

K-8
Mathematics
Curriculum Framework

Revised 2004

Mathematics Curriculum Framework

Standards

Number and Operations	
1. Number Sense	Students shall understand numbers, ways of representing numbers, relationships among numbers and number systems.
2. Properties of Number Operations	Students shall understand meanings of operations and how they relate to one another.
3. Numerical Operations and Estimation	Students shall compute fluently and make reasonable estimates.
Algebra	
4. Patterns, Relations and Functions	Students shall recognize, describe and develop patterns, relations and functions.
5. Algebraic Representations	Students shall represent and analyze mathematical situations and structures using algebraic symbols.
6. Algebraic Models	Students shall develop and apply mathematical models to represent and understand quantitative relationships.
7. Analysis of Change	Students shall analyze change in various contexts.
Geometry	
8. Geometric Properties	Students shall analyze characteristics and properties of 2 and 3 dimensional geometric shapes and develop mathematical arguments about geometric relationships.
9. Transformation of Shapes	Students shall apply transformations and the use of symmetry to analyze mathematical situations.
10. Coordinate Geometry	Students shall specify locations and describe spatial relationships using coordinate geometry and other representational systems.
11. Visualization and Geometric Models	Students shall use visualization, spatial reasoning and geometric modeling.
Measurement	
12. Physical Attributes	Students shall use attributes of measurement to describe and compare mathematical and real-world objects.
13. Systems of Measurement	Students shall identify and use units, systems and processes of measurement.
Data Analysis and Probability	
14. Data Representation	Students shall formulate questions that can be addressed with data and collect, organize and display relevant data to answer them.
15. Data Analysis	Students shall select and use appropriate statistical methods to analyze data.
16. Inferences and Predictions	Students shall develop and evaluate inferences and predictions that are based on data.
17. Probability	Students shall understand and apply basic concepts of probability.

*Each grade level continues to address earlier Student Learner Expectations as needed and as they apply to more difficult text.

Strand: Number and Operations

Standard 1 Number Sense:

Students shall understand numbers, ways of representing numbers, relationships among numbers and number systems

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Whole Numbers	<p>NO.1.K.1 Count with understanding, explaining that each object should be counted only once and that placement of objects does not change the total amount</p> <p>NO.1.K.2 Group physical objects to represent a <i>whole number</i> less than 10 in at least two ways using <i>composition</i> and <i>decomposition</i></p> <p><i>Composition:</i> A group of 5 <i>cubes</i> can be made by combining 2 red and 3 blue or 4 red and 1 blue <i>Decomposition:</i> 5 <i>cubes</i> can be separated into 2 red and 3 green or 1 red and 4 green</p>	<p>NO.1.1.1 Use efficient <i>strategies</i> to count a given set of objects in groups of 10 up to 100</p> <p>NO.1.1.2 Represent a <i>whole number</i> less than 15 in all possible ways using <i>composition</i> and <i>decomposition</i></p> <p><i>Composition:</i> 10 can be made by combining 1 and 9, 2 and 8, 3 and 7, 4 and 6, 5 and 5 <i>Decomposition:</i> 10 can be separated into 1 and 9, 2 and 8, 3 and 7, 4 and 6, and 5 and 5</p>	<p>NO.1.2.1 Use efficient <i>strategies</i> to count a given set of objects in groups of 2s and 5s to 100 and in groups of 3s to 30</p> <p>NO.1.2.2 Represent a <i>whole number</i> in <i>multiple</i> ways using <i>composition</i> and <i>decomposition</i></p> <p>Ex. A collection of 80 blocks <i>Composition:</i> 80 can be made by combining: 70 and 10, 60 and 20 <i>Decomposition:</i> 80 can be separated into 50 and 30, 40 and 40</p>	<p>NO.1.3.1 Recognize <i>equivalent</i> representations for the same <i>whole number</i> and generate them by <i>composing</i> and <i>decomposing</i> numbers</p> <p>Ex. $352 = 300 + 50 + 2;$ $300 + 25 + 25 + 2;$ $150 + 150 + 50 + 2,$ etc</p>	<p>NO.1.4.1 Recognize <i>equivalent</i> representations for the same <i>whole number</i> and generate them by <i>composing</i> and <i>decomposing</i> numbers</p> <p>Ex. $1,076 = 1,000 + 70 + 6;$ $500 + 500 + 25 + 25 + 25 + 1;$ $250 + 250 + 250 + 250 + 75 + 1,$ etc...</p>

Strand: Number and Operations

Standard 1 Number Sense:

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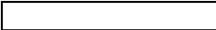
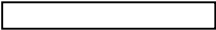
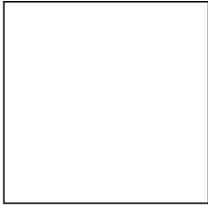
THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Whole Numbers	<p>NO.1.K.3 Connect various physical models and representations to the quantities they represent using number names, numerals and number words up to 10 with and without appropriate <i>technology</i></p> <p>NO.1.K.4 Represent numbers to 10 in various forms Ex. 1 rod, 1 bundle of 10, tally marks, 10 units</p>	<p>NO.1.1.3 Connect various physical models and representations to the quantities they represent using number names, numerals and number words to 20 with and without appropriate <i>technology</i></p> <p>NO.1.1.4 Represent numbers to 20 in various forms Ex. 2 rods, 2 bundles of 10, tally marks, a rod and 10 units</p>	<p>NO.1.2.3 Connect various physical models and representations to the quantities they represent using number names, numerals and number words to 100 with and without appropriate <i>technology</i></p> <p>NO.1.2.4 Represent numbers to 100 in various forms Ex. Arrange tally marks, combinations of rods and units</p>		

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THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Whole Numbers	<p>NO.1.K.5 Recognize the number or quantity in sets up to 5 without counting, regardless of arrangement</p>	<p>NO.1.1.5 Use multiple models to develop understandings of <i>place value</i> including tens and ones Ex. pictures of base 10 blocks to show 23 will be ___ tens and ___ ones = ___ <input type="checkbox"/> ones  tens</p> <p>NO.1.1.6 Recognize the number or quantity of sets up to 10 without counting, regardless of arrangement</p>	<p>NO.1.2.5 Use multiple models to represent understanding of <i>place value</i> including hundreds Ex. 127 is 1 flat and 2 ten rods and 7 units ___ hundreds ___ tens ___ ones added is $100 + 20 + 7$ <input type="checkbox"/> ones  tens  hundreds</p>	<p>NO.1.3.2 Use the <i>place value</i> structure of the base ten number system and be able to represent and compare <i>whole numbers</i> including thousands (using models, illustrations, symbols, <i>expanded notation</i> and problem solving) Ex. $2,308$ ___ $2,038$</p>	<p>NO.1.4.2 Use the <i>place value</i> structure of the base ten number system and be able to represent and compare <i>whole numbers</i> to millions (using models, illustrations, symbols, <i>expanded notation</i> and problem solving) Ex. $1,246,477$ ___ $1,244$</p>

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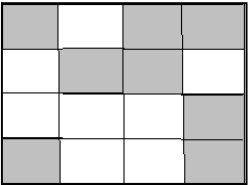

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Whole Numbers	<p>NO.1.K.6 <i>Estimate</i> quantities fewer than or equal to 10 and judge the reasonableness of the <i>estimate</i></p> <p>NO.1.K.7 Orally determine relative position using <i>ordinal numbers</i> (first through tenth)</p> <p>NO.1.K.8 Compare 2 numbers, with less than 6 in each set, using objects and pictures, with and without appropriate <i>technology</i> Ex. A: (XXX) B: (□ □) Set A has more elements than set B</p> <p>NO.1.K.9 Compare and order numbers less than twenty using terms more than, same amount as, less than</p>	<p>NO.1.1.7 <i>Estimate</i> the results of <i>whole number</i> addition and subtraction problems and judge the reasonableness</p> <p>NO.1.1.8 Determine relative position using <i>ordinal numbers</i> (first through twelfth)</p> <p>NO.1.1.9 Compare 2 numbers, with less than 12 in each set, using objects and pictures with and without appropriate <i>technology</i> Ex. A: (XXXXXX) B: (□ □ □) Set A has more elements than set B</p> <p>NO.1.1.10 Compare 2 numbers, less than 100 using mathematical language of greater than, equal to (same amount as), less than</p>	<p>NO.1.2.6 Determine relative position using <i>ordinal numbers</i> (first through eighteenth)</p> <p>NO.1.2.7 Compare 2 numbers, less than 100 using numerals and =, <, > with and without appropriate <i>technology</i></p>	<p>NO.1.3.3 Use mathematical language and symbols to compare and order four-<i>digit</i> numbers with and without appropriate <i>technology</i> (<, >, =)</p>	<p>NO.1.4.3 Use mathematical language and symbols to compare and order any <i>whole numbers</i> with and without appropriate <i>technology</i> (<, >, =)</p>

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THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Rational Numbers	<p>NO.1.K.10 Consecutively order sets of physical objects from 1 to 10</p> <p>NO.1.K.11 Use physical models and drawings to represent commonly used fractions such as halves, thirds and fourths in relation to the whole</p>	<p>NO.1.1.11 Communicate the relative position of any number less than 20 (18 is less than 20 and greater than 12)</p> <p>NO.1.1.12 Represent commonly used fractions using words and physical models for halves, thirds and fourths Ex. <ul style="list-style-type: none"> recognize that fractions are represented by equal parts of a whole identify and illustrate parts of sets of objects </p>	<p>NO.1.2.8 Communicate the relative position of any number less than 100 (27 is greater than 25 and less than 30)</p> <p>NO.1.2.9 Represent fractions (halves, thirds, fourths, sixths and eighths) using words, numerals, and physical models Ex. Identify and illustrate parts of a whole</p>	<p>NO.1.3.4 Represent fractions (halves, thirds, fourths, sixths and eighths) using words, numerals and physical models Ex. <ul style="list-style-type: none"> identify and illustrate parts of a whole and parts of sets of objects. recognize that a fractional part of a rectangle does not have to be shaded with <i>contiguous</i> parts  </p>	<p>NO.1.4.4 Write a fraction to name part of a whole, part of a set, a location on a number line, and the division of <i>whole numbers</i>, using models up to 12/12 Ex.</p> <p>$\frac{1}{4}$</p>  <p>$\frac{1}{4} =$ ● ○</p> <p>$\frac{1}{4} =$ ○ ○</p> <p>$\frac{1}{4} =$ -----*----- 0 $\frac{1}{4}$ $\frac{1}{2}$ 1</p> <p>$\frac{1}{4} =$ One cookie shared by 4 children</p>

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	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Rational Numbers			NO.1.2.10 Utilize models to recognize that a fractional part can mean different amounts depending on the original quantity	NO.1.3.5 Utilize models to recognize that the size of the whole determines the size of the fraction depending on the original quantity NO.1.3.6 Use the <i>place value</i> structure of the base ten number system and be able to represent and compare decimals to hundredths in money (using models, illustrations, symbols, <i>expanded notation</i> and problem solving) Ex. \$193.76 ____ \$139.67	NO.1.4.5 Utilize models, benchmarks, and <i>equivalent</i> forms to recognize that the size of the whole determines the size of the fraction NO.1.4.6 Use the <i>place value</i> structure of the base ten number system and be able to represent and compare decimals to hundredths (using models, illustrations, symbols, <i>expanded notation</i> and problem solving) Ex. 3.87 ____ 3.78 NO.1.4.7 Write an <i>equivalent</i> decimal for a given fraction relating to money Ex. 1/10 = \$0.10 1/4 = \$0.25

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	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Rational Numbers				NO.1.3.7 Write a fraction that is <i>equivalent</i> to a given fraction with the use of models Ex. $1/2 = 4/8 = 8/16$	NO.1.4.8 Write a fraction that is <i>equivalent</i> to a given fraction with the use of models Ex. $1/3 = 2/6 = 4/12$

Strand: Number and Operations

Standard 2: Properties of Number Operations

Students shall understand meanings of operations and how they relate to one another

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Number Theory	<p>NO.2.K.1 Count on (forward) and count back (backward) using physical models or a number line starting at any <i>whole number</i> between zero and twenty Ex. Start at six and count forward to ten Start at eight and count backward to five</p>	<p>NO.2.1.1 Count on (forward) and back (backward) using physical models or a number line starting at any <i>whole number</i> up to fifty</p> <p>NO.2.1.2 Develop an understanding of the <i>commutative</i> (turn around facts) and <i>identity</i> (add 0) <i>properties of addition</i> using objects</p>	<p>NO.2.2.1 Count on (forward) and back (backward) on a number line and a 100's chart starting at any <i>whole number</i> up to 100</p> <p>NO.2.2.2 <i>Model</i> and use the <i>commutative property for addition</i> Ex. 3 + 2 is the same as (=) 2 + 3</p> <p>NO.2.2.3 Develop an understanding of the <i>associative property of addition</i> using objects</p>	<p>NO.2.3.1 Develop an understanding of the <i>commutative</i> and <i>identity properties of multiplication</i> using objects</p>	<p>NO.2.4.1 Develop an understanding of the <i>associative</i> and zero properties of multiplication using objects</p>

Strand: Number and Operations

Standard 2: Properties of Number Operations

Students shall understand meanings of operations and how they relate to one another

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Number Theory		NO.2.1.3 Apply <i>number theory</i> <ul style="list-style-type: none"> determine if a <i>one-digit</i> number is <i>odd</i> or <i>even</i> use the terms <i>sum</i> and <i>difference</i> in appropriate context use conventional symbols (+, -, =) to represent the operations of addition and subtraction 	NO.2.2.4 Apply <i>number theory</i> <ul style="list-style-type: none"> determine if a <i>two-digit</i> number is <i>odd</i> or <i>even</i> use the terms <i>sum</i>, <i>addends</i>, and <i>difference</i> in an appropriate context ($2 + 3 = 5$, 2 and 3 are <i>addends</i>; 5 is a <i>sum</i>) 	NO.2.3.2 Apply <i>number theory</i> <ul style="list-style-type: none"> determine if a <i>three-digit</i> number is <i>even</i> or <i>odd</i> use the terms <i>multiple</i>, <i>factor</i>, <i>product</i> and <i>quotient</i> in an appropriate context (Since $3 \times 4 = 12$, 3 and 4 are <i>factors</i>; 12 is the <i>product</i>, 3, 6, 9, 12 are <i>multiples</i> of 3; 4, 8, 12, 16 are <i>multiples</i> of 4; $12 \div 4 = 3$, the <i>quotient</i>) 	NO.2.4.2 Apply <i>number theory</i> <ul style="list-style-type: none"> determine if any number is <i>even</i> or <i>odd</i> use the terms <i>multiple</i>, <i>factor</i>, and <i>divisible by</i> in an appropriate context generate and use <i>divisibility</i> rules for 2, 5, and 10 demonstrate various multiplication & division relationships

Strand: Number and Operations

Standard 2: Properties of Number Operations

Students shall understand meanings of operations and how they relate to one another

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Whole Number Operations	<p>NO.2.K.2 Use physical and <i>pictorial models</i> to demonstrate various meanings of addition and subtraction See Appendix for examples.</p> <p>NO.2.K.3 Demonstrate the relationship between addition and subtraction with informal language and models in <i>contextual situations</i> involving <i>whole numbers</i></p>	<p>NO.2.1.4 Use physical, <i>pictorial</i> and symbolic models to demonstrate various meanings of addition and subtraction See Appendix for examples.</p> <p>NO.2.1.5 Identify and use relationships between addition and subtraction to solve problems in <i>contextual situations</i> involving <i>whole numbers</i></p>	<p>NO.2.2.5 Demonstrate various meaning of addition and subtraction See Appendix for examples.</p> <p>NO.2.2.6 Demonstrate various addition and subtraction relationships (property) to solve problems in <i>contextual situations</i> involving <i>whole numbers</i></p>	<p>NO.2.3.3 Use conventional mathematical symbols to write <i>equations</i> for <i>contextual problems</i> involving multiplication See Appendix for examples</p>	<p>NO.2.4.3 Use conventional mathematical symbols to write <i>equations</i> for <i>contextual problems</i> involving multiplication See Appendix for examples</p>

Strand: Number and Operations

Standard 2: Properties of Number Operations

Students shall understand meanings of operations and how they relate to one another

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	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Whole Number Operations	<p>NO.2.K.4 Partition or share a small set of objects into groups of equal size e.g., sharing 6 pencils equally among 3 children</p>	<p>NO.2.1.6 Model and represent division as sharing equally in <i>contextual situations</i> Ex. Sharing cookies equally among four children</p>	<p>NO.2.2.7 Model, represent and explain division as sharing equally and repeated subtraction in <i>contextual situations</i> Ex. Mrs. Lopez bought a dozen pencils for her four children. She gave each child the same number of pencils. How many pencils did each child receive?</p>	<p>NO.2.3.4 Model, represent and explain division as measurement and partitive division including equal groups, related <i>rates</i>, price, <i>rectangular arrays (area model)</i>, combinations and multiplicative comparison See Appendix for more details Ex. <ul style="list-style-type: none"> • translate contextual situations involving division into conventional mathematical symbols • explain how a remainder may impact an answer in a real world situation </p>	<p>NO.2.4.4 Represent and explain division as measurement and partitive division including equal groups, related <i>rates</i>, price, <i>rectangular arrays (area model)</i>, combinations and multiplicative comparison See Appendix for more details Ex. <ul style="list-style-type: none"> • translate contextual situations involving division into conventional mathematical symbols • explain how a remainder may impact an answer in a real world situation </p>

