WASHINGTON
Essential Academic Learning Requirements—Mathematics
Benchmark 2—Grade 7
Mathematics: Applications and Concepts Course 2 © 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: 106-107, 210, 216-217 *Hands-On Mini Lab* 207, 264 *Prerequisite Skills* 555 *When* 254 TWE: A 108 *Reading to Learn Mathematics* 106, 207
Compare and order integers, fractions, and decimals.	SE: 109-111, 115 #47-#50, 227-231 TWE: A 111 IE 110, 228 *Practice: Skills* 111, 231 *Practice: Word Problems* 111, 231 *Study Guide and Intervention* 11, 231
Understand the concepts of prime and composite numbers, factors and multiples, and divisibility rules.	SE: 197-200, 206 #35-#37, 224-226 *Hands-On Lab* 196 TWE: A 200 B 197 DI 198 *Study Guide and Intervention* 200
Understand and apply the concepts of ratio and direct proportion.	SE: 216, 288-291, 295 #31, 297-300, 308 #30 *Hands-On Lab* 301 TWE: DI 289, 298 IE 289 *Practice: Word Problems* 291
Computation	
Understand operations on nonnegative rational numbers.	SE: 30-31, 120, 134, 138 *Study Skill* 125 TWE: A 33 IE 31 *Practice: Skills* 33 *Study Guide and Intervention* 33
Add, subtract, multiply, and divide nonnegative fractions and decimals using rules for order of operation.	SE: 244-247, 248-251, 254-257, 258-261, 264-266 *Prerequisite Skills* 559 *Problem-Solving Strategy* 252-253 *Practice: Skills* 247, 251, 257

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Use mental arithmetic, pencil and paper, calculator, or computer as appropriate to the task involving nonnegative rational numbers.	SE: 121 Examples 3-4, 122 #1 *Hands-On Lab* 126-127 *Hands-On Mini Lab* 128, 134, 138 *Problem-Solving Strategy* 132-133 *The Game Zone* 263 TWE: DI 121 IE 135 *Practice: Skills* 131, 141
Estimation	
Identify situations involving nonnegative rational numbers in which estimation is sufficient and computation is not required.	SE: 241 Examples 3-5, 242 #2 *Problem-Solving Strategy* 338-339 *When* 334 TWE: DI 241, 335
Use estimation to predict computation results and to determine the reasonableness of answers involving nonnegative rational numbers, *for example, estimating a tip*.	SE: 241 Examples 3-5, 242 #4-#9, 334-337, 339 #4-#5, 446 Example 2, #3, 475 Example 1 *Hands-On Mini Lab* 475 TWE: IE 338 *Practice: Skills* 337 *Practice: Word Problems* 243, 337
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: 271, 272 #1, #21, 273 #29, 485 #22, 495 #31, 527 #28 *Hands-On Lab* 274, 488, 536-537 *Spreadsheet Investigation* 523 TWE: DI 493
Measure objects and events directly or using indirect methods *such as calculating and applying procedures for determining perimeter, area, and volume.*	SE: 245 #28, 422 #5-#17, 423 Examples 3-4, 431 #24, 437 #45, 441 Example 2, 447 Example 3, 480 Example 3, 493-495 *Hands-On Lab* 478
Understand the concept of rate and how to calculate rates and determine units.	SE: 161 Example 3, 292-295, 477 #32 *Hands-On Lab* 296 TWE: A 295 DI 293 IE 293 *Practice: Skills* 295 *Practice: Word Problems* 295 *Reading to Learn Mathematics* 292 *Study Guide and Intervention* 295
Approximation and Precision	
Understand that precision is related to the unit of measurement used and the calibration of the measurement tool.	SE: 542-545 TWE: A 545 DI 543 IE 543 PA 544 *Practice: Skills* 545 *Practice: Word Problems* 545 *Reading to Learn Mathematics* 542 *Study Guide and Intervention* 545

