



STANDARDS

PAGE REFERENCES

Number and Operations

Purpose: Numbers and operations remain a cornerstone for the study of mathematics in grades K – 12. Students use numbers to quantify sets, identify location, measure, quantify the probability of an event, analyze data, and describe and interpret real-world phenomena. Having students know basic facts and having students compute fluently (i.e., accurately and efficiently) continues to be an important goal in mathematics education. However, knowing basic facts should be incorporated into a rich mathematics curriculum that builds conceptual understanding of these facts.

Through the school years, the amount of time spent on numbers and their operations will decrease and the types of numbers studied will change. As students progress through the elementary grades and into middle school, they will need to develop an in-depth conceptual understanding of fractions, decimals, and percents prior to doing algorithmic computations with these numbers. Conceptual development of integers and meaningful computation with them are also goals for middle grade students. The study of irrational numbers and the real number system will begin in eighth grade and continue through high school. Imaginary and complex numbers are introduced in advanced mathematics. It is important for students to model and represent the different types of numbers they study.

Students cannot appreciate the power of numbers unless they also understand the operations upon those numbers. Students need to recognize which operation to apply to a given problem situation they encounter. They need to know what effect the various operations will have on different types of numbers. They need to know the relationships among the operations and among the operations and their properties. A deep understanding of the operations and their properties will help students make sense of computation algorithms and lead to fluency in computation. A firm understanding of numbers as well as operations and their properties will provide a good foundation for the study of algebra.

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<p>M:N&O:2:1 Demonstrates conceptual understanding of rational numbers with respect to:</p> <p>whole numbers from <u>0</u> to <u>199</u> using place value, by applying the concepts of equivalency in composing or decomposing numbers (e.g., $34 = 17 + 17$; $34 = 29 + 5$); and in expanded notation (e.g., $141 = 1$ hundred + 4 tens + 1 one or $141 = 100 + 40 + 1$) using models, explanations, or other representations; and positive fractional numbers (benchmark fractions: $\frac{a}{2}$, $\frac{a}{3}$, or $\frac{a}{4}$, where a is a whole number greater than 0 and less than or equal to the denominator) as a part to whole relationship in area and set models where the denominator is equal to the number of parts in the whole using models, explanations, or other representations. (State)</p>	<p>Student Edition: 17-18, 19-20, 55-56, 73-74, 87-88, 144, 147-148, 195-196, 279, 280, 283-284, 285-286, 289-290, 297-298, 299-300 <i>Chapter Review</i> 46 #6, #7, 172, 305 #3-#6, 337 <i>Start Smart</i> 2, 3 <i>Tech Link</i> 59-60 <i>Test Practice</i> 307-308</p> <p>Teacher Edition: CCL 51G, 51H, 83G, 142G, 143H, 175G, 175H, 279G; FMB 17A, 55A, 73A, 88A, 147A, 195A, 283A, 285A, 289A, 297A, 299A</p>
<p>M:N&O:2:2 Demonstrates understanding of the relative magnitude of numbers from <u>0</u> to <u>199</u> by ordering whole numbers; by comparing whole numbers to each other or to benchmark whole numbers (10, 25, 50, 75, 100, <u>125</u>, <u>150</u>, or <u>175</u>); by demonstrating an understanding of the relation of inequality when comparing whole numbers by using “1 more”, “1 less”, “10 more”, “10 less”, “<u>100 more</u>”, or “<u>100 less</u>”; or by connecting number words and numerals to the quantities they represent using models, number lines, or explanations. (State)</p>	<p>Student Edition: 27-28, 33-34, 35-36, 309, 310, 315-316, 323-324, 329-330, 365-366 <i>Chapter Review</i> 48 #15-#18, 338 #20 <i>Extra Practice</i> 37 <i>Game Time</i> 38</p> <p>Teacher Edition: BI 309A; CCL 13H; CP 15; FMB 27A, 33A, 35A, 315A, 323A, 329A, 365A</p>
<p>M:N&O:2:3 Demonstrates conceptual understanding of mathematical operations involving addition and subtraction of whole numbers by solving problems involving joining actions, separating actions, part-part whole relationships, and comparison situations; and addition of multiple one-digit whole numbers. (State) (See Appendix A.)</p>	<p>Student Edition: 51, 52, 83 <i>Chapter Review</i> 80 <i>Data File</i> 92 <i>Problem Solving</i> 77-78, 107-108 <i>Problem Solving Investigation</i> 42, 76, 106 <i>Problem Solving Strategy</i> 62 <i>Start Smart</i> 5, 6</p> <p>Teacher Edition: CCL 51H; FMB 55A</p>

