



Republic of the Philippines
Department of Education
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**MATATAG K TO 10 CURRICULUM
OF THE K TO 12 PROGRAM**

**MATHEMATICS
GRADES 1-10**

THE SHAPE OF THE GRADES 1 TO 10 MATHEMATICS CURRICULUM

Mathematics is a powerful means of identification, description, and application of patterns and relationships; generalization; and communication. It provides opportunities for challenge, creativity, and users' recognition and appreciation of the nature, beauty and power of mathematical processes, strategies, and reasoning.

The successful study of mathematics in Grades 1 to 10 is a key component of Filipino learners' preparation for life in the 21st century. For full participation in society, learners need to develop sound mathematical knowledge, skills, and understanding for making informed decisions and for solving problems in a variety of contexts relevant to their daily lives.

Historically, mathematics arose from necessity of the human society, with real-world problems giving birth to its existence, emphasizing problem solving at its core. In schools, mathematics serves as an ideal training ground, fostering the problem-solving ability learners.

Additionally, in this age of scientific and technological innovations, being “numerate” is crucial for engaging in various endeavors. The Organisation for Economic Co-operation and Development (OECD) defines numeracy as “the ability to access, use, interpret, and communicate mathematical information and ideas, in order to engage in and manage the mathematics demands of a range of situations in adult life.”

“Numeracy, a significant ancillary to problem solving, relates to a high proportion of the mathematics content of the Grades 1 to 10 Mathematics curriculum. Learners become increasingly ‘numerate’ as they develop the confidence and ability to:

- choose and use mathematics effectively in its application to situations that arise in their life at home, at work, and in the community; and
- apply, evaluate, and communicate their mathematical thinking.

Development of the Curriculum

Curriculum Goals

The main goal of the curriculum is for Filipino learners to become mathematically proficient and critical problem solvers.

The development of mathematical proficiency among learners involves the development of confidence and competence in different aspects of mathematics and includes becoming increasingly aware of the value and usefulness of mathematics.

According to Polya (1981), problem solving is “finding a way out of a difficulty, a way around an obstacle, attaining an aim which was not immediately attainable” (p. ix). Further, the National Council of Teachers of Mathematics (NCTM), (2000) asserts that “solving problems is not only a goal of learning mathematics but also a major means of doing so” (p. 52).

In mathematics education, problem solving has been considered as a goal, as a process, and as a basic skill. The processes involved in solving mathematical problems, from recognizing and understanding a problem to modelling the problem through different representations, to planning a solution, to executing the solution, and to finally checking whether the problem has been solved, demonstrate that problem solving is a very important life skill for 21st-century citizens to possess.

Theoretical and Philosophical Bases

Mathematics is a diverse discipline. With its universal applicability, it finds widespread use in various fields of endeavor, especially in solving real-world problems. It is essential that learners be mathematically proficient and critical thinkers to effectively tackle such problems.

Effective mathematics teaching requires understanding what students know and need to learn, and then challenging and supporting them to learn it well. It also requires knowing and understanding mathematics, students as learners, and pedagogical strategies (NCTM, 2000).

The teaching practices recommended by NCTM are grounded in views of knowledge, learning, and teaching informed by a constructivist perspective (e.g., Ball & Bass; Confrey, 1991; Gelman, 1994; Smith, diSessa & Roschelle, 1993). Teaching mathematics through constructivist methods allows students to deepen their knowledge beyond rote memorization, to develop meaningful contexts, and to take charge of the learning process as active participants rather than mere observers (WGU, 2020).

These constructivist theories point to active learning, cognitive development in the context of social interaction, and conceptual understanding as critical in the teaching of mathematics.

Piaget's theory of cognitive development (1977) states that all knowledge is constructed, and the instrument of instruction includes cognitive structures that themselves are products of continued construction. In the preoperational stage, Piaget suggests that elementary school children need concrete objects, pictures, actions, and symbols to develop a deep understanding of mathematical concepts. In addition, Bruner concurs that conceptual learning begins from active engagement or experiences with concrete tasks ('enactive'), moves towards perceptual images ('iconic'), and then to abstract ('symbolic') representations (Bruner, 1966). For instance, when teaching addition with regrouping for obtaining, for example, $8 + 6$, Grade 1 learners should move blocks in two groups to act out the idea of using part of one addend so that the other addend will become a complete "ten." This hands-on approach views numbers as quantities and not mere numerals, and progresses to pictorial representation of the same problem type. Learners' advancement leads to mental visualization and application of manipulations to abstract problems. Thus, the ultimate objective of mathematics education, as outlined in the Concrete-Representational-Abstract (CRA) Model, is to guide learners toward representations and operations that involve abstract symbols (Hui et al., 2017).

Vygotsky (1978), on the other hand, states that an individual cannot develop without interacting with the environment as emphasized in his zone of proximal development. By incorporating this theory into their teaching practices, teachers can tailor strategic instructional plans for groups or individual learners at various developmental stages. By effectively connecting complex material to familiar concepts, teachers can offer appropriate scaffolding such as strategic social interactions, tailored learning experiences, and instructions aligned with a learner's prior performance, intuition, and current thought processes. This improves the learner's ability to make sense of new situations, build on prior knowledge, and transfer learning. In teaching mathematics, these strategic instructional plans include the use of manipulatives, games, models, partial solutions, or making use of contextual problems based on the learner's interest.

Meanwhile, Glasersfeld (1987) claims that knowledge is not passively received but actively built up by the cognizing individual and thus, knowledge is the result of a self-organized cognitive process. This suggests that all knowledge is constructed rather than perceived through the senses. For instance, learning multiplication is not just about memorizing the multiplication facts, but it is also important for learners to understand the concepts underlying multiplication. Learners who lack understanding of fundamental concepts are more likely to struggle with higher-order thinking.

The use of representations in mathematics helps to demonstrate a learner's thinking. Whether these representations are concrete or abstract, they help them analyze the problem at hand, formulate an idea, and extend their reasoning. The NCTM Standards (2000) include that curriculum should emphasize that learners create and use representations to organize, record, and

communicate mathematical ideas; select, apply, and translate mathematical representations to solve problems; and use representations to model and interpret physical, social, and mathematical phenomena (cited in Fennell & Rowan, 2001).

Curriculum Framework

The framework designed for the revised Mathematics curriculum for Grades 1 to 10 guides teachers in their preparation of mathematically rich lessons and helps them in working towards the main curriculum goal.

To achieve the main goal, three facilitating facets have been developed: content, skills, and disposition.

The three facilitating facets are further reinforced by three supporting components: pedagogy, assessment, and resources, with each of these being relevant to the learning context, the curriculum content, and the learning phases of the learners.

Figure 1 shows the diagrammatic representation of the framework designed for the revised curriculum.

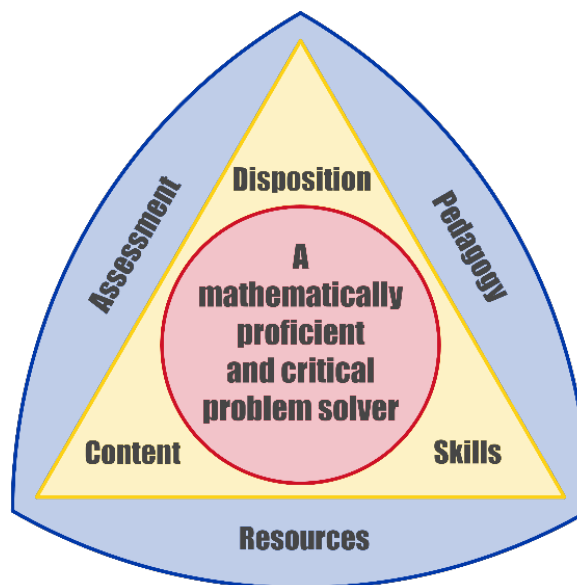


Figure 1. *The Revised Grades 1 – 10 Mathematics Curriculum Framework*

Through the teaching and learning of the revised curriculum, it is also intended that learners exhibit the qualities emanating from the five intertwining strands of mathematical proficiency as defined by the National Research Council (NRC, 2001).

These strands are:

- Conceptual Understanding – comprehension of mathematical concepts, operations, and relations;
- Procedural Fluency – skill in carrying out procedures flexibly, accurately, efficiently, and appropriately;
- Strategic Competence – ability to formulate, represent, and solve mathematical problems;
- Adaptive Reasoning – capacity for logical thought, reflection, explanation, and justification; and
- Productive Disposition – habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy (p. 116).

These intertwining strands of mathematical proficiency are also covered in the SEAMEO Basic Education Standards (SEA-BES): Common Core Regional Learning Standards (CCRLS) in Mathematics and Science (2017). The SEA-BES CCRLS refers to: (1) cultivating basic human characters through mathematical values, attitudes and habits of mind; (2) developing creative human capital and process skills; and (3) the importance of knowledge of mathematics in cultivating well-qualified citizens.

Facione and Gittens (2016) define critical thinking as “the process of purposeful, reflective judgment” (p. 386). They further asserted that “the critical thinking process applies cognitive skills of interpretation, analysis, inference, evaluation, explanation, and self-regulation in an effort to judge what to believe or what to do” (p. 36).

The revised Mathematics curriculum will aim to develop among learners’ proficiency in solving mathematical problems critically, grounded in strong conceptual knowledge, strategic use of mathematical skills and processes, and desirable values and disposition in mathematics, thus assisting them to become productive and successful 21st-century citizens.

The Facilitating Facets

The three facilitating facets for achieving the curriculum goal of the Grades 1 to 10 Mathematics curriculum are content, skills, and disposition.

Content

To become mathematically proficient and critical problem solvers, learners need to be equipped with strong mathematical knowledge and understanding. Lessons that are logically sequenced and interconnected enable students to learn deeply and flexibly.

The revised mathematics curriculum will have three content domains: (1) Number and Algebra; (2) Measurement and Geometry; and (3) Data and Probability.

Skills

As proficient problem solvers, learners need to possess a range of mathematical skills. Such skills enhance the ability to analyze and evaluate mathematical situations and obtain solutions to real-world problems.

In today's highly technological world, the teaching and learning of mathematics needs to include, and also go beyond, calculations and algorithmic procedures. This is because such calculations and procedures can be carried out by calculation devices and software applications.

Disposition

Disposition is closely related to “attitude” and “value.” Values are the “guiding principles that underpin what people believe to be important when making decisions in private and public life ... [while] attitudes are underpinned by values and beliefs and have an influence on behaviour” (Organization for Economic Co-operation and Development [OECD], 2019, p. 4). Mathematical disposition also incorporates appreciation of values intrinsic to mathematics such as its coherence and consistency, precision and clarity, and generality and extendibility.

A sound mathematical disposition facilitates genuine learning and the development of the mathematical proficiency needed for efficient and successful problem solving.

The Supporting Components

The three components designed to support the facilitating facets for achieving the curriculum goal of the Grades 1 to 10 Mathematics curriculum are pedagogy, assessment, and resources.

Pedagogy

Pedagogy is concerned with the methods used to deliver a curriculum. The quality of mathematics learning depends on the quality of the various learning experiences employed to engage and instruct learners.

Assessment

Assessment complements pedagogical approaches and is a vital aspect of curriculum implementation in mathematics.

With the curriculum goal centered on developing mathematical proficiency, critical thinking, and problem solving, the assessment process should not only record learners' level of achievement in understanding concepts, reasoning, and the solution of mathematics problems, but should also result in the development of appropriate feedback for improving instruction.

Assessments, whether for formative or summative purposes, should be administered in various forms.

Resources

The learning of mathematics needs to be supported with a variety of teaching and learning resources. Electronic and print resources need to be carefully selected and judiciously used. Teachers and other instructional leaders are acknowledged as key resources in the implementation of the curriculum.

Structure of the Learning Area**Big Ideas**

Charles (2005) defines a big idea as “a statement of an idea that is central to the learning of mathematics, one that links numerous mathematical understandings into a coherent whole” (p. 10).

The notion of Big Ideas lays the foundation for defining the context of the curriculum in terms of its mathematics content. The formulation of these Big Ideas illustrates the connections across the various mathematical concepts in the different stages of the learning process.

These Big Ideas are present in curriculum content domains and across the curriculum stages. They are interconnected and support and reinforce the integration of key concepts, while supporting and reinforcing each other. With the notion of Big Ideas,

“mathematics is no longer seen as a set of disconnected concepts, skills, and facts. Rather, mathematics becomes a coherent set of ideas” (p. 10).

The revised curriculum identifies twelve Big Ideas:

1. Numbers – Real numbers can be paired one-to-one with the points on the number line, and so can quantify and describe a mathematical or real-world object and its attributes.
2. Measures – Some attributes of a mathematical or real-world object can be quantified by using measures, so that they can be studied further.
3. Shapes, Space, and Graphs – Mathematical objects such as geometric figures, solids, equations, inequalities, relations, and data can be visualized using shapes and graphs and in space.
4. Patterns, Relations, and Functions – Mathematical rule, graph, or table can be used to assign object(s) from one set to object(s) from another set to show specific relations between the two sets.
5. Data – Data can be collected and processed to obtain meaningful information.
6. Chance – The number 0 and 1 (inclusive) can be used to quantify and describe the chances for an event to occur.
7. Representations and Communications – Mathematical objects, properties, operations, and quantities (known or unknown) can be translated, represented, and communicated concretely or visually in a precise manner by using numbers, symbols, notations, variables, expressions, equations, geometric figures, flowcharts, tables, and graphs.
8. Relationships – The relationships that exists between mathematical concepts (e.g. objects, statements) can be used to generate more properties about them and to connect them to other concept in mathematics.
9. Operations and Transformations – Meaningful operations or transformations can be performed on a collection of mathematical objects or statements to obtain another mathematical object or statement that models a situation.
10. Properties and Applications – A mathematical object has properties that define the object or describe its attributes, and these properties and their logical consequences can be applied to mathematical and real-world problems.
11. Equivalence – Mathematical objects or statements can be represented or stated in different ways that have the same value, form, or logical meaning.
12. Reasoning and Proof – Mathematical reasoning and proofs establish and communicate the truth and falsity of a mathematical statement, computational and/or verbal procedure, and problem-solving process.

Through these Big Ideas, concepts and their competencies that are essential in the succeeding levels of the curriculum and that prepare the learners for higher-level mathematics are selected. A concept or a skill is “essential” if it is indispensable in building concepts and skills to equip learners for subsequent grade levels and, at the same time, for lifelong learning.

Developmental Sequence of Concepts

“Any subject can be taught in some intellectually honest form to any child at any stage of development (Bruner, 1977, p.33).” Even the most complex mathematical concept can be learned at a young age if it is properly structured, suitably scaffolded, and progressively revisited over a span of time, gaining mastery and rigor along the way.

