



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)–3–1 Demonstrates conceptual understanding of rational numbers with respect to: whole numbers from 0 to 999 through equivalency, composition, decomposition, or place value using models, explanations, or other representations; and positive fractional numbers (benchmark fractions: $\frac{a}{2}$, $\frac{a}{3}$, $\frac{a}{4}$, $\frac{a}{6}$, or $\frac{a}{8}$, 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 number of parts in the whole is equal to the denominator; and decimals (within a context of money) as a part of 100 using models, explanations, or other representations. (State)</p>	<p>Student Edition: <i>Chapter Test</i> 63 #5, #6, #18, 595 #5, #7, #9 <i>Check What You Know</i> 26, 29, 562, 565 <i>Example</i> 24, 28 <i>Explore</i> 22-23, 559-560, 570, 571, 601-602, 616-617 <i>Extra Practice</i> R2, R3, R35 <i>Mid-Chapter Check</i> 31 #4, #5, #8, #9, 577 #1, #2, #6, #14 <i>Practice and Problem Solving</i> 26-27, 30 #13-#20, 563, 566 <i>Real-World Example</i> 25, 561, 564, 603, 608 <i>Start Smart</i> 4</p> <p>Teacher Edition: A 27; AE 25, 29; ATS 26, 29, 562, 604; I 561; IWO 24B, 561B, 564B, 608B; Sc 14H; SGO 24B, 28B, 603B</p>
<p>M(N&O)–3–2 Demonstrates understanding of the relative magnitude of numbers from 0 to 999 by ordering whole numbers; by comparing whole numbers to benchmark whole numbers (100, 250, 500, 750); or by comparing whole numbers to each other; and comparing or identifying equivalent positive fractional numbers ($\frac{a}{2}$, $\frac{a}{3}$, $\frac{a}{4}$, where a is a whole number greater than 0 and less than or equal to the denominator) using models, number lines, or explanations. (State)</p>	<p>Student Edition: 34 <i>Check What You Know</i> 36, 39, 573, 582 <i>Example</i> 572 <i>Explore</i> 570-571 <i>Extend</i> 575 <i>Extra Practice</i> R3, R4, R36 <i>Game Time</i> 570 <i>Practice and Problem Solving</i> 36-37, 40-41, 573-574, 582-583 <i>Real-World Example</i> 34, 35, 38, 39, 580, 581 <i>Study Guide and Review</i> 60 #31-#40, 592 #17-#24, 593 #28-#30</p> <p>Teacher Edition: AE 35, 39; ATS 36, 39, 573, 581; IWO 34B, 38B, 572B, 580B; SGO 34B</p>
<p>M(N&O)–3–3 Demonstrates conceptual understanding of mathematical operations by describing or illustrating the inverse relationship between addition and subtraction of whole numbers; and the relationship between repeated addition and multiplication using models, number lines, or explanations. (State)</p>	<p>Student Edition: <i>Big Idea</i> 154 <i>Explore</i> 157-158 <i>Real-World Example</i> 111, 112</p> <p>Teacher Edition: ATS 112</p>

