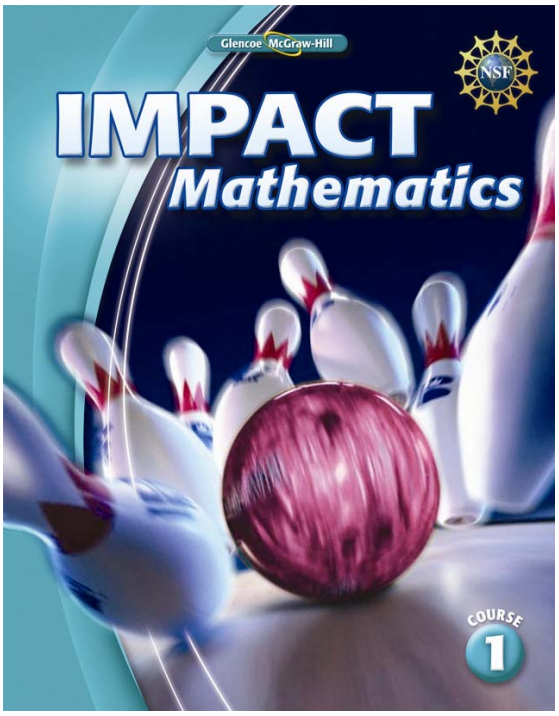
Glencoe

Mathematics
Academic Content Standards
Grade 6

Ohio




# IMPACT Mathematics

## COURSE 1



| STANDARDS | PAGE REFERENCES |
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| **Number, Number Sense and Operations Standard** | |
| *Number and Number Systems* | |
| 1. Decompose and recompose whole numbers using factors and exponents (e.g., 32 = 2 x 2 x 2 x 2 x 2 = $2^5$ ), and explain why “squared” means “second power” and “cubed” means “third power.” | **Student Edition:**<br>113-116<br>*On Your Own Exercises* 117-119<br>**Teacher Guide:**<br>A 114; DU 114-116; QQ 119; RAL 113, 115 |
| 2. Find and use the prime factorization of composite numbers. For example:<br>a. Use the prime factorization to recognize the greatest common factor (GCF).<br>b. Use the prime factorization to recognize the least common multiple (LCM).<br>c. Apply the prime factorization to solve problems and explain solutions. | **Student Edition:**<br>61-63, 64-65<br>*Math Link* 63<br>**Teacher Guide:**<br>ML 63; TT 62; WU 64 |

**Codes used for Teacher Guide pages are the initial caps of headings on that page.**

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| 3. Explain why a number is referred to as being "rational," and recognize that the expression $\frac{a}{b}$ can mean *a* parts of size $\frac{1}{b}$ each, *a* divided by *b*, or the ratio of *a* to *b*. | **Student Edition:**<br>58-60, 94-97, 352-354<br>*On Your Own Exercises* 68-73, 100-104<br>**Teacher Guide:**<br>A 59; DU 59-60, 94-97; MB 60; QQ 73; T97 |
| 4. Describe what it means to find a specific percent of a number, using real-life examples. | **Student Edition:**<br>368-371, 372-375, 380-384, 384-387<br>*On Your Own Exercises* 376-379, 390-392<br>*Inquiry Investigation* 388-389<br>**Teacher Guide:**<br>368B<br>A 374, 380, 383; DU 372-375, 382-384, 385-387; QQ 379, 392; RAL 371, 375, 385; T 371, 384 |
| 5. Use models and pictures to relate concepts of ratio, proportion and percent, including percents less than 1 and greater than 100. | **Student Edition:**<br>288-289, 290-294, 294-296, 297-299, 299-301, 308-311, 312-313<br>*On Your Own Exercises* 302-307, 316-320<br>*Inquiry Investigation* 314-315<br>**Teacher Edition:**<br>290B, 308B<br>A 291, 298, 315; DU 291-294, 295-296, 298-299, 299-301; KV 289; MB 292; RAL 295, 296, 299, 314; T 294 |
| ***Meaning of Operations*** | |
| 6. Use the order of operations, including the use of exponents, decimals and rational numbers, to simplify numerical expressions. | **Student Edition:**<br>126-129, 130-132<br>*On Your Own Exercises* 136-142<br>**Teacher Guide:**<br>A 127, 128, 130; DU 127-129, 130-132; QQ 142; RAL 129 |
| 7. Use simple expressions involving integers to represent and solve problems; e.g., if a running back loses 15 yards on the first carry but gains 8 yards on the second carry, what is the net gain/loss? | **Student Edition:**<br>510, 512-514<br>*Real World Link* 514 |