Strand: Number and Operations

Standard 3: Numerical Operations and Estimation

Students shall compute fluently and make reasonable estimates

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Computational Fluency-Addition and Subtraction	<p>NO.3.K.1 Develop <i>strategies</i> for basic addition facts</p> <ul style="list-style-type: none"> • counting all • counting on • one more, two more <p>NO.3.K.2 Develop <i>strategies</i> for basic subtraction facts</p> <ul style="list-style-type: none"> • counting back • one less, two less 	<p>NO.3.1.1 Develop <i>strategies</i> for basic addition facts</p> <ul style="list-style-type: none"> • counting all • counting on • one more, two more • doubles • doubles plus one or minus one • make ten • using ten frames • <i>Identity Property</i> (add zero) <p>NO.3.1.2 Develop <i>strategies</i> for basic subtraction facts</p> <ul style="list-style-type: none"> • relating to addition <p>Ex. Think of $7 - 3 = \underline{\quad}$ as "$3 + \underline{\quad} = 7$"</p> <ul style="list-style-type: none"> • one less, two less • all but one <p>Ex. $9 - 8, 6 - 5$</p> <ul style="list-style-type: none"> • using ten frames of the answers 	<p>NO.3.2.1 Develop <i>strategies</i> for basic addition facts</p> <ul style="list-style-type: none"> • counting all • counting on • one more, two more • doubles • doubles plus one or minus one • make ten • using ten frames • <i>Identity Property</i> (add zero) <p>NO.3.2.2 Demonstrate multiple <i>strategies</i> for adding or subtracting two-digit whole numbers</p> <ul style="list-style-type: none"> • <i>Compatible Numbers</i> • <i>compensatory numbers</i> • informal use of <i>commutative</i> and <i>associative properties of addition</i> 		

Strand: Number and Operations

Standard 3: Numerical Operations and Estimation

Students shall compute fluently and make reasonable estimates

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	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Computational Fluency-Addition and Subtraction			<p>NO.3.2.3 Demonstrate <i>computational fluency</i> (accuracy, efficiency and flexibility) in addition facts with addends through 9 and corresponding subtractions Ex. $9+9=18$ and $18-9=9$ add and subtract <i>multiples</i> of ten</p>	<p>NO.3.3.1 Develop, with and without appropriate <i>technology</i>, <i>computational fluency</i>, in multi-<i>digit</i> addition and subtraction through 999 using contextual problems</p> <ul style="list-style-type: none"> • <i>strategies</i> for adding and subtracting numbers • <i>estimation</i> of sums and <i>differences</i> in appropriate situations • relationships between operations 	<p>NO.3.4.1 Demonstrate, with and without appropriate <i>technology</i>, <i>computational fluency</i> in multi-<i>digit</i> addition and subtraction in <i>contextual problems</i></p>
Computational Fluency-Multiplication and Division				<p>NO.3.3.2 Develop, with and without appropriate <i>technology</i>, fluency with basic number combinations for multiplication and division facts (10 x 10)</p>	<p>NO.3.4.2 Demonstrate fluency with combinations for multiplication and division facts (12 x 12) and use these combinations to mentally compute related problems (30 x 50)</p>

Strand: Number and Operations

Standard 3: Numerical Operations and Estimation

Students shall compute fluently and make reasonable estimates

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	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Computational Fluency- Multiplication and Division				NO.3.3.3 Develop, with and without appropriate <i>technology</i> , <i>computational fluency</i> in multiplication and division up to two- <i>digit</i> by one- <i>digit</i> numbers using two- <i>digit</i> by one- <i>digit</i> number <i>contextual problems</i> using <ul style="list-style-type: none"> • <i>strategies</i> for multiplying and dividing numbers, • performance of operations in more than one way, • <i>estimation</i> of <i>products</i> and <i>quotients</i> in appropriate situations, and • relationships between operations 	NO.3.4.3 Attain, with and without appropriate <i>technology</i> , <i>computational fluency</i> in multiplication and division using <i>contextual problems</i> using <ul style="list-style-type: none"> • two-<i>digit</i> by two-<i>digit</i> multiplication (larger numbers with <i>technology</i>), • up to three-<i>digit</i> by two-<i>digit</i> division (larger numbers with <i>technology</i>), • <i>strategies</i> for multiplication and dividing numbers, • performance of operations in more than one way, • <i>estimation</i> of <i>products</i> and <i>quotients</i> in appropriate situations, and • relationships between operations

Strand: Number and Operations

Standard 3: Numerical Operations and Estimation

Students shall compute fluently and make reasonable estimates

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Application of Computation	NO.3.K.3 Solve problems by using a variety of methods and tools (e.g., objects, and/or illustrations, with and without appropriate <i>technology</i> and mental computations)	NO.3.1.3 Solve problems by using a variety of methods and tools (e.g., objects, mental computations, paper and pencil and with and without appropriate <i>technology</i>)	NO.3.2.4 Solve problems using a variety of methods and tools (e.g., objects, mental computation, paper and pencil, and with and without appropriate <i>technology</i>)	NO.3.3.4 Solve simple problems using one operation involving addition and subtraction using a variety of methods and tools (e.g., objects, mental computation, paper and pencil and with and without appropriate <i>technology</i>)	NO.3.4.4 Solve simple problems using operations involving addition, subtraction, and multiplication using a variety of methods and tools (e.g., objects, mental computation, paper and pencil and with and without appropriate <i>technology</i>)
Estimation			NO.3.2.5 Use <i>estimation strategies</i> to solve addition and subtraction problems and judge the reasonableness of the answer	NO.3.3.5 Use <i>estimation strategies</i> to solve problems and judge the reasonableness of the answer	NO.3.4.5 Use <i>estimation strategies</i> to solve problems and judge the reasonableness of the answer

Strand: Algebra

Standard 4: Patterns, Relations and Functions

Students shall recognize, describe and develop patterns, relations and functions

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Sort and Classify	<p>A.4.K.1 Identify how objects are alike or different</p> <p>A.4.K.2 Sort objects into groups in one or more ways and identify which <i>attribute</i> was used to sort</p>	<p>A.4.1.1 Sort and classify objects by one or two <i>attributes</i> in more than one way</p>	<p>A.4.2.1 Sort, classify, and label objects by three or more <i>attributes</i> in more than one way</p>		
Recognize, describe and develop patterns	<p>A.4.K.3 Identify <i>patterns</i> in the environment</p> <p>A.4.K.4 Use <i>patterns</i> to rote count up to 100 and count backward from 20 to 0</p> <p>A.4.K.5 Identify, describe and extend <i>skip-counting patterns</i> by 5s and 10s</p>	<p>A.4.1.2 Identify and describe <i>patterns</i> in the environment</p> <p>A.4.1.3 Use <i>patterns</i> to count forward and backward when given a number less than or equal to 50</p> <p>A.4.1.4 Identify, describe and extend <i>skip-counting patterns</i> by 2s</p>	<p>A.4.2.2 Describe repeating and growing <i>patterns</i> in the environment</p> <p>A.4.2.3 Use <i>patterns</i> to count forward and backward when given a number less than or equal to 100 ____, 69, ____, ____</p> <p>A.4.2.4 Identify, describe and extend <i>skip counting patterns</i> from any given number</p>	<p>A.4.3.1 Count forward and backward when given a number less than or equal to 1000 ____, 399, ____, ____</p> <p>A.4.3.2 Relate <i>skip-counting patterns</i> to multiplication</p>	

Strand: Algebra

Standard 4: Patterns, Relations and Functions

Students shall recognize, describe and develop patterns, relations and functions

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Recognize, describe and develop patterns	A.4.K.6 Duplicate, extend, create and describe repeating <i>patterns</i> using a wide variety of materials	A.4.1.5 Identify a number that is one more or one less than any <i>whole number</i> less than 100 A.4.1.6 Recognize, extend, and create simple repeating and growing <i>patterns</i> using a wide variety of materials and describe them using words, pictures or symbols	A.4.2.5 Identify a number that is more or less than any <i>whole number</i> less than 100 using <i>multiples</i> of ten Ex. 30 more than 26 is 56 A.4.2.6 Recognize, describe, extend, and create repeating and growing <i>patterns</i> using a wide variety of materials to solve problems	A.4.3.3 Identify a number that is more or less than any <i>whole number</i> up to 1000 using <i>multiples</i> of ten and/or 100 Ex. 100 less than 587 is 487 10 more than 196 is 206 A.4.3.4 Use repeating and growing numeric or geometric <i>patterns</i> to solve problems	A.4.4.1 Identify a number that is more or less than any <i>whole number</i> using <i>multiples</i> of 10, 100 and/or 1000 Ex. 100 more than 4987 is 5087 A.4.4.2 Use repeating and growing numeric and geometric <i>patterns</i> to make predictions and solve problems
Patterns, Relations and Functions				A.4.3.5 Determine the relationship between sets of numbers by selecting the rule (1 step rule in words)	A.4.4.3 Determine the relationship between sets of numbers by selecting the rule (2 step rule in words)

Strand: Algebra

Standard 5: Algebraic Representations

Students shall represent and analyze mathematical situations and structures using algebraic symbols

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Expressions, Equations and Inequalities	<p>A.5.K.1 Use drawings and labels to record solutions of addition and subtraction problems with answers less than or equal to 10</p> <p>A.5.K.2 Identify, create, compare and describe sets of objects as more, less or equal</p>	<p>A.5.1.1 Select and/or write number sentences to find the unknown in problem-solving contexts involving single-<i>digit</i> addition and subtraction using appropriate labels Ex. Bob had 5 baseball cards. His friend gave him some more. Now he has seven cards. How many cards did his friend give him?</p> <p>A.5.1.2 Recognize that “=” indicates a relationship in which the quantities on each side of an <i>equation</i> are equal Ex. $3 + 2 = 4 + 1$</p>	<p>A.5.2.1 Select and/or write number sentences to find the unknown in problem-solving contexts involving two-<i>digit</i> addition and subtraction using appropriate labels Ex Mrs. Cole’s class has 22 students. Ms. River’s class joined them on a field trip. When everyone got on a bus, there were 45 children. How many students are in Ms River’s class?</p> <p>A.5.2.2 Express mathematical relationships using <i>equalities</i> and <i>inequalities</i> ($>$, $<$, $=$, \neq) Ex. $4 + 6 = 7 + 3$ $3 + 5 < 4 + 5$ $4 + 6 \neq 7 + 5$</p>	<p>A.5.3.1 Select and/or write number sentences (<i>equations</i>) to find the unknown in problem-solving contexts involving two-<i>digit</i> times one-<i>digit</i> multiplication using appropriate labels</p> <p>A.5.3.2 Express mathematical relationships using <i>equalities</i> and <i>inequalities</i> ($>$, $<$, $=$, \neq) Ex. $4 \times 9 \underline{\hspace{1cm}} 36 - 3$</p>	<p>A.5.4.1 Select and/or write number sentences (<i>equations</i>) to find the unknown in problem-solving contexts involving two-<i>digit</i> by one-<i>digit</i> division using appropriate labels</p> <p>A.5.4.2 Express mathematical relationships using simple <i>equations</i> and <i>inequalities</i> ($>$, $<$, $=$, \neq) Ex. $4 \times 5 \underline{\hspace{1cm}} 8 \times 2 + 3$</p>

Strand: Algebra

Standard 5: Algebraic Representations

Students shall represent and analyze mathematical situations and structures using algebraic symbols

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Expressions, Equations and Inequalities		<p>A.5.1.3 Recognize that symbols such as \square, Δ and \diamond in an addition or subtraction equation, represent a missing value that will make the statement true Ex. $\square + 3 = 6$ $5 + 7 = \Delta$ $4 = 5 - \diamond$</p>	<p>A.5.2.3 Recognize that symbols such as \square, Δ and \diamond in an addition or subtraction equation, represent a missing value that will make the statement true Ex. $\square + 3 = 7$ $\Delta - 4 = 6$ $8 - \square = 6$ $6 = 8 - \Delta$</p>	<p>A.5.3.3 Use a symbol to represent an unknown quantity in a number sentence involving <i>contextual situations</i> and find the value Ex. Mary buys <i>two</i> bags of candy with the same number of pieces in each bag. If she has sixteen pieces in all, how many pieces of candy are in each bag? $2 \times \sim = 16$</p>	<p>A.5.4.3 Use a <i>variable</i> to represent an unknown quantity in a number sentence involving <i>contextual situations</i> and find the value Ex. Susie bought 48 pencils. If the pencils came in packages of 12, how many packages of pencils did she buy? $P = 48 \div 12$</p>

Strand: Algebra

Standard 6: Algebraic Models

Students shall develop and apply mathematical models to represent and understand quantitative relationships

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES																																											
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4																																						
Algebraic Models and Relationships		A.6.1.1 Explore the use of a chart or table to organize information and to understand relationships Ex. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>People</th> <th>Eyes</th> </tr> </thead> <tbody> <tr><td>1</td><td>2</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>6</td></tr> <tr><td>4</td><td>8</td></tr> <tr><td>5</td><td>□</td></tr> </tbody> </table>	People	Eyes	1	2	2	4	3	6	4	8	5	□	A.6.2.1 Use a chart or table to organize information and to understand relationships Ex. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Starfish</th> <th>Arms</th> </tr> </thead> <tbody> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>10</td></tr> <tr><td>3</td><td>15</td></tr> <tr><td>4</td><td></td></tr> <tr><td>5</td><td></td></tr> <tr><td>6</td><td></td></tr> </tbody> </table>	Starfish	Arms	1	5	2	10	3	15	4		5		6		A.6.3.1 Complete a chart or table to organize given information and to understand relationships and explain the results Ex. The library has 5 workstations. Four students can sit at each station. How many students can sit at all the stations? <table style="margin-left: 20px;"> <thead> <tr> <th>stations</th> <th>students</th> </tr> </thead> <tbody> <tr><td>1</td><td>4</td></tr> <tr><td>2</td><td>?</td></tr> <tr><td>3</td><td>?</td></tr> <tr><td>4</td><td>?</td></tr> <tr><td>5</td><td>?</td></tr> </tbody> </table>	stations	students	1	4	2	?	3	?	4	?	5	?	A.6.4.1 Create a chart or table to organize given information and to understand relationships and explain the results Ex. Troy must read independently for 2 hours a week. If Troy reads 20 minutes a day, how long will it take him to read a total of two hours?
	People	Eyes																																									
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Strand: Algebra

Standard 7: Analysis of Change


Students shall analyze change in various contexts

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES													
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4								
Analyze Change	<p>A.7.K.1 Recognize <i>qualitative change</i> Ex. changes in seasons, temperature, height, etc “Today is colder/warmer than yesterday”</p>	<p>A.7.1.1 Interpret <i>qualitative change</i> Ex. changes in seasons, temperature, height, etc “Today is colder than yesterday, so I need to wear a jacket”</p>	<p>A.7.2.1 Interpret and compare <i>quantitative change</i> Ex. changes in temperature, age, height, etc. “The temperature this morning was 75 degrees. This afternoon is 85 degrees. What is the difference in the temperature?”</p>	<p>A.7.3.1 Identify the change over time Ex. We have recorded the morning and afternoon temperatures all week Which day had the greatest change in temperature?</p>	<p>A.7.4.1 Identify, describe and generalize relationships in which quantities change proportionally Ex. If a car travels at a rate of 50 mph, how far will it travel in three hours?</p> <table border="1" data-bbox="1696 592 1990 646"> <tr> <td>hours</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>miles</td> <td>50</td> <td>100</td> <td>150</td> </tr> </table>	hours	1	2	3	miles	50	100	150
hours	1	2	3										
miles	50	100	150										

Strand: Geometry

Standard 8: Geometric Properties

Students shall analyze characteristics and properties of 2 and 3 dimensional geometric shapes and develop mathematical arguments about geometric relationships

