

# Mathematics

# Grade-Level Expectations

Missouri Department of Elementary and Secondary Education  
March 2, 2004

# Number and Operations

3/02/04

1. Understand numbers, ways of representing numbers, relationships among numbers and number systems									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
A Read, write and compare numbers	rote counts to 100	recognizes "how many" in a set of objects	read, write and compare whole numbers less than 100	read, write and compare whole numbers up to 3 digits	read, write and compare decimals to the hundredths place and whole numbers up to 6 digits	read, write, compare and order <u>unit fractions</u> and decimals to thousandths	compare and order integers, positive rationals and percents, including finding their approximate location on a number line	compare and order integers, positive rationals and percents, including finding their approximate location on a number line	compare and order rationals and percents, including finding their approximate locations on a number line
	ST FR	MA 1,6 1.6, 1.10 V.1.d, X.a	MA 1,6 1.10 V.d, X.a	MA 1 1.10 V.d	MA 1 1.10 V.d	MA 5 1.10 IX.b	MA 5 3.3 IX.b	MA 5 3.3 IX.b	MA 5 3.3 IX.b
B Represent and use rational numbers			recognize 1/2, 1/3 and 1/4 of a shape	represents commonly used fractions: halves, thirds and fourths	use models, benchmarks (0, 1/2 and 1) and equivalent forms to judge the size of fractions	recognize and generate equivalent forms of <u>commonly used</u> fractions, decimals and percents	recognize and generate equivalent forms of fractions, decimals and percents	use fractions, decimals and percents to solve problems	use fractions, decimals and percents to solve problems
	ST FR		MA 1 1.10 V.c	MA 1 1.10 V.c, V.i	MA 1 3.3 V.c, V.i	MA 1 3.3 V.b	MA 1 3.3 V.b	MA 1 3.4 V.d	MA 1 3.4 V.d
C Compose and decompose numbers	connect number words (orally) and quantities they represent	<u>compose</u> or <u>decompose</u> numbers using known facts, doubles and <u>close to doubles</u>	<u>compose</u> or <u>decompose</u> numbers by using a variety of strategies, such as using known facts, tens or <u>landmark numbers</u> to solve problems	recognize equivalent representations for the same number and generate them by <u>decomposing and composing numbers</u>	recognize equivalent representations for the same number and generate them by <u>decomposing and composing numbers</u>	recognize equivalent representations for the same number and generate them by <u>decomposing and composing numbers</u>	recognize equivalent representations for the same number and generate them by <u>decomposing and composing numbers</u> , including expanded notation	recognize equivalent representations for the same number and generate them by <u>decomposing and composing numbers</u> , including exponential notation	recognize equivalent representations for the same number and generate them by <u>decomposing and composing numbers</u> , including scientific notation
	ST FR	MA 1 1.10 V.c	MA 1 3.2,3.3 V.e	MA 1 3.2,3.3 V.e	MA 1 3.6 V.e	MA 1 3.6 V.e	MA 1 3.6 V.b	MA 1 3.6 V.b	MA 1 3.6 V.b

# Number and Operations

3/02/04

1. Understand numbers, ways of representing numbers, relationships among numbers and number systems -- continued									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>D</b>			skip count by 2s, 5s and 10s	<u>classify numbers</u> by their characteristics, including odd and even	classify and describe numbers by their characteristics, including <u>odd, even and multiples</u>	describe numbers according to their characteristics, including whole number <u>factors, prime or composite, odd or even and square numbers</u>	use <u>factors</u> and <u>multiples</u> to describe relationships between and among numbers, including whole number <u>common factors and multiples</u>	use whole number <u>factors</u> and <u>multiples</u> to describe relationships between and among numbers	use <u>factors</u> and <u>multiples</u> to describe relationships between and among numbers and justify characteristics of numbers
Classify and describe numeric relationships									
ST			MA 1 1.10	MA 1 1.10	MA 1 1.10	MA 5 1.10	MA 5 1.10	MA 5 1.10	MA 5 1.10
FR			V.1.d	V.e	V.e, IX.d	IX.c	IX.c	IX.c	IX.c