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<p>M:N&O:2:5 Demonstrates understanding of monetary value by adding coins together to a value no greater than \$1.99 and representing the result in dollar notation; making change from \$1.00 or less, or recognizing equivalent coin representations of the same value (values up to \$1.99). (State)</p>	<p>Student Edition: 211-212, 215-216, 223-224, 225-226, 229-230, 231-232 <i>Chapter Review</i> 237-238 <i>Concepts & Skills Bank</i> CS9-CS10 <i>Extra Practice</i> 227 <i>Hands On Activity</i> 223-224 <i>Problem Solving</i> 235-236 <i>Tech Link</i> 214-215 <i>Test Practice</i> 239 Teacher Edition: FMB 211A, 215A, 223A, 229A, 231A</p>
<p>M:N&O:2:6 Mentally adds and subtracts whole number facts through 20 (addends whose sum is at most 20 and related subtraction facts); names the number that is 10 more or less than the original number, and mentally adds and subtracts two-digit multiples of ten (e.g., $60 + 80$, $90 - 30$). (Local)</p> <p>(IMPORTANT: The intent of this GLE is to embed mental arithmetic throughout the instructional program, not to teach it as a separate unit.)</p>	<p>Student Edition: 97-98, 101-102, 103-104, 147-148, 179-180 <i>Chapter Review</i> 110, 172 #21-#22, 203 #3-#5 <i>Game Time</i> 100 <i>Start Smart</i> 6 <i>Test Practice</i> 111-112, 173 #2, 174 #7, 307 #2 Teacher Edition: FMB 47A, 101A, 103A, 147A, 179A; 5MC 105A</p>
<p>M:N&O:2:7 Makes estimates of the number of objects in a set (up to 50) by selecting an appropriate method of estimation. (Local)</p> <p>(IMPORTANT: The intent of this GLE is to embed estimation throughout the instructional program, not to teach it as a separate unit.)</p>	<p>Student Edition: 29-30, 143, 163-164, 199-200, 309, 447-448, 459-460 <i>Chapter Review</i> 47 #3, 172 #21-#22, 204 #30-#31 <i>Problem Solving Strategy</i> 93-94 Teacher Edition: CCL 13H; FMB 29A, 163A; KV 143</p>
<p>M:N&O:2:8 Applies properties of numbers (odd and even) and field properties (commutative for addition, identity for addition, and associative for addition) to solve problems and to simplify computations involving whole numbers. (Local)</p>	<p>Student Edition: 55-56, 73-74, 103-104 <i>Chapter Review</i> 80, 110 #20 <i>Problem Solving</i> 77-78, 169-170 <i>Test Practice</i> 81-82 Teacher Edition: BI 51A; CCL 51G; FMB 55A, 73A, 103A</p>

