



**MISSOURI**

**Mathematics Grade-Level Expectations, Grades 6, 7, 8**  
***MathScape: Seeing and Thinking Mathematically***  
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***MathScape: Seeing and Thinking Mathematically***  
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OBJECTIVES	PAGE REFERENCES
<b>GRADE 6</b>	
<b>Number and Operations</b>	
<b>1. Understand numbers, ways of representing numbers, relationships among numbers and number systems</b>	
<b>A. Read, write and compare numbers</b>	
compare and order integers, positive rationals and percents, including finding their approximate location on a number line <b>ST MA 5 3.3</b> <b>FR IX.b</b>	SE: 108-109, 110-111, 112-113, 114-115, 148, 150, 214-215, 216-217, 244-245, 246-247, 270, 280-281 TG: 106-107, 110A, 111A, 112A, 116-117, 214A, 216A, 242-243, 244A, 246A
<b>B. Represent and use rational numbers</b>	
recognize and generate equivalent forms of fractions, decimals and percents <b>ST MA 1 3.3</b> <b>FR V.b</b>	SE: 108, 110-111, 112-113, 148, 149, 212-213, 232-233, 238-239, 256, 257, 266, 268, 312 TG: 110A, 212A, 218, 230, 232A
<b>C. Compose and decompose numbers</b>	
recognize equivalent representations for the same number and generate them by <u>decomposing and composing numbers</u> , including expanded notation <b>ST MA 1 3.6</b> <b>FR V.b</b>	SE: 54-55, 81, 110-111, 112-113, 148, 149, 210-211, 211-213, 232-233, 257, 265, 266, 268 TG: 112A, 211A, 213A, 230-231
<b>D. Classify and describe numeric relationships</b>	
use <u>factors</u> and <u>multiples</u> to describe relationships between and among numbers, including whole number <u>common factors and multiples</u> <b>ST MA 5 1.10</b> <b>FR IX.c</b>	SE: 96-97, 98-99, 100-101, 104-105, 142, 143, 144, 146, 150 TG: 93G, 94-95, 99A, 100A, 101A, 105A, 116
<b>2. Understand meanings of operations and how they relate to one another</b>	
<b>A. Represent operations</b>	
<b>B. Describe effects of operations</b>	
describe the effects of addition and subtraction on fractions and decimals <b>ST MA 1, 5 3.4, 4.1</b> <b>FR V.a, IX.a</b>	SE: 118-119, 120-121, 122-123, 124-125, 126-127, 151, 154, 155, 220-221, 260 TG: 93G, 93H, 117, 120A, 123A, 207G, 207H, 218

OBJECTIVES	PAGE REFERENCES
<b>C. Apply properties of operations</b>	
<b>D. Apply operations on real and complex numbers</b>	
<b>3. Compute fluently and make reasonable estimates</b>	
<b>A. Describe or represent mental strategies</b>	
<b>B. Develop and demonstrate fluency</b>	
<b>C. Compute problems</b>	
add and subtract positive rational numbers <b>ST MA 1 1.10, 3.3</b> <b>FR V.a</b>	SE: 118-119, 120-121, 122-123, 124-125, 126-127, 151, 154, 155, 220-221, 246-247, 248-249, 250-251, 252-253, 254-255, 260, 271, 272, 275 TG: 93G, 93H, 117, 120A, 123A, 207G, 207H, 218, 242-243
<b>D. Estimate and justify solutions</b>	
estimate and justify the results of addition and subtraction of positive rational numbers <b>ST MA 1 3.3, 4.1</b> <b>FR V.e &amp; h</b>	SE: 134-135, 138-139, 158, 160, 216-217, 259, 267, 284-285, 291 TG: 284A, 291A
<b>E. Use proportional reasoning</b>	
solve problems using equivalent ratios <b>ST MA 1 3.3</b> <b>FR V.c</b>	SE: 280-281, 282-283, 286-287, 308, 309, 311 TG: 277G
<b>Algebraic Relationships</b>	
<b>1. Understand patterns, relations and functions</b>	
<b>A. Recognize and extend patterns</b>	
<b>B. Create and analyze patterns</b>	
represent and describe patterns with tables, graphs, pictures, <u>symbolic rules</u> or words <b>ST MA 4 1.6, 3.6</b> <b>FR VIII.4.b, VIII.3</b>	SE: 324-325, 326-327, 328-329, 332-333, 334-335, 336-337, 342-343, 344-345, 348-349, 350-351, 357, 358, 362, 363, 364 TG: 323, 326A, 345A, 346-347, 349A
<b>C. Classify objects and representations</b>	
compare various forms of <u>representations</u> to identify a pattern <b>ST MA 4 1.6</b> <b>FR VIII.3.b</b>	SE: 324-325, 326-327, 328-329, 332-333, 334-335, 336-337, 342-343, 344-345, 348-349, 350-351, 357, 358, 362, 363, 364 TG: 323, 326A, 345A, 346-347, 349A
<b>D. Identify and compare functions</b>	
identify <u>functions</u> as <u>linear</u> or <u>nonlinear</u> from a table or graph <b>ST MA 4 1.6, 3.6</b> <b>FR VIII.b &amp; c</b>	SE: 342-343, 344-345, 361, 362 TG: 21, 339
<b>E. Describe the effects of parameter changes</b>	
<b>2. Represent and analyze mathematical situations and structures using algebraic symbols</b>	
<b>A. Represent mathematical situations</b>	
use variables to represent unknown quantities in expressions <b>ST MA 4 1.6, 3.1</b> <b>FR VIII.2e</b>	SE: 332-333, 334-335, 336-337, 357, 358, 359 TG: 332A, 346, 347