# Number and Operations

3/02/04

2. Understand meanings of operations and how they relate to one another									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>A</b>		represent a given situation involving addition	represent a given situation involving addition or subtraction	represent a given situation involving multiplication	represent and recognize multiplication using various models, including <u>sets and arrays</u>	represent and recognize division using various models, including <u>quotative and partitive</u>			
ST		MA 1 1.6,1.10	MA 1 1.6,1.10	MA 1 1.6,1.10	MA 1 3.6	MA 1 3.6			
FR		V.a	V.a	V.a	V.a				
<b>B</b>				describe the effects of adding and subtracting whole numbers as well as the relationship between the two operations		describe the effects of multiplying and dividing whole numbers as well as the relationship between the two operations	describe the effects of addition and subtraction on fractions and decimals	describe the effects of multiplication and division on fractions and addition and subtraction on integers	describe the effects of multiplication and division on integers
ST				MA 1 3.4,4.1		MA 5 3.4,4.1	MA 1, 5 3.4,4.1	MA 1 3.4,4.1	MA 1 3.4,4.1
FR				V.e		IX.e & c	V.a, IX.a	V.a	V.a
<b>C</b>				apply <u>commutative and identity properties</u> of addition to whole numbers	apply <u>commutative and identity properties</u> of multiplication to whole numbers	apply the <u>distributive</u> and <u>associative</u> properties to whole numbers		apply <u>properties of operations</u> (including order of operations) to positive rational numbers	apply <u>properties of operations</u> to rational numbers, including order of operations and inverse operations
ST				MA 5 1.6,1.10	MA 5 1.6,1.10	MA 5 1.6,1.10		MA 5 1.6,1.10	MA 5 1.6,1.10
FR				IX.c	IX.c	IX.e		IX.e	IX.e

# Number and Operations

3/02/04

2. Understand meanings of operations and how they relate to one another -- continued									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>D</b>								approximate the value of square roots to the nearest whole number	apply the relationship between squares and square roots and cubes and cube roots to solve a problem
Apply operations on real and complex numbers									
ST								MA 5 3.3	MA 5 1.6,3.4
FR								IX.f	IX.f

# Number and Operations

3/02/04

<b>3. Compute fluently and make reasonable estimates</b>									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>A</b> Describe or represent mental strategies	recognize numerals up to 31	describe or represent the mental strategy used to compute an addition problem	describe or notate the mental strategy used to compute addition or subtraction of whole numbers, including 2-digit numbers		represent a mental strategy used to compute a given multiplication problem (up to 2-digit by 2-digit multiple of)	describe a mental strategy used to compute a given division problem, where the quotient is a multiple of 10 and the divisor is a 1-digit number (e.g., 350 /7)			
	ST FR	MA _ 1.6,1.10	MA 1 3.4,4.1 V.2.a	MA 1 3.4,4.1 V.f		MA 5 3.3 IX.d	MA 1 1.4,3.3 V.g		
<b>B</b> Develop and demonstrate fluency		develop fluency with basic number relationships of addition and subtraction for sums up to 20	demonstrate fluency with basic number relationships of addition and subtraction for sums up to 20	develop fluency with basic number relationships (12 X 12) of multiplication and division	demonstrate fluency with basic number relationships (12 X 12) of multiplication and division				
	ST FR	MA.1 1.6 V. 4.e	MA.1 1.6 V. 4.e	MA.1 1.6 V. 4.e	MA.1 1.6 V. 4.e				
<b>C</b> Compute problems			apply and describe the strategy used to compute 2-digit addition or subtraction problems	apply and describe the strategy used to compute up to a 3-digit addition or subtraction problem	apply and describe the strategy used to compute a given <ul style="list-style-type: none"> <li>multiplication problem up to a 2-digit by 2-digit</li> <li>division problem up to a 3-digit by 1-digit</li> </ul>	apply and describe the strategy used to compute a given division problem up to a 3-digit by 2-digit	add and subtract positive rational numbers	multiply and divide positive rational numbers	apply all operations on rational numbers
	ST FR		MA 5 1.6,1.10 IX.e	MA 5 1.6,1.10 IX.e	MA 5 3.3,4.1 IX.e	MA 5 3.3,4.1 IX.d	MA 1 3.3,4.1 V.e	MA 1 1.10,3.3 V.a	MA 1 1.10,3.3 V.a