STANDARDS	PAGE REFERENCES
Geometry and Measurement	
<p>Purpose: Geometry and the related area of measurement help students represent, describe, and make sense of the world in which they live. Geometry is also a natural place for students to develop their reasoning and justification skills.</p> <p>We live in a three-dimensional world. To interpret, understand, and appreciate that world, students need to develop an understanding of space. In addition, success in mathematics depends, in part, on the development of spatial abilities. Spatial skills include making and interpreting drawings, forming mental images, and visualizing changes.</p> <p>Measurement is the process of assigning a numerical value to an attribute of an object. The study of measurement provides students with techniques and tools they will need to describe and analyze their world. It also provides an opportunity to make connections within mathematics and between mathematics and other curricular areas. High school students must develop more mature insights into the essential role of measurement as a link between the abstractness of mathematics and the concreteness of the real-world.</p> <p>In both areas, geometry and measurement, students need to investigate, experiment, and explore geometric properties using both technology and hands-on materials.</p>	
<p>M:G&M:2:1 Uses properties, attributes, composition, or decomposition to sort or classify polygons or objects by <u>a combination of two or more</u> non-measurable or measurable attributes. (State)</p>	<p>Student Edition: 341, 351-352, 357-358, 361-362 <i>Chapter Review</i> 372 <i>Problem Solving</i> 369-370 <i>Problem Solving Investigation</i> 364 #3 <i>Test Practice</i> 373 #2 Teacher Edition: CCL 341G, 341H; FMB 351A, 357A, 361A</p>
<p>M:G&M:2:4 Demonstrates conceptual understanding of congruency by <u>composing and decomposing two-dimensional objects using models or explanations (e.g., using triangular pattern blocks to construct a figure congruent to the hexagonal pattern block); and uses line symmetry to demonstrate congruent parts within a shape.</u> (Local)</p>	<p>Student Edition: 341, 361-362 <i>Chapter Review</i> 372 #4 <i>Looking Ahead</i> LA11, LA12, LA13, LA14 <i>Problem Solving</i> 369-370 <i>Problem Solving Investigation</i> 364 #5 <i>Test Practice</i> 373 #2 Teacher Edition: CCL 341G; DI 351B(BL), 361B(BL); FMB 361A, LA11A, LA13A; 5MC 363A</p>

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<p>M:G&M:2:6 Demonstrates conceptual understanding of perimeter and area by using models or manipulatives to surround and cover polygons. (State)</p>	<p>The following references cover length of perimeter. Student Edition: 379-380, 381-382, 391-392 <i>Chapter Test</i> 402 #9 <i>Hands On Activity</i> 395-396 Teacher Edition: CCL 375G; CP 377; FMB 379A</p>
<p>M:G&M:2:7 Measures and uses units of measures appropriately and consistently, and makes conversions within systems when solving problems across the content strands. (State)</p>	<p>Student Edition: 375-376, 381-382, 387-388, 391-392, 393-394, 411-412, 417-418, 423-424, 425-426 <i>Chapter Review</i> 401-402 <i>Concepts and Skills Bank CS7</i> <i>Game Time</i> 416 <i>Problem Solving</i> 430(D) <i>Problem Solving Strategy</i> 414 Teacher Edition: A 412, 424, 426; CCL 375G, 375H, 417B; FMB 381A, 387A, 391A, 393A, 411A, 417A, 423A, 425A; 5MC 395A</p>
<p>M:G&M:2:9 Demonstrates understanding of spatial relationships using location and position by using positional language <u>in two- and three- dimensional situations to describe and interpret relative positions (e.g., above the surface of the desk, below the triangle on the paper); and creates and interprets simple maps and names locations on simple coordinate grids.</u> (Local)</p>	<p>Student Edition: 367-368 <i>Chapter Review</i> 372 #17 <i>Problem Solving Projects</i> P6, P15-P18 With a list of positional words the following references could also be used in classroom discussion to meet this objective. <i>Introductory Chapter Pictures</i> 83, 113, 207, 309, 341, 435, 469 <i>Problem Solving</i> 399-400, 463-464 Teacher Edition: A 368; I 367; T 367</p>