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Characteristics and Properties- Three Dimensional	<p>G.8.K.1 Sort and describe <i>three-dimensional</i> solids (<i>sphere, cube, cone, and cylinder</i>) by investigating their physical characteristics</p> <p>G.8.K.2 Locate the presence of <i>two-dimensional</i> figures within <i>three-dimensional</i> objects in the environment</p>	<p>G.8.1.1 Compare <i>three-dimensional</i> solids (<i>sphere, cube, rectangular prism, cone, and cylinder</i>) by investigating their physical characteristics</p> <p>G.8.1.2 Investigate the presence of <i>three-dimensional</i> objects in the environment</p>	<p>G.8.2.1 Identify, name, sort and describe <i>three-dimensional</i> solids (<i>cube, sphere, rectangular prism, cone, and cylinder</i>) according to the shapes of <i>faces</i></p> <p>G.8.2.2 Match <i>three-dimensional</i> objects to their <i>two-dimensional faces</i></p>	<p>G.8.3.1 Compare, contrast and build <i>three-dimensional</i> solids by investigating the number of <i>faces, edges, and vertices</i> on models</p>	<p>G.8.4.1 Identify, describe and classify <i>three-dimensional</i> solids by properties including the number of <i>vertices, edges, and shapes of faces</i> using models</p>
Characteristics and Properties- Two Dimensional	<p>G.8.K.3 Sort, describe and make geometric figures (triangle, rectangle [including square] and circle) by investigating their physical characteristics independent of position or size</p>	<p>G.8.1.3 Compare and make geometric figures (triangle, rectangle [including square] and circle) by investigating their physical characteristics independent of position or size Ex. </p>	<p>G.8.2.3 Identify, classify and describe <i>two-dimensional</i> geometric figures (rectangle [including square], triangle and circle) using concrete objects drawings, and computer graphics</p>	<p>G.8.3.2 Identify regular <i>polygons</i> with at least 4 sides (square, pentagon, hexagon and octagon)</p>	<p>G.8.4.2 Identify regular and <i>irregular polygons</i> including octagon See the <i>Polygons</i> page in the Appendix</p>

Strand: Geometry

Standard 8: Geometric Properties

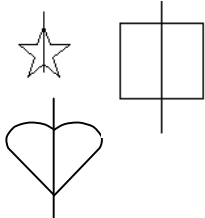
Students shall analyze characteristics and properties of 2 and 3 dimensional geometric shapes and develop mathematical arguments about geometric relationships

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Characteristics and Properties- One Dimensional				G.8.3.3 Identify and draw <i>line</i> , <i>line segment</i> and <i>ray</i> using appropriate labels	G.8.4.3 Identify, draw, and describe a <i>line</i> , <i>line segment</i> , a <i>ray</i> , an angle, <i>intersecting</i> , <i>perpendicular</i> , and <i>parallel lines</i>
Geometric Relationships				G.8.3.4 Identify and draw <i>intersecting</i> and <i>parallel lines</i>	G.8.4.4 Identify and describe <i>intersecting</i> , <i>perpendicular</i> and <i>parallel lines</i> in problem solving context G.8.4.5 Classify angles relative to 90° as more than, less than or equal to

Strand: Geometry

Standard 9: Transformation of Shapes

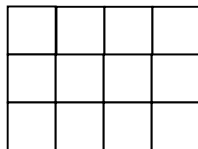
Students shall apply transformations and the use of symmetry to analyze mathematical situations

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Symmetry and Transformations	<p>G.9.K.1 Identify figures with a <i>line of symmetry</i> as they appear in the environment Ex. Butterfly, leaf</p>	<p>G.9.1.1 Identify a <i>line</i> or <i>lines of symmetry</i> in <i>two – dimensional</i> figures and justify by folding Ex.</p> 	<p>G.9.2.1 Use <i>lines of symmetry</i> to demonstrate and describe <i>congruent</i> figures within a <i>two-dimensional</i> figure Ex. Letter, shapes, environmental print and <i>polygons</i></p>	<p>G.9.3.1 Draw one or more <i>lines of symmetry</i> in a <i>polygon</i></p>	
	<p>G.9.K.2 Explore <i>slides, flips</i> and <i>turns</i></p>	<p>G.9.1.2 Manipulate <i>two-dimensional</i> figures through <i>slides, flips</i> and <i>turns</i></p>	<p>G.9.2.2 Demonstrate the motion of a single <i>transformation</i></p>	<p>G.9.3.2 Describe the motion (<i>transformation</i>) of a <i>two-dimensional</i> figure as a <i>flip (reflection), slide (translation)</i> or <i>turn (rotation)</i></p>	<p>G.9.4.1 Determine the result of a <i>transformation</i> of a <i>two-dimensional</i> figure as a <i>slide (translation), flip (reflection)</i> or <i>turn (rotation)</i> and justify the answer</p>

Strand: Geometry

Standard 10: Coordinate Geometry

Students shall specify locations and describe spatial relationships using coordinate geometry and other representational systems

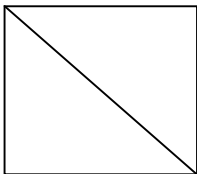
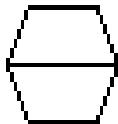
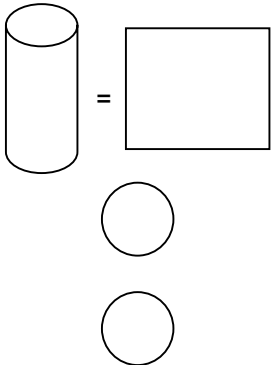
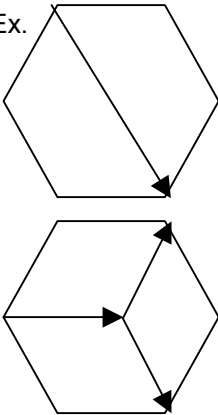
THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Coordinate Geometry	G.10.K.1 Demonstrate and describe the relative position of objects as follows: over, under, inside, outside, on, beside, between, above, below, on top of, upside-down, behind, in back of and in front of	G.10.1.1 Extend the use of location words to include distance (near, far, close to) and direction (left and right)	G.10.2.1 Extend the use of directional words to include rows and columns Ex. This rectangle has 3 rows and 4 columns 	G.10.3.1 Locate and identify points on a <i>coordinate grid</i> and name the <i>ordered pair (quadrant one only)</i> using common language and geometric vocabulary (horizontal and vertical)	G.10.4.1 Locate and identify points on a <i>coordinate grid</i> and name the <i>ordered pair (quadrant one only)</i> using common language and geometric vocabulary (horizontal and vertical)

Strand: Geometry

Standard 11: Visualization and Geometric Models

Students shall use visualization, spatial reasoning and geometric modeling

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Spatial Visualization and Models	<p>G.11.K.1 Arrange physical materials (toothpicks, pretzel sticks, modeling clay, etc...) to form <i>two-dimensional</i> figures</p>	<p>G.11.1.1 Replicate a simple <i>two-dimensional</i> figure from a briefly displayed example or from a description</p> <p>G.11.1.2 Recognize that new figures can be created by combining and subdividing models of existing figures</p> <p>Ex.</p> 	<p>G.11.2.1 Replicate a simple geometric design from a briefly displayed example or from a description</p> <p>G.11.2.2 Create new figures by combining and subdividing models of existing figures</p> <p>Ex.</p> 	<p>G.11.3.1 Replicate a <i>three-dimensional</i> model composed of <i>cubes</i> when given a physical model</p> <p>G.11.3.2 Determine which new figure will be formed by combining and subdividing models of existing figures</p> <p>Ex.</p> 	<p>G.11.4.1 Construct a <i>three-dimensional</i> model composed of <i>cubes</i> when given an illustration</p> <p>G.11.4.2 Create new figures by combining and subdividing models of existing figures in multiple ways and record results in a table</p> <p>Ex.</p> 

Strand: Measurement

Standard 12: Physical Attributes

Students shall use attributes of measurement to describe and compare mathematical and real-world objects

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Time: Calendar	<p>M.12.K.1 Recognize that a calendar is used to measure time and use it to identify units of time (day, week, month, season, year) and compare them</p> <p>M.12.K.2 Orally sequence and count the days of the week</p>	<p>M.12.1.1 Recognize the number of days in a week and the number of days in a month using a calendar</p> <p>M.12.1.2 Orally sequence the months of the year</p>	<p>M.12.2.1 Recognize that there are 12 months in a year and that each month has a specific number of days</p>	<p>M.12.3.1 Determine the number of days in a month, days in a year and identify the number of weeks in a year</p>	
Time: Clock	<p>M.12.K.3 Recognize that a clock is used to tell time</p>	<p>M.12.1.3 Recognize that an hour is longer than a minute and a minute is longer than a second</p>	<p>M.12.2.2 Recognize that there are 24 hours in a day</p>	<p>M.12.3.2 Recognize that 60 minutes equals 1 hour and that a day is divided into A.M. and P.M.</p>	<p>M.12.4.1 Recognize that 60 seconds equals 1 minute</p>
Money	<p>M.12.K.4 Recognize and identify <i>attributes</i> of penny, nickel, dime, and quarter</p> <p>M.12.K.5 State the values of coins (penny, nickel, dime)</p>	<p>M.12.1.4 Recognize and identify <i>attributes</i> of penny, nickel, dime, quarter and dollar bill</p> <p>M.12.1.5 State the values of a penny, nickel, dime, and quarter and dollar bill</p>	<p>M.12.2.3 State the value of all coins and a dollar</p>		

Strand: Measurement

Standard 12: Physical Attributes

Students shall use attributes of measurement to describe and compare mathematical and real-world objects

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Money		M.12.1.6 Compare the value of coins (pennies, nickels, dimes and quarters)	M.12.2.4 Compare the value of all coins		
Temperature	M.12.K.6 Differentiate and make connections between hot and cold temperatures Ex. What else is as cold as ice cream? If it is cold outside, what type of clothing will you wear?	M.12.1.7 Distinguish between hot and cold temperatures on a thermometer Ex. The higher the mercury level the warmer the temperature	M.12.2.5 Compare temperatures using the Fahrenheit scale on a thermometer	M.12.3.3 Distinguish the temperature in contextual problems using the Fahrenheit scale on a thermometer Ex. If I need to wear mittens and a scarf, what temperature would it be? 35° F or 70° F?	M.12.4.2 Distinguish the temperature in contextual problems using the Fahrenheit scale on a thermometer
Tools and Attributes	M.12.K.7 Explore the <i>attributes</i> of length, weight, <i>capacity</i> , and <i>mass</i> using relative terms (longer, shorter, bigger, smaller, heavier, lighter, more and less) Ex. How many cheerios/marbles will a container hold? Which is longer, a pencil or paper clip?	M.12.1.8 Recognize <i>attributes</i> of measurement (length, weight, <i>capacity</i> and <i>mass</i>) and identify appropriate tools used to measure each attribute	M.12.2.6 Make simple comparisons within units of like dimension (units of length, <i>mass/weight</i> and <i>capacity</i>) Ex. An inch is shorter than a foot. A pound is more than an ounce. A cup is less than a pint.	M.12.3.4 Demonstrate the relationship among different <i>standard units</i> <u>Length:</u> 12 in = 1 ft, 3 ft = 1 yd, 36 in = 1 yd <u>Capacity:</u> 2 cups = 1 pint, 2 pints = 1 quart 4 quarts = 1gallon <u>Weight:</u> 16 ounces = 1 lb	M.12.4.3 Use the relationship among units of measurement <u>Length:</u> 12 in = 1 ft 3 ft = 1 yd 36 in = 1 yd 100 cm = 1 m <u>Capacity:</u> 2 cups = 1 pint 2 pints = 1 quart 4 quarts = 1 gallon <u>Weight:</u> 16 ounces = 1 lb

Strand: Measurement

Standard 12: Physical Attributes

Students shall use attributes of measurement to describe and compare mathematical and real-world objects

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Tools and Attributes				M.12.3.5 Create and complete a conversion table (from larger unit to smaller unit) to show relationships between units of measurement in the same system Ex. change feet to inches using multiplication	M.12.4.4 Create and complete a conversion table to show relationships between units of measurement in the same system

Strand: Measurement

Standard 13: Systems of Measurement

Students shall identify and use units, systems and processes of measurement

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Calendar	M.13.K.1 Use a calendar to determine elapsed time using the terms yesterday, today and tomorrow	M.13.1.1 Use a calendar to determine <i>elapsed time</i> involving a time period of one week	M.13.2.1 Use a calendar to determine <i>elapsed time</i> involving a time period within a given month	M.13.3.1 Use a calendar to determine <i>elapsed time</i> from month to month	M.13.4.1 Using a calendar to determine <i>elapsed time</i> from month to month
Clock	M.13.K.2 Tell time to the hour the nearest hour using <i>analog</i> and digital clock	M.13.1.2 Tell time to the half-hour	M.13.2.2 Tell time to the nearest five-minute interval	M.13.3.2 Tell time to the nearest one-minute intervals M.13.3.3 Express time to the half hour and quarter hour using the terms half-past, quarter after, quarter -until	M.13.4.2 Solve problems involving conversions between minutes and hours M.13.4.3 Restate the time in multiple ways given an <i>analog</i> clock to the nearest one-minute

Strand: Measurement

Standard 13: Systems of Measurement

Students shall identify and use units, systems and processes of measurement

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Elapsed Time	<p>M.13.K.3</p> <p>Order events based on time</p> <p>Ex.</p> <ul style="list-style-type: none"> • Activities that take long or short time • Review what we do first, next, last • Recall what we did or plan to do yesterday, today, and tomorrow 	<p>M.13.1.3</p> <p>Determine <i>elapsed time</i> (to the hour) in <i>contextual situations</i></p> <p><u>End time unknown</u></p> <p>Ex.</p> <p>Lunch began at 11:00 and lasted 1 hour. When was lunch over? <u>Elapsed hours unknown</u></p> <p>Ex.</p> <p>John went to Tim's house at 3:00. He left at 5:00. How long did he stay? <u>Beginning time unknown</u></p> <p>Ex.</p> <p>Mary watched a movie for 2 hours. The movie ended at 8:00. When did the movie begin?</p>	<p>M.13.2.3</p> <p>Determine <i>elapsed time</i> in <i>contextual situations</i> in hour increments regardless of starting time</p> <p><u>End time unknown</u></p> <p>Ex.</p> <p>Lunch began at 11:15 and lasted 1 hour. When was lunch over? <u>Elapsed hours unknown</u></p> <p>Ex.</p> <p>John went to Tim's house at 3:20. He left at 5:20. How long did he stay? <u>Beginning time unknown</u></p> <p>Ex.</p> <p>Mary watched a movie for 2 hours. The movie ended at 8:30. When did the movie begin?</p>	<p>M.13.3.4</p> <p>Determine <i>elapsed time</i> in <i>contextual situations</i> to five-minute intervals</p> <p><u>End time unknown</u></p> <p>Ex.</p> <p>Lunch began at 10:45 and lasted 25 minutes. When was lunch over? <u>Elapsed hours unknown</u></p> <p>Ex.</p> <p>John went to Tim's house at 3:15. He left at 4:20. How long did he stay?</p>	<p>M.13.4.4</p> <p>Determine <i>elapsed time</i> in <i>contextual situations</i> to five-minute intervals with beginning time unknown</p> <p>Ex.</p> <p>Mary watched a movie for 1 hour and 15 minutes. The movie ended at 8:15. When did the movie begin?</p>

Strand: Measurement

Standard 13: Systems of Measurement

Students shall identify and use units, systems and processes of measurement

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Money		<p>M.13.1.4 Determine the value of a small collection of coins (with a total value up to one dollar) using one or two different types of coins, including pennies, nickels, dimes and quarters</p> <p>M.13.1.5 Represent and write the value of money using the cent sign</p> <p>M.13.1.6 Show different combination of coins that have the same value</p>	<p>M.13.2.4 Determine the value of a combination of coins up to the dollar</p> <p>M.13.2.5 Demonstrate a given value of money up to \$1.00 using a variety of coin combinations</p> <p>M.13.2.6 Demonstrate a given value of money up to \$1.00 using the fewest coins possible</p> <p>M.13.2.7 Represent and write the value of money using the cent sign and in decimal form when using the dollar sign</p>	<p>M.13.3.5 Determine the value of money up to \$10</p>	

Strand: Measurement

Standard 13: Systems of Measurement

Students shall identify and use units, systems and processes of measurement

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Money			<p>M.13.2.8 Calculate the amount of money, spent with and without <i>regrouping</i> in a <i>contextual situation</i> Ex. <ul style="list-style-type: none"> A notebook costs 43¢ and a pencil costs 24¢. How much will Joe spend on these supplies? Sue has 55¢. If pencils cost 10¢, how many can Sue buy? How much change will Sue get back? </p>	<p>M.13.3.6 Apply money concepts in <i>contextual situations</i> up to \$10.00 Ex. <ul style="list-style-type: none"> determine change with the least amount of currency compare money </p>	<p>M.13.4.5 Apply money concepts in <i>contextual situations</i> Ex. <ul style="list-style-type: none"> determine the better buy determine change back with the least amount of currency compare money </p>
Temperature			<p>M.13.2.9 Read temperatures on a Fahrenheit scale in intervals of ten</p>	<p>M.13.3.7 Read temperatures on Fahrenheit and Celsius scales in intervals of two and five</p>	<p>M.13.4.6 Read temperatures on Fahrenheit and Celsius scales</p>
Applications	<p>M.13.K.4 Name common tools for measurement (balance scale, ruler and thermometer)</p>	<p>M.13.1.7 Select the appropriate <i>non-standard</i> measurement tools for length, <i>capacity</i> and <i>mass</i></p>	<p>M.13.2.10 Select appropriate customary measurement tools (rulers, balance scale, cup and thermometer) for situations involving length, <i>capacity</i>, and <i>mass</i></p>	<p>M.13.3.8 Use appropriate customary measurement tools for length, <i>capacity</i> and <i>mass</i></p>	<p>M.13.4.7 Use appropriate customary and metric measurement tools for length, <i>capacity</i> and <i>mass</i></p>

