

Mathematics Curriculum

May 2010 Grade Level	Skills Focus	Problem Solving Strategies and Skills
Pre-Kindergarten 3-year olds	Count objects 1-5 Rote count 1-10 Recognize numbers 1-5 Be able to create a pattern (1-2-1-2-1) Introduce concepts more/less Introduce sizes large/small Introduce measurement: Find something larger/smaller than your hand) Introduce concepts same/different Recognize simple shapes(circle,square,triangle,oval) Calendar math/pattern One to One correspondence	Oral direction Use of manipulatives : arrange and count a variety of objects Finger plays, action rhymes and songs that associate number concepts with action (Five Little Monkeys) Discovery bin: sort to size/color/number Turn taking Sequence with pictures Count children at circle Graph and count: How many like/don't likes red apples? Which has more/less?
Pre-Kindergarten 4 year olds	Count objects 1-10 Rote count 1-20 Recognize numbers 1-15 Able to create pattern (1-2-3-1-2-3) Calendar math/pattern concept more/less Grasp concepts small, medium, large	Oral direction Use of manipulatives. Arrange and count a variety of objects. Finger plays and action rhymes that associate number concepts with actions (e.g. Five Little Fish). File folder games: identify and match Discovery Bin: sort to size/color

	<p>Grasp concept same/different Recognize basic shapes. (circle, square, triangle, oval, rectangle, heart, star) Reinforce first, second, third</p>	<p>Listen to song to describe the characteristics of an object Turn taking: Who is first, second, third? Sequence with pictures: which comes first, second, third? Napkins to match number of children Count children at circle . How many boys/girls. Which is more or less? Steps involved in an activity. First trace, second color, third cut,, forth glue.</p>
<p>Kindergarten</p>	<p>Number sense and operations oral counting numerals to 100 counting by tens and fives recite phone number and address identify names of the days of the week in order recite months of the year identify position words writing numerals to 31 identify penny, nickel, dime and quarter practice adding groups to sum of 10 practice separating groups from 10 or less daily calendar work identify the value of pennies, nickels, dimes, quarters, and dollar bill</p> <p>Patterns, relations and algebra sorting by attributes and size explore, copy, create and extend patterns show basic quantities using more and fewer writing number sentences using plus, minus and equal</p> <p>Geometry identify relationships between solid and plane figures explore the concepts of halves and whole</p> <p>Measurement measure and compare lengths of objects using cubes tell time to hour and half hour on analog and digital clock understand minute and hour hand read a thermometer and understand above and below</p>	<p>Use of manipulatives—such as unifix cubes, pattern blocks, counting bears and frogs, play mats, real and play money, dominoes and clocks</p> <p>Extend and find a pattern</p> <p>Make a real graph</p> <p>Act out a problem</p> <p>Make predictions</p> <p>Use illustrations</p> <p>Compare and contrast</p>

	freezing Data analysis, statistics and probability make a graph using real object gather information and record using a picture graph make predictions about what could happen estimate what an answer is	
Grade 1	<p>Number sense and operations</p> <ul style="list-style-type: none"> • Read, write and compare whole numbers to 100 • identify ordinal position • identify and draw common fractions • identify odd and even numbers • find the value of an assortment of coins up to \$1.00 • learn addition/subtraction facts and addends to 10 • identify place value 1s, 10s, and 100s <p>Patterns, relations and algebra</p> <ul style="list-style-type: none"> • identify, describe and extend patterns • skip count by 2, 5 and 10 up to 100 • describe coins and exchanges <p>Geometry</p> <ul style="list-style-type: none"> • name, describe, draw, and sort two and three dimensional shapes • describe attributes • introduce symmetry <p>Measurement</p> <ul style="list-style-type: none"> • identify parts of the day and days of the week • tell time to hour, half hour, and quarter hour • measure and compare objects using metric and English units length • <p>Data analysis, statistics and probability</p> <ul style="list-style-type: none"> • introduce: survey, observations to gather data about themselves and their surroundings 	Use of manipulatives open number sentences ex. $\square + 3 = 5$ read it, draw it, solve it pictures use tables and graphs predictions acting it out compare and contrast guess and check

