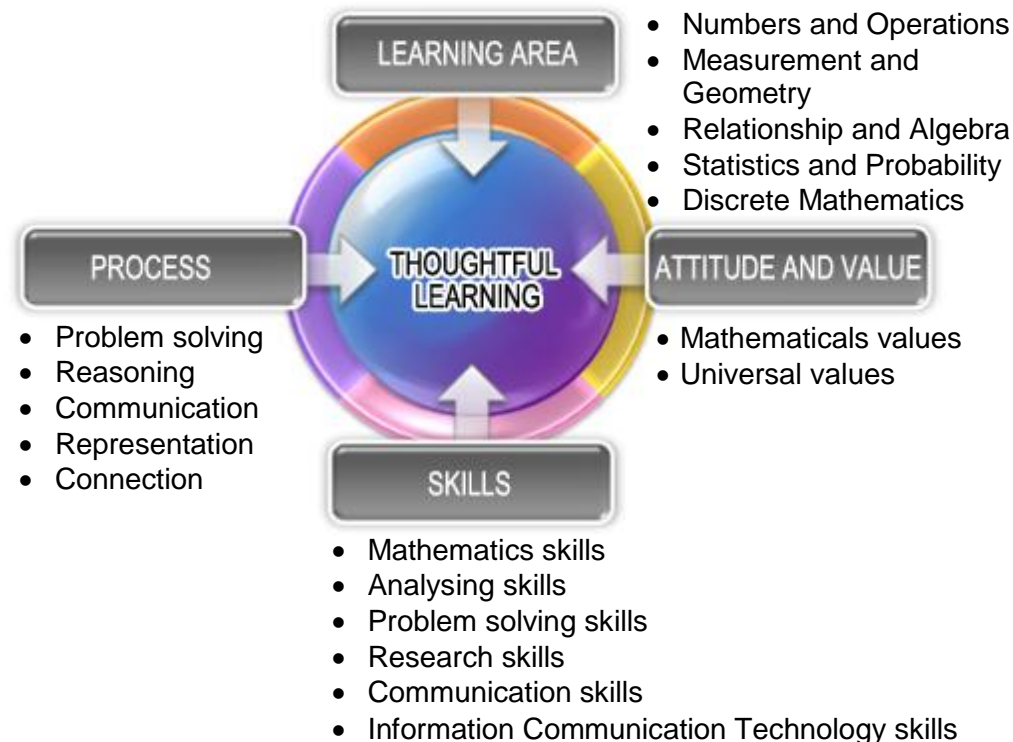


Figure 2 : Primary School Standard-Based Curriculum Framework

Mathematical Thoughtful Learning

Thoughtful learning has the same meaning as the ability to think and create thoughts. In the context of mathematics education, thoughtful learning refers to the desired quality of pupils to be produced through the national mathematics education system. Pupils who are mathematically inclined are those who are capable of doing mathematics and understanding the mathematical ideas and responsibly applying the mathematical knowledge and skills in daily life based on attitudes and values of mathematics.

Mathematics thoughtful learning aims to produce creative and innovative individuals as well as fulfill the requirements of the 21st century because the nation's capability depends on its human capital who are able to think and generate ideas.

Learning Area

The Mathematics Curriculum encompasses five learning areas:

- Numbers and Operations;
- Measurement and Geometry;
- Relationship and Algebra;
- Statistics and Probability; and
- Discrete Mathematics

Mathematical Process

Mathematical processes which support the effective and thoughtful learning of mathematics are:

- problem solving;
- reasoning;
- communication in mathematics;
- relationship; and
- representation

These five mathematical processes are interrelated and need to be implemented intergradedly across the curriculum.

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

- (i) Understand and interpret problems;
- (ii) Planning solution strategies;
- (iii) Implement strategies; and
- (iv) Review the answers.

The various uses of general strategies in problem solving, including the steps in solving problems, need to be expanded. Some of the common strategies are drawing diagrams, identifying patterns, making tables/charts or listing systematically; using algebra, trying simpler cases, logical reasoning, trial and error, working backwards and using analogy.

Reviewing answers is an important step in problem solving. Pupils should be trained to review answers to a problem. By reviewing the answers, pupils see, understand and appreciate the perspective of mathematics from different angles as well as consolidate their understanding of a concept learnt.

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

Reasoning can be done inductively through mathematics activities that involve the identification of patterns and make conclusions based on the patterns.

Reasoning element in teaching and learning prevents pupils from assuming mathematics as only a set of procedures or algorithms that need to be followed to get a solution, without actually understanding the true concepts of mathematics. Reasoning does not only change the pupils' paradigm from just learning to think, but also gives an intellectual empowerment when pupils are coached and trained to make a

conjecture, prove the conjecture, provide logical explanation, analyse, evaluate and give justification to all mathematics activities. This training will produce pupils who are self-confident and resilient in line with the aspiration to mould mathematical thinkers with high capabilities.

Communication can help pupils to clarify and strengthen their mathematical understanding. By sharing understanding written and oral mathematics with classmates, teachers and parents, pupils will be able to increase their confidence and lighten the task of the teachers in monitoring the progress of their mathematical skills.

Communication plays a vital role in ensuring the meaningful learning of mathematics. Through communication, mathematical ideas can be expressed and understood better. Mathematical communication, whether oral, written, or with the use of symbols and visual representations (using charts, graphs, diagrams etc), enable pupils to understand and apply mathematics effectively.

Communicating among themselves or with peers, parents, adults and teachers can help pupils to describe, clarify and strengthen their ideas and understanding of mathematics. To ensure that the process of generating, sharing and increasing understanding take place, pupils should be given the

opportunity to debate their mathematical ideas analytically and systematically. Communication which involves a variety of perspectives and points-of-view, can help pupils to improve their understanding of mathematics.

An important aspect of effective communication in mathematics is the ability to provide explanation effectively, understand and apply the correct mathematical notation. Pupils need to use mathematical language and symbols correctly to ensure that mathematical ideas can be 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 materials to explain mathematical ideas and solve mathematical problems.

Effective communication requires a sensitive environment that suits the needs of the pupils to feel comfortable to talk, ask questions, answer questions and explain the statements to classmates and teachers. Pupils should be given the opportunities to communicate actively in various situations, for example, communicating during activities in pairs, groups or provide explanation to the entire class.

Assessment on the ability of pupils to communicate effectively in mathematics should show the evidence that they are able to generate, explain and share their mathematical ideas through

various forms of communication in various environments. 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 order to learn mathematics and to communicate mathematically.

