

**TOWNSHIP OF FRANKLIN PUBLIC SCHOOLS  
MATHEMATICS CURRICULUM  
SEPTEMBER 2005**

**OVERVIEW OF KINDERGARTEN**

The student develops number sense and is able to represent numbers.

- Uses a variety of manipulatives to represent whole numbers (composes and decomposes)
- Uses one-to-one correspondence when counting
- Counts whole numbers (skip counts by 5's, 10's)
- Creates and extends patterns
- Uses cardinal and ordinal numbers
- Uses concrete, pictorial, and symbolic representation of whole numbers

The student demonstrates an understanding of the nature of mathematics and applies basic number concepts.

- Adds, counts, and compares money using manipulative coins
- Identifies names and value of coins to the quarter as well as a dollar bill
- Reads, writes, counts, represents, and orders numbers up to 100
- Solves real-world problems involving number operations
- Identifies half/whole
- Understands and applies concept of more or less
- Identifies and understands the use of first, next and last

The student develops estimation strategies and recognizes situations in which estimation is appropriate.

- Uses manipulatives for addition up to 10 and subtraction from 10
- Develops and uses a variety of strategies for addition and subtraction

The student applies the concepts and methods of discrete mathematics (problem solving) to model and explore a variety of practical situations.

- Chooses an operation in problem solving
- Uses manipulatives to add or subtract
- Chooses a calculation method
- Solves word problems with too much information given

The student develops and gives evidence of an understanding of the collection and use of data.

- Reads and interprets graphs
- Gathers data and creates and analyzes graphs
- Uses bar graphs, pictographs, and/or tally marks

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**OVERVIEW OF KINDERGARTEN**

The student develops spatial sense and applies knowledge of geometric properties.

- Identifies basic geometric two and three dimensional shapes
- Identifies corner and face of geometric shapes
- Understands symmetry and identifies shapes that are symmetrical

The student develops and applies understanding of the concepts of measurement.

- Measures using non-standard measurement
- Estimates and measures length
- Understands the vocabulary of weight, length, capacity, and temperature
- Reads and identifies components of a calendar
- Tells time to the hour and half hour
- Identifies the names of the months of the year in sequence

The student uses mathematical language to communicate.

- Develops the ability to explain solutions to problems clearly and logically, and to support solutions with evidence, in both oral and pictorial representation
- Recognizes mathematics in real life situations

**TOWNSHIP OF FRANKLIN PUBLIC SCHOOLS  
MATHEMATICS CURRICULUM  
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**OVERVIEW OF GRADE 1**

The student develops number sense and is able to represent numbers.

- Uses a variety of manipulatives to represent whole numbers (composes and decomposes)
- Uses one-to-one correspondence when counting
- Counts whole numbers (skip counts by 2's, 5's, 10's)
- Creates and extends patterns
- Uses cardinal and ordinal numbers
- Uses concrete, pictorial, and symbolic representation of whole numbers
- Demonstrates a sense of the magnitude of whole numbers

The student demonstrates an understanding of the nature of mathematics and applies basic number concepts.

- Adds and subtracts, counts and compares money using manipulative coins
- Identifies names and value of coins to the quarter
- Reads, writes, and orders numbers up to 100
- Adds and subtracts two digit numbers without regrouping
- Solves real-world problems involving number operations
- Understands and applies the concept of simple fractions
- Uses fractions to name parts of a whole and parts of a set
- Understands and applies symbols for greater than and less than
- Demonstrates understanding of place value - tens and ones

The student develops estimation strategies and recognizes situations in which estimation is appropriate.

- Uses mental math for addition and subtraction up to 12
- Develops and uses a variety of strategies for addition and subtraction
- Estimates one-half of a given whole

The student applies the concepts and methods of discrete mathematics (problem solving) to model and explore a variety of practical situations.