STANDARDS	PAGE REFERENCES
<p>M(N&O–3–4) Accurately solves problems involving addition and subtraction with regrouping; the concept of multiplication; and addition or subtraction of decimals (in the context of money). (State)</p>	<p>Student Edition: <i>Check What You Know</i> 79, 93, 112 #3-#5, 129, 140, 160, 163, 169, 175, 204, 207, 215, 219, 223, 231 <i>Concepts and Skills</i> R65 <i>Extra Practice</i> R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16 <i>Facts Practice</i> 177, 189, 210, 225, R46-R47 <i>Get Ready to Learn</i> 78 <i>Mid-Chapter Check</i> 81 #12-#15, 121 #3, #4 <i>Practice and Problem Solving</i> 80, 94, 113, 130, 140, 161, 164, 169, 176, 180, 205, 208, 216, 220, 224, 232 <i>Real-World Example</i> 78, 92, 93, 112, 128, 133, 139 <i>Study Guide and Review</i> 102 #21-#23, 104 #32-#37, 145 #8, #9, #11, #12, 147, 149, 191-193, 239-243</p> <p>Teacher Edition: AE 79, 93, 112, 129, 139; ATS 79, 93, 129, 140, 160, 169, 175, 179, 204, 207, 215, 219, 223, 231</p>
<p>M(N&O)–3–6) Mentally adds and subtracts whole number facts through 20; <u>adds two-digit and one-digit whole numbers; adds combinations of two-digit and three-digit whole numbers that are multiples of ten (e.g., $60 + 50$, $300 + 400$, $320 + 90$); subtracts a one-digit whole number from a two-digit whole number (e.g., $37 - 5$); and subtracts two-digit whole numbers that are multiples of ten and three-digit whole numbers that are multiples one hundred (e.g., $50 - 20$, $500 - 200$).</u> (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: <i>Check What You Know</i> 75, 115 <i>H.O.T. Problems</i> 80 #25, 94 #32, 113 #27 <i>Practice and Problem Solving</i> 71 #16-#19, 76, 116</p>

STANDARDS	PAGE REFERENCES
<p>M(N&O)–3–7 Makes estimates in a given situation by <u>identifying when estimation is appropriate, selecting the appropriate method of estimation, and evaluating the reasonableness of solutions appropriate to grade level GLEs across content strands.</u> (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: <i>Analyze the Skill</i> 73, 125 <i>Check What You Know</i> 45, 50, 75, 115, 641 <i>Data File</i> 116 <i>Extra Practice</i> R5, R9 <i>Key Concept</i> 49 <i>Practice and Problem Solving</i> 46, 50, 76, 116, 642 <i>Practice the Skill</i> 73, 125 <i>Real-World Example</i> 44, 45, 48, 49, 74, 75, 114, 115, 640, 641 <i>Real-World Problem Solving</i> 46 <i>Study Guide and Review</i> 61 #49-#52, 62 #57, 101 #11, #12, 145 #17, 146 #24, #25, 664 #23</p> <p>Teacher Edition: AE 45, 49, 75, 115, 641; ATS 45, 50, 73, 75, 115, 641; IWO 72B, 124B; SGO 72B, 124B, 640B</p>
<p>M(N&O)–3–8 Applies properties of numbers (odd, even, and <u>multiplicative property of zero for single-digit whole numbers [$6 \times 0 = 0$]</u>) and field properties (commutative for addition, associative for addition, <u>identity for multiplication</u>, and <u>commutative for multiplication for single-digit whole numbers</u> [e.g., $3 \times 4 = 4 \times 3$]) to solve problems and to simplify computations involving whole numbers. (Local)</p>	<p>Student Edition: 186 <i>Check What You Know</i> 70, 160 #3, #4 <i>Concepts and Skills</i> R64 <i>H.O.T. Problems</i> 71 #23, 161 #14, 221 #36 <i>Key Concept</i> 69, 160 <i>Practice and Problem Solving</i> 71, 161 #8-#11 <i>Real-World Example</i> 70, 79, 219 <i>Study Guide and Review</i> 101 #6-#10, 191 #8, #9</p> <p>Teacher Edition: A 71; AE 70; ATS 70, 187; T 214</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)–3–1 Uses properties or attributes of angles (number of angles) or sides (number of sides or length of sides) or composition or decomposition of shapes to identify, describe, or distinguish among triangles, squares, rectangles, rhombi, trapezoids, hexagons, or circles. (State)</p>	<p>Student Edition: 472 <i>Chapter Test</i> 507 #3, #4 <i>Check What You Know</i> 11, 473 <i>Concepts and Skills</i> R69 <i>Example</i> 473 <i>H.O.T. Problems</i> 475 <i>Mid-Chapter Check</i> 483 #5, #6 <i>Practice and Problem Solving</i> 474 <i>Real-World Example</i> 472 <i>Real-World Problem Solving</i> 475 <i>Study Guide and Review</i> 501 #13-#19 <i>Test Practice</i> 508 #1, #3, #10</p> <p>Teacher Edition: AE 473; ATS 473; IWO 472B; SGO 472B</p>
<p>M(G&M)–3–4 Demonstrates conceptual understanding of congruency by <u>matching congruent figures using reflections, translations, and rotations (flips, slides, and turns) (e.g., recognizing when pentominoes are reflections, translations and rotations of each other); composing and decomposing two- and three-dimensional objects using models or explanations (e.g., Given a cube, students use blocks to construct a congruent cube.); and by using line symmetry to demonstrate congruent parts within a shape.</u> (Local)</p>	<p>Student Edition: <i>Check What You Know</i> 484 <i>Concepts and Skills</i> R73, R74 <i>Example</i> 434 <i>Practice and Problem Solving</i> 485 <i>Study Guide and Review</i> 503 #29, #30</p> <p>Teacher Edition: ATS 485; IWO 488B; SGO 484B, 488B</p>

