

Republic of the Philippines  
Department of Education  
DepEd Complex, Meralco Avenue  
Pasig City

# **K to 12 Curriculum Guide**

# **MATHEMATICS**

(Grades 1 and 7)

January 31, 2012

## CONCEPTUAL FRAMEWORK

Mathematics is one subject that pervades life at any age, in any circumstance. Thus, its value goes beyond the classroom and the school. Mathematics as a school subject, therefore, must be learned comprehensively and with much depth.

The twin goals of mathematics in the basic education levels, K-10 are Critical Thinking and Problem Solving. We adopt the definition of critical thinking by Scriven and Paul (1987):

Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action.

On the other hand, we define Problem Solving in mathematics using Polya's (1945 & 1962) definition:

Mathematical problem solving is finding a way around a difficulty, around an obstacle, and finding a solution to a problem that is unknown.

These two goals are to be achieved with an organized and rigorous curriculum content, a well-defined set of high-level skills and processes, desirable values and attitudes, and appropriate tools, recognizing as well the different contexts of Filipino learners.

There are five content areas in the curriculum, as adopted from the framework prepared by MATHTED & SEI (2010): Numbers and Number Sense, Measurement, Geometry, Patterns and Algebra, and Probability and Statistics.

The specific skills and processes to be developed are: Knowing and Understanding; Estimating, Computing and Solving; Visualizing and Modelling; Representing and Communicating; Conjecturing, Reasoning, Proving and Decision-making, and: Applying and Connecting.

The following values and attitudes are to be honed as well: Accuracy, Creativity, Objectivity, Perseverance, and Productivity.

We recognize that the use of appropriate tools is needed in teaching mathematics. These include: manipulative objects, measuring devices, calculators and computers, Smartphones and tablet PCs, and the Internet.

We define context as a locale, situation or set of conditions of Filipino learners that may influence their study and use of mathematics to develop critical thinking and problem solving skills. Contexts refer to beliefs, environment, language and culture that include traditions and practices, and learner's prior knowledge and experiences.

The framework is supported by the following underlying learning principles and theories: Experiential and Situated Learning, Reflective Learning, Constructivism, Cooperative Learning and Discovery and Inquiry-based Learning. The mathematics curriculum is grounded in these theories.

Experiential learning as advocated by David Kolb is learning that occurs by making sense of direct everyday experiences. Experiential learning theory defines learning as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (Kolb, 1984, p. 41). Situated learning, theorized by Lave and Wenger, is learning in the same context on which concepts and theories are applied.

Reflective learning refers to learning that is facilitated by reflective thinking. It is not enough that learners encounter real-life situations. Deeper learning occurs when learners are able to think about their experiences and process these allowing them the opportunity to make sense and meaning of their experiences.

Constructivism is the theory that argues that knowledge is constructed when the learner is able to draw ideas from his own experiences and connects them to new ideas that are encountered.

Cooperative Learning puts premium on active learning achieved by working with fellow learners as they all engage in a shared task.

The mathematics curriculum allows for students to learn by asking relevant questions and discovering new ideas. Discovery and Inquiry-based learning (Bruner, 1961) support the idea that students learn when they make use of personal experiences to discover facts, relationships and concepts.