- Chooses an operation in problem solving
- Uses mental math to add or subtract
- Chooses a calculation method
- Solves word problems with too much information given

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**OVERVIEW OF GRADE 1**

The student develops and gives evidence of an understanding of the collection and use of data.

- Reads and interprets graphs
- Gathers data and creates and analyzes graphs
- Uses bar graphs, pictographs, venn diagrams and tally marks

The student develops spatial sense and applies knowledge of geometric properties.

- Identifies basic lines of symmetry/creates symmetrical and asymmetrical figures
- Identifies basic geometric two and three dimensional shapes
- Identifies corner, edge and face of geometric shapes

The student develops and applies understanding of the concepts of measurement.

- Measures using non-standard measurement
- Measures length to nearest inch up to a foot
- Estimates and measures length
- Recognizes basic standard units (e.g., weight, length, capacity)
- Reads and identifies components of a calendar, and tells time on a calendar
- Tells time to the hour and half hour
- Uses units of time (minutes, hours, days) to estimate time needed for real-life activities

The student uses mathematical language to communicate.

- Develops the ability to explain solutions to problems clearly and logically, and to support solutions with evidence, in both oral and pictorial representation
- Recognizes mathematics in real life situations

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**OVERVIEW OF GRADE 2**

The student develops number sense and is able to represent numbers.

- Uses a variety of manipulatives to represent whole numbers (composes and decomposes)
- Uses one-to-one correspondence when counting
- Counts whole numbers (skip counts by 2's, 3's, 4's, 5's, 10's)
- Creates and extends patterns
- Uses cardinal and ordinal numbers
- Uses concrete, pictorial, and symbolic representation of whole numbers
- Demonstrates a sense of the magnitude of whole numbers

The student demonstrates an understanding of the nature of mathematics and applies basic number concepts.

- Adds and subtracts, counts and compares money
- Counts money to \$5.00
- Rounds numbers to the nearest 10
- Demonstrates understanding of regrouping in addition and subtraction
- Reads, writes, and orders numbers into the hundredths
- Estimates sums and differences of whole numbers
- Adds and subtracts two digit whole numbers
- Understands and uses multiplication and division concepts
- Solves real-world problems involving number operations
- Understands and applies the concept of simple fractions
- Uses fractions to name parts of a whole and parts of a set
- Understands and applies symbols for greater than and less than
- Demonstrates understanding of basic number sentences using an unknown

The student develops estimation strategies and recognizes situations in which estimation is appropriate.

- Uses mental math for addition and subtraction
- Chooses calculation method for addition and subtraction
- Estimates using rounding and front end estimation
- Estimates one-half of a given whole

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**OVERVIEW OF GRADE 2**

The student applies the concepts and methods of discrete mathematics (problem solving) to model and explore a variety of practical situations.

- Chooses an operation in problem solving
- Uses mental math to add or subtract
- Chooses a calculation method
- Chooses whether an estimate or an exact answer is needed in problem solving
- Solves word problems with too much information given
- Recognizes word problems with too little information

The student develops and gives evidence of an understanding of the collection and use of data.

- Reads and interprets graphs
- Gathers data and creates and analyzes graphs
- Uses bar graphs, pictographs, venn diagrams and tally marks

The student develops spatial sense and applies knowledge of geometric properties.

- Identifies congruent figures
- Identifies basic lines of symmetry/creates symmetrical and asymmetrical figures
- Identifies basic geometric two and three dimensional shapes
- Identifies corner, edge and face of geometric shapes
- Understands the concepts of perimeter and area of rectangles

The student develops and applies understanding of the concepts of measurement.

- Measures length to the nearest inch
- Estimates and measures length
- Recognizes basic standard units (e.g., weight, length, capacity)
- Reads and identifies components of a calendar, and tells time on a calendar
- Tells time to the five minute interval
- Uses units of time (minutes, hours, days, weeks) to estimate time needed for real-life activities

The student uses mathematical language to communicate.