OBJECTIVES	PAGE REFERENCES
<b>B. Describe and use mathematical manipulation</b>	
recognize equivalent forms for simple algebraic expressions (associative, distributive properties) <b>ST MA 5 3.6</b> <b>FR IX.1</b>	SE: 332-333, 334-335, 336-337, 350, 356, 359, 364 TG: 321G, 330-331
<b>C. Utilize equivalent forms</b>	
<b>D. Utilize systems</b>	
<b>3. Use mathematical models to represent and understand quantitative relationships</b>	
<b>A. Use mathematical models</b>	
model and solve problems, using multiple representations such as graphs, tables, expressions and equations <b>ST MA 4 1.6, 3.6</b> <b>FR VIII.b</b>	SE: 326-327, 328-329, 332-333, 334-335, 336-337, 340-341, 342-343, 344-345, 352-353, 355, 356, 357, 358, 361, 363 TG: 322, 323, 326A, 328A, 330-331, 336A, 338-339, 344A
<b>4. Analyze change in various contexts</b>	
<b>A. Analyze change</b>	
compare situations with constant or varying rates of change <b>ST MA 2, 4 1.6, 4.1</b> <b>FR VI.I, VIII.c</b>	SE: 16-17, 18-19, 22-23, 26-27, 41, 42, 44 TG: 20, 21, 22A
<b>Geometric and Spatial Relationships</b>	
<b>1. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships</b>	
<b>A. Describe and use geometric relationships</b>	
identify the <u>properties</u> of 1- 2- and 3-dimensional <u>shapes</u> using the appropriate geometric vocabulary <b>ST MA 2 1.10, 3.3</b> <b>FR VI.2.a</b>	SE: 166-167, 168-169, 170-171, 176-177, 180-181, 186-187, 192-193, 196, 198, 199, 200, 205 TG: 163G, 163H, 164, 167A, 174-175, 175A, 184-185
<b>B. Apply geometric relationships</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) <b>ST MA 2 1.6</b> <b>FR VI.c</b>	SE: 176-177, 178-179, 180-181, 182-183, 198, 199, 200, 282-283, 290-291 TG: 178A, 180A, 181A, 278, 279, 289
<b>C. Compose and decompose shapes</b>	
<b>2. Specify locations and describe spatial relationships using coordinate geometry and other representational systems</b>	
<b>A. Use coordinate systems</b>	
use coordinate geometry to construct geometric shapes <b>ST MA 2 1.6, 1.8</b> <b>FR VI.a</b>	SE: 340-341, 342-343, 360

OBJECTIVES	PAGE REFERENCES
<b>3. Apply transformations and use symmetry to analyze mathematical situations</b>	
<b>A. Use transformations on objects</b>	
describe the transformation from a given <u>pre-image</u> to its image using the terms <u>reflection/flips</u> , <u>rotation/turn</u> and <u>translation/slide</u> <b>ST MA 2 3.7</b> <b>FR VI.b</b>	SE: 168-169, 176-177, 195, 198 TG: 169A
<b>B. Use transformations on functions</b>	
<b>C. Use symmetry</b>	
create polygons and designs with <u>rotational symmetry</u> <b>ST MA 2 1.6</b> <b>FR VI.b</b>	SE: 168-169, 195 TG: 169A
<b>4. Use visualization, spatial reasoning and geometric modeling to solve problems</b>	
<b>A. Recognize and draw three-dimensional representations</b>	
use spatial visualization to identify <u>isometric representations</u> of <u>mat plans</u> <b>ST MA 2 3.3</b> <b>FR VI.a</b>	SE: 168-169, 170-171, 172-173, 195, 196 TG: 163G, 163H, 164, 170A
<b>B. Draw and use visual models</b>	
draw or use <u>visual models</u> to represent and solve problems <b>ST MA 2 3.1</b> <b>FR VI.d</b>	SE: 166-167, 168-169, 172-173, 176-177, 186-187, 188-189, 190-191, 192-193, 195, 197, 198, 202 TG: 163B, 164, 165, 166A, 175
<b>Measurement</b>	
<b>1. Understand measurable attributes of objects and the units, systems and processes of measurement</b>	
<b>A. Determine unit of measurement</b>	
identify and justify an angle as acute, obtuse, straight or right <b>ST MA 2 3.1, 4.1</b> <b>FR VI.g</b>	SE: 178-179, 180-181, 199, 200
<b>B. Identify equivalent measures</b>	
<b>C. Tell and use units of time</b>	
solve problems involving elapsed time (hours and minutes) <b>ST MA 5 3.1</b> <b>FR IX.d</b>	SE: 26-27, 44, 144
<b>D. Count and compute money</b>	
<b>2. Apply appropriate techniques, tools and formulas to determine measurements</b>	
<b>A. Use standard or non-standard measurement</b>	
estimate a measurement using either <u>standard</u> or <u>non-standard</u> unit of measurement <b>ST MA 2 1.6, 3.3</b> <b>FR VI.e &amp; f</b>	SE: 284-285, 286-287, 290-291, 292-293, 304-305, 310