Harden and Stamper (1999) present the following features of a curriculum that incorporates a developmental sequence of concepts:

- topics are revisited;
- there are increasing levels of difficulty;
- new learning is related to previous learning;
- the competence of students increases as learning progresses (p. 141).

Developmental sequence of concepts is proposed in the structuring of the curriculum. Through this, mathematical knowledge and skills increase in depth and breadth as the grade level increases. Mathematical concepts are revisited in higher grade levels leading to increased complexity, increased conceptual understanding, and enhanced problem-solving skills.

Vertical and Horizontal Articulation

Vertical and horizontal articulation are used with the aim of ensuring that standards and competencies are logically sequenced within the mathematics curriculum and across learning areas.

Vertical Articulation

Vertical articulation is concerned with the development of mathematical knowledge, skills, and understanding across the grades in the curriculum. Key Stage 1 centers on foundational competencies in the three content domains. These competencies gradually progress to Key Stages 2 and 3, with an emphasis on analysis, reasoning, and communicating mathematically to confidently solve mathematical problems.

Emphasizing the key concepts identified, the Big Ideas reinforce the learning to achieve mathematical proficiency. Learners are equipped with skills and processes to carry out mathematical procedures and solve problems. They are then able to communicate their reasoning and successfully complete tasks of higher cognitive demand.

Horizontal Articulation

Horizontal articulation is concerned with the role of mathematics across the curriculum. For instance, the concepts and skills in Key Stage 1 are indispensable in the development of foundational skills in other learning areas. Predominantly falling under the Languages learning areas, foundational skills in reading and writing are requisite to a fuller understanding of mathematical concepts and skills, including in reading and writing numbers expressed using numerals and in words, determining place value, and counting.

Meanwhile, concepts and skills in Mathematics are articulated vis-à-vis those in other learning areas. For example, describing the motion of an object in terms of distance, velocity, and acceleration in Science requires knowledge of formulating equations and finding solutions. Mensuration and calculation are core competencies in Edukasyong Pantahanan at Pangkabuhayan (EPP)/Technology and Livelihood Education (TLE).

It is also clear that skills in data management and analysis should be acquired by learners, especially for dealing with big data. Knowledge and skills in Number and in the use of money are fundamentally important in daily-life activities, including in budgeting, spending, saving, and earning, which are key to the development of strong financial literacy. Proficiency in Mathematics arguably facilitates better understanding in other learning areas, where it is used as a tool for learning the concepts and skills in those learning areas.

Development of 21st Century Skills

The knowledge, skills, attitudes, and competencies that learners need to develop so that they can prepare for and succeed in work and life in the 21st century are referred to as “21st century skills.” Through the facilitating facets and supporting components, the mathematics curriculum promotes and develops information, media and technology skills; learning and innovation skills; communication skills; and life and career skills (DepEd Order 21 S. 2019, p. 6).

To support learners in meeting the challenges of the 21st century, it is important to nurture their abilities to create innovative solutions to real-world problems. This gives further emphasis to the main curriculum goal.

Through the various mathematical tasks that they undertake, learners are engaged in cognitive processes to understand and solve problems using a variety of approaches, such as modelling, data analysis, and logical reasoning. Such approaches to solving problems encourage learners to pursue other Learning and Innovation Skills such as creativity, critical thinking, and reflective thinking. Presented with non-routine problems, learners can identify new connections between concepts and ideas, examine them from various perspectives, consider alternative ideas or solutions, and demonstrate a willingness to try other methods or strategies in spite of previous unsuccessful attempts.

In developing skills in Information, Media and Technology, learners closely examine, interpret, and communicate understanding of various objects, shapes, symbols, and text types to stimulate and nurture visual literacy. By considering different objects, shapes and symbols, learners are able to bring their understanding of numbers, geometry, or data management to the interpretation of data sets presented in tables and graphs, and to the creation of engaging presentations and infographics.

The development of communication skills is critical for learners to be able to express their ideas, explain their solutions, and justify their reasoning in oral and/or written form. Learning tasks that involve activities that require teamwork and collaboration are also avenues for the development of interpersonal skills, intrapersonal skills, interactive communication, and non-verbal communication.

Life and career skills are evidenced in the curriculum through tasks that require skills for informed decision-making and collaboration that foster adaptive leadership. Self-discipline, resilience, and adversity management may be manifested through learners’ perseverance in solving mathematical problems by using different approaches or strategies.

Social Issues and Government Priorities

The learning competencies and performance standards of the curriculum are relevant in the address of some societal issues.

The curriculum equips learners with the mathematical concepts and skills that may be relevant to social justice, cultural diversity, sustainable development, and disaster risk reduction and management. Mathematical modelling, for example, could be utilized to address simple problems related to sustainable development and disaster risk reduction and management.

STEM

Science, Technology, Engineering, and Mathematics (STEM) is a government priority and is significant in the development of problem solvers and innovative thinkers. As depicted in the STEM Framework, this is achieved through three learning areas in the K to 12 curriculum – Science, Mathematics, and Technology and Livelihood Education (TLE), which may collectively employ the Engineering Design Process (EDP) to attain curriculum goals. Though distinct and taught separately, these three learning areas are interrelated, and each contributes knowledge and skills for the solution of real-world problems. Figure 2 shows a diagrammatic representation of the STEM Framework.

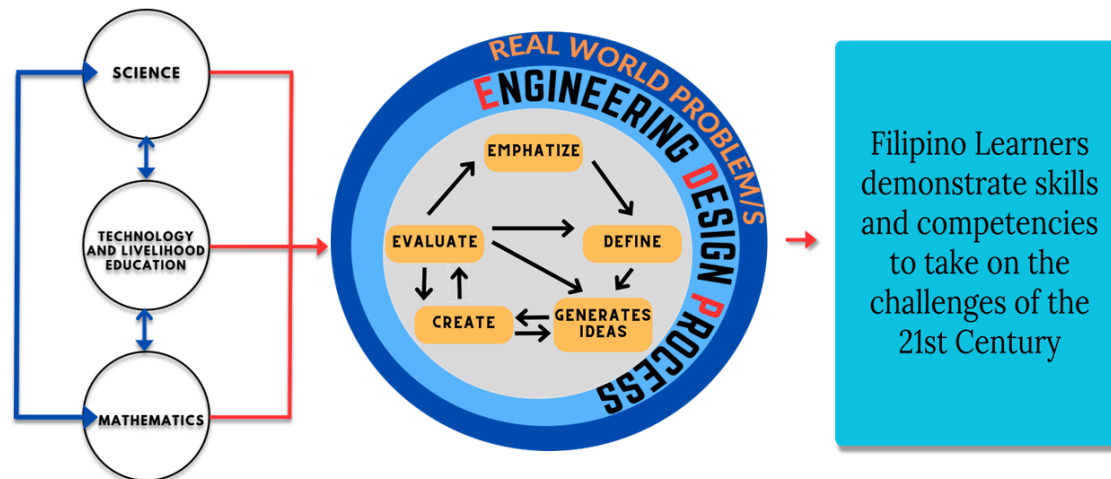


Figure 2. The diagrammatic representation of the STEM Framework

Utilizing the EDP in the instruction allows learners to repeat steps as many times as needed to make improvements, learn from unsuccessful attempts, and discover different or novel design possibilities to arrive at optimal solutions. In the curriculum, EDP is exhibited through problem solving and investigative approaches where learners apply their mathematical, scientific, and technological understanding to formulate, conjecture, reason, create and evaluate a solution to a real-world problem.

Financial Literacy

Financial literacy is “the ability to use knowledge and skills to manage one’s financial resources effectively for lifetime financial security” (Mandell, 2009).

The Financial Education Policy (DO 22, s. 2021) targets the financial literacy and capability of learners. The policy reiterates the need to integrate financial concepts across learning areas at different levels. In Mathematics, learners focus on concepts relating to the identification and value of money and use these concepts to solve specific problems on investment, saving, budgeting, and spending.

Pedagogy, Assessment and Resources

The achievement of the Mathematics curriculum goals requires explicit guidance on instruction, on the role of assessment, on the use of resources for teaching and learning, and on the use of student context.

Pedagogy

In broader terms, there are two types of knowledge at play in a mathematics classroom: the mathematical knowledge that the learners have gained from their everyday experiences and the mathematical knowledge articulated in the curriculum. Relating learners’ informal knowledge of mathematical concepts and facilitating learners’ internalization of school mathematics are major tasks of teaching. It necessitates teaching strategies that bring into the fore what learners already know, such as using in tasks situations that are familiar to the learners to draw out the mathematics that they already know in this context.

For achieving the Mathematics curriculum goal, a variety of pedagogical approaches can be used. Strategies that can be adopted include: guided discovery learning, inquiry-based learning, reflective learning, experiential learning, and the concrete-representational-abstract (CRA) instructional approach, among others. In addition, pedagogical approaches that include guided or

direct instruction coupled with opportunities for learners' inquiry in generating their own solutions, collaborative learning with peers, and independent learning, may also be employed. Mastery learning is also emphasized to ensure that learners reach a certain level of proficiency to be able to engage in a new learning task successfully.

The curriculum views the attainment of its goals with all learners in mind. Through its standards and competencies, the curriculum acknowledges the different needs of learners, fosters their engagement with learning, and promotes the use of appropriate language and technologies to make learning accessible.

The curriculum is informed by reviews that have identified the different levels of performance of Filipino learners. At the same time, diversity, equity, and inclusion need to be continually considered throughout the teaching and learning of Mathematics.

Assessment

As a vital aspect of curriculum implementation in Mathematics, assessment plays a key role in shaping learners' thinking about their mathematical potential, moving away from performance and towards an emphasis on growth and learning (Boaler, Dance & Woodbury, 2018).

Regardless of whether assessment is formal or informal, assessment tools should be varied in order to understand the different dimensions of students' learning (SEI-DOST, 2011). While examinations and quizzes have a place in measuring skills learned, and knowledge development and acquisition, many aspects of mathematical learning could be effectively measured by other means such as interview tasks, analysis of student work samples, presentations by learners, and questioning by teachers.

Formative and summative assessment tasks that are appropriate to the grade level and relevant conceptual understanding and skills, should be developed in conjunction with other learning areas. For example, developing a healthy menu plan for a week may be primarily in Health or Science, may include Mathematics on the computation of a budget for the daily meal, English for the written presentation of the menu, and Arts for the visual presentation of the menu.

Together with data from international assessments, results from classroom assessments need to be analyzed and used to improve planning for further instruction and learning.

Formative and summative assessments provide opportunities for learners to demonstrate higher-order mathematical thinking, justify their solutions, communicate their understanding, and express their ideas well in written and/or oral form. For instance, portfolios of learner's mathematical work on meaningful tasks (e.g., drawing interconnections of mathematical concepts across various disciplines), as well as reports, including mathematical investigations, may be employed.

As envisioned for the revised curriculum, the continuous interaction of teaching and learning may be realized through assessment tasks that are information driven and are seamlessly designed to communicate the goals of successful learning.

Resources

Appropriate resources are fundamental to supporting the delivery of a quality curriculum. Such resources are developed and disseminated to schools for the various learning areas and grades.

Teaching and learning have been assisted and made more inclusive through the use of technology. From calculating devices, instructional manipulatives and software applications, to assistive and adaptive devices, the curriculum strongly recommends the use of these available technologies to facilitate the teaching and learning of concepts and skills, and to enhance problem solving.

In particular, the curriculum presupposes the use of instructional manipulatives and software applications in Key Stages 1, 2 and 3, calculating devices as additional technological support in Key Stage 3, and assistive and adaptive devices for learners with special needs.

The TIMSS 2019 results show that “there is a modest positive association between home educational resources and average mathematics achievement at the country level” (Mullis et al., 2020, p. 285). Relevant to the level of these home resources are the availability of Internet connection, books, and one’s own room, as well as parents’ level of education. The learners’ home environment, together with the availability of technological resources, plays a significant role in supporting the implementation of the curriculum.

The Role of Language

Mathematics has its own specialized terminology to name objects such as numbers, polygons and functions; its own specialized symbolic and representational system; and its own rules for working with these objects.

Foundational understanding of mathematics is contingent on the learner’s ability to communicate in the language of mathematics. The use of particular mathematical terms and representations demonstrates how a learner’s thinking processes evolve. For example, at an early stage of learning, a learner may describe a square as “a shape with four equal sides,” then at a middle stage, “a rectangle with four equal sides,” and, at a later stage, “a quadrilateral with four equal angles and four equal sides.”

For mathematical terms in multilingual classrooms, it is recommended that the English terms be adopted. Furthermore, the learner’s language can be used as a tool in learning and understanding mathematics across all levels.

Key Stage Curriculum and Standards

Key Stage 1 Curriculum

Key Stage 1 (KS 1) of the Mathematics curriculum focuses on Grades 1 to 3 learners. At this stage, the curriculum addresses the development of early numeracy by focusing on the learners' understanding of 1-to-4-digit numbers, measures, basic shapes, and simple data. It also develops their fluency in carrying out procedures or operations involving these mathematical objects in their various representations (concrete, contextual, verbal, visual, and symbolic). Mastery of early numeracy concepts lays the groundwork for understanding more complex mathematical concepts and solving more complex problems.

Learning experiences include basic mathematical explorations of these objects and operations that will engage learners in a variety of thinking processes in real, in situated, and in purely mathematical contexts. The goal of learning experiences is to support and strengthen the young learners' interest and appreciation of mathematics as a tool for solving problems and for communicating ideas in everyday situations.

The learning standards of the Key Stage 1 Mathematics curriculum aim to ensure that learners:

- accurately understand and apply concepts, operations, procedures, and relationships in solving routine and non-routine problems related to their day-to-day lives;
- acquire high-level skills and fluency in the procedures and processes of mathematics through varied frequent practice and meaningful learning experiences;
- communicate and represent mathematical concepts and understanding using developmentally appropriate language;
- acquire problem-solving and critical thinking skills through real, situated, or purely mathematical problems;
- develop appreciation, curiosity, interest, creativity, and other desirable values, attitudes and dispositions in mathematics.