- Develops the ability to explain solutions to problems clearly and logically, and to support solutions with evidence, in both oral and pictorial representation
- Recognizes mathematics in real life situations

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**OVERVIEW OF GRADE 3**

The student demonstrates an understanding of the nature of mathematics and applies basic number concepts.

- Adds and subtracts, counts and compares money
- Makes change
- Demonstrates understanding of regrouping in addition and subtraction
- Reads, writes, orders, and rounds numbers into the thousandths
- Shows, reads, writes and orders decimals to the hundredths (and rounds to the nearest whole numbers)
- Estimates sums and differences of whole numbers and decimals (in money amounts)
- Adds and subtracts two digit whole numbers
- Multiplies whole numbers up to a four digit by one digit number
- Estimates products
- Divides whole numbers (one digit divisor) with/without remainders
- Estimates quotients
- Multiplies money in whole dollar amounts
- Understands and uses multiplication and division terms
- Solves real-world problems involving number operations
- Understands and applies terms used in fractions
- Demonstrates understanding of properties of multiplication
- Demonstrates understanding of patterns in multiplication and division
- Uses fractions to name parts of a whole and parts of a set
- Demonstrates understanding of equivalent fractions
- Compares and orders fractions
- Identifies fractions greater than one
- Adds and subtracts fractions with like denominators
- Understands and applies symbols for greater than and less than
- Demonstrates understanding of basic algebraic expressions using an unknown

The student develops mental math and estimation strategies and recognizes situations in which estimation is appropriate.

- Uses mental math for addition, subtraction, and multiplication
- Chooses calculation method for addition, subtraction, and multiplication
- Estimates using rounding and front end estimation
- Estimates the fractional part of a given whole

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**OVERVIEW OF GRADE 3**

The student applies the concepts and methods of discrete mathematics (problem solving) to model and explore a variety of practical situations.

- Chooses an operation in problem solving
- Uses mental math to divide
- Chooses a calculation method
- Chooses whether an estimate or an exact answer is needed in problem solving
- Solves word problems with too much or too little information given

The student develops and gives evidence of an understanding of the collection and use of data.

- Uses line, bar, and pictographs
- Reads and interprets graphs
- Gathers data and creates and analyzes graphs

The student develops spatial sense and applies knowledge of geometric properties.

- Identifies intersecting and parallel lines
- Shows and names rays and line segments
- Identifies right angle
- Identifies similar and congruent polygons
- Identifies lines of symmetry/symmetrical and asymmetrical figures
- Finds areas of rectangles and squares
- Identifies polygons and solid shapes
- Find perimeter of polygons

The student develops and applies understanding of the concepts of measurement.

- Measures length to the nearest one-half inch
- Estimates and measures lengths
- Understands perimeter and area
- Recognizes basic standard units (e.g., weight, length, centimeters, feet) and relationships between inches and feet
- Reads and identifies components of a calendar, and tells time on a calendar
- Tells time to the minute
- Uses units of time (minutes, hours, days, weeks) to estimate time needed for real-life activities

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**OVERVIEW OF GRADE 3**

The student demonstrates understanding of the general nature and use of mathematics.

- Understands that numbers and the operations performed on them can be used to describe things in the real world and predict what may occur
- Understands that mathematical ideas and concepts can be represented concretely, graphically, and symbolically
- Develops the ability to explain solutions to problems clearly and logically, and to support solutions with evidence, in both oral and written work

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**PACING SCHEDULE FOR GRADE 3**

<b>MONTH</b>	<b>CHAPTER</b>	<b>TOPIC</b>
September	2	Addition
October	3	Subtraction
November	1	Place Value
December	11	Measurement
January	5 & 6	Multiplication
February	7 & 8	Division
March	12	Geometry
April	13	Fractions
May	4	Time & Graphs
June	9 & 10	Advanced Multiplication & Division

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**OVERVIEW OF GRADE 4**

The student demonstrates an understanding of the nature of mathematics and applies basic number concepts.

