



WASHINGTON
Essential Academic Learning Requirements—Mathematics
Benchmark 2—Grade 7
Impact Mathematics: Algebra and More Course 1 © 2004

BENCHMARKS	PAGE REFERENCES
1. The student understands and applies the concepts and procedures of mathematics. To meet this standard, the student will:	
1.1 Understand and apply concepts and procedures from number sense.	
Number and Numeration	
Demonstrate understanding of integers, fractions, decimals, percents, place value of decimals, and properties of the rational number system using pictures and symbols.	SE: 96-98, 113-116, 128-131, 131-134, 134-136, 143-145, 227-229 <i>On Your Own Exercises</i> 137-140 <i>Explore</i> 142
Compare and order integers, fractions, and decimals.	SE: 99-101, 102-103, 120-122, 128-131, 143-145, 149, 236-239 <i>On Your Own Exercises</i> 124 #24-26, 146-147
Understand the concepts of prime and composite numbers, factors and multiples, and divisibility rules.	SE: 76-78, 79-81, 82-84, 85-87 <i>Lab Investigation</i> 88-89 <i>On Your Own Exercises</i> 90-95, 247 #48-50, 513 #59-64
Understand and apply the concepts of ratio and direct proportion.	The concept of proportion is used on the following pages SE: 100-102, 124-126, 195, 199, 205-206
Computation	
Understand operations on nonnegative rational numbers.	SE: 15-18, 19-22, 23-27, 198-201, 201-203, 204-206, 207-210, 210-212 <i>On Your Own Exercises</i> 213-219
Add, subtract, multiply, and divide nonnegative fractions and decimals using rules for order of operation.	SE: 157-160, 161-163, 172-174, 175-177, 185-188, 201-203, 204-206, 207-209, 210-212 <i>Lab Investigation</i> 164-165
Use mental arithmetic, pencil and paper, calculator, or computer as appropriate to the task involving nonnegative rational numbers.	SE: 104-105, 200 #1-7, 204-206 <i>Lab Investigation</i> 164-165, 324-326, 525-527 <i>Explore</i> 514
Estimation	
Identify situations involving nonnegative rational numbers in which estimation is sufficient and computation is not required.	SE: 482-485, 504-507, 522-524 <i>Explore</i> 514
Use estimation to predict computation results and to determine the reasonableness of answers involving nonnegative rational numbers, <i>for example, estimating a tip.</i>	SE: 104-105, 128-131, 215 #25-28, 233 <i>On Your Own Exercises</i> 189-190