Representation 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:

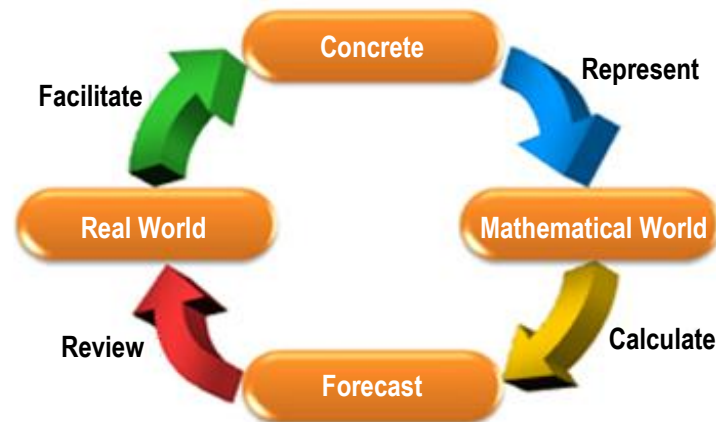


Figure 3: Representation Process

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

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

Internal representation consists of notions that help in visualizing the human process of learning and solving problems in mathematics, while external representation consists of items such as diagrams, the formal language and notational symbols. Using multiple representations in order to show a concept not only helps to develop better conceptual understanding but also strengthens pupils' ability in solving problems.

Representation is necessary for pupils' understanding in mathematical concept and relationship. Representation allows pupils to communicate approaches, debates and understanding of mathematics to themselves and others. It 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 abstract, mostly philosophical and probably unapproachable by most of the

population. With representation, the notion of mathematics can be formed into a model, important relationship can be elaborated, understanding can be stimulated through construction and sequencing of suitable experiences and observations.

Pupils should shape and explore mathematical ideas in depth through opportunities and various learning experiences. Awareness that mathematical ideas are interrelated and mathematics is comprehensive and not fragmented knowledge should be nurtured and developed among pupils. With that understanding and awareness, the meaning of mathematical ideas is more meaningful and thus, can enhance pupils' ability to apply mathematics.

The opportunities and various learning experiences provided should involve pupils actively in the learning of mathematics, help pupils to form in-depth understanding about mathematical concepts and create meaningful understanding of various mathematical ideas. Based on the understanding and meaning formed, pupils are able to relate and apply mathematical ideas, thus, enabling them to be more confident to explore and apply mathematics. The use of teaching aids, technological tools and implementation of task/practical/project work should be encompassed in learning experiences which are prepared for the pupils.

Connections need to be established so that pupils can relate conceptual and procedural knowledge as well as be able to connect to topics in mathematics particularly and mathematics with other fields generally. This will enhance the pupils' understanding and make mathematics clearer, meaningful and interesting to them.

Mathematics curriculum generally consists of several discrete areas such as calculation, geometry, algebra, measurement and problem solving. Without relating these areas, pupils will have to learn and remember too many concepts and skills separately. Instead, by recognizing how the concepts or skills in different fields relate to each other, mathematics will be seen and studied as a holistic knowledgeable discipline and easily understood. When these mathematical ideas are related with everyday experience inside and outside the school, pupils will be more aware of the use, importance, strength and the beauty of mathematics.

Mathematical Process Standard

The standards of process that need to be achieved by the pupils throughout this implementations are as follow :

Table 1: Process Standard of Mathematics

Problem Solving
<ul style="list-style-type: none"> • Understanding the problem. • Extracting relevant information in the given situation and arrange information systematically. • Planning various strategies to solve problem. • Implementing strategies according to the prescribed plan. • Producing solutions which fulfil the requirements of the problem. • Interpreting solutions. • Making reviews and reflections for the solution and strategy used.
Reasoning
<ul style="list-style-type: none"> • Recognizing reasoning and proof as the basis of mathematics. • Identifying pattern, structure and similarity in real world situation and symbolic representation. • Choosing and using various reasoning and proving methods. • Making, investigating and verifying mathematical conjectures. • Constructing and evaluating mathematical argument and evidence. • Making decision and justifying them.

Mathematical Communication

- Organizing and combining mathematical thoughts through communication to clarify and strengthen mathematical understanding.
- Communicating mathematical thoughts and ideas clearly and confidently.
- Using mathematical language to state mathematical ideas accurately.
- Analysing and evaluating mathematical thoughts and strategies of others.

Representation

- Describing mathematical ideas using various representations.
- Making interpretation from given representation.
- Choosing suitable representations.
- Using various mathematical representation to :
 - simplify complex mathematical ideas.
 - help in problem solving.
 - make a model and interpreting mathematical phenomena.
 - create connection between various representations.

Connection

- Identifying and using connection between mathematical ideas.
- Understanding how mathematical ideas are interconnected and build on one another to produce a coherent whole.
- Relating mathematical ideas with daily life and other fields.

Skills

Mathematical skills should be developed and instilled in pupils and these skills include numeration, measuring and constructing, handling and interpreting data, manipulating arithmetic, manipulating algebra, using algorithm and mathematic tools, and Information and Communications Technology (ICT).

Mathematical skills that support effective and thoughtful learning mathematics are:

- Mathematical skill
- Analysing skill
- Problem solving skill
- Research skill
- Communication skill
- Technology using skill

Mathematical skills refer to the following abilities:

- Using correct standard mathematical language and applying logical reasoning.
- Stating mathematical ideas concisely.
- Creating, testing, and proving conjecture.
- Extracting meaning from a mathematical writing; and
- Using mathematics to explain the physical world.

Analysing skills refer to the following abilities:

- Thinking clearly;
- Giving attention and examining every aspect.
- Manipulating precise, concise and detailed ideas.
- Understanding complex mathematical reasoning.
- Constructing and defending logical arguments; and
- Debating illogical arguments.

Problem solving skills refer to the following abilities:

- (i) Constructing problem statement precisely and identifying the main issues.
- (ii) Presenting solutions clearly and explicating the developed assumptions.
- (iii) Solving complex problems by analysing simpler and specific problems.
- (iv) Being open-minded and using different approaches in solving the same problem.
- (v) Solving problems confidently even though the solution is not complex; and
- (vi) Asking for help, if needed.

Research Skills refer to the following abilities:

- (i) Referring to notes, textbooks and other sources.
- (ii) Accessing books in the library.
- (iii) Using database.
- (iv) Getting information from various individuals; and
- (v) Thinking

Communication Skills refer to the following abilities:

- (i) Listen effectively.
- (ii) Writing mathematical ideas clearly and precisely.
- (iii) Writing essays and reports; and
- (iv) Doing presentations.

Technology Skills refer to the ability in using and handling mathematical tools such as abacus, calculators, computers, educational software, websites and educational packages for:

- (i) Developing and having a deeper understanding of mathematical concepts.
- (ii) Creating, testing and proving conjecture.
- (iii) Exploring mathematical ideas.
- (iv) Solving problems.

Attitudes and Values in Mathematics Education

Values are affective qualities built through the teaching and learning of mathematics using appropriate contexts. They are taught and learnt implicitly in learning sessions. Good values that are nurtured will eventually produce good attitudes. The instilled values and attitudes in teaching and learning of mathematics aim to produce individuals who excel in the aspects of knowledge and skills as well as possess virtuous attitudes. The instilling of virtuous values can mould a younger generation which is noble and possesses good attitudes.

Attitudes and values which can be instilled in pupils through the teaching and learning of mathematics are:

1. Values of mathematics refer to mathematics knowledge which encompasses the stress on the characteristics in mathematical knowledge.
2. Attitudes and global values refer to the practice and global virtuous values which are instilled across all subjects.

The formation of values through teaching and learning mathematics also involves spirituality, beliefs, interests, appreciation, confidence, efficiency and endurance.

