MARYLAND
Voluntary State Curriculum – Mathematics Grade 7
Mathematics: Applications and Concepts Course 2 © 2004

OBJECTIVES	PAGE REFERENCES
STANDARD 1.0 KNOWLEDGE OF ALGEBRA, PATTERNS, OR FUNCTIONS – Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships.	
A. Patterns and Functions	
1. Identify, describe, extend, and create linear patterns and functions a) Identify and extend an arithmetic sequence represented as a function table • **Assessment limit:** Complete a function table with a given rule with two operations (+, -, x) using whole numbers no more than 20 in the rule (0 – 500) b) Identify and extend a geometric sequence c) Describe how a change in one variable in a linear function affects the other variable in a table of values	SE: 34-36, 177-181, 272 #21, 276 #1 *Hands-On Lab* 37, 176 *Problem-Solving Strategy* 23 #7, 132-133 *Standard Test Practice* 51 #17 TWE: ICE 178-179 *Chapter 1 Resource Masters* pages 31-33 *Chapter 4 Resource Masters* page 213 *Chapter 6 Resource Masters* page 317

OBJECTIVES	PAGE REFERENCES
B. Expressions, Equations, and Inequalities	
1. Write and evaluate expressions a) Write an algebraic expression to represent unknown quantities • **Assessment limit:** Use one unknown and one or two operations (+, -, x, ÷ with no remainders) with whole numbers (0 – 20), fractions with denominators as factors of 100 (0- 20), or decimals with no more than three decimal places (0 – 20) b) Evaluate algebraic expressions • **Assessment limit:** Use one unknown and no more than two operations (+, -, x, ÷ with no remainders) with whole numbers (0 – 200), fractions with denominators as factors of 100 (0 – 100), or decimals with no more than three decimal places (0 – 100) c) Evaluate numeric expressions using the order of operations • **Assessment limit:** Use no more than 4 operations (+, -, x, ÷ with no remainders) and 1 set of parentheses, brackets, or a division bar, with whole numbers (0 – 200), fractions with denominators as factors of 100 (0 – 100), or decimals with no more than three decimal places (0 – 100) d) Simplify algebraic expressions represented as physical models by combining like terms	SE: 14-17, 18-21, 123 #46-#51, 150-152 *The Game Zone* 29 *Hands-On Lab* 118-119, 126-127 TWE: A 14, 21 ICE 19 *Chapter 1 Resource Masters* pages 11-13, 15 *Chapter 3 Resource Masters* pages 145-146 *Chapter 4 Resource Masters* page 187

OBJECTIVES	PAGE REFERENCES
2. Identify, write, solve, and apply equations and inequalities a) Write equations and inequalities to represent relationships • **Assessment limit:** Use a variable, the appropriate relational symbols (>, ≥, <, ≤, =), and one or two operational symbols (+, -, ×, ÷) on either side and use whole numbers (0 – 20), fractions with denominators as factors of 100 (0 – 20), or decimals with no more than three decimal places (0 – 20) b) Determine the unknown in a linear equation • **Assessment limit:** Use one or two operations (+, -, ×) and the unknown only once with whole numbers (0 – 500), fractions with denominators as factors of 100 (0 – 50), or decimals with no more than three decimal places (0 – 100) c) Solve for the unknown in an inequality • **Assessment limit:** Use an inequality with one variable with a positive whole number coefficient and one operation (+, -, ×, ÷ with no remainders) using whole numbers or decimals with no more than 2 decimal places (0 – 100) d) Identify or graph solutions of inequalities on a number line • **Assessment limit:** Use whole numbers (0 – 50) e) Identify equivalent equations • **Assessment limit:** Use formulas having no more than three variables and up to two operations, with whole numbers (0 –100), fractions with denominators as factors of 100 (0 – 100), or decimals with no more than three decimal places (0 – 100)	SE: 150-152, 156-159, 160-163, 166-169, 172-175 *Hands-On Lab* 154-155 *Study Skill* 153 TWE: DI 167 ICE 173 *Chapter 4 Resource Masters* pages 206-207
C. Numeric and Graphic Representations of Relationships	
1. Locate points on a number line and in a coordinate graph a) Graph rational numbers on a number line b) **Assessment limit:** Use rational numbers (-100 to 100) c) Graph ordered pairs in a coordinate plane d) **Assessment limit:** Use no more than 4 ordered pairs of rational numbers e) (-20 to 20) f) Graph linear equations with one operation in a coordinate plane	SE: 25 Example 2, 106-108, 112-115, 178-181 *The Game Zone* 117 TWE: ICE 113, 178-179 *Chapter 3 Resource Masters* page 130 *Chapter 3 Resource Masters* page 140 *Chapter 4 Resource Masters* page 210