STANDARDS	PAGE REFERENCES
<p>M(G&M)–3–5 Demonstrates conceptual understanding of similarity by identifying similar shapes. (Local)</p>	<p>Student Edition: <i>Concepts and Skills</i> R73</p>
<p>M(G&M)–3–6 Demonstrates conceptual understanding of perimeter of polygons, and the area of rectangles on grids using a variety of models or manipulatives. <u>Expresses all measures using appropriate units.</u> (State)</p>	<p>Student Edition: <i>Check What You Know</i> 393, 399 <i>Example</i> 393, 398 <i>Explore</i> 396-397 <i>Extra Practice</i> R25 <i>Get Ready to Learn</i> 392 <i>Practice and Problem Solving</i> 394, 400 <i>Real-World Example</i> 399 <i>Study Guide and Review</i> 415</p> <p>Teacher Edition: ATS 393, 399; IWO 392B, 398B; SGO 392B, 398B</p>
<p>M(G&M)–3–7 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: <i>Big Idea</i> 370 <i>Check What You Know</i> 8, 9, 376, 380, 388, 409, 426, 433, 439, 446 <i>Explore</i> 373-374, 384-385, 406-407, 423-424 <i>Game Time</i> 429 <i>Practice and Problem Solving</i> 377, 380, 388, 410, 427, 434, 440, 447 <i>Practice the Skill</i> 73 #9, 263 #6, #8, #10, 343 #6, 403 #4 <i>Real-World Example</i> 375, 376, 378, 379, 387, 408, 425, 426, 433, 439, 444, 445</p> <p>Teacher Edition: AE 376, 379; ATS 376, 380, 388, 409, 426, 439, 446; AE 376, 379; SGO 375B, 378B</p>
<p>M(G&M)–3–9 Demonstrates understanding of spatial relationships using location and position by interpreting and giving directions from one location to another (e.g., classroom to the gym, from school to home) using positional words; and between locations on a map or coordinate grid (first quadrant) using positional words or compass directions. (Local)</p>	<p>The diagrams on the following pages can be used during teacher/class discussion to meet this standard.</p> <p>Student Edition: 494-495, 499, 506</p>
<p>M(G&M)–3–10 Demonstrates conceptual understanding of spatial reasoning and visualization by copying, comparing, and drawing models of triangles, squares, rectangles, rhombi, trapezoids, hexagons, and circles; and builds models of rectangular prisms from three-dimensional representations. (Local)</p>	<p>Student Edition: <i>Check What You Know</i> 469 #9 <i>H.O.T. Problems</i> 470 #28, 475 #32</p> <p>Teacher Edition: ATS 469; IWO 472B; SGO 472B; T 467</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)–3–1 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 one, <u>two</u>, or <u>three elements</u>, or finding missing elements. (State)</p>	<p>Student Edition: <i>Are You Ready?</i> 16 #13-#17, 156 #7-#12, 200 #11-#14 <i>Check What You Know</i> 7, 18, 479 <i>Example</i> 17 <i>Extra Practice</i> R30 <i>Mid-Chapter Check</i> 31 #1, #2 <i>Mixed Problem Solving</i> 33 #2, 229 #3, #4, 277 #7 <i>Practice and Problem Solving</i> 19, 380 <i>Practice the Skill</i> 21 #6, #9 <i>Real-World Example</i> 18, 478, 479 <i>Spiral Review</i> 27 #35, #36, 428 #31, 471 #42, #43 <i>Study Guide and Review</i> 57 #7-#10, 503 #25-#28</p> <p>Teacher Edition: A 19, 481; AE 479; ATS 18, 479; IWO 17B, 478B; SGO 478B</p>
<p>M(F&A)–3–4 Demonstrates conceptual understanding of equality by showing equivalence between two expressions using models or different representations of the expressions; or 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, subtraction, or <u>multiplication</u>) (State)</p>	<p>Student Edition: <i>Check What You Know</i> 6, 207 #5-#8, 215 #5-#7, 236 #4-#6 <i>Practice and Problem Solving</i> 36 #21-#23, 71 #12-#15, 94 #28-#31, 187 #29-#36, 208 #23-#26, 216 #26-#31, 220 #23-#26, 224 #27-#32, 236 #15-#20, 302 #19, #20</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)–3–1 Interprets a given representation (line plots, tally charts, tables, or <u>bar graphs</u>) to answer questions related to the data, to analyze the data to formulate conclusions, or to <u>make predictions</u>. (State)</p> <p>(IMPORTANT: Analyzes data consistent with concepts and skills in M(DSP)–3–2.)</p>	<p>Student Edition: <i>Check What You Know</i> 13, 529 #3, #4, 533, 537 #3, #4 <i>Extra Practice</i> R33 <i>Practice and Problem Solving</i> 140 #23-#25, 180 #22-#24, 530 #8-#15, 534, 538 #10-#13 <i>Real-World Example</i> 529, 532, 533, 537 <i>Real-World Math</i> 541 <i>Real-World Problem Solving</i> 130, 340 <i>Test Practice</i> 554 #1, #2, #6, #8</p> <p>Teacher Edition: ATS 533</p>
<p>M(DSP)–3–2 Analyzes patterns, trends, or distributions in data in a variety of contexts by determining or using most frequent (mode), least frequent, largest, or smallest. (State)</p>	<p>Student Edition: <i>Concepts and Skills</i> R75</p>
<p>M(DSP)–3–3 Organizes and displays data using tables, tally charts, and bar graphs, to answer questions related to the data, to analyze the data to formulate conclusions, to make predictions, or to solve problems. (Local)</p>	<p>Student Edition: <i>Check What You Know</i> 529 #1, #2, 537 #1, #2 <i>Explore</i> 526-527 <i>Extra Practice</i> R33, R34 <i>Practice and Problem Solving</i> 530 #6, #7, 534 #13, #14, 536 #6-#9 <i>Real-World Example</i> 528, 536 <i>Study Guide and Review</i> 550 #13, #14, #17</p> <p>Teacher Edition: ATS 529, 537; SGO 528B; SS 510H</p>
<p>M(DSP)–3–3 Identifies or describes representations or elements of representations that best display a given set of data or situation, consistent with the representations required in M(DSP)–3–1. (State)</p> <p>(IMPORTANT: Analyzes data consistent with concepts and skills in M(DSP)–3–2.)</p>	<p>The following page references can be expanded to meet this standard.</p> <p>Student Edition: 528-530, 532-535, 536-538 <i>Concepts and Skills</i> R76 <i>Explore</i> 526-527</p> <p>Teacher Edition: FMB 528A, 536A; T 528, 532, 537</p>