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| 8. Represent multiplication and division situations involving fractions and decimals with models and visual representations; e.g., show with pattern blocks what it means to take $2\frac{2}{3} \div \frac{1}{6}$. | **Student Edition:**<br>222-225, 226-229, 229-232, 242-245, 245-247, 248-250, 251-254, 254-256<br>*On Your Own Exercises* 233-241, 257-264<br>**Teacher Guide:**<br>242B<br>A 222, 226, 227; DU 222-225, 243-245, 245-247, 248-250, 251-254; MB 232; QQ 264; RAL 225, 231, 251; T 245, 254; TT230 |
| 9. Give examples of how ratios are used to represent comparisons; e.g., part-to-part, part-to-whole, whole-to-part. | **Student Edition:**<br>288-289, 290-294, 294-296, 297-299, 299-301, 308-311, 312-313<br>*On Your Own Exercises* 302-307, 316-320<br>*Inquiry Investigation* 314-315<br>**Teacher Edition:**<br>290B, 308B<br>A 291, 298, 315; DU 291-294, 295-296, 298-299, 299-301; KV 289; MB 292; RAL 295, 296, 299, 314; T 294 |
| 10. Recognize that a quotient may be larger than the dividend when the divisor is a fraction; e.g., $6 \div \frac{1}{2} = 12$. | **Student Edition:**<br>226-229, 229-232<br>*On Your Own Exercises* 233-241<br>**Teacher Guide:**<br>A 226, 227; DU 227-229, 231-232; MB 232; RAL 231; TT230 |
| *Computation and Estimation* | |
| 11. Perform fraction and decimal computations and justify their solutions; e.g., using manipulatives, diagrams, mathematical reasoning. | **Student Edition:**<br>198-201, 201-204, 205-207, 216-219, 219-221, 222-225, 226-229, 229-232<br>*Inquiry Investigation* 208-209<br>*On Your Own Exercises* 210-214, 233-241<br>**Teacher Guide:**<br>198B, 216B, 242B<br>A 201, 207, 220, 221, 222, 226, 227; DU 199-201, 202-204, 206-207, 217-219, 220-221, 222-225; MB 217, 232; QQ 215; RAL 200, 204, 205, 218, 225, 231; T198, 219; TT230 |

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| 12. Develop and analyze algorithms for computing with fractions and decimals, and demonstrate fluency in their use. | **Student Edition:**<br>198-201, 201-204, 205-207, 216-219, 219-221, 222-225, 226-229, 229-232<br>*Inquiry Investigation* 208-209<br>*On Your Own Exercises* 210-214, 233-241<br>**Teacher Guide:**<br>198B, 216B, 242B<br>A 201, 207, 220, 221, 222, 226, 227; DU 199-201, 202-204, 206-207, 217-219, 220-221, 222-225; MB 217, 232; QQ 215; RAL 200, 204, 205, 218, 225, 231; T198, 219; TT230 |
| 13. Estimate reasonable solutions to problem situations involving fractions and decimals; e.g., $\frac{7}{8} + \frac{12}{13} \approx 2$ and $4.23 \times 5.8 \approx 25$. | **Student Edition:**<br>242-245, 248-250, 251-254<br>*On Your Own Exercises* 257-264<br>**Teacher Guide:**<br>DU 243-244, 251-254; EP 242 |
| 14. Use proportional reasoning, ratios and percents to represent problem situations and determine the reasonableness of solutions. | **Student Edition:**<br>288-289, 290-294, 294-296, 297-299, 299-301, 308-311, 312-313<br>*On Your Own Exercises* 302-307, 316-320<br>*Inquiry Investigation* 314-315<br>**Teacher Guide:**<br>290B, 308B<br>A 291, 298, 315; DU 291-294, 295-296, 298-299, 299-301; KV 289; MB 292; RAL 295, 296, 299, 314; T 294 |
| 15. Determine the percent of a number and solve related problems; e.g., find the percent markdown if the original price was $140, and the sale price is $100. | **Student Edition:**<br>249 #3, 368-371, 372-375, 380-384, 384-387<br>*On Your Own Exercises* 376-379, 390-392<br>*Inquiry Investigation* 388-389<br>**Teacher Guide:**<br>368B<br>A 374, 380, 383; DU 372-375, 382-384, 385-387; QQ 379, 392; RAL 371, 375, 385; T 371, 384 |

