



**WASHINGTON**  
**Essential Academic Learning Requirements—Mathematics**  
**Benchmark 2—Grade 7**  
***Mathematics: Applications and Concepts Course 1* © 2004**

BENCHMARKS	PAGE REFERENCES
<b>1. The student understands and applies the concepts and procedures of mathematics.</b> To meet this standard, the student will:	
<b>1.1 Understand and apply concepts and procedures from number sense.</b>	
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: 102-105, 202-203, 294-298, 333-336, 395-397, 586 TWE: A 105, 397 DI 410 TNT 220
Compare and order integers, fractions, and decimals.	SE: 108-110, 114 #14, 127 #10-13, 129 #13-14, 198-201, 295-297 TWE: A 110 B 111 DI 108
Understand the concepts of prime and composite numbers, factors and multiples, and divisibility rules.	SE: 10-13, 14-17, 27 #46, 47 #26, 147 #41, 177-180, 189 #59-62, 194-197 TWE: B 14 DI 11 ICE 11, 15
Understand and apply the concepts of ratio and direct proportion.	SE: 380-383, 386-389, 391-393, 418, 419, 422 #5-6, 423 #21 <i>Spreadsheet Investigation</i> 39D TWE: DI 391 ICE 381
Computation	
Understand operations on nonnegative rational numbers.	SE: 24-27, 28-31, 44 #32-37, 46 #8-9, 131 #17, 214 #2, 252 #2 <i>Problem Solving Strategy</i> 125-126 TWE: A 27, 38 DI 25 ICE 25
Add, subtract, multiply, and divide nonnegative fractions and decimals using rules for order of operation.	SE: 123 #27-30, 143 #22-25
Use mental arithmetic, pencil and paper, calculator, or computer as appropriate to the task involving nonnegative rational numbers.	SE: 8 (e.g. 2), 136 (e.g. 5), 206-207 (e.g. #1, #2), 275 #45 <i>Study Tip</i> 19, 236, 404, 409

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<b>Estimation</b>	
Identify situations involving nonnegative rational numbers in which estimation is sufficient and computation is not required.	SE: 6, 116-119, 130 #8, 416 (e.g. 3) <i>Problem Solving Strategy</i> 125-126 <i>Web Quest</i> 3 TWE: A 258 B 116, 125 ICE 117
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: 7, 116-119, 154 #37, 416-417 <i>Problem Solving Strategy</i> 125-126, 156-157 TWE: B 16, 142 DI 125
<b>1.2 Understand and apply concepts and procedures from measurement.</b>	
<b>Attributes and Dimensions</b>	
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: 41 #21, 159 #2, 171 #16, 193 #8, 573 #24 <i>Hands-On Lab</i> 464 <i>Spreadsheet Investigation</i> 469 TWE: DI 40, 159 TNT 571
Measure objects and events directly or using indirect methods <i>such as calculating and applying procedures for determining perimeter, area, and volume.</i>	SE: 17 #53, 39-41, 47 #23, 158-160, 215 #9, 268 #18, 391-393 <i>Hands-On Lab</i> 394, 550 <i>Hands-On Mini Lab</i> 546, 575 TWE: B 158 DI 40, 158 TNT 571
Understand the concept of rate and how to calculate rates and determine units.	SE: 30 #46, 112 #10, 382 #20-23, 383 #28, 389 #32-33, 398 #5-6, 414 #10 TWE: A 155, 412
<b>Approximation and Precision</b>	
Understand that precision is related to the unit of measurement used and the calibration of the measurement tool.	SE: 21 #41, 215 #14, 318 #26, 363 (e.g. 3), 465-468, 470-473, 476-479, 502 #10 TWE: A 468 DI 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: 117 (e.g. 4), 257 #10, 375 #10, 554 #18-19 <i>Problem Solving Strategy</i> 125-126, 156-157 TWE: B 125 DI 156, 162 ICE 117
<b>Systems and Tools</b>	
Understand the appropriate uses of standard units of measurement for both direct and indirect measurement.	SE: 55 #10, 171 #11, 215 #14, 391-393, 465-468, 470-473, 476-479, 484-487 <i>Hands-On Lab</i> 474-475 TWE: A 468 DI 381