Strand: Measurement

Standard 13: Systems of Measurement

Students shall identify and use units, systems and processes of measurement

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Applications	M.13.K.5 <i>Estimate</i> and measure length, <i>capacity/volume</i> and <i>mass</i> of familiar objects using <i>non-standard units</i>	M.13.1.8 <i>Estimate</i> and measure length, <i>capacity/volume</i> and <i>mass</i> with <i>non-standard units</i>	M.13.2.11 <i>Estimate</i> and measure length, <i>capacity/volume</i> and <i>mass</i> with <i>non-standard units</i> to recognize the need for <i>standard units</i>	M.13.3.9 <i>Estimate</i> and measure length, <i>capacity/volume</i> and <i>mass</i> using appropriate customary units <u>Length</u> : 1 inch <u>Perimeter</u> : inches, feet, etc <u>Area</u> : square inches (use models) <u>Weight</u> : pounds/ounces <u>Capacity</u> : cups, pints, quarts, gallons	M.13.4.8 <i>Estimate</i> and measure length, <i>capacity/volume</i> and <i>mass</i> using appropriate customary and metric units <u>Length</u> : 1/2 inch, 1 cm <u>Perimeter</u> : inches, feet, centimeters, meters <u>Area</u> : square inches, square feet, square centimeters, square meters <u>Weight</u> : pounds/ounces <u>Mass</u> : kilograms/grams <u>Capacity</u> : cups, pints, quarts, gallons <u>Volume</u> : liters
Perimeter	M.13.K.6 Surround a figure with objects (links, craft sticks, etc) and tell how many it takes to go around (<i>Perimeter</i> answers the question: How many units does it take to travel a path?)	M.13.1.9 Surround a figure with objects and tell how many it takes to go around	M.13.2.12 Determine <i>perimeter</i> using physical materials (paper clips, craft sticks or grids) and by using measurement tools (rulers)	M.13.3.10 Find the <i>perimeter</i> of a figure by measuring the length of the sides	M.13.4.9 Use <i>strategies</i> for finding the <i>perimeter</i> of a rectangle
Area	M.13.K.7 Cover a figure with one type of shape and tell how many it takes to cover (<i>Area</i> answers the questions: How much to cover?)	M.13.1.10 Cover a figure with squares and tell how many it takes	M.13.2.13 Find the <i>area</i> of a region by counting squares on a grid	M.13.3.11 Find the <i>area</i> of any region counting squares and half-squares	M.13.4.10 Use <i>strategies</i> for finding the <i>area</i> of a rectangle

Strand: Measurement

Standard 13: Systems of Measurement

Students shall identify and use units, systems and processes of measurement

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Volume			M.13.2.14 Compare and order containers of various shapes and sizes according to their <i>volume</i> (<i>Volume</i> is determined by the number of cubic units to fill the container)	M.13.3.12 Develop <i>strategies</i> for finding the <i>volume</i> (cubic units) of <i>rectangular prisms</i> and <i>cubes</i> using models	M.13.4.11 Use <i>strategies</i> to find the <i>volume</i> (cubic units) of <i>rectangular prisms</i> and <i>cubes</i>

Strand: Data Analysis and Probability

Standard 14: Data Representation

Students shall formulate questions that can be addressed with data and collect, organize and display relevant data to answer them

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Collect, Organize and display data	DAP.14.K.1 Explore and discuss data collection by collecting, organizing and displaying physical objects	DAP.14.1.1 Identify the purpose for data collection and collect, organize and display physical objects for describing the results	DAP.14.2.1 Identify the purpose for data collection and collect, organize, record and display the data using physical materials (<i>pictographs, Venn diagrams and vertical and horizontal bar graphs</i>)	DAP.14.3.1 Design a survey question after being given a topic and collect, organize, display and describe simple data using <i>frequency tables or line plots, pictographs, and bar graphs</i>	DAP.14.4.1 Create a data collection plan after being given a topic and collect, organize, display, describe and interpret simple data using <i>frequency tables or line plots, pictographs and bar graphs</i>

Strand: Data Analysis and Probability

Standard 15: Data Analysis

Students shall select and use appropriate statistical methods to analyze data

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES																																					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4																																
Data Analysis	DAP.15.K.1 Analyze and interpret concrete and <i>pictorial graphs</i> (i.e. <i>bar graphs</i> , <i>pictographs</i> , <i>Venn diagrams</i> , T-chart)	DAP.15.1.1 Analyze and interpret concrete and <i>pictorial graphs</i> (i.e. <i>bar graphs</i> , <i>pictographs</i> , <i>Venn diagrams</i> , T-chart) DAP.15.1.2 Make a true statement about the data displayed on a graph or chart (i.e. 5 people ride the bus)	DAP.15.2.1 Analyze and make predictions from data represented in charts and graphs DAP.15.2.2 Make true statements comparing data displayed on a graph or chart Ex. More children chose pizza than chicken <table border="1" style="margin-left: 20px;"> <tr><td>7</td><td>X</td><td></td><td></td></tr> <tr><td>6</td><td>X</td><td></td><td></td></tr> <tr><td>5</td><td>X</td><td>X</td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td></tr> <tr><td>3</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>2</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>1</td><td>X</td><td>X</td><td>X</td></tr> <tr><td></td><td>pizza</td><td>Hot dogs</td><td>chicken</td></tr> </table>	7	X			6	X			5	X	X		4	X	X		3	X	X	X	2	X	X	X	1	X	X	X		pizza	Hot dogs	chicken	DAP.15.3.1 Read and interpret <i>pictographs</i> and <i>bar graphs</i> in which symbols or intervals are greater than one DAP.15.3.2 Match a set of data with a graphical representation of the data	DAP.15.4.1 Represent and interpret <i>data</i> using <i>pictographs</i> , <i>bar graphs</i> and <i>line graphs</i> in which symbols or intervals are greater than one DAP.15.4.2 Match a set of data with a graphical representation of the data
7	X																																				
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2	X	X	X																																		
1	X	X	X																																		
	pizza	Hot dogs	chicken																																		

Strand: Data Analysis and Probability

Standard 16: Inferences and Predictions

Students shall develop and evaluate inferences and predictions that are based on data

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Inferences and Predictions		DAP.16.1.1 Explore making simple predictions for a given set of data	DAP.16.2.1 Make simple predictions for a given set of data	DAP.16.3.1 Make predictions for a given set of data	DAP.16.4.1 Make predictions for a given set of data

Strand: Data Analysis and Probability

Standard 17: Probability

Students shall understand and apply basic concepts of probability

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Probability	<p>DAP.17.K.1 Describe the <i>probability</i> of an event as being possible or not possible Ex. There are only apples in this bag. Could I pull a banana from this bag?</p>	<p>DAP.17.1.1 Describe the <i>probability</i> of an event as being more, less, or equally likely to occur Ex. There are 10 red <i>cubes</i> and 4 blue <i>cubes</i> in this bag. Which color are you more/less likely to pull from this bag?</p>	<p>DAP.17.2.1 Describe the <i>probability</i> of an event as being more, less, and equally likely to occur Ex. There are 5 blue <i>cubes</i>, 8 red <i>cubes</i>, and 1 yellow <i>cube</i> in this bag. Which color are you more/less likely to pull from this bag?</p>	<p>DAP.17.3.1 Use fractions to predict <i>probability</i> of an event Ex. If there were 5 blue tiles, 3 red tiles, and 2 green tiles in a bag What is the <i>probability</i> you would pull out a green tile?</p> <p>DAP.17.3.2 Conduct simple <i>probability</i> experiments, record the data and draw conclusions about the likelihood of possible <i>outcomes</i> (roll number <i>cubes</i>, pull tiles from a bag, spin a spinner, or determine the fairness of games)</p>	<p>DAP.17.4.1 Use fractions to predict <i>probability</i> of an event Ex. There are 5 blue tiles, 3 red tiles, and 2 green tiles What is the <i>probability</i> of pulling out a green tile?</p> <p>DAP.17.4.2 Conduct simple <i>probability</i> experiments, record the data and draw conclusions about the likelihood of possible <i>outcome</i> (roll number <i>cubes</i>, pull tiles from a bag, spin spinner, or determine the fairness of the game)</p>

Strand: Data Analysis and Probability

Standard 17: Probability

Students shall understand and apply basic concepts of probability

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Probability				DAP.17.3.3 Use physical models, pictures, and organized lists to find combinations of two sets of objects Ex. Sarah has a red shirt, white shirt, and blue shirt .She also has a pair of kaki pants and blue pants. How many different combinations of shirts and pants can she wear?	DAP.17.4.3 Find all possible combinations of two or three sets of objects

Strand: Number and Operations

Standard 1 Number Sense:

Students shall understand numbers, ways of representing numbers, relationships among numbers and number systems

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES

	Grade 5	Grade 6	Grade 7	Grade 8
Rational Numbers	<p>NO.1.5.1 Use models and visual representations to develop the concepts of the following: <u>Fractions:</u></p> <ul style="list-style-type: none"> • parts of unit wholes • parts of a collection • locations on number lines • locations on ruler (<i>benchmark fractions</i>) • divisions of whole numbers <p><u>Ratios:</u></p> <ul style="list-style-type: none"> • part-to-part (2 boys to 3 girls) • part-to-whole (2 boys to 5 people) <p><u>Percents:</u></p> <ul style="list-style-type: none"> • part-to-100 <p>NO.1.5.2 Develop understanding of decimal <i>place value</i> using models</p>	<p>NO.1.6.1 Demonstrate conceptual understanding to find a specific <i>percent</i> of a number, using models, real life examples, or explanations</p>	<p>NO.1.7.1 Relate, with and without models and <i>pictures</i>, concepts of <i>ratio</i>, <i>proportion</i>, and <i>percent</i>, including <i>percents</i> less than 1 and greater than 100</p> <p>NO.1.7.2 Demonstrate, with and without appropriate <i>technology</i>, an understanding of <i>place value</i> using powers of 10 and write numbers greater than one in <i>scientific notation</i></p>	<p>NO.1.8.1 Read, write, compare and solve problems, with and without appropriate <i>technology</i>, including numbers less than 1 in <i>scientific notation</i></p>

Strand: Number and Operations

Standard 1 Number Sense:

Students shall understand numbers, ways of representing numbers, relationships among numbers and number systems

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Rational Numbers	<p>NO.1.5.3 Identify decimal and <i>percent equivalents</i> for <i>benchmark fractions</i></p> <p>NO.1.5.4 Round and compare decimals to a given <i>place value</i> (<i>whole number, tenths, hundredths</i>)</p>	<p>NO.1.6.2 Find decimal and <i>percent equivalents</i> for proper fractions and explain why they represent the same value</p> <p>NO.1.6.3 Round and compare decimals to a given <i>place value</i> including thousandths</p>	<p>NO.1.7.3 Convert between <i>scientific notation</i> and <i>standard notation</i> using numbers greater than one.</p> <p>NO.1.7.4 Find decimal and <i>percent equivalents</i> for mixed numbers and explain why they represent the same value</p>	<p>NO.1.8.2 Convert between <i>scientific notation</i> and <i>standard notation</i>, including numbers from zero to one.</p>

Strand: Number and Operations

Standard 1 Number Sense:

Students shall understand numbers, ways of representing numbers, relationships among numbers and number systems

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Rational Numbers	<p>NO.1.5.5 Use <i>models</i> of <i>benchmark fractions</i> and their <i>equivalent</i> forms:</p> <ul style="list-style-type: none"> • to analyze the size of fractions • to determine that simplification does not change the value of the fraction • to convert between mixed numbers and improper fractions <p>NO.1.5.6 Use models to differentiate between <i>perfect squares</i> up to 100 and other numbers</p>	<p>NO.1.6.4 Convert, compare and order fractions (mixed numbers and improper fractions) decimals and <i>percents</i> and find their approximate locations on a number line</p> <p>NO.1.6.5 Recognize and identify <i>perfect squares</i> and their <i>square roots</i></p>	<p>NO.1.7.5 Compare and represent <i>integers</i>, fractions, decimals and mixed numbers and find their approximate location on a number line</p> <p>NO.1.7.6 Recognize subsets of the <i>real number system</i> (<i>natural, whole, integers, rational, and irrational numbers</i>)</p>	<p>NO.1.8.3 Compare and order <i>real numbers</i> including <i>irrational numbers</i> and find their approximate location on a number line (Use <i>technology</i> when appropriate)</p> <p>NO.1.8.4 Understand and justify classifications of numbers in the <i>real number system</i></p>

Strand: Number and Operations

Standard 2: Properties of Number Operations

Students shall understand meanings of operations and how they relate to one another

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Number Theory	<p>NO.2.5.1 Use <i>divisibility rules</i> to determine if a number is a <i>factor</i> of another number (2, 3, 5, 10)</p> <p>NO.2.5.2 Identify <i>commutative</i> and <i>associative properties</i></p> <p>NO.2.5.3 Identify the <i>distributive property</i> by using physical models to solve computation and real world problems</p>	<p>NO.2.6.1 Use <i>divisibility rules</i> to determine if a number is a <i>factor</i> of another number (4, 6, 9)</p> <p>NO.2.6.2 Apply the <i>distributive property</i> of multiplication over addition to simplify computations with <i>whole numbers</i></p> <p>NO.2.6.3 Apply the addition, subtraction, multiplication and division properties of equality to one-step <i>equations</i> with <i>whole numbers</i></p>	<p>NO.2.7.1 Apply the <i>distributive property</i> of multiplication over addition or subtraction to simplify computations with <i>integers</i>, fractions and decimals</p> <p>NO.2.7.2 Apply the addition, subtraction, multiplication and division properties of equality to one-step <i>equations</i> with <i>integers</i>, fractions, and decimals</p>	<p>NO.2.8.1 Apply the addition, subtraction, multiplication and division properties of equality to two-step <i>equations</i></p>

Strand: Number and Operations

Standard 2: Properties of Number Operations

Students shall understand meanings of operations and how they relate to one another

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
<i>Number theory</i>	<p>NO.2.5.4 Apply rules (conventions) for <i>order of operations</i> to <i>whole numbers</i> where the left to right computations are modified only by the use of parentheses</p>	<p>NO.2.6.4 Apply rules (conventions) for <i>order of operations</i> to <i>whole numbers</i> with and without parentheses</p>	<p>NO.2.7.3 Apply rules (conventions) for <i>order of operations</i> to <i>integers</i> and positive <i>rational numbers</i> including parentheses, brackets or exponents</p>	<p>NO.2.8.2 Understand and apply the <i>inverse</i> and <i>identity</i> properties</p> <p>NO.2.8.3 Use <i>inverse</i> relationships (addition and subtraction, multiplication and division, squaring and <i>square roots</i>) in problem solving situations</p> <p>NO.2.8.4 Apply rules (conventions) for <i>order of operations</i> to <i>rational numbers</i></p>
Understand Operations	<p>NO.2.5.5 Model addition, subtraction, and multiplication of fractions with like and unlike denominators and decimals</p>	<p>NO.2.6.5 Model multiplication and division of fractions (including mixed numbers) and decimals using pictures and physical objects Ex. weight, money and measuring cups</p>	<p>NO.2.7.4 Model and develop addition, subtraction, multiplication and division of <i>integers</i></p>	<p>NO.2.8.5 Model and develop addition, subtraction, multiplication and division of <i>rational numbers</i> Ex. $-8\frac{1}{2} + 2\frac{3}{4}$</p>

Strand: Number and Operations

Standard 3: Numerical Operations and Estimation

Students shall compute fluently and make reasonable estimates

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Computational Fluency	<p>NO.3.5.1 Develop and use a variety of <i>algorithms</i> with <i>computational fluency</i> to perform <i>whole number</i> operations using addition and subtraction (up to five-<i>digit</i> numbers), multiplication (up to three-<i>digit</i> x two-<i>digit</i>), division (up to two-<i>digit</i> divisor) interpreting remainders, including real world problems</p> <p>NO.3.5.2 Develop and use <i>algorithms</i>:</p> <ul style="list-style-type: none"> • to add and subtract numbers containing decimals (up to thousandths place) • to multiply decimals (hundredths x tenths) • to divide decimals by <i>whole number</i> divisors • to add and subtract fractions with like denominators 	<p>NO.3.6.1 Apply, with and without appropriate <i>technology</i>, <i>algorithms</i> with <i>computational fluency</i> to perform <i>whole number</i> operations (+, -, x, /)</p> <p>NO.3.6.2 Develop and analyze <i>algorithms</i> for computing with fractions (including mixed numbers) and decimals and demonstrate, with and without <i>technology</i>, <i>computational fluency</i> in their use and justify the solution</p>	<p>NO.3.7.1 Compute, with and without appropriate <i>technology</i>, with <i>integers</i> and positive <i>rational numbers</i> using real world situations to solve problems</p>	<p>NO.3.8.1 Compute, with and without appropriate <i>technology</i>, with <i>rational numbers</i> in multi-step problems</p>

