

MATH GAME FRAMEWORK

DETAIL	LEVEL 0 (4 TO 5 YEARS)	LEVEL 1 (6 TO 7 YEARS)	LEVEL 2 (8 TO 10 YEARS)	LEVEL 3 (11 TO 14 YEARS)
NUMBERS AND OPERATIONS				
Counting and Cardinality	<p>Count to 50 by ones and by tens.</p> <ul style="list-style-type: none"> - Count numbers from 1 to 50. - Skip count in 2s, 5s, and 10s for numbers from 1 to 50 <p>Count forward beginning from a given number within the known sequence.</p> <ul style="list-style-type: none"> - Identify '1 more' or '1 less' than a number. - Identify the missing number in a sequence. - Say the number names in the standard order, when counting objects <p>Understand the relationship between numbers and quantities</p> <ul style="list-style-type: none"> - Write numbers from 0 to 20. - Represent a number of objects with a written numeral from 0 to 20 - Understand that the last number name said tells the number of objects counted. - Understand that each successive number name refers to a quantity that is one larger. <p>Compare numbers and quantities</p> <ul style="list-style-type: none"> - Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group using matching and counting strategies. - Compare two numbers between 1 and 10 presented as written numerals. 	<p>Count to 120, starting at any number less than 120.</p> <ul style="list-style-type: none"> - Count numbers from 1 to 120. - Read and write numerals and represent a number of objects with a written numeral. - Skip count in 2s, 5s, and 10s for numbers from 1 to 120. <p>Arrange numbers 0-100 in ascending and descending order</p> <ul style="list-style-type: none"> - Explain the meaning of the terms 'ascending' and 'descending'. - Arrange a given set of numbers in mentioned order. 	<p>Count to 1000, starting at any number less than 1000.</p> <ul style="list-style-type: none"> - Count numbers from 1 to 1000. - Read and write numerals and represent a number of objects with a written numeral. - Skip count by 100s <p>Count in multiples of 6, 7, 8, 9, 11, and 12.</p> <p>Recall prime numbers up to 100.</p>	
Operations and Algebraic Thinking	<p>Solve addition and subtraction word problems, and add and subtract within 10.</p> <ul style="list-style-type: none"> - Represent addition and subtraction with objects, fingers, drawings, or equations. - For any number from 1 to 9, find the number that makes 10 when added to the given number by using objects or drawings. - Fluently add and subtract within 10 using equations. <p>Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false.</p>	<p>Solve addition and subtraction problems, and add and subtract within 20.</p> <ul style="list-style-type: none"> - Represent addition and subtraction with objects, drawings, or equations. - Use addition and subtraction within 20 to solve problems - Fluently add and subtract within 20 using equations. <p>Determine whether a group of objects (up to 20) has an odd or even number of members</p> <p>Identify odd and even numbers in a given set of numbers.</p> <p>Represent even numbers as a sum of two odd numbers and two even numbers.</p>	<p>Solve addition and subtraction word problems, and add and subtract within 100.</p> <ul style="list-style-type: none"> - Use addition and subtraction within 1000 to solve word problems - Determine the unknown whole number in an addition or subtraction equation relating four whole numbers. - Fluently add and subtract within 100 <p>Use multiplication and division within 100 to solve word problems</p> <ul style="list-style-type: none"> - Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. - Interpret whole-number quotients of whole numbers - Determine the unknown whole number in a multiplication or division equation relating three whole numbers. 	<p>Understand what exponents are.</p> <ul style="list-style-type: none"> -Write repeated factors using exponential notation. -Evaluate expressions containing exponents using the laws of exponents. -Find the square root and square of a given number. -Find the cube root and cube of a given number. <p>Form an algebraic expression.</p> <ul style="list-style-type: none"> -Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); -Generate algebraic expressions to represent one or two quantities in a real-world problem. -Add, subtract, multiply, and divide algebraic expressions. <p>Understand functions and solve linear equations in one and two variables.</p> <ul style="list-style-type: none"> -Use functions to model relationships between