Key Stage 1 Standards

At the end of Grade 3, the learner demonstrates knowledge, skills, and understanding in relation to the curriculum content domain Number and Algebra (whole numbers up to 10 000; ordinal numbers up to 100th; addition and subtraction of numbers of up to 4 digits, and money up to ₱10 000; multiplication and division using 6, 7, 8 and 9 multiplication tables; estimation of products of two numbers; determination of missing terms contained in patterns; generation of patterns; division of 2- to 4-digit numbers; estimation of quotients; addition and subtraction of similar fractions); Measurement and Geometry (areas of squares and rectangles; points, lines, line segments, and rays; parallel, perpendicular, and intersecting lines; measures of mass and capacity;

line symmetry; resulting figure after a translation; duration of time, elapsed time, and telling and writing time in hours and minutes (using a.m. and p.m.); composite figures made up of squares, rectangles, triangles, circles, half-circles, and quarter-circles; perimeter of triangles, squares, and rectangles); Data and Probability (data presented in tables, pictographs, and single bar graphs; outcomes from experiments and real-life situations). This knowledge, skills, and understanding are applied, with the use of technology, to the processes within Mathematics of critical thinking, problem solving, communicating, reasoning, and making connections between topic areas.

Key Stage 2 Curriculum

Key Stage 2 (KS 2) of the Mathematics curriculum focuses on Grades 4 to 6 learners. At this stage, the curriculum extends numbers, algebra, measures, geometry, data, and probability. The coverage includes more complex properties, operations, and problems in different contexts that demand efficient written and mental methods of calculation.

The learning standards of the KS 2 Mathematics curriculum aim to ensure that learners:

- use efficient mental and written mathematical concepts, operations, procedures, relationships, and tools to solve routine and non-routine real-world problems;
- reason and communicate using precise mathematical language to discuss ideas, investigate problems, and justify solutions;
- exhibit willingness and confidence to explore alternative solutions, and to take risks necessary to solve real-world problems;
- acquire problem-solving and critical thinking skills through real, situated, or purely mathematical problems; and
- enhance appreciation, curiosity, interest, creativity, and other desirable values, attitudes and dispositions in mathematics.

Key Stage 2 Standards

At the end of Grade 6, the learner demonstrates knowledge, skills, and understanding in relation to the curriculum content domain Number and Algebra (the four operations with decimals; the four operations with different combinations of fractions, whole numbers, and mixed numbers; ratio and proportion; percentages, and their relationships with fractions and decimals; exponential form, including calculation using the GEMDAS rules; greatest common factors, least common multiples); Measurement and Geometry (right, acute, and obtuse; tessellation of shapes; resulting figure after translation, reflection and rotation; units of volume and capacity; volume of cubes and rectangular prisms; properties of triangles and quadrilaterals; perimeter and area of triangles, parallelograms, trapezoids; parts of a circle, including circumference; area of a circle; composite figures composed of any two or

more of: triangle, square, rectangle, circle, semi-circle; prisms and pyramids; surface area of solid figures; symmetric figures and designs; 12- and 24-hour time, and world time zones); Data and Probability (presentation and interpretation of data in tabular form and in a single line graph; double bar graphs and double line graphs; theoretical probability; pie graphs). This knowledge, skills and understanding is applied, with the use of technology, to the processes within Mathematics of critical thinking, problem solving, communicating, reasoning, and making connections between topic areas.

Key Stage 3 Curriculum

Key Stage 3 (KS 3) of the Mathematics curriculum focuses on Grades 7 to 10 learners. At this stage, the curriculum covers algebra, measurement, geometry, data and probability with greater emphasis on cognitive development towards self-directed learning.

Dealing with more complex and abstract forms, Key Stage 3 concentrates on sets and real numbers, functions, equations, inequalities, sequences, axiomatic structure of geometry, triangle congruence and similarity, basic trigonometry, basic statistical measures, and probability.

The learning standards of the KS 3 Mathematics curriculum aim to ensure that learners:

- apply mathematical concepts, operations, procedures, facts, relationships, and tools to describe, explain, investigate, model, and predict phenomena;
- reason mathematically, construct plausible arguments, evaluate the reasoning of others, and ask useful questions to clarify or improve arguments;
- access, use, interpret, and communicate mathematical information and ideas to engage in and manage the mathematical demands in various 21st-century contexts;
- utilize mathematical thinking in decision-making and acquire problem-solving and critical thinking skills through real, situated, or purely mathematical problems; and
- strengthen appreciation, curiosity, interest, creativity, and other desirable values, attitudes, and dispositions in mathematics.

Key Stage 3 Standards

At the end of Grade 10, the learner demonstrates knowledge, skills, and understanding in relation to the curriculum content domain Number and Algebra (use of rates; sets and subsets, and the union and intersection of sets; Venn diagrams; operations using scientific notation; rules for obtaining terms in sequences; earning money, profit and loss, ‘best buys’, buying on terms; relations and functions; graphs of linear functions, and the identification of domain and range, slope, intercepts, and zeros; direct and inverse variation; quadratic inequalities in one variable and in two variables; absolute value equations and inequalities in one variable, and their graphs; radical expressions; the roots of a quadratic equation; quadratic functions; equations reducible to quadratic equations; equation of a circle and the graph of a circle; compound interest and depreciation); Measurement and Geometry (volume of square and rectangular pyramids, and cylinders; measures of length, area, surface area, volume, time, and temperature; volume of pyramids, cones, and spheres; the Pythagorean Theorem; triangle inequality theorems; perpendicular and parallel lines, and angles formed by-parallel lines cut by a transversal; congruence of triangles; congruence proofs; similarity of polygons; special triangles; triangle theorems and triangle inequality theorems; the laws of sines and the laws of cosines; translations, reflections, and rotations in the Cartesian plane; central angles, inscribed angles, and angles and lengths formed by intersecting chords, secants, and tangents of a circle; sectors and segments of a circle, and their areas); Data and Probability (Fundamental Counting Principle; probabilities of simple and compound events; box-and-whisker plots, and cumulative frequency histograms and polygons; quartiles, deciles, and percentiles; interquartile range, and outliers; evaluation of statistical reports; union and intersection of events, dependent and independent events, and complementary events). This knowledge, skills, and understanding are applied, with the use of technology, to the processes within Mathematics of critical thinking, problem solving, communicating, reasoning, and making connections between topic areas.

GRADE LEVEL STANDARDS

GRADE LEVEL	GRADE LEVEL STANDARDS
GRADE 1	The learner demonstrates knowledge, skills, and understanding in relation to the curriculum content domains Number and Algebra (whole numbers up to 100; ordinal numbers up to 10 th ; addition of numbers with sums up to 20; place value in any 2-digit number; addition of numbers, with sums up to 100; subtraction of numbers where both numbers are less than 100; repeating patterns, fractions $\frac{1}{2}$ and $\frac{1}{4}$; the denominations and values of Philippine coins and bills up to ₱100; addition of money where the sum is up to ₱100 and subtraction of money where both amounts are less than ₱100); Measurement and Geometry (simple 2-dimensional shapes;

	<p>measurement of length and distance using non-standard units; the movement of objects in half turn or quarter turn, in clockwise or counter clockwise direction; time measured in hours, half-hours, quarter hours, days, weeks, months, years); and Data and Probability (pictographs without a scale for the representation of data). This knowledge, skills, and understanding is applied, with the use of technology, to the processes within Mathematics of critical thinking, problem solving, communicating, reasoning, and making connections between topic areas.</p>
GRADE 2	<p>The learner demonstrates knowledge, skills, and understanding in relation to the curriculum content domains Number and Algebra (whole numbers up to 1000, ordinal numbers up to 20th; addition of numbers with sums up to 1000; the denominations and values of Philippine coins and bills up to ₱1000, and the addition of amounts of money with sums up to ₱1000; subtraction of numbers where both numbers are less than 1000; increasing patterns and decreasing patterns; multiplication and division of whole numbers using the 2, 3, 4, 5, and 10 multiplication tables; odd and even numbers; unit fractions and similar fractions with denominators 2, 3, 4, 5, 6, and 8); Measurement and Geometry (circles, half circles, quarter circles and composite figures made up of squares, rectangles, triangles, circles, half-circles, and quarter-circles; one step slides and flips of basic shapes and figures; measurement, comparison, and estimation of length and distance using appropriate tools and units; duration of time, elapsed time, and telling and writing time in hours and minutes (using a.m. and p.m.); straight and curved lines, and flat and curved surfaces; the perimeter of triangles, squares, and rectangles); and Data and Probability (pictographs with a scale for the representation of data). This knowledge, skills, and understanding is applied, with the use of technology, to the processes within Mathematics of critical thinking, problem solving, communicating, reasoning, and making connections between topic areas.</p>
GRADE 3	<p>The learner demonstrates knowledge, skills, and understanding in relation to the curriculum content domains Number and Algebra (whole numbers up to 10 000; ordinal numbers up to 100th; addition and subtraction of numbers of up to 4 digits, and money up to ₱10 000; multiplication using 6, 7, 8 and 9 multiplication tables; estimation of products of two numbers by first rounding to the nearest multiple of 10; determination of missing terms contained in repeating and increasing patterns and repeating and decreasing patterns; generation of repeating and increasing patterns, and repeating and decreasing patterns; division using the 6, 7, 8 and 9 multiplication tables; division of 2- to 4-digit numbers; estimation of quotients by first rounding the divisor and dividend to the nearest multiple of 10, addition and subtraction of similar fractions); Measurement and Geometry (areas of squares and rectangles; points, lines, line segments, and rays; parallel, perpendicular and intersecting lines; measures of mass and capacity; line symmetry; resulting figure after a translation); and Data and Probability (data presented in tables and single bar graphs; outcomes from experiments and real-life situations). This knowledge, skills, and understanding is applied, with the use of technology, to the processes within</p>

	Mathematics of critical thinking, problem solving, communicating, reasoning, and making connections between topic areas.
GRADE 4	The learner demonstrates knowledge, skills, and understanding in relation to the curriculum content domains Number and Algebra (whole numbers up to 1 000 000; addition of numbers with sums up to 1 000 000 and subtraction of numbers where both numbers are less than 1 000 000; multiplication of whole numbers with products-up to 1 000 000; division of up to 4-digit numbers by up to 2-digit numbers, and the MDAS rules; addition and subtraction of similar fractions, including mixed numbers; dissimilar and equivalent fractions; factors and multiples of numbers up to 100; addition and subtraction of dissimilar fractions; simple patterns; number sentences; decimal numbers and their relationship to fractions); Measurement and Geometry (right, acute, and obtuse angles; properties of triangles and quadrilaterals; perimeter of quadrilaterals, and composite figures composed of triangles and quadrilaterals; conversion of units of length, mass, capacity, and time; symmetric figures and designs; reflection with shapes); and Data and Probability (presentation and interpretation of data in tabular form and in a single line graph). This knowledge, skills, and understanding is applied, with the use of technology, to the processes within Mathematics of critical thinking, problem solving, communicating, reasoning, and making connections between topic areas.
GRADE 5	The learner demonstrates knowledge, skills, and understanding in relation to the curriculum content domains Number and Algebra (the GMDAS rules for operations with numbers; multiplication and division of fractions; decimal numbers with decimal parts up to ten thousandths; addition and subtraction of decimal numbers; divisibility rules; prime and composite numbers; multiplication and division of decimal numbers; GMDAS rules when performing three or more operations with fractions and decimals); Measurement and Geometry (12- and 24-hour time, and world time zones; area of a parallelogram, triangle, and trapezoid; prisms and pyramids; surface area of solid figures; cubes and rectangular prisms; rotation about a point given an angle); and Data and Probability (double bar graphs and double line graphs; theoretical probability). This knowledge, skills, and understanding is applied, with the use of technology, to the processes within Mathematics of critical thinking, problem solving, communicating, reasoning, and making connections between topic areas.
GRADE 6	The learner demonstrates knowledge, skills, and understanding in relation to the curriculum content domains Number and Algebra (the four operations with decimals; the four operations with different combinations of fractions, whole numbers, and mixed numbers; ratio and proportion; percentages, and their relationships with fractions and decimals; exponential form, including calculation using the GEMDAS rules; common factors, greatest common factors, common multiples, and least common multiples); Measurement and Geometry (tessellation of shapes; translation, reflection, and rotation with shapes; units of volume and capacity; volume of cubes and rectangular prisms; perimeter and area of triangles, parallelograms, trapezoids, and composite figures composed of triangles, squares, and rectangles; parts of a circle, including circumference; area of a circle;

	composite figures composed of any two or more of: triangle, square, rectangle, circle, semi-circle); and Data and Probability (construction and interpretation of pie graphs). This knowledge, skills, and understanding is applied, in association with the use of technology, in the processes within Mathematics of critical thinking, problem solving, communicating, reasoning, and making connections between topic areas.
GRADE 7	The learner demonstrates knowledge, skills, and understanding in relation to the curriculum content domains Number and Algebra (application of percentages; use of rates; rational numbers; square roots of perfect squares, cube roots of perfect cubes, and irrational numbers; sets and subsets, and the union and intersection of sets; Venn diagrams; the set of integers, and comparing and ordering integers; the four operations with integers; simplification of numerical expressions involving integers; absolute value of an integer; the solution of simple equations; the evaluation of algebraic expressions following substitution; the rearrangement of a formula to make a different variable the subject of the formula; operations using scientific notation); Measurement and Geometry (regular and irregular polygons and their features/properties; determination of measures of angles and number of sides of polygons; conversion of units of measure; volume of square and rectangular pyramids, and cylinders); and Data and Probability (data collection and sampling techniques, and the presentation of data in appropriate tables and graphs; interpretation of statistical graphs; outcomes from experiments). This knowledge, skills, and understanding is applied, with the use of technology, to the processes within Mathematics of critical thinking, problem solving, communicating, reasoning, and making connections between topic areas.
GRADE 8	The learner demonstrates knowledge, skills and understanding in relation to the curriculum content domains Number and Algebra (algebraic expressions and operations with monomials, binomials, and multinomials; special products for binomials, and factorization of polynomials; rational algebraic expressions and equations; rules for obtaining terms in sequences; plotting points, and finding distance and the midpoint of line segments on the Cartesian coordinate plane; earning money, profit and loss, 'best buys,' buying on terms; linear equations in one variable; linear inequalities in one variable and their graphs; linear equations in two variables and their graphs; systems of linear equations in two variables; linear inequalities in two variables); Measurement and Geometry (volume of pyramids, cones, and spheres; the Pythagorean Theorem; triangle inequality theorems); and Data and Probability (measures of central tendency of ungrouped data; measures of variability for ungrouped data; interpretation and analysis of graphs from primary and secondary data; experimental and theoretical probability; the Fundamental Counting Principle). This knowledge, skills, and understanding is applied, with the use of technology, to the processes within Mathematics of critical thinking, problem solving, communicating, reasoning, and making connections between topic areas.
GRADE 9	The learner demonstrates knowledge, skills, and understanding in relation to the curriculum content domains Number and Algebra (relations and functions; graphs of linear functions, and the identification of domain and range, slope, intercepts, and zeros; quadratic equations and graphs of quadratic functions; the solution of

	quadratic equations; direct and inverse variation); Measurement and Geometry (simple geometric concepts and notations; perpendicular and parallel lines, and angles formed by—parallel lines cut by a transversal; quadrilaterals and their properties; congruence of triangles; congruence proofs; similarity of polygons; special triangles; triangle theorems and triangle inequality theorems; the trigonometric ratios and their application); and Data and Probability (interpretation and analysis of data to assess whether the data may be misleading; probabilities of simple and compound events). This knowledge, skills, and understanding is applied, with the use of technology, to the processes within Mathematics of critical thinking, problem solving, communicating, reasoning, and making connections between topic areas.
GRADE 10	The learner demonstrates knowledge, skills, and understanding in relation to the curriculum content domains Number and Algebra (quadratic inequalities in one variable and in two variables; absolute value equations and inequalities in one variable, and their graphs; radical expressions; the roots of a quadratic equation; quadratic functions; equations reducible to quadratic equations; equation of a circle and the graph of a circle; compound interest and depreciation); Measurement and Geometry (the laws of sines and the laws of cosines; translations, reflections, and rotations, in the Cartesian plane; central angles, inscribed angles, and angles and lengths formed by intersecting chords, secants, and tangents of a circle; sectors and segments of a circle, and their areas); and Data and Probability (box-and-whisker plots, and cumulative frequency histograms and polygons; quartiles, deciles, and percentiles; interquartile range, and outliers; evaluation of statistical reports; union and intersection of events, dependent and independent events, and complementary events). This knowledge, skills, and understanding is applied, in association with the use of technology, in the processes within Mathematics of critical thinking, problem solving, communicating, reasoning, and making connections between topic areas.