BENCHMARKS	PAGE REFERENCES
1.2 Understand and apply concepts and procedures from measurement.	
Attributes and Dimensions	
Understand the concepts of and the relationships among perimeter, area, and volume and how changes in one dimension affect perimeter, area, and/or volume.	SE: 482-486, 486-489, 494-498, 498-501, 504-507, 514-517, 518-521 <i>On Your Own Exercises</i> 597 #29
Measure objects and events directly or using indirect methods <i>such as calculating and applying procedures for determining perimeter, area, and volume.</i>	SE: 482-486, 486-489, 490-493, 494-498, 498-503, 514-517, 518-521, 522-524 <i>Explore</i> 514 <i>Lab Investigation</i> 525-527
Understand the concept of rate and how to calculate rates and determine units.	SE: 429 #21, 582 #19, 583 #22, 596 #22
Approximation and Precision	
Understand that precision is related to the unit of measurement used and the calibration of the measurement tool.	SE: 306-310, 467-471
Know when to estimate and use estimation to obtain reasonable approximations, <i>for example, estimating the length and width of the playground to approximate its area.</i>	SE: 482-486, 486-489, 522-524 <i>Think & Discuss</i> 482 <i>On Your Own Exercises</i> 490-493 <i>Explore</i> 514
Systems and Tools	
Understand the appropriate uses of standard units of measurement for both direct and indirect measurement.	SE: 466-471, 472-476, 477-481, 536-539, 540-543, 544-550
Understand the relationship among units within both the U.S. and metric systems.	SE: 17-18, 117-119 <i>On Your Own Exercises</i> 111 #52-55, 123 #12-21, 141 #54-57
Select and use tools that will provide an appropriate degree of precision, <i>for example, using meters vs. kilometer.</i>	SE: 17-18, 117-119, 470-471, 486-489, 495-497 <i>Lab Investigation</i> 58-60, 525-526
1.3. Understand and apply concepts and procedures from geometric sense—properties and relationships and locations and transformations.	
Properties and Relationships.	
Use the properties and relationships of plane geometry to describe shapes and figures, <i>including angles, degrees in a circle, triangles, isosceles, equilateral, or quadrilateral.</i>	SE: 42-46, 46-49, 50-53, 54-57, 61-68, 466-471, 472-476 <i>Lab Investigation</i> 58-60 <i>On Your Own Exercises</i> 61-68
Identify, describe, or draw objects in the surrounding environment in geometric terms, <i>for example, producing a simple scale drawing of a classroom.</i>	SE: 470-471, 474-476, 482-486, 486-489 <i>On Your Own Exercises</i> 490-493
Understand symmetry, congruence, and similarity.	SE: 42-46, 46-49, 50-54, 54-57, 466-471 <i>Lab Investigation</i> 58-60 <i>On Your Own Exercises</i> 61-68
Perform geometric constructions using a variety of tools and technologies <i>such as paper folding, computer software, straightedge, compass.</i>	SE: 467-471, 477-480, 486-489, 495-497 <i>Lab Investigation</i> 58-60 <i>Explore</i> 494 <i>On Your Own Exercises</i> 513 #69-72

BENCHMARKS	PAGE REFERENCES
Locations and Transformations.	
Identify and describe location of objects on coordinate grids in any of the four quadrants.	SE: 302-305 <i>On Your Own Exercises</i> 311-312, 619 #31
Understand and apply simple geometric transformations using combinations of translations (slides), or reflections (flips), or rotations (turns).	SE: 50-51, 62 #9
1.4. Understand and apply concepts and procedures from probability and statistics.	
Probability	
Know how to calculate numerical measures of chance for simple events.	SE: 604-607, 608-612, 621-622, 623-624, 624-625, 626-630 <i>Lab Investigation</i> 613-614 <i>On Your Own Exercises</i> 615-618, 631-636
Understand procedures for counting outcomes to determine probabilities.	SE: 604-607, 608-612, 621-622, 623-624, 624-625, 626-630 <i>Share & Summarize</i> 607 <i>Lab Investigation</i> 613-614 <i>On Your Own Exercises</i> 615-618, 631-636
Know how to conduct experiments and simulations and to compare results with mathematical expectations.	SE: 604-607, 608-612, 626-630, 638-642, 643-645, 646-650 <i>Lab Investigation</i> 613-614 <i>On Your Own Exercises</i> 615-618
Statistics	
Collect a random sample of data that represents a described population.	SE: 224, 362-365, 390-393, 394-395
Organize and display data in appropriate forms such as frequency tables, circle graphs, and stem-and-leaf plots.	SE: 230-233, 278-282, 282-291, 346-349, 350-352, 362-365, 366-369 <i>Share & Summarize</i> 291 <i>On Your Own Exercises</i> 380-388 <i>Review and Self-Assessment</i> 402-407
Calculate and appropriately use range and measures of central tendency to describe data.	SE: 362-365, 366-369, 370-372, 373-376, 394-395 <i>On Your Own Exercises</i> 380-388 <i>Lab Investigation</i> 396-398
Identify how statistics can be used to support different points of view.	SE: 346-349, 377-379, 390-393 <i>On Your Own Exercises</i> 353-360, 399-401
Prediction and Inference	
Predict outcomes of experiments and simulations and compare the predictions to experimental results.	SE: 605-607, 608-612, 621-622, 623-624, 624-625, 626-630, 639-642, 643-645 <i>Lab Investigation</i> 613-614 <i>On Your Own Exercises</i> 615-618, 631-636
Understand and make inferences based on analysis of experimental results, statistical data, and simple graphical representations.	SE: 320-323, 621-622, 623-625, 626-630, 643-645 <i>On Your Own Exercises</i> 646-650
1.5 Understand and apply concepts and procedures from algebraic sense.	
Patterns	
Recognize, extend, and create patterns and sequences.	SE: 4-9, 10-12, 14-18, 32-35, 36-41, 42-45, 410-413