# Number and Operations

3/02/04

3. Compute fluently and make reasonable estimates -- continued									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>D</b>				estimate and justify the results of addition and subtraction of whole numbers	estimate and justify the results of multiplication of whole numbers	estimate and justify the results of division of whole numbers	estimate and justify the results of addition and subtraction of positive rational numbers	estimate and justify the results of multiplication and division of positive rational numbers	estimate and justify the results of all operations on rational numbers
Estimate and justify solutions									
ST				MA 1 3.3,4.1	MA 1 3.3,4.1	MA 1 3.3,4.1	MA 1 3.3,4.1	MA 1 3.3,4.1	MA 1 3.3,4.1
FR				V.2.a	V.f	V.f	V.e & h	V.e & h	V.e & h
<b>E</b>							solve problems using equivalent ratios	solve problems involving proportions, such as scaling and finding equivalent ratios	solve problems involving proportions, such as scaling and finding equivalent ratios
Use proportional reasoning									
ST							MA 1 3.3	MA 1 3.3	MA 1 3.3
FR							V.c	V.c & f	V.c & f

# Algebraic Relationships

3/02/04

1. Understand patterns, relations and functions									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>A</b> Recognize and extend patterns	recognize or repeat sequences of sounds or shapes	extend patterns of sound, shape, motion or a simple numeric pattern	describe and extend simple numeric patterns and change from one representation to another	extend geometric (shapes) and numeric patterns to find the next term	describe geometric and numeric patterns	make and describe <u>generalizations</u> about geometric and numeric patterns			
	ST MA 4 1.6 FR VIII.a	MA 4 1.6 VIII.a	MA 4 1.6 VIII.1.b	MA 4 1.6 VIII.a	MA 4 1.6,4.1 VIII.b	MA 4 1.6,4.1 VIII.4.a			
<b>B</b> Create and analyze patterns	create and continue patterns	describe how simple <u>repeating patterns</u> are generated	describe how simple <u>growing patterns</u> are generated	represent patterns using words, tables or graphs	analyze patterns using words, tables and graphs	represent and analyze patterns using words, tables and graphs	represent and describe patterns with tables, graphs, pictures, <u>symbolic rules</u> or words	analyze patterns represented <u>graphically</u> or <u>numerically</u> using words or <u>symbolic rules</u> , including <u>recursive notation</u>	generalize patterns represented <u>graphically</u> or <u>numerically</u> using words or <u>symbolic rules</u> , including <u>recursive notation</u>
	ST FR	MA 4 1.6, 3.5 VIII.a	MA 4 1.6,3.5 VIII.a	MA 4 3.6 VIII.3.a	MA 4 1.6,3.6 VIII.4.b	MA 4 1.6,3.6 VIII.4.b	MA 4 1.6,3.6 VIII.4.b, VIII.3	MA 4 1.6,3.6 VIII.4.b	MA 4 1.6,3.6 VIII.4.b
<b>C</b> Classify objects and representations	sort objects by size	classify objects by size or number	classify objects by size, number or other <u>attributes</u>				compare various forms of <u>representations</u> to identify a pattern	compare and contrast various forms of <u>representations</u> of patterns	compare and contrast various forms of <u>representations</u> of patterns
	ST FR	MA 2 1.8 VI.a	MA 2 1.8 VI.a	MA 2,6 1.8 VI.a, X.c			MA 4 1.6 VIII.3.b	MA 4 1.6 VIII.3.b	MA 4 1.6 VIII.3.b

# Algebraic Relationships

3/02/04

1. Understand patterns, relations and functions -- continued									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>D</b>							identify <u>functions</u> as <u>linear</u> or <u>nonlinear</u> from a table or graph	identify <u>functions</u> as <u>linear</u> or <u>nonlinear</u> from tables, graphs or equations	compare <u>properties of linear functions</u> between or among tables, graphs and equations
Identify and compare functions									
ST							MA 4 1.6,3.6	MA 4 1.6,3.6	MA 4 1.6,3.6
FR							VIII.b & c	VIII.b & c	VIII.b & c
<b>F</b>									
Describe the effects of parameter changes									
ST									
FR									