Belief in the power and greatness of God can basically be nurtured through the contents in this curriculum. The relationship between the content learnt and the real world is to show and validate the greatness and power of the creator of the universe.

Elements of history and patriotism should also be incorporated in appropriate topics to enable pupils to appreciate mathematics and stimulate pupils' interest and confidence in mathematics. Historical elements which could also be a particular event about a mathematician or a brief history about a concept or symbol are also emphasized in this curriculum.

21st CENTURY SKILLS

One of the aspirations of Primary School Standard Curriculum is to produce pupils with the 21st century skills by focusing on thinking skills as well as living skills and careers that are based on practical moral values. 21st century skills aims to produce pupils with the characteristics as stated in the pupils profile in table 2 so that they are able to compete globally. The mastering of Content Skills (CS) and Learning Skills (LS) in the primary school mathematical curriculum contributes to the acquisition of 21st century skills among pupils.

Table 2: Pupil's Profile

PUPIL'S PROFILE	DESCRIPTION
Resilient	They are able to face and overcome difficulties and challenges with wisdom, confidence, tolerance and empathy.
Communication skills	They voice and express their thoughts, ideas and information confidently and creatively, verbally and in written form, using various media and technology.

PUPIL'S PROFILE	DESCRIPTION
Thinker	They think critically, creatively and innovatively; able to overcome 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's and societal traditions. They are confident and creative in handling new learning fields.
Teamwork	They can work effectively and harmoniously with others. They take on responsibility while respecting and appreciating the contributions given by all team members. They obtain interpersonal skills through collaborative activities, and this makes them better leaders and team mates.
Curious	They develop natural curiosity to explore strategies and new ideas. They learn skills that are needed to carry out inquiry and research, as well as show independent attitudes in learning. They enjoy continuous lifelong learning experiences.
Principled	They are honest and have integrity, equality, fair and respect individual, group and community dignity. They are responsible for their actions, consequences and decisions.
Informative	They gain knowledge and develop wide and balanced understanding across various knowledge disciplines. They explore knowledge effectively and efficiently in the context of local and global issues. They understand ethics/laws related to the information gained.

PUPIL'S PROFILE	DESCRIPTION
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.
Patriotic	They demonstrate love, support and respect towards the country.

HIGHER ORDER THINKING SKILL

Higher Order Thinking Skills (HOTS) is stated explicitly in the curriculum so that the teachers can translate them in teaching and learning to stimulate structured and focused thinking among pupils. HOTS description is focused on four levels of thinking as shown in **Table 3**.

Table 3: Thinking levels in HOTS

Thinking level	Description
Application	<ul style="list-style-type: none"> Using knowledge, skills and values in different situations to accomplish a task.
Analysis	<ul style="list-style-type: none"> Breaking down information into smaller parts for in-depth understanding and make connections between these parts.
Evaluation	<ul style="list-style-type: none"> Considering and making decisions using knowledge, experience, skills, values and justifying decisions made.
Creation	<ul style="list-style-type: none"> Producing ideas or products or methods creatively and innovatively.

HOTS is the ability to apply knowledge, skills and values in reasoning and reflecting to solve problems, make decisions, be innovative and capable of inventing something. HOTS include critical and creative thinking skills, reasoning and thinking strategies.

Critical thinking is the ability to evaluate ideas logically and rationally to make sensible judgements using reasons and logical evidence.

Creative thinking is the capacity to produce or create something new and valuable using genuine imagination and unconventional thinking

Reasoning skill is the individual's capability to consider and evaluate logically and rationally.

Thinking strategy is a way of thinking that is structured and focused to solve problems.

HOTS can be applied in classrooms through reasoning based activities, inquiry learning, problem solving and projects. Teachers and pupils need to use thinking tools such as thinking maps and mind maps and also higher level questions to encourage pupils to think.

STRATEGIES IN TEACHING AND LEARNING

Mathematics is a science based on concepts, facts, attitudes, rules, patterns and processes. Good mathematic teaching and learning requires teachers to plan activities meticulously and integrate various strategies that not only allow pupils to understand the contents indepth but also challenge them to think on a higher level.

Opportunities and a variety of learning experiences, integrating the use of ICT, and problem solving that involves a balance of both routine and non-routine questions are also emphasized in the teaching and learning of Mathematics. Non-routine questions requiring higher order thinking is emphasized to achieve the aim of producing human capital that are thoughtful, creative and innovative, able to compete in the era of globalization and able to meet challenges of the 21st century challenges. Thus, teachers need to design teaching and learning that provides opportunities for pupils to make conjectures, reason, ask questions, reflect and then form concepts and self-knowledge. Hence, structured questioning techniques are needed to enable pupils to discover rules, patterns or the nature of mathematical concepts.

Therefore, the strategies used in teaching and learning mathematics require diversity and balance. The use of technologies such as dynamic software, graphic calculators, the internet and so on need to be integrated in the teaching and learning of mathematics to help pupils develop a deep understanding of the concept mainly which involve abstract concepts. However, traditional strategies sometimes are still required when teaching procedure based contents.

In addition, teachers need to use a diversity of approaches in teaching and learning such as mastery learning, contextual learning, project-based learning, problem-based learning, simulation, inquiry-discovery, modular approach and STEM approach. These approaches provide learning experiences in mathematics that are fun, meaningful, useful and challenging which in turn, will form deep understanding of concepts. Therefore, teachers need to choose strategies of teaching and learning to meet the needs of pupils with diverse abilities, interests and preferences in meaningful and challenging activities designed specifically based on their needs.

Mastery Learning

Mastery learning is a learning that ensures that all pupils master the learning objectives set. This learning adheres to the principle that each pupil is able to learn if given the opportunity. Opportunities should be given to the pupils to learn at their own pace, enrichment and remedial action needs to be made as part of teaching and learning process.

Contextual Learning

Contextual learning is learning that requires pupils to make connections with their lives. In this context, pupils do not learn in theory only, but can apply their knowledge of mathematics in daily life situations. Pupils can apply their diverse skills, experiences and local culture, thereby integrating all these into new learning experiences.

Project-based Learning

Project-based learning is a learning process focused on practical tasks in a systematic and well-planned time frame to investigate and explore a problem or produce a product.

Normally, it involves tasks that require data collection and data analysis activities, reporting the results of the project and self-reflection. The focus of learning is on the process where a product or end result of the project is complementary to learning.

Problem-based Learning

Problem-based learning is learning that provides opportunities for pupils to learn through the exploration of daily life problems. Pupils will be able to form resilience when they face and overcome challenges and difficulties in the process of interpreting problems, gathering information, identifying possible solutions, evaluating each problem solving and presenting the conclusions and decisions.

Simulation

Simulation is a learning strategy that gives an opportunity for pupils to learn through activities that resemble real situations. Examples of simulation are role-play, games and the use of models. In role-play, pupils play a role spontaneously based on conditions determined. Pupils play in order to learn a concept or understand the process and make a decision. Models can be used to represent real objects or situations.

Inquiry-discovery

Inquiry-discovery is learning that uses the curiosity in pupils to explore a field of knowledge. This learning is focused on the expansion of skills and intellect to raise questions and find answers that stem from the curiosity of pupils.