- Adds and subtracts, counts and compares money
- Makes change
- Demonstrates understanding of regrouping in addition and subtraction
- Reads, writes, orders, and rounds numbers into the millions
- Shows, reads, writes, and orders decimals to the thousandths (and rounds to the nearest whole number)
- Estimates sums and differences of whole numbers and decimals
- Adds and subtracts two to four digit whole numbers and decimals through to the hundredths place
- Multiplies whole numbers by two digits
- Estimates products
- Divides whole numbers by two digits
- Estimates quotients
- Multiplies and divides money
- Understands and applies terms used in multiplication and division
- Solves real-world problems involving number operations
- Understands and applies terms used in fractions
- Places zeros correctly in a quotient
- Demonstrates understanding of the properties of multiplication
- Demonstrates understanding of patterns in multiplication and division
- Divides whole numbers by multiples of ten
- Uses fractions to name parts of a whole and parts of a set
- Finds equivalent fractions
- Compares, orders, and simplifies fractions and mixed numbers

The student demonstrates an understanding of the nature of mathematics and applies basic number concepts.

- Identifies fractions greater than one and writes as improper fractions and mixed numbers
- Adds and subtracts fractions with like and unlike denominators
- Recognizes prime and composite numbers
- Understands and applies symbols for greater than and less than
- Demonstrates understanding of basic algebraic expressions using variables

The student develops mental math and estimation strategies and recognizes situations in which estimation is appropriate.

- Uses mental math for addition, subtraction, and multiplication
- Chooses calculation method for addition, subtraction, and multiplication
- Corrects overestimates and underestimates
- Estimates the fractional part of a given whole

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**OVERVIEW OF GRADE 4**

The student applies the concepts and methods of discrete mathematics (problem solving) to model and explore a variety of practical situations.

- Chooses an operation in problem solving
- Solves problems by interpreting remainders
- Uses mental math to divide
- Chooses a calculation method
- Chooses whether an estimate or an exact answer is needed in problem solving
- Solves word problems with too much or too little information given

The student develops and gives evidence of an understanding of the collection and use of data.

- Uses line, bar and pictographs
- Reads and interprets graphs
- Gathers data and creates and analyzes graphs, and finds ranges
- Demonstrates understanding of basic characteristics of measures of central tendency (median, mode)

The student develops spatial sense and applies knowledge of geometric properties.

- Identifies intersecting and parallel lines
- Shows and names rays and line segments
- Identifies the parts of an angle
- Classifies angles, triangles and quadrilaterals
- Identifies similar and congruent polygons
- Identifies lines of symmetry; creates symmetrical and asymmetrical figures
- Finds areas of rectangles and squares
- Identifies polygons and solid shapes
- Finds perimeters of polygons
- Uses tessellation to solve a problem

The student develops and applies understanding of the concepts of measurement.

- Measures length to nearest  $\frac{1}{4}$  of an inch
- Estimates and measures length
- Understands perimeter and area
- Recognizes basic standard units (centimeters, feet, grams) and the relationships between them (e.g., between inches and feet)
- Reads Fahrenheit and Celsius thermometers
- Reads and identifies components of a calendar, and tells time on a calendar
- Tells time to the minute
- Uses units of time (minutes, hours, days, weeks, months and years) to estimate time needed for real-life activities



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**OVERVIEW OF GRADE 5**

The student demonstrates an understanding of the nature of mathematics and applies basic number concepts.