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Know when to estimate and use estimation to obtain reasonable approximations, *for example, estimating the length and width of the playground to approximate its area.*	SE: 242 #10, 243 #37-#38, 336 #14, 337 #33-#34, #37 TWE: DI 338 *Problem-Solving Strategy* 338-339 *When* 240, 334
Systems and Tools	
Understand the appropriate uses of standard units of measurement for both direct and indirect measurement.	SE: 441 Example 2, 442 #5, #10, 443 #13-#14, #19, 472 #34-#36, 479 Example 1, 490 Example 3, 495 #25 *Problem-Solving Strategy* 496 TWE: IE 441 *Practice: Word Problems* 473
Understand the relationship among units within both the U.S. and metric systems.	SE: 38-41, 267-269 TWE: DI 39 IE 39 *Practice: Word Problems* 41
Select and use tools that will provide an appropriate degree of precision, *for example, using meters vs. kilometer.*	SE: 44 Example 3, 45 #44 *Hands-On Mini Lab* 38 *Study Skill* 42 TWE: DI 39
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, *including angles, degrees in a circle, triangles, isosceles, equilateral, or quadrilateral*.	SE: 270, 413, 428-429, 435, 440, 483, 489, 493, 520, 524
Identify, describe, or draw objects in the surrounding environment in geometric terms, *for example, producing a simple scale drawing of a classroom.*	SE: 458 #1, 484 #2, 491 #2, 494 #1, 516 #17-#20, 517 #23 *Hands-On Lab* 536-537 *Hands-On Mini Lab* 524 *Spreadsheet Investigation* 309 TWE: DI 304 *Practice: Word Problems* 517
Understand symmetry, congruence, and similarity.	SE: 291 #34-#36, 304-308, 422, 425 #27, 429 Examples 3-4, 456 TWE: B 456 DI 304 IE 305-306
Perform geometric constructions using a variety of tools and technologies *such as paper folding, computer software, straightedge, compass.*	SE: 516 #17-#20 *Hands-On Lab* 512-513, 530-531 *Hands-On Mini Lab* 532, 538 *Problem-Solving Strategy* 518-519 TWE: DI 441

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Locations and Transformations.	
Identify and describe location of objects on coordinate grids in any of the four quadrants.	SE: 451 Example 1, 452 Example 2, 453 #3, #6-#9, 457 Examples 4-5, 458 #11-#14 *Hands-On Lab* 460-461 *Spreadsheet Investigation* 455 *Practice: Skills* 459 *Practice: Word Problems* 459
Understand and apply simple geometric transformations using combinations of translations (slides), or reflections (flips), or rotations (turns).	SE: 451-454, 456-459 *Hands-On Lab* 460-461 *Spreadsheet Investigation* 455 TWE: A 450, 459 IE 452, 457
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: 370-373, 375 Example 3, 376 #16-#17, 395 #5-#10 TWE: A 373 IE 371
Understand procedures for counting outcomes to determine probabilities.	SE: 374-377, 378-380, 381-383, 387-390 *Hands-On Lab* 386 TWE: IE 379 *Practice: Skills* 377, 383 *Practice: Word Problems* 377, 383
Know how to conduct experiments and simulations and to compare results with mathematical expectations.	SE: 393-396 *Hands-On Lab* 397 *Hands-On Mini Lab* 393 *Problem-Solving Strategy* 391-392 TWE: DI 371
Statistics	
Collect a random sample of data that represents a described population.	SE: *Hands-On Lab* 397 *Hands-On Mini Lab* 60 TWE: A 59 B 64 DI 371
Organize and display data in appropriate forms *such as frequency tables, circle graphs, and stem-and-leaf plots.*	SE: 54-55 Examples 1-2, 56-57, 64-68, 80-83, 85-89 *Graphing Calculator Investigation* 84 *Problem-Solving Strategy* 58-59 *When* 54
Calculate and appropriately use range and measures of central tendency to describe data.	SE: 69-72, 79 #26-#28 *Hands-On Lab* 73 *Study Guide and Review* 97 #16-#19 TWE: B 69 DI 69 IE 70 *Practice: Skills* 72 *Practice: Word Problems* 72 *Study Guide and Intervention* 72