Strand: Number and Operations

Standard 3: Numerical Operations and Estimation

Students shall compute fluently and make reasonable estimates

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Computational Fluency	NO.3.5.3 Solve, with and without appropriate <i>technology</i> , two-step problems using a variety of methods and tools (i.e. objects, mental computation, paper and pencil)	NO.3.6.3 Solve, with and without appropriate <i>technology</i> , multi-step problems using a variety of methods and tools (i.e., objects, mental computation, paper and pencil)	NO.3.7.2 Solve with and without appropriate <i>technology</i> , multi-step problems using a variety of methods and tools (i.e., objects, mental computation, paper and pencil)	NO.3.8.2 Solve, with and without appropriate <i>technology</i> , multi-step problems using a variety of methods and tools (i.e. objects, mental computation, paper and pencil)
Estimation	NO.3.5.4 Develop and use <i>strategies</i> to <i>estimate</i> the results of <i>whole number</i> computations and to judge the reasonableness of such results	NO.3.6.4 <i>Estimate</i> reasonable solutions to problem situations involving fractions and decimals Ex. $7/8 + 12/13 \approx 2$ $4.23 \times 5.8 \approx 24$	NO.3.7.3 Determine when an <i>estimate</i> is sufficient and use <i>estimation</i> to decide whether answers are reasonable in problems including fractions and decimals	NO.3.8.3 Use <i>estimation</i> to solve problems involving <i>rational numbers</i> ; including <i>ratio</i> , <i>proportion</i> , <i>percent</i> (increase or decrease) then judge the reasonableness of solutions

Strand: Number and Operations

Standard 3: Numerical Operations and Estimation

Students shall compute fluently and make reasonable estimates

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Application of Computation	<p>NO.3.5.5 Use <i>factors</i> of numbers:</p> <ul style="list-style-type: none"> to introduce exponents Ex. $36= 6 \times 6$ or 6^2 to find common <i>factors</i> of two numbers to simplify fractions to the lowest terms 	<p>NO.3.6.5 Find and use <i>factorization (tree diagram)</i> including <i>prime factorization</i> of composite numbers (expanded and exponential notation) to determine the greatest common factor (<i>GCF</i>) and least common multiple (<i>LCM</i>)</p> <p>NO.3.6.6 Use proportional reasoning and <i>ratios</i> to represent problem situations and determine the reasonableness of solutions with and without appropriate <i>technology</i> (Ex. unit <i>rates</i>)</p> <p>NO.3.6.7 Determine the <i>percent</i> of a number and solve related problems in real world situations Ex. tip, sales tax, discounts, etc</p>	<p>NO.3.7.4 Apply <i>factorization, LCM, and GCF</i> to solve problems using more than two numbers and explain the solution</p> <p>NO.3.7.5 Represent and solve problem situations that can be modeled by and solved using concepts of <i>absolute value</i>, exponents and <i>square roots</i> (for <i>perfect squares</i>) with and without appropriate <i>technology</i></p> <p>NO.3.7.6 Solve, with and without <i>technology</i>, real world <i>percent</i> problems Ex. $I=PRT$</p>	<p>NO.3.8.4 Apply factorization to find <i>LCM</i> and <i>GCF</i> of <i>algebraic expressions</i> Ex. $4x^2y^3$ $6xy^2$ $GCF=2xy^2$ $LCM=12x^2y^3$</p> <p>NO.3.8.5 Calculate and find approximations of <i>square roots</i> with appropriate <i>technology</i></p> <p>NO.3.8.6 Solve, with and without <i>technology</i>, real world <i>percent</i> problems including <i>percent</i> of increase or decrease</p>

Strand: Algebra

Standard 4: Patterns, Relations and Functions

Students shall recognize, describe, and develop patterns, relations and functions

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Patterns, Relations and Functions	<p>A.4.5.1 Solve problems by finding the next term or missing term in a <i>pattern</i> or <i>function</i> table using real world situations</p> <p>A.4.5.2 Interpret and write a rule for a one operation <i>function table</i> Ex. adding 3</p>	<p>A.4.6.1 Solve problems by finding the next term or missing term in a <i>pattern</i> or <i>function</i> table using real world situations</p> <p>A.4.6.2 Interpret and write an <i>algebraic</i> rule for a one operation <i>function table</i> Ex. $y=x+ 3$</p>	<p>A.4.7.1 Create and complete a <i>function</i> table (<i>input/output</i>) using a given rule with two operations</p> <p>A.4.7.2 Identify and extend <i>patterns</i> in real world situations</p> <p>A.4.7.3 Interpret and write a rule for a two operation <i>function table</i> Ex. multiply by 2, add 1</p>	<p>A.4.8.1 Find the n^{th} term in a <i>pattern</i> or a <i>function</i> table</p> <p>A.4.8.2 Using real world situations, describe <i>patterns</i> in words, tables, pictures, and symbolic representations</p> <p>A.4.8.3 Interpret and represent a two operation <i>function</i> as an <i>algebraic equation</i> Ex. $y = 2x + 1$</p> <p>A.4.8.4 Use tables, graphs, and <i>equations</i> to identify <i>independent/dependent variables</i> (<i>input/output</i>)</p>

Strand: Algebra

Standard 5: Algebraic Representations

Students shall represent and analyze mathematical situations and structures using algebraic symbols

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Expressions, Equations and Inequalities	<p>A.5.5.1 Model and solve simple <i>equations</i> by informal methods using manipulatives and appropriate <i>technology</i></p> <p>A.5.5.2 Write <i>expressions</i> containing one <i>variable</i> (a letter representing an unknown quantity) using rules for addition and subtraction</p> <p>A.5.5.3 Select, write and evaluate <i>algebraic expressions</i> with one <i>variable</i> by substitution Ex. Evaluate $x+4$ if $x=7$</p>	<p>A.5.6.1 Model, write and solve one-step <i>equations</i> by informal methods using manipulatives and appropriate <i>technology</i></p> <p>A.5.6.2 Write simple <i>algebraic expressions</i> using appropriate operations (+, -, x, /) with one <i>variable</i></p> <p>A.5.6.3 Evaluate <i>algebraic expressions</i> with one <i>variable</i> using appropriate properties and operations (+, -, x, /)</p>	<p>A.5.7.1 Solve and graph one-step <i>linear equations</i> and <i>inequalities</i> using a variety of methods (i.e., hands-on, <i>inverse operations</i>, symbolic) with real world application with and without <i>technology</i></p> <p>A.5.7.2 Solve simple <i>linear equations</i> using <i>integers</i> and graph on a <i>coordinate plane</i> Ex. use a T chart</p> <p>A.5.7.3 Translate phrases and sentences into <i>algebraic expressions</i> and <i>equations</i> including parentheses and positive and <i>rational numbers</i> and simplify <i>algebraic expressions</i> by combining like terms</p> <p>A.5.7.4 Write and evaluate <i>algebraic expressions</i> using positive <i>rational numbers</i></p>	<p>A.5.8.1 Solve and graph two-step <i>equations</i> and <i>inequalities</i> with one <i>variable</i> and verify the reasonableness of the result with real world application with and without <i>technology</i></p> <p>A.5.8.2 Solve and graph <i>linear equations</i> (in the form $y=mx+b$)</p> <p>A.5.8.3 Translate sentences into <i>algebraic equations</i> and <i>inequalities</i> and combine like terms within <i>polynomials</i></p> <p>A.5.8.4 Write and evaluate <i>algebraic expressions</i> using <i>rational numbers</i></p>

Strand: Algebra

Standard 6: Algebraic Models

Students shall develop and apply mathematical models to represent and understand quantitative relationships

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Algebraic Models and Relationships	A.6.5.1 Draw conclusions and make predictions, with and without appropriate <i>technology</i> , from models, tables and <i>line graphs</i>	A.6.6.1 Complete, with and without appropriate <i>technology</i> , and interpret tables and <i>line graphs</i> that represent the relationship between two <i>variables</i> in <i>quadrant I</i> Ex. time and distance	A.6.7.1 Use tables and graphs to represent <i>linear equations</i> by plotting, with and without appropriate <i>technology</i> , points in a <i>coordinate plane</i> A.6.7.2 Represent, with and without appropriate <i>technology</i> , <i>linear equations</i> by plotting and graphing points in the <i>coordinate plane</i> using all four <i>quadrants</i> given data in a table from a real world situation, A.6.7.3 Create and complete a <i>function table (input/output)</i> using a given rule with two operations in real world situations	A.6.8.1 Describe, with and without appropriate <i>technology</i> , the relationship between the graph of a line and its equation, including being able to explain the meaning of slope as a constant rate of change (rise/run) and <i>y-intercept</i> in real world problems A.6.8.2 Represent, with and without appropriate <i>technology</i> , <i>linear relationships</i> concretely, using tables, graphs and <i>equations</i> . A.6.8.3 Differentiate between <i>independent/dependent variables</i> given a <i>linear relationship</i> in context A.6.8.4 Represent, with and without appropriate <i>technology</i> , simple exponential and/or quadratic <i>functions</i> using verbal descriptions, tables, graphs and formulas and translate among these representations

Strand: Algebra

Standard 7: Analysis of Change

Students shall analyze change in various contexts

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Analyze Change	A.7.5.1 Model and describe quantities that change using real world situations Ex. age and height	A.7.6.1 Identify and compare situations with constant or varying <i>rates</i> of change Ex. a student's rate of growth each year is a varying rate, hourly wages is a constant rate	A.7.7.1 Use, with and without appropriate <i>technology</i> , tables and graphs to compare and identify situations with constant or varying <i>rates</i> of change	A.7.8.1 Use, with and without <i>technology</i> , graphs of real life situations to describe the relationships and analyze change including graphs of change (cost per minute) and graphs of accumulation (total cost)

Strand: Geometry

Standard 8: Geometric Properties

Students shall analyze characteristics and properties of 2 and 3 dimensional geometric shapes and develop mathematical arguments about geometric relationships

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Characteristics of Geometric Shapes	<p>G.8.5.1 Identify and model regular and <i>irregular polygons</i> including decagon</p> <p>G.8.5.2 Identify and draw <i>congruent, adjacent, obtuse, acute, right</i> and <i>straight</i> angles (Label parts of an angle: <i>vertex, rays, interior</i> and <i>exterior</i>)</p>	<p>G.8.6.1 Identify <i>three-dimensional</i> geometric figures using models (<i>rectangular prisms, cylinders, cones, pyramids</i> and <i>spheres</i>)</p> <p>G.8.6.2 Investigate with manipulatives or grid paper what happens to the <i>perimeter</i> and <i>area</i> of a <i>two-dimensional</i> shape when the dimensions are changed Ex. length of sides are doubled</p> <p>G.8.6.3 Identify, describe, draw, and classify triangles as <i>equilateral, isosceles, scalene, right, acute, obtuse</i>, and <i>equiangular</i></p>	<p>G.8.7.1 Identify, draw, classify and compare geometric figures using models and real world examples</p> <p>G.8.7.2 Investigate geometric properties and their relationships in one-, <i>two-</i>, and <i>three-dimensional</i> models, including convex and concave <i>polygons</i></p> <p>G.8.7.3 Recognize the pairs of angles formed and the relationship between the angles including <i>two intersecting lines</i> and <i>parallel lines</i> cut by a <i>transversal</i> (<i>vertical, supplementary, complementary, corresponding, alternate interior, alternate exterior angles</i> and <i>linear pair</i>)</p>	<p>G.8.8.1 Form generalizations and validate conclusions about properties of geometric shapes</p> <p>G.8.8.2 Make, with and without appropriate <i>technology</i>, and test <i>conjectures</i> about characteristics and properties between <i>two-dimensional</i> figures and <i>three-dimensional</i> objects Ex. circle vs. cylinder, square vs. <i>cube</i></p>

Strand: Geometry

Standard 8: Geometric Properties

Students shall analyze characteristics and properties of 2 and 3 dimensional geometric shapes and develop mathematical arguments about geometric relationships

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Characteristics of Geometric Shapes	<p>G.8.5.3 Model and identify circle, <i>radius, diameter, center, circumference</i> and <i>chord</i></p> <p>G.8.5.4 Model and identify the properties of <i>congruent</i> figures</p>	<p>G.8.6.4 Draw, label and determine relationships among the <i>radius, diameter, center</i> and <i>circumference</i> (e.g. <i>radius</i> is half the <i>diameter</i>) of a circle</p> <p>G.8.6.5 Identify <i>similar figures</i> and explore their properties</p>	<p>G.8.7.4 Use paper or physical models to determine the sum of the measures of <i>interior angles</i> of triangles and <i>quadrilaterals</i></p> <p>G.8.7.5 <i>Model</i> and develop the concept that π (π) is the <i>ratio</i> of the <i>circumference</i> to the <i>diameter</i> of any circle</p> <p>G.8.7.6 Develop the properties of <i>similar figures</i> (<i>ratio</i> of sides and <i>congruent angles</i>)</p>	<p>G.8.8.3 Determine appropriate application of geometric ideas and relationships, such as <i>congruence</i>, similarity, and the <i>Pythagorean theorem</i>, with and without appropriate <i>technology</i></p>

Strand: Geometry

Standard 9: Transformation of Shapes

Students shall apply transformations and the use of symmetry to analyze mathematical situations

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Symmetry and Transformations	G.9.5.1 Predict and describe the results of <i>translation (slide)</i> , <i>reflection (flip)</i> , <i>rotation (turn)</i> , showing that the transformed shape remains unchanged	G.9.6.1 Identify and describe <i>line</i> and <i>rotational symmetry</i> in <i>two-dimensional</i> shapes, <i>patterns</i> and designs G.9.6.2 Describe positions and orientations of shapes under <i>transformation (translation, reflection and rotation)</i> recognizing the size and shape do not change	G.9.7.1 Examine the congruence, similarity, and <i>line</i> or <i>rotational symmetry</i> of objects using <i>transformations</i> G.9.7.2 Perform <i>translations</i> and <i>reflections</i> of <i>two-dimensional</i> figures using a variety of methods (paper folding, tracing, graph paper)	G.9.8.1 Determine a <i>transformation's line of symmetry</i> and compare the properties of the figure and its <i>transformation</i> G.9.8.2 Draw the results of <i>translations</i> and <i>reflections</i> about the x- and y-axis and <i>rotations</i> of objects about the origin

Strand: Geometry

Standard 10: Coordinate Geometry

Students shall specify locations and describe spatial relationships using coordinate geometry and other representational systems

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Coordinate Geometry	G.10.5.1 Use geometric vocabulary (horizontal/x-axis, vertical/ y-axis, <i>ordered pairs</i>) to describe the location and plot points in <i>Quadrant I</i>	G.10.6.1 Use <i>ordered pairs</i> to plot points in <i>Quadrant I</i> G.10.6.2 Plot points that form the <i>vertices</i> of a geometric figure and draw, identify and classify the figure.	G.10.7.1 Plot points in the <i>coordinate plane</i> G.10.7.2 Plot points that form the <i>vertices</i> of a geometric figure and draw, identify and classify the figure.	G.10.8.1 Use coordinate geometry to explore the links between geometric and algebraic representations of problems (lengths of segments/distance between points, <i>slope/perpendicular-parallel lines</i>)

Strand: Geometry

Standard 11: Visualization and Geometric Models

Students shall use visualization, spatial reasoning and geometric modeling

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Spatial Visualization and Models	G.11.5.1 Using grid paper, draw and identify <i>two-dimensional patterns (nets)</i> for <i>cubes</i>	G.11.6.1 Identify <i>two-dimensional patterns (nets)</i> for <i>three-dimensional</i> solids, such as <i>prisms, pyramids, cylinders, and cones</i>	G.11.7.1 Build <i>three-dimensional</i> solids from <i>two-dimensional patterns (nets)</i> G.11.7.2 Construct a building out of <i>cubes</i> from a set of views (front, top, side)	G.11.8.1 Using isometric dot paper interpret and draw different views of buildings

Strand: Measurement

Standard 12: Physical Attributes

Students shall use attributes and tools of measurement to describe and compare mathematical and real-world objects

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Attributes and Tools	<p>M.12.5.1 Identify and select appropriate units and tools to measure Ex. angles with degrees, distance with feet</p> <p>M.12.5.2 Make conversions within the customary measurement system in real world problems Ex. hours to minutes, feet to inches, quarts to gallons, etc</p> <p>M.12.5.3 Establish through experience benchmark prefixes of milli-, centi-, and kilo-</p>	<p>M.12.6.1 Identify and select appropriate units and tools from both systems to measure Ex. angles with degrees, distance with feet/meters</p> <p>M.12.6.2 Make conversions within the same measurement system in real world problems Ex. hours to minutes to seconds, meters to centimeters, feet to inches, liters to milliliters, quarts to gallons, etc</p>	<p>M.12.7.1 Understand, select and use the appropriate units and tools (metric and customary) to measure length, weight, <i>mass</i> and <i>volume</i> to the required degree of accuracy for real world problems</p> <p>M.12.7.2 Understand relationships among units within the same system</p>	<p>M.12.8.1 Understand, select and use, with and without appropriate <i>technology</i>, the appropriate units and tools to measure angles, <i>perimeter</i>, <i>area</i>, <i>surface area</i> and <i>volume</i> to solve real world problems</p> <p>M.12.8.2 Describe and apply equivalent measures using a variety of units within the same system of measurement</p>