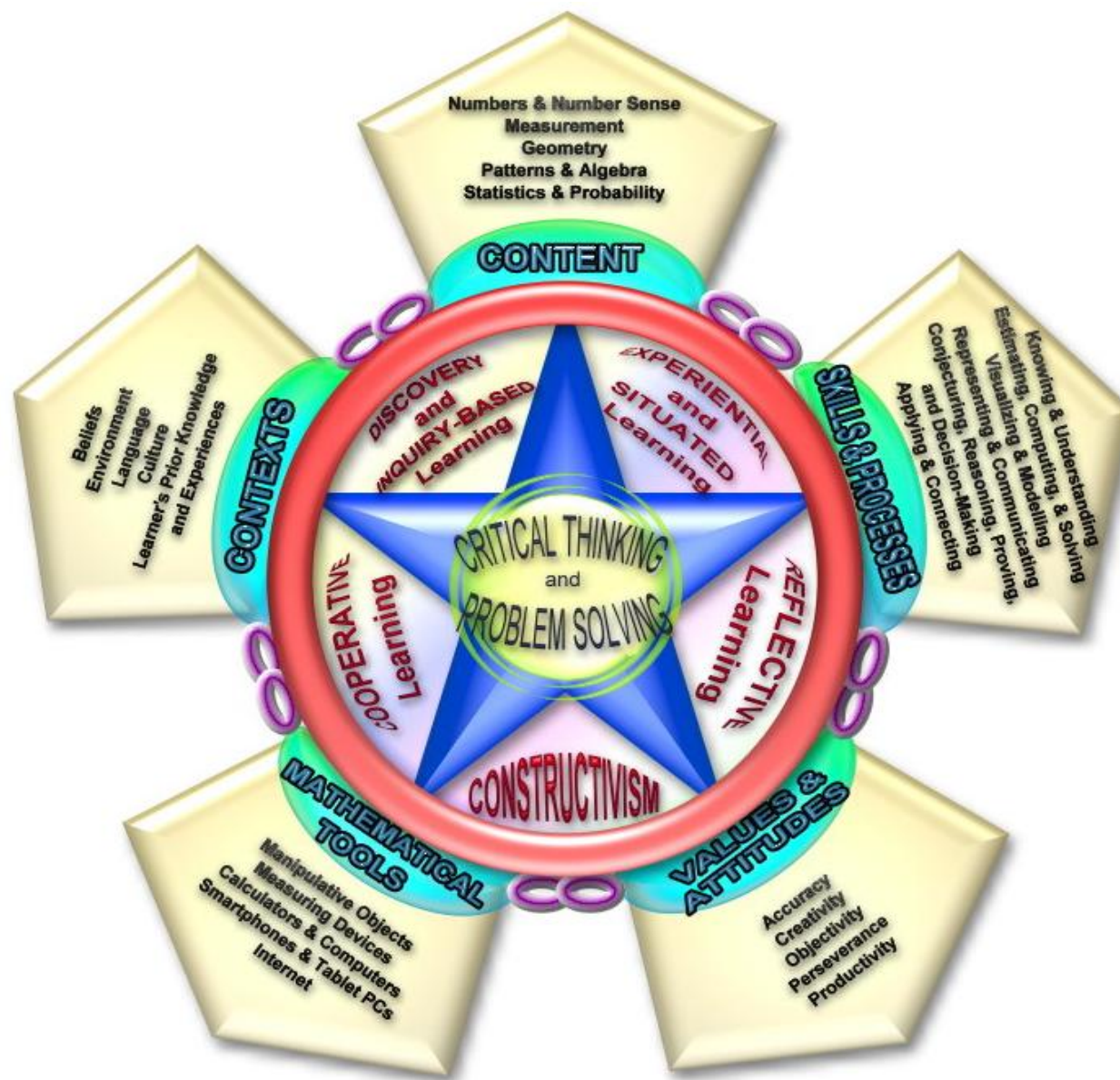


Figure 1. The Conceptual Framework of Mathematics Education

## BRIEF COURSE DESCRIPTION

Mathematics from K-10 is a skills subject. By itself, it is all about quantities, shapes and figures, functions, logic and reasoning. Mathematics is also a tool of science and a language complete with its own notations and symbols and “grammar” rules, with which concepts and ideas are effectively expressed.

The contents of mathematics include **Numbers and Number Sense**, **Measurement**, **Geometry**, **Patterns & Algebra** and **Statistics and Probability**.

**Numbers and Number Sense** as a strand includes concepts of numbers, properties, operations, estimation and their applications.

**Measurement** as a strand includes the use of numbers and measures to describe, understand and compare mathematical and concrete objects. It focuses on attributes such as length, mass and weight, capacity, time, money and temperature among others, as well as applications involving perimeter, area, surface area, volume and angle measure.

**Geometry** as a strand includes properties of two- and three-dimensional figures and their relationships, spatial visualization, reasoning and geometric modeling and proofs.

**Patterns and Algebra** as a strand studies patterns, relationships and changes among shapes and quantities and includes the use of algebraic notations and symbols, equations and most importantly, functions, to represent and analyze relationships.

**Statistics and Probability** as a strand is all about developing skills in collecting and organizing data using charts, tables and graphs, understanding, analyzing and interpreting data, dealing with uncertainty and making predictions and outcomes.