GRADE 1 – QUARTER 1

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	1. simple 2-dimensional shapes and their features.	1. identify simple 2-dimensional shapes (triangle, rectangle, square) of different size and in different orientation. 2. compare and distinguish 2-dimensional shapes according to features such as sides and corners. 3. compose and decompose triangles, squares, and rectangles.
Number and Algebra (NA)	2. whole numbers up to 100. 3. ordinal numbers up to 10th. 4. addition of numbers with sums up to 20.	4. count up to 100 (includes counting up or down from a given number and identifying a number that is 1 more or 1 less than a given number). 5. read and write numerals up to 100. 6. recognize and represent numbers up to 100 using a variety of concrete and pictorial models (e.g., number line, block or bar models, and numerals). 7. compare two numbers up to 20. 8. order numbers up to 20 from smallest to largest, and vice versa. 9. describe the position of objects using ordinal numbers: 1st, 2nd, 3rd, up to 10th. 10. compose and decompose numbers up to 10 using concrete materials (e.g., 5 is 5 and 0; 4 and 1; 3 and 2; 2 and 3; 1 and 4; 0 and 5). 11. illustrate addition of numbers with sums up to 20 using a variety of concrete and pictorial models and describes addition as “counting up,” and “putting together.” 12. illustrate by applying the following properties of addition, using sums up to 20: a. the sum of zero and any number is equal to the number, and b. changing the order of the addends does not change the sum. 13. solve problems (given orally or in pictures) involving addition with sums up to 20.
Performance Standards <i>By the end of the quarter, the learners are able to ...</i> <ul style="list-style-type: none"> • identify and distinguish simple 2-dimensional shapes. (MG) • count, recognize and represent whole numbers up to 100. (NA) • use ordinal numbers up to 10th to describe position. (NA) • compare and order numbers up to 20 and perform addition of numbers with sums up to 20. (NA) 		

GRADE 1 – QUARTER 2

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	1. measurement of length and distance using non-standard units.	1. measure the length of an object and the distance between two objects using non-standard units. 2. compare lengths and distances using non-standard units. 3. solve problems involving lengths and distances using non-standard units.
Number and Algebra (NA)	2. place value in any 2-digit number. 3. addition of numbers, with sums up to 100.	4. order numbers up to 100 from smallest to largest, and vice versa. 5. counts by 2s, 5s and 10s up to 100. 6. determine a. the place value of a digit in a 2-digit number, b. the value of a digit, and c. the digit of a number, given its place value 7. decompose any 2-digit number into tens and ones. 8. add numbers by expressing addends as tens and ones (expanded form). 9. add numbers with sums up to 100 without regrouping, using a variety of concrete and pictorial models for: a. 2-digit and 1-digit numbers, and b. 2-digit and 2-digit numbers. 10. solve problems (given orally or in pictures) involving addition with sums up to 100 without regrouping.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • use non-standard units to compare and measure length and distance. (MG) • order and decompose (into tens and ones) numbers up to 100. (NA) • perform addition of numbers with sums up to 100. (NA) 		

GRADE 1 – QUARTER 3

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Data and Probability (DP)	1. a pictograph without a scale for the representation of data.	<ol style="list-style-type: none"> 1. collect data in one variable through a simple interview. 2. present data in a pictograph without a scale. 3. interpret a pictograph without a scale. 4. organize data in a pictograph without a scale into a table.
Number and Algebra (NA)	<ol style="list-style-type: none"> 2. subtraction of numbers where both numbers are less than 100. 3. repeating patterns. 	<ol style="list-style-type: none"> 5. illustrate subtraction involving numbers up to 20 using a variety of concrete and pictorial models, and describes subtraction as “taking away.” 6. find the missing number in addition or subtraction sentences involving numbers up to 20. 7. write an equivalent expression to a given addition or subtraction expression (e.g., $2+3 = 1+4$; $10-5 = 6-1$). 8. solve subtraction problems (given orally or in pictures) where both numbers are less than 20. 9. subtract numbers where both numbers are less than 100 using concrete and pictorial models, without regrouping: <ol style="list-style-type: none"> a. 2-digit minus 1-digit numbers, and b. 2-digit minus 2-digit numbers. 10. subtract numbers by expressing minuends and subtrahends as tens and ones (expanded form), without regrouping. 11. determine the next term/s in a repeating pattern (patterns could use rhythmic properties, visual elements in the arts, ...) (e.g., numbers: 2, 4, 2, 4, __, __; letters: a, b, c, a, b, c, a, __, __). 12. create repeating patterns using objects, images, or numbers.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • represent and interpret data in a pictograph without a scale. (DP) • perform subtraction of numbers where both numbers are less than 100. (NA) • extend existing repeating patterns and create new repeating patterns. (NA) 		

GRADE 1 – QUARTER 4

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (NA)	1. fractions $\frac{1}{2}$ and $\frac{1}{4}$. 2. the denominations and values of Philippine coins and bills up to ₱100. 3. addition of money where the sum is up to ₱100 and subtraction of money where both amounts are less than ₱100.	1. illustrate $\frac{1}{2}$ and $\frac{1}{4}$ as parts of a whole. 2. compare $\frac{1}{2}$ and $\frac{1}{4}$ using models. 3. count halves and quarters 4. recognize coins (excluding centavo coins) and bills up to ₱100 and their notations. 5. determine the value of a number of bills and/or a number of coins (excluding centavo coins) up to ₱100. 6. compare different denominations of peso coins (excluding centavo coins) and bills up to ₱100. 7. solve 1-step problems (given orally or in pictures) involving addition of money where the sum is up to ₱100, or subtraction of money where both amounts are less than ₱100.
Measurement and Geometry (MG)	4. the movement of objects in half turn or quarter turn, in clockwise or counter clockwise direction. 5. time measured in hours, half hours, quarter hours, days, weeks, months, and years.	8. identify the position of objects moved in half turn or in quarter turn, in clockwise or in counter-clockwise direction, given an initial facing direction. 9. read and write time by the hour, half hour, and quarter hour using an analog clock. 10. give the days of the week and months of the year in the correct order. 11. determine the day and month of the year using a calendar. 12. solve problems involving time (hour, half hour, quarter hour, days in a week, and months in a year).
Performance Standards <i>By the end of the quarter, the learners are able to ...</i> <ul style="list-style-type: none"> • illustrate and compare the fractions $\frac{1}{2}$ and $\frac{1}{4}$. (NA) • recognize, and determine the value of, Philippine coins and bills up to ₱100. (NA) • add money where the sum is up to ₱100 and subtract money where both amounts are less than ₱100. (NA) • identify the position of an object following a half turn or quarter turn, in clockwise or counter-clockwise direction. (MG) • identify and work with time measured in hours, half hours, quarter hours, days, weeks, months, and years. (MG) 		

GRADE 2 – QUARTER 1

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	<ol style="list-style-type: none"> 1. circles, half circles, quarter circles and composite figures made up of squares, rectangles, triangles, circles, half circles, and quarter circles. 2. one step slides and flips of basic shapes and figures. 	<ol style="list-style-type: none"> 1. represent and describe circles, half circles and quarter circles. 2. compose and decompose composite figures made up of squares, rectangles, triangles, circles, half circles, and quarter circles, using cut-outs and square grids. 3. describe and draw the effect of one-direction multi-step slide (or translation) in basic shapes and figures.
Number and Algebra (NA)	<ol style="list-style-type: none"> 3. whole numbers up to 1000. 4. ordinal numbers up to 20th. 5. addition of numbers with sums up to 1000. 	<ol style="list-style-type: none"> 4. count up to 1000. 5. read and write numerals up to 1000. 6. recognize and represent numbers up to 1000 using a variety of concrete and pictorial models, and numerals. 7. count by 2s, 5s, 10s, 20s, 50s, and 100s (not beyond 1000). 8. order numbers up to 1000 from smallest to largest, and vice versa. 9. describe the position of objects using ordinal numbers up to 20th. 10. determine <ol style="list-style-type: none"> a. the place value of a digit in a 3-digit number, b. the value of a digit, and c. the digit of a number, given its place value. 11. illustrate addition of 2-digit and by 1-digit numbers as “counting up” on the number line. 12. add numbers with sums up to 1000 in expanded form. 13. add numbers with sums up to 1000, with or without regrouping. 14. illustrate and apply the following properties of addition using sums up to 1000: <ol style="list-style-type: none"> a. the sum of zero and any number is equal to the number, b. changing the order of the addends does not change the sum, and c. changing the grouping of the addends does not change the sum.

Performance Standards

By the end of the quarter, the learners are able to ...

- represent and describe circles, half circles and quarter circles. (MG)
- compose and decompose composite figures made up of squares, rectangles, triangles, circles, half circles, and quarter circles. (MG)
- describe and draw the effect of one-step slides or flips in basic shapes and figures. (MG)
- count, recognize, and represent, whole numbers up to 1000. (NA)
- use ordinal numbers up to 20th to describe position. (NA)
- perform addition of numbers with sums up to 1000. (NA)

GRADE 2 – QUARTER 2

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (NA)	1. the denominations and values of Philippine coins and bills up to ₱1000, and the addition of amounts of money with sums up to ₱1000.	<ol style="list-style-type: none"> 1. determine and write the value of a number of bills, or a number of coins, or a combination of bills and coins up to ₱1000 (centavo coins only, peso coins only, peso bills only, combined peso coins and peso bills). 2. compare the values of different denominations of peso coins and bills up to ₱1000. 3. solve problems involving addition with sums up to 1000, including problems involving money, with and without regrouping.
Measurement and Geometry (MG)	2. measurement, comparison, and estimation of length and distance using appropriate tools and units.	<ol style="list-style-type: none"> 4. measure and compare lengths of objects, in meters (m) or centimeters (cm), and distance in meters, using appropriate measuring tools. 5. identify and use the appropriate unit (m or cm) to measure the length of an object and the distance between two locations. 6. estimate length using meters or centimeters, and distance using meters. 7. solve problems involving length and distance.
Number and Algebra (NA)	<ol style="list-style-type: none"> 3. subtraction of numbers where both numbers are less than 1000. 4. increasing patterns and decreasing patterns. 	<ol style="list-style-type: none"> 8. illustrate subtraction of 2-digit by 1-digit on the number line and as an inverse of addition. 9. subtract numbers where both numbers are less than 100 with regrouping: <ol style="list-style-type: none"> a. 2-digit minus 1-digit numbers, and b. 2-digit minus 2-digit numbers. 10. solve problems (given orally or in pictures) involving subtraction where both numbers are less than 100, with and without regrouping. 11. subtract numbers, where both numbers are less than 1000, with and without regrouping. 12. solve 1- and 2-step problems involving subtraction where both numbers are less than 1000 (including problems involving money), with and without regrouping. 13. determine the next term/s in increasing or decreasing patterns, e.g., numbers, letters and rhythmic properties, visual elements in arts, and repetitions. 14. create increasing or decreasing patterns.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • determine, and compare the value of, combinations of Philippine coins and bills up to ₱1000. (MG) • perform addition of amounts of money with sums up to ₱1000. (NA) • measure, compare, and estimate, length and distance using appropriate units. (MG) • perform subtraction of numbers where both numbers are less than 1000. (NA) • extend existing increasing patterns and decreasing patterns and create new increasing patterns and decreasing patterns. (NA) 		

GRADE 2 – QUARTER 3

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Data and Probability (DP)	1. a pictograph with a scale for the representation of data.	1. present raw data, or data in tabular form, in a pictograph with a scale, or vice versa. 2. interpret data in tabular form and in a pictograph with or without scale.
Number and Algebra	2. multiplication and division of whole numbers using the 2, 3, 4, 5, and 10 multiplication tables. 3. odd and even numbers.	3. count the number of concrete objects in a group by repeated addition and create equal groups, using language such as “5 groups of 3” and “5 threes”. 4. illustrate and write multiplication as repeated addition, using a variety of concrete and pictorial models and numerals, and using a. groups of equal quantities, b. arrays, c. counting by multiples, and d. equal jumps on a number line. 5. multiply numbers using the 2, 3, 4, 5, and 10 multiplication tables. 6. solve multiplication problems using the 2, 3, 4, 5, and 10 multiplication tables, including problems involving money. 7. illustrate division through equal distribution of a number of objects into several groups. 8. illustrate and write division expressions using a variety of concrete and pictorial models and numerals, in modelling division as: a. equal sharing or formation of equal groups of objects, and b. repeated subtraction. 9. divide numbers using the 2, 3 4, 5, and 10 multiplication tables. 10. find the missing number in a number sentence involving multiplication or division by 2, 3, 4, 5, and 10. 11. distinguish even and odd numbers using division by 2. 12. solve division problems using the 2, 3, 4, 5, and 10 multiplication tables, including problems involving money.
Performance Standards <i>By the end of the quarter, the learners are able to...</i> <ul style="list-style-type: none"> • represent and interpret data in a pictograph with a scale. (DP) • perform multiplication and division of whole numbers using the 2, 3, 4, 5, and 10 multiplication tables. (NA) • distinguish even and odd numbers. (NA) 		