	<ul style="list-style-type: none"> introduce: organize, classify, represent and interpret data using tallies, charts, tables, bar graph, pictographs, and Venn diagrams introduce: make educated guesses about a situation based on information gained from data introduce: decide which outcomes of experiments are most likely 	
Grade 2	<p>Number sense and operations Know addition facts and related subtraction facts to 24 Add and subtract 3 digit numbers to 999 with and without regrouping Estimate and solve problems involving addition and subtraction Name, write, compare, order, and identify place value of numbers to 1,000 Review counting by 2s, 5s,10s, and 100's and introduce skip counting by 3's and 4's Identify all U.S. coins and bills to \$20 and find the value of coins and bills to \$5 Making change for a "purchase" to \$5.00 Understand part and whole for fractions to 1/12 Introduce concepts of multiplication and division using manipulatives</p> <p>Patterns, relations and algebra Identify and develop number patterns Identify different patterns on the 100s chart Write number sentences using plus, minus, <, >, =</p> <p>Geometry Identify, describe, and compare two-dimensional shapes and three-dimensional objects Identify symmetry and congruence for two-dimensional shapes Predict the results of putting shapes together and taking them apart</p>	<p>Use of manipulatives (ex. Unifix cubes, number cards, dice, play money) to develop conceptual understanding</p> <p>Read it, draw it, solve it</p> <p>Choosing operations (+ or -)</p> <p>Finding patterns</p> <p>Make a graph or table</p> <p>Use rulers to measure items in the classroom</p> <p>Use shape blocks to sort, pattern, and describe attributes</p> <p>Use of manipulative clock to learn hour, minute, and elapsed time</p>

	<p>Introduce concept of perimeter and area</p> <p>Measurement Reinforce months, days, and weeks on a calendar Compare the length, weight, and volume of two or more objects Measure and compare classroom objects using Metric and English units Tell time to the 5 minute and find elapsed time for hour and half hour Understand meaning of second, minute, hour, am, and pm Read temperature on a thermometer and discuss relative feel for English and Metric systems (freezing vs hot weather)</p> <p>Data analysis, statistics and probability Collect, organize, and present data using tallies, charts, tables, bar graph, pictographs, and Venn diagrams Make predictions and observations about information being collected Decide which outcomes are most likely (probability) Introduce: range and mode for a set of numbers</p>	
<p>Grade 3</p>	<p>Number sense and operations demonstrates understanding of the number system by reading, modeling, writing, comparing, ordering and interpreting whole numbers to millions explain the commutative, associative and identity properties subtract up to five digit numbers and multiply up to three digit by one digit use various models of multiplication and division of whole numbers know multiplication and division facts through 12 introduce division of a three digit whole number with a single digit divisor demonstrates an understanding of fractions as parts of unit wholes find equivalent fractions, mixed numbers, and order fractions</p> <p>Patterns, relations and algebra</p>	<p>Use of manipulatives: Base ten blocks, Cuisenaire rods, Judy clocks, connecting cubes, play money, flashcards, geometric shapes, dice, and fraction pieces Act it out Choose a strategy Guess and check Logical reasoning Find a pattern Make a graph Make a table Make a diagram Estimate Use a number sentence</p>