OBJECTIVES	PAGE REFERENCES
<b>B. Use angle measurement</b>	
select and use <u>benchmarks</u> to estimate measurements of 0-, 45-, 90-, 180-, 360-degree angles <b>ST MA 2 3.4</b> <b>FR VI.f &amp; g</b>	SE: 178-179, 199 TG: 230 (supplies the definition of benchmark)
<b>C. Apply geometric measurements</b>	
describe how to solve problems involving the area or perimeter of polygons <b>ST MA 2 3.4, 4.1</b> <b>FR VI.i &amp; g</b>	SE: 182-183, 201 TG: 182A
<b>D. Analyze precision</b>	
<b>E. Use relationships within a measurement system</b>	
convert from one unit to another within a system of measurement (mass and weight) <b>ST MA 2 1.6, 1.10</b> <b>FR VI.e &amp; f</b>	SE: 149 #21-#25, 280-281, 292-293, 310, 311, 313, 314
<b>Data and Probability</b>	
<b>1. Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them</b>	
<b>A. Formulate questions</b>	
formulate questions, design studies and collect data about a characteristic <b>ST MA 3 1.2</b> <b>FR VII.a</b>	SE: 6-7, 10-11, 14-15, 18-19, 22-23, 32-33, 36, 37, 39, 41
<b>B. Classify and organize data</b>	
<b>C. Represent and interpret data</b>	
interpret circle graphs; create and interpret <u>stem-and-leaf plots</u> <b>ST MA 3 1.8</b> <b>FR VII.b</b>	SE: 265 #10-#12 (circle graph) Line plots are covered on the following pages SE: 6-7, 10-11, 22-23, 36, 38 TG: 7A, 21
<b>2. Select and use appropriate statistical methods to analyze data</b>	
<b>A. Describe and analyze data</b>	
find the <u>range</u> and <u>measures of center</u> , including <u>median</u> , <u>mode</u> and <u>mean</u> <b>ST MA 3 3.2</b> <b>FR VII.c</b>	SE: 6-7, 8-9, 10-11, 18-19, 22-23, 26-27, 31, 33, 36, 37, 42-46 TG: 4, 6A, 8A, 9A
<b>B. Compare data representations</b>	
compare different representations of the same data and evaluate how well each representation shows important aspects of the data <b>ST MA 3 3.6</b> <b>FR VII.d</b>	SE: 18-19, 34-35, 38 #6, #7, 39 #7 TG: 18A
<b>C. Represent data algebraically</b>	

OBJECTIVES	PAGE REFERENCES
<b>3. Develop and evaluate inferences and predictions that are based on data</b>	
<b>A. Develop and evaluate inferences</b>	
use observations about differences between 2 samples to make <u>conjectures</u> about the populations from which the samples were taken <b>ST MA 3 3.5</b> <b>FR VII.e</b>	SE: 8-9, 11, 19, 26-27, 35, 38 TG: 8A, 19A, 26A
<b>B. Analyze basic statistical techniques</b>	
<b>4. Understand and apply basic concepts of probability</b>	
<b>A. Apply basic concepts of probability</b>	
use a model (diagrams, list, sample space or area model) to illustrate the possible outcomes of an event <b>ST MA 3, 6 3.2</b> <b>FR VII.g, X.c</b>	SE: 30-31, 34-35 For diagrams and lists, see <i>MathScape: Seeing and Thinking Mathematically Course 3</i> © 2005 SE: 27, 29
<b>B. Use and describe compound events</b>	

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OBJECTIVES	PAGE REFERENCES
<b>GRADE 7</b>	
<b>Number and Operations</b>	
<b>1. Understand numbers, ways of representing numbers, relationships among numbers and number systems</b>	
<b>A. Read, write and compare numbers</b>	
compare and order integers, positive rationals and percents, including finding their approximate location on a number line <b>ST MA 5 3.3</b> <b>FR IX.b</b>	SE: 6-7, 10-11, 16-17, 18-19, 26-27, 28-29, 30-31, 34, 36, 38, 39, 42-44, TG: 3G, 6A, 10A, 19A, 24, 25, 26A
<b>B. Represent and use rational numbers</b>	
use fractions, decimals and percents to solve problems <b>ST MA 1 3.4</b> <b>FR V.d</b>	SE: 6-7, 10-11, 12-13, 16-17, 26-27, 28-29, 30-31, 34, 36, 37, 38, 42, 44, 162-163, 177, 190-191 TG: 4, 5, 7A, 25, 26A
<b>C. Compose and decompose numbers</b>	
recognize equivalent representations for the same number and generate them by <u>decomposing and composing numbers</u> , including exponential notation <b>ST MA 1 3.6</b> <b>FR V.b</b>	SE: 16-17, 18-19, 28-29, 38, 39, 43, 106, 107, 108-109, 110-111, 112-113, 128-131, 188-189, 214 TG: 4, 93H, 104-105
<b>D. Classify and describe numeric relationships</b>	
use whole number <u>factors</u> and <u>multiples</u> to describe relationships between and among numbers <b>ST MA 5 1.10</b> <b>FR IX.c</b>	SE: 116-117, 118-119, 120-121, 132, 133, 134 TG: 93E, 118A, 119A
<b>2. Understand meanings of operations and how they relate to one another</b>	
<b>A. Represent operations</b>	
<b>B. Describe effects of operations</b>	
describe the effects of multiplication and division on fractions and addition and subtraction on integers <b>ST MA 1 3.4, 4.1</b> <b>FR V.a</b>	SE: 96-97, 98-99, 108-109, 124, 125, 129 TG: 93G, 94, 95, 98A
<b>C. Apply properties of operations</b>	
apply <u>properties of operations</u> (including order of operations) to positive rational numbers <b>ST MA 5 1.6, 1.10</b> <b>FR IX.e</b>	SE: 100-101, 102-103, 106-107, 127, 128, 188-189, 214, 238-239, 262 TG: 93G, 102A, 103A, 183, 189A
<b>D. Apply operations on real and complex numbers</b>	
approximate the value of square roots to the nearest whole number <b>ST MA 5 3.3</b> <b>FR IX.f</b>	SE: 106-107, 110-111, 128, 129 TG: 93H, 111A