The K to 10 Mathematics Curriculum provides a solid foundation for Mathematics at Grades 11 to 12. More importantly, it provides necessary concepts and life skills needed by Filipino learners as they proceed to the next stage in their life as learners and as citizens of our beloved country, the Philippines.

**LEARNING AREA STANDARD:** The learner demonstrates understanding and appreciation of key concepts and principles of mathematics as applied, using appropriate technology, in problem solving, communicating, reasoning, making connections, representations, and decisions in real life.

**KEY STAGE STANDARDS:**

K – 3	4 – 6	7 – 10
At the end of Grade 3, the learner demonstrates understanding and appreciation of key concepts and skills involving whole numbers up to ten thousand, fractions, measurement, simple geometric figures, pre-algebra concepts and data representation and analysis as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decisions in real life.	At the end of Grade 6, the learner demonstrates understanding and appreciation of key concepts and skills involving rational numbers, measurement, geometric figures, pre-algebra concepts, simple probability and data analysis as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decisions in real life.	At the end of grade 10, the learner demonstrates understanding and appreciation of key concepts and skills involving number sense, measurement, algebra, geometry, probability and statistics, and trigonometry as applied, using appropriate technology, in critical thinking, problem solving, communicating, reasoning, making connections, representations, and decisions in real life.

**GRADE LEVEL STANDARDS:**

Grade Level	Grade Level Standards
<b>Grade 1</b>	The learner demonstrates understanding and appreciation of key concepts and skills involving whole numbers up to 100, fractions, measurement, simple geometric figures, pre-algebra concepts, data collection and representation as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decision in real life.
<b>Grade 2</b>	The learner demonstrates understanding and appreciation of key concepts and skills involving whole numbers up to 1 000, fractions, measurement and geometric figures, pre-algebra concepts, data collection, representation and analysis as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decision in real life.
<b>Grade 3</b>	The learner demonstrates understanding and appreciation of key concepts and skills involving whole numbers up to 10 000, fractions, measurement, geometric figures, pre-algebra concepts, data collection, representation and analysis as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decision in real life.
<b>Grade 4</b>	The learner demonstrates understanding and appreciation of key concepts and skills involving whole numbers up to 100 000, fractions, decimals including money, ratio, angles, plane figures like square, rectangle, and triangle, measurement (perimeter, area of triangle, parallelogram and trapezoids, volume of cubes and rectangular prisms, pre-algebra concepts, data collection, representation and analysis as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decisions in real life.
<b>Grade 5</b>	The learner demonstrates understanding and appreciation of key concepts and skills involving whole numbers up to 10 000 000, fractions, decimals including money, ratio, percent, geometry (circles and five or more-sided polygons), measurement (circumference, area of circle, volume of cubes and rectangular prisms, temperature) ,pre-algebra concepts, data collection, representation and analysis as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decisions in real life.
<b>Grade 6</b>	The learner is expected to have mastered the concepts and operations on whole numbers; demonstrates understanding and appreciation of the key concepts and skills involving fractions, decimals including money, ratio and proportion, percent, rate, integers, geometry (spatial figures), measurement (surface area, volume, meter reading), pre-algebra concepts, data collection, representation and analysis, probability, expressions and equations as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decisions in real life.

# K TO 12 MATHEMATICS

Grade Level	Grade Level Standards
<b>Grade 7</b>	The learner demonstrates understanding of key concepts and principles of number sense, measurement, algebra, geometry, probability and statistics as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decisions in real life.
<b>Grade 8</b>	The learner demonstrates understanding of key concepts and principles of algebra, geometry, probability and statistics as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decisions in real life.
<b>Grade 9</b>	The learner demonstrates understanding of key concepts and principles of algebra, geometry, and trigonometry as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decisions in real life.
<b>Grade10</b>	The learner demonstrates understanding of key concepts and principles of number sense, algebra, geometry, probability and statistics as applied, using appropriate technology, in critical thinking, problem solving, reasoning, communicating, making connections, representations and decisions in real life.