Modular Approach

A Modular approach is a teaching and learning strategy that is based on the pupil-centered principle with a focus on personal development, integration of skills, internalisation of knowledge and values in subjects, presenting content in a linear or non-linear sequence, and selecting and presenting content, skills and values which are aimed at flexibility. Operation time is also flexible in the implementation of teaching and learning, such as, using the flipped classroom strategy and so on.

STEM Approach (Science, Technology, Engineering and Mathematics)

STEM approach is the teaching and learning method which applies integrated knowledge, skills and values of STEM through inquiry, problem solving or project in the context of daily life, environment and local as well as global community, as shown in Figure 4.

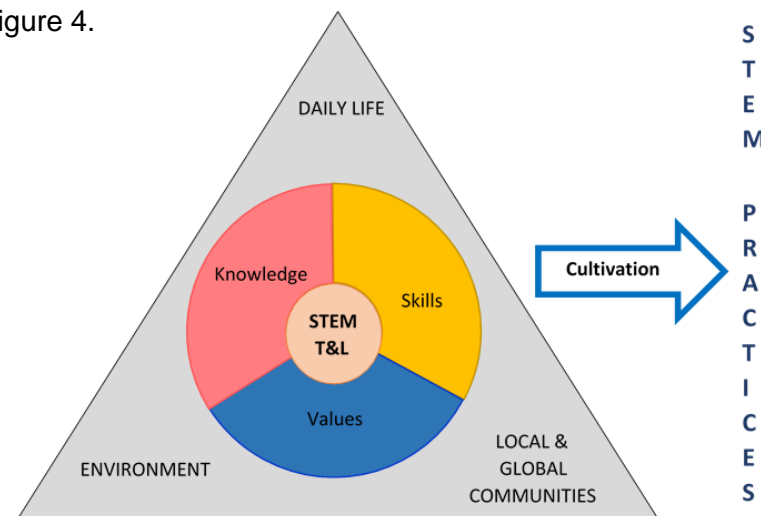


Figure 4: STEM Teaching and Learning Approach

STEM teaching and learning which is contextual and authentic is able to encourage in-depth learning among pupils. Pupils can work in groups or individually according to their ability to cultivate the STEM practices, as follows:

1. Questioning and identifying problems,
2. Developing and using models,
3. Planning and carrying out investigations,
4. Analyzing and interpreting data,
5. Using mathematical and computational thinking,
6. Developing explanation and designing solutions,
7. Engaging in argument and discussion based on evidence, and
8. Acquiring information, evaluating and communicating about the information.

CROSS CURRICULAR ELEMENTS

Cross curricular Elements (EMK) are value-added elements applied in the teaching and learning process other than those specified in the Content Standard. These elements are applied to strengthen the skills and competency of the intended human capital, capable of dealing with the current and future challenges. The elements in the EMK are as follows:

1. Language

- The use of proper language of instruction should be emphasized in all subjects.
- During the teaching and learning of each subject, the pronunciation aspect, sentence structure, grammar and the terminology of the language need to be emphasized to assist pupils to organise ideas as well as communicate effectively.

2. Environmental Sustainability

- Awareness towards the love of the environment in the pupils' lives needs to be nurtured through the teaching and learning process in all subjects.
- Knowledge and awareness of the importance of the environment and global sustainability is important to shape pupils' ethics in appreciating nature.

3. Values

- Values are emphasised in all subjects to ensure that pupils are aware of its importance and practise them.
- Values include the aspects of spirituality, humanity and national and global citizenship which will be practiced in pupils' daily life.

4. Science and Technology

- Increasing the interest in science and technology can improve scientific and technological literacy among pupils.
- The use of technology in teaching can help and contribute to efficient and effective learning.
- The integration of science and technology in the teaching and learning process covers four areas, namely:
 - i. The knowledge of science and technology (facts, principles, concepts related to science and technology);
 - ii. Scientific skills (thinking process and specific manipulative skills);
 - iii. Scientific attitudes (such as accuracy, honesty, security); and
 - iv. Use of technology in teaching and learning activities.

5. Patriotism

- Patriotism can be nurtured through all subjects, co-curricular activities and community services.
- Patriotism can produce pupils who have the spirit of patriotism and pride as Malaysians.

6. Creativity and Innovation

- Creativity is the ability to use imagination in gathering, extracting and generating ideas or creating new or original ideas through inspiration or a combination of existing ideas.
- Innovation is the application of creativity through the modification, improvement and practice of ideas.
- Creativity and innovation are always inter-connected and is needed to ensure that human capital development can meet the challenges of the 21st century.
- Elements of creativity and innovation should be integrated in teaching and learning.

7. Entrepreneurship

- The incorporation of entrepreneurship elements aims to develop attributes and entrepreneurial habits that will become a culture among the pupils.
- Entrepreneurial attributes can be ingrained in teaching and learning through activities that could foster attitudes such as diligence, honesty, trustworthiness and

responsibility as well as developing creative minds and innovative ideas to spur to the market.

8. Information and Communication Technology (ICT)

- Information and communication technology elements are incorporated in the teaching and learning to ensure pupils can apply and strengthen their basic knowledge and skills in ICT.
- The application of ICT will not only motivate pupils to be creative but stimulate interest and enjoyment as well as improve the quality of teaching and learning.
- ICT should be integrated in the lessons based on appropriate topics to be taught to enhance pupils' understanding of the subject content.

9. Global Sustainability

- Elements of Global Sustainability aim to develop pupils with sustainable thinking and highly responsive attitude to the environment in their daily lives with the application of knowledge, skills, and values acquired through the elements of the Sustainable Consumption and Production, Global Citizenship and Solidarity.
- Elements of Global Sustainability is important in preparing pupils to face challenges and current issues at the local, national and global levels.

- These elements are taught directly and indirectly in related subjects.

10. Finance Education

- Application of financial education elements aims at shaping the future generation that is capable of making right financial decisions, ethical practice and financial management skills to manage the financial affairs responsibly.
- Elements of financial education can be applied in teaching and learning directly or indirectly. Direct application is done through the titles that contain explicit financial elements such as the calculation of simple interest and compound interest. Indirect application is integrated through other titles across the curriculum. Exposure to financial management in real life is important to provide pupils with the knowledge, skills and values that can be applied effectively and meaningfully.

SCHOOL ASSESSMENT (SA)

School Assessment (SA) is part of the assessment approaches, a process to obtain information on pupils' progress which is planned, carried out and reported by the teachers concerned. This on-going process occurs formally and informally so that teachers can determine the actual level of pupils' achievement.

SA is to be carried out holistically based on inclusive, authentic and localised principles. Information obtained from the school assessments will be used by administrators, teachers, parents and pupils in planning follow-up actions towards improving the pupils' learning development.

SA can be carried out by teachers in formative and summative ways. Formative assessments are carried out in line with the process of teaching and learning, and summative assessment at the end of every learning unit, term, semester or year.

In carrying out the SA, teachers need to plan, build items, administer, inspect, record and report the level of pupils' mastery of the subjects taught based on Standard-based Curriculum and Assessment Documents (DSKP).