GRADE 2 – QUARTER 4

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (NA)	1. unit fractions and similar fractions with denominators 2, 3, 4, 5, 6, and 8.	<ol style="list-style-type: none"> 1. represent and identify unit fractions with denominators 2, 3, 4, 5, 6, and 8. 2. read and write unit fractions in fraction notation. 3. order unit fractions from smallest to largest, and vice versa. 4. represent and identify similar fractions with denominators 2, 3, 4, 5, 6, and 8 using groups of objects, fraction charts, fraction tiles, and the number line. 5. read and write similar fractions in fraction notation. 6. order similar fractions from smallest to largest, and vice versa.
Measurement and Geometry (MG)	<ol style="list-style-type: none"> 2. duration of time, elapsed time, and telling and writing time in hours and minutes (using a.m. and p.m.). 3. straight and curved lines, and flat and curved surfaces. 4. the perimeter of triangles, squares, and rectangles. 	<ol style="list-style-type: none"> 7. describe the duration of an event in terms of number of days and/or weeks using a calendar. 8. read and write time in hours and minutes, with a.m. and p.m., using an analog clock. 9. solve problems involving elapsed time (minutes in an hour, hours in a day, days in a week), including timetables. 10. identify and explain the difference between straight and curved lines, and flat and curved surfaces of 3-dimensional objects. 11. identify and measure the perimeter of a plane figure using appropriate tools. 12. find the perimeter of triangles, squares, and rectangles. 13. solve problems involving perimeter of triangles, squares, and rectangles.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • represent, identify, and order unit fractions and similar fractions with denominators 2, 3, 4, 5, 6, and 8. (NA) • identify and work with time measured in hours, half-hours, quarter hours, days, weeks, months, years. (MG) • describe duration of time and elapsed time, and read and write time in hours and minutes. (MG) • distinguish between straight and curved lines, and between flat and curved surfaces. (MG) • find the perimeter of triangles, squares, and rectangles. (MG) 		

GRADE 3 – QUARTER 1

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	<ol style="list-style-type: none"> 1. areas of squares and rectangles. 2. points, lines, line segments, and rays. 3. parallel, perpendicular, and intersecting lines. 	<ol style="list-style-type: none"> 1. illustrate and estimate the area of a square or rectangle using square tile units. 2. explore inductively the derivation of the formulas for the areas of a square and a rectangle using square tile units. 3. find the areas of squares and rectangles in sq. cm and sq. m. 4. solve problems involving areas of squares and rectangles. 5. recognize, using models, and draws a point, line, line segment, and ray. 6. recognize and draw parallel, intersecting, and perpendicular lines. 7. identify and draw line segments of equal length using a ruler.
Number and Algebra (NA)	<ol style="list-style-type: none"> 4. whole numbers up to 10 000. 5. ordinal numbers up to 100th. 	<ol style="list-style-type: none"> 8. represent numbers up to 10 000 using pictorial models and numerals. 9. read and write numbers up to 10 000 in numerals and in words. 10. describe the position of objects using ordinal numbers up to 100th. 11. determine <ol style="list-style-type: none"> a. the place value of a digit in a 4-digit number, b. the value of a digit, and c. the digit of number, given its place value. 12. round numbers to the nearest ten, hundred, or thousand. 13. compare numbers up to 10 000 using the symbols =, >, and <. 14. order numbers up to 10 000 from smallest to largest, and vice versa.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • determine the area of squares and rectangles. (MG) • recognize and draw points, lines, lines segments, rays, and parallel and perpendicular lines. (MG) • represent, round, compare, and order numbers up to 10 000. (NA) 		

GRADE 3 – QUARTER 2

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	1. measures of mass and capacity.	1. measure mass in grams (g), kilograms (kg) and/or milligrams (mg), using appropriate measuring tools. 2. estimate mass of an object using grams, kilograms, and/or milligrams. 3. compare masses of objects including the use of a balance scale. 4. measure capacity in liters (L) and/or milliliters (mL), using appropriate measuring tools. 5. estimate capacity using liters and/or milliliters. 6. compare capacities of two containers.
Number and Algebra (NA)	2. addition and subtraction of numbers of up to 4 digits and money up to ₱10 000.	7. read and write money in words and using: a. Philippine currency symbols (₱ and PhP) up to ₱10 000, and b. the centavo sign. 8. add numbers with sums up to 10 000, with and without regrouping. 9. estimate the sum of addends with up to 4 digits. 10. solve problems involving addition of numbers with sums up to 10 000, including problems involving money. 11. subtract numbers, where both numbers are less than 10 000, with and without regrouping. 12. estimate the difference of two numbers of up to 4 digits. 13. perform addition and subtraction of 3 to 4 numbers of up to 2 digits, observing correct order of operations. 14. solve problems involving addition and subtraction with 3 to 4 numbers of up to 2 digits, including problems involving money.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • measure, estimate, and compare mass of objects. (MG) • measure and estimate capacity. (MG) • add and subtract whole numbers (including amounts of money) of up to 4 digits. (NA) 		

GRADE 3 – QUARTER 3

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Data and Probability (DP)	<ol style="list-style-type: none"> 1. data presented in tables and single bar graphs. 2. outcomes from experiments and real-life situations. 	<ol style="list-style-type: none"> 1. collect data from experiments with a small number of possible outcomes (e.g., rolling a die or tossing a coin). 2. present data in tables and single bar graphs (horizontal and vertical). 3. interpret data in tables and single bar graphs (horizontal and vertical). 4. solve problems using data presented in a single bar graph (horizontal and vertical). 5. describe and compare outcomes in real-life situations using the following terms: equally likely, less/least likely, more/most likely, certain, and impossible.
Number and Algebra (NA)	<ol style="list-style-type: none"> 3. multiplication using 6, 7, 8, and 9 multiplication tables. 4. properties of multiplication 5. multiplication of numbers with and without regrouping 6. estimation of products of two numbers by first rounding to the nearest multiple of 10. 7. determination of missing terms contained in repeating and increasing patterns, and repeating and decreasing patterns. 8. generation of repeating and increasing patterns, and repeating and decreasing patterns. 	<ol style="list-style-type: none"> 6. multiply numbers using the 6, 7, 8, and 9 multiplication tables. 7. illustrate and apply properties of multiplication for the 6, 7, 8, and 9 multiplication tables: <ol style="list-style-type: none"> a. one multiplied by any number is equal to the number; b. zero multiplied by any number is zero; c. changing the order of the numbers being multiplied does not change the product; d. changing the grouping of the numbers being multiplied does not change the product; and e. multiplying the sum of two addends by a number is the same as the sum of the products of a number by each addend. 8. multiply numbers with and without regrouping: <ol style="list-style-type: none"> a. 2- to 3-digit numbers by a 1-digit number, and b. 2- to 4-digit numbers by a number whose leading digit is the only non-zero digit, with products up to 10 000. 9. estimate the product of 2- to 3-digit numbers by 1- to 2-digit numbers by estimating the factors using multiples of 10. 10. solve 1-to 2-step multiplication problems, including problems involving money. 11. determine the missing term/s in a pattern with repeating and increasing components or repeating and decreasing components (e.g., 1a, 1b, 1c, 2a, 2b, 2c, ...). 12. explain how to generate a given pattern with repeating and increasing components or repeating and decreasing components.
<p>Performance Standards <i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • present and interpret data in tables and single bar graphs. (DP) 		

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
		<ul style="list-style-type: none"> • describe and compare outcomes of events. (DP) • multiply using 6, 7, 8, and 9 multiplication tables. (NA) • illustrate and applies properties of multiplication. (NA) • multiply numbers with and without regrouping. (NA) • estimate products of two numbers by first rounding to the nearest multiple of 10. (NA) • find a missing term and generate repeating and increasing patterns, and repeating and decreasing patterns. (NA)

GRADE 3 – QUARTER 4

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (N/A)	<ol style="list-style-type: none"> 1. division using the 6, 7, 8, and 9 multiplication tables. 2. division of 2- to 4-digit numbers. 3. estimation of quotients by first rounding the divisor and dividend to the nearest multiple of 10. 4. addition and subtraction of similar fractions. 	<ol style="list-style-type: none"> 1. illustrate division through equal jumps on the number line and as inverse of multiplication. 2. divide numbers using the 6, 7, 8, and 9 multiplication tables. 3. find the missing number in a number sentence involving multiplication or division by 6, 7, 8, and 9 (e.g., $_ \times 7 = 56$; $56 \div _ = 7$). 4. divide numbers with and without remainder: <ol style="list-style-type: none"> a. 2- to 3-digit numbers by 1-digit number without remainder, b. 2-digit numbers by 1-digit number with remainder, and c. 2- to 4-digit numbers by 10,100, and 1000. 5. estimate the quotient of 2- to 3-digit numbers divided by 1- to 2-digit numbers, using multiples of 10 or 100 as appropriate 6. solve division problems involving 2- to 3 -digit numbers by a 1-digit number, including problems involving money. 7. represent fractions that are equal to one and greater than one using models. 8. add and subtract similar fractions using models.
Measurement and Geometry (M/G)	<ol style="list-style-type: none"> 5. line symmetry. 6. resulting figure after a translation. 	<ol style="list-style-type: none"> 9. describe and draw the effect of a two-direction multi-step slide (or translation) in basic shapes and figures. 10. identify shapes or figures that show line symmetry by drawing the line of symmetry. 11. complete a figure that is symmetric with respect to a line.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • use the 6, 7, 8, and 9 multiplication tables to divide numbers. (N/A) • divide 2- to 4-digit numbers. (N/A) • estimate quotients by first rounding the divisor and dividend to the nearest multiple of 10. (N/A) • add and subtract similar fractions. (N/A) • identify a symmetrical shape and draw the line of symmetry. (M/G) 		

GRADE 4 – QUARTER 1

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	<ol style="list-style-type: none"> 1. measures of angles 2. properties of triangles and quadrilaterals. 3. perimeter of quadrilaterals, and composite figures composed of triangles and quadrilaterals. 	<ol style="list-style-type: none"> 1. illustrate different angles (right, acute, and obtuse) using models. 2. measure and draw angles using a protractor. 3. draw and state the properties of triangles and quadrilaterals. 4. classify triangles and quadrilaterals according to sides and angles. 5. differentiate different quadrilaterals. 6. find the perimeter of quadrilaterals that are not squares or rectangles. 7. find the perimeter of composite figures composed of triangles and quadrilaterals.
Number and Algebra (NA)	<ol style="list-style-type: none"> 4. whole numbers up to 1 000 000. 5. addition of numbers with sums up to 1 000 000 and subtraction of numbers where both numbers are less than 1 000 000. 	<ol style="list-style-type: none"> 8. read and write numbers up to 1 000 000 in numerals and in words. 9. determine <ol style="list-style-type: none"> a. the place value of a digit in a 6-digit number, b. the value of a digit, and c. the digit of number, given its place value. 10. compare numbers up to 1 000 000 using =, < and >. 11. round numbers to the nearest hundred thousand. 12. estimate the sum and difference of two 5- to 6-digit numbers by rounding the addends to the nearest large place value of the numbers. 13. add numbers with sums up to 1 000 000 and subtracts numbers where both numbers are less than 1 000 000, with and without regrouping.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • illustrate and measure different angles (MG) • classify triangles and quadrilateral, and differentiate quadrilaterals, by applying their properties. (MG) • find the perimeter of quadrilaterals and composite figures composed of triangles and quadrilaterals. (MG) • read, write, and compare whole numbers up to 1 000 000. (NA) • performs addition of numbers with sums up to 1 000 000 and subtraction of numbers where both numbers are less than 1 000 000. (NA) 		

GRADE 4 – QUARTER 2

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (NA)	1. multiplication of whole numbers with products-up to 1 000 000, division of up to 4-digit numbers by up to 2-digit numbers, and the MDAS rules.	1. multiply two numbers with and without regrouping: a. 3- to 4-digit numbers by a 1-digit number, and b. 2- to 3-digit numbers by 2-digit numbers, with products up to 1 000 000. 2. estimate the result of multiplying two numbers where the product is less than 1 000 000. 3. solve multi-step problems involving one or more of the four operations with results of calculations up to 1 000 000, including problems involving money. 4. divide two numbers with and without regrouping a. 3- to 4-digit numbers by 1-digit numbers b. 2- to 3-digit numbers by 2-digit numbers 5. estimate the quotient when dividing 3- to 4-digit dividends by 1- to 2-digit divisors, by first estimating the dividends and divisors using multiples of 10. 6. represent situations involving one or more of the four operations using a number sentence. 7. perform two or more different operations by applying the MDAS rules.
Measurement and Geometry (MG)	2. conversion of units of length, mass, capacity, and time.	8. convert common units of measure from larger to smaller units, and vice versa: a. meter and centimeter, b. kilometer and meter, c. kilogram and gram, d. gram and milligram, and e. liter and milliliter. 9. convert time measures from smaller to larger units, and vice versa: a. seconds to minutes, b. minutes to hours, c. hours to days, d. days to weeks e. weeks to months, and f. months to years. 10. solve problems involving conversion of units of length, mass, capacity, and time, including problems involving elapsed time in hours and minutes.