# Algebraic Relationships

3/02/04

2. Represent and analyze mathematical situations and structures using algebraic symbols									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Represent mathematical situations	<b>A</b>	represent a mathematical situation as an <u>expression</u> or number sentence	represent a mathematical situation as an <u>expression</u> or number sentence	represent a mathematical situation as an <u>expression</u> or number sentence	represent a mathematical situation as an <u>expression</u> or number sentence	represent a mathematical situation as an <u>expression</u> or number sentence using a letter or symbol	use variables to represent unknown quantities in expressions	use variables to represent unknown quantities in equations and inequalities	use <u>symbolic algebra</u> to represent and solve problems that involve linear relationships, including <u>recursive</u> relationships
		ST	MA 4 1.6,3.1	MA 4 1.6,3.1	MA 4 1.6,3.1	MA 4 1.6,3.1	MA 4 1.6,3.1	MA 4 1.6,3.1	MA 4 1.6,3.1
		FR	VIII.2.b, VIII.5.c	VIII.2.b, VIII.5.c	VIII.2.b	VIII.2.b	VIII.2.e	VIII.2.e	VIII.2.e
Describe and use mathematical manipulation	<b>B</b>		investigate <u>commutative</u> principle with whole numbers	apply the <u>commutative</u> property to addition of whole numbers	apply the <u>commutative</u> property of multiplication to whole numbers	apply the <u>distributive</u> and <u>associative</u> properties to whole numbers	recognize equivalent forms for simple algebraic expressions (associative, distributive properties)	generate equivalent forms for simple algebraic expressions	generate equivalent forms for linear expressions
		ST		MA 5 3.1	MA 5 3.1	MA 5 3.1	MA 5 3.1	MA 5 3.6	MA 4 3.6
		FR	IX.1	IX.1	IX.1	IX.1	IX.1	VIII.a	VIII.a

# Algebraic Relationships

3/02/04

2. Represent and analyze mathematical situations and structures using algebraic symbols -- continued									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>C</b>									
Utilize equivalent forms									
ST									
FR									
<b>D</b>									
Utilize systems									
ST									
FR									

# Algebraic Relationships

3/02/04

<b>3. Use mathematical models to represent and understand quantitative relationships</b>										
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	
<b>A</b>	Use mathematical models	<u>model</u> situations that involve whole numbers, using pictures, objects or symbols	<u>model</u> situations that involve the addition of whole numbers, using pictures, objects or symbols	<u>model</u> situations that involve addition and subtraction of whole numbers, using pictures, objects or symbols	<u>model</u> problem situations, including multiplication with objects or drawings	<u>model</u> problem situations, using representations such as graphs, tables or number sentences	<u>model</u> problem situations and draw conclusions, using representations such as graphs, tables or number sentence	<u>model</u> and solve problems, using multiple representations such as graphs, tables, expressions and equations	<u>model</u> and solve problems, using multiple representations such as graphs, tables, expressions, equations or inequalities	<u>model</u> and solve problems, using multiple representations such as graphs, tables, equations or inequalities
ST		MA 1,4 1.6,3.6	MA 1,4 1.6,3.6	MA 1,4 1.6,3.6	MA 4 1.6,3.6	MA 4 1.6,3.6	MA 4 1.6,3.6	MA 4 1.6,3.6	MA 4 1.6,3.6	MA 4 1.6,3.6
FR	V.c, VIII.1	V.c, VIII.1	V.c, VIII.1	VIII.1	VIII.1	VIII.b	VIII.b	VIII.b	VIII.b	

<b>4. Analyze change in various contexts</b>									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>A</b>	Analyze change		describe <u>qualitative</u> change, such as students growing taller	describe <u>quantitative</u> change, such as students growing two inches in a year	describe mathematical relationships in terms of constant rates of change	identify, model and describe situations with constant or varying rates of change	compare situations with constant or varying rates of change	compare situations with constant or varying rates of change	analyze the nature of changes (including slope and intercepts) in quantities in linear relationships
ST		MA 4 4.1	MA 4 4.1	MA 4 4.1	MA 4 1.6,4.1	MA 2,4 1.6,4.1	MA 2,4 1.6,4.1	MA 2,4 1.6,4.1	MA 2,4 1.6,4.1
FR	VIII.b	VIII.b	VIII.c	VIII.c	VI I, VIII.c	VI I, VIII.c	VI I, VIII.c	VI I, VIII.c	