In order to ensure that formative assessment helps to enhance pupils' ability and achievement, teachers should use assessment strategies which have the following characteristics:

1. Taking into account the knowledge and skills learnt by the pupils and assess how far they understand.
2. In various forms, such as observations of the activities carried out, tests, presentations, projects, folios, etc.
3. Designed to enable pupils to exhibit a variety of learning abilities.
4. Fair to all pupils.
5. Take into account the various cognitive, affective and psychomotor levels.

Primary School Mathematics Assessment involves elements of content, skills and processes, as well as attitudes and values. Pupils Assessment refers to Performance Standards Criteria in the six mastery levels that provide a specific interpretation. Assessment of Mathematics also can be reported using the reporting template designed and built to record pupil achievement. At the end of each year, report of overall level of mastery achieved is recorded as a summary of the elements of content, skills and processes, as well as attitudes and values.

Assessment content

The assessment is generally conducted topically. This assessment aims to see to what extent pupils understand the specific content standards comprehensively and holistically. This standard outlines the curriculum content which is organized according to specific learning areas. The topics listed are hierarchically arranged and shows the development according to the learning areas. Teachers need to assess the pupils holistically. Standard Performance (SPi) for each topic is built based on general performance level as shown in Table 4.

Table 4: General Interpretation of Performace Level of Mathematical Contents.

PERFORMANCE LEVEL	DESCRIPTOR
1	Know basic knowledge of mathematics.
2	Know and understand the basic knowledge of mathematics.
3	Know and understand basic knowledge of mathematics to perform basic operations of mathematics and basic conversion.
4	Know and understand the basic knowledge of mathematics to perform calculation steps in solving daily routine problems.
5	Master and apply knowledge and skills of mathematics in solving daily routine problems using various strategies.
6	Master and apply knowledge and skills of mathematics in solving daily non routine problems creatively and innovatively.

Mathematics Skills and Processes

Elements of skills and processes that should be displayed and practised by the pupils are assessed on an ongoing basis through a variety of methods such as observation, training, presentation, pupils' oral responses, group work and so on. Achievement reports of these elements can be done in the middle of the year and at the end of the year to see the development of pupils and help them improve their skills.

In the Teaching and Learning process, the teacher should assess the mathematical skills ability together with the learning practices that are shown through mathematical process, which are problem solving, mathematical reasoning, communication, relationship and representation. Performance level for mathematical skills are as shown in table 5.

Table 5 : General Interpretation of Performance Level of Mathematics Skills Process

PERFORMANCE LEVEL	SKILLS PROCESS				
	PROBLEM SOLVING	REASONING	COMMUNICATION	CONNECTION	REPRESENTATION
1	Able to state the steps of problem solving without performing the process.	Able to give justification for mathematics activity logically and with guidance.	Able to state mathematical idea verbally or in written form using mathematical symbol or visual representation	Able to connect skills learnt in other topics and daily life with guidance.	Able to use representation with guidance.
2	Able to solve routine problems with guidance.	Able to give justification for mathematics activity logically without guidance.	Able to explain mathematical idea verbally or in written form using mathematical symbol or visual representation	Able to connect skills learnt in other topics and daily life without guidance.	Able to use representation to show mathematical understanding without guidance.
3	Able to solve routine problems involving one step calculation without guidance.	Able to show the accurate justification for mathematics activity involving one calculation.	Able to use correct mathematical language, symbol or visual representation	Able to connect concept and procedure to solve mathematical sentence.	Able to explain mathematical concept and procedures using representation.
4	Able to solve complex routine problems.	Able to show the accurate justification for mathematics activity involving more than one calculation.	Able to explain mathematical idea systematically using correct language, symbol or visual representation	Able to connect concept and procedure to solve daily routine problems.	Use representation to solve daily routine problems.
5	Able to solve complex routine problems using various strategies.	Able to show the accurate justification for mathematics activity involving routine problem solving.	Able to explain mathematical idea systematically using correct mathematical language, symbol or visual representation to solve routine problems.	Able to connect concept and procedure to solve daily routine problems using various strategies.	Use various representation to solve daily routine problem using various strategies.
6	Able to solve non routine problems creatively and innovatively.	Able to explain the accurate justification for mathematics activity involving non routine problem solving creatively and innovatively.	Able to explain mathematical idea systematically using correct mathematical language, symbol or visual representation to solve non routine problems creatively and innovatively	Able to connect concept and procedure to solve daily non routine problems creatively and innovatively.	Use representation to solve daily non routine problems creatively and innovatively

Attitudes and values

Elements of attitudes and values that should be displayed and practised by pupils continuously is assessed through various methods, such as, observation, exercise, presentation, pupils' verbal responses, group work and so on. Achievement reports of these elements can be done in the middle of the year and end of the year to see the development of the pupils and help them improve their practices of good values as in table 6.

Table 6: General Interpretation of Performance Level of Attitude and Values

PERFORMANCE LEVEL	DESCRIPTOR
1	Pupils able to state attitudes and values in mathematics with guidance.
2	Pupils able to explain of attitudes and values in mathematics by giving reasonable example.
3	Pupils able to show attitude and values related to mathematics in a given situation.
4	Pupils able to demonstrate attitude and values related to mathematics in various situation and become mentor to their peers.
5	Pupils always practise attitude and values related to mathematics in teaching and learning process and become mentor to their peers.
6	Pupils always practise attitude and values related to mathematics in daily life and become mentor and role model to their peers.

Overall Performance Report

At the end of the school term, teachers should determine the overall performance level of pupils. This final assessment includes content, skills and mathematical process and values aspects. As such, teachers should evaluate pupils holistically taking into consideration pupils activities such as topical tests, observations, exercises, presentations, pupils' oral responses, project works etc. However, professional consideration and teachers discretion is needed to state the pupils' overall performance based on the table 7 below.

Table 7 : Overall Performance Level

PERFORMANCE LEVEL	DESCRIPTOR
1	<ul style="list-style-type: none"> Review the basic knowledge of mathematics. Use mathematical process skills to review the basic knowledge of mathematics with guidance. State attitudes and values in mathematics with guidance.
2	<ul style="list-style-type: none"> Explain basic knowledge of mathematics. Use mathematical process skills to explain basic knowledge of mathematics. Explain attitudes and values in mathematics by giving reasonable example.
3	<ul style="list-style-type: none"> Apply basic knowledge of mathematics. Use mathematical process skills to apply basic knowledge of mathematics. Show attitudes and values in mathematics for a given situation.
4	<ul style="list-style-type: none"> Solve routine problems in daily life. Use mathematical process skills to solve routine problems. Demonstrate attitudes and values related to mathematics in various situation. and become mentor to peers.
5	<ul style="list-style-type: none"> Solve complex routine problems using various strategies of problem solving. Use mathematical process skills to solve complex routine problems. Always practice attitude and values related to mathematics in teaching and learning process. and become mentor to peers.
6	<ul style="list-style-type: none"> Solve non-routine problems in daily life. Use mathematical process skills to solve non-routine problems Always practise attitudes and values related to mathematics in daily life and become mentor and role model to peers.

Mathematics Assessment for Primary School Report

Assessment is a process used in determining learning achievement. This achievement is recorded in a report template as in Diagram 5. The process of recording pupils' achievement is carried out based on Performance Level as described in the Standard-based Curriculum and Assessment Documents (DSKP).

