

Macmillan/McGraw-Hill

MATH CONNECTS

2009

Grade 4

Correlated with

**Pennsylvania
Academic Standards for Mathematics**

Grade 5

**Macmillan/McGraw-Hill
800-442-9685**

2.1. Numbers, Number Systems and Number Relationships	
2.1.5. GRADE 5	
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>	
A. Use expanded notation to represent whole numbers or decimals.	pp. 17B, 18-19, 22-25, 31, 44-45, 49, 50
B. Apply number theory concepts to rename a number quantity (e.g., six, $6, \frac{12}{2}, 3 \times 2, 10 - 4$).	pp. 16, 17B, 17, 18-19, 22B, 22-25, 31, 42-43, 44-45, 49, 50
C. Demonstrate that mathematical operations can represent a variety of problem situations.	pp. 19, 24, 30, 38, 60, 82, 100, 106, 152, 156, 162, 168, 174, 178, 200, 210, 222, 239, 244, 254, 260, 275, 286, 290, 298, 315, 318, 328, 334, 338, 364, 370, 402, 424, 458, 488, 506, 522, 551, 563, 619, 624, 640
D. Use models to represent fractions and decimals.	pp. 534, 537-544, 546, 560-564, 566-569, 574G, 574, 577-585, 586B, 586-587, 588-591, 596-598, 602-604, 606-608, 610, 614, 628-630, 636-638, 648
E. Explain the concepts of prime and composite numbers.	Readiness: pp. 176-179 Refer also to Grade 5.
F. Use simple concepts of negative numbers (e.g., on a number line, in counting, in temperature).	pp. R60-R61 Refer also to Grade 5.
G. Develop and apply number theory concepts (e.g., primes, factors, multiples, composites) to represent numbers in various ways.	pp. 176B, 176-179, 180, 186, 187, 237B, 237-239, 262-263, 273-275
2.2. Computation and Estimation	
2.2.5. GRADE 5	
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>	
A. Create and solve word problems involving addition, subtraction, multiplication and division of whole numbers.	pp. 55, 58, 59, 60, 65, 72, 80, 81, 82, 148, 151, 152, 156, 160, 162, 166, 167, 168, 172, 174, 176, 178, 237, 238, 239, 242, 243, 244, 252, 254, 258, 259, 260, 273, 274, 275, 276, 277, 284, 285, 286, 288, 290, 296, 298, 313, 314, 315, 316, 318, 322, 323, 326, 327, 328, 332, 333, 334, 336, 337, 338, 342, 343, 617, 618, 619, 622, 624, 630, 631, 632, 638, 639, 640

B. Develop and apply algorithms to solve word problems that involve addition, subtraction, and/or multiplication with decimals with and without regrouping.	pp. 617, 618, 619, 622, 624, 630, 631, 632, 638, 639, 640
C. Develop and apply algorithms to solve word problems that involve addition, subtraction, and/or multiplication with fractions and mixed numbers that include like and unlike denominators.	pp. LA14B, LA14, LA15, LA16, LA17
D. Demonstrate the ability to round numbers.	pp. 36-37, 48, 58-62, 72-73, 84-85, 242-243, 300-301, 617-625, 644-645
E. Determine through estimations the reasonableness of answers to problems involving addition, subtraction, multiplication and division of whole numbers.	pp. 64, 247, 252, 258, 285, 288, 296, 326, 333, 337, 343, 457, 461, 631, 639
F. Demonstrate skills for using fraction calculators to verify conjectures, confirm computations and explore complex problem-solving situations.	Opportunities to address: pp. LA14-LA17
G. Apply estimation strategies to a variety of problems including time and money.	pp. 58-67, 72-74, 84-86, 242-245, 247, 252-253, 258-259, 262, 264, 276-279, 285, 288-289, 296-297, 300-301, 303, 322-328, 332-334, 337-338, 343-346, 349, 351-352, 622-625, 631-632, 639-640, 644-645, 648
H. Explain multiplication and division algorithms.	pp. 142, 146-149, 150-153, 166, 167-182, 247, 273-274, 282-283, 308-319, 322-329, 332-347, 349-353
I. Select a method for computation and explain why it is appropriate.	pp. 158B, 158-159, 160A, 170B, 170-171, 183, 185
2.3. Measurement and Estimation	
2.3.5. GRADE 5	
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i>	
A. Select and use appropriate instruments and units for measuring quantities (e.g., perimeter, volume, area, weight, time, temperature).	pp. 441, 442, 443, 451, 452, 453, 456A, 459, 479, 486, 487, 488, 489, 493, 494, 495, 498B, 498, 499, 500, 501, 507, 509, 510, 515, 531
B. Select and use standard tools to measure the size of figures with specified accuracy, including length, width, perimeter and area.	pp. 436I, 436J, 439-440, 441B, 441-443, 448-449, 450B, 450-452, 453, 456B, 463