# Geometric and Spatial Relationships

3/02/04

1. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships										
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	
A	sort 2- and 3-dimensional shapes using physical models (circle, rectangle, triangle, sphere, rectangular prism, cylinder, pyramid)	recognize and name 2- and 3-dimensional shapes using physical models (circle, triangle, trapezoid, rectangle, rhombus, sphere, rectangular prism, cylinder, pyramid)	describe <u>attributes</u> and <u>parts</u> of 2- and 3-dimensional shapes (circle, triangle, trapezoid, rectangle, rhombus, sphere, rectangular prism, cylinder, pyramid)	compare 2- and 3-dimensional shapes by describing their <u>attributes</u> (circle, rectangle, rhombus, trapezoid, triangle, rectangular prism, cylinder, pyramid and sphere)	identify and describe the <u>attributes</u> of 2- and 3-dimensional shapes (prisms, cones, parallelism, perpendicularity)	analyze 2- and 3-dimensional shapes by describing the <u>attributes</u>	identify the <u>properties of 1- 2- and 3- dimensional shapes</u> using the appropriate geometric vocabulary	classify 2- and 3-dimensional shapes based on their <u>properties</u>	describe, classify and generalize relationships between and among types of a) 2-dimensional objects and b) 3-dimensional objects using their defining <u>properties</u> including <ul style="list-style-type: none"> <li>• Pythagorean Theorem</li> </ul> <u>cross-section</u> of a 3-dimensional object results in what 2-dimensional shape	
										ST
	FR	VI.2	VI.2.a	VI.2.a	VI.2.c	VI.2.a	VI.2	VI.2.a	VI.2.a	VI.c
B							describe relationships between the <u>corresponding angles</u> and the length of <u>corresponding sides</u> of <u>similar triangles</u> (whole number scale factors)	describe relationships between <u>corresponding sides</u> , <u>corresponding angles</u> and corresponding perimeters of <u>similar polygons</u>	apply relationships between <u>corresponding sides</u> and <u>corresponding areas</u> of <u>similar polygons</u> to solve problems	
										ST
	FR							VI.c	VI.c	VI.c

# Geometric and Spatial Relationships

3/02/04

1. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships -- continued									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
C				predict the results of putting together or taking apart 2- and 3-dimensional shapes	describe the results of subdividing, combining and <u>transforming shapes</u>	predict and justify the results of subdividing, combining and <u>transforming shapes</u>			
ST				MA 2 1.6,4.1	MA 2 1.6,4.1	MA 2 1.6,4.1			
FR				VI.2.b	VI.b	VI.b			

2. Specify locations and describe spatial relationships using coordinate geometry and other representational systems									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
A	describe, name and interpret relative positions in space (above, below, front, behind)	describe, name and interpret relative positions in space (left, right)	find and name locations with simple relationships on a map (coordinate system)	describe location using common language and geometric vocabulary (forward, back, left, right, north, south, east, west)	describe movement using common language and geometric vocabulary (forward, back, left, right, north, south, east, west)	use <u>coordinate systems</u> to specify locations, describe paths and find the distance between points along horizontal and vertical lines	use coordinate geometry to construct geometric shapes	given ordered pairs, identify geometric shapes in the <u>coordinate plane</u> using their properties	use coordinate geometry to analyze <u>properties of right triangles</u> and quadrilaterals
ST	MA 2 3.3,4.1	MA 2 3.3,4.1	MA 2 3.3,4.1	MA 2 3.3,4.1	MA 2 3.3,4.1	MA 2 1.6,1.8	MA 2 1.6,1.8	MA 2 1.6,1.8	MA 2 3.6
FR	VI.4.i	VI.4.i	VI.4.i	VI.4.i	VI.4.i	VI.e	VI.a	VI.c	VI.f