This report template shows the process of delivering information on pupils learning and achievement from time to time. This report encompasses the progress and development of pupils from the aspects of knowledge, skills and values as aspired in the curriculum.

ORGANISATION OF CONTENT

The Primary School Mathematics Curriculum Standard is designed with the emphasis on Content Standard and Learning Standard that needs to be known and can be done by pupils. This standard is presented in a modular form, divided into topics based on learning areas. The level of pupils' learning development is measured by the Performance Standard and is organized according to each topic.

The content of Primary School Mathematics Standard-based Curriculum and Assessment Documents is based on learning areas as in Table 8.

KEMENTERIAN PENDIDIKAN MALAYSIA		SEKOLAH :																bpl
		ALAMAT :																
		PENILAIAN :																
MATA PELAJARAN		NAMA GURU MATA PELAJARAN:																
MATEMATIK		KELAS:																
BIL.	NAMA MURID	NO. MY KID / NO. KAD PENGENALAN	JANTINA	PENGETAHUAN MATEMATIK									KEMAHIRAN DAN PROSES					TAHAP PENGUASAAN KESELURUHAN
				T1	T2	T3	T4	T5	T6	T7	T8	T9	PENYELESAIAN MASALAH	PENAAKULAN	PERKAITAN	PERWAKILAN	KOMUNIKASI	

Figure 5: Example of Using MS Excel Reporting Template

Table 8 : List of Topics According to Learning Area in Primary School Mathematics

Numbers and Operations
<ul style="list-style-type: none"> • Whole Numbers • Basic Operations • Fractions, Decimals and Percentage • Money
Measurement and Geometry
<ul style="list-style-type: none"> • Time • Measurement • Space
Relationship and Algebra
<ul style="list-style-type: none"> • Coordinate • Ratio and Proportion
Statistics and Probability
<ul style="list-style-type: none"> • Data Management • Probability
Discrete Mathematics
Not at primary level

Primary School Mathematics Standard-based Curriculum and Assessment Documents focus on the mastery of knowledge, skills and values that are suitable to the pupils' abilities. The minimum time provision for mathematics phase 1 is 96 hours per year. Standard-based Curriculum and Assessment Documents are organised through a statement of Standard Content, Learning Standard, and Performance Standard, while the notation column is appended with the proposal of activities and notes in Table 9.

The objective of each topic is explicated as a guide to prepare activities and learning environment which is appropriate and relevant to the ability and the needs of pupils. Teachers need to use creativity and their professional discretion to achieve the objectives. The proposed activities are not something absolute. Teachers are advised to use a variety of sources such as modules, books and the internet to provide suitable teaching and learning activities.

Table 9 : Organisation of Mathematics Standard-based Curriculum and Assessment Documents

CONTENT STANDARD	LEARNING STANDARD	REMARKS
Specific statements about what pupils should know and can do within a period of schooling that encompass knowledge, skills and values.	A specification of criteria or indicators of the quality of learning and achievement that can be measured for each content standard.	Proposed teaching and learning activities and notes to assist teachers' understanding in translating Learning Standard.
PERFORMANCE STANDARD		
A set of common criteria which shows the levels of achievement that should be exhibited by pupils as a sign that the matter has been mastered (indicator of success).		

LEARNING AREA

NUMBERS AND OPERATIONS

TOPIC

1.0 WHOLE NUMBERS UP TO 1000

Objectives

Enable pupils to:

- Know, understand and apply whole numbers up to 1000.
- Solve problems involving whole numbers.
- Give mathematical reasoning, relationship, representation, communicate and use technology in learning whole numbers up to 1000.

CONTENT STANDARD	LEARNING STANDARD	NOTES
1.1 Number value.	<p>Pupils will be able to:</p> <p>1.1.1 Name the value of numbers up to 1000:</p> <ul style="list-style-type: none"> (i) Read any given number in words. (ii) Say any given number in words. (iii) Match the numerals with the words. <p>1.1.2 Determine the value of numbers up to 1000:</p> <ul style="list-style-type: none"> (i) Show the quantity of numbers given. (ii) Match groups of objects with numbers. (iii) Compare the value of two numbers. (iv) Arrange groups of objects in ascending and descending order. 	<p>Say the number correctly. 235 read as two hundred and thirty-five' not 'two three five'.</p> <p>Use real objects, pictures, number lines and abacus 4:1.</p>
1.2 Write numbers.	1.2.1 Write numbers in numerals and words.	
1.3 Number sequence.	<p>1.3.1 Count numbers.</p> <p>1.3.2 Complete any number sequence.</p>	Count in ones up to tens and hundreds in ascending and descending order by using various objects, pictures, number lines and abacus 4:1.
1.4 Place value.	<p>1.4.1 State the place value and digit value of any number.</p> <p>1.4.2 Partition any number according to place value and digit value.</p>	Use various representations of place value and abacus 4:1 to state the place value and the digit value.

CONTENT STANDARD	LEARNING STANDARD	NOTES
1.5 Estimate.	Pupils will be able to: 1.5.1 Give reasonable estimation for the quantity of objects.	Estimation is made by stating the quantity based on a reference set and using “approximate”, “less than” and “more than”.
1.6 Round off numbers.	1.6.1 Round off whole numbers to the nearest hundreds.	Round off can be done by using a number line and various strategies.
1.7 Number patterns.	1.7.1 Identify patterns for a given number series. 1.7.2 Complete various simple number patterns.	Number patterns in ascending and descending order by ones up to tens and hundreds.
1.8 Problem solving.	1.8.1 Solve problems involving daily life situations.	

PERFORMANCE STANDARD	
PERFORMANCE LEVEL	DESCRIPTOR
1	State any number up to 1000.
2	Determine the number values and arrange numbers in order.
3	<ul style="list-style-type: none">• Estimate and round off any number.• Complete number sequence and number patterns.
4	Solve daily routine problems involving numbers.
5	Solve daily routine problems involving numbers using various strategies.
6	Solve daily non-routine problems involving numbers creatively and innovatively.

LEARNING AREA

NUMBERS AND OPERATIONS

TOPIC

2.0 BASIC OPERATIONS

Objectives

Enable pupils to:

- Understand and apply concepts and procedural skills in addition, subtraction, multiplication and division.
- Use mathematical knowledge and skills to solve problems.
- Use mathematical terms correctly when doing addition, subtraction, multiplication and division processes.
- Give mathematical reasoning, relationship, representation, communicate and use technology in learning basic operations.

