



Math Connects

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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.

STANDARDS	PAGE REFERENCES
<p>M(N&O)–5–1 Demonstrates conceptual understanding of rational numbers with respect to: whole numbers from 0 to 9,999,999 through equivalency, composition, decomposition, or place value using models, explanations, or other representations; and positive fractional numbers (proper, mixed number, and improper) (halves, fourths, eighths, thirds, sixths, <u>twelfths</u>, fifths, or powers of ten (10, 100, 1000)), decimals (to thousandths), or benchmark percents (10%, 25%, 50%, 75% or 100%) as a part to whole relationship in area, set, or linear models using models, explanations, or other representations. (State)</p>	<p>Student Edition: 17-19, 23 #46-#52, 28-30, 32-35, 39 #50-#52, 332, 333-335, 346-348, 350-353, 391-393, 404-407 R56 <i>Explore</i> 336-337, 402-403 <i>Mid-Chapter Check</i> 349 <i>Study Guide and Review</i> 362-365, 410-413 <i>Chapter Test</i> 367</p> <p>Teacher Edition: A 19; AE 18, 334, 351, 387, 405; SQ 17, 28, 333, 350</p>
<p>M(N&O)–5–2 Demonstrates understanding of the relative magnitude of numbers by ordering, comparing, or identifying equivalent positive fractional numbers, decimals, or benchmark percents within number formats (<u>fractions to fractions, decimals to decimals, or percents to percents</u>); or integers in context using models or number lines. (State)</p>	<p>Student Edition: 36-39, 42-46, 350-353, 359 #39-#41, 391-393, 404-407, 533-535, 541 #46-#49 <i>Problem-Solving in Science</i> 40-41 <i>Game Time</i> 47 <i>Study Guide and Review</i> 53-54, 365, 411-414, 549 <i>Chapter Test</i> 55, 367, 415, 551 <i>Problem Solving in Geography</i> 355 #4-#6 <i>Explore</i> 402-403</p> <p>Teacher Edition: A 39, 45, 353, 393, 535; AE 37, 351, 392, 534; SQ 36, 42, 350, 533</p>
<p>M(N&O)–5–3 Demonstrates conceptual understanding of mathematical operations by <u>adding and subtracting decimals and positive proper fractions with unlike denominators</u>. (Local)</p>	<p>Student Edition: 80-82, 87 #29-#31, 91 #36-#39, 423-425, 428-431, 434-436, 439-441, 448-451, 452-454, 458-461 <i>Explore</i> 78-79, 421-422, 425-427, 432-433, 437-438 <i>Game Time</i> 83, 455 <i>Study Guide and Review</i> 95, 464-468 <i>Chapter Test</i> 97, 469 <i>Problem-Solving in Science</i> 462-463 <i>Mid-Chapter Check</i> 447</p> <p>Teacher Edition: A 82, 425, 431, 436, 441, 451, 454; AE 81, 424, 429, 435, 440, 449, 453; ATS 81, 429, 453; SQ 80 423, 428, 434, 439, 448, 452</p>

STANDARDS	PAGE REFERENCES
<p>M(N&O)–5–3 Demonstrates conceptual understanding of mathematical operations by describing or illustrating the <u>meaning of a remainder with respect to division of whole numbers</u> using models, explanations, or <u>solving problems</u>. (State)</p>	<p>Student Edition: 149-151, 152-155, 158-161, 162-164, 174-176 <i>Explore</i> 156-157 <i>Mid-Chapter Check</i> 165 <i>Game Time</i> 177 <i>Problem-Solving in Social Studies</i> 178-179 <i>Study Guide and Review</i> 182-186 <i>Chapter Test</i> 187</p> <p>Teacher Edition: 152A, 158A, 162A, 166A A 151, 155, 164; AE 153, 159, 163; ATS 150, 153, 159, 163, 175; SQ 149, 152, 158, 162</p>
<p>M(N&O)–5–4 Accurately solves problems involving multiple operations on whole numbers or the use of the properties of factors, multiples, <u>prime</u>, or <u>composite numbers</u>; and addition or subtraction of <u>fractions (proper) and decimals to the hundredths place</u>. (Division of whole numbers by up to a two-digit divisor.) (State)</p> <p>(IMPORTANT: <i>Applies the conventions of order of operations <u>with and without parentheses</u>.</i>)</p>	<p>Student Edition: 80-82, 91 #36-#39, 158-161, 162-164, 170-173, 174-176, 373-375, 378-381, 387 #41, 389 #40, 396-399, 407 #37-#40, 423-425, 428-431, 434-436, 439-441, 448-451, 452-454, 458-461 <i>Explore</i> 78-79, 156-157, 168-169, 421-422, 426-427, 432-433, 437-438 <i>Game Time</i> 83, 177, 455 <i>Mid-Chapter Check</i> 165, 390 <i>Problem-Solving in Social Studies</i> 178-179 <i>Study Guide and Review</i> 183-186, 411-413, 464-468 <i>Explore</i> 376-377 <i>Chapter Test</i> 187, 415, 469 <i>Problem-Solving in Science</i> 462-463</p> <p>Teacher Edition: A 161, 164, 375, 381, 399, 425, 441, 451, 454; AE 374, 397, 440, 453; ATS 159, 163, 424; SQ 158, 162, 373, 378, 423, 439, 452</p>