OBJECTIVES	PAGE REFERENCES
<b>3. Compute fluently and make reasonable estimates</b>	
<b>A. Describe or represent mental strategies</b>	
<b>B. Develop and demonstrate fluency</b>	
<b>C. Compute problems</b>	
multiply and divide positive rational numbers <b>ST MA 1 1.10, 3.3</b> <b>FR V.a</b>	SE: 26-27, 32-33, 42-45, 100-101, 108-109, 126, 129, 294-299, 310-312
<b>D. Estimate and justify solutions</b>	
estimate and justify the results of multiplication and division of positive rational numbers <b>ST MA 1 3.3, 4.1</b> <b>FR V.e &amp; h</b>	SE: 6-7, 10-11, 12-13, 26, 28-29, 30-31, 34, 36, 37, 42, 146-147, 160-161, 162-163, 298-299 TG: 6A, 10A, 137H, 146A, 161A, 162A, 298A, 299A
<b>E. Use proportional reasoning</b>	
solve problems involving proportions, such as scaling and finding equivalent ratios <b>ST MA 1 3.3</b> <b>FR V.c &amp; f</b>	SE: 16-17, 18-19, 20-21, 22-23, 38-40, 140-141, 142-143, 144-145, 168-170 TG: 14, 15, 16A, 20A, 138-139
<b>Algebraic Relationships</b>	
<b>1. Understand patterns, relations and functions</b>	
<b>A. Recognize and extend patterns</b>	
<b>B. Create and analyze patterns</b>	
analyze patterns represented <u>graphically</u> or <u>numerically</u> using words or <u>symbolic rules</u> , including <u>recursive notation</u> <b>ST MA 4 1.6, 3.6</b> <b>FR VIII.4.b</b>	SE: 86, 106-107, 112-113, 116-117, 120-121, 127, 128, 132, 194-195, 196-197, 198-199, 217, 218, 219 TG: 104, 107A, 112A, 114-115, 193
<b>C. Classify objects and representations</b>	
compare and contrast various forms of <u>representations</u> of patterns <b>ST MA 4 1.6</b> <b>FR VIII.3.b</b>	SE: 112-113, 120-121, 128, 134, 198-199 TG: 115, 199A
<b>D. Identify and compare functions</b>	
identify <u>functions</u> as <u>linear</u> or <u>nonlinear</u> from tables, graphs or equations <b>ST MA 4 1.6, 3.6</b> <b>FR VIII.b &amp; c</b>	SE: 194-195, 196-197, 198-199, 200-201, 204-205, 208-209, 217, 220 TG: 194A, 202
<b>E. Describe the effects of parameter changes</b>	
<b>2. Represent and analyze mathematical situations and structures using algebraic symbols</b>	
<b>A. Represent mathematical situations</b>	
use variables to represent unknown quantities in equations and inequalities <b>ST MA 4 1.6, 3.1</b> <b>FR VIII.2.e</b>	SE: 184-185, 186-187, 190-191, 206-207, 208-209, 212, 213, 215, 221, 222 TG: 182, 185A, 186A, 202-203, 207A, 208A
<b>B. Describe and use mathematical manipulation</b>	
generate equivalent forms for simple algebraic expressions <b>ST MA 4 3.6</b> <b>FR VIII.a</b>	SE: 184-185, 188-189, 212, 214 TG: 183, 184A, 188A, 192

OBJECTIVES	PAGE REFERENCES
<b>C. Utilize equivalent forms</b>	
<b>D. Utilize systems</b>	
<b>3. Use mathematical models to represent and understand quantitative relationships</b>	
<b>A. Use mathematical models</b>	
model and solve problems, using multiple representations such as graphs, tables, expressions, equations or inequalities <b>ST MA 4 1.6, 3.6</b> <b>FR VIII.b</b>	SE: 166-167, 179, 184-185, 186-187, 196-197, 198-199, 200-201, 204-205, 206-207, 208-209, 211, 213, 216-219, 222 TG: 181H, 184A, 186A, 192-193, 202, 203
<b>4. Analyze change in various contexts</b>	
<b>A. Analyze change</b>	
compare situations with constant or varying rates of change <b>ST MA 2, 4 1.6, 4.1</b> <b>FR VI.I, VIII.c</b>	SE: 8-9, 35 TG: 4, 5
<b>Geometric and Spatial Relationships</b>	
<b>1. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships</b>	
<b>A. Describe and use geometric relationships</b>	
classify 2- and 3-dimensional shapes based on their <u>properties</u> <b>ST MA 2 3.6</b> <b>FR VI.2.a</b>	SE: 150-151, 164-165, 166-167, 172, 278-279, 280-281, 284-285, 288-289, 290-291, 296-297, 304, 305, 306, 308, 309, 311 TG: 279A, 281A, 282, 283, 284A, 288A, 291A
<b>B. Apply geometric relationships</b>	
describe relationships between <u>corresponding sides</u> , <u>corresponding angles</u> and corresponding perimeters of <u>similar polygons</u> <b>ST MA 2 1.6</b> <b>FR VI.c</b>	SE: 140-141, 142-143, 144-145, 164-165, 170, 178, 274-275, 276-277, 280-281, 286-287, 290-291, 302, 303, 305, 307, 309 TG: 137G, 141A, 271G, 271H, 272, 273, 276A, 277A, 280A, 281A, 287A
<b>C. Compose and decompose shapes</b>	
<b>2. Specify locations and describe spatial relationships using coordinate geometry and other representational systems</b>	
<b>A. Use coordinate systems</b>	
given ordered pairs, identify geometric shapes in the <u>coordinate plane</u> using their properties <b>ST MA 2 1.6, 1.8</b> <b>FR VI.c</b>	SE: 288-289, 308 TG: 283, 289A
<b>3. Apply transformations and use symmetry to analyze mathematical situations</b>	
<b>A. Use transformations on objects</b>	
reposition shapes under <u>informal</u> transformations, such as reflection (flip), rotation (turn) and translation (slide) <b>ST MA 2 3.6</b> <b>FR VI.b</b>	SE: 288-289, 308 TG: 283, 288A