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| **Measurement Standard** | |
| *Measurement Units* | |
| 1. Understand and describe the difference between surface area and volume. | **Student Edition:**<br>434-437, 437-440<br>*On Your Own Exercises* 444-447<br>*Review and Self-Assessment* 464-465<br>**Teacher Guide:**<br>434B<br>DU 435-437, 438-440; QQ 447; RAL 435 |
| *Use Measurement Techniques and Tools* | |
| 2. Use strategies to develop formulas for finding circumference and area of circles, and to determine the area of sectors; e.g., $\frac{1}{2}$ circle, $\frac{2}{3}$ circle, $\frac{1}{3}$ circle, $\frac{1}{4}$ circle. | **Student Edition:**<br>44-47, 419-421, 422-424<br>*On Your Own Exercises* 49-51, 430-433<br>**Teacher Guide:**<br>A 424; DU 45-47, 420-421, 422-424; MB 46; QQ 51; RAL 45, 422; T419 |
| 3. Estimate perimeter or circumference and area for circles, triangles and quadrilaterals, and surface area and volume for prisms and cylinders by:<br>a. estimating lengths using string or links, areas using tiles or grid, and volumes using cubes;<br>b. measuring attributes (diameter, side lengths, or heights) and using established formulas for circles, triangles, rectangles, parallelograms and rectangular prisms. | **Student Edition:**<br>40-44, 44-47, 398-402, 402-404, 409-412, 413-416, 419-421, 422-424, 434-437, 437-440<br>*On Your Own Exercises* 48-51, 405-408, 425-433, 444-447<br>**Teacher Guide:**<br>40B, 398B, 409B, 434B<br>A 400, 415; DU 41-44, 399-402, 413-416, 420-422, 435-437; MB 414; QQ 51, 408, 433, 447; RAL 42, 45, 409; T47, 410, 419 |
| 4. Determine which measure (perimeter, area, surface area, volume) matches the context for a problem situation; e.g., perimeter is the context for fencing a garden, surface area is the context for painting a room. | **Student Edition:**<br>40-44, 44-47, 398-402, 402-404, 409-412, 413-416, 419-421, 422-424, 434-437, 437-440<br>*On Your Own Exercises* 48-51, 405-408, 425-433, 444-447<br>*Review and Self-Assessment* 55, 464-465<br>**Teacher Guide:**<br>40B, 398B, 409B, 434B<br>A 400, 415; DU 41-44, 399-402, 413-416, 420-422, 435-437; MB 414; QQ 51, 408, 433, 447; RAL 42, 45, 409; T47, 410, 419 |

| STANDARDS | PAGE REFERENCES |
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| 5. Understand the difference between perimeter and area, and demonstrate that two shapes may have the same perimeter, but different areas or may have the same area, but different perimeters. | **Student Edition:**<br>40-44, 44-47, 398-402, 402-404, 409-412, 413-416, 419-421, 422-424<br>*On Your Own Exercises* 48-51, 405-408, 425-433<br>*Review and Self-Assessment* 55<br>**Teacher Guide:**<br>40B, 398B, 409B<br>A 400, 415; DU 41-44, 399-402, 413-416, 420-422; MB 414; QQ 51, 408, 433; RAL 42, 45, 409; T47, 410, 419 |
| 6. Describe what happens to the perimeter and area of a two-dimensional shape when the measurements of the shape are changed; e.g. length of sides are doubled. | **Student Edition:**<br>40-44, 44-47, 398-402, 402-404, 409-412, 413-416, 419-421, 422-424<br>*On Your Own Exercises* 48-51, 405-408, 425-433<br>*Review and Self-Assessment* 55<br>**Teacher Guide:**<br>40B, 398B, 409B<br>A 400, 415; DU 41-44, 399-402, 413-416, 420-422; MB 414; QQ 51, 408, 433; RAL 42, 45, 409; T47, 410, 419 |
| **Geometry and Spatial Sense Standard** | |
| *Characteristics and Properties* | |
| 1. Classify and describe two-dimensional and three-dimensional geometric figures and objects by using their properties; e.g., interior angle measures, perpendicular/parallel sides, congruent angles/sides. | **Student Edition:**<br>2-3, 4-8, 8-11, 24-29, 30-34, 44-47, 434-437, 437-440<br>*On Your Own Exercises* 18-19, 35-39, 444-447<br>*Inquiry Investigation* 441-443<br>**Teacher Guide:**<br>4B, 24B, 434B<br>A 11; DU 7-9, 10-11, 45-47, 435-437, 438-440; KV 3; QQ 23; RAL 6, 9, 45, 435-437, 438-440 |
| 2. Use standard language to define geometric vocabulary: vertex, face, altitude, diagonal, isosceles, equilateral, acute, obtuse and other vocabulary as appropriate. | **Student Edition:**<br>2-3, 4-8, 8-11, 24-29, 30-34, 44-47<br>*Inquiry Investigation* 16-17<br>*On Your Own Exercises* 18-19, 35-39<br>**Teacher Edition:**<br>24B, 40B<br>A 11, 17; DU 7-9, 10-11, 45-47; MB 27, 46; RAL 6, 9, 16, 45; QQ 23 |