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<p>M(N&O)–5–6 Mentally calculates change back from \$1.00, \$5.00, and \$10.00; calculates multiplication and related division facts to a product of 144; multiplies a two-digit whole number by a one-digit whole number (e.g., 45×5), two-digit whole numbers that are multiples of ten (e.g., 50×60), a three-digit whole number that is a multiple of 100 by a two- or three-digit number which is a multiple of 10 or 100, respectively (e.g., 400×50, 400×600); and divides 3- and 4-digit multiples of powers of ten by their compatible factors (e.g., $360 \div 6$; $360 \div 60$; $3600 \div 6$; $3600 \div 60$; $3600 \div 600$; $360 \div 12$; $360 \div 120$; $3600 \div 12$; $3600 \div 120$; $3600 \div 1200$). (Local)</p> <p>(IMPORTANT: <i>The intent of this GLE is to embed mental arithmetic throughout the instructional program, not to teach it as a separate unit.</i>)</p>	<p>Student Edition: 60, 70-72, 102, 103-105, 112-115, 148, 149-151, 152-155 <i>Mid-Chapter Check</i> 73, 165 <i>Study Guide and Review</i> 95 Ex 7, 183 <i>Chapter Test</i> 187</p> <p>Teacher Edition: 17A, 74A, 74B, 108A, 116A, 152A A 105, 115, 151, 155; AE 104, 113, 150, 153; ATS 104; SQ 103, 112, 149, 152</p>
<p>M(N&O)–5–7 Makes estimates in a given situation by identifying when estimation is appropriate, selecting the appropriate method of estimation, determining the level of accuracy needed given the situation, analyzing the effect of the estimation method on the accuracy of results, and evaluating the reasonableness of solutions appropriate to grade level GLEs across content strands. (Local)</p> <p>(IMPORTANT: <i>The intent of this GLE is to embed estimation throughout the instructional program, not to teach it as a separate unit.</i>)</p>	<p>Student Edition: 61-63, 64-67, 112-115, 118 #37-#40, 152-155, 161 #44-#47, 356-359, 444-446 <i>Mid-Chapter Check</i> 73, 119, 165, 447 <i>Problem-Solving Investigation</i> 74-75 <i>Study Guide and Review</i> 95-96, 140, 183, 365, 467 <i>Chapter Test</i> 97, 143, 187, 367, 469</p> <p>Teacher Edition: 116A, 158A, 360A A 67, 115, 155, 359, 446; AE 65, 113, 153, 357, 445; ATS 65, 114, 357, 445; SQ 64, 112, 152, 356, 444</p>
<p>M(N&O)–5–8 Applies properties of numbers (odd, even, and divisibility) and field properties (commutative, associative, identity, and distributive) to solve problems and to simplify computations. (Local)</p>	<p>Student Edition: 84-87, 91 #33-#35, 108-111, 118 #41-#43, 124 #42 126-129, 135 #32-#34, 222 #25-#26 <i>Study Guide and Review</i> 96, 139, 142 <i>Mid-Chapter Check</i> 119 <i>Chapter Test</i> 143</p> <p>Teacher Edition: 88A, 132A A 87, 111, 129; AE 85, 109, 127; ATS 86, 109, 127; SQ 84, 108, 126</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)–5–1 Uses properties or attributes of angles (right, acute, or obtuse) or sides (number of congruent sides, parallelism, or perpendicularity) to identify, describe, classify, or distinguish among different types of triangles (right, acute, obtuse, equiangular, or equilateral) or quadrilaterals (rectangles, squares, rhombi, trapezoids, or parallelograms). (State)</p>	<p>Student Edition: 556, 566-569, 570-574 <i>Explore</i> 564-565 <i>Mid-Chapter Check</i> 575 <i>Study Guide and Review</i> 598 <i>Chapter Test</i> 601</p> <p>Teacher Edition: 570A, 576A A 569, 573; AE 567, 571; ATS 567, 571; I 566, 570; SQ 566, 570</p>
<p>M(G&M)–5–3 Uses properties or attributes (shape of bases, number of lateral faces, or number of bases) to identify, compare, or describe three-dimensional shapes (rectangular prisms, triangular prisms, cylinders, spheres, pyramids, or cones). (State)</p>	<p>Student Edition: 624-627, 635 #29 <i>Study Guide and Review</i> 652 <i>Chapter Test</i> 655</p> <p>Teacher Edition: 628A A 627; AE 625; ATS 625; I 624; SQ 624</p>
<p>M(G&M)–5–5 Demonstrates conceptual understanding of similarity by describing the proportional effect on the linear dimensions of triangles and rectangles when scaling up or down while preserving angle measures, or by solving related problems (including applying scales on maps). Describes effects using models or^{sc} explanations. (Local)</p>	<p>Student Edition: R58-R59</p>