- Reads, writes, orders, and rounds numbers into the billions
- Shows, reads, writes, and orders decimals to the thousandths (and rounds to the hundredths)
- Estimates sums and differences of whole numbers and decimals
- Adds and subtracts three to five digit whole numbers and decimals through hundredths place
- Multiplies whole numbers, mixed numbers, and decimals
- Multiplies whole numbers and digits by 5 digits
- Estimates products
- Divides whole numbers and decimals
- Estimates quotients
- Divides whole numbers and decimals by 3-digit divisors
- Estimates quotients by 2-digit divisors
- Multiplies and divides money
- Understands and applies terms used in division
- Solves real-world problems involving number operations
- Places zeros correctly in a quotient
- Demonstrates understanding of patterns in division
- Demonstrates understanding of multiples and LCM
- Divides whole numbers and decimals by multiples of 10 to 10,000
- Uses fractions to name parts of a whole and parts of a set
- Find equivalent fractions
- Compares, orders, and simplifies fractions and mixed numbers

The student demonstrates an understanding of the nature of mathematics and applies basic number concepts.

- Identifies fractions greater than one and writes as improper fractions and mixed numbers
- Expresses values as percents, fractions, and decimals
- Multiplies fractions by whole numbers and by other fractions
- Divides fractions
- Finds the least common denominator for two or more fractions
- Renames to add and regroup to subtract mixed numbers
- Demonstrates understanding of common factors and GCF
- Finds common denominators
- Explores prime and composite numbers
- Identifies place values
- Uses exponential notation
- Understands and applies symbols for greater than and less than
- Demonstrates understanding of basic algebraic expressions using variables

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**OVERVIEW OF GRADE 5**

The student develops mental math and estimation strategies and recognizes situations in which estimation is appropriate.

- Uses mental math to multiply
- Chooses calculation method to multiply
- Corrects overestimates and underestimates
- Uses mental math to add and subtract fractions with like denominators
- Estimates and find sums and differences of mixed numbers
- Uses mental math to multiply a whole number by a fraction
- Estimates the fractional part of a given whole

The student applies the concepts and methods of discrete mathematics (problem solving) to model and explore a variety of practical situations.

- Chooses an operation in problem solving
- Solves problems by interpreting remainders
- Uses mental math to divide
- Applies divisibility rules
- Chooses a calculation method
- Chooses whether an estimate or an exact answer is needed in problem solving
- Solves word problems with too much or too little information given
- Solves problems using overestimating or underestimating

The student develops spatial sense and applies knowledge of geometric principles.

- Shows and names rays, points and line segments
- Identifies parts of an angle
- Shows, names, and measures lines and angles
- Classifies angles, triangles, and quadrilaterals
- Identifies similar and congruent polygons
- Identifies lines of symmetry
- Uses scale drawings
- Finds areas of triangles, parallelograms, and other polygons
- Finds the circumference of a circle
- Identifies prisms, pyramids, and cubes
- Finds total surface areas and volumes of solid geometric figures
- Finds number of faces, edges, and vertices of solid geometric figures
- Identifies properties of solid geometric figures
- Describes and draws tessellations

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**OVERVIEW OF GRADE 5**

The student develops and applies understanding of the concepts of measurement.

- Measures length to nearest  $\frac{1}{8}$  inch and changes units among feet, yards, and miles
- Estimates and measures length
- Understands the basic measures of perimeter, area, volume, capacity, mass, angle, and circumference
- Knows approximate size of basic standard units (centimeters, feet, grams) and the relationships between them (e.g., inches and feet)
- Reads Fahrenheit and Celsius thermometers
- Finds areas and perimeters of rectangles
- Changes units of weight among ounces, pounds, and tons

The student demonstrates understanding of the general nature and use of mathematics.

- Understands that numbers and the operations performed on them can be used to describe things in the real world and predict what may occur
- Understands that mathematical ideas and concepts can be represented concretely, graphically, and symbolically

The student develops and gives evidence of an understanding of statistics and probability concepts.

- Uses line, bar, double bar, histogram, stem-leaf, and pictograph
- Reads and interprets graphs
- Gathers data and creates and analyzes graphs, finding range, median, mode and mean
- Writes and simplifies ratios
- Estimates and finds the percent of a number
- Predicts probabilities and expresses them as percents, ratios, and fractions
- Finds equal ratios
- Uses ratio tables to write proportions

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**OVERVIEW OF GRADE 6**

The student understands the nature and general use of mathematics.