CONTENT STANDARD	LEARNING STANDARD	NOTES
2.1 Add within 1000.	<p>Pupils will be able to:</p> <p>2.1.1 Add two numbers within the sum of 1000.</p> <p>2.1.2 Add three numbers within the sum of 1000.</p>	<p>Use various calculation strategies to perform addition.</p> <p>Use objects, pictures, number lines, abacus 4:1 and mental calculation to represent calculation in addition.</p>
2.2 Subtract within 1000.	<p>2.2.1 Subtract two numbers within 1000.</p> <p>2.2.2 Subtract two numbers from any one number within 1000.</p>	<p>Use various calculation strategies to perform subtraction.</p> <p>Use objects, pictures, number lines, abacus 4:1 and mental calculation to represent calculation in subtraction.</p>
2.3 Multiply within 1000.	<p>2.3.1 Multiply in the range of basic facts.</p> <p>2.3.2 Multiply one digit number with 10.</p>	<p>Basic facts involving multiplication of one digit number with one digit.</p> <p>Multiplication as repeated addition.</p> <p>Use various strategies to construct and state basic facts of multiplication.</p> <p>Use objects, pictures, number lines, abacus 4:1 and mental calculation to represent calculation in multiplication.</p> <p>Commutative Law of Multiplication: $a \times b = b \times a$</p>

CONTENT STANDARD	LEARNING STANDARD	NOTES
2.4 Divide within 1000.	<p>Pupils will be able to:</p> <p>2.4.1 Divide in the range of basic facts.</p> <p>2.4.2 Divide any two digit number with 10.</p>	<p>Basic facts involving division with and without remainder.</p> <p>Divide by one digit number and by 10.</p> <p>Division as sharing, grouping, repeated subtraction and inverse multiplication.</p> <p>Use various strategies to construct and state basic facts of division.</p> <p>Use objects, pictures, number lines, abacus 4:1 and mental calculation to represent calculation in division.</p>
2.5 Problem solving.	<p>2.5.1 Create stories involving addition, subtraction, multiplication and division within 1000.</p> <p>2.5.2 Solve problems involving addition, subtraction, multiplication and division in daily life situations.</p>	<p>Solve daily problems involving two numbers.</p> <p>Problem-solving skill involves the following steps:</p> <ul style="list-style-type: none"> • Understand and interpret the problem. • Plan a solving strategy. • Carry out the strategy. • Review the answer. <p>Use simulations or situation model.</p>

PERFORMANCE STANDARD	
PERFORMANCE LEVEL	DESCRIPTOR
1	Read number sentence involving basic operations.
2	Determine and explain number sentence involving basic operations.
3	Solve number sentence and determine reasonable answer involving basic operations.
4	Solve daily routine problems involving basic operations.
5	Solve daily routine problems involving basic operations using various strategies.
6	Solve daily non-routine problems involving basic operations creatively and innovatively.

LEARNING AREA

NUMBERS AND OPERATIONS

TOPIC

3.0 FRACTIONS AND DECIMALS

Objectives

Enable pupils to:

- Relate fractions and decimals in daily life.
- Use representation, give mathematical reasoning, communicate and explore in understanding the concept of fractions and decimals.

3.0 FRACTIONS AND DECIMALS

CONTENT STANDARD	LEARNING STANDARD	NOTES
3.1 Proper fractions.	<p>Pupils will be able to:</p> <p>3.1.1 Identify and state the proper fractions with 1 as the numerator and denominator up to 10.</p> <p>3.1.2 Name the proper fractions with numerator up to 9 and denominator up to 10.</p> <p>3.1.3 Represent with diagrams based on given fractions.</p> <p>3.1.4 Write given proper fractions.</p> <p>3.1.5 Compare the value of two proper fractions.</p>	<p>Use concrete materials, pictures and folded papers to explain the concept of fractions.</p> <p>Determine proper fractions based on an object.</p> <p>Representation can be done through drawing, shading, pasting and colouring.</p> <p>Write proper fractions as said and based on the shaded diagrams.</p> <p>Compare the value based on folded papers, fraction boards and diagrams.</p>
3.2 Decimals.	<p>3.2.1 Convert fractions of tenths to decimals.</p> <p>3.2.2 Say decimal numbers of zero point one up to zero point nine.</p> <p>3.2.3 Show decimal numbers of 0.1 to 0.9.</p> <p>3.2.4 Represent diagrams based on given decimal numbers.</p> <p>3.2.5 Write decimals as given.</p> <p>3.2.6 Compare the value of two given decimals.</p>	<p>Use diagrams and number lines to explain the concept of decimals</p> <p>Write decimals as said, based on the shaded diagrams and number lines.</p> <p>Compare the value based on folded papers, number lines and diagrams.</p>

CONTENT STANDARD	LEARNING STANDARD	NOTES
3.3 Fractions and decimals.	Pupils will be able to: 3.3.1 Compare the given values of fractions and decimals.	Compare the value based on concrete materials and diagrams.
3.4 Problem solving.	3.4.1 Solve problems involving daily life situations.	

PERFORMANCE STANDARD	
PERFORMANCE LEVEL	DESCRIPTOR
1	State proper fractions and decimals.
2	<ul style="list-style-type: none"> • Write proper fractions and decimals. • Represent diagrams for proper fractions and decimals as given.
3	Compare the values of two proper fractions, two decimals and the values between fractions and decimals.
4	Solve daily routine problems involving fractions and decimals.
5	Solve daily routine problems involving fractions and decimals using various strategies.
6	Solve daily non-routine problems involving fractions and decimals creatively and innovatively.

LEARNING AREA

NUMBERS AND OPERATIONS

TOPIC

4.0 MONEY

Objectives

Enable pupils to:

- Relate the usage of money in daily life.
- Apply financial education in daily life.
- Think, give mathematical reasoning and conduct exploration in daily life for future benefits.
- Communicate, relate and solve problems involving finance.
- Instill entrepreneurship.

CONTENT STANDARD	LEARNING STANDARD	NOTES
4.1 Notes and coins.	<p>Pupils will be able to:</p> <p>4. 1.1 Identify notes of Malaysian currency up to RM100.</p> <p>4.1.2 Determine the value of money up to RM100.</p>	<p>Use money in daily life situation.</p> <p>Represent the value using abacus 4:1.</p> <p>Use combination of money in the form of coins and notes.</p>
4.2 Add values of money.	<p>4.2.1 Add two values of money within the sum of RM100.</p> <p>4.2.2 Add three values of money within the sum of RM100.</p>	
4.3 Subtract values of money.	<p>4.3.1 Subtract two values of money within RM100.</p> <p>4.3.2 Subtract two values of money consecutively from any value within RM100.</p>	
4.4 Multiply values of money.	4.4.1 Multiply values of money within the product of RM100.	Multiply the value of money with one digit number and with 10.
4.5 Divide values of money.	4.5.1 Divide values of money within RM100.	Divide the value of money with one digit number and with 10.

CONTENT STANDARD	LEARNING STANDARD	NOTES
4.6 Savings and investment.	Pupils will be able to: 4.6.1 Manage finances effectively as basic of savings and spending.	Use suitable situations to explain the related financial management within RM1000.
4.7 Problem solving.	4.7.1 Solve problems involving daily life situations.	

PERFORMANCE STANDARD	
PERFORMANCE LEVEL	DESCRIPTOR
1	State money up to RM100.
2	Determine value of money up to RM100.
3	<ul style="list-style-type: none">Justify the solution for number sentences involving money.Explain financial management effectively.
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.

LEARNING AREA

MEASUREMENT AND GEOMETRY

TOPIC

5.0 TIME

Objectives

Enable pupils to:

- Understand analogue clock and digital clock in daily life.
- Communicate, generate ideas and convey a situation regarding time clearly.
- Think, give mathematical reasoning, relate, and representation, use technological skills to solve the problems.
- Use time effectively in daily life.