STANDARDS	PAGE REFERENCES
<p>M(DSP)–3–4 Uses counting techniques to solve problems involving combinations and <u>simple permutations</u> using a variety of strategies (e.g., student diagrams, organized lists, tables, tree diagrams, or^{sc} others). (Local)</p>	<p>Student Edition: 522 <i>Analyze the Strategy</i> 523 <i>Mixed Problem Solving</i> 547 #3, 649 #6 <i>Study Guide and Review</i> 550 #11, #12</p> <p>Teacher Edition: ATS 523</p>
<p>M(DSP)–3–5 For a probability event in which the sample space may or may not contain equally likely outcomes, predicts the likelihood of an event using “more likely,” “less likely,” “equally likely,” certain, or impossible and tests the prediction through experiments; and determines if a game is fair. (Local)</p>	<p>Student Edition: <i>Data File</i> 544 #21</p> <p>Teacher Edition: ATS 543; IWO 542B; SGO 542B</p>
<p>M(DSP)–3–5 For a probability event in which the sample space may or may not contain equally likely outcomes, determines the likelihood of the occurrence of an event (using “more likely”, “less likely”, or “equally likely”). (State)</p>	<p>Student Edition: <i>Chapter Test</i> 553 #6-#9 <i>Check What You Know</i> 543 <i>Data File</i> 544 <i>H.O.T. Problems</i> 545 #22, #23 <i>Key Concept</i> 542 <i>Practice and Problem Solving</i> 544 <i>Real-World Example</i> 542 <i>Study Guide and Review</i> 552 #21-#24 <i>Test Practice</i> 554 #4, #9, #10</p> <p>Teacher Edition: A 545; AE 543; ATS 543</p>
<p>M(DSP)–3–6 In response to a teacher or student generated question or hypothesis, groups 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)–3–2.</i>)</p>	<p>Student Edition: <i>Explore</i> 527 #6 <i>H.O.T. Problems</i> 530 #16, 535 #15</p> <p>Teacher Edition: CP 510; IC 510; IWO 528B, 536B; Sc 510H</p>