<p>Number and Algebra (NA)</p>	<p>3. addition and subtraction of similar fractions, including mixed numbers.</p>	<p>11. identify proper fractions, improper fractions, and mixed numbers. 12. rewrite improper fractions into mixed numbers, and vice versa. 13. plot fraction (proper fractions, improper fractions, and mixed numbers) with denominators 2, 4, 5, and 10 on the number line. 14. add and subtract similar fractions: a. two proper fractions, b. two mixed numbers, c. a mixed number and a proper fraction, d. a whole number and a proper fraction, and e. a whole number and a mixed number.</p>
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • perform multiplication of whole numbers with products up to 1 000 000. (NA) • perform division of up to 4-digit numbers by up to 2-digit numbers. (NA) • perform different operations by applying the MDAS rules. (NA) • convert units of length, mass, capacity, and time. (MG) • perform addition and subtraction of similar fractions, including mixed numbers. (NA) 		

GRADE 4 – QUARTER 3

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (NA)	<ol style="list-style-type: none"> 1. dissimilar and equivalent fractions. 2. factors and multiples of numbers up to 100. 3. addition and subtraction of dissimilar fractions. 	<ol style="list-style-type: none"> 1. represent dissimilar fractions, with denominators up to 10, using models. 2. compare dissimilar fractions using the symbols =, >, and <. 3. order dissimilar fractions from smallest to largest, and vice versa. 4. generate equivalent fractions using models. 5. determine equivalent fractions. 6. identify the multiples of given numbers up to 100. 7. find all the factors of a given number up to 100. 8. reduce fractions to simplest form. 9. add and subtract dissimilar fractions using models. 10. add and subtract dissimilar fractions: <ol style="list-style-type: none"> a. two proper fractions, b. two mixed numbers, c. a mixed number and a proper fraction, d. a whole number and a proper fraction, and e. a whole number and a mixed number. 11. solve multi-step problems involving addition and/or subtraction of fractions.
Measurement and Geometry (MG)	<ol style="list-style-type: none"> 4. symmetric figures with respect to a line 5. resulting images after applying reflection with respect to a line. 	<ol style="list-style-type: none"> 12. identify symmetry with respect to a line. 13. complete a figure that is symmetric with respect to a line. 14. draws the image of an object after applying reflection with respect to a line, including glide reflection.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • represent, compare, and order dissimilar fractions. (NA) • find factors and multiples of numbers up to 100. (NA) • identify symmetry with respect to a line, and create figures that have line symmetry. (MG) • perform reflection with respect to a line, including glide reflection, to obtain images of shapes. (MG) 		

GRADE 4 – QUARTER 4

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Data and Probability (DP)	1. presentation and interpretation of data in tabular form and in a single line graph.	1. collect data with time element using appropriate sources. 2. present data in a tabular form, or in a single line graph. 3. interpret data presented in a tabular form, or in a single line graph. 4. solve problems using data for at most two variables in a tabular form, or in a single line graph.
Number and Algebra (NA)	2. simple patterns. 3. number sentences. 4. decimal numbers and their relationship to fractions.	5. describe the rule used to generate a given simple pattern. 6. complete a number sentence: a. to represent a property of operations (e.g., $4 + 3 = 3 + \underline{\quad}$) (commutative property of addition) b. to represent equivalent number facts (e.g., $4 + \underline{\quad} = 6 + 3$) 7. represent decimal numbers using models and manipulatives to show the relationship to fractions. 8. read and write decimal numbers with decimal parts to hundredths. 9. determine a. the place value to hundredths of a digit in a given decimal number, b. the value of a digit, and c. the digit of number, given its place value. 10. convert decimal numbers to fractions, and fractions with denominators 10 or 100 to decimals. 11. plot decimal numbers with tenth decimal part on the number line. 12. compare and order decimal numbers with decimal parts to hundredths. 13. round decimal numbers to the nearest whole number and to the nearest tenth.
<p>Performance Standards <i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • present and interpret data in tabular form and in a single line graph. (DP) • generate a simple pattern and describe the rule used. (NA) • complete number sentences to represent number properties and number facts. (NA) • represent, compare, order, and round decimal numbers. (NA) • convert decimal numbers to fractions and fractions (with denominators 10 or 100) to decimals. (NA) 		

GRADE 5 – QUARTER 1

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	1. 12- and 24-hour time, and world time zones.	1. describe a 12- and 24-hour clock system. 2. convert 12-hour time to 24-hour time, and vice-versa. 3. solve problems involving 12- and 24-hour time. 4. compare the time in different world time zones to the time in the Philippines using a world time zone map. 5. solve problems on comparing the time in different world time zones to the time in the Philippines.
Number and Algebra (NA)	2. the GMDAS rules for operations with numbers. 3. multiplication of fractions.	6. perform three or more different operations by applying the GMDAS rules. 7. multiply fractions using models. 8. multiply a fraction by a fraction. 9. solve multi-step problems involving multiplication of fractions that may or may not also involve addition or subtraction of fractions.
Measurement and Geometry (MG)	4. area of a parallelogram, triangle, and trapezoid.	10. identify the height of a parallelogram, triangle, and trapezoid, in different orientations. 11. find the area of a parallelogram, triangle, and trapezoid, in sq. cm or sq. m, using formulas. 12. estimate the areas of triangles and quadrilaterals (parallelogram, rhombus, trapezoid) using grids.
<p>Performance Standards <i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • use 12- and 24- hour time. (MG) • compare the time in world time zones with the time in the Philippines. (MG) • use the GMDAS rules for 3 or more different operations. (NA) • multiply fractions. (NA) • determine the area of a parallelogram, triangle, and trapezoid. (MG) 		

GRADE 5 – QUARTER 2

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (NA)	<ol style="list-style-type: none"> 1. division of fractions. 2. decimal numbers with decimal parts up to ten thousandths. 3. addition and subtraction of decimal numbers. 4. divisibility rules. 5. prime and composite numbers. 	<ol style="list-style-type: none"> 1. divide fractions using models. 2. divide a fraction by a fraction. 3. solve multi-step problems involving division of fractions that may or may not involve the other operations with fractions. 4. determine <ol style="list-style-type: none"> a. the place value to thousandths of a digit in a given decimal number, b. the value of a digit, and c. the digit of a number, given its place value. 5. read and write decimal numbers with decimal parts to thousandths. 6. convert terminating decimals to fractions, and vice versa. 7. compare and order decimal numbers with decimal parts to thousandths. 8. round decimal numbers to the nearest thousandths. 9. add and subtract decimal numbers with decimal parts of up to 3 decimal places. 10. solve multi-step problems involving addition and/or subtraction of decimals, including problems involving money. 11. use divisibility rules to find common factors of numbers: <ol style="list-style-type: none"> a. divisibility rules for 2, 5, and 10, b. divisibility rules for 3, 6, and 9, and c. divisibility rules for 4, 8, 11, and 12. 12. distinguish prime numbers from composite numbers using the Sieve of Eratosthenes.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • divide fractions. (NA) • compare, order, and round decimals to the nearest one thousandth. (NA) • add and subtract decimal numbers. (NA) • use divisibility rules. (NA) • distinguish prime numbers from composite numbers. (NA) 		

GRADE 5 – QUARTER 3

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Data and Probability (DP)	<ol style="list-style-type: none"> double bar graphs and double line graphs. theoretical probability. 	<ol style="list-style-type: none"> collects bivariate data from interview, questionnaire, and other appropriate sources. identify the appropriate graph (bar graph or line graph) to represent a given set of data. construct double bar graphs and double line graphs. interpret data presented in a double bar graph or a double line graph. draw conclusions or make inferences based on data presented in a double bar graph or a double line graph. solve problems using data presented in a double bar graph or a double line graph. describe probability as a measure of the chance of an event occurring. calculate the theoretical probability of a simple event by listing all possible outcomes.
Number and Algebra (NA)	<ol style="list-style-type: none"> multiplication and division of decimal numbers. 	<ol style="list-style-type: none"> estimate each of two decimal numbers to the nearest whole number to estimate their product. multiply decimal numbers with decimal parts of up to 2 decimal places. solve multi-step problems involving multiplication of decimals that may or may not also involve addition or subtraction of decimals, including problems involving money. estimate the quotient when dividing two decimal numbers by estimating the dividend and divisor to the nearest whole number. divide: <ol style="list-style-type: none"> 1- to 2-digit whole numbers resulting in a terminating decimal quotient (e.g., $4 \div 5 = 0.8$), and a decimal of up to 2 decimal places by a 1- to 2-digit whole number, resulting in a terminating decimal quotient of up to 3 decimal places.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> identify, construct, and interpret double bar graphs and double line graphs. (DP) draw conclusions and make inferences from data represented in double bar graphs and double line graphs. (DP) calculate theoretical probability. (DP) multiply and divide decimal numbers. (NA) 		

GRADE 5 – QUARTER 4

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (NA)	<ol style="list-style-type: none"> GMDAS rules when performing three or more operations with fractions and decimals. 	<ol style="list-style-type: none"> solve multi-step problems involving division of decimals that may or may not also involve the other operations with decimals, including problems involving money. perform three or more different operations with fractions and decimals by applying the GMDAS rules.
Measurement and Geometry (MG)	<ol style="list-style-type: none"> prisms and pyramids. surface area of solid figures. cubes and rectangular prisms. resulting image after rotation 	<ol style="list-style-type: none"> illustrate different solid figures using concrete and pictorial models. relate plane figures to solid figures using concrete and pictorial models. describe and differentiate prisms and pyramids using their vertices, faces, and/or edges. illustrate and describe solid figures and their nets. make models of solid figures. illustrate and find the surface area of solid figures. solve problems involving the surface area of solid figures. describe and distinguish cubes and rectangular prisms. estimate the volume of a cube and of a rectangular prism using non-standard units of measurement. draw the image of an object after applying rotation about a point given an angle of rotation, clockwise or counterclockwise.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> apply the GMDAS rules with operations with fractions and decimals. (NA) illustrate and describe solid figures and their nets. (MG) determine the surface area of solid figures. (MG) distinguish between cubes and rectangular prisms, and estimate their volumes. (MG) draw the image of an object after applying rotation about a point (MG) 		

GRADE 6 – QUARTER 1

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	<ol style="list-style-type: none"> tessellation of shapes. translation, reflection and rotation with shapes 	<ol style="list-style-type: none"> explore whether or not a shape tessellates. tessellate a surface using different shapes, including triangles, squares, and rectangles. draw resulting images of shapes that undergo translation, reflection, rotation
Number and Algebra (NA)	<ol style="list-style-type: none"> the four operations with decimals. the four operations with different combinations of fractions, whole numbers, and mixed numbers. 	<ol style="list-style-type: none"> add and subtract decimals with decimal parts of up to 4 decimal places. solve multi-step problems involving addition and/or subtraction of decimals, including problems involving money. mentally multiply decimals of up to 2 decimal places by 0.1, 0.01, 0.001, 10, 100, and 1000. solve multi-step problems involving multiplication of decimals that may or may not also involve addition or subtraction of decimals, including problems involving money. divide: <ol style="list-style-type: none"> 1- to 2-digit whole numbers resulting in a repeating (non-terminating) decimal quotient. (e. g., $\frac{1}{3} = 0.3333 \dots$), and a whole number by a decimal of 1 decimal place. mentally divide: <ol style="list-style-type: none"> decimals of up to 4 decimal places by 0.1, 0.01, and 0.001, and decimals of up to 2 decimal places by 10, 100, and 1000. solve problems involving division of decimals that may or may not involve the other operations with decimals and/or whole numbers. obtain products that result from multiplying different combinations of fractions, whole numbers, and mixed numbers. solve multi-step problems involving multiplication that may or may not involve addition or subtraction of different combinations of fractions, whole numbers, and mixed numbers. divide different combinations of fractions, whole numbers, and mixed numbers. solve multi-step problems involving division of different combinations of fractions, whole numbers, and mixed numbers that may or may not involve any of the other operations of fractions.
<p>Performance Standards <i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> tessellate a surface using different shapes. (MG) perform the four operations with decimals. (NA) perform the four operations with different combinations of fractions, whole numbers, and mixed numbers. (NA) 		

GRADE 6 – QUARTER 2

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (NA)	<ol style="list-style-type: none"> 1. ratio and proportion. 2. percentages, and their relationships with fractions and decimals. 3. exponential form, including calculation using the GEMDAS rules. 	<ol style="list-style-type: none"> 1. describe the relationship between quantities using ratio for: <ol style="list-style-type: none"> a. part-whole relationships, and b. part-part relationships. 2. express one number as a fraction of another given their ratio, and vice versa. 3. identify and write equivalent ratios. 4. solve problems involving ratio. 5. illustrate ratio and proportion in given situations using tables and/or the double number line model. 6. find how many times one value is larger than another given their ratio, and vice versa. 7. solve problems involving ratio and proportion. 8. illustrate and explain the relationships between percentages, fractions, and decimals. 9. identify and explain the uses of percentages. 10. write numbers in exponential form e. g., $2 \times 2 \times 2 = 2^3$, and vice versa e.g., $2^3 = 2 \times 2 \times 2$. 11. give the value of numbers expressed in exponential form. 12. perform calculations involving numbers in exponential form by applying the GEMDAS rules.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • describe and apply the concepts of ratio and proportion. (NA) • relate percentages to fractions and decimals. (NA) • evaluate, and perform calculations with, numbers expressed in exponential form. (NA) 		

GRADE 6 – QUARTER 3

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	<ol style="list-style-type: none"> 1. units of volume and capacity. 2. volume of cubes and rectangular prisms. 3. perimeter and area of triangles, parallelograms, trapezoids, and composite figures composed of triangles, squares, and rectangles. 4. parts of a circle, including circumference. 	<ol style="list-style-type: none"> 1. determine appropriate units for measuring volume and capacity. 2. convert cu. cm to L, and vice versa. 3. find the volume of a cube and of a rectangular prism using standard units of measurement. 4. solve problems involving volumes of cubes and rectangular prisms. 5. solve problems involving capacity. 6. convert sq. cm to sq. m, and vice versa. 7. find the area, in sq. m or sq. cm, of composite figures composed of triangles, squares, and rectangles. 8. solve problems involving the perimeter and area of triangles, parallelograms, trapezoids, and composite figures composed of triangles, squares, and rectangles. 9. draw circles with different radii using a pair of compasses. 10. identify and describes the parts of a circle. 11. measure the circumference of circles using appropriate tools. 12. approximate the value of pi (π) (the ratio of circumference to diameter). 13. find the circumference of a circle using $C = \pi d$ or $C = 2\pi r$.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • convert between units of volume and capacity. (MG) • find the volume of cubes and rectangular prisms. (MG) • find the perimeter and area of triangles, parallelograms, trapezoids, and composite figures composed of triangles, squares, and rectangles. (MG) • describe the parts of a circle. (MG) • use pi (π) to calculate the circumference of a circle. (MG) 		

GRADE 6 – QUARTER 4

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	<ol style="list-style-type: none"> area of a circle composite figures composed of any two or more of: triangle, square, rectangle, circle, semi-circle. 	<ol style="list-style-type: none"> explore inductively the area of a circle leading to the formula $A = \pi r^2$. find the area of a circle using the formula. find the area of composite figures composed of any two or more of the following: triangle, square, rectangle, circle, and semicircle. solve problems involving circumference and area of circles, and composite figures.
Data and Probability (DP)	<ol style="list-style-type: none"> pie graphs. 	<ol style="list-style-type: none"> find the angle measures and/or percentages based on the given data for a pie graph. construct a pie graph using appropriate tools. interpret data presented in a pie graph. interpret data from digital media that are presented in tabular or graphical form. draw conclusions or make inferences based on data presented in a pie graph. solve problems using data presented in a pie graph.
Number and Algebra (NA)	<ol style="list-style-type: none"> common factors, greatest common factors, common multiples, and least common multiples. 	<ol style="list-style-type: none"> determine the common factors and the greatest common factor (GCF) of two numbers using the following methods: listing, prime factorization, and continuous division. find the common multiples and least common multiple (LCM) of two numbers using the following methods: listing, prime factorization, and continuous division. solve problems involving GCF and LCM.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> find the area of a circle. (MG) find the area of composite figures composed of any two or more of: triangle, square, rectangle, circle, semi-circle. (MG) construct and interpret pie graphs. (DP) find common factors, greatest common factors, common multiples, and least common multiples. (NA) 		