CONTENT STANDARD	LEARNING STANDARD	NOTES
5.1 Time in hours and minutes.	<p>Pupils will be able to:</p> <p>5.1.1 Recognise minute graduations on the clock face.</p> <p>5.1.2 State and show time in hours and minutes.</p> <p>5.1.3 Convert time in hours and minutes from words to numerals and vice versa.</p> <p>5.1.4 Record time in hours and minutes.</p>	<p>Recognise minute graduations and multiples of five minutes in numerals on analogue clock.</p> <p>Time in hours and multiples of five minutes are introduced. Then, introduce half an hour, and quarter hour.</p> <p>Analogue and digital clock can be used to recognise hours and minutes.</p> <p>Record daily activities based on time in hours and minutes.</p>
5.2 Relationship in time.	5.2.1 State the relationship between days with hours and hours with minutes.	
5.3 Problem solving.	5.3.1 Solve problems involving daily life situations.	

PERFORMANCE STANDARD	
PERFORMANCE LEVEL	DESCRIPTOR
1	State five minutes graduation on the clock face and be able to state time in hours and minutes.
2	Convert time in hours and minutes from words to numerals and vice versa, and state days to hours and hours to minutes.
3	Record time in hours and minutes, and justify the answer.
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.

LEARNING AREA

MEASUREMENT AND GEOMETRY

TOPIC

6.0 MEASUREMENT

Objectives

Enable pupils to:

- Use various concrete materials to build the understanding of the concept and apply mathematical knowledge in real life situations.
- Think, give mathematical reasoning, communicate and explore mathematically in real life situations.
- Relate, represent and solve the problems.

CONTENT STANDARD	LEARNING STANDARD	NOTES
6.1 Length.	<p>Pupils will be able to:</p> <p>6.1.1 Recognise unit of length .</p> <p>6.1.2 Measure length.</p> <p>6.1.3 Estimate length.</p>	<p>Recognise centimetre and metre by observing the graduations on a ruler and measuring tape. Write the given length in centimetres and metres by using the symbol cm and m.</p> <p>Measure and mark specified distance in units cm and m. Measure and record the length of objects in the units cm and m. Sketch and draw straight lines according to the given measurement in units cm and m.</p> <p>Estimate the length of objects in units of centimetres and metres and compare the estimation with the actual measurement.</p>
6.2 Mass.	<p>6.2.1 Recognise unit of mass.</p> <p>6.2.2 Weigh objects.</p> <p>6.2.3 Estimate mass.</p>	<p>Recognise grams and kilograms by observing graduation on the weighing scale.</p> <p>Recognise mass in grams and kilograms.</p> <p>Write given mass in gram and kilogram by using the symbol g and kg.</p> <p>Weigh and record mass of objects in grams and kilograms.</p> <p>Estimate the mass of objects in units of grams and kilogram and compare the estimation with the actual weight</p>

CONTENT STANDARD	LEARNING STANDARD	NOTES
6.3 Volume of liquid.	<p>Pupils will be able to:</p> <p>6.3.1 Recognise volume of liquid.</p> <p>6.3.2 Measure volume of liquid.</p> <p>6.3.3 Estimate volume of liquid.</p>	<p>Recognise millilitres and litres by observing the graduation on the measuring cylinder.</p> <p>Recognise volume of liquid in millilitres and litres.</p> <p>Write the volume of liquid given in millilitres by using the symbol ml and litres by using the symbol l.</p> <p>Measure, mark and record volume of liquid as determined in millilitres and litres.</p> <p>Estimate the volume of liquid in units of millilitre and litre and compare with the actual measurement.</p>
6.4 Problem solving.	6.4.1 Solve problems involving daily life situations.	

PERFORMANCE STANDARD	
PERFORMANCE LEVEL	DESCRIPTOR
1	Recognise centimetres, metres, grams, kilograms, millilitres and litres.
2	Measure length, mass and volume of liquid.
3	Estimate and compare length and measurement, and to justify the answer.
4	Solve daily routine problems involving measurement.
5	Solve daily routine problems involving measurement using various strategies.
6	Solve daily non-routine problems involving measurement creatively and innovatively.

LEARNING AREA

MEASUREMENT AND GEOMETRY

TOPIC

7.0 SPACE

Objectives

Enable pupils to:

- Understand and apply mathematical concepts and skills.
- Give mathematical reasoning, communicate, relate, represent, think and use technological skills to solve the problems.
- Appreciate and admire mathematical skills in various forms generated by two-dimensional and three-dimensional shapes.

CONTENT STANDARD	LEARNING STANDARD	NOTES
7.1 Three-dimensional shapes.	<p>Pupils will be able to:</p> <p>7.1.1 Identify three-dimensional shapes based on descriptions.</p> <p>7.1.2 Identify basic shapes of three-dimensional shapes.</p> <p>7.1.3 Identify various nets of three-dimensional shapes.</p>	Three-dimensional shapes involving cube, cuboid, square based pyramid, cylinder and cone.
7.2 Two-dimensional shapes.	<p>7.2.1 Identify two-dimensional shapes based on descriptions.</p> <p>7.2.2 Draw basic shapes of two-dimensional shapes.</p>	Two-dimensional shapes involving square, rectangle, triangle and circle.
7.3 Problem solving.	7.3.1 Solve problems involving daily life situations.	

PERFORMANCE STANDARD	
PERFORMANCE LEVEL	DESCRIPTOR
1	Describe two-dimensional and three-dimensional shapes.
2	Identify two-dimensional and three-dimensional basic shapes.
3	<ul style="list-style-type: none"> • Determine three-dimensional shapes based on nets. • Draw two-dimensional basic shapes. • Justify the answers.
4	Solve daily routine problems involving space.
5	Solve daily routine problems involving space using various strategies.
6	Solve daily non-routine problems involving space creatively and innovatively.

LEARNING AREA

STATISTICS AND PROBABILITY

TOPIC

8.0 DATA MANAGEMENT

Objectives

Enable pupils to:

- Obtain skills in gaining information of bar chart given.
- Communicate, thinking, give mathematical reasoning, making decision and deliver ideas to explain daily life situation.
- Use technology to build an understanding of mathematical concepts and apply the mathematical knowledge.

CONTENT STANDARD	LEARNING STANDARD	NOTES
8.1 Collect, classify and arrange data.	Pupils will be able to: 8.1.1 Collect data based on daily life situation.	Use various methods to arrange data.
8.2 Bar chart.	8.1.2. Read and obtain information from bar chart.	Begin with graduations on horizontal axis (x-axis) and vertical axis (y-axis) to represent one unit.
8.3 Problem solving.	8.3.1 Solve problems involving daily life situations.	Use simple vocabulary to explain topic, legend, horizontal axis and vertical axis on bar chart.

PERFORMANCE STANDARD	
PERFORMANCE LEVEL	DESCRIPTOR
1	Read information from the bar chart.
2	Collect data from daily life situation.
3	Determine reasonable answers for the given information from the bar chart.
4	Solve daily routine problems involving bar chart.
5	Solve daily routine problems involving bar chart using various strategies.
6	Solve daily non-routine problems involving bar chart creatively and innovatively.

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