# Geometric and Spatial Relationships

3/02/04

<b>3. Apply transformations and use symmetry to analyze mathematical situations</b>									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>A</b>  Use transformations on objects		use manipulatives to model slides and turns	use manipulatives to model flips	determine if two objects are <u>congruent</u> through a slide, flip or turn	predict the results of <u>sliding/ translating, flipping/ reflecting or turning/ rotating around the center point</u> of a polygon	predict, draw and describe the results of <u>sliding/ translating, flipping/ reflecting and turning/ rotating around a center point</u> of a polygon	describe the transformation from a given <u>pre-image</u> to its <u>image</u> using the terms <u>reflection/flips, rotation/turn</u> and <u>translation/ slide</u>	reposition shapes under <u>informal</u> transformations, such as reflection (flip), rotation (turn) and translation (slide)	reposition shapes under <u>formal</u> transformations, such as reflection, rotation and translation
	ST	MA 2 1.4	MA 2 1.4	MA 2 3.6	MA 2 3.6,4.1	MA 2 3.6,4.1	MA 2 3.7	MA 2 3.6	MA 2 3.6
FR		VI	VI	VI.f	VI	VI.b	VI.b	VI.b	VI.b
<b>B</b>  Use transformations on functions								describe the relationship between the scale factor and the perimeter of the image using a <u>dilation (contractions- magnifications)</u> (stretching/shrin-king)	describe the relationship between the scale factor and the area of the image using a <u>dilation</u> (stretching/ shrinking)
	ST							MA 2 3.6	MA 2 3.6
FR							VI.b & g	VI.b & g	VI.b & g
<b>C</b>  Use symmetry			recognize and create shapes that have symmetry	identify lines of symmetry in polygons	construct a figure with multiple lines of symmetry and identify the lines of symmetry	identify polygons and designs with <u>rotational symmetry</u>	create polygons and designs with <u>rotational symmetry</u>	determine all lines of symmetry of polygons	identify the number of rotational symmetries of regular polygons
	ST		MA 2 1.10	MA 2 1.10	MA 2 1.10	MA 2 1.6	MA 2 1.6	MA 2 1.6	MA 2 1.6
FR		VI.f	VI.f	VI.f	VI.	VI.b	VI.b	VI.b	VI.b

# Geometric and Spatial Relationships

3/02/04

4. Use visualization, spatial reasoning and geometric modeling to solve problems										
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	
A	Recognize and draw three-dimensional representations	recognize geometric shapes in the student's environment (stop sign, number cube, ball)	recognize geometric shapes and structures in the student's environment and specify the shape's location	recognize and represent shapes from different perspectives		given the picture of a <u>prism</u> , identify the shapes of the faces	given a <u>net of a prism</u> or cylinder, identify the 3-dimensional shape	use spatial visualization to identify <u>isometric representations</u> of <u>mat plans</u>	use spatial visualizations to identify various 2-dimensional views of <u>isometric drawings</u>	create <u>isometric drawings</u> from a given <u>mat plan</u>
		ST	MA 2 3.3	MA 2 3.3	MA 2 3.6		MA 2 3.3	MA 2 3.3	MA 2 3.3	MA 2 3.3
	FR	VI.3.e	VI.3 & 4.e & f	VI		VI.3.c or b	VI	VI.a	VI.a	VI.a
B	Draw and use visual models							draw or use <u>visual models</u> to represent and solve problems	draw or use <u>visual models</u> to represent and solve problem	draw or use <u>visual models</u> to represent and solve problems
		ST							MA 2 3.1	MA 2 3.1
	FR							VI.d	VI.d	VI.d

# Measurement

3/02/04

1. Understand measurable attributes of objects and the units, systems and processes of measurement									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>A</b> Determine unit of measurement	compare and order objects according to their size or weight	select the appropriate tool for the <u>attribute</u> being measured	select an appropriate unit and tool for the <u>attribute</u> being measured	Identify, justify and use the appropriate unit of measure (linear, time, weight)	identify and justify the unit of linear measure including perimeter and (customary metric)	identify and justify the unit of measure for area (customary and metric)	identify and justify an angle as acute, obtuse, straight or right	identify and justify the unit of measure for volume (customary and metric)	
	ST MA 2 1.8	MA 2 1.4,3.7	MA 2 1.4,3.7	MA 2 3.1, 4.1	MA 2 3.1,4.1	MA 2 3.1,4.1	MA 2 3.1,4.1	MA 2 3.1,4.1	
FR VI.1.h	VI.1.h	VI.1.h	VI.h	VI.h	VI.h	VI.f	VI.g	VI.f & g	
<b>B</b> Identify equivalent measures					identify equivalent linear measures within a system of measurement	identify the equivalent weights and equivalent capacities within a system of measurement		identify the equivalent area measures within a system of measurement (e.g., sq ft. to sq in.)	identify the equivalent volume measures within a system of measurement (e.g., m <sup>3</sup> to cm <sup>3</sup> )
	ST				MA 2 1.6	MA 2 1.6		MA 2 1.6	MA 2 1.6
FR					VI.h	VI.f		VI.i	VI.i
<b>C</b> Tell and use units of time	describe passage of time using terms such as today, yesterday, tomorrow	tell time to the nearest hour	tell time to the nearest half hour	tell time to the nearest five minutes	tell time to the nearest minute	solve problems involving elapsed time (hours)	solve problems involving elapsed time (hours and minutes)	solve problems involving addition and subtraction of time (hours, minutes and seconds)	
	ST MA 2 3.3	MA 2 3.3	MA 2 3.3	MA 2 3.3	MA 2 3.3		MA 5 3.1	MA 5 3.1	
FR VI.1.g & h	VI.1.g & h	VI.g & h	VI.g & h	VI.g & h	VI.f		IX.d	IX.d	