## GRADE 1

<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
<b>Numbers and Number Sense</b>	<p><i>The learner demonstrates understanding of...</i></p> <ul style="list-style-type: none"> <li>number notation and place value, cardinal and ordinal numbers, and comparing and ordering numbers up to 100.</li> </ul>	<p><i>The learner is able to...</i></p> <ul style="list-style-type: none"> <li>explore the concept of cardinal numbers up to 100 and compare these numbers in various contexts.</li> </ul>	<p><i>The learner...</i></p> <ul style="list-style-type: none"> <li>recognizes cardinal numbers from 0 to 100.</li> <li>counts and tells the number of objects in a given set by ones and tens.</li> <li>identifies the number that is one more or one less from a given number.</li> <li>composes and decomposes a given number.</li> <li>regroups sets of ones into sets of tens and sets of tens into hundred using objects.</li> <li>compares two sets using the expressions “fewer than,” “more than,” and “as many as.”</li> <li>orders sets from least to greatest and viceversa.</li> <li>counts by 2’s, 5’s and 10’s through 100.</li> <li>reads and writes numbers up to 100 in symbols and in words.</li> <li>identifies the place value and finds the value of a digit in a one- and two-digit numbers.</li> <li>renames numbers into tens and ones.</li> <li>compares numbers up to 100 using relation symbols.</li> </ul>

K TO 12 MATHEMATICS

<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
	<i>The learner demonstrates understanding of...</i>	<i>The learner is able to...</i>	<i>The learner ...</i> <ul style="list-style-type: none"> <li>• arranges numbers up to 100 in increasing order and vice versa.</li> <li>• recognizes coins and bills up to P100 (pesos and centavos).</li> </ul>
		<ul style="list-style-type: none"> <li>• explore the concept of ordinal numbers.</li> </ul>	<ul style="list-style-type: none"> <li>• reads and writes ordinal numbers 1st, 2nd, 3rd up to 10th.</li> <li>• identifies the 1st, 2nd, 3rd up to the 10th object in a given set from a given point of reference.</li> <li>• determines the position of an object using 1st to 10th from a given point of reference.</li> </ul>
	<ul style="list-style-type: none"> <li>• addition and subtraction up to 100.</li> </ul>	<ul style="list-style-type: none"> <li>• illustrate addition and subtraction of whole numbers.</li> </ul>	<ul style="list-style-type: none"> <li>• illustrates addition as putting together and subtraction as taking away, comparing and adding up.</li> <li>• illustrates the relationship of joining sets to addition of whole numbers.</li> <li>• illustrates that addition and subtraction are inverse operations.</li> <li>• identifies and constructs equivalent number expressions using addition and subtractions.</li> <li>• identifies and creates patterns to compose and decomposes numbers using addition.</li> </ul>

<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
	<i>The learner demonstrates understanding of...</i>	<i>The learner is able to...</i> <ul style="list-style-type: none"> <li>• compute for sums and solve addition problems.</li> </ul>	<i>The learner ...</i> <ul style="list-style-type: none"> <li>• adds two one-digit numbers with sums up to 18 using the order and zero properties of addition.</li> <li>• adds two to three one-digit numbers horizontally and vertically with sums up to 18.</li> <li>• adds three one-digit numbers having sums up to 18 using the order and grouping properties of addition.</li> <li>• uses expanded form to explain the meaning of addition with regrouping.</li> <li>• adds numbers with sums through 99 without or with regrouping.</li> <li>• mentally adds two to three 1-digit numbers with sums up to 18.</li> <li>• mentally adds a 2-digit number and 1-digit number with regrouping.</li> <li>• solves one-step word problems involving addition of whole numbers including money with sums up to 99 using appropriate problem solving strategy.</li> </ul>
		<ul style="list-style-type: none"> <li>• compute for differences and solve subtraction problems.</li> </ul>	<ul style="list-style-type: none"> <li>• subtracts one-digit numbers with minuends through 18 (basic facts).</li> </ul>