- Understands the ways in which mathematics has been helpful in practical ways for many centuries
- Understands that in mathematics, as in other sciences, simplicity is one of the highest values; some mathematicians try to identify the smallest set of rules from which many other propositions can be logically derived
- Understands that theories in mathematics are greatly influenced by practical issues; real-world problems sometimes result in new mathematical theories and pure mathematical theories sometimes have highly practical applications
- Understands that science and mathematics operate under common principles; belief in order, ideas of honesty and openness, the importance review by colleagues, and the importance of imagination
- Understands that mathematics provides a precise system to describe objects, events, and relationships, and to construct logical arguments
- Understands that technological progress has opened, and will continue to open, new doors to mathematics
- Understands that mathematics often stimulates innovations in science and technology

The student understands and applies basic and advanced properties of the concepts of numbers.

- Develops mastery in addition, subtraction, multiplication, and division of whole numbers, fractions and decimals
- Demonstrates understanding of the concept of integers and explores addition, subtraction, multiplication, and division of positive and negative numbers
- Raises rational numbers to whole number powers
- Identifies the different kinds of subset or real numbers
- Demonstrates mastery of comparing and ordering of rational numbers
- Demonstrates knowledge of converting rational numbers to fractions, decimals, and percents interchangeably
- Demonstrates an ability to perform all necessary and appropriate graphing activities
- Uses numbers to demonstrate an understanding of different types of measurement
- Performs mathematical operations which demonstrate knowledge of concepts such as divisibility, prime factorization, commutativity, associativity, distribution, and identity
- Identifies and computes key number patterns such as those involving multiples, squares, or cubes
- Uses written statements with frequency to summarize and explain number and operation concepts
- Uses calculators, computers, manipulatives, and other mathematical tools to enhance mathematical thinking, understanding and power

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**OVERVIEW OF GRADE 6**

The student develops an understanding of and uses geometry and measurement concepts to describe and analyze phenomena.

- Demonstrates knowledge of various geometric two and three dimensional shapes
- Demonstrates an ability to identify similar and congruent shapes
- Demonstrates an understanding of length, area, and volume, using units, square units, and cubic units of measure
- Converts units of measure within a customary or metric system
- Computes areas of triangles, rectangles, and circles
- Computes volume
- Understands the concept of tessellation (i.e., a repetitive pattern of polygons that fit together with no gaps or holes)
- Understands the defining properties of three-dimensional figures
- Understands the defining properties of triangles
- Demonstrates the ability to model situations geometrically so as to recognize, communicate and solve problems
- Uses calculators, computers, manipulatives, and other mathematical tools to enhance mathematical thinking, understanding, and power

The student understands and applies basic and advanced properties of functions of algebra.

- Knows that an expression is a mathematical statement using numbers and symbols to represent relationships and real-world situations (e.g., equations and inequalities with or without variables)
- Demonstrates that a variable can be used in many ways (e.g., as a placeholder for a specific unknown, such as  $x + 8 = 13$ ; as a representative of a range of values, such as  $4t + 7$ )
- Demonstrates understanding of various representations (e.g., tables, graphs, verbal descriptions, algebraic expressions, Venn diagram) of patterns and functions, and the relationships among these representations
- Demonstrates understanding of the basic concept of a function (functions describe how changes in one quantity or variable result in changes in another)
- Solves simple inequalities and non-linear equations with rational number solutions, using concrete and informal methods
- Demonstrates understanding of basic operations on algebraic expressions
- Demonstrates understanding of the properties of arithmetic and geometric sequences
- Uses calculators, computers, manipulatives, and other mathematical tools to enhance mathematical thinking, understanding, and power

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**OVERVIEW OF GRADE 6**

The student understands and applies basic and advanced concepts of statistics and data analysis.