Strand: Measurement

Standard 12: Physical Attributes

Students shall use attributes and tools of measurement to describe and compare mathematical and real-world objects

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Attributes and Tools	<p>M.12.5.4 Understand when to use linear units to describe <i>perimeter</i>, square units to describe <i>area</i> or <i>surface area</i>, and cubic units to describe <i>volume</i>, in real world situations</p> <p>M.12.5.5 Model the differences between covering the <i>faces</i> (<i>surface area/nets</i>) and filling the <i>interior</i> (<i>volume of cubes</i>)</p>	<p>M.12.6.3 Compare and contrast the differences among linear units, square units, and cubic units</p>	<p>M.12.7. 3 Find different <i>areas</i> for a given <i>perimeter</i> and find a different <i>perimeter</i> for a given <i>area</i></p>	

Strand: Measurement

Standard 13: Systems of Measurement

Students shall identify and use units, systems and processes of measurement

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Attributes and Tools	<p>M.13.5.1 Solve real world problems involving one <i>elapsed time</i>, counting forward (calendar and clock)</p> <p>M.13.5.2 Determine which unit of measure or measurement tool matches the context for a problem situation</p> <p>M.13.5.3 Draw and measure distance to the nearest cm and $\frac{1}{4}$ inch accurately</p> <p>M.13.5.4 Develop and use <i>strategies</i> to solve real world problems involving <i>perimeter</i> and <i>area</i> of rectangles</p>	<p>M.13.6.1 Solve real world problems involving one <i>elapsed time</i>, counting forward and backward (calendar and clock)</p> <p>M.13.6.2 Determine which unit of measure or measurement tool matches the context for a problem situation</p> <p>M.13.6.3 Draw and measure distance to the nearest mm and $\frac{1}{8}$ inch accurately</p> <p>M.13.6.4 Establish and apply formulas to find <i>area</i> and <i>perimeter</i> of triangles, rectangles, and parallelograms</p>	<p>M.13.7.1 Solve real world problems involving two or more <i>elapsed times</i>, counting forward and backward (calendar and clock)</p> <p>M.13.7.2 Draw and measure distance to the nearest mm and $\frac{1}{16}$ inch accurately</p> <p>M.13.7.3 Develop and use <i>strategies</i> to solve problems involving <i>area</i> of a <i>trapezoid</i> and <i>circumference</i> and <i>area</i> of a circle</p>	<p>M.13.8.1 Draw and apply measurement skills with <i>fluency</i> to appropriate levels of precision</p>

Strand: Measurement

Standard 13: Systems of Measurement

Students shall identify and use units, systems and processes of measurement

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Applications	<p>M.13.5.5 Count the distance between two points on a horizontal or vertical line and compare the lengths of the paths on a grid Ex. shortest path, paths of equal length, etc</p> <p>M.13.5.6 Use benchmark angles to estimate the measure of angles Ex. 45 degrees, 90 degrees, 120 degrees, 180 degrees</p>	<p>M.13.6.5 Find the distance between two points on a number line</p> <p>M.13.6.6 Use estimation to check the reasonableness of measurements obtained from use of various instruments (including angle measures)</p>	<p>M.13.7.4 Derive and use formulas for <i>surface area</i> and <i>volume</i> of <i>prisms</i> and <i>cylinders</i> and justify them using geometric models and common materials</p> <p>M.13.7.5 Apply properties (<i>scale factors</i>, <i>ratio</i>, and <i>proportion</i>) of <i>congruent</i> or <i>similar</i> triangles to solve problems involving missing lengths and angle measures</p> <p>M.13.7.6 Find the distance between two points on a number line and locate the midpoint</p> <p>M.13.7.7 Estimate and compute the <i>area</i> of more complex or irregular <i>two-dimensional</i> shapes by dividing them into more basic shapes</p>	<p>M.13.8.2 Solve problems involving <i>volume</i> and <i>surface area</i> of <i>pyramids</i>, <i>cones</i> and composite figures, with and without appropriate <i>technology</i></p> <p>M.13.8.3 Apply proportional reasoning to solve problems involving indirect measurements, scale drawings or rates</p> <p>M.13.8.4 Find the distance between two points on a <i>coordinate plane</i> using with the <i>Pythagorean theorem</i></p> <p>M.13.8.5 Estimate and compute the <i>area</i> of irregular <i>two-dimensional</i> shapes</p>

Strand: Data Analysis and Probability

Standard 14: Data Representation

Students shall formulate questions that can be addressed with data and collect, organize and display

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Collect, organize and display data	<p>DAP.14.5.1 Develop appropriate questions for surveys</p> <p>DAP.14.5.2 Collect <i>numerical</i> and <i>categorical data</i> using surveys, observations and experiments that would result in <i>bar graphs, line graphs, line plots</i> and <i>stem-and-leaf plots</i></p> <p>DAP.14.5.3 Construct and interpret <i>frequency tables, charts, line plots, stem-and-leaf plots</i> and <i>bar graphs</i></p>	<p>DAP.14.6.1 Formulate questions, design studies, and collect data about a characteristic shared by two populations or different characteristics within one population</p> <p>DAP.14.6.2 Collect data and select appropriate graphical representations to display the data including <i>Venn diagrams</i></p> <p>DAP.14.6.3 Construct and interpret graphs, using correct scale, including <i>line graphs</i> and <i>double-bar graphs</i></p>	<p>DAP.14.7.1 Identify different ways of selecting samples and compose appropriate questions Ex. survey response, random sample, representative sample and convenience sample</p> <p>DAP.14.7.2 Explain which types of display are appropriate for various data sets (<i>line graph</i> for change over time, <i>circle graph</i> for part-to-whole comparison, <i>scatter plot</i> for trends)</p> <p>DAP.14.7.3 Construct and interpret <i>circle graphs, box-and-whisker plots, histograms, scatter plots</i> and <i>double line graphs</i> with and without appropriate <i>technology</i></p>	<p>DAP.14.8.1 Design and conduct investigations which include</p> <ul style="list-style-type: none"> • adequate number of trials • unbiased sampling • accurate measurement • record-keeping <p>DAP.14.8.2 Explain which types of display are appropriate for various data sets (<i>scatter plot</i> for relationship between two variants and <i>line of best fit</i>)</p> <p>DAP.14.8.3 Interpret or solve real world problems using data from charts, <i>line plots, stem-and-leaf plots, double-bar graphs, line graphs, box-and whisker plots, scatter plots, frequency tables</i> or <i>double line graphs</i></p>

Strand: Data Analysis and Probability

Standard 15: Data Analysis

Students shall select and use appropriate statistical methods to analyze data

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Data Analysis	<p>DAP.15.5.1 Interpret graphs such as <i>line graphs, double bar graphs, and circle graphs</i></p> <p>DAP.15.5.2 Determine, with and without appropriate <i>technology</i>, the <i>range, mean, median and mode (whole number data sets)</i> and explain what each indicates about the set of data</p>	<p>DAP.15.6.1 Interpret graphs such as <i>double line graphs and circle graphs</i></p> <p>DAP.15.6.2 Compare and interpret information provided by measures of <i>central tendencies (mean, median and mode)</i> and <i>measures of spread (range)</i></p>	<p>DAP.15.7.1 Analyze data displays, including ways that they can be misleading</p> <p>DAP.15.7.2 Analyze, with and without appropriate <i>technology</i>, a set of data by using and comparing measures of <i>central tendencies (mean, median, mode)</i> and <i>measures of spread (range, quartile, interquartile range)</i></p>	<p>DAP.15.8.1 Compare and contrast the reliability of data sets with different size populations Ex. 40/80 vs. 40/800</p> <p>DAP.15.8.2 Analyze, with and without appropriate <i>technology</i>, graphs by comparing measures of <i>central tendencies</i> and <i>measures of spread</i></p> <p>DAP.15.8.3 Given at least one of the measures of <i>central tendency</i> create a data set</p> <p>DAP.15.8.4 Describe how the inclusion of <i>outliers</i> affects those measures</p>

Strand: Data Analysis and Probability

Standard 16: Inferences and Predictions

Students shall develop and evaluate inferences and predictions that are based on data

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Inferences and Predictions	DAP.16.5.1 Make predictions and justify conclusions based on data	DAP.16.6.1 Use observations about differences in data to make justifiable inferences	DAP.16.7.1 Make, with and without appropriate <i>technology</i> , <i>conjectures</i> of possible relationships in a <i>scatter plot</i> and approximate the <i>line of best fit (trend line)</i>	DAP.16.8.1 Use observations about differences between sets of data to make <i>conjectures</i> about the populations from which the data was taken

Strand: Data Analysis and Probability

Standard 17: Probability

Students shall understand and apply basic concepts of probability

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Probability	<p>DAP.17.5.1 Identify and predict the <i>probability</i> of events within a simple experiment</p> <p>DAP.17.5.2 List and explain all possible <i>outcomes</i> in a given situation</p>	<p>DAP.17.6.1 Distinguish between <i>theoretical</i> and <i>experimental probability</i></p>	<p>DAP.17.7.1 Understand that <i>probability</i> can take any value between 0 and 1 (events that are not going to occur have <i>probability</i> 0, events certain to occur have <i>probability</i> 1)</p> <p>DAP.17.7.2 Design, with and without appropriate <i>technology</i>, an experiment to test a <i>theoretical probability</i> and explain how the results may vary Ex. suggested materials for simulations are: two-color counters, a number <i>cube</i>, and spinners</p>	<p>DAP.17.8.1 Compute, with and without appropriate <i>technology</i>, probabilities of compound events, using organized lists, <i>tree diagrams</i> and <i>logic grid</i></p> <p>DAP.17.8.2 Make predictions based on <i>theoretical probabilities</i>, design and conduct an experiment to test the predictions, compare actual results to predict results, and explain differences Ex. suggested materials for simulations are: polyhedra die, random number table, and <i>technology</i></p>

Glossary for K-8 Mathematics Framework

<i>Absolute value</i>	A number's distance from zero on a number line Ex. The absolute value of 2 is equal to the absolute value of -2.
<i>Acute angle</i>	An angle whose measure is less than 90° and greater than 0°
<i>Addends</i>	Numbers that are being added in an addition problem
<i>Adjacent angles</i>	Two angles that have a common side and a common vertex and whose interiors do not overlap
<i>Algebraic equations</i>	A mathematical sentence involving at least one variable and sometimes numbers and operation symbols Ex. $n - 10 = 2$
<i>Algebraic expressions</i>	A mathematical phrase involving at least one variable and sometimes numbers and operation symbols Ex. $n - 2$
<i>Algorithm</i>	A rule or procedure used to complete an exercise or solve a problem
<i>Alternate interior angles</i>	A pair of angles formed when a third line (a transversal) crosses two other lines (These angles are on opposite sides of the transversal and are inside the other two lines.)
<i>Alternate exterior angles</i>	A pair of angles formed when a third line (a transversal) crosses two other lines (These angles are on opposite sides of the transversal and are outside the other two lines.)
<i>Analog clock</i>	A device with an hour, minute and second hand which shows a continuous sweep of time passing rather than in "jumps" Ex. digital
<i>Area</i>	The amount of space in square units
<i>Associative property</i>	The sum or product of three or more numbers is the same, regardless of how the numbers are paired Ex. $a + (b + c) = (a + b) + c$, $a \cdot (b \cdot c) = (a \cdot b) \cdot c$
<i>Attribute</i>	A characteristic of an object (color, shape, size)
<i>Bar graph</i>	A graph that uses horizontal or vertical bars to represent data that do not touch
<i>Basic measures</i>	The units of measurement used to find distance, capacity and weight (The Metric system measures distance with meters, capacity with liters, and mass with grams. The customary system measures distance with inches, feet, yards, and miles, capacity with cups, quarts, and gallons, and weight with ounces, pounds, and tons.)
<i>Benchmark fractions</i>	A fraction that can be used to estimate the size of other numbers: $0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1$
<i>Box and Whisker plot</i>	Organization of data in a graph that shows the minimum, first quartile, median, third quartile, and maximum values (The graph uses a rectangle (or box) to represent the middle 50% of the date (interquartile range) and line segments (or whiskers) at both ends to represent the remainder of the data.)
<i>Capacity</i>	The maximum amount of liquid a container can hold
<i>Categorical data</i>	Data that can be categorized, such as types of lunch food (Conversely, numerical data is data that is ordered numerically, such as heights of students.)
<i>Center of a circle</i>	The point in the plane of a circle equally distant from all points on the circle
<i>Central tendencies</i>	A single number that is used to describe a set of data (mean, median, mode)
<i>Chord</i>	A line segment joining any two points on a circle
<i>Circle graph</i>	A graph in which a circle and its interior are divided into parts to represent the parts of a set of data
<i>Circumference</i>	The distance around a circle or the maximum distance around a sphere

<i>Combinations</i>	Subsets chosen from a larger set of objects in which the order of the items does not matter Ex. the number of different committees of three that can be chosen from a group of twelve members
<i>Commutative property</i>	The sum or product of two numbers is the same, regardless of the order of the numbers. Ex. $a + b = b + a$, $a \cdot b = b \cdot a$
<i>Compatible numbers</i>	A pair of numbers that is easy to work with mentally, also known as friendly numbers Ex. The numbers 25 and 70 are compatible numbers for estimating $22 + 73$; the numbers 150 and 5 are compatible for estimating $148 \div 5$; the numbers 90 and 30 are compatible for estimating $91.3 \div 29.7$.
<i>Compensatory numbers</i>	Compensatory numbers are used to adjust numbers in a computation after the use of compatible numbers. Ex. $23 + 18 \sim 23 + 20 = 43$ (Since two was added to increase 18 to 20 as compatible numbers, two will be subtracted from 43 to compensate for the change. Therefore, two is the compensatory number.)
<i>Complementary angles</i>	Two angles that have measures with a sum of 90°
<i>Composite numbers</i>	A natural number that has more than two factors Ex. 9 is a composite number because it has more than two factors: 1, 3, 9
<i>Composite figure</i>	A figure that is made up of two or more shapes
<i>Composition</i>	A set of numbers together to form a new number using addition or multiplication
<i>Compound event</i>	An event consisting of two or more non-mutually exclusive events
<i>Computational fluency</i>	Computational fluency refers to having efficient and accurate methods for computing. (Students exhibit computational fluency when they demonstrate flexibility in the computational methods they choose, understand and can explain these methods, and produce accurate answers efficiently.)
<i>Concave</i>	A polygon with one or more diagonals that have points outside of the polygon
<i>Cone</i>	A three-dimensional shape having a circular base, a curved lateral surface, and one vertex
<i>Congruent</i>	(\cong) Having exactly the same size and shape Ex. If you put one figure on top of the other, they would match exactly.
<i>Conjecture</i>	Guesses or conclusions based on assumed or known knowledge, but without proof
<i>Contextual situations</i>	Relating a mathematical problem to a real modeled or illustrated circumstance
<i>Contiguous</i>	Touching, in actual contact, adjacent, and adjoining
<i>Convex</i>	A polygon with all interior angles measuring less than 180° (No segment that connects two vertices can be drawn outside of the polygon.)
<i>Coordinate plane</i>	A two dimensional system in which a location is described by its distance from two perpendicular number lines called (<i>Coordinate grid</i>) axes
<i>Corresponding angles</i>	(1) Two angles that lie on the same side of the transversal, in corresponding positions with respect to the two lines that the transversal intersects (The angles are congruent if the two lines are parallel.) (2) (2) When comparing two figures, angles in the same relative position are corresponding angles. (If the figures are similar or congruent, then the corresponding angles are congruent.)
<i>Cube</i>	A polyhedron with six square faces
<i>Cylinder</i>	A three-dimensional figure shaped like a can of soup
<i>Decimal number system</i>	A place value number system based on groupings by powers of ten

<i>Decompose</i>	The process of breaking a number into smaller units to simplify units for problem solving Ex: $64 + 26$ can be written as $(60 + 4) + (20 + 6)$, for the purpose of identifying compatible numbers.
<i>Dependent variable</i>	In a function, a variable whose value is determined by the value of the related independent variable
<i>Diameter</i>	A line segment that passes through the center of the circle and has endpoints on the circle (chord)
<i>Difference</i>	The result of a subtraction problem
<i>Digit</i>	A digit is any one of the basic symbols used to write a numeral. Ex: The numeral 23 is made up of the digits 2 and 3.
<i>Distributive property</i>	When one of the factors of a product is written as a sum or difference, multiplying each addend first does not change the original product. Ex. $3 \cdot (4 + 5) = (3 \cdot 4) + (3 \cdot 5)$
<i>Divisibility rules</i>	Patterns that make it easier to determine whether a whole number is divisible by another whole number, without actually doing the division
<i>Double bar graph</i>	A bar graph used to compare two similar kinds of data
<i>Double line graph</i>	A line graph with two or more lines or line segments that represent two or more sets of data that reflect change over time
<i>Edge</i>	The line formed where two faces of a three-dimensional figure intersect. Ex. A cube has 12 edges.
<i>Elapsed time</i>	An amount of time between two events
<i>Equalities</i>	A mathematical sentence that contains a symbol in which the terms on either side of the symbol are equal Ex. $7 = 7$, $7 = 3 + x$
<i>Equation</i>	A statement that two mathematical expressions are equal Ex. $5 + 3 = 8$ and $x + 7 = 15$ are equations.
<i>Equiangular</i>	All angles have the same measure. Ex. an equiangular quadrilateral where each angle measures 90°
<i>Equilateral shape</i>	A shape in which all have sides are the same length
<i>Equivalent</i>	Equal in value but in different form
<i>Estimate</i>	A close rather than an exact answer
<i>Even number</i>	Even numbers are numbers ending in a 2,4,6 or 8. (multiples of 2)
<i>Expanded notation</i>	A way to write numbers that reflect the place value of each digit Ex. $343 = 300 + 40 + 3$
<i>Experimental probability</i>	A statement of probability based on the results of a series of trials Experimental probability (event) = $\frac{\text{number of trials resulting in a favorable outcome}}{\text{Total number of trials in experiment}}$
<i>Explicit</i>	A formula whose dependent variable is defined in terms of the independent variable Ex. $y = 2x - 3$
<i>Exponential form</i>	A quantity expressed as a number raised to a power (In exponential form, 32 can be written as 2^5 .)
<i>Face</i>	A two-dimensional side of a three-dimensional figure Ex. The faces of a cube are squares.
<i>Factor</i>	One of two or more numbers that are multiplied together to get a product (13 and 4 are both factors of 52 because $13 \cdot 4 = 52$.)
<i>Flip (Reflection)</i>	(See Reflection.)
<i>Frequency table</i>	A table that shows how often each item, number, or range of numbers (interval) occurs in a set of data.