<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
	<i>The learner demonstrates understanding of...</i>	<i>The learner is able to...</i>	<i>The learner ...</i> <ul style="list-style-type: none"> <li>subtracts one to two-digit numbers with minuends up to 99 without regrouping.</li> <li>uses the expanded form to explain subtraction with regrouping.</li> <li>subtracts one to two-digit numbers with minuends up to 99 with regrouping.</li> <li>mentally subtracts 1-digit numbers from minuends up to 18 without regrouping.</li> <li>mentally subtracts a 1-digit number from 2-digit minuends without regrouping.</li> <li>solves word problems involving subtraction of whole numbers including money with minuends up to 99 with and without regrouping using appropriate problem solving strategy.</li> </ul>
	<ul style="list-style-type: none"> <li>the concepts of halves and fourths and applies them in dividing a whole or set equally.</li> </ul>	<ul style="list-style-type: none"> <li>visualize, model and represent the concept of halves and fourths using whole objects and sets.</li> </ul>	<ul style="list-style-type: none"> <li>visualizes and identifies <math>\frac{1}{2}</math> and <math>\frac{1}{4}</math> of a whole object.</li> <li>divides a whole into halves and fourths.</li> <li>divides the elements of a set of objects into two groups of equal quantities to show halves of sets.</li> <li>divides the elements of a set of objects into four groups of equal quantities to show fourths of sets.</li> </ul>

<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
	<i>The learner demonstrates understanding of...</i>	<i>The learner is able to...</i>	<i>The learner...</i> <ul style="list-style-type: none"> <li>given half of a region or a set, draws the whole region or set.</li> </ul>
<b>Geometry</b>	<ul style="list-style-type: none"> <li>2-D and 3-D shapes through identifying, classifying and constructing figures using cut-outs and concrete models.</li> </ul>	<ul style="list-style-type: none"> <li>explore the properties of 2- and 3-dimensional figures.</li> </ul>	<ul style="list-style-type: none"> <li>identifies, names and describes the four basic shapes in 2- and 3-dimensional objects: square, rectangle, triangle and circle.</li> <li>compares and classifies 2- and 3-dimensional figures according to common attributes.</li> </ul>
		<ul style="list-style-type: none"> <li>model and represent 2- and 3-dimensional objects.</li> </ul>	<ul style="list-style-type: none"> <li>draws the four basic shapes.</li> <li>constructs three-dimensional objects using manipulative materials.</li> </ul>
<b>Patterns and Algebra</b>	<ul style="list-style-type: none"> <li>simple patterns.</li> </ul>	<ul style="list-style-type: none"> <li>identify and create number and attribute patterns.</li> </ul>	<ul style="list-style-type: none"> <li>identifies and explains simple repeating patterns.</li> <li>makes patterns of shapes, colors and numbers.</li> </ul>
		<ul style="list-style-type: none"> <li>complete number and attribute patterns.</li> </ul>	<ul style="list-style-type: none"> <li>finds the missing number/digit in addition or subtraction problems.</li> <li>finds and completes patterns of one or two of the following attributes: Shape, Size, Color, Number, Orientation.</li> <li>determines the next term (figure/number) in a given sequence and give a reason.</li> </ul>

<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
<b>Measurement</b>	<i>The learner demonstrates understanding of...</i> <ul style="list-style-type: none"> <li>the concepts of time and measures and compares objects using direct comparison and non-standard units of length, mass and capacity.</li> </ul>	<i>The learner is able to...</i> <ul style="list-style-type: none"> <li>give different measures of time.</li> </ul>	<i>The learner ...</i> <ul style="list-style-type: none"> <li>names and tells the number of days in a week; months in a year in the right order.</li> <li>uses a calendar to determine a day or month.</li> <li>tells the time by an hour, half-hour and quarter-hour.</li> </ul>
		<ul style="list-style-type: none"> <li>estimate and compute for measurements of length, mass and capacity.</li> </ul>	<ul style="list-style-type: none"> <li>compares objects using the comparative words: Short, shorter, shortest; Long, longer, longest; Tall, taller, tallest; High, higher, highest; Heavy, heavier, heaviest; Light, lighter, lightest.</li> <li>estimates and measures length using non-standard units of linear measures.</li> <li>estimates and measures mass using non-standard units of mass/weight measures.</li> <li>shows and finds capacity using non-standard unit.</li> </ul>
<b>Statistics and Probability</b>	<ul style="list-style-type: none"> <li>organizing, representing and comparing data using pictographs without scale representations and probability, and explores games and activities.</li> </ul>	<ul style="list-style-type: none"> <li>organize and interpret data.</li> </ul>	<ul style="list-style-type: none"> <li>collects and organizes data using tallies and tables.</li> <li>represents data using pictographs without using a scale.</li> <li>reads and interprets a pictograph.</li> </ul>