STANDARDS	PAGE REFERENCES
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 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>Analyze the Skill</i> 125, 213, 305, 343, 383, 431, 477, 523, 579 <i>Practice the Skill</i> 125, 213, 305, 343, 383, 431, 477, 523, 579 <i>Study Guide and Review</i> 146 #24, #25, 240, 324, 364 #12, #13, 414 #13, #14, 457 #10, #11, 502, 550 #11, #12, 593 #25-#27</p> <p>Teacher Edition: ATS 125, 213, 305, 343, 383, 431, 477, 579; IWO 124B; SGO 124B, 342B, 382B, 430B, 476B</p>
<p>M(PRP)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: <i>Analyze the Strategy</i> 477, 639 <i>Practice the Strategy</i> 477, 639 <i>Study Guide and Review</i> 663 #12-#14</p> <p>Teacher Edition: ATS 639; SGO 476B, 638B</p>

STANDARDS

PAGE REFERENCES

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.

M(CCR)–5–1 **Students will communicate their understanding of mathematics** and be able to:

- 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.

The following page references use the concept of multiplication to meet this standard.

Student Edition:

Check What You Know 163 #9, 166 #9, 175 #8, 179 #8, 207 #10, 215 #9, 223 #10

Extend 165-166

H.O.T. Problems 161 #15, 176 #25, 181 #30, 216 #38, 224 #39

STANDARDS	PAGE REFERENCES
<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>The following page references use the concept of place value to meet this standard.</p> <p>Student Edition: 24, 28 <i>Explore</i> 22-23 <i>H.O.T. Problems</i> 27 #30, 30 #37, 37 #30, 41 #29 <i>Real-World Example</i> 29</p> <p>Teacher Edition: A 37; ATS 26, 29, 36, 39; IWO 24B</p>
<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>The following page references use geometric concepts to meet this standard.</p> <p>Student Edition: <i>Extend</i> 491 <i>Game Time</i> 482 <i>H.O.T. Problems</i> 470 #28, 475 #32, 481 #19 <i>Real-World Math</i> 499</p> <p>Teacher Edition: Ar 464G; ATS 469, 489; CP 464; IWO 472B, 488B; Sc 464H; SS 464H</p>