GRADE 7 – QUARTER 1

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	<ol style="list-style-type: none"> 1. regular and irregular polygons and their features/properties. 2. determination of measures of angles and number of sides of polygons. 	<ol style="list-style-type: none"> 1. draw and describe regular and irregular polygons with 5, 6, 8, or 10 sides, based on measurements of sides and angles, using a ruler and protractor. 2. draw triangles, quadrilaterals, and regular polygons (5, 6, 8, or 10 sides) with given angle measures. 3. describe and explain the relationships between angle pairs based on their measures. 4. classify polygons according to the number of sides, whether they are regular or irregular, and whether they are convex or non-convex. 5. deduce the relationship between the exterior angle and adjacent interior angle of a polygon. 6. determine the measures of angles and the number of sides of polygons.
Number and Algebra (NA)	<ol style="list-style-type: none"> 3. application of percentages. 4. use of rates. 5. rational numbers. 	<ol style="list-style-type: none"> 7. solve problems involving: <ol style="list-style-type: none"> a. percentage increase, and b. percentage decrease. 8. solve money problems involving percentages (e. g., discount, commission, sales tax, simple interest). 9. create a financial plan. 10. identify and explain the uses of rates. 11. solve problems involving rates (e.g., speed). 12. describe given rational numbers as fractions, decimals, or percentages. 13. order rational numbers on a number line. 14. perform operations on rational numbers.
<p>Performance Standards <i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • draw, and describe the features/properties of, regular and irregular polygons. (MG) • use percentages in different contexts. (NA) • identify and use rates. (NA) • create a financial plan. (NA) • describe, order, and perform operations on, rational numbers. (NA) 		

GRADE 7 – QUARTER 2

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (NA)	1. square roots of perfect squares, cube roots of perfect cubes, and irrational numbers.	1. determine the square roots of perfect squares and the cube roots of perfect cubes. 2. identify irrational numbers involving square roots and cube roots, and their locations on the number line.
Measurement and Geometry (MG)	2. conversion of units of measure. 3. volume of square and rectangular pyramids, and cylinders.	3. convert units of measure within the International System of Units (SI) and across different systems of measure. 4. explain inductively the volume of a cylinder using the area of a circle, leading to the identification of the formula. 5. find the volume of a cylinder. 6. solve problems involving the volumes of cylinders. 7. explore inductively the volume of square and rectangular pyramids using rectangular prisms, leading to the identification of the formula. 8. estimate volumes of square and rectangular pyramids. 9. solve problems involving volumes of square or rectangular pyramids.
Number and Algebra (NA)	4. sets and subsets, and the union and intersection of sets using Venn diagrams 5. subset of real numbers.	10. describe sets and their subsets, the union of sets, and the intersection of sets 11. illustrate sets and their subsets, the union of sets, and the intersection of sets, through the use of Venn diagrams. 12. illustrate the different subsets of real numbers.
<p>Performance Standards <i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> determine square roots of perfect squares and cube roots of perfect cubes, and identify irrational numbers. (NA) convert units of measure from different systems of measure. (MG) find the volume of square and rectangular pyramids, and the volume of cylinders. (MG) describe sets and their subsets, and the union and intersection of sets. (NA) illustrates sets and subsets, and union and intersection of sets, using Venn diagrams. (NA) 		

GRADE 7 – QUARTER 3

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Data and Probability (DP)	<ol style="list-style-type: none"> 1. data collection and sampling techniques, and the presentation of data in appropriate tables and graphs. 2. interpretation of statistical graphs. 	<ol style="list-style-type: none"> 1. investigate different data collection and sampling techniques. 2. organize statistical data in a frequency distribution table. 3. use appropriate graphs to represent organized data: pie graph, bar graph, line graph, and stem-and-leaf plot. 4. interpret statistical graphs.
Number and Algebra (NA)	<ol style="list-style-type: none"> 3. the set of integers, and comparing and ordering integers. 4. the four operations with integers. 5. simplification of numerical expressions involving integers. 6. absolute value of an integer. 	<ol style="list-style-type: none"> 5. describe the set of integers. 6. use positive and negative numbers to describe directions or opposites in real-life situations. 7. locate integers on the number line. 8. compare and order integers. 9. add and subtract integers; using concrete models (e.g., counters, integer chips), pictorial models (e.g., bar models, number lines), and with integers written as numerals. 10. multiply and divide integers. 11. simplify numerical expressions involving integers using number properties and the order of operations (GEMDAS). 12. identify the absolute value of an integer, and its meaning on the number line.
<p>Performance Standards <i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • collect data, and organize data in a frequency distribution table. (DP) • represent and interpret data in different types of graphs. (DP) • compare and order integers, including through the use of the number line. (NA) • perform the four operations with integers. (NA) • simplify numerical expressions involving integers. (NA) • identify the absolute value of an integer. (NA) 		

GRADE 7 – QUARTER 4

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners should have knowledge and understanding of...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (NA)	<ol style="list-style-type: none"> the solution of simple equations. the evaluation of algebraic expressions following substitution. the rearrangement of a formula to make a different variable the subject of the formula. 	<ol style="list-style-type: none"> solve simple equations represented by bar models to find unknowns. distinguish a variable from a constant in an algebraic expression. evaluate algebraic expressions given the value/s of the variable/s. translate verbal phrases into algebraic expressions. illustrate the properties of equality. solve one variable in terms of the other variables in a formula. write equations in algebraic form. find the value of an unknown in an equation where the unknown is non-negative. solve problems involving algebraic expressions and formulas
Data and Probability (DP)	<ol style="list-style-type: none"> outcomes from experiments. 	<ol style="list-style-type: none"> collect data from experiments (e.g., number of heads obtained when tossing a coin, a number of times, number of prime numbers obtained when rolling a die a number of times). express outcomes in words and/or symbols, and represents outcomes in tables and/or graphs. solve problems using the outcomes of experiments.
Number and Algebra (NA)	<ol style="list-style-type: none"> operations using scientific notation. 	<ol style="list-style-type: none"> write numbers in scientific notation to represent very large or very small numbers, and vice versa. perform operations on numbers expressed in scientific notation.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> solve simple equations. (NA) substitute into an algebraic expression to evaluate the expression. (NA) rearrange a formula to make a different variable the subject of the formula. (NA) gather data from experiments and represent the data in different forms. (DP) write numbers in scientific notation and perform operations on numbers written in scientific notation. (NA) 		

GRADE 8 – QUARTER 1

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of...</i>	LEARNING COMPETENCIES <i>The learners...</i>
Data and Probability (DP)	1. measures of central tendency of ungrouped data.	1. determine measures of central tendency of ungrouped data. 2. draw conclusions from statistical data using the measures of central tendency.
Number and Algebra (NA)	2. algebraic expressions and operations with monomials, binomials, and multinomials. 3. special products for binomials, and factorization of polynomials. 4. rational algebraic expressions and equations. 5. rules for obtaining terms in sequences.	3. model real-life situations using algebraic expressions. 4. add and subtract simple monomials. 5. multiply and divide simple monomials, leading to the derivation of the laws of exponents. 6. multiply simple monomials and binomials with simple binomials and multinomials, using the distributive property with various techniques and models. 7. use special product patterns to multiply binomials. 8. completely factor different types of polynomials (polynomials with common monomial factor; difference of two squares; quadratic trinomials, including perfect square trinomials). 9. solve problems involving special products and factors of polynomials. 10. simplify rational algebraic expressions. 11. perform operations on rational algebraic expressions. 12. solve problems involving simple rational algebraic equations (using cross-multiplication). 13. formulate the rule for finding the next term in a sequence by looking for patterns.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • determine measures of central tendency of ungrouped data and use the measures to draw conclusions. (DP) • add and subtract monomials, and multiply combinations of monomials, binomials, and multinomials. (NA) • obtain special binomial products. (NA) • factorize different types of polynomials. (NA) • simplify, and operate with, rational algebraic expressions and solve simple rational algebraic equations. (NA) • obtain the rule for finding the next term in a sequence. (NA) 		

GRADE 8 – QUARTER 2

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of...</i>	LEARNING COMPETENCIES <i>The learners...</i>
Number and Algebra (NA)	1. plotting points, and finding distance and the midpoint of line segments on the Cartesian coordinate plane.	1. illustrate and describe the Cartesian coordinate plane. 2. plot points on the Cartesian coordinate plane and determine the coordinates of a point on the plane. 3. solve problems involving distance between two points and midpoint of a line segment on the Cartesian coordinate plane.
Measurement and Geometry (MG)	2. volume of pyramids (other than square and rectangular pyramids), cones, and spheres. 3. the Pythagorean Theorem. 4. triangle inequality theorems.	4. explore inductively the volume of pyramids other than square and rectangular pyramids. 5. find the volume of pyramids other than square and rectangular pyramids. 6. solve problems involving volume of pyramids. 7. explore inductively the volumes of cones and spheres, leading to their formulas. 8. find the volumes of cones and spheres. 9. solve problems involving the volume of cones and spheres. 10. apply the Pythagorean Theorem in finding the missing side of a right triangle, and its converse in classifying triangles. 11. apply the triangle inequality theorems to establish results for angles and sides in triangles.
Number and Algebra (NA)	5. earning money, profit and loss, ‘best buys’, buying on terms.	12. solve financial problems involving: <ol style="list-style-type: none"> a. earning money, b. profit and loss, c. buying amounts of products that represent the best value (‘best buys’), and d. buying on terms (‘instalment plan’).
<p>Performance Standards <i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • plot points, find the distance between two points, and find the midpoint of line segments, on the Cartesian coordinate plane. (NA) • finds the volume of pyramids other than square and rectangular pyramids, and the volumes of cones and spheres. (MG) • use the Pythagorean theorem to find sides in right triangles and its converse to classify triangles. (MG) • use the triangle inequality theorems to establish results for angles and sides in triangles. (MG) • solve financial problems involving earning money, profit and loss, “best buys,” and buying on terms. (NA) 		

GRADE 8 – QUARTER 3

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of...</i>	LEARNING COMPETENCIES <i>The learners...</i>
Number and Algebra (NA)	<ol style="list-style-type: none"> 1. linear equations in one variable. 2. linear inequalities in one variable and their graphs. 3. linear equations in two variables and their graphs. 4. systems of linear equations in two variables. 5. linear inequalities in two variables. 	<ol style="list-style-type: none"> 1. solve linear equations in one variable. 2. solve problems (e.g., number problems, geometry problems, and money problems) involving linear equations in one variable. 3. solve linear inequalities in one variable. 4. graph on a number line the solution of linear inequalities in one variable. 5. solve problems involving linear inequalities in one variable. 6. describe a linear equation in two variables and express its solution using ordered pairs. 7. define and determine the slope and intercepts of a line. 8. find the equation of a line given: <ol style="list-style-type: none"> a. two points, b. the slope and a point, c. the slope and y-intercept, and d. the x- and y- intercepts. 9. sketch the graph (straight line) of a linear equation given: <ol style="list-style-type: none"> a. any two points on the line, b. the x- and y- intercepts, and c. the slope and a point on the line. 10. define and illustrate a system of linear equations in two variables. 11. solve a system of linear equations (with integer solutions) by graphing. 12. classify the types of systems of linear equations based on the number of solutions. 13. solve algebraically a system of linear equations in two variables. 14. solve problems involving systems of linear equations in two variables. 15. recognize and solve problems involving linear inequalities in two variables.
<p>Performance Standards <i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • solve linear equations and linear inequalities in one variable. (NA) • graph linear inequalities in one variable. (NA) • graph linear equations in two variables. (NA) • solve a system of linear equations graphically and algebraically. (NA) • use linear inequalities in two variables in the solution of problems. (NA) 		

GRADE 8 – QUARTER 4

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of...</i>	LEARNING COMPETENCIES <i>The learners...</i>
Data and Probability (D/P)	<ol style="list-style-type: none"> 1. measures of variability for ungrouped data. 2. interpretation and analysis of graphs from primary and secondary data. 3. experimental and theoretical probability. 4. the Fundamental Counting Principle. 	<ol style="list-style-type: none"> 1. calculate the measures of variability (range, mean deviation, and standard deviation) for ungrouped data. 2. draw conclusions from statistical data using the measures of variability. 3. investigate, interpret, and analyze graphs from primary data (e.g., examination scores). 4. investigate, interpret, and analyze graphs from secondary data. 5. differentiate theoretical from experimental probability by conducting an experiment or an investigation. 6. describe the sample space of an experiment. 7. use the Fundamental Counting Principle to determine the number of possible outcomes of an experiment. 8. calculate the theoretical probability of a single event by listing all possible outcomes. 9. describe probability as a measure of the chance of an event occurring. 10. calculate the probability of simple combined events by listing, or by possibility diagrams or tree diagrams. 11. solve problems involving experimental probability and/or theoretical probability using the Fundamental Counting Principle.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • calculate measures of variability for ungrouped data. (DP) • interpret and analyze graphs from primary and secondary data. (DP) • determine the number of possible outcomes of an experiment using the Fundamental Counting Principle. (DP) • calculate the probability of a single event and the probability of simple combined events. (DP) 		

GRADE 9 – QUARTER 1

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	<ol style="list-style-type: none"> 1. simple geometric concepts and notations. 2. perpendicular and parallel lines, and angles formed by parallel lines cut by a transversal. 	<ol style="list-style-type: none"> 1. illustrate and describe point, line, ray, line segment, angle, and plane using models and geometric notations. 2. construct perpendicular and parallel lines. 3. identify the relationships between angles formed by parallel lines cut by a transversal. 4. determine angle measures involving angle pairs, parallel and perpendicular lines, and parallel lines cut by a transversal.
Number and Algebra (NA)	<ol style="list-style-type: none"> 3. relations and functions. 4. graphs of linear functions, and the identification of domain and range, slope, intercepts, and zeros. 	<ol style="list-style-type: none"> 5. identify relations that are functions based on the definitions of relations and functions. 6. determine the domain and the range of a function expressed in different representations. 7. express the relationship between two variables as a function. 8. determine the slopes (as rate of change) and the zeros of linear functions represented in: <ol style="list-style-type: none"> a. graphs, b. equations, and c. tables of values. 9. graph a linear function and determine its: <ol style="list-style-type: none"> a. domain, b. range, c. intercepts, and d. slope. 10. represent linear relationships found in real-life situations using different representations. 11. solve problems involving linear functions.
<p>Performance Standards <i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • illustrate and describe points, lines, rays, line segments, angles, and planes. (MG) • construct perpendicular and parallel lines. (MG) • determine the measure of the angles formed by parallel lines cut by a transversal. (MG) • identify relations and functions. (NA) • graph a linear function and identify the domain and range, intercepts, slope, and zeros. (NA) 		