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| 3. Use multiple classification criteria to classify triangles; e.g., right scalene triangle. | **Student Edition:**<br>2-3, 4-8, 8-11, 24-29, 30-34, 44-47<br>*Inquiry Investigation* 16-17<br>*On Your Own Exercises* 18-19, 35-39<br>**Teacher Edition:**<br>24B, 40B<br>A 11, 17; DU 7-9, 10-11, 45-47; MB 27, 46; RAL 6, 9, 16, 45; QQ 23 |
| 4. Identify and define relationships between planes; i.e., parallel, perpendicular and intersecting. | **Student Edition:**<br>25-29, 30-34<br>*On Your Own Exercises* 35-39<br>**Teacher Guide:**<br>A 31; DU 28-29, 30-34; MB 27; RAL 26, 30, 33 |
| *Spatial Relationships* | |
| 5. Predict and describe sizes, positions and orientations of two-dimensional shapes after transformations such as reflections, rotations, translations and dilations. | Beginning of Concept is introduced in the following references.<br>**Student Edition:**<br>9<br>*On Your Own Exercises* 19<br>**Teacher Edition:**<br>A9; RAL 9 |
| *Transformations and Symmetry* | |
| 6. Draw similar figures that model proportional relationships; e.g., model similar figures with a 1 to 2 relationship by sketching two of the same figure, one with corresponding sides twice the length of the other. | **Student Edition:**<br>325-326, 327-331, 332-334<br>*On Your Own Exercises* 335-340, 339 #23<br>**Teacher Guide:**<br>A328, 329; DU 325-326, 328-331; MB 325 |
| *Visualization and Geometric Models* | |
| 7. Build three-dimensional objects with cubes, and sketch the two-dimensional representations of each side; i.e., projection sets. | **Student Edition:**<br>434-437, 437-440<br>*Inquiry Investigation* 441-443<br>*On Your Own Exercises* 444-447<br>**Teacher Guide:**<br>434B<br>DU 435-437, 438-440; RAL 435, 438; T 439 |

| STANDARDS | PAGE REFERENCES |
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| **Patterns, Functions and Algebra Standard** | |
| *Use Patterns, Relations and Functions* | |
| 1. Represent and analyze patterns, rules and functions, using physical materials, tables and graphs. | **Student Edition:**<br>149-152, 152-156, 160-162, 550-552, 552-554<br>*Inquiry Investigation* 157-159<br>*On Your Own Exercises* 166-173, 555-559<br>**Teacher Guide:**<br>DU 149-151, 161-162; RAL 158,160 |
| 2. Use words and symbols to describe numerical and geometric patterns, rules and functions. | **Student Edition:**<br>120-125, 133-135, 149-152, 152-156<br>*On Your Own Exercises* 136-142<br>*Inquiry Investigation* 157-159<br>**Teacher Guide:**<br>120B<br>A 135; DU 121-125, 149-152; RAL 121, 134 |
| *Use Algebraic Representations* | |
| 3. Recognize and generate equivalent forms of algebraic expressions, and explain how the commutative, associative and distributive properties can be used to generate equivalent forms; e.g., perimeter as $2(l + w)$ or $2l + 2w$. | **Student Edition:**<br>174-178, 179-183<br>*On Your Own Exercises* 187-190<br>*Review and Self-Assessment* 193-194<br>**Teacher Guide:**<br>A 177, 180, 182; DU 175-178, 179-183; RAL 174, 175, 178; S&S 178 |
| 4. Solve simple linear equations and inequalities using physical models, paper and pencil, tables and graphs. | **Student Edition:**<br>534-536, 536-538, 550-552, 552-554<br>*Inquiry Investigation* 539-540<br>*On Your Own Exercises* 541-545, 555-559<br>**Teacher Guide:**<br>534B<br>DU 535-536; MB 536; RAL 537 |
| 5. Produce and interpret graphs that represent the relationship between two variables. | **Student Edition:**<br>308, 495-499, 552-554<br>*On Your Own Exercises* 503-508, 557 #19<br>**Teacher Guide:**<br>A 495; DU 497-498, 553-554; RAL 499 |