	<p>use symbol and letter variables to represent unknowns use pictures, models, tables, charts, graphs, words and number sentences to interpret mathematical relationships</p> <p>Geometry analyze describe, model, draw, and compare attributes of 2 and 3 dimensional shapes recognize similar figures identify angles as obtuse, right and acute draw and describe parallel, perpendicular, and intersecting lines</p> <p>Measurement reinforce length, area, weight, and volume reinforce hours to minutes, cents to dollars, yards to feet compute elapsed time using a clock and calendar find area and perimeter of simple shapes</p> <p>Data analysis, statistics and probability collect and organize data using observations, measurements, surveys or experiments</p>	
<p>Grade 4</p>	<p>Number sense and operations demonstrates understanding of the number system by reading, modeling, writing, comparing, ordering and interpreting whole numbers to 1 billion demonstrates an understanding of fractions as parts of unit wholes, and their relationships with mixed numbers simplify fractions and create equivalent fraction introduce addition and subtraction of fractions and mixed numbers with like denominators demonstrates an understanding of reading, naming, and writing decimals up to thousandths inverse relationships (fact families) demonstrates the use of properties: commutative, associative, identity and distributive learns multiplication and division facts through 12s</p>	<p>Use of manipulatives: base ten blocks, geometric shapes, dice, flashcards, Cuisenaire rods, Judy Clocks, play money, counting discs, and fraction pieces Use the 4 step process Work backward Choose a strategy or operation Guess and check Logical reasoning Find a pattern Make a graph Make a table Make a diagram Estimate Use a number sentence</p>

	<p>mastery of addition and subtraction up to 5 digit numbers multiplication of 2 digits by up to five digits introduce division with 2 digit divisor with remainders round whole numbers through 100,000 by using a variety of strategies</p> <p>Patterns, relations and algebra write number sentences with letter and symbol variables to represent unknowns in equations and number sentences interpret and create various types of graphs based on real world information use graphs to find mean, median, range and mode</p> <p>Geometry analyze, describe, model, draw, and compare attributes of 2 and 3 dimensional shapes demonstrates an understanding of similar and congruent figures and symmetry Identify and measure angles as obtuse, right and acute describe and create various types of lines</p> <p>Measurement reinforce length, area, weight, and volume and type of unit for each reinforce hours to minutes, cents to dollars, yards to feet within systems of measurement compute elapsed time using a clock and calendar find area and perimeter of regular shapes</p> <p>Data analysis, statistics and probability determine possible outcomes of simple probability equations classify outcomes as certain, likely, unlikely, or impossible by designing and conducting experiments using concrete objects</p>	
Grade 5	Number sense and operations	

Compare and order numbers including fractions, decimals, mixed numbers and percents
Understand place value to billions
Use fractions as ratios of whole numbers
Find fractions, mixed numbers, and decimals on a number line
Use prime and composite numbers, prime factorization, GCF, LCM and divisibly factors to solve problems
Addition, subtraction, multiplication and division, and use of exponents with whole numbers, fractions, mixed numbers, decimals and percents.
Mastery of multiplication facts
Multiplication by three or more digits
Division with double digit divisors

Patterns, relations and algebra

Use variables to evaluate problems
Using properties of equality to solve problems
Using graphs, tables and models

Geometry

Identify relationships between points, lines and planes
Graph points and identify coordinates on a plane
Find the distance between points on a number line

Measurement

Use perimeter and area
Identify and describe various angles

Data analysis, statistics and probability
Compare with mean, median, mode and range
Stem and leaf plots, line plots, circle graphs