# K TO 12 MATHEMATICS

<b><i>Content</i></b>	<b><i>Content Standards</i></b>	<b><i>Performance Standards</i></b>	<b><i>Learning Competencies</i></b>
		<i>The learner is able to...</i> <ul style="list-style-type: none"> <li>• make conjectures about games and activities.</li> </ul>	<i>The learner ...</i> <ul style="list-style-type: none"> <li>• identifies cause and effect relationships.</li> <li>• predicts and records outcome of experiments and chance games.</li> </ul>

## GRADE 7

<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
<b>Numbers and Number Sense</b>	<i>The learner demonstrates understanding of...</i> <ul style="list-style-type: none"> <li>the key concepts of sets, the real number system, estimation / approximation of a square of a number and the measures of quantities, and the applications of real numbers to measurements.</li> </ul>	<i>The learner is able to...</i> <ul style="list-style-type: none"> <li>explore set concepts and set operations.</li> </ul>	<i>The learner...</i> <ul style="list-style-type: none"> <li>describes and illustrates well-defined sets, subsets, universal set and the null set.</li> <li>defines and describes the union and intersection of sets and the complement of a set.</li> <li>uses Venn Diagrams to represent sets, subsets and set operations.</li> <li>solves problems involving sets.</li> </ul>
		<ul style="list-style-type: none"> <li>apply various procedures and manipulations on the different subsets of the set of real numbers.</li> </ul>	<ul style="list-style-type: none"> <li>describes and illustrates the absolute value of a number on a number line as the distance of the number from 0.</li> <li>performs fundamental operations on integers: addition, subtraction, multiplication, division.</li> <li>states and illustrates the different properties of the operations on integers (commutative, associative, distributive, identity, inverse).</li> <li>defines and illustrates rational numbers and arrange them on a number line.</li> </ul>



<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
	<i>The learner demonstrates understanding of...</i>	<i>The learner is able to...</i>	<p><i>The learner ...</i></p> <ul style="list-style-type: none"> <li>expresses rational numbers (both repeating and terminating/non-repeating and non-terminating) from fraction form to decimal form and vice versa.</li> <li>performs operations on rational numbers and illustrate their properties.</li> <li>describes principal roots and tells whether they are rational or irrational.</li> <li>determines between what two integers the square root of a number is.</li> <li>estimates the square root of a number to the nearest tenth.</li> <li>illustrates and graphs irrational numbers (square roots) on a number line with and without appropriate technology.</li> <li>describes, represents and compares the different subsets of real numbers.</li> <li>finds the union, intersection and complement of the set of real numbers and its subsets.</li> <li>arranges real numbers in increasing or decreasing order.</li> <li>determines the significant digits in a given situation.</li> </ul>

<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
	<i>The learner demonstrates understanding of...</i>	<i>The learner is able to...</i>	<i>The learner ...</i> <ul style="list-style-type: none"> <li>writes very large or very small numbers in scientific notation.</li> <li>describes and represents real-life situations which involve integers, rational numbers, square roots of a rational numbers and irrational numbers.</li> <li>solves problems involving real numbers.</li> </ul>
<b>Measurement</b>	<ul style="list-style-type: none"> <li>the different types of measures.</li> </ul>	<ul style="list-style-type: none"> <li>extend concepts of measurements to include different types of measures and all the subsets of the set of real numbers to solve measurement problems.</li> </ul>	<ul style="list-style-type: none"> <li>describes what it means to measure.</li> <li>describes the development of measurement from the primitive to the present international system of units.</li> <li>estimates or approximates the measures of quantities particularly length, weight/mass, volume, time, angle and temperature.</li> <li>uses appropriate instruments to measure quantities such as length, weight/mass, volume, time, angle and temperature.</li> <li>converts measurements from one unit to another for each type of measurement including the English system.</li> <li>solves problems involving measurements such as perimeter, area, weight, time, speed, temperature, volume/capacity and utilities usage (meter reading).</li> </ul>