STANDARDS	PAGE REFERENCES
Functions and Algebra	
<p>Purpose: Algebra is the language through which much of mathematics is communicated. Students in Kindergarten begin to explore algebraic concepts using informal representations (e.g., words, physical models, tables, graphs). In later years students progress to more abstract representations. The study of patterns is one of the central themes of algebraic thinking and leads to an understanding of relations and functions. Students at all grade-levels should recognize, describe, and generalize patterns and build mathematical models to describe, interpret, and predict the behavior of real-world phenomenon. Algebraic processes are important tools that students can use throughout their lives.</p>	
<p>M:F&A:2:1 Identifies and extends to specific cases a variety of patterns (linear and non-numeric) represented in models, tables, or sequences by extending the pattern to the next element, or finding a missing element (e.g., 2, 4, 6, ____, 10). (State)</p>	<p>Student Edition: 14 #5, 39-40, 43-44, 101-102, 310, 333-334 <i>Chapter Review</i> 48 #19, #20, #21 <i>Hands On Activity</i> 261-262 <i>H.O.T. Problems</i> 56 #17-#20 <i>Problem Solving Projects</i> P9-P10, P15-P16 <i>Problem Solving Strategy</i> 255-256, 353-354 <i>Test Practice</i> 49 #4 Teacher Edition: CP 311; FMB 39A, 43A, 101A, 261A, 333A</p>
<p>M:F&A:2:4 Demonstrates conceptual understanding of equality by finding the value that will make an open sentence true (e.g., $2 + \square = 7$). (limited to one operation and limited to use addition or subtraction) (State)</p>	<p>Student Edition: 101-102 <i>H.O.T. Problems</i> 56 #17-#18, 90 #29-#30 <i>Problem Solving Projects</i> P8 Teacher Edition: DI 101B, 103B; FMB 101A; T 101</p>

STANDARDS	PAGE REFERENCES
Data, Statistics, and Probability	
<p>Purpose: Collecting, organizing, and displaying data, as well as interpreting and analyzing the information to make decisions and predictions, have become very important in our society. Statistical instruction should be carried out in a spirit of investigation and exploration so students can answer and formulate questions about data. Probability should be studied in familiar contexts. Students need to investigate fairness, chances of winning, and uncertainty. Technology should be used as a tool throughout the investigation process.</p>	
<p>M:DSP:2:1 Interprets a given representation (pictographs with one-to-one correspondence, <u>line plots</u>, tally charts, or tables) to answer questions related to the data, or to analyze the data to formulate conclusions. (State)</p> <p>(IMPORTANT: Analyzes data consistent with concepts and skills in M:DSP:2:2.)</p>	<p>Student Edition: 113, 117-118, 119-120, 121-122, 127-128, 129-130 <i>Concepts and Skills Bank</i> CS1-CS3, CS5 <i>Problem Solving</i> 137-138, 429-430 <i>Problem Solving Projects</i> P3-P6, P11-P14, P15-P18 <i>Problem Solving Strategy</i> 123-124, 317-318, 445-446 <i>Start Smart</i> 11-12</p> <p>Teacher Edition: CCL 113G, 113H; CP 115; FMB 117A, 119A, 121A, 123A, 127A, 129A</p>
<p>M:DSP:2:2 Analyzes patterns, trends, or distributions in data in a variety of contexts by determining or using more, less, or equal. (State)</p>	<p>Student Edition: 35-36, 39-40, 117-118 <i>Concepts and Skills Bank</i> CS5 <i>Problem Solving</i> 138 <i>Start Smart</i> 11-12</p> <p>Teacher Edition: CCL 113G, 113H; FMB 35A, 39A, 117A</p>
<p>M:DSP:2:4 Uses counting techniques to solve problems involving combinations using a variety of strategies (e.g., student diagrams, organized lists, tables, tree diagrams, or^{sc} others); (e.g., How many ways can you make 50 cents using nickels, dimes, and quarters?) (State)</p>	<p>Student Edition: 33-34, 39-40, 43-44, 57-58, 149-150, 181-182, 211-212, 215-216 <i>Hands On Activity</i> 223-224 <i>Problem Solving Investigation</i> 135, 328 #4 <i>Problem Solving Strategy</i> 317-318</p> <p>Teacher Edition: FMB 33A, 39A, 43A, 57A, 149A, 181A, 211A, 215A</p>
<p>M:DSP:2:5 For a probability event in which the sample space may or may not contain equally likely outcomes, uses experiments to describe the likelihood or chance of an event using “more likely,” “less likely,” “equally likely,” <u>certain</u> or <u>impossible</u>. (Local)</p>	<p>Student Edition: 133-134 <i>Chapter Review</i> 140 #10-#11</p> <p>Teacher Edition: A 134; FMB 133A</p>