STANDARDS	PAGE REFERENCES
<p>M(G&M)–5–6 Demonstrates conceptual understanding of perimeter of polygons, and the area of rectangles or right triangles through models, manipulatives, or formulas, the area of polygons or irregular figures on grids, and volume of rectangular prisms (cubes) using a variety of models, manipulatives, or formulas. Expresses all measures using appropriate units. (State)</p>	<p>Student Edition: 608-611, 616-619, 627 #20-#22, 631-635, 643 #21, 644-647 <i>Game Time</i> 622 <i>Mid-Chapter Check</i> 623 <i>Problem-Solving in Science</i> 637 <i>Study Guide and Review</i> 651, 653, 654 <i>Chapter Test</i> 655</p> <p>Teacher Edition: 612A, 624A, 640A, 648A A 611, 619, 634; AE 609, 617, 632, 645; ATS 610, 617, 632; CE 633; SQ 608, 616, 644</p>
<p>M(G&M)–5–7 Measures and uses units of measures appropriately and consistently, and makes conversions within systems when solving problems across the content strands. (State)</p> <p>See Benchmarks in Appendix B.</p>	<p>Student Edition: 477-480, 484-487, 488-490, 492-495, 500-503, 517-521, 527-530 <i>Explore</i> 475-476, 515-516 <i>Game Time</i> 481 <i>Mid-Chapter Check</i> 491, 532 <i>Problem Solving in Health</i> 498-499 <i>Study Guide and Review</i> 505- 507, 547-548 <i>Chapter Test</i> 509, 551 <i>Problem Solving in Social Studies</i> 542-543</p> <p>Teacher Edition: 482A, 488A, 496A, 517A, 522A A 480, 487, 490, 495, 503, 521, 530; AE 478, 485, 489, 493, 501, 528; ATS 478, 485, 489, 493, 501, 508, 519; I 492, 500; SQ 477, 484, 488, 492, 500, 517, 527</p>
<p>M(G&M)–5–9 Demonstrates understanding of spatial relationships using location and position by interpreting and giving directions between locations on a map or coordinate grid (<u>all four quadrants</u>); <u>plotting points in four quadrants in context (e.g., games, mapping, identifying the vertices of polygons as they are reflected, rotated, and translated)</u>; and determining horizontal and vertical distances between points on a coordinate grid in the first quadrant. (Local)</p>	<p>Student Edition: 250-252, 578-581, 582-585, 586-590, 591-593 <i>Mid-Chapter Check</i> 253 <i>Problem Solving in Geography</i> 259 <i>Game Time</i> 263 <i>Study Guide and Review</i> 599-600 <i>Chapter Test</i> 601</p> <p>Teacher Edition: 254A, 582A, 586A, 591A A 252, 581, 585, 589; AE 251, 579, 583, 587; ATS 251, 579, 583, 587; I 578, 586; SQ 250, 578, 582, 586</p>