OBJECTIVES	PAGE REFERENCES
<b>B. Use transformations on functions</b>	
describe the relationship between the scale factor and the perimeter of the image using a <u>dilation</u> ( <u>contractions-magnifications</u> ) (stretching/shrinking) <b>ST MA 2 3.6</b> <b>FR VI.b &amp; g</b>	SE: 280-281, 305, 311 TG: 280A, 281A
<b>C. Use symmetry</b>	
determine all lines of symmetry of polygons <b>ST MA 2 1.6</b> <b>FR VI.b</b>	SE: 278-279, 288-289, 290-291, 304, 308, 309 TG: 279A, 290A
<b>4. Use visualization, spatial reasoning and geometric modeling to solve problems</b>	
<b>A. Recognize and draw three-dimensional representations</b>	
use spatial visualizations to identify various 2-dimensional views of <u>isometric drawings</u> <b>ST MA 2 3.3</b> <b>FR VI.a</b>	Graph paper could be used to show isometric drawings on pages SE: 280-281 Also see <i>MathScape: Seeing and Thinking Mathematically Course 1</i> © 2005 for isometric drawings. SE: 168-169, 170-171, 172-173, 195-196 TG: 163G, 163H, 164, 170A
<b>B. Draw and use visual models</b>	
draw or use <u>visual models</u> to represent and solve problems <b>ST MA 2 3.1</b> <b>FR VI.d</b>	SE: 140-141, 142-143, 151, 153, 157, 166-167, 168, 169, 172, 179, 278-279, 280-281, 288-289, 300-301, 305, 308, 313 TG: 141A, 143A, 151A, 153A, 157A, 166A, 271G, 271H, 280A, 288A
<b>Measurement</b>	
<b>1. Understand measurable attributes of objects and the units, systems and processes of measurement</b>	
<b>A. Determine unit of measurement</b>	
identify and justify the unit of measure for volume (customary and metric) <b>ST MA 2 3.1, 4.1</b> <b>FR VI.f &amp; g</b>	See <i>MathScape: Seeing and Thinking Mathematically Course 1</i> © 2005 (review measure conversion) SE: 284-285, 294-297, 304, 305, 310, 314, 315, 318
<b>B. Identify equivalent measures</b>	
identify the equivalent area measures within a system of measurement (e.g., sq ft. to sq in.) <b>ST MA 2 1.6</b> <b>FR VI.i</b>	After reviewing measure conversion, see SE: 140-141, 142-143, 144-145, 169, 170 TG: 138, 139, 143A
<b>C. Tell and use units of time</b>	
solve problems involving addition and subtraction of time (hours, minutes and seconds) <b>ST MA 5 3.1</b> <b>FR IX.d</b>	SE: 204-205, 220, 223
<b>D. Count and compute money</b>	

OBJECTIVES	PAGE REFERENCES
<b>2. Apply appropriate techniques, tools and formulas to determine measurements</b>	
<b>A. Use standard or non-standard measurement</b>	
<b>B. Use angle measurement</b>	
use tools to measure angles to the nearest degree <b>ST MA 2 1.4, 3.2</b> <b>FR VI.f</b>	SE: 274-275, 276-277, 280-281, 303, 305 TG: 271G, 272, 273, 274A
<b>C. Apply geometric measurements</b>	
describe how to solve problems involving circumference and/or area of a circle <b>ST MA 2 3.4, 4.1</b> <b>FR VI.i &amp; g</b>	SE: 294-295, 298-299, 310, 312 TG: 292, 293, 294A
<b>D. Analyze precision</b>	
analyze <u>precision</u> and accuracy in measurement situations <b>ST MA 2 1.7, 3.8</b> <b>FR VI.f</b>	SE: 146-147, 152-153, 280-281, 290-291, 300-301
<b>E. Use relationships within a measurement system</b>	
convert from one unit to another within a system of measurement (capacity) <b>ST MA 2 1.6, 1.10</b> <b>FR VI.e &amp; f</b>	SE: 140-141, 142-143, 144-145, 168, 169, 170 For discussion of capacity see <i>MathScape: Seeing and Thinking Mathematically Course 1</i> © 2005 SE: 284, 294, 304, 305, 310, 314, 315, 318
<b>Data and Probability</b>	
<b>1. Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them</b>	
<b>A. Formulate questions</b>	
formulate questions, design studies and collect data about a characteristic <b>ST MA 3 1.2</b> <b>FR VII.a</b>	SE: 232-233, 236-237, 240-241, 246-247, 248-249, 252-253, 254-255, 256-257, 260, 261, 264, 265, 266 TG: 234, 235, 236A, 237A, 242, 243, 253A, 254A
<b>B. Classify and organize data</b>	
<b>C. Represent and interpret data</b>	
select, create and use appropriate graphical representation of data, including circle graphs, histograms and box plots (box and whiskers) <b>ST MA 3 1.8, 3.6</b> <b>FR VII.b</b>	SE: 8-9, 28-29, 32-33, 35, 41, 43, 198-199, 200-201, 218, 219, 246-247, 248-249, 265, 266 TG: 3H, 24-25, 28A, 29A, 33A, 200A, 242, 243, 247A, 248A
<b>2. Select and use appropriate statistical methods to analyze data</b>	
<b>A. Describe and analyze data</b>	
find, use and interpret <u>measures of center</u> and spread, including ranges and <u>interquartile range</u> <b>ST MA 3 3.4</b>	See <i>MathScape: Seeing and Thinking Mathematically Course 3</i> © 2005 SE: 12-13, 17, 35-38