# Measurement

3/02/04

1. Understand measurable attributes of objects and the units, systems and processes of measurement -- continued									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>D</b>	identify and know the value of a penny, nickel and dime	count money to fifty cents, including quarters and half dollars	count money to a dollar	determine change from \$5.00 and add and subtract money values to \$5.00	determine change from \$10.00 and add and subtract money values to \$10.00				
Count and compute money									
ST									
FR									

# Measurement

2. Apply appropriate techniques, tools and formulas to determine measurements									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>A</b>	measure with multiple copies of a unit of the same size (e.g., paper clips laid end to end)	use repetition of a single unit to measure something larger than the unit, (e.g., measuring the length of the room with a single meter stick)	use tools to measure (size, temperature, time, weight) to the nearest inch, centimeter, degree, hour and pound	use a <u>referent</u> for measures to make comparisons and estimates	select and use <u>benchmarks</u> to estimate measurements (linear, capacity, weight)		estimate a measurement using either <u>standard</u> or <u>non-standard</u> unit of measurement		
Use standard or non-standard measurement									
ST	MA 2 3.3	MA 2 3.3	MA 2 1.4,3.3	MA 2 1.6,3.3	MA 2 1.6,3.3		MA 2 1.6,3.3		
FR	VI.5.h	VI.5.h	VI.5.g.h	VI.5.h	VI.d		VI.e & f		
<b>B</b>					select and use <u>benchmarks</u> to estimate measurements of 0-, 45-, 90- degree angles		select and use <u>benchmarks</u> to estimate measurements of 0-, 45-, 90-, 180-, 360- degree angles	use tools to measure angles to the nearest degree	use tools to determine the measure of <u>reflex</u> angles to the nearest degree
Use angle measurement									
ST					MA 2 3.4		MA 2 3.4	MA 2 1.4,3.2	MA 2 1.4,3.2
FR					VI.d		VI.f & g	VI.f	VI.f
<b>C</b>				determine the perimeter of polygons	determine the area of a polygon on a rectangular grid	describe how to solve problems involving the area of polygons and non-polygonal regions imposed on a rectangular grid	describe how to solve problems involving the area or perimeter of polygons	describe how to solve problems involving circumference and/or area of a circle	describe how to solve problems involving surface area and/or volume of a rectangular or triangular prism, or cylinder
Apply geometric measurements									
ST				MA 2 1.10	MA 2 1.10	MA 2 3.1,4.1	MA 2 3.4,4.1	MA 2 3.4,4.1	MA 2 3.4,4.1
FR				VI.g	VI.g	VI.i	VI.i & g	VI.i & g	VI.i & g

# Measurement

3/02/04

2. Apply appropriate techniques, tools and formulas to determine measurements -- continued									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>D</b>								analyze <u>precision</u> and accuracy in measurement situations	analyze <u>precision</u> and accuracy in measurement situations and determine number of significant digits
Analyze precision									
ST FR									
<b>F</b>						convert from one unit to another within a system of measurement (linear)	convert from one unit to another within a system of measurement (mass and weight)	convert from one unit to another within a system of measurement (capacity)	convert square or cubic units to equivalent square or cubic units within the same system of measurement
Use relationships within a measurement system									
ST FR									