C. Estimate, refine and verify specified measurements of objects.	pp. 439-440, 441-443, 444-445, 446-447, 448-449, 450-452, 453, 454-455, 456-459, 460-462, 464-465, 466-467, 468-471, 472-478, 479, 485, 486-489, 490-491, 492-495, 496-497, 498-500, 501, 502-503, 504-507, 508-510, 511, 512-515, 516-517, 518-519, 524-530, 531
D. Convert linear measurements within the same system.	pp. 444A, 444B, 444-445, 453, 455, 459, 473
E. Add and subtract measurements.	pp. 41, 59, 60, 72, 77, 82, 83, 87, 88, 201
2.4. Mathematical Reasoning and Connections	
2.4.5. GRADE 5	
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i>	
A. Compare quantities and magnitudes of numbers.	pp. 28-35, 44, 47
B. Use models, number facts, properties and relationships to check and verify predictions and explain reasoning.	pp. 240-241, 263, 320-321, 348, 502-503, 527, 586-587, 608
C. Draw inductive and deductive conclusions within mathematical contexts.	pp. 240-241, 263, 502-503, 527
D. Distinguish between relevant and irrelevant information in a mathematical problem.	pp. 202-203, 226
E. Interpret statements made with precise language of logic (e.g., "all", "or", "every", "none", "some", "or", "many").	pp. 40-41, 48, 76-77, 88, 118-119, 137, 170-171, 185, 218-219, 230, 250-251, 265, 294-295, 304, 330-331, 350, 380-381, 388, 416-417, 431, 466-467, 477, 518-519, 529, 564-565, 570, 594-595, 609, 634-635, 647
F. Use statistics to quantify issues (e.g., in social studies, in science).	pp. 42-43, 78-79, 120-121, 164-165, 212-213, 256-257, 292-293, 340-341, 382-383, 426-427, 454-455, 516-517, 558-559, 600-601, 642-643
2.5. Mathematical Problem Solving and Communication	
2.5.5. GRADE 5	
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i>	
A. Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense and explain how the problem was solved.	pp. 26-27, 46, 102-103, 134, 280-281, 302, 320-321, 348, 366-367, 386, 404-405, 430, 446-447, 502-503, 527, 544-545, 568, 586-587, 608, 626-627, 646

<p>B. Use appropriate mathematical terms, vocabulary, language symbols and graphs to explain clearly and logically solutions to problems.</p>	<p>pp. 18, 23, 29, 33, 38, 56, 59, 66, 81, 96, 99, 105, 109, 113, 135, 129, 148, 152, 155, 161, 167, 173, 177, 194, 199, 209, 215, 221, 238, 243, 247, 253, 259, 274, 277, 285, 289, 297, 314, 317, 323, 328, 333, 337, 360, 363, 369, 373, 377, 396, 402, 407, 414, 419, 423, 442, 451, 457, 461, 470, 487, 491, 493, 499, 505, 509, 514, 521, 538, 541, 550, 555, 563, 580, 583, 589, 591, 597, 603, 618, 623, 631, 639</p>
<p>C. Show ideas in a variety of ways, including words, numbers, symbols, pictures, charts, graphs, tables, diagrams and models.</p>	<p>pp. 40-41, 42-43, 48, 76-77, 78-79, 88, 102-103, 118-119, 120-121, 134, 137, 164-165, 170-171, 185, 212-213, 218-219, 230, 250-251, 256-257, 265, 280-281, 292-293, 294-295, 302, 304, 320-321, 330-331, 340-341, 348, 350, 366-367, 380-381, 382-383, 386, 388, 404-405, 416-417, 426-427, 430, 431, 446-447, 454-455, 466-467, 477, 502-503, 516-517, 518-519, 527, 529, 544-545, 558-559, 564-565, 568, 570, 586-587, 594-595, 600-601, 608, 609, 626-627, 634-635, 642-643, 646, 647, P2-P3, P4-P5, P6-P7, P8-P9</p>
<p>D. Connect, extend and generalize problem solutions to other concepts, problems and circumstances in mathematics.</p>	<p>pp. 19, 24, 30, 38, 42-43, 60, 78-79, 82, 100, 106, 120-121, 152, 156, 162, 164-165, 168, 174, 178, 200, 210, 212-213, 222, 239, 244, 254, 256-257, 260, 275, 286, 290, 292-293, 298, 315, 318, 328, 334, 338, 340-341, 364, 370, 382-383, 402, 424, 426-427, 454-455, 458, 488, 506, 516-517, 522, 551, 563, 558-559, 600-601, 619, 624, 640, 642-643</p>
<p>E. Select, use and justify the methods, materials and strategies used to solve problems.</p>	<p>pp. 40-41, 48, 76-77, 88, 102-103, 118-119, 134, 137, 170-171, 185, 218-219, 230, 250-251, 265, 280-281, 294-295, 302, 304, 320-321, 330-331, 348, 350, 366-367, 380-381, 386, 388, 404-405, 416-417, 430, 431, 446-447, 466-467, 477, 502-503, 518-519, 527, 529, 544-545, 564-565, 568, 570, 586-587, 594-595, 608, 609, 626-627, 634-635, 646, 647</p>
<p>F. Use appropriate problem-solving strategies (e.g., solving a simpler problem, drawing a picture or diagram).</p>	<p>pp. 102-103, 134, 280-281, 302, 320-321, 348, 366-367, 386, 404-405, 430, 446-447, 502-503, 527, 544-545, 568, 586-587, 608, 626-627, 646</p>