OBJECTIVES	PAGE REFERENCES
<b>B. Compare data representations</b>	
compare different representations of the same data and evaluate how well each representation shows important aspects of the data <b>ST MA 3 3.6</b> <b>FR VII.d</b>	SE: 210-211, 223, 244-245, 246-247, 248-249, 256-257, 264, 266, 269 TG: 245A, 247A, 256A
<b>C. Represent data algebraically</b>	
<b>3. Develop and evaluate inferences and predictions that are based on data</b>	
<b>A. Develop and evaluate inferences</b>	
use observations about differences between samples to make <u>conjectures</u> about the populations from which the samples were taken <b>ST MA 3 3.5</b> <b>FR VII.e</b>	See <i>MathScape: Seeing and Thinking Mathematically Course 3</i> © 2005 SE: 8-9, 11, 19, 26-27, 35, 38 TG: 8A, 19A, 26A
<b>B. Analyze basic statistical techniques</b>	
<b>4. Understand and apply basic concepts of probability</b>	
<b>A. Apply basic concepts of probability</b>	
use models to compute the probability of an event <b>ST MA 3, 6 3.3</b> <b>FR VII.h &amp; g, X.c</b>	SE: 50-51, 52-53, 54-55, 58-59, 60-61, 62-63, 66-67, 70-71 TG: 47G, 48, 49, 52A, 53A, 56, 57, 58A, 60A, 64, 65, 71A
<b>B. Use and describe compound events</b>	

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OBJECTIVES	PAGE REFERENCES
<b>GRADE 8</b>	
<b>Number and Operations</b>	
<b>1. Understand numbers, ways of representing numbers, relationships among numbers and number systems</b>	
<b>A. Read, write and compare numbers</b>	
compare and order rationals and percents, including finding their approximate locations on a number line <b>ST MA 5 3.3</b> <b>FR IX.b</b>	SE: 162-163, 176 TG: 135E, 162A
<b>B. Represent and use rational numbers</b>	
use fractions, decimals and percents to solve problems <b>ST MA 1 3.4</b> <b>FR V.d</b>	SE: 144-145, 160-161, 162-163, 169, 176, 242-243, 246-247, 262, 264 TG: 160A, 162A, 163A, 241
<b>C. Compose and decompose numbers</b>	
recognize equivalent representations for the same number and generate them by <u>decomposing and composing numbers</u> , including scientific notation <b>ST MA 1 3.6</b> <b>FR V.b</b>	SE: 162-163, 176, 246-247, 264, 300-301, 313 TG: 269H, 300A
<b>D. Classify and describe numeric relationships</b>	
use <u>factors</u> and <u>multiples</u> to describe relationships between and among numbers and justify characteristics of numbers <b>ST MA 5 1.10</b> <b>FR IX.c</b>	See <i>MathScape: Seeing and Thinking Mathematically Course 2</i> © 2005 SE: 116-117, 118-119, 120-121, 132, 133, 134 TG: 114, 115, 118A, 119A
<b>2. Understand meanings of operations and how they relate to one another</b>	
<b>A. Represent operations</b>	
<b>B. Describe effects of operations</b>	
describe the effects of multiplication and division on integers <b>ST MA 1 3.4, 4.1</b> <b>FR V.a</b>	SE: 52-53, 79, 144-145, 186-187, 188-189, 196-197, 212, 213, 216 TG: 53A, 181, 186A, 196A, 197A
<b>C. Apply properties of operations</b>	
apply <u>properties of operations</u> to rational numbers, including order of operations and inverse operations <b>ST MA 5 1.6, 1.10</b> <b>FR IX.e</b>	SE: 144-145, 169, 196-197, 206-207, 208-209, 216, 217, 220, 221 TG: 196A, 197A

OBJECTIVES	PAGE REFERENCES
<b>D. Apply operations on real and complex numbers</b>	
apply the relationship between squares and square roots and cubes and cube roots to solve a problem <b>ST MA 5 1.6, 3.4</b> <b>FR IX.f</b>	Limited discussion is found on SE: 150-151, 171 TG: 151A Also see <i>MathScape: Seeing and Thinking Mathematically Course 2</i> © 2005 SE: 106-107, 108-109, 110-111, 112-113, 128-131 TG: 93H, 106A, 109A, 110A, 111A
<b>3. Compute fluently and make reasonable estimates</b>	
<b>A. Describe or represent mental strategies</b>	
<b>B. Develop and demonstrate fluency</b>	
<b>C. Compute problems</b>	
apply all operations on rational numbers <b>ST MA 1 1.10, 3.3</b> <b>FR V.a</b>	SE: 22-23, 41, 48, 50-51, 52-53, 72-73, 79
<b>D. Estimate and justify solutions</b>	
estimate and justify the results of all operations on rational numbers <b>ST MA 1 3.3, 4.1</b> <b>FR V.e &amp; h</b>	SE: 98-99, 118-119, 132, 160-161, 162-163, 164-165, 166-167, 176, 177 TG: 162A, 163A
<b>E. Use proportional reasoning</b>	
solve problems involving proportions, such as scaling and finding equivalent ratios <b>ST MA 1 3.3</b> <b>FR V.c &amp; f</b>	SE: 242-243, 244-245, 246-247, 262, 263, 264 TG: 223C, 240, 241, 242A
<b>Algebraic Relationships</b>	
<b>1. Understand patterns, relations and functions</b>	
<b>A. Recognize and extend patterns</b>	
<b>B. Create and analyze patterns</b>	
generalize patterns represented <u>graphically</u> or <u>numerically</u> using words or <u>symbolic rules</u> , including <u>recursive notation</u> <b>ST MA 4 1.6, 3.6</b> <b>FR VIII.4.b</b>	SE: 54-55, 56-57, 80, 81, 138-139, 140-141, 142-143, 144-145, 148-149, 150-151, 152-153, 160-161, 166, 167, 170, 171, 173-177 TG: 135G, 135H, 138A, 142A, 146, 147, 149A, 156
<b>C. Classify objects and representations</b>	
compare and contrast various forms of <u>representations</u> of patterns <b>ST MA 4 1.6</b> <b>FR VIII.3.b</b>	SE: 138-139, 140-145, 148-149, 150-151, 154-155, 166-171, 173 TG: 135C, 135E, 135G, 136, 137, 138A, 140A, 141A, 146, 147, 149A, 151A, 153A, 156
<b>D. Identify and compare functions</b>	
compare <u>properties of linear functions</u> between or among tables, graphs and equations <b>ST MA 4 1.6, 3.6</b> <b>FR VIII.b &amp; c</b>	SE: 272-273, 274-275, 276-277, 280-281, 282-283, 284-285, 302, 303, 304, 305, 306, 307 TG: 269E, 270, 271, 273A, 276A, 280A
<b>E. Describe the effects of parameter changes</b>	