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<p>M(G&M)–5–10 Demonstrates conceptual understanding of spatial reasoning and visualization by building models of rectangular and <u>triangular prisms</u>, <u>cones</u>, <u>cylinders</u>, and <u>pyramids</u> from two- or three-dimensional representations. (Local)</p>	<p>Student Edition: 624-627 <i>Problem-Solving Strategy</i> 628-629</p> <p>Teacher Edition: 628A A 627; AE 625; ATS 625; I 624; SQ 624</p>
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)–5–1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, or <u>in problem situations</u>; and writes a rule in words or ^{sc} symbols <u>for finding specific cases of a linear relationship</u>. (State)</p>	<p>Student Edition: 210-213, 222 #23, 260-262 <i>Study Guide and Review</i> 228 <i>Chapter Test</i> 229 <i>Problem-Solving Strategy</i> 248-249 <i>Extend</i> 264-265</p> <p>Teacher Edition: A 213; AE 211; ATS 211; I 210; SQ 210</p>
<p>M(F&A)–5–2 Demonstrates conceptual understanding of linear relationships ($y = kx$) as a constant rate of change by identifying, describing, or comparing situations that represent constant rates of change (e.g., tell a story given a line graph about a trip). (Local)</p>	<p>Student Edition: 260-262 <i>Extend</i> 264-265 <i>Study Guide and Review</i> 271 <i>Chapter Test</i> 273</p> <p>Teacher Edition: 266A A 262; AE 260; ATS 260; I 260; SQ 260</p>
<p>M(F&A)–5–3 Demonstrates conceptual understanding of algebraic expressions by using letters to represent unknown quantities to write <u>linear algebraic expressions involving any two of the four operations</u>; or by evaluating <u>linear algebraic expressions</u> using whole numbers. (State)</p>	<p>Student Edition: 193-195, 198-201, 202-204, 234 <i>Mid-Chapter Check</i> 205 <i>Study Guide and Review</i> 225-226 <i>Chapter Test</i> 229</p> <p>Teacher Edition: 196A, 202A, 206A A 195, 201; AE 194, 199, 203; ATS 194, 199, 203; I 198, 202, 204; SQ 193, 198, 202</p>

STANDARDS	PAGE REFERENCES
<p>M(F&A)–5–4 Demonstrates conceptual understanding of equality by showing equivalence between two expressions using models or different representations of the expressions (expressions consistent with the parameters of M(F&A)–5–3), by solving one-step linear equations of the form $ax = c$, $x \pm b = c$, or $x/a = c$, where a, b, and c are whole numbers with $a \neq 0$; or by determining which values of a replacement set make the equation (multi-step of the form $ax \pm b = c$ where a, b, and c are whole numbers with $a \neq 0$) a true statement (e.g., $2x + 3 = 11$, $\{x: x = 2, 3, 4, 5\}$). (State)</p>	<p>Student Edition: 237-239, 244-247, 288 #30-#33 <i>Explore</i> 235-236, 242-243</p> <p>Teacher Edition: 244A, 248A A 239, 247; AE 238, 245; ATS 238, 245, SQ 237, 244</p>
<p>Data, Statistics, and Probability</p>	
<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)–5–1 Interprets a given representation (tables, bar graphs, circle graphs, or line graphs) to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems. (State)</p> <p>(IMPORTANT: Analyzes data consistent with concepts and skills in M(DSP)–5–2.)</p>	<p>Student Edition: 284-288, 289-292, 294-298, 299-303, 306-310 <i>Mid-Chapter Check</i> 293 <i>Problem-Solving in Art</i> 304-305 <i>Game Time</i> 311 <i>Study Guide and Review</i> 322-326 <i>Chapter Test</i> 327</p> <p>Teacher Edition: A 287, 292, 297, 303; AE 285, 290, 295, 300; ATS 286, 291, 301; SQ 284, 289, 294, 299</p>
<p>M(DSP)–5–2 Analyzes patterns, trends, or distributions in data in a variety of contexts by determining or using measures of central tendency (<u>mean</u>, median, or mode) or range to analyze situations, or to solve problems. (State)</p>	<p>Student Edition: 279-281, 284-288, 289-292, 294-298, 299-303, 306-310 <i>Mid-Chapter Check</i> 293 <i>Problem-Solving in Art</i> 304-305 <i>Game Time</i> 311 <i>Study Guide and Review</i> 322-326 <i>Chapter Test</i> 327</p> <p>Teacher Edition: 282A, 294A A 281, 287, 292, 297, 303; AE 280, 285, 290, 295, 300; ATS 286, 291, 301; SQ 279, 284, 289, 294, 299</p>