OBJECTIVES	PAGE REFERENCES
2. Analyze linear relationships a) Identify and describe the change represented in a table of values • **Assessment limit:** Identify increase, decrease, or no change b) Describe the rate of change of a linear relationship by a table of values and a graph	SE: 159 #39, 177-181, 182-185 *Hands-On Lab* 176 TWE: A 181 B 182 ICE 178-179 *Chapter 4 Resource Masters* page 213 #3 *Chapter 4 Resource Masters* page 219
STANDARD 2.0 KNOWLEDGE OF GEOMETRY – Students will apply the properties of one-, two-, or three-dimensional geometric figures to describe, reason, or solve problems about shape, size, position, or motion of objects.	
A. Plane Geometric Figures	
1. Analyze the properties of plane geometric figures a) Identify and describe angles formed by intersecting lines, line segments, and rays • **Assessment limit:** Use vertical, adjacent, complementary, or supplementary angles (Include the angle symbol $<$m) b) Identify angles formed when two parallel lines are cut by a transversal c) Identify the parts of right triangles	SE: 413-415, 422-425, 428-431, 434-437, 446-449, 479 *Hands-On Lab* 426-427 TWE: A 431, 437 B 413 *Chapter 10 Resource Masters* pages 553-555
2. Analyze geometric relationships a) Determine a missing angle measure using the sum of the interior angles of polygons • **Assessment limit:** Use angle measures in a quadrilateral b) Determine the measure of angles formed by intersecting lines, line segments, and rays • **Assessment limit:** Use vertical, adjacent, complementary, or supplementary angles c) Describe the relationship between the legs and hypotenuse of right triangles	SE: 422-425, 428-431, 434-437, 446-450, 479-482 *Hands-On Lab* 426-427, 478 TWE: A 425 B 422 *Chapter 10 Resource Masters* page 564 #10-#15 *Chapter 11 Resource Masters* page 622 #6
C. Representation of Geometric Figures	
1. Represent plane geometric figures a) Construct geometric figures using a variety of construction tools • **Assessment limit:** Construct a circle using a given line segment as the radius in inches or centimeters b) Construct geometric figures using a variety of construction tools • **Assessment limit:** Construct a line segment congruent to a given line segment c) Construct geometric figures using a variety of construction tools • **Assessment limit:** Construct a perpendicular bisector to a given line segment or a bisector of a given angle	SE: 416-417 *Hands-On Lab* 426-427, 432-433 See *Mathematics: Applications and Concepts Course 3* page 271.