OBJECTIVES	PAGE REFERENCES
<b>2. Represent and analyze mathematical situations and structures using algebraic symbols</b>	
<b>A. Represent mathematical situations</b>	
use <u>symbolic algebra</u> to represent and solve problems that involve linear relationships, including <u>recursive</u> relationships <b>ST MA 4 1.6, 3.1</b> <b>FR VIII.2.e</b>	SE: 196-197, 204-205, 206-207, 216, 219, 220, 272-273, 276-277, 280-281, 284-285, 302, 304, 305, 307 TG: 146, 147, 156
<b>B. Describe and use mathematical manipulation</b>	
generate equivalent forms for linear expressions <b>ST MA 4 3.6</b> <b>FR VIII.a</b>	SE: 54-55, 74-75, 80, 88, 182-183, 184-185, 186-187, 188-189, 194-195, 196-197, 198-199, 208-209, 210-213, 215-217, 221 TG: 146, 147, 179G, 179H, 182A, 184A, 198A
<b>C. Utilize equivalent forms</b>	
<b>D. Utilize systems</b>	
<b>3. Use mathematical models to represent and understand quantitative relationships</b>	
<b>A. Use mathematical models</b>	
<u>model</u> and solve problems, using multiple representations such as graphs, tables, equations or inequalities <b>ST MA 4 1.6, 3.6</b> <b>FR VIII.b</b>	SE: 6-7, 20-21, 34, 40, 60-61, 62-63, 144-145, 148, 152-153, 154-155, 169-172, 202-207, 218-220, 244-245, 263, 280-281, 282-283, 284-285, 305-307 TG: 58, 59, 62A, 136, 137, 148A, 154A, 200, 201, 204A, 279
<b>4. Analyze change in various contexts</b>	
<b>A. Analyze change</b>	
analyze the nature of changes (including slope and intercepts) in quantities in linear relationships <b>ST MA 2, 4 1.6, 4.1</b> <b>FR VI.i, VIII.c</b>	SE: 138-139, 154-155, 160-161, 162-163, 164-165, 166, 173, 174, 175-177, 244-245, 280-281, 282-283, 284-285, 305-307 TG: 138A, 158A, 159A, 163A, 164A, 223A, 224, 225, 240, 242A, 280A
<b>Geometric and Spatial Relationships</b>	
<b>1. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships</b>	
<b>A. Describe and use geometric relationships</b>	
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 ▶ Pythagorean Theorem ▶ <u>cross-section</u> of a 3-dimensional object results in what 2-dimensional shape <b>ST MA 2 1.6, 3.6</b> <b>FR VI.c</b>	SE: 94-95, 96-97, 108-109, 114-117, 122, 126, 130, 236, 238-239, 247, 250-251, 260, 261, 264, 265 TG: 91G, 92, R2 (Shapes & Space), 94A, 95A, 96A, 104A, 108A, 113, 232, 237A, 238A
<b>B. Apply geometric relationships</b>	
apply relationships between the <u>corresponding sides and corresponding areas</u> of <u>similar polygons</u> to solve problems <b>ST MA 2 1.6, 3.6</b> <b>FR VI.c</b>	SE: 96-97, 108-109, 120-121, 123, 128, 133, 252-253, 254-255, 266, 267, 280-281 TG: 281A
<b>C. Compose and decompose shapes</b>	

OBJECTIVES	PAGE REFERENCES
<b>2. Specify locations and describe spatial relationships using coordinate geometry and other representational systems</b>	
<b>A. Use coordinate systems</b>	
use coordinate geometry to analyze <u>properties of right triangles</u> and quadrilaterals <b>ST MA 2 3.6</b> <b>FR VI.f</b>	The following pages are limited to isometric drawings. SE: 242-243, 244-245, 262, 263 Also see <i>MathScape: Seeing and Thinking Mathematically Course 2</i> © 2005 for coordinate references. SE: 288-289, 308 TG: 283, 289A
<b>3. Apply transformations and use symmetry to analyze mathematical situations</b>	
<b>A. Use transformations on objects</b>	
reposition shapes under formal transformations, such as reflection, rotation and translation <b>ST MA 2 3.6</b> <b>FR VI.b</b>	A limited reference is found on SE: 259 Also see <i>MathScape: Seeing and Thinking Mathematically Course 2</i> © 2005 SE: 288-289
<b>B. Use transformations on functions</b>	
describe the relationship between the scale factor and the area of the image using a <u>dilation</u> (stretching/shrinking) <b>ST MA 2 3.6</b> <b>FR VI.b &amp; g</b>	See <i>MathScape: Seeing and Thinking Mathematically Course 2</i> © 2005 SE: 140-141, 142-143, 144-145 TG: 138, 139, 140A
<b>C. Use symmetry</b>	
identify the number of rotational symmetries of regular polygons <b>ST MA 2 1.6</b> <b>FR VI.b</b>	See <i>MathScape: Seeing and Thinking Mathematically Course 2</i> © 2005 SE: 288-289, 290-291, 308, 309 TG: 283
<b>4. Use visualization, spatial reasoning and geometric modeling to solve problems</b>	
<b>A. Recognize and draw three-dimensional representations</b>	
create <u>isometric drawings</u> from a given <u>mat plan</u> <b>ST MA 2 3.3</b> <b>FR VI.a</b>	See limited references on SE: 242-243, 244-245, 262, 263 Also see <i>MathScape: Seeing and Thinking Mathematically Course 1</i> © 2005 SE: 168-173
<b>B. Draw and use visual models</b>	
draw or use <u>visual models</u> to represent and solve problems <b>ST MA 2 3.1</b> <b>FR VI.d</b>	SE: 94-95, 100-101, 108-109, 110-111, 114-115, 122, 125, 128-130, 142-143, 152-153, 154-155, 172, 173 TG: 92, 94A, 100A, 109A, 110A, 114A