<i>Function table</i>	A table that lists pairs of numbers that shows a function (A set of ordered pairs such that for any input there is only one possible output.)
<i>Histogram</i>	A graphic representation of the frequency distribution of a continuous variable (Rectangles are drawn in such a way that their bases lie on a linear scale representing different intervals (bin width). Therefore, the variable on the x-axis is continuous. Frequency of occurrence appears on the y-axis.)
<i>Identity Property of Addition</i>	If you add zero to a number, the sum is the same as that given number. Ex. $8 + 0 = 8$ and $a + 0 = a$
<i>Identity Property of Multiplication</i>	If you multiply a number, the product is the same as that given number. Ex. $3.5 \cdot 1 = 3.5$ and $a \cdot 1 = a$
<i>Independent variable</i>	In a function, a variable that determines the value of the related dependent variable
<i>Inequality</i>	A mathematical sentence that compares two amounts using the symbols $<$, $>$, \leq , \geq , \neq .
<i>Inferences</i>	Generalizations that are useful in making predictions based on data
<i>Input/Output</i>	(See Independent variable and Dependent variable.) (<i>Independent variable/ Dependent variable</i>)
<i>Integers</i>	The set of whole numbers and their opposites $\{\dots-2, -1, 0, 1, 2\dots\}$
<i>Interquartile range</i>	The difference between the upper quartile and the lower quartile
<i>Intersecting lines</i>	Lines that cross and have exactly one point in common
<i>Inverse operation</i>	An operation that will undo another operation (Ex. addition and subtraction)
<i>Inverse property</i>	The result of two real numbers that combined will give the identity elements of zero or one (When a number is added to its additive inverse, the sum is zero. When a number is multiplied by its multiplicative inverse, the product is one.)
<i>Irrational numbers</i>	Real numbers that have infinite, but non-repeating, decimal representation
<i>Irregular polygons</i>	A polygon whose sides is not the same length and whose angles are not all congruent
<i>Isosceles triangle</i>	A triangle that has at least two congruent sides
<i>Line</i>	A straight path that extends infinitely in opposite directions
<i>Line of best fit</i>	A line, segment, or ray drawn on a scatter plot to estimate the relationship between two sets of data, also called a trend line
<i>Line graph</i>	A graph in which data points are connected by line or line segments that represent data and reflect change over time
<i>Line plot</i>	A sketch of data in which check marks, X's, or other symbols above a labeled number line show the frequency of each value
<i>Line of symmetry</i>	A line that divides a figure or figures into two congruent parts that are mirror images of each other
<i>Line segments</i>	Part of a line defined by two endpoints
<i>Line symmetry</i>	A figure that can be divided along a line so it has two congruent halves is said to have line symmetry.
<i>Linear equation</i>	An algebraic equation that describes a straight line
<i>Linear pair</i>	Two angles are said to be linear if they are adjacent angles formed by two intersecting lines and form a straight angle (180 degrees).
<i>Logic grid</i>	A grid of rows and columns used to organize information in a problem
<i>Mass</i>	The measure of the amount of matter of an object in the object's mass while an object's weight is a measure of the force with which gravity attracts the object (Although your mass is the same on earth as it is on the Moon, you weigh more on Earth because the attraction of gravity is greater on Earth.)
<i>Mean</i>	The sum of a set of numbers divided by the number of elements in the set (also referred to as average)
<i>Measures of spread</i>	Range

<i>Median</i>	The middle number (or the average of the two middle numbers, when necessary) in a set of numbers that are arranged from least to greatest
<i>Mode</i>	The number that occurs most often in a set of data (there may be one, more than one, or no mode)
<i>Multiple</i>	A number that is the product of the given number and an integer
<i>Natural numbers</i>	Counting numbers {1,2,3,4,5...}
<i>Nets</i>	A two-dimensional shape that can be folded to form a three-dimensional figure
<i>Non-linear</i>	Not a straight line
<i>Non-Standard units</i>	Informal units of measure such as handfuls, arms length, and stride.
<i>Number theory</i>	The exploration of properties and characteristics of numbers
<i>Numerical data</i>	Data consisting of numbers
<i>Obtuse angle</i>	An angle whose measure is greater than 90° and less than 180°
<i>Odd number</i>	A whole number that has 1, 3, 5, 7, or 9 in the ones' place that is not divisible by two
<i>Operation</i>	An action performed on one or two numbers producing a single number result (addition, subtraction, multiplication, division, opposite of a number, and square root of a number)
<i>Order of operations</i>	Rules describing what sequence to use in evaluating expressions
<i>Ordered pair</i>	A pair of numbers of the form (x, y) that give the location of a point on a coordinate plane (The first number in the ordered pair describes the horizontal distance and the second describes the vertical distance.)
<i>Ordinal number</i>	A number used to express position or order in a series, such as first, third, and tenth (Generally, ordinal numbers are used in dates.)
<i>Outcomes</i>	The results of an event (Heads and tails are the two outcomes of the event of tossing a coin.)
<i>Outlier</i>	Numerical data piece that is significantly larger or smaller than the rest of the data set
<i>Parallel lines</i>	Lines that are the same distance apart and never meet
<i>Patterns</i>	A model, plan, or rule using words or variables to describe a set of shapes or numbers that repeat in a predictable way
<i>Percent</i>	Means "hundredths" or "out of 100" Ex. $\frac{45}{100} = 45\%$
<i>Percentage</i>	The expression of a part of a whole (the whole of something is always 100 percent) in terms of hundredths
<i>Perfect square</i>	The product of a number times itself (The square root of any number that is not a perfect square is an irrational number.)
<i>Perimeter</i>	The sum of the lengths of the sides of a two-dimensional figure
<i>Perpendicular lines</i>	Two rays, lines, or line segments that form right angles
<i>Pi</i>	The ratio of the circumference of a circle to its diameter (Pi is the same for every circle, approximately 3.14)
<i>Pictograph</i>	A graph constructed with pictures or symbols (A pictograph makes it possible to compare at a glance the relative amounts of two or more counts or measures.)
<i>Pictorial models</i>	Pictures of items used in modeling
<i>Place value</i>	The relative worth of each number that is determined by its position
<i>Plane figure</i>	A figure that can be entirely contained in a single plane
<i>Polygon</i>	A closed two-dimensional figure made up of segments called sides, which intersect only at their endpoints called vertices
<i>Polyhedron</i>	A closed three-dimensional figure in which all the surfaces are polygons
<i>Polynomial</i>	An expression consisting of two or more terms

<i>Prime factorization</i>	A composite number expressed as the product of factors that are prime numbers
<i>Prism</i>	A polyhedron with two parallel faces (called bases) that are the same size and shape
<i>Probability</i>	A number from zero to one that indicates the likelihood that something (an event) will happen (The closer a probability is to one, the more likely it is that an event will happen.)
<i>Product</i>	The result of multiplication
<i>Proportion</i>	An equation $a/b = c/d$ that states that the two ratios are equivalent
<i>Pyramid</i>	A polyhedron in which one face (the base) is a polygon and the other faces are formed by triangles with a common vertex (the apex) (A pyramid is classified according to the shape of its base.)
<i>Pythagorean theorem</i>	In a right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse $(a^2 + b^2) = c^2$.
<i>Quadrilateral</i>	A polygon with four sides
<i>Quadrant</i>	Any of the four sections into which a rectangular coordinate grid is divided by the intersection of the x- and y-axes (The quadrants are numbered I, II, III, and IV, beginning at the upper right (where x- and y-coordinates are positives) and continuing counterclockwise.)
<i>Qualitative change</i>	Relating to or involving comparisons based on qualities
<i>Quantitative change</i>	Involving distinctions based on quantities
<i>Quartile</i>	The quartiles divide an ordered set of data into four groups of the same size
<i>Quotient</i>	The result of division of one quantity by another (dividend/divisor = quotient)
<i>Radius</i>	A line segment from the center of a circle or sphere to any point on the circle or sphere (also, the length of such a line segment)
<i>Range</i>	The difference between the maximum and minimum in a set of data
<i>Rate</i>	A comparison by division of two quantities with different units
<i>Ratio</i>	Comparisons of two quantities with like units (Ratios can be expressed with fractions, decimals, percents, or words. They can be written with a colon between the two numbers being compared.)
<i>Rational numbers</i>	Any number that can be written in the form a/b where a is any integer and b is any integer except zero
<i>Ray</i>	A part of a line that has one endpoint and extends endlessly in one direction
<i>Real numbers</i>	A set of numbers combining rational and irrational numbers
<i>Rectangular arrays</i>	A rectangular arrangement of objects in rows and columns in which each row has the same number of parts and each column has the same number of parts
<i>Rectangular prism</i>	A prism whose faces (including the bases) are all rectangles
<i>Reflection</i>	A transformation that "flips" a figure over a line or an object over a plane so that it becomes a mirror image of the original (same as a flip)
<i>Regrouping</i>	A process in a mathematical operation where numbers are renamed Ex. 2 tens and 14 ones are equivalent to 34.
<i>Regular polygon</i>	A polygon whose sides are the same lengths and whose angles are equal
<i>Rhombus</i>	A parallelogram whose sides are all the same length (The angles are usually not right angles, but they may be right angles.)
<i>Right angle</i>	An angle whose measure is ninety degrees
<i>Rotation</i>	A transformation obtained by rotating a figure around a given point often referred to as a turn (same as a turn)

<i>Rotational symmetry</i>	In a plane, a figure has rotational symmetry if it can be rotated less than one full turn around a point so that the resulting figure (the image) exactly matches the original figure (the pre-image).
<i>Scalene triangle</i>	A triangle with sides of three different lengths and angles of three different sizes
<i>Rounding numbers</i>	Replacing a number with a nearby number that is easier to work with or better reflects the precision of the data
<i>Scatter plot</i>	A graph with one point for each item being measured (The coordinates of a point represent the measures of two attributes of each item.)
<i>Scientific notation</i>	A method of representing a number as a product of a number between 1 and 10 and a power of 10 Ex. 3456 can be written as 3.456×10^3 .
<i>Sequence</i>	A series of numbers that are predictable and can be extended using operations
<i>Skip count</i>	To count by multiples of a number
<i>Similar figure</i>	Figures that are exactly the same shape, but not necessarily the same size
<i>Slide (Translation)</i>	(See Translation.)
<i>Slope</i>	The measure of steepness of a line; the ratios of rise over run; or change in y over change in x
<i>Sphere</i>	A three dimensional shape whose curved surface is, at all points, a given distance from its center point
<i>Square root</i>	The square root of a number n is a number that, when multiplied by itself, results in the number n. Ex. 4 is a square root of 16 because $4 \times 4 = 16$.
<i>Standard units</i>	Units of measure that have an accepted value like inch, cup, meter, and pound
<i>Stem and Leaf plot</i>	A method of organizing data for the purpose of comparison where the "leaf" is the number in the smallest place value and the "stem" includes the numbers in the larger place values
<i>Straight angle</i>	An angle whose measure is 180 degrees (It is formed by two opposite rays.)
<i>Strategy</i>	A method or way of solving a problem
<i>Supplementary angles</i>	Two angles whose measures total 180 degrees
<i>Surface area</i>	The total area of the faces (including the bases) and curved surfaces of a three-dimensional figure
<i>Symmetry</i>	(See line symmetry or rotational symmetry.)
<i>Technology</i>	Tools used to enhance teaching: calculators, interactive graphics programs, spreadsheets, Smart-Board, etc.
<i>Theoretical probability</i>	Identifying, using mathematical expectations, the number of possible ways an event can happen compared to all of the possible events
<i>Three-Dimensional</i>	A figure that has depth, width, and height
<i>Transformation</i>	An operation on a geometric figure by which each point gives rise to a unique image (rotations, dilations, translations, and reflections)
<i>Translation</i>	The motion of sliding an object or picture any direction along a straight line without rotation or reflection (same as a slide)
<i>Transversal</i>	The name given to a line that intersects two or more other lines in a given plane
<i>Trapezoid</i>	A quadrilateral that has exactly one pair of parallel sides (No two sides need be the same length.)
<i>Tree diagram</i>	A method of finding all the possible outcomes of prime factorization or probability situations by systematically listing the possibilities
<i>Trend line</i>	A line segment, or ray drawn on a scatter plot to estimate the relationship between two sets of data (line of best fit)
<i>Turns</i>	A transformation obtained by rotating a figure around a given point often referred to as a turn (same as a rotation)
<i>Two-Dimensional</i>	Objects that have length and width but no thickness

<i>Variable</i>	A symbol such as a letter, box, star, etc. that is used to represent an unknown or undetermined value in an expression or number sentence (equation)
<i>Venn diagram</i>	A pictorial representation of two or more sets showing elements that the sets have in common and elements that are unique to one or the other sets
<i>Vertex (Plural: Vertices)</i>	The point where two sides of a two-dimensional figure meet or the point where two or more edges of a three-dimensional figure meet
<i>Vertical angles</i>	When two lines intersect, the angles that do not share a common side; the angles opposite each other (Vertical angles have equal measures.)
<i>Volume</i>	A measure of the amount of space occupied by a three-dimensional shape, generally expressed in “cubic” units
<i>Whole numbers</i>	The set of natural numbers plus the number zero Ex: 0, 1, 2, 3, 4...
<i>Y-Intercept</i>	The coordinate at which the graph of a line intersects the y-axis

APPENDIX

CLASSIFICATION OF WORD PROBLEMS

Problem Type			
Join	(Result Unknown) Connie had 5 marbles. Juan gave her 8 more marbles. How many marbles does Connie have altogether?	(Change Unknown) Connie has 5 marbles. How many more marbles does she need to have 13 marbles altogether?	(Start Unknown) Connie had some marbles. Juan gave her 5 more marbles. Now she has 13 marbles. How many marbles did Connie have to start with?
Separate	(Result Unknown) Connie had 13 marbles. She gave 5 to Juan. How many marbles does Connie have left?	(Change Unknown) Connie had 13 marbles. She gave some to Juan. Now she has 5 marbles left. How many marbles did Connie give to Juan?	(Start Unknown) Connie had some marbles. She gave 5 to Juan. Now she has 8 marbles left. How many marbles did Connie have to start with?
Part-Part-Whole	(Whole Unknown) Connie has 5 red marbles and 8 blue marbles. How many does she have?	(Part Unknown) Connie has 13 marbles. 5 are red and the rest are blue. How many blue marbles does Connie have?	
Compare	(Difference Unknown) Connie has 13 marbles. Juan has 5 marbles. How many more marbles does Connie have than Juan?	(Compare Quantity Unknown) Juan has 5 marbles. Connie has 8 more than Juan. How many marbles does Connie have?	(Referent Unknown) Connie has 13 marbles. She has 5 more marbles than Juan. How many marbles does Juan have?