<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
<b>Algebra</b>	<p><i>The learner demonstrates understanding of...</i></p> <ul style="list-style-type: none"> <li>the key concepts of algebraic expressions as applied in solving problems.</li> </ul>	<p><i>The learner is able to...</i></p> <ul style="list-style-type: none"> <li>simplify and evaluate algebraic expressions in one or more variables.</li> </ul>	<p><i>The learner ...</i></p> <ul style="list-style-type: none"> <li>translates verbal phrases to mathematical phrases and vice versa.</li> <li>differentiates between constants and variables in a given algebraic expression.</li> <li>evaluates algebraic expressions for given values of the variables.</li> </ul>
		<ul style="list-style-type: none"> <li>explore the concept of and manipulate polynomials.</li> </ul>	<ul style="list-style-type: none"> <li>gives examples of polynomials, monomial, binomial, trinomial.</li> <li>identifies the base, coefficient, terms and exponents in a given polynomial.</li> <li>defines and interprets the meaning of an where <math>n</math> is a positive integer.</li> <li>derives inductively the laws of exponents (Exponents restricted to positive integers).</li> <li>illustrates the laws of exponents.</li> <li>adds and subtracts polynomials.</li> <li>multiplies and divides polynomials.</li> <li>finds inductively using models the (a) product of two binomials; (b) product of a sum and difference of two terms; (c) square of a binomial; (d) cube of a binomial; (e) product of a binomial and a trinomial.</li> </ul>

<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
	<i>The learner demonstrates understanding of...</i>	<i>The learner is able to...</i>	<i>The learner ...</i> <ul style="list-style-type: none"> <li>finds algebraically the (a) product of two binomials; (b) product of a sum and difference of two terms; (c) square of a binomial; (d) cube of a binomial; (e) product of a binomial and a trinomial.</li> </ul>
		<ul style="list-style-type: none"> <li>solve equations and inequalities.</li> </ul>	<ul style="list-style-type: none"> <li>differentiates between mathematical expressions and mathematical equations.</li> <li>translates English sentences to mathematical sentences and vice versa.</li> <li>differentiates between equations and inequalities.</li> <li>defines and illustrates the meaning of absolute value.</li> <li>finds the solution of an equation or inequality involving one variable, including one that involves absolute value (a) from a given replacement; (b) intuitively by guess and check; (c) by algebraic procedures (applying the properties of equalities and inequalities); (d) graphing.</li> <li>solves problems that use equations and inequalities.</li> </ul>

<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
<b>Geometry</b>	<p><i>The learner demonstrates understanding of...</i></p> <ul style="list-style-type: none"> <li>the key concepts of geometry of shapes and sizes, geometric construction and the application of measurements in geometric figures.</li> </ul>	<p><i>The learner is able to...</i></p> <ul style="list-style-type: none"> <li>analyze and investigate in a more formal environment the basic concepts in geometry.</li> </ul>	<p><i>The learner ...</i></p> <ul style="list-style-type: none"> <li>represents a point, line and plane using concrete and pictorial models.</li> <li>defines, identifies and names the subsets of a line.</li> <li>illustrates, names, identifies and defines the different kinds of angles.</li> <li>derives relationships of geometric figures using measurements and by inductive reasoning: supplementary angles, complementary angles, equal angles, adjacent angles, linear pairs, perpendicular lines and parallel lines.</li> <li>derives relationships between vertical angles and among angles formed by parallel lines cut by a transversal using measurement and by inductive reasoning.</li> </ul>
		<ul style="list-style-type: none"> <li>analyze and investigate the different kinds of triangles, quadrilaterals, convex polygons and circles.</li> </ul>	<ul style="list-style-type: none"> <li>uses a compass and straightedge to bisect line segments and angles and construct perpendiculars and parallels.</li> <li>classifies triangles according to their angles and according to their sides.</li> <li>illustrates, names and identifies different kinds of triangles and define the terms associated with a triangle.</li> </ul>