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| 6. Evaluate simple expressions by replacing variables with given values, and use formulas in problem-solving situations. | **Student Edition:**<br>143-148, 160-162<br>*On Your Own Exercises* 166-173<br>**Teacher Guide:**<br>143B<br>A 145; T 148, 162 |
| *Analyze Change* | |
| 7. Identify and describe situations with constant or varying rates of change, and compare them. | **Student Edition:**<br>308, 495-499, 500-502, 552-554<br>*On Your Own Exercises* 503-508, 557 #19<br>**Teacher Edition:**<br>A 495; DU 497-498, 553-554; RAL 499 |
| 8. Use technology to analyze change; e.g., use computer applications or graphing calculators to display and interpret rate of change. | The following exercises in *Impact Mathematics, Course 3* © 2009 can be used to meet this objective.<br>**Student Edition:**<br>*Develop & Understand* 607 |
| **Data Analysis and Probability Standard** | |
| *Data Collection* | |
| 1. Read, construct and interpret line graphs, circle graphs and histograms. | **Student Edition:**<br>579-580, 581-584, 585-587<br>*On Your Own Exercises* 592-599<br>**Teacher Guide:**<br>A 581; DU 580, 581-584; RAL 584; T 587 |
| 2. Select, create and use graphical representations that are appropriate for the type of data collected. | **Student Edition:**<br>579-580, 581-584, 585-587, 588-591, 601-604, 605-606<br>*Explore* 578<br>*On Your Own Exercises* 592-599<br>**Teacher Guide:**<br>578B, 601B<br>A 581, 589; DU 580, 581-584, 589-591; RAL 584, 588, 590; T 587, 608 |
| 3. Compare representations of the same data in different types of graphs, such as a bar graph and circle graph. | **Student Edition:**<br>588, 609-610<br>*Explore* 578<br>*On Your Own Exercises* 592 #1, 594 #5, 612-616<br>**Teacher Guide:**<br>DU 609-610; RAL 610 |

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| *Statistical Methods* | |
| 4. Understand the different information provided by measures of center (mean, mode and median) and measures of spread (range). | **Student Edition:**<br>265-268, 269-271, 272-275<br>*On Your Own Exercises* 276-281<br>**Teacher Guide:**<br>265B<br>A 267; DU 266-268, 269-271, 272-275; RAL 275; T 268 |
| 5. Describe the frequency distribution of a set of data, as shown in a histogram or frequency table, by general appearance or shape; e.g., number of modes, middle of data, level of symmetry, outliers. | **Student Edition:**<br>265-268, 269-271, 272-275<br>*On Your Own Exercises* 276-281<br>**Teacher Guide:**<br>265B<br>A 267; DU 266-268, 269-271, 272-275; RAL 275; T 268 |
| 6. Make logical inferences from statistical data. | **Student Edition:**<br>265-268, 269-271, 272-275, 579-580, 581-584, 585-587<br>*On Your Own Exercises* 276-281, 592-599<br>**Teacher Edition:**<br>A 267, 581; DU 266-268, 269-271, 272-275, 580, 581-584; RAL 275, 584; T 268, 587 |
| *Probability* | |
| 7. Design an experiment to test a theoretical probability and explain how the results may vary. | **Student Edition:**<br>617-620, 621-625, 628-632<br>*Inquiry Investigation* 626-627<br>*On Your Own Exercises* 633-637<br>**Teacher Guide:**<br>617B<br>A 619, 631; DU 618-620, 621-625, 628-631; T 620, 632 |