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Identify how statistics can be used to support different points of view.	SE: 92-95 *Study Guide and Review* 98 #30 TWE: A 95 B 92 DI 92 IE 93 *Practice: Skills* 95 *Practice: Word Problems* 95 *Study Guide and Intervention* 95
Prediction and Inference	
Predict outcomes of experiments and simulations and compare the predictions to experimental results.	SE: 393-396 *Hands-On Lab* 397 *Hands-On Mini Lab* 393 *Problem-Solving Strategy* 391-392 TWE: DI 371
Understand and make inferences based on analysis of experimental results, statistical data, and simple graphical representations.	SE: 55 Example 3, 57 #19, 60-63, 81 Example 2, 393-396 *Hands-On Lab* 397 *Problem-Solving Strategy* 391 TWE: DI 59 IE 61
1.5 Understand and apply concepts and procedures from algebraic sense.	
Patterns	
Recognize, extend, and create patterns and sequences.	SE: 8 Example 2, #5, 9 #9, 12 #40, 34-36 *Hands-On Lab* 37 *Hands-On Mini Lab* 18 *When* 10 TWE: A 36 DI 35
Represent and describe patterns with tables, graphs, and rule.	SE: 20 #39, 21 #43-#44, 33 #49, 36 #26, 177-181 *Hands-On Lab* 37 TWE: IE 178 *Practice: Word Problems* 21
Representations	
Represent equalities and inequalities symbolically using =, >, <, ≤, ≥.	SE: 10, 12 #42-#47, 31, 32 #29, 160-163, 166-169, 172-175, 178, 210 Examples 1-2 TWE: B 172
Use variables to write simple expressions, equations, and inequalities, for example, 3x > 18.	SE: 150-152, 158 Example 3, 159 #42, 258-261, 276 Example 2 TWE: A 152 IE 151, 173 *Reading to Learn Mathematics* 150

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Operations	
Evaluate expressions and formulas.	SE: 14-17, 18-21, 30-33 *Problem-Solving Strategy* 22-23 TWE: A 21 IE 15, 19 *Practice: Skills* 21 *Practice: Word Problems* 21 *Study Guide and Intervention* 21
Solve single-variable equations.	SE: 24-29, 156-159, 160-163, 198-169 *Hands-On Lab* 154-155 TWE: A 27 DI 25 IE 25 *Practice: Skills* 27 *Practice: Word Problems* 27 *Study Guide and Intervention* 27
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: 34-36, 41 #47-#50, 45 #50, 48 #44-#47, 50 #7, 51 #17 *Hands-On Lab* 37 TWE: A 36 B 34 DI 35
Develop and use a variety of strategies and approaches.	SE: *Problem-Solving Strategy* 22-23, 58-59, 132-133, 164-165, 201-202, 252-253, 302-303, 444-445, 496-497, 518-519
Identify missing or extraneous information.	SE: *Problem-Solving Strategy* 338-339
Recognize the need to modify or abandon an unproductive approach.	SE: *Problem-Solving Strategy* 252-253
2.2 Formulate questions and define the problem.	
Identify questions to be answered in new situations.	SE: 6-8 TWE: B 6
Define problems in new situations.	SE: 6-8, 50 #1
Identify the known and unknown in new situations.	SE: 6-8
2.3 Construct solutions.	
Organize relevant information from multiple sources.	SE: *Problem-Solving Strategy* 201-202 *WebQuest* 3, 103, 193, 285, 409
Select and use appropriate mathematical tools.	SE: 6-8, 50 #1 TWE: DI 7
Apply viable strategies and appropriate concepts and procedures to construct a solution.	SE: *Problem-Solving Strategy* 22-23, 58-59, 132-133, 164-165, 201-202, 252-253, 302-303, 444-445, 496-497, 518-519