INVENTED ALGORITHMS-ADDITION & SUBTRACTION

PROBLEM	INCREMENTING	COMBINING TENS AND ONES	COMPENSATING
Join (Result Unknown) Paul has 28 strawberries in his basket. He picked 35 more strawberries. How many strawberries did he have then?	"20 and 30 is 50, and 8 more is 58. 2 more is 60, and 3 more than that is 63."	"20 and 30 is 50. 8 plus 5 is like 8 plus 2 and 3 more, so it's 13. 50 and 13 is 63."	"30 and 35 would be 65. But it's 28, so it's 2 less. It's 63."
Separate (Result Unknown) Paul had 75 strawberries in his basket. He ate 26. How many did he have left?	"70 take away 20 is 50, and take away 6 more is 44. But you have to put back the 5 from the 75. That's 49."	"70 take away 20 is 50. 5 take away 6 that makes 1 more to take away from the 50. That's 49."	"If it was 75 take away 25, it would be 50. But it's 26, so you have to take one more away. 49."
Join (Change Unknown) Paul has 47 strawberries in his basket. How many more strawberries does he have to pick to have 75 all together?	"47 and 3 is 50 and 20 more is 70. So that's 23, but I need 5 more, so it's 28." "47, 57, 67. That's 20. 67 and 3 is 70, and 5 more is 75. So 8 and the 20, 28."	Combining tens and ones is not commonly used for Join (change unknown) problems.	"If it were 45, it would be 30. But it's 47, so it's 2 less. It's 28."

GROUPING/PARTITIONING, RATE, PRICE, & MULTIPLICATIVE COMPARISON PROBLEMS

Problem Type	Multiplication	Measurement Division	Partitive Division
Grouping/Partitioning	Gene has 4 tomato plants. There are 6 tomatoes on each plant. How many tomatoes are there all together?	Gene has some tomato plants. There are 6 tomatoes on each plant. All together there are 24 tomatoes. How many tomato plants does Gene have?	Gene has 4 tomato plants. There are the same number of tomatoes on each plant. All together there are 20 tomatoes. How many tomatoes are there on each tomato plant?
Rate	Ellen walks 3 miles an hour. How many miles does she walk in 5 hours?	Ellen walks 3 miles an hour. How many hours will it take her to walk 15 miles?	Ellen walked 15 miles. It took her 5 hours. If she walked the same speed the whole way, how far did she walk in one hour?
Price	Pies cost 4 dollars each. How much doe 7 pies cost?	Pies cost 4 dollars each. How many pies can you buy for \$28?	Jan bought 7 pies. She spent a total of \$28. If each pie cost the same amount, how much did one pie cost?
Multiplicative Comparison	The giraffe in the zoo is 3 times as tall as the kangaroo. The kangaroo is 6 feet tall. How tall is the giraffe?	The giraffe is 18 feet tall. The kangaroo is 6 feet tall. The giraffe is how many times taller than the kangaroo?	The giraffe is 18 feet tall. She is 3 times as tall as the kangaroo. How tall is the kangaroo?

MANIPULATIVES TO CONCEPTS

The following is a listing of SOME of the concepts that can effectively be taught using the given manipulatives.

Manipulative	Concepts
Algebra Tiles	Integers, equations, inequalities, polynomials, similar terms, factoring, estimation
Attribute Blocks	Sorting, classification, investigation of size, shape, color, logical reasoning, sequencing, patterns, symmetry, similarity, congruence, thinking skills, geometry, organization of data
Balance Scale	Weight, mass, equality, inequality, equations, operations on whole numbers, estimation, measurement
Base-Ten blocks	Place value, operations on whole numbers, decimals, decimal-fractional-percent equivalencies, comparing, ordering, classifications, sorting, number concepts, square and cubic numbers, area, perimeter, metric measurement, polynomial
Calculators	Problems with large numbers, problem solving, interdisciplinary problems, real-life problems, patterns, counting, number concepts, estimation, equality, inequality, fact <i>strategies</i> , operations on whole numbers, decimals, fractions
Capacity Containers	Measurement, capacity, volume, estimation
Clocks	Time, multiplication, fractions, modular arithmetic, measurement
Color Tiles	Color, shape, patterns, estimation, counting, number concepts, equality, inequality, operations on whole numbers and fractions, probability, measurement, area, perimeter, surface area, even and odd numbers, prime and composite numbers, ratio, proportion, percent, integers, square and cubic numbers, spatial visualization
Compasses	Constructions, angle measurement
Cubes	Number concepts, counting, place value, fact <i>strategies</i> – especially turnaround facts, classification, sorting, colors, patterns, square and cubic numbers, equality, inequalities, averages, ratio, proportion, percent, symmetry, spatial visualization, area, perimeter, volume, surface area, transformational geometry, operations on whole numbers and fractions, even and odd numbers, prime and composite numbers, probability
Cuisenaire Rods	Classification, sorting, ordering, counting, number concepts, comparisons, fractions, ratio, proportion, place value, patterns, even and odd numbers, prime and composite numbers, logical reasoning, estimation, operations on whole numbers
Decimal Squares	Decimals – place value, comparing, ordering, operations, classification, sorting, number concepts, equality, inequality, percent, perimeter, area
Dominoes	Counting, number concepts, fact <i>strategies</i> , classification, sorting, patterns, logical reasoning, equality, inequality, mental math, operations on whole numbers

Fraction Models	Fractions – meaning, recognition, classification, sorting comparing, ordering, number concepts, equivalence, operations, perimeter, area, percent, probability
Geoboards	Size, shape, counting, area, perimeter, circumference, symmetry, fractions, coordinate geometry, slopes, angles, Pythagorean Theorem, estimation, percent, similarity, congruence, rotations, reflections, translations, classification, sorting, square numbers, polygons, spatial visualization, logical reasoning
Geometric Solids	Shape, size, relationships between area and volume, volume, classification, sorting, measurement, spatial visualization
Math Balance Invicta, number	Equality, inequality, operations on whole numbers, open sentences, equations, place value, fact <i>strategies</i> , measurement, logical reasoning
Miras	Symmetry, similarity, congruence, reflections, rotations, translations, angles, parallel and perpendicular lines, constructions
Money	Money, change, comparisons, counting, classifications, sorting, equality, inequality, operations on whole numbers, decimals, fractions, probability, fact <i>strategies</i> , number concepts
Number Cubes	Counting, number concepts, fact <i>strategies</i> , mental math, operations on whole numbers, fractions, decimals, probability, generation of problems, logical reasoning
Numeral Cards	Counting, classification, sorting, comparisons, equality, inequality, order, fact <i>strategies</i> , number concepts, operations on whole numbers, fractions, decimals, logical reasoning, patterns, odd and even numbers, prime and composite numbers
Pattern blocks	Patterns, one-to-one correspondence, sorting, classification, size, shape, color, geometric relationships, symmetry, similarity, congruence, area, perimeter, reflections, rotation, translations, problem solving, logical reasoning, fractions, spatial visualization, tessellations, angles, ratio, proportions
Polyhedra Models	Shape, size, classification, sorting, polyhedra, spatial visualization
Protractors	Constructions, angle measurement
Rulers Tape Measures	Measurement, area, perimeter, constructions, estimation, operations on whole numbers, volume
Spinners	Counting, number concepts, operations on whole numbers, decimals, fractions, fact <i>strategies</i> , mental math, logical reasoning, probability, generation of problems
Tangrams	Geometric concepts, spatial visualization, logical reasoning, fractions, similarity, congruence, area, perimeter, ratio, proportion, angles, classification, sorting, patterns, symmetry, reflections, translations, rotations
Ten-frames	Fact <i>strategies</i> , mental math, number concepts, counting, equality, inequality, place value, patterns, operations on whole numbers
Thermometers	Temperature, integers, measurement
Two-Color Counters	Counting, comparing, sorting, classification, number concepts, fact <i>strategies</i> , even and odd numbers, equality, inequality, operations, ratio, proportions, probability, integers

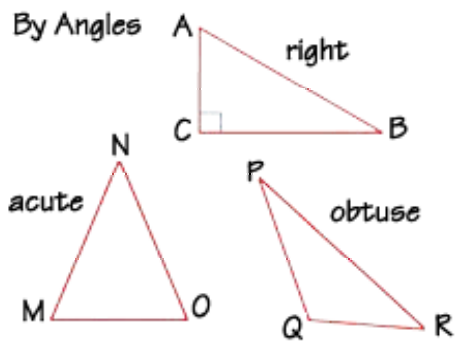
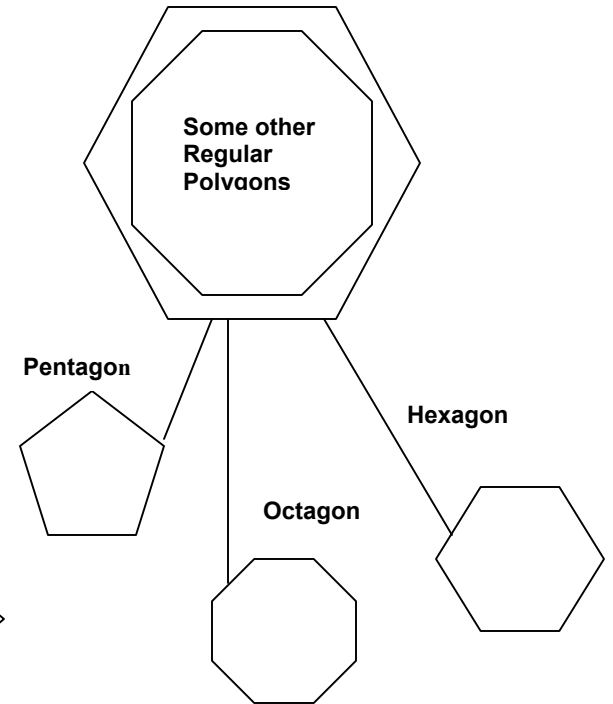
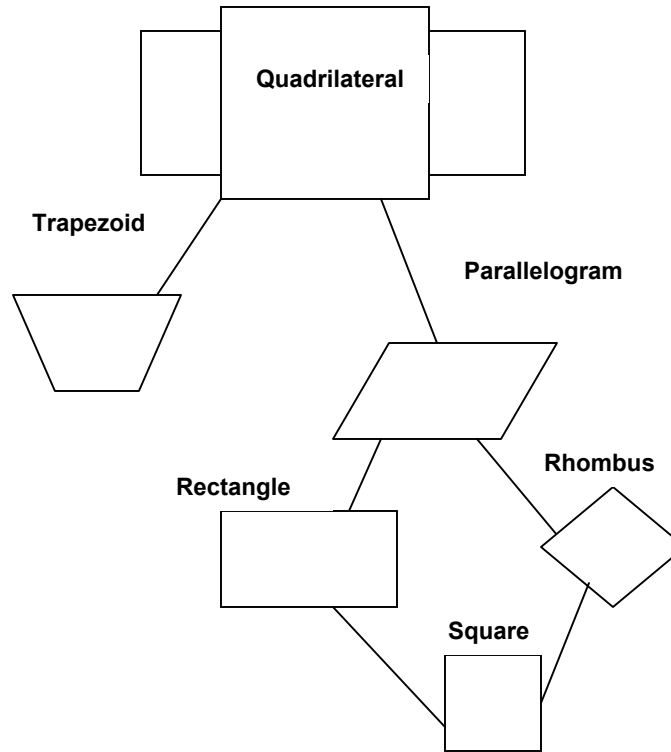
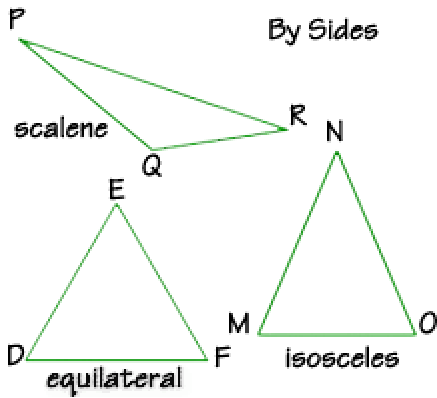
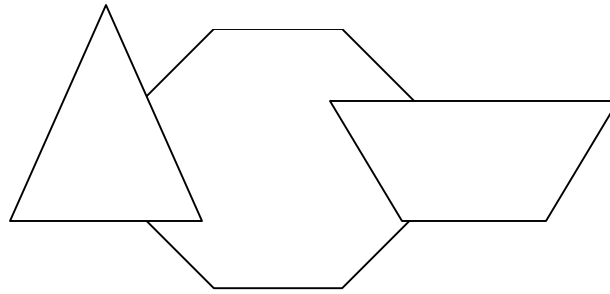
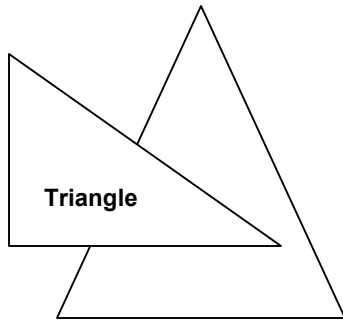
CONCEPTS TO MANIPULATIVES

The following is a listing of SOME of the manipulatives that can effectively be used to teach the given concept.

Concepts	Manipulative
Angles	Protractors, compasses, geoboards, miras, rulers, tangrams, pattern blocks
Area	Geoboards, color tiles, base-ten blocks, decimal squares, cubes, tangrams, pattern blocks, rulers, fraction models
Classification, sorting	Attribute blocks, cubes, pattern blocks, tangrams, 2-color counters, Cuisenaire rods, dominoes, geometric solids, money, numeral cards, base-ten materials, polyhedra models, geoboards, decimal squares, fraction models
Coordinate Geometry	geoboards
Constructions	Compasses, protractors, rulers, miras
Counting	Cubes, 2-color counters, color tiles, Cuisenaire rods, dominoes, numeral cards, spinners, 10-frames, number cubes, money calculators
Decimals	Decimal squares, base-ten blocks, money, calculators, number cubes, numeral cards, spinners
Equations/inequalities Equality/inequality Equivalence	Algebra tiles, math balance, calculators, 10-frames, balance scale, color tiles, dominoes, money, numeral cards, 2-color counters, cubes, Cuisenaire rods, decimal squares, fraction models
Estimation	Color tiles, geoboards, balance scale, capacity containers, rulers, Cuisenaire rods, calculators
Factoring	Algebra tiles
Fact Strategies	10-frames, 2-color counters, dominoes, cubes, numeral cards, spinners, number cubes, money, math balance, calculators
Fractions	Fraction models, pattern blocks, base-ten materials, geoboards, clocks, color tiles, cubes, Cuisenaire rods, money, tangrams, calculators, number cubes, spinners, 2-color counters, decimal squares, numeral cards
Integers	2-color counters, algebra tiles, thermometers, color tile
Logical reasoning	Attribute blocks, Cuisenaire rods, dominoes, pattern blocks, tangrams, number cubes, spinners, geoboards
Mental Math	10-frames, dominoes, number cubes, spinners
Money	Money
Number Concepts	Cubes, 2-color counters, spinners, number cubes, calculators, dominoes, numeral cards, base-ten materials, Cuisenaire rods, fraction models, decimal squares, color tiles, 10-frames, money
Odd, Even, Prime, Composite	Color tiles, cubes, Cuisenaire rods, numeral cards, 2-cold counters
Patterns	Pattern blocks, attribute blocks, tangrams, calculators, cubes, color tiles, Cuisenaire rods, dominoes, numeral cards, 10-frames
Percent	Base-ten materials, decimal squares, color tiles, cubes, geoboards, fraction models
Perimeter/Circumference	Geoboards, color tiles, tangrams, pattern blocks, rulers, base-ten materials, cubes, fraction circles, decimal

	squares
Place Value	Base-ten materials, decimal squares, 10-frames, Cuisenaire rods, math balance, cubes, 2-color counters
Polynomials	Algebra tiles, base-ten materials
Pythagorean Theorem	Geoboards
Ratio/Proportion	Color tiles, cubes, Cuisenaire rods, tangrams, pattern blocks, 2-color counters
Similarity/Congruence	Geoboards, attribute blocks, pattern blocks, tangrams, miras
Size/Shape/color	Attribute blocks, cubes, color tiles, geoboards, geometric solids, pattern blocks, tangrams, polyhedra models
Spatial Visualization	Tangrams, pattern blocks, geoboards, geometric solids, polyhedra models, cubes, color tiles
Square/Cubic numbers	Color tiles, cubes, base-ten materials, geoboards
Surface area	Color tiles, cubes
Symmetry	Geoboards, pattern blocks, tangrams, miras, cubes, attribute blocks
Tessellations	Pattern blocks, attribute blocks
Transformational geometry, translations, rotations, reflections	Geoboards, cubes, miras, pattern blocks, tangrams
Volume	Capacity containers, cubes, geometric solids, rulers
Whole Numbers	Base-ten materials, balance scale, number cubes, spinners, color tiles, cubes, math balance, money, numeral cards, dominoes, rulers, calculators, 10-frames, Cuisenaire rods, clocks, 2-color counters

Polygons



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