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<p>M(DSP)–5–3 Organizes and displays data using tables, bar graphs, or <u>line graphs</u> to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems. (Local)</p>	<p>Student Edition: 284-288, 289-292, 294-298, 299-303, 306-310 <i>Mid-Chapter Check</i> 293 <i>Problem-Solving in Art</i> 304-305 <i>Game Time</i> 311 <i>Study Guide and Review</i> 322-326 <i>Chapter Test</i> 327</p> <p>Teacher Edition: A 287, 292, 297, 303; AE 285, 290, 295, 300; ATS 286, 291, 301; SQ 284, 289, 294, 299</p>
<p>M(DSP)–5–3 Identifies or describes representations or elements of representations that best display a given set of data or situation, consistent with the representations required in <u>M(DSP)–5–1</u>. (State)</p> <p>(IMPORTANT: Analyzes data consistent with concepts and skills in M(DSP)–5–2.)</p>	<p>Student Edition: 312-317 <i>Extend</i> 318-319 <i>Problem-Solving Strategy</i> 320-321 <i>Study Guide and Review</i> 326 <i>Chapter Test</i> 327</p> <p>Teacher Edition: 320A A 316, AE 313-314; ATS 315; SQ 312</p>
<p>M(DSP)–5–5 For a probability event in which the sample space may or may not contain equally likely outcomes, predicts the likelihood of an event as a <u>fraction</u> and tests the prediction through experiments; and determines if a game is fair. (Local)</p>	<p>Student Edition: 661-663, 668-672, 677-680 <i>Explore</i> 666-667 <i>Extend</i> 673 <i>Mid-Chapter Check</i> 676 <i>Study Guide and Review</i> 685-686 <i>Chapter Test</i> 687</p> <p>Teacher Edition: 674A A 663, 671, 680; AE 669, 678; ATS 669; SQ 668</p>
<p>M(DSP)–5–5 For a probability event in which the sample space may or may not contain equally likely outcomes, determines the <u>experimental</u> or theoretical probability of an event and <u>expresses the result as a fraction</u>. (State)</p>	<p>Student Edition: 668-672, 677-680 <i>Explore</i> 666-667 <i>Mid-Chapter Check</i> 676 <i>Study Guide and Review</i> 685-686 <i>Chapter Test</i> 687</p> <p>Teacher Wraparound Edition: 674A A 671, 680; AE 669, 678; ATS 669; SQ 668</p>

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<p>M(DSP)–5–6 In response to a teacher or student generated question or hypothesis decides 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; and asks new questions and makes connections to real world situations. (Local)</p> <p>(IMPORTANT: Analyzes data consistent with concepts and skills in M(DSP)–5–2.)</p>	<p>Student Edition: 312-317 <i>Extend</i> 318-319 <i>Problem-Solving Strategy</i> 320-321 <i>Study Guide and Review</i> 326 <i>Chapter Test</i> 327</p> <p>Teacher Edition: A 316; AE 313-314; ATS 315; SQ 312</p>

Problem Solving, Reasoning, and Proof

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.