2.6. Statistics and Data Analysis	
2.6.5. GRADE 5	
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i>	
A. Organize and display data using pictures, tallies, tables, charts, bar graphs and circle graphs.	pp. 12, 13, 22, 80, 92I, 92J, 92, 94, 95-97, 101, 104, 108-117, 120, 127, 129-130, 132, 133, 135-136, 139-140, 141, 159, 232, 260, 268, 354-355, R72-R73
B. Describe data sets using mean, median, mode and range.	pp. 98B, 98-101, 102A, 105-107, 108A, 111, 133, R74-R75
C. Sort data using Venn diagrams.	pp. 377, R72-R73
D. Predict the likely number of times a condition will occur based on analyzed data.	pp. 92I, 122-123, 124B, 124-127, 138, 139
E. Construct and defend simple conclusions based on data.	pp. 96, 101, 102-103, 105, 109, 110, 112B, 114, 117, 125, 126
2.7. Probability and Predictions	
2.7.5. GRADE 5	
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>	
A. Perform simulations with concrete devices (e.g., dice, spinner) to predict the chance of an event occurring.	pp. 128B, 128, 131
B. Determine the fairness of the design of a spinner.	pp. 128B, 130
C. Express probabilities as fractions and decimals.	pp. 128B, 129
D. Compare predictions based on theoretical probability and experimental results.	pp. 128A, 131
E. Calculate the probability of a simple event.	pp. 128A, 128B, 128-130, 131, 138, 139
F. Determine patterns generated as a result of an experiment.	Opportunities to address: pp. 128-130, 131
G. Determine the probability of an event involving “and”, “or” or “not”.	pp. 125, 126, 127, 129, 130, 139
H. Predict and determine why some outcomes are certain, more likely, less likely, equally likely or impossible.	pp. 128B, 128-130, 131, 138, 139

I. Find all possible combinations and arrangements involving a limited number of variables.	pp. 124B, 124, 125, 126, 127, 128A, 130, 138
J. Develop a tree diagram and list the elements.	pp. 124B, 124, 125, 126, 127, 128A, 130, 138
2.8. Algebra and Functions	
2.8.5. GRADE 5	
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i>	
A. Recognize, reproduce, extend, create and describe patterns, sequences and relationships verbally, numerically, symbolically and graphically, using a variety of materials.	pp. 6, 40, 119, 134, 137, 144, 192, 204-211, 218B, 219, 220-224, 227-228, 230, 237, 251, 316-318, 331, 350, 366B, 366, 367, 375, 381, 386, 417, 459, 467, 519, 565, 625, 633
B. Connect patterns to geometric relations and basic number skills.	pp. 137, 205, 206, 218B, 219, 227, 251, 366B, 366-367, 375, 381, 386, 565, 625
C. Form rules based on patterns (e.g., an equation that relates pairs in a sequence).	pp. 208-211, 220-224, 228, 230, 260, 266
D. Use concrete objects and combinations of symbols and numbers to create expressions that model mathematical situations.	pp. 190, 193A, 193B, 193-195, 198A, 201, 207, 214B, 214-216, 217, 218A, 224-225, 229, 231, 267
E. Explain the use of combinations of symbols and numbers in expressions, equations and inequalities.	pp. 190, 193A, 193B, 193-195, 196-197, 198A, 198B, 198-201, 202A, 202, 207, 214B, 214-216, 217, 218A, 220-223, 224-225, 228, 229, 230, 231, 267
F. Describe a realistic situation using information given in equations, inequalities, tables or graphs.	pp. 193, 194, 198, 199, 200, 209, 210, 212-213, 214, 215, 218, 219, 220, 221, 222, 231
G. Select and use appropriate strategies, including concrete materials, to solve number sentences and explain the method of solution.	pp. 7, 31, 148, 149, 152, 156-157, 163, 168, 173, 182, 186, 187, 239
H. Locate and identify points on a coordinate system.	pp. 392H, 406B, 406-408, 409, 412A, 415, 430
I. Generate functions from tables of data and relate data to corresponding graphs and functions.	pp. 208-211, 220-224, 228, 230, 260, 266
2.9. Geometry	
2.9.5. GRADE 5	
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i>	
A. Give formal definitions of geometric figures.	pp. 359, 362, 368, 369, 372, 373, 376, 384