<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
	<i>The learner demonstrates understanding of...</i>	<i>The learner is able to...</i>	<i>The learner ...</i> <ul style="list-style-type: none"> <li>derives relationships among the sides and angles of a triangle using measurement and inductive reasoning.</li> <li>illustrates, names and identifies the different kinds of quadrilaterals.</li> <li>derives relationships among the angles and among the sides of a quadrilateral using measurement and inductive reasoning.</li> <li>defines and illustrates convex polygons.</li> <li>derives the relationship of exterior and interior angles of any convex polygon using measurement and inductive reasoning.</li> <li>illustrates a circle and defines the terms related to it: radius, diameter, center, arc and central angle.</li> </ul>
<b>Statistics and Probability</b>	<ul style="list-style-type: none"> <li>the key concepts, uses and importance of statistics and probability, data collection/gathering and the different forms of data representation.</li> </ul>	<ul style="list-style-type: none"> <li>engage in statistical investigations.</li> </ul>	<ul style="list-style-type: none"> <li>explains the basic concepts, uses and importance of Statistics.</li> <li>poses questions and problems that may be answered using Statistics.</li> <li>collects or gathers statistical data and organizes the data in a frequency table according to some systematic considerations.</li> </ul>

<b>Content</b>	<b>Content Standards</b>	<b>Performance Standards</b>	<b>Learning Competencies</b>
		<i>The learner is able to...</i>	<i>The learner ...</i> <ul style="list-style-type: none"> <li>• uses appropriate graphs to represent organized data: pie chart, bar graph, line graph and a histogram.</li> <li>• finds the mean, median and mode of statistical data.</li> <li>• describes the data using information from the mean, median and mode.</li> <li>• analyzes, interprets accurately and draws conclusions from graphic and tabular presentations of statistical data.</li> </ul>

**GLOSSARY**

**Accuracy** – the quality of being correct and precise.

**Applying** – the skill of using concepts, procedures, algorithms and other mathematical constructs on practical situations and phenomena.

**Communicating** – the use of notations, symbols, figures, equations and functions to convey mathematical ideas.

**Computing** – the skill of calculating using correct algorithms, procedures and tools to arrive at a final exact result.

**Conjecturing** – the skill of formulating mathematical theories that still need to be proven.

**Connecting** – the skill of integrating mathematics to other school subjects and other areas in life.

**Constructivism** – the theory that knowledge is constructed when the learner is able to draw ideas from his/her own experiences and connects them to new ideas that are encountered.

**Context** - a locale, situation or set of conditions of students that may influence their study and use of mathematics to develop critical thinking and problem solving skills.

**Cooperative Learning** - learning that is achieved by working with fellow learners as they all engage in a shared task.

**Creativity** – the skill of using available procedures in Mathematics and non-conventional methods to solve a problem and produce answers.

**Critical Thinking** - the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action (Scriven & Paul, 1987).

**Decision-making** – the skill of arriving at a choice or decision based on sound, logical procedures and mathematical analyses.

**Discovery Learning** – learning that is achieved by allowing students to discover new ideas using their experiences (Bruner, 1961).

**Estimating** – the skill of roughly calculating or judging a numerical value or quantity.



**Experiential Learning** – learning that occurs by making sense of direct everyday experiences (Kolb, 1984)

**Inquiry-based Learning** – learning that focuses on students asking questions and finding answers to their questions using their personal experiences.

**Knowing and Understanding** – meaningful acquisition of concepts that include memorizing and recalling of facts and procedures

**Mathematical Problem Solving** - finding a solution to a problem that is unknown (Polya, 1945 & 1962).

**Modeling** – the use of functions and graphs to represent relationships between and among quantities in a phenomenon.

**Objectivity** – the quality of judging, evaluating and making decisions based on mathematical facts and results without being influenced by subjective conditions.

**Perseverance** – firmness in finishing a task despite difficulties and obstacles.

**Productivity** – the quality of pursuing an activity to arrive at a meaningful and useful result or product.

**Proving** – the skill of demonstrating the truth or falsity of a theory using reasoning and arguments.

**Reasoning** – the process of explaining using sound analyses, following the rules of logic.

**Reflective Learning** – learning that is facilitated by deep thinking.

**Representing** – the use of figures and shapes, variables, equations and functions to concretize and illustrate quantities and their relationships.

**Situated Learning** – learning in the same context on which concepts and theories are applied.

**Solving** – to find the answer to an algebraic or mathematical problem using any procedures and tools available.

**Visualizing** - using one's creativity and imagination to produce images, pictures and other means to represent and understand mathematical concepts (MATHTED & SEI, 2010).

## References

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