Grades 3-5

<p>M(PRP)–5–1 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"> • Determine the reasonableness of solutions to real-world problems. • Generalize solutions and apply strategies to new problem situations. • Add to the repertoire of problem-solving strategies (e.g., looking for similar problems) and use those strategies in more sophisticated ways. • Solve problems with multiple solutions, recognize when a problem has no solution, and recognize problems where more information is needed. • Translate results of a computation into solutions that fit the real-world problem (e.g., when a computation shows that one needs 3.2 gallons of paint to paint a room, how much paint do you buy?). 	<p>Student Edition: <i>Problem-Solving Investigation</i> 24-25, 74-75, 136-137 <i>Problem-Solving in Social Studies</i> 76-77</p> <p>Teacher Wraparound Edition: A 25, 137; ATS 25; I 24; T 24</p>
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<p>M(PR)P-5-2 Students will use mathematical reasoning and proof and be able to:</p> <ul style="list-style-type: none"> • Draw conclusions and solve problems using elementary deductive reasoning and reasoning by analogy. • Make and defend conjectures and generalizations. • Use models, known facts, properties, and relationships to explain thinking and to justify answers and solution processes. • Recognize the pervasive use and power of reasoning as a part of mathematics. 	<p>Student Edition: 279-281, 284-288, 289-292, 294-298, 299-303, 306-310 <i>Mid-Chapter Check</i> 293 <i>Problem-Solving in Art</i> 304-305 <i>Game Time</i> 311 <i>Study Guide and Review</i> 322-326 <i>Chapter Test</i> 327</p> <p>Teacher Edition: 282A, 294A A 281, 287, 292, 297, 303; AE 280, 285, 290, 295, 300; ATS 286, 291, 301; SQ 279, 284, 289, 294, 299</p>

Communication, Connections, and Representations

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.

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.

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.

STANDARDS	PAGE REFERENCES
<p>M(CCR)–5–1 Students will communicate their understanding of mathematics and be able to:</p> <ul style="list-style-type: none"> • Discuss mathematical ideas and write convincing arguments. • Understand, explain, analyze, and evaluate mathematical arguments and conclusions presented by others. • Ask clarifying and extending questions related to mathematics they have heard or read about. • Understand and appreciate the economy and power of mathematical symbolism and its role in the development of mathematics. • Demonstrate an understanding of mathematical concepts and relationships through a variety of methods (e.g., writing, graphing, charts, diagrams, number sentences, or symbols). • Use a variety of technologies (e.g., computers, calculators, video, probes) to represent and communicate mathematical ideas. 	<p>Student Edition: 279-281, 284-288, 289-292, 294-298, 299-303, 306-310 <i>Mid-Chapter Check</i> 293 <i>Problem-Solving in Art</i> 304-305 <i>Game Time</i> 311 <i>Study Guide and Review</i> 322-326 <i>Chapter Test</i> 327 Teacher Edition: 282A, 294A A 281, 287, 292, 297, 303; AE 280, 285, 290, 295, 300; ATS 286, 291, 301; SQ 279, 284, 289, 294, 299</p>
<p>M(CCR)–5–2 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"> • Use physical models and diagrams to represent important mathematical ideas (e.g., multiplication). • Use appropriate representations to solve problems or to portray, clarify, or extend a mathematical idea. • Recognize equivalent representations of concepts and procedures and translate among them as appropriate (for example, understand how the addition of whole numbers, fractions, and decimals are related). 	<p>Student Edition: <i>Problem-Solving Investigation</i> 24-25, 180-181 <i>Explore</i> 26-27 <i>Problem-Solving in Science</i> 40-41 <i>Problem-Solving Strategy</i> 48-49, 120-121, 482-483 Teacher Edition: A 27, 121, 181, 483; ATS 49, 121, 181; T 180, 482</p>

STANDARDS	PAGE REFERENCES
<p>M(CCR)–5–3 Students will recognize, explore, and develop mathematical connections and be able to:</p> <ul style="list-style-type: none"> • See mathematics as an integrated whole. • Recognize relationships among different topics in mathematics. • Recognize and use mathematics in other curriculum areas and in their daily lives. • Link concepts and procedures. • Use mathematical skills, concepts, and applications in other disciplines (e.g., graphs in social studies, patterns in art, or music and geometry in technology education). 	<p>Student Edition: 279-280 EX 1-2, 284-285 EX 1-3, 287 #16-#17, 289-292 EX 1-3, 294-295 EX 1-2, 299-300 EX 1-2, 306-310, 312-317 <i>Problem Solving in Art</i> 304-305</p> <p>Teacher Edition: 306A A 309; AE 307; APK 304; I 306; RWM 305; SQ 306</p>