BENCHMARKS	PAGE REFERENCES
Represent and describe patterns with tables, graphs, and rule.	SE: 4-9, 14-18, 28-31, 32-35, 42-45, 134-136, 410-413, 414-418, 419-421 <i>On Your Own Exercises</i> 422-429
Representations	
Represent equalities and inequalities symbolically using =, >, <, ≤, ≥.	SE: 559-562 <i>On Your Own Exercises</i> 565 #4-9, 589 #26-31
Use variables to write simple expressions, equations, and inequalities, for example, $3x > 18$.	SE: 436-439, 439-442, 451-454, 455-456, 559-560, 560-562 <i>On Your Own Exercises</i> 565-569
Operations	
Evaluate expressions and formulas.	SE: 19-22, 25 #7-14, 422-428, 439-442, 484, 488, 497, 517, 519, 522-523
Solve single-variable equations.	SE: 558-560, 560-562, 570-573, 574-578 <i>Lab Investigation</i> 563-564 <i>On Your Own Exercises</i> 565-569
2. The student uses mathematics to define and solve problems. To meet this standard, the student will:	
2.1 Investigate situations.	
Search systematically for patterns in simple situations.	SE: 4-9, 14-18, 28-31, 32-35, 42-45, 134-136, 410-413, 414-418, 419-421 <i>On Your Own Exercises</i> 422-429
Develop and use a variety of strategies and approaches.	SE: 316-318, 343-345, 419-421, 571-573, 575-578, 586-591, 592-593, 594-597
Identify missing or extraneous information.	SE: 560-562, 576-578, 579-584, 586-591 <i>Lab Investigation</i> 563-564
Recognize the need to modify or abandon an unproductive approach.	SE: 592-593, 600 #9-10 <i>Lab Investigation</i> 433-435
2.2 Formulate questions and define the problem.	
Identify questions to be answered in new situations.	SE: 343-345, 592-593 <i>On Your Own Exercises</i> 594-597
Define problems in new situations.	SE: 343-345, 592-593 <i>On Your Own Exercises</i> 594-597
Identify the known and unknown in new situations.	SE: 343-345, 560-562, 592-593 <i>On Your Own Exercises</i> 594-597
2.3 Construct solutions.	
Organize relevant information from multiple sources.	SE: 377-379, 390-393, 394-395 <i>On Your Own Exercises</i> 380-388, 399-401
Select and use appropriate mathematical tools.	SE: 200, 201-203, 466-471 <i>Lab Investigation</i> 324-326, 396-398
Apply viable strategies and appropriate concepts and procedures to construct a solution.	SE: 390-393, 394-395, 419-421, 436-438, 450-454 <i>Think & Discuss</i> 173 <i>Lab Investigation</i> 433-435