OBJECTIVES	PAGE REFERENCES
<b>Measurement</b>	
<b>1. Understand measurable attributes of objects and the units, systems and processes of measurement</b>	
<b>A. Determine unit of measurement</b>	
<b>B. Identify equivalent measures</b>	
identify the equivalent volume measures within a system of measurement (e.g., m <sup>3</sup> to cm <sup>3</sup> ) <b>ST MA 2 1.6</b> <b>FR VI.i</b>	SE: 98-99, 100-101, 110-111, 114-115, 116-117, 118-119, 124, 125, 129-132 TG: 93, 98A, 100A, 112, 113, 114A, 118A
<b>C. Tell and use units of time</b>	
<b>D. Count and compute money</b>	
<b>2. Apply appropriate techniques, tools and formulas to determine measurements</b>	
<b>A. Use standard or non-standard measurement</b>	
<b>B. Use angle measurement</b>	
use tools to determine the measure of <u>reflex</u> angles to the nearest degree <b>ST MA 2 1.4, 3.2</b> <b>FR VI.f</b>	See <i>MathScape: Seeing and Thinking Mathematically Course 2</i> © 2005 SE: 274-275, 302 TG: 272
<b>C. Apply geometric measurements</b>	
describe how to solve problems involving surface area and/or volume of a rectangular or triangular prism, or cylinder <b>ST MA 2 3.4, 4.1</b> <b>FR VI.i &amp; g</b>	SE: 98-99, 100-101, 104-105, 108-109, 110-111 TG: 91A, 91B, 93, 98A, 99A, 102, 103, 106A, 108A, 109A
<b>D. Analyze precision</b>	
analyze <u>precision</u> and accuracy in measurement situations and determine number of significant digits <b>ST MA 2 1.7, 3.8</b> <b>FR VI.f</b>	SE: 16-17, 38, 160-161, 175, 228-229, 238-239, 257, 259, 290-291, 309 TG: 16A, 228A
<b>E. Use relationships within a measurement system</b>	
convert square or cubic units to equivalent square or cubic units within the same system of measurement <b>ST MA 2 1.6, 1.10</b> <b>FR VI.e &amp; f</b>	SE: 98-99, 118-119, 124, 132
<b>Data and Probability</b>	
<b>1. Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them</b>	
<b>A. Formulate questions</b>	
formulate questions, design studies and collect data about a characteristic <b>ST MA 3 1.2</b> <b>FR VII.a</b>	SE: 6-7, 8-9, 10-11, 16-17, 18-19, 20-21, 35, 36, 39, 40, 41 TG: 4, 5, 8A, 9A
<b>B. Classify and organize data</b>	
<b>C. Represent and interpret data</b>	
select, create and use appropriate graphical representation of data (including <u>scatter plots</u> ) <b>ST MA 3 1.8, 3.6</b>	SE: 6-7, 12-13, 16-23, 34, 35, 36, 39-41 TG: 3A, 3C, 3G, 7A, 12A, 14, 15, 17A

OBJECTIVES	PAGE REFERENCES
<b>2. Select and use appropriate statistical methods to analyze data</b>	
<b>A. Describe and analyze data</b>	
find, use and interpret <u>measures of center</u> , <u>outliers</u> and spread, including range and <u>interquartile range</u> <b>ST MA 3 3.4</b> <b>FR VII.c</b>	SE: 6-7, 8-9, 10-11, 12-13, 16-17, 34-38 TG: 3G, 4, 5, 8A, 12A
<b>B. Compare data representations</b>	
compare different representations of the same data and evaluate how well each representation shows important aspects of the data <b>ST MA 3 3.6</b> <b>FR VII.d</b>	SE: 6-7, 10-11, 34, 36, 52-53, 62-63, 83, 154-155, 173 TG: 7A, 52A, 62A
<b>C. Represent data algebraically</b>	
<b>3. Develop and evaluate inferences and predictions that are based on data</b>	
<b>A. Develop and evaluate inferences</b>	
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 to fit <b>ST MA 3 3.5</b> <b>FR VII.e</b>	SE: 18-19, 20-21, 22-23, 39-41, 154-155, 173 TG: 14, 15, 18A, 21A
<b>B. Analyze basic statistical techniques</b>	
<b>4. Understand and apply basic concepts of probability</b>	
<b>A. Apply basic concepts of probability</b>	
make <u>conjectures</u> (based on theoretical probability) about the results of experiments <b>ST MA 3 3.5</b> <b>FR VII.g</b>	SE: 26-27, 28-29, 30-31, 32-33, 42-45 TG: 3C, 24, 30A, 33A
<b>B. Use and describe compound events</b>	