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<p>M:DSP:2:6 <u>In response to a teacher or student generated question or hypothesis, groups</u> decide the most effective method (e.g., survey, observation, experimentation) to collect the data (numerical or categorical) necessary to answer the question; collects, organizes, and appropriately displays the data; analyzes the data to draw conclusions about the question or hypothesis being tested, and when appropriate makes predictions. (Local)</p> <p>(IMPORTANT: <i>Analyzes data consistent with concepts and skills in M:DSP:2:2.</i>)</p>	<p>Student Edition: 117-118, 119-120, 121-122, 127-128, 129-130 <i>Concepts and Skills Bank</i> CS1, CS2, CS5 <i>Problem Solving</i> 137-138 <i>Problem Solving Investigation</i> 136-136 <i>Problem Solving Projects</i> P3-P6, P11-P14, P15-P18 <i>Start Smart</i> 11-12</p> <p>Teacher Edition: CCL 113G, 113H; CP 115; FMB 117A, 119A, 121A, 127A, 129A; WU P6, P14, P18</p>
Problem Solving, Reasoning, and Proof	
<p>Purpose: Problem solving should serve as the organizing feature of the mathematics curriculum as well as other areas of study and be applied to everyday activities. Thus, problem solving approaches should be used to investigate and understand new mathematical content, with students working sometimes independently and sometimes in groups. Students should have many experiences in posing and solving problems from their world, from data that are meaningful to them, and from mathematical investigations. Students should build a positive disposition toward problem solving, including the confidence needed to explore unique problems and increasingly complex tasks.</p>	
Grades K-2	
<p>M:PRP:2:1 Students will use problem-solving strategies to investigate and understand increasingly complex mathematical content and be able to:</p> <ul style="list-style-type: none"> • Formulate and solve multi-step problems from everyday and mathematical situations. • Solve problems using a variety of strategies (e.g., working backwards, looking for patterns and relationships; guess and check; making tables, charts, or organized lists; solving a simpler version of a problem, drawing a diagram; or creating a model) • Verify and interpret results with respect to the original problem. • Determine if the solution of a problem is reasonable. • Solve problems using manipulatives, graphs, charts, diagrams, and calculators. • Demonstrate that a problem may be solved in more than one way. • Exhibit confidence in their ability to solve problems independently and in groups. • Display increasing perseverance, and persistence in problem solving. 	<p>Student Edition: 39-40, 121-122, 129-130 <i>Problem Solving</i> 107-108, 169-170 <i>Problem Solving Investigation</i> 41-42, 75-76 <i>Problem Solving Projects</i> P3-P6, P7-P11 <i>Problem Solving Strategy</i> 61-62, 93-94, 123-124, 151-152, 255-256, 317-318, 445-446 <i>Start Smart 2</i> <i>Tech Link</i> 23, 59</p> <p>Teacher Edition: CP 15, 53, 115, 177, 437; FMB 39A, 117A, 121A, 129A</p>

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<p>M:PRP:2:2 Students will use mathematical reasoning and proof and be able to:</p> <ul style="list-style-type: none"> • Use models, known facts, properties, and relationships to explain their thinking. • Justify solution processes and answers (e.g., "I chose this method to solve the problem because..."). • Draw conclusions using inductive reasoning. • Identify the missing information needed to find a solution to a given story problem. • Use patterns and relationships to analyze mathematical situations (e.g., count by fives). 	<p>Student Edition: 39-40, 101-102, 121-122, 333-334, 475-476 <i>H.O.T. Problems</i> 28, 56, 72, 104, 294 <i>Problem Solving</i> 164, 190, 270, 422, LA10 <i>Problem Solving Investigation</i> 41-42, 75-76, 233-234, 301-302 <i>Problem Solving Projects</i> P3-P6, P7-P11 <i>Problem Solving Strategy</i> 25-26, 255-256, 353-354</p> <p>Teacher Edition: FMB 25A, 33A, 39A, 101A, 121A, 475A</p>