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Understand the relationship among units within both the U.S. and metric systems.	SE: 31 #49-50, 279 #42-43, 465-468, 470-473, 476-479, 484-487, 497 <i>Hands-On Mini Lab</i> 158, 219 <i>Problem Solving Strategy</i> 126 #12
Select and use tools that will provide an appropriate degree of precision, <i>for example, using meters vs. kilometer.</i>	SE: 21 #41, 264 #45, 363 (e.g. 3), 465-468, 470-473, 501 #25 <i>Hands-On Lab</i> 474-475, 480-481 <i>Hands-On Mini Lab</i> 165 TWE: B 465 DI 145, 471 ICE 145
<b>1.3. Understand and apply concepts and procedures from geometric sense—properties and relationships and locations and transformations.</b>	
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: 504, 506-509 <i>Hands-On Lab</i> 513-514, 526-527 TWE: PS 541
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: 504, 544 <i>Hands-On Lab</i> 394 TWE: DI 391, 507 PC 504F PS 169, 581 TNT 507
Understand symmetry, congruence, and similarity.	SE: 504, 528-531, 534-536, 542 #8 <i>Hands-On Lab</i> 384-385, 394, 513-514 TWE: A 531 B 534 DI 534 ICE 535
Perform geometric constructions using a variety of tools and technologies <i>such as paper folding, computer software, straightedge, compass.</i>	SE: 515-516 <i>Hands-On Lab</i> 384-385, 394, 513-514, 526-527 <i>Problem Solving Strategy</i> 520-521 TWE: PS 541, 581 TNT 507
Locations and Transformations.	
Identify and describe location of objects on coordinate grids in any of the four quadrants.	SE: 320-323, 326, 327 #21-22, 328 #10, 329 #17, #18, #20, 336 #48, 342 #47-49, 367-369, 372, 375 #16 TWE: DI 321 ICE 321 PS 327
Understand and apply simple geometric transformations using combinations of translations (slides), or reflections (flips), or rotations (turns).	SE: <i>Hands-On Lab</i> 532-533, 537

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<b>1.4. Understand and apply concepts and procedures from probability and statistics.</b>	
Probability	
Know how to calculate numerical measures of chance for simple events.	SE: 428-431, 450-453, 458-459 <i>Hands-On Lab 432</i> TWE: DI 433 PS 457
Understand procedures for counting outcomes to determine probabilities.	SE: 428-431, 433-436 TWE: ICE 434
Know how to conduct experiments and simulations and to compare results with mathematical expectations.	SE: 438-441 <i>The Game Zone 191, 443</i> <i>Hands-On Lab 426-427</i>
Statistics	
Collect a random sample of data that represents a described population.	SE: 48, 51 (e.g. 2), 438-441 <i>Web Quest 3, 97, 377</i> TWE: DI 51, 438 ICE 439 TNT 183
Organize and display data in appropriate forms such as frequency tables, circle graphs, and stem-and-leaf plots.	SE: 50-53, 56-59, 62-65, 72-75, 95 #11, 298 #53-55 <i>Problem Solving Strategy 54-55</i> TWE: A 53 ICE 51 PS 93
Calculate and appropriately use range and measures of central tendency to describe data.	SE: 76-78, 80-83, 88 #8-10, 95 #12-13, 297 #51 <i>Spreadsheet Investigation 79</i> TWE: ICE 77, 81 TT 79
Identify how statistics can be used to support different points of view.	SE: 53 #17-18, 86-89, 438-441 <i>Web Quest 97</i> TWE: DI 73 TT 79
Prediction and Inference	
Predict outcomes of experiments and simulations and compare the predictions to experimental results.	SE: 70 #8-9, 438-441, 455 <i>Hands-On Lab 426-427</i> <i>Web Quest 3, 97</i> TWE: B 66
Understand and make inferences based on analysis of experimental results, statistical data, and simple graphical representations.	SE: 48, 66-69, 75 #30-32, 86, 89 #11-12, 438-441 <i>Web Quest 3, 97, 291</i> TWE: DI 63, 73 PS 93
<b>1.5 Understand and apply concepts and procedures from algebraic sense.</b>	
Patterns	
Recognize, extend, and create patterns and sequences.	SE: 9 #7, 21 #42-47, 46 #2, 185 (ex. lesson), 197 #29, 282-284 <i>Problem Solving Strategy 280-281</i> TWE: A 284 DI 351