			<p>Perform multiplication and division on 4-digit numbers. Multiply numbers up to 4 digits by a one- or two-digit number Divide numbers up to 4 digits by a one- or two-digit number</p> <p>Solve two-step word problems using the four operations.</p>	<p>quantities -Understand linear and simple quadratic functions -Define, evaluate, and compare functions given in different forms (Ex: table v/s linear equation v/s line on graph) -Generate simple linear equations involving one or two variables -Solve word problems which include forming and evaluating linear equations in one or two variables.</p>
Number and Operations	<p>Compose and decompose numbers from 11 to 19 into tens and ones. - Understand that 2-digit numbers are composed of tens and ones. - Record each composition or decomposition by a drawing or equation (Eg: $18 = 10 + 8$)</p> <p>Compare two one-digit numbers - Compare two one-digit numbers - Use $>$, $=$, and $<$ symbols to record the results of comparisons.</p>	<p>Compose and decompose 3-digit numbers into hundreds, tens and ones. - Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones - Record each composition or decomposition by a drawing or equation (Eg: $186 = 100 + 80 + 6$)</p> <p>Compare two two-digit numbers - Compare two three-digit numbers based on meanings of the tens and ones digits - Use $>$, $=$, and $<$ symbols to record the results of comparisons.</p>	<p>Compose and decompose 4-digit numbers into thousands, hundreds, tens and ones. - Understand that the four digits of a four-digit number represent amounts of hundreds, tens, and ones - Record each composition or decomposition by a drawing or equation (Eg: $2186 = 2000 + 100 + 80 + 6$)</p> <p>Compare two three-digit and four-digit numbers - Compare two three-digit and four-digit numbers based on meanings of the place value of digits - Use $>$, $=$, and $<$ symbols to record the results of comparisons.</p> <p>Use place value understanding to round whole numbers to the nearest 10, 100, or 1000.</p>	<p>Understand the divisibility rules of 2, 3, 4, 5, 6, 8, 9, 10, and 11.</p> <p>Understand factors and multiples of numbers - Identify the multiples and factors of a given number. - Calculate the GCF (greatest common factor) of two whole numbers less than 100 using prime factorisation. - Calculate the LCM (least common multiple) two whole numbers less than or equal to 12. - Solve word problems involving GCF and LCM of numbers.</p> <p>Perform operations on rational numbers - Understand that rational numbers constitute positive and negative numbers having opposite directions or values - Represent positive and negative integers on a number line. - Add, subtract, multiple, and divide positive and negative integers - Apply properties of operations as strategies to perform operations on integers</p> <p>Understand the concept of arithmetic sequences - Generate terms of a sequence, recognize arithmetic sequences and find the nth term - Apply the knowledge of arithmetic sequences in a variety of contexts</p>
Fractions and Decimals		<p>Recognize and represent fractions numerically and pictorially. - Understand a fraction a/b as the number of parts formed when 'a' is divided by size 'b' - Identify numerators and denominators in a fraction. - Represent fractions on a number line.</p> <p>Perform basic operations on fractions - Compare fractions with the same denominator pictorially. - Add and subtract fractions with the same denominator within one whole pictorially.</p>	<p>Perform basic operations on fractions - Understand two fractions as equivalent (equal) if they are the same size - Recognize and generate simple equivalent fractions, e.g., $1/2 = 2/4$, $4/6 = 2/3$. - Add and subtract fractions with unlike denominators. - Solve word problems involving addition and subtraction of fractions.</p> <p>Understand decimal notation - Use decimal notation for fractions with denominators 10 or 100.</p>	<p>Perform basic operations on fractions - Multiply and divide fractions - Solve word problems involving addition and subtraction of fractions. - Convert fractions into percentage and vice-versa.</p> <p>Perform operations on decimals - Add and subtract decimals. - Multiply and divide decimals (upto the hundredths place) - Solve word problems involving the multiplication and division of decimals. - Convert decimals into percentage and vice-versa.</p>