B. Classify and compare triangles and quadrilaterals according to sides or angles.	pp. 358, 372A, 372B, 372-375, 376B, 376-378, 380A, 387, 388, 389
C. Identify and measure circles, their diameters and their radii.	pp. R64-R65
D. Describe in words how geometric shapes are constructed.	pp. 359, 360-361, 362, 368, 369, 372, 373, 376, 384
E. Construct two- and three-dimensional shapes and figures using manipulatives, geoboards and computer software.	pp. 356G, 356H, 366, 368B, 380, 513, 518A, 529
F. Find familiar solids in the environment and describe them.	pp. 356G, 356H, 356, 359, 360, 364, 382-383
G. Create an original tessellation.	pp. 366B, 366, 413, 418B
H. Describe the relationship between the perimeter and area of triangles, quadrilaterals and circles.	pp. 293, 436I, 436J, 436, 456B, 456-459, 460A, 460B, 460-462, 463, 464-465, 466A, 466-467, 472, 474, 475, 476, 477, 479
I. Represent and use the concepts of line, point and plane.	pp. 368, 384, 392H, 395-397, 398, 399, 400B, 400-403, 404A, 409, 429, 433
J. Define the basic properties of squares, pyramids, parallelograms, quadrilaterals, trapezoids, polygons, rectangles, rhombi, circles, triangles, cubes, prisms, spheres and cylinders.	pp. 10-11, 356, 359-361, 362-365, 372-378, 384-385, 387-388
K. Analyze simple transformations of geometric figures and rotations of line segments.	pp. 392, 410-415, 425, 428, 431, 433
L. Identify properties of geometric figures (e.g., parallel, perpendicular, similar, congruent, symmetrical).	pp. 392G, 398-399, 400B, 401-403, 409, 418B, 418-420, 421, 422A, 422B, 422-424, 425, 426-427, 429, 432, 433
2.10. Trigonometry	
2.10.5. GRADE 5	
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i>	
A. Identify and compare parts of right triangles, including right angles, acute angles, hypotenuses and legs.	pp. 372B, 372-375, 387
B. Create right triangles on a geoboard.	Opportunities to address: pp. 372-375

2.11. Concepts of Calculus	
2.11.5. GRADE 5	
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i>	
A. Make comparisons of numbers (e.g., more, less, same, least, most, greater than, less than).	pp. 28-35, 44, 47, 554-557, 569, 590B, 590-592, 606, 609
B. Identify least and greatest values represented in bar and circle graphs.	pp. 13, 22, 80, 92, 94, 108-117, 120, 127, 132, 135-136, 139-140, 159, 232, 260, 268, 354-355, R72-R73
C. Identify maximum and minimum.	pp. 13, 22, 80, 92, 94, 108-117, 120, 127, 132, 135-136, 139-140, 159, 232, 260, 268, 354-355, R72-R73
D. Describe the relationship between rates of change and time.	Opportunities to address: pp. 114, 116-117, R70-R71 Refer also to Grade 5.
E. Estimate areas and volumes as the sums of areas of tiles and volumes of cubes.	pp. 461-463, 512-515, 529, 531, LA18-LA21, LA22B, LA22-LA25
F. Describe the relationship between the size of the unit of measurement and the estimate of the areas and volumes.	pp. 461-463, 515, 516-517