# Data and Probability

3/02/04

1. Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>A</b> Formulate questions	pose questions and gather data about themselves and their surroundings	pose questions and gather data about themselves and their surroundings	pose questions and gather data about themselves and their surroundings	design investigations to address a given question	collect data using observations, surveys and experiments	evaluate data-collection methods	formulate questions, design studies and collect data about a characteristic	formulate questions, design studies and collect data about a characteristic	formulate questions, design studies and collect data about a characteristic
	ST	MA 3 1.2	MA 3 1.2	MA 3 1.2	MA 3 1.2	MA 3 1.2	MA 3 1.2	MA 3 1.2	MA 3 1.2
FR	VII.1.a	VII.1.a	VII.1.a	VII.1.c	VII.1.a	VII.a	VII.a	VII.a	VII.a
<b>B</b> Classify and organize data	sort items according to their <u>attributes</u> .	sort and classify items according to their <u>attributes</u> .	sort and classify items according to their <u>attributes</u> and organize data about the items						
	ST	MA 2 1.8	MA 2 1.8	MA 2,3 1.8					
FR	VI.a	VI.a	VI.a,VII.3						
<b>C</b> Represent and interpret data	represent data using physical objects	represent data using pictures and bar graphs	represent data using pictures and bar graphs	read and interpret information from <u>line plots</u> and graphs ( <u>bar</u> , <u>line</u> , <u>pictorial</u> )	create tables or graphs to represent <u>categorical</u> and <u>numerical</u> data (including <u>line plots</u> )	describe methods to collect, organize and represent <u>categorical</u> and <u>numerical</u> data	interpret circle graphs; create and interpret <u>stem-and-leaf plots</u>	select, create and use appropriate graphical representation of data, including circle graphs, <u>histograms</u> and <u>box plots</u> ( <u>box and whiskers</u> )	select, create and use appropriate graphical representation of data (including <u>scatter plots</u> )
	ST	MA 3 1.8	MA 3 1.8	MA 3 1.8	MA 3 1.8	MA 3 1.2	MA 3 1.8	MA 3 1.8,3.6	MA 3 1.8, 3.6
FR	VII.3	VII.3	VII.3	VII.b	VII.a	VII.a	VII.b	VII.b	

# Data and Probability

3/02/04

2. Select and use appropriate statistical methods to analyze data									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>A</b> Describe and analyze data				describe the <u>shape of data</u> and analyze it for patterns	describe important <u>features</u> of the data set	compare related data sets	find the <u>range</u> and <u>measures of center</u> , including <u>median</u> , <u>mode</u> and <u>mean</u>	find, use and interpret <u>measures of center</u> and spread, including ranges and <u>interquartile range</u>	find, use and interpret <u>measures of center</u> , <u>outliers</u> , and spread, including range and <u>interquartile range</u>
	ST			MA 3 1.6	MA 3 4.1	MA 3 3.6	MA 3 3.2	MA 3 3.4	MA 3 3.4
	FR			VII.b	VII.b	VII.c	VII.c		VII.c
<b>B</b> Compare data representations						compare different representations of the same data and evaluate how well each representation shows important aspects of the data	compare different representations of the same data and evaluate how well each representation shows important aspects of the data	compare different representations of the same data and evaluate how well each representation shows important aspects of the data	compare different representations of the same data and evaluate how well each representation shows important aspects of the data
	ST					MA 3 3.6	MA 3 3.6	MA 3 3.6	MA 3 3.6
	FR					VII.d & e	VII.d	VII.d	VII.d
<b>C</b> Represent data algebraically									
	ST								
	FR								

# Data and Probability

3/02/04

3. Develop and evaluate inferences and predictions that are based on data									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>A</b>				discuss events related to students' experiences as likely or unlikely	given a set of data, propose and justify conclusions that are based on the data	given a set of data make and justify prediction(s)	use observations about differences between 2 samples to make <u>conjectures</u> about the populations from which the samples were taken	use observations about differences between samples to make <u>conjectures</u> about the populations from which the samples were taken	make <u>conjectures</u> about possible relationships between 2 characteristics of a sample on the basis of scatter plots of the data and approximate lines of fit
Develop and evaluate inferences									
ST				MA 3 3.3	MA 3 3.1,4.1	MA 3 3.1,4.1	MA 3 3.5	MA 3 3.5	MA 3 3.5
FR				VII.d	VII.c	VII.c	VII.e	VII.e	VII.e
<b>B</b>									
Analyze basic statistical techniques									
ST									
FR									

# Data and Probability

3/02/04

<b>4. Understand and apply basic concepts of probability</b>									
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
<b>A</b>						describe the degree of likelihood of events using such words as certain, equally likely and impossible	use a model (diagrams, list, sample space, or area model) to illustrate the possible outcomes of an event	use models to compute the probability of an event	make <u>conjectures</u> (based on theoretical probability) about the results of experiments
Apply basic concepts of probability									
ST						MA 3 4.1	MA 3,6 3.2	MA 3,6 3.3	MA 3 3.5
FR						VII.g	VII.g, X.c	VII.h & g, X.c	VII.g
<b>B</b>									
Use and describe compound events									
ST									
Fr									