BENCHMARKS	PAGE REFERENCES
3. The student uses mathematical reasoning. To meet this standard, the student will:	
3.1 Analyze information.	
Compare, contrast, and interpret information from a variety of sources.	SE: 278-282, 282-291, 327-334 <i>Share & Summarize</i> 291 <i>Lab Investigation</i> 324-326
Validate thinking and mathematical ideas using models, known facts, patterns, relationships, and counter-examples.	SE: 14-18, 410-414, 414-418 <i>On Your Own Exercises</i> 23-27, 422-429
3.2 Predict results.	
Make conjectures based on analysis of new problem situations.	SE: 320-323, 377-379 <i>Lab Investigation</i> 396-397 <i>On Your Own Exercises</i> 399-401
3.3 Draw conclusions and verify results.	
Test conjectures and explain why they are true or false.	SE: 320-323, 391-393, 394-395 <i>Lab Investigation</i> 396-397
Support arguments and justify results using evidence.	SE: 391-393, 394-395 <i>Share & Summarize</i> 320 <i>Lab Investigation</i> 396-397 <i>On Your Own Exercises</i> 399-401
Check for reasonableness of results.	SE: 104-105, 128-131, 320-323, 504-507 <i>Lab Investigation</i> 324-326 <i>Share & Summarize</i> 439, 630 #3b
Reflect on and evaluate procedures and results in new problem situations.	SE: 316-318, 319-320, 343-345, 346-349 <i>Lab Investigation</i> 268-269, 525-527
4. The student communicates knowledge and understanding in both everyday and mathematical language. To meet this standard, the student will:	
4.1 Gather information.	
Develop and follow a plan for collecting information.	SE: 230, 350-352, 390-393, 394-395 <i>Lab Investigation</i> 396-398 <i>On Your Own Exercises</i> 399-401
Use reading, listening, and observation to access and extract mathematical information from multiple sources <i>such as pictures, diagrams, physical models, oral narratives, and symbolic representations.</i>	SE: 278-282, 343-345, 346-349, 430-432, 436-439 <i>Lab Investigation</i> 433-435
Choose appropriate available technology to browse, select, and retrieve relevant mathematical information from a variety of sources.	SE: 200, 201-203, 631 #3 <i>Lab Investigation</i> 164-165, 324-326, 396-398, 525-527
4.2 Organize and interpret information.	
Organize and clarify mathematical information by reflecting, verbalizing, discussing, or writing.	SE: <i>Share & Summarize</i> 291, 486, 498, 630 <i>On Your Own Exercises</i> 292-299, 423 #5b

BENCHMARKS	PAGE REFERENCES
4.3 Represent and share information.	
Clearly and effectively express or present ideas and situations using both everyday and mathematical language <i>such as models, tables, charts, graphs, written reflection, or algebraic notation.</i>	SE: 200, 201-203, 403-407, 466-471 <i>Share & Summarize</i> 291, 305, 486, 498, 630 <i>On Your Own Exercises</i> 292-299, 423 #5b <i>Lab Investigation</i> 324-326, 396-398 <i>Think & Discuss</i> 486
Explain or represent mathematical ideas and information in ways appropriate for audience and purpose.	SE: 230-233 <i>Share & Summarize</i> 236, 345, 349
5. The student understands how mathematical ideas connect within mathematics, other subject areas, and real-life situations. To meet this standard, the student will:	
5.1 Relate concepts and procedures within mathematics.	
Relate and use conceptual and procedural understandings among a variety of mathematical content areas.	SE: 143-145, 370-372 <i>Explore</i> 142, 182 <i>Think & Discuss</i> 162
Relate and use different mathematical models and representations of the same situation.	SE: 154-157, 182, 230, 377-379 <i>Example</i> 159
5.2 Relate mathematical concepts and procedures to other disciplines.	
Identify mathematical patterns and ideas in other disciplines.	SE: 2-3, 5-9 <i>On Your Own Exercises</i> 123-126, 327-334, 565-569
Use mathematical thinking and modeling in other disciplines.	SE: 346-349 <i>On Your Own Exercises</i> 213-219, 327-334, 569 #32
Describe examples of contributions to the development of mathematics <i>such as the contributions of women, men, and different cultures.</i>	SE: 2-3, 5-9 <i>Just the Facts</i> 8, 468 <i>On Your Own Exercises</i> 92 #31
5.3 Relate mathematical concepts and procedures to real-life situations.	
Recognize the widespread use of mathematics in daily life and the extensive use of mathematics outside the classroom, <i>for example, in banking or sports statistics.</i>	SE: 121 <i>Think & Discuss</i> 210, 226 <i>On Your Own Exercises</i> 241-246, 327-334, 380-388 <i>Explore</i> 342 <i>Lab Investigation</i> 563-564
Investigate the use of mathematics within several occupations/careers of interest.	SE: 343-345 <i>On Your Own Exercises</i> 270 #18, 299 #15, 329 #4 <i>Explore</i> 342