<p>Grade 6</p>	<p>Number sense and operations</p> <ul style="list-style-type: none"> • Using integers • Using expanded notation to identify large and small numbers • Determine and use equivalent fractions, mixed numbers, decimals and percents • Order of operations • Negative and positive integers • Apply inverse relationships to addition and subtraction • Addition, subtraction, multiplication and division of fractions and mixed numbers • Simply fractions <p>Patterns, relations and algebra</p> <ul style="list-style-type: none"> • Use of graphing and tables • Using and describing use of variables <p>Geometry</p> <ul style="list-style-type: none"> • Identify polygons, angles, and their properties • Identify 3 dimensional shapes • Use and identify types of symmetry <p>Measurement</p> <ul style="list-style-type: none"> • Unit conversions, and proportional relationships • Volumes and surface area of shapes • Area of triangles and parallelograms • Diameter, radius and circumference of a circle <p>Data analysis, statistics and probability</p> <ul style="list-style-type: none"> • Diagrams and models to represent trials • Predictions, probability and statistics 	<p>Use the 4 step process</p> <p>Work backward</p> <p>Write an equation</p> <p>Make organized lists</p> <p>Solve using alternate methods</p> <p>Represent numbers with variables</p> <p>Use Venn diagrams</p> <p>Choose a strategy or operation</p> <p>Guess and check</p> <p>Logical reasoning</p> <p>Find a pattern</p> <p>Make a graph</p> <p>Make a table</p> <p>Make a diagram</p> <p>Estimate</p> <p>Choose representations</p> <p>Detect missing or extra information</p>
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<p>Grade 7</p>	<p>Number Sense</p> <ul style="list-style-type: none"> • Compare and order rational numbers using the number line, lists and the symbols $<$, $>$, or $=$. • Understand and use order of operations. • Accurately add, subtract, multiply and divide rational numbers. • Define and determine the absolute value of a number. • Solve word problems involving rational numbers and verify the solution. • Solve one- and two-step linear equations. • Solve one and two-step inequalities. • Represent numbers in scientific notation and translate numbers written in scientific notation into standard form. • Solve problems involving numbers in scientific notation and verify solutions. • Use prime factorization to solve problems. <p>Demonstrate an understanding of the properties of arithmetic operations on rational numbers</p> <ul style="list-style-type: none"> • Use the associative, commutative, identity and inverse properties to solve problems. • Determine when to estimate rather than an exact answer is appropriate. <p>Patterns, Relations, and Algebra</p> <ul style="list-style-type: none"> • Represent arithmetic and geometric patterns. • Evaluate simple algebraic expressions for given variable values. <p>Geometry</p> <p>Measurement</p> <p>Data Analysis, Statistics, and Probability</p> <ul style="list-style-type: none"> • Describe the characteristics and limitations of a data sample. • Select, create and interpret various tabular and graphical representations of data. • Find describe, and interpret appropriate measures of 	<p>Use of manipulatives</p> <p>Use the 4 step process</p> <p>Work backward</p> <p>Write an equation</p> <p>Make organized lists</p> <p>Solve using alternate methods</p> <p>Represent numbers with variables</p> <p>Estimate</p> <p>Two colored disks and cups</p> <p>Spinners</p> <p>Algebra tiles</p> <p>Pattern blocks</p> <p>Dice</p> <p>Cards</p> <p>Mindstorms Robots</p> <p>Equate (Equation game)</p> <p>Conceptual Bingo</p> <p>Real-life Problems</p> <p>Geometric solids</p> <p>Rulers, compasses, and protractors</p> <p>Calculators</p> <p>Building Math (STEM)</p> <p>www.arcademicskillbuilders.com</p> <p>http://calculationnation.nctm.org/</p>
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	<p>central tendency.</p> <ul style="list-style-type: none"> • Use models to compute probabilities for simple compound events. 	
<p>Grade 8</p>	<p>Number Sense</p> <ul style="list-style-type: none"> • Solve one- and two-step linear equations. • Identify rational and irrational numbers. <p>Patterns, Relations, and Algebra</p> <ul style="list-style-type: none"> • Identify the slope and y-intercept of a linear function. • Apply the concept of slope to the solution of problems. • Identify the roles of variables within an equation. ($y=mx+b$, y is a function of x with parameters of m and b.) • Set-up and solve linear equations with one or two variables, using algebraic methods, models, and/or graphs. • Explain and analyze how a change in one variable results in a change in another. • Determine and justify whether a given verbal description represents a linear relationship. <p>Geometry</p> <p>Measurement</p> <ul style="list-style-type: none"> • Use ratio and proportions in the solution of problems. • Use models, graphs, and formulas to solve simple problems involving rates. <p>Data Analysis, Statistics, and Probability</p> <p>Create a scatterplot for a two-variable data set, and when appropriate sketch and use a trend line to make predictions</p>	<p>Use of manipulatives Use the 4 step process Work backward Write an equation Make organized lists Solve using alternate methods Represent numbers with variables Estimate</p>