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Represent and describe patterns with tables, graphs, and rule.	SE: 13 #42, 47 #25, 66-69, 75 #30-32, 185 (ex. lesson), 193 #15, 194, 206 #16 TWE: B 66
<b>Representations</b>	
Represent equalities and inequalities symbolically using =, >, <, ≤, ≥.	SE: 37 (ex. lesson) and #40-43, 339-340 <i>Hands-On Lab</i> 354 TWE: A 354 B 515
Use variables to write simple expressions, equations, and inequalities, for example, $3x > 18$ .	SE: 28-31, 307 #30, 312 <i>Hands-On Lab</i> 337-338, 343, 354 TWE: DI 29
<b>Operations</b>	
Evaluate expressions and formulas.	SE: 28-31, 37 #45, 39-41, 44 #38-46, 122 (e.g. 5), 236 (e.g. 4), 263 #11, 307 #30, 318 #24-25, 412 #38-40
Solve single-variable equations.	SE: 34-37, 339-342, 344-347, 350-353 <i>Hands-On Lab</i> 337-338, 343 TWE: A 353 ICE 340, 345, 351
<b>2. The student uses mathematics to define and solve problems.</b> To meet this standard, the student will:	
<b>2.1 Investigate situations.</b>	
Search systematically for patterns in simple situations.	SE: 31 #52, 47 #25, 66-69, 185 (ex. lesson), 197 <i>Hands-On Lab</i> 384-385 <i>Problem Solving Strategy</i> 32-33, 280-281 <i>Spreadsheet Investigation</i> 165 TWE: B 66
Develop and use a variety of strategies and approaches.	SE: 56-59, 503 #21 <i>Hands-On Lab</i> 384-385 <i>Problem Solving Strategy</i> 32-33, 156-157, 226-227, 314-315, 358-359 TWE: B 56, 276
Identify missing or extraneous information.	SE: <i>Problem Solving Strategy</i> 32-33, 314-315, 358-359, 413-414 TWE: A 359 B 28, 32
Recognize the need to modify or abandon an unproductive approach.	SE: 89 #11 <i>Hands-On Lab</i> 384-385 <i>Problem Solving Strategy</i> 32-33, 156-157, 226-227, 280-281, 314-315 <i>Web Quest</i> 3, 97 TWE: A 227

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<b>2.2 Formulate questions and define the problem.</b>	
Identify questions to be answered in new situations.	SE: 48, 330, 544 <i>Problem Solving Strategy</i> 32-33, 156-157, 192-193 <i>Web Quest</i> 3, 97, 291, 377 TWE: A 41, 78, 138, 298 B 192 DI 32 PS 581
Define problems in new situations.	SE: 48, 330, 544 <i>Problem Solving Strategy</i> 32-33, 156-157 <i>Web Quest</i> 3, 97, 291, 377 TWE: A 41, 138, 298 PS 581
Identify the known and unknown in new situations.	SE: 48, 171 #16, 208 #4, 330, 544 <i>Problem Solving Strategy</i> 32-33, 156-157, 280-281 <i>Web Quest</i> 3, 97, 291, 377 TWE: A 41, 138, 298 DI 32 PS 581
<b>2.3 Construct solutions.</b>	
Organize relevant information from multiple sources.	SE: <i>Web Quest</i> 3, 97, 291, 377 TWE: A 59 DI 183, 294 MIC 291
Select and use appropriate mathematical tools.	SE: 89 #11 <i>The Game Zone</i> 309 <i>Hands-On Lab</i> 150-151, 218, 394, 474-475, 513-514 <i>Hands-On Mini Lab</i> 14, 161 <i>Spreadsheet Investigation</i> 165, 390 TWE: A 105, 189 B 10, 206 PS 541
Apply viable strategies and appropriate concepts and procedures to construct a solution.	SE: 116-119, 219-222, 329 #20, 375 #20, 503 #21 <i>Hands-On Lab</i> 426-427 <i>Hands-On Mini Lab</i> 272 <i>Problem Solving Strategy</i> 32-33, 54-55, 192-193, 520-521 <i>Study Skill</i> 38 <i>Web Quest</i> 3, 173 TWE: A 38, 119, 258 B 32 TNT 55, 334

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<b>3. The student uses mathematical reasoning.</b> To meet this standard, the student will:	
<b>3.1 Analyze information.</b>	
Compare, contrast, and interpret information from a variety of sources.	SE: <i>Hands-On Mini Lab</i> 438 <i>Problem Solving Strategy</i> 32-33, 54-55 <i>Web Quest</i> 3, 97, 173, 291, 377 TWE: DI 32, 57, 294 MIC 3, 291 TNT 183, 277
Validate thinking and mathematical ideas using models, known facts, patterns, relationships, and counter-examples.	SE: 16 #47, 47 #25, 81 (e.g. 3), 180 #31, 400, 524 #18-19 <i>Hands-On Lab</i> 360-361 <i>Hands-On Mini Lab</i> 450 <i>Problem Solving Strategy</i> 32-33, 280-281, 568-569 <i>Study Skill</i> 176 TWE: B 28, 66, 102, 194 DI 25 TNT 576
<b>3.2 Predict results.</b>	
Make conjectures based on analysis of new problem situations.	SE: 66-69 <i>Graphing Calculator Investigation</i> 84-85 <i>Hands-On Lab</i> 100-101, 106-107, 139-140, 181, 259-260, 338 <i>Hands-On Mini Lab</i> 144, 310
<b>3.3 Draw conclusions and verify results.</b>	
Test conjectures and explain why they are true or false.	SE: 67 #2, 171 #16 <i>Hands-On Lab</i> 134, 139-140, 218, 537 <i>Problem Solving Strategy</i> 32-33
Support arguments and justify results using evidence.	SE: 95 #14, 131 #17, 171 #16, 253 #17 <i>Graphing Calculator Investigation</i> 84-85 <i>Hands-On Lab</i> 150-151, 270-271, 432, 537 <i>Problem Solving Strategy</i> 32-33, 192-193 TWE: A 258
Check for reasonableness of results.	SE: 6-7, 253 #17 <i>Hands-On Lab</i> 407-408 <i>Problem Solving Strategy</i> 32-33, 156-157, 314-315 TWE: A 143, 157 TNT 491
Reflect on and evaluate procedures and results in new problem situations.	SE: 329 #20 <i>Hands-On Lab</i> 139-140, 270-271 <i>Hands-On Mini Lab</i> 28, 228 <i>Problem Solving Strategy</i> 413-414 <i>Study Skill</i> 120 TWE: A 38, 239 B 186 DI 25