OBJECTIVES	PAGE REFERENCES
D. Congruence and Similarity	
1. Apply the properties of congruent polygons a) Determine the congruent parts of polygons • **Assessment limit:** Use the length of corresponding sides or the measure of corresponding angles and whole numbers (0 – 1000) b) Identify and describe similar polygons and their corresponding parts	SE: 440-443 TWE: B 440 DI 441 ICE 441 *Chapter 10 Resource Masters* pages 568-570
E. Transformations	
1. Analyze a transformation on a coordinate plane a) Identify, describe, and plot the results of one transformation on a coordinate plane • **Assessment limit:** Identify and plot the result of one translation (horizontal or vertical), reflection (horizontal or vertical), or rotation (90° or 180°) about a given point b) Identify and describe transformations that result in rotational and reflectional symmetry	SE: 451-454, 456-459 *Hands-On Lab* 460-461 *Spreadsheet Investigation* 455 TWE: B 451 DI 451 ICE 452, 457 *Chapter 10 Resource Masters* pages 578-581 *Chapter 10 Resource Masters* page 584
STANDARD 3.0 KNOWLEDGE OF MEASUREMENT – Students will identify attributes, units, or systems of measurements or apply a variety of techniques, formulas, tools or technology for determining measurements.	
C. Applications in Measurement	
1. Estimate and apply measurement formulas a) Estimate and determine the area of quadrilaterals b) **Assessment limit:** Use parallelograms or trapezoids and whole number dimensions (0 – 1000) c) Determine the surface area of geometric solids d) **Assessment limit:** Use rectangular prisms with whole number dimensions (0 – 1000) e) Estimate pi using physical models f) Estimate and determine the volume of a triangular prism	SE: 270-273, 483-485, 489-492, 532-535 *Hands-On Lab* 274, 488 TWE: DI 533 *Chapter 11 Resource Masters* page 638 *Chapter 12 Resource Masters* page 678 *Chapter 12 Resource Masters* pages 684-686
2. Analyze measurement relationships a) Determine a missing dimension for a figure using a scale b) **Assessment limit:** Use a polygon with no more than 8 sides using whole numbers (0 – 1000) c) Determine the distance between 2 points using a drawing and a scale d) **Assessment limit:** Use a scale of 1 cm: ?, ¼ inch: ?, ½ inch: ?, or ¾ inch: ? and whole numbers (0 – 1000)	SE: 304 Example 1, 306-307 #8-#12, 440-443 TWE: DI 441 ICE 441 *Chapter 7 Resource Masters* page 390 #1-#4 *Chapter 10 Resource Masters* pages 568-570

OBJECTIVES	PAGE REFERENCES
STANDARD 4.0 KNOWLEDGE OF STATISTICS – Students will collect, organize, display, analyze, or interpret data to make decisions or predictions.	
A. Data Displays	
1. Organize and display data a) Organize and display data using back-to-back stem & leaf plots • **Assessment limit:** Use no more than 20 data points using whole numbers (0 – 100) b) Organize and display data to make circle graphs	SE: 76-79, 418-421 TWE: DI 77, 418 ICE 77-78 *Chapter 2 Resource Masters* page 91 *Chapter 10 Resource Masters* pages 548-550
B. Data Analysis	
1. Analyze data a) Recognize misuses of data • **Assessment limit:** Use whether the choice of graphical display or the scale leads to faulty interpretation or representation of data b) Analyze misleading data representation	SE: 92-95 *Study Guide and Review* 98 (Misleading Statistics) TWE: B 92 DI 92 ICE 93 *Chapter 2 Resource Masters* pages 102-104
2. Describe a set of data a) Compare measures of central tendency (mean, median, mode) to determine which is most appropriate • **Assessment limit:** Use no more than 10 pieces of data using whole numbers or decimals with no more than 2 decimal places (0 – 100)	SE: 69-72 *Hands-On Lab* 73 TWE: ICE 70 #3 *Chapter 2 Resource Masters* pages 84-85
STANDARD 5.0 KNOWLEDGE OF PROBABILITY – Students will use experimental methods or theoretical reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.	
A. Sample Space	
1. Identify a sample space a) Determine the number of outcomes • **Assessment limit:** Use no more than 3 independent events with a sample space of no more than 6 outcomes in each event	SE: 374-377, 378-380 TWE: B 374, 378 ICE 375, 379 *Chapter 9 Resource Masters* pages 490-492 *Chapter 9 Resource Masters* pages 495-497
B. Theoretical Probability	
1. Determine the probability of one simple event comprised of equally likely outcomes a) Express the probability of an event as a fraction, a decimal, or a percent • **Assessment limit:** Use a sample space of no more than 35 outcomes	SE: 370-373 *Study Guide and Review* 402 (Simple Events) TWE: ICE 371 *Chapter 9 Resource Masters* pages 485-487

OBJECTIVES	PAGE REFERENCES
C. Experimental Probability	
1. Analyze the results of a survey or simulation a) Make predictions and express the probability of the results as a fraction, a decimal, and a percent with no more than 2 decimal places, or a percent • **Assessment limit:** Use results of 25 or 50	SE: 393-396 *Hands-On Lab* 397 *Problem-Solving Strategy* 391 TWE: B 391 DI 394 *Chapter 9 Resource Masters* pages 510-512
2. Conduct a probability experiment	SE: *Hands-On