			<ul style="list-style-type: none"> - Identify the place value of each digit in a decimal. - Read and write decimals in words. (2.7 --> two and seven tenths) - Compare decimals to the tenth and hundredth place. 	<p>Perform operations on rational numbers</p> <ul style="list-style-type: none"> - Represent positive and negative fractions on a number line. - Represent rational numbers as a decimal. - Add, subtract, multiply and divide positive and negative fractions - Apply properties of operations as strategies to perform operations on rational numbers. <p>Understand ratios and proportional relationships</p> <p>Express fractions as ratios. Use ratio and rate reasoning to solve real-world and mathematical problems Recognize and represent proportional relationships between quantities. Use proportional relationships to solve multistep ratio and percent problems.</p>
SHAPES AND MEASUREMENTS				
Geometry	<p>Describe objects in the environment using names of shapes</p> <ul style="list-style-type: none"> - Correctly name shapes regardless of their orientations or overall size. - Describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to. <p>Analyze 2D and 3D shapes</p> <ul style="list-style-type: none"> - Identify shapes as 2D (lying in a plane, "flat") or 3D ("solid"). <p>Model shapes in the world by building shapes from components and drawing shapes.</p> <ul style="list-style-type: none"> - Compose simple shapes to form larger shapes. 	<p>Describe objects in the environment using names of shapes</p> <p>Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.</p> <p>Compare 2D and 3D shapes</p> <ul style="list-style-type: none"> - Describe the similarities and differences between two shapes. <p>Describe simple properties such as the number of sides and corners common 2-D shapes</p> <ul style="list-style-type: none"> - Identify a quadrilateral - Recognize rhombuses, rectangles, and squares as examples of quadrilaterals - Understand that shapes in different categories may share attributes (no. of sides and vertices, diagonals, etc.) 	<p>Understand and identify lines of symmetry in shapes</p> <ul style="list-style-type: none"> - Identify lines of symmetry in basic shapes. <p>Calculate the perimeter and area of various shapes</p> <ul style="list-style-type: none"> - Find the area of a shape by counting unit squares. - Find the area of a rectangle with whole-number side lengths by tiling it. - Calculate area and perimeters of regular shapes (square, rectangle) - Calculate the area of parallelograms and triangles - Calculate the area of composite shapes <p>Understand the properties of angles</p> <ul style="list-style-type: none"> - Identify the properties of angles of squares, rectangles and parallelograms (number of vertices, sum of angles, etc.) - Estimate and compare acute, obtuse and reflex angles - Draw given angles, and measure them in degrees - Find unknown angles in any triangles, quadrilaterals, and regular polygons <p>Illustrate and name parts of circles, including radius, diameter and circumference</p> <p>Describe positions on the full coordinate grid (all 4 quadrants)</p>	<p>Understand and identify lines of symmetry in objects</p> <ul style="list-style-type: none"> - Recognize rotation, reflection and translation symmetry in objects. <p>Calculate the perimeter and area of various shapes</p> <ul style="list-style-type: none"> - Find the area of a trapezium and parallelograms - Calculate surface area of a cube, cuboids, and cylinder. - Calculate the area of composite shapes or objects. <p>Recognize pairs of angles (linear, supplementary, complementary, adjacent, vertically opposite)</p> <p>Understand and apply the Pythagorean theorem.</p> <p>Represent linear equations on a graph</p> <ul style="list-style-type: none"> - Plot a linear equation on a graph. - Interpret mathematical relationships both graphically. - Find the solution of a linear equation graphically.
Measurement	-	<p>Describe the differences in attributes between objects.</p> <ul style="list-style-type: none"> - Describe measurable attributes of objects, such as length or weight. 	<p>Perform operations on measurements</p> <ul style="list-style-type: none"> - Measure objects within one system of units including km, m, cm; kg, g; l, ml. - Measure and estimate volumes of containers 	<p>Perform operations on measurements</p> <ul style="list-style-type: none"> - Convert among different-sized standard measurement units within a given measurement system using decimals (e.g., convert 5 cm to 0.05

		<ul style="list-style-type: none"> - Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, etc. - Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute - Separate objects by comparing their length, weight, time in non-uniform units <p>Learn to tell and write time in both digital and analog formats</p> <ul style="list-style-type: none"> - Tell and write time from analog and digital clocks using a.m. and p.m. <p>Understands the concept of money</p> <ul style="list-style-type: none"> - Identify common currency notes and coins. 	<p>using the correct units.</p> <ul style="list-style-type: none"> - Solve word problems involving masses and volumes of the same unit. <p>Learn to tell and write time in both digital and analog formats</p> <ul style="list-style-type: none"> - Read clock time to the nearest hours and minutes. Express time, using the terms, 'a.m.' and 'p.m.' - Interpret the time in the 24-hour clock. <p>Understands the concept of money</p> <ul style="list-style-type: none"> - Convert among different-sized standard measurement of money (Ex: dollar to cents) - Use the four operations to solve word problems involving money. 	<p>m)</p> <ul style="list-style-type: none"> - Solve word problems involving distances, intervals of time, liquid volumes, and masses of objects of different units. <p>Understands the concept of money</p> <ul style="list-style-type: none"> - Calculates profit and loss for a given transaction - Understands simple interest and how it is calculated
DATA HANDLING & PROBABILITY				
<p>Data Handling and Probability</p>	<p>Classify objects into given categories by count.</p> <ul style="list-style-type: none"> - Count the numbers of objects in each category. - Sort the categories by count. 	<p>Sort objects and shapes according to a single criterion</p> <ul style="list-style-type: none"> - Identify the criterion and the categories. - Place each object/shape in the correct category. <p>Understand simple pictograms and bar graphs</p> <ul style="list-style-type: none"> - Read a simple pictogram in which the symbol represents one unit. - Read a simple bar graph 	<p>Represent data using simple pictograms and bar graphs</p> <ul style="list-style-type: none"> - Draw a scaled picture graph to represent a data set with several categories - Draw a scaled bar graph to represent a data set with several categories <p>Solve problems using data presented in bar graphs and tables.</p> <ul style="list-style-type: none"> - Complete, extract and interpret information presented in lists and two-way tables. - Solve problems using the data obtained in bar graphs and tables. 	<p>Summarize numerical data sets in relation to their context, such as by:</p> <ul style="list-style-type: none"> - calculating the mean of the data set - calculating the median of the data set - calculating the mode of the data set - representing the data set visually through bar graphs and pie charts - representing the frequency outcomes through histograms <p>Explain and represent the probability of an event</p> <ul style="list-style-type: none"> - Understand that the probability of an event is between 0 and 1 that expresses the likelihood of the event occurring. - Understand that the probabilities of all possible outcomes sum to 1 - Calculate the probability of an event involving coins or dices through experiments. - Calculate probability using Venn diagrams - Record, describe and analyze the frequency of outcomes of simple probability involving randomness, fairness, equally and unequally likely outcomes.