STANDARDS	PAGE REFERENCES
Communication, Connections, and Representations	
<p>Purpose: Reading, writing, talking, listening, and modeling provide students with the opportunity to develop deeper mathematical understanding and to integrate the language of mathematics into their world. Actively exploring, investigating, describing, and explaining mathematical ideas promote communication which leads to a greater comprehension of mathematical concepts.</p> <p>Representing ideas and connecting the representations to mathematics lies at the heart of understanding mathematics. Representations make mathematical ideas more concrete and available for reflection, and they help students recognize the common mathematical nature of different situations. Students can develop and deepen their understanding of mathematical concepts and relationships as they create, compare, and use various representations.</p> <p>Mathematical topics, ideas, and procedures must be connected to each other and to the students' everyday experiences, both in and out of school. In particular, mathematics must be connected to all other curriculum areas. Mathematical connections will help students become aware of the usefulness of mathematics, serve to bridge the concrete and the abstract, and enable deeper understanding of important ideas.</p>	
<p>M:CCR:2:1 Students will communicate their understanding of mathematics and be able to:</p> <ul style="list-style-type: none"> • Demonstrate mathematical communication through discussion, reading, writing, listening, and responding, individually and in groups. • Discuss relationships between everyday language and mathematical language and symbols (e.g., words that mean something different in mathematics and in everyday life). • Explain conclusions, thought processes, and strategies in problem-solving situations. • Discuss, illustrate, and write about mathematical concepts and relationships. • Draw pictures and use objects to illustrate mathematical concepts. 	<p>Student Edition: 121-122, 129-130 <i>Problem Solving</i> 107-108, 169-170, 214, 422, 493-494, 496 <i>Problem Solving Investigation</i> 167-168, 327-328 <i>Problem Solving Projects</i> P3-P6, P7-P10, P11-P14 <i>Problem Solving Strategy</i> 25-26, 151-152, 219-220, 287-288, 477-478 <i>Teacher Handbook</i> TR22-TR67</p> <p>Teacher Edition: CCL 13G, 51G, 113H, 143G; CP 15, 53, 85, 177, 311, 437</p>

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<p>M:CCR:2:2 Students will create and use representations to communicate mathematical ideas and to solve problems and be able to:</p> <ul style="list-style-type: none"> • Create and use age level appropriate representations to organize, record, and communicate mathematical ideas (e.g., students should recognize the relationship among seven counters, seven tally marks, and the symbol 7). • Select, apply, and translate among mathematical representations to solve problems (e.g., representing fractions with circles, with geoboards, and with pattern blocks). • Link different representations. • Use representations to model and interpret physical, social, and mathematical phenomena. • Use conventional and self-generated (invented) representations and connect them. • Realize that any representation is subject to multiple interpretations (e.g., drawings and graphs can be read in a different way). 	<p>Student Edition: 119-120 <i>Hands On Activity</i> 117-118, 189-190, 223-224, 265-268 <i>Problem Solving</i> 303-304, 496 <i>Problem Solving Projects</i> P3-P6, P7-P10, P11-P14, P15-P18 <i>Problem Solving Strategy</i> 287-288, 477-478</p> <p>Teacher Edition: CCL 83G, 113G, 175G; CP 85, 115, 145, 281, 311; FMB 89A, 117A, 119A, 189A, 223A</p>
<p>M:CCR:2:3 Students will recognize, explore, and develop mathematical connections and be able to:</p> <ul style="list-style-type: none"> • Link conceptual and procedural knowledge (e.g., they will know that when they “regroup,” they are simply changing the representation of the minuend, but not its value). • Recognize and use mathematics in other curriculum areas (e.g., science, social studies). • Recognize and use mathematics in their daily lives (e.g., graphs, tables, or maps). • Identify mathematical situations occurring in literature for children. • Identify examples of geometry in nature, art, and architecture. 	<p>Student Edition: 183-184, 191-192, 345 <i>Hands On Activity</i> 71-72, 159-160 <i>H.O.T. Problems</i> 200, 454 <i>Problem Solving</i> 45-46, 77-78, 235-236, 335-336, 369-370, 429-430 <i>Problem Solving Projects</i> P3-P6, P7-P10, P15-P18 <i>Teacher Handbook</i> TR22-TR67</p> <p>Teacher Edition: CCL 341G, 341H; CP 115, 343; FMB 71A, 183A, 191A, 345A; RWPSL 353A</p>