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<b>4. The student communicates knowledge and understanding in both everyday and mathematical language.</b> To meet this standard, the student will:	
<b>4.1 Gather information.</b>	
Develop and follow a plan for collecting information.	SE: 6-9 <i>Web Quest</i> 3, 97, 173, 291, 461 TWE: A 9, 193 DI 7 TNT 145
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: <i>Web Quest</i> 3, 97, 173, 461 TWE: A 359 B 18, 102, 198 PC 48F, 132F, 292F TNT 220, 227, 334
Choose appropriate available technology to browse, select, and retrieve relevant mathematical information from a variety of sources.	SE: <i>Spreadsheet Investigation</i> 60-61, 79, 165, 469 <i>Web Quest</i> 3, 97, 173, 461
<b>4.2 Organize and interpret information.</b>	
Organize and clarify mathematical information by reflecting, verbalizing, discussing, or writing.	SE: <i>Spreadsheet Investigation</i> 60-61, 79 TWE: A 89, 143, 193 PC 48F, 132F, 378F, 504F
<b>4.3 Represent and share information.</b>	
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: <i>Study Skill</i> 38, 120 <i>Web Quest</i> 3, 97, 461 TWE: A 258 BWW 254D, 544D ELL 48G PC 48F, 544F PS 373, 457
Explain or represent mathematical ideas and information in ways appropriate for audience and purpose.	SE: <i>Study Skill</i> 120, 239 <i>Web Quest</i> 3, 97, 461 TWE: A 55, 157 BWW 544D DI 25, 63 PC 132F, 544F PS 373, 457
<b>5. The student understands how mathematical ideas connect within mathematics, other subject areas, and real-life situations.</b> To meet this standard, the student will:	
<b>5.1 Relate concepts and procedures within mathematics.</b>	
Relate and use conceptual and procedural understandings among a variety of mathematical content areas.	SE: 10-13, 39-41, 111-113, 198-201, 300-303, 333-336, 450-453, 506-509
Relate and use different mathematical models and representations of the same situation.	SE: 56-59, 300-301, 366 <i>Hands-On Lab</i> 60-61, 150-151, 560-561 <i>Hands-On Mini Lab</i> 102 <i>Spreadsheet Investigation</i> 79 TWE: A 119

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<b>5.2 Relate mathematical concepts and procedures to other disciplines.</b>	
Identify mathematical patterns and ideas in other disciplines.	SE: 136 (e.g. 5) <i>Hands-On Lab</i> 280-281, 384-385 <i>Web Quest</i> 3, 97, 173, 377 TWE: DI 236
Use mathematical thinking and modeling in other disciplines.	SE: 112 #10, 216, 318 #26, 391-393 <i>Hands-On Lab</i> 394 <i>Web Quest</i> 3, 97, 173, 377 TWE: DI 81, 236, 294 MIC 3, 173 PS 93, 581 TNT 277 TT 4D, 462D
Describe examples of contributions to the development of mathematics <i>such as the contributions of women, men, and different cultures.</i>	SE: <i>Hands-On Lab</i> 106-107 TWE: DI 36
<b>5.3 Relate mathematical concepts and procedures to real-life situations.</b>	
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: 98, 132, 216, 254, 292, 544 <i>Web Quest</i> 97, 377 TWE: DI 236, 314 ICS 330D MIC 3, 97, 173 PS 45, 93, 421
Investigate the use of mathematics within several occupations/careers of interest.	SE: 48, 544 <i>Real Life</i> 19, 81, 142, 183, 220, 277, 311, 523 TWE: DI 236 ICS 132D, 216D, 330D

### Codes Used for TWE Pages

A	Assess
B	Bellringer
BWW	Building a Word Wall
DI	Daily Intervention
ELL	English Language Learner
ICE	In-Class Examples
ICS	In-Class Speaker
MIC	More Interdisciplinary Connections
PC	Project Criss
PS	Portfolio Suggestion
TNT	Tips for New Teachers
TT	Team Teaching