GRADE 9 – QUARTER 2

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	<ol style="list-style-type: none"> 1. parallelism and perpendicularity of lines. 2. different quadrilaterals and their properties. 3. congruence of triangles. 4. congruence proofs. 	<ol style="list-style-type: none"> 1. determine conditions that guarantee parallelism and perpendicularity of lines. 2. classify quadrilaterals based on formal definitions. 3. use properties of parallelograms to find measures of angles, sides, perpendicular height, and diagonals. 4. solve problems involving parallelograms, rectangles, squares, or rhombuses by applying their different properties. 5. prove properties of parallelograms by applying the relevant theorems. 6. derive the properties of trapezoids and kites by exploring the relationship between their parts and secondary parts. 7. solve problems on trapezoids and kites by applying their properties. 8. distinguish inductive and deductive reasoning for establishing proofs. 9. state postulates and theorems about defined and undefined terms in geometry, and formulates proofs involving them. 10. use the triangle congruence postulates and theorems to illustrate congruence of triangles, including CPCTC (definition of congruent triangles). 11. solve problems involving right triangle congruence theorems, isosceles triangle theorem, perpendicular bisector theorem, and midline theorem 12. construct and justify the construction of segments, angles and triangles, including, but not limited to, the triangle’s secondary parts and centers, using the triangle congruence postulates and theorems. 13. construct congruence proofs involving triangles or corresponding parts of triangles using a two-column proof.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • determine the conditions for lines to be parallel or perpendicular. (MG) • use geometric properties to find unknown sides and angles of quadrilaterals. (MG) • apply the triangle congruence postulates and theorems. (MG) • construct and justify the construction of segments, angles, and triangles. (MG) • construct proofs of the congruence of triangles. (MG) 		

GRADE 9 – QUARTER 3

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (N/A)	<ol style="list-style-type: none"> quadratic equations and graphs of quadratic functions. the solution of quadratic equations. 	<ol style="list-style-type: none"> represent real-life situations that can be modelled using quadratic relationships. graph equations in two variables to represent quadratic relationships, such as $y = ax^2$, $y = ax^2 + b$, $y = a(x - b)^2$. interpret features of a parabola such as vertex, axis of symmetry, x-intercepts, opening direction, minimum or maximum value, zeros, and increasing and decreasing intervals. transform the quadratic functions $y = ax^2$, $y = ax^2 + b$, $y = a(x - b)^2$ and $y = ax^2 + bx + c$ into the form $y = a(x - h)^2 + k$, and vice versa. sketch the graph of quadratic functions expressed in equation form. analyze the effect of changing the values of the parameters on the behavior of its graph and on the properties of the quadratic function $y = a(x - h)^2 + k$. find the zeros of quadratic functions in factored and standard form, graphically and algebraically. solve quadratic equations by: <ol style="list-style-type: none"> extracting square roots, factoring, and using the quadratic formula. solve problems involving quadratic functions and equations
Measurement and Geometry (MG)	<ol style="list-style-type: none"> similarity of polygons. special triangles. 	<ol style="list-style-type: none"> illustrate similarity of polygons. illustrate and apply triangle similarity theorems in different situations. solve problems involving triangle similarity. solve problems involving measures of sides and angles of special triangles (30-60-90, 45-45-90).
Number and Algebra (NA)	<ol style="list-style-type: none"> direct and inverse variation. 	<ol style="list-style-type: none"> illustrate real-life situations that involve direct variation and real-life situations that involve inverse variation. translate a relationship between two quantities into a variation statement and/or a mathematical equation, given a table of values or a graph. solve problems involving variation.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> represent quadratic relationships. (NA) interpret features of a parabola. (NA) express quadratic functions in different forms. (NA) 		

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
		<ul style="list-style-type: none"> • sketch the graph of a quadratic function. (NA) • solve quadratic equations. (NA) • illustrate and apply similarity of polygons, including triangles. (MG) • apply direct and inverse variation. (NA)

GRADE 9 – QUARTER 4

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	<ol style="list-style-type: none"> triangle theorems and triangle inequality theorems. the trigonometric ratios and their application. 	<ol style="list-style-type: none"> solve problems involving the perpendicular bisector theorem, isosceles triangle theorem, theorems on equilateral triangles, and the midline theorem. explain theorems on triangle inequalities and apply these theorems in comparing measures in a triangle. determine the values of the sine, cosine, and tangent trigonometric ratios corresponding to the angles of the special triangles. find the values of the sine, cosine, and tangent ratios of any acute angle. use the trigonometric ratios in solving right triangles. illustrate angles of elevation and angles of depression. solve real-life problems involving right triangles through the application of the trigonometric ratios.
Data and Probability (DP)	<ol style="list-style-type: none"> interpretation and analysis of data to assess whether the data may be misleading. probabilities of simple and compound events. 	<ol style="list-style-type: none"> interpret and analyze data from the digital media that are in tabular or graphical form to assess whether the data may be misleading. illustrate simple and compound events. determine the probabilities of simple and compound events. solve problems involving probabilities of simple and compound events.
<p>Performance Standards <i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> apply triangle theorems and triangle inequality theorems. (MG) apply trigonometric ratios to solve right triangles. (MG) interpret and analyze data to assess whether the data may be misleading. (DP) determine the probabilities of simple and compound events. (DP) 		

GRADE 10 – QUARTER 1

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Measurement and Geometry (MG)	<ol style="list-style-type: none"> the laws of sines and the laws of cosines. translations, reflections, and rotations, in the Cartesian plane. 	<ol style="list-style-type: none"> apply laws of sines in solving oblique triangles, including ambiguous cases. apply laws of cosines in solving oblique triangles. describe the position of points in the Cartesian plane. describe translations, reflections, and rotations, in the Cartesian plane using coordinates. solve problems involving laws of sines and cosines, including bearings.
Number and Algebra (NA)	<ol style="list-style-type: none"> quadratic inequalities in one variable and in two variables. absolute value equations and inequalities in one variable and their graphs. 	<ol style="list-style-type: none"> illustrate on the number line quadratic inequalities in one variable. solve quadratic inequalities in one variable and expresses solutions in various notations. solve problems involving quadratic inequalities in one variable. solve quadratic inequalities in two variables. determine the region of solutions of a linear or quadratic inequality in two variables. solve absolute value equations in one variable and express solutions in various notations) solve absolute value inequalities in one variable and express solutions in various notations
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> find sides and angles in oblique triangles using the laws of sines and the laws of cosines. (MG) describe translations, reflections, and rotations in the Cartesian plane. (MG) solve and graph the solutions of quadratic inequalities in one variable and in two variables. (NA) solve absolute value equations in one variable and absolute value inequalities in one variable, and graph the solutions. (NA) 		

GRADE 10 – QUARTER 2

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Data and Probability (DP)	<ol style="list-style-type: none"> 1. box-and-whisker plots, and cumulative frequency histograms and polygons. 2. quartiles, deciles, and percentiles; interquartile range, and outliers. 	<ol style="list-style-type: none"> 1. illustrate measures of position (quartiles, deciles, and percentiles). 2. construct and interpret box-and-whisker plots and cumulative frequency histograms and polygons. 3. calculate a specified measure of position, interquartile range, and outliers, from ungrouped data. 4. calculate the percentile rank of a given score from ungrouped data. 5. draw conclusions from statistical data using the measures of position.
Number and Algebra (NA)	<ol style="list-style-type: none"> 3. radical expressions. 4. the roots of a quadratic equation. 5. quadratic functions. 6. equations reducible to quadratic equations. 	<ol style="list-style-type: none"> 6. illustrate the laws of rational non-integral exponents. 7. simplify radical expressions. 8. perform operations involving radical expressions, including rationalizing the denominator. 9. determine the nature of roots of a quadratic equation using the discriminant. 10. determine the equation of a quadratic function given: <ol style="list-style-type: none"> a. a table of values b. its graph, and c. its zeros. 11. solve equations reducible to quadratic equations, e.g., $x^4 - 5x^2 + 4 = 0$ 12. solve problems involving quadratic functions. 13. solve radical equations, including equations reducible to linear or quadratic equations.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> • construct and interpret box-and-whisker plots, and cumulative frequency histograms and polygons. (DP) • calculate quartiles, deciles, and percentiles; interquartile range, and outliers. (DP) • simplify, and perform operations, involving radical expressions. (NA) • determine the nature of roots of a quadratic equation. (NA) • determine the equation of a quadratic function. (NA) • solve equations reducible to quadratic equations and radical equations. (NA) 		

GRADE 10 – QUARTER 3

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (NA)	1. equation of a circle and the graph of a circle.	1. transform the equation of a circle from center-radius form to general form, and vice versa. 2. determine the center and the radius of a circle from a given equation. 3. sketch the graph of a circle given its equation. 4. find the equation of a circle from given conditions, e.g., given two points as the endpoints of a diameter. 5. solve problems involving geometric figures on the Cartesian plane.
Data and Probability (DP)	2. evaluation of statistical reports. 3. union and intersection of events, dependent and independent events, and complementary events.	6. evaluate statistical reports by linking claims to displays, statistics, and representative data. 7. illustrate mutually exclusive events and non-mutually exclusive events. 8. identify complementary events. 9. solve probability problems involving: <ol style="list-style-type: none"> union and intersection of events, including mutually and non-mutually exclusive events; dependent and independent events, including conditional probability where the solution is limited to the use of contingency tables or Venn diagrams; and complementary events.
<p>Performance Standards</p> <p><i>By the end of the quarter, the learners are able to ...</i></p> <ul style="list-style-type: none"> transform the equation of a circle from center-radius form to general form, and vice versa, and determine the center and radius from a given equation. (NA) graph a circle from a given equation of the circle. (NA) evaluate statistical reports. (DP) calculate probabilities in relation to union and intersection of events; dependent and independent events; and complementary events. (DP) 		

GRADE 10 – QUARTER 4

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
Number and Algebra (NA)	1. simple interest, compound interest, and depreciation.	1. explore inductively the relationship between simple interest and compound interest. 2. calculate compound interest by repeated applications of simple interest. 3. solve problems involving compound interest by repeated applications of simple interest. 4. explain inductively the formulas for compound interest and depreciation. 5. explore inductively the differences in the amount of compound interest obtained on amounts of money invested: a. annually, b. quarterly, and c. monthly. 6. solve real-life problems involving: a. compound interest, and b. depreciation.
Measurement and Geometry (MG)	2. central angles; inscribed angles; and angles and lengths formed by intersecting chords, secants, and tangents of a circle. 3. sectors and segments of a circle, and their areas.	7. establish properties and relationships for central angles, inscribed angles, secants, and tangents, of a circle. 8. solve problems involving: a. central angles, b. inscribed angles, c. angles formed by two intersecting chords, d. angles formed by two secants intersecting outside the circle, e. angles formed by two intersecting tangents, and f. angles formed by intersecting secant and tangent. 9. establish properties and relationships for chords, secants, and tangents. 10. solve problems involving lengths of: a. intersecting chords, b. two secant segments intersecting outside a circle, and c. two intersecting tangent segments. 11. define sectors and segments of a circle and finds their areas. 12. solve problems involving area of a sector of a circle, segment of a circle, and shaded regions in other figures that involve sectors or segments.
Performance Standards <i>By the end of the quarter, the learners are able to ...</i>		

CONTENT DOMAIN	CONTENT STANDARDS <i>The learners demonstrate knowledge and understanding of ...</i>	LEARNING COMPETENCIES <i>The learners ...</i>
		<ul style="list-style-type: none"> • calculate compound interest and depreciation. (NA) • apply properties and relationships of central angles, inscribed angles, chords, secants, and tangents of circles. (MG) • define sectors and segments of a circle, and find their areas. (MG)

Curriculum Organization

It is proposed that the curriculum organizers described below are used together to form the curriculum description in the Grades 1 to 10 Mathematics Curriculum Guide. The definitions (in italics) within this section are drawn from DepEd Order No. 8, s. 2015 and DepEd Order No. 21, s. 2019.

- 1) **Standard** – *In its broadest sense, it is something against which other things can be compared to for the purpose of determining accuracy, estimating quantity or judging quality. It is a stated expectation of what one should know and be able to do.*
 - 2) **Key Stage** – *This refers to stages in the K to 12 Program reflecting distinct developmental milestones. These are Key Stage 1 (Kindergarten – Grade 3), Key Stage 2 (Grades 4 – 6), Key Stage 3 (Grades 7 – 10), and Key Stage 4 (Grades 11 and 12).*
 - 3) **Key Stage Standard*** – *This shows the degree or quality of proficiency that the learner is able to demonstrate in each key stage after learning a particular learning area in relation to the core learning area standard.*
 - 4) **Grade Level Standard** – *This shows the degree or quality of proficiency that the learner is able to demonstrate in each Grade after learning a particular learning area in relation to the core learning area standard.*
 - 5) **Content Domain**** – *This is a particular strand (or ‘domain’) of the curriculum in which the scope and sequence of a set of related topics and skills are covered.*
 - 6) **Content Standard** – *The content standards identify and set the essential knowledge and understanding that should be learned. They cover a specified scope of sequential topics within each learning strand, domain, theme, or component. Content standards answer the question, “What should the learners know?”*
 - 7) **Learning Competency** – *This refers to a specific skill performed with varying degrees of independence. It has different degrees of difficulty and performance levels. It also refers to the ability to perform activities according to the standards expected by drawing from one’s knowledge, skills, and attitudes.*
 - 8) **Performance Standard** – *The performance standards describe the abilities and skills that learners are expected to demonstrate in relation to the content standards and integration of 21st century skills. The integration of knowledge, understanding, and skills is expressed through creation, innovation, and adding value to products/performance during independent work or in collaboration with others.*
- * To ensure that the components of mathematical proficiency focused on problem solving are articulated in the revised curriculum, the key stage standards presented provide guidance in the writing of the content standards, learning competencies and performance standards.
- ** The content domains proposed for the K to 10 Mathematics curriculum are Number and Algebra, Measurement and Geometry, and Data and Probability.

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