- Demonstrates understanding of basic characteristics of measures of central tendency (mean, mode, median)
- Demonstrates understanding of basic characteristics of frequency and distribution (range, gaps, clusters)
- Gives evidence of introductory knowledge of the basic concepts of center and dispersion of data
- Reads and interprets data in charts, tables, plots (e.g., stem and leaf, box and whiskers, scatter) and graphs (bar, circle, line)
- Uses data and statistical measures for a variety of purposes (formulating hypotheses, making predictions, testing conjectures)
- Organizes and displays data using tables, graphs (line, circle, bar), frequency distributions, and plots (stem and leaf, box and whiskers, scatter)
- Demonstrates an understanding of faulty arguments, common errors, and misleading presentations of data, and expresses why they are such
- Demonstrates an understanding that the same set of data can be represented using a variety of tables, graphs, and symbols, and that different modes of representation often convey different messages (e.g., variation in a scale can alter a visual message)
- Demonstrates a basic understanding about how samples are chosen
- Identifies and analyzes the effects of missing or incorrect information

The student understands and applies basic and advanced concepts of probability.

- Determines probability using mathematical/theoretical models (table or tree diagram, area model, list, counting procedures, sample space)
- Demonstrates probability using simulations or experiments
- Demonstrates understanding of how predictions are based on data and probabilities (e.g., the difference between predictions based on theoretical probability and experimental probability)
- Demonstrates an understanding that the measure of certainty in a given situation depends on a number of factors (e.g., amount of data collected, what is known about the situation, how current data is)
- Demonstrates an understanding of the relationship between the numerical expression of a probability (e.g., fraction, percentage, odds) and the events that produce these numbers

The student develops and demonstrates the ability to pose and solve mathematical problems, communicating mathematically through written, oral, symbolic, and visual forms of expression.

- Identifies a problem situation, lists pertinent information as part of the problem-solving process through use of discovery-oriented, inquiry-based and problem-centered approaches
- Recognizes, formulates, and solves problems arising from mathematical situations, everyday experiences, and applications to other disciplines

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**OVERVIEW OF GRADE 6**

- Constructs and uses concrete, pictorial, symbolic, and graphical models to represent problem situations and effectively apply processes of mathematical modeling in mathematics and other areas
- Identifies the steps in the problem-solving solution, expresses these in a variety of forms, and monitors own progress towards solutions

The student understands, selects, and applies various methods of performing numerical operations.

- Carries out all essential calculations, computations, and functions as deemed essential within the specific area of mathematical study identified.
- Applies strategies of estimation (rounding) and computation of whole numbers, fractions, and decimals
- Uses all basic and necessary terminology identified as appropriate to the specific area of mathematical study
- Creates for real purposes scales, diagrams, graphs, sketches, and written papers to express information and solutions
- Solves all types of equations deemed essential within the specific area of mathematical study
- Demonstrates an ability to use algorithms
- Demonstrates an ability over time to apply knowledge regarding basic solutions to solve more complex problems

The student communicates mathematically through written, oral, symbolic, and visual forms of expression.

- Uses basic terminology, symbols, conventions, and visual aids to effectively communicate a mathematical concept, process and solution
- Produces work which demonstrates proficiency (as to organization, clarity, accuracy) relative to all standards which are established to identify a certain area of study (e.g., arithmetic, discrete mathematics, statistics, algebra)
- Presents orally and in writing a variety of mathematical ideas, procedures, and solutions, including narrative accounts of simple and complex processes
- Writes succinct accounts of the mathematical results obtained in a project completed over time, with all appropriate visuals

The student applies mathematical knowledge and skills to relate to real-world situations.

- Works at rich, open-ended problems which require the use of mathematics in meaningful ways
- Demonstrates an understanding of historical and cultural contributions in the field of mathematics, including those of women and minorities