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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: *Problem-Solving Strategy* 201-202 *WebQuest* 3, 103, 193, 285, 409
Validate thinking and mathematical ideas using models, known facts, patterns, relationships, and counter-examples.	SE: 87 #2, 119 #3, 127 #3, 176 #4 *Hands-On Lab* 154-155
3.2 Predict results.	
Make conjectures based on analysis of new problem situations.	SE: 119 #3, 127 #3, 155 #5, 176 #4, 274 #6, 296 #5, 322 #4, 386 #5 *Problem-Solving Strategy* 22-23 TWE: DI 22
3.3 Draw conclusions and verify results.	
Test conjectures and explain why they are true or false.	SE: 37 #5, 119 #3, 127 #3
Support arguments and justify results using evidence.	SE: 37 #5, 73 #1, 119 #3, 127 #3
Check for reasonableness of results.	SE: *Problem-Solving Strategy* 338-339
Reflect on and evaluate procedures and results in new problem situations.	SE: *Problem-Solving Strategy* 252-253, 496-497
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: *Problem-Solving Strategy* 201-202 *WebQuest* 3, 103, 193, 285, 409
Use reading, listening, and observation to access and extract mathematical information from multiple sources *such as pictures, diagrams, physical models, oral narratives, and symbolic representations.*	SE: *Problem-Solving Strategy* 201-202 *WebQuest* 3, 103, 193, 285, 409
Choose appropriate available technology to browse, select, and retrieve relevant mathematical information from a variety of sources.	SE: *Problem-Solving Strategy* 201-202 *WebQuest* 3, 103, 193, 285, 409
4.2 Organize and interpret information.	
Organize and clarify mathematical information by reflecting, verbalizing, discussing, or writing.	SE: *Problem-Solving Strategy* 201-202 *WebQuest* 3, 103, 193, 285, 409
4.3 Represent and share information.	
Clearly and effectively express or present ideas and situations using both everyday and mathematical language *such as models, tables, charts, graphs, written reflection, or algebraic notation*.	SE: 26 #1, 35 #1-#2, 78 #1, 136 #1, 140 #2 TWE: A 9, 23, 33, 111, 137
Explain or represent mathematical ideas and information in ways appropriate for audience and purpose.	SE: 11 #1, 35 #1-#2, 82 #1, 107 #1, 130 #1 TWE: A 27, 68, 111, 141 DI 66

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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.	TWE: BPK 52C, 104C, 148C, 194C, 238C, 286C, 332C, 368C, 410C, 468C
Relate and use different mathematical models and representations of the same situation.	TWE: A 21, 33, 137, 169, 219, 231, 266, 291, 343, 473
5.2 Relate mathematical concepts and procedures to other disciplines.	
Identify mathematical patterns and ideas in other disciplines.	SE: 45 #42-#43, 59 #3-#4, 133 #9, 141 #49 *Real-Life Math* 31, 122, 221, 245, 471, 490
Use mathematical thinking and modeling in other disciplines.	SE: 45 #42-#43, 59 #3-#4, 133 #9, 141 #49 *Real-Life Math* 31, 122, 221, 245, 471, 490
Describe examples of contributions to the development of mathematics *such as the contributions of women, men, and different cultures.*	SE: 10 TWE: MLA 409
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*, for example, in banking or sports statistics*.	SE: *Real-Life Math* 7, 15, 70, 151, 161, 204, 228, 248, 371, 382
Investigate the use of mathematics within several occupations/careers of interest.	SE: *Real-Life Careers* 19, 77, 113, 208, 249, 298, 351, 394, 448, 480

Codes Used for TWE Pages

A	Assess
B	Bellringer
BPK	Building on Prior Knowledge
DI	Daily Intervention
IE	In-Class Examples
MLA	Math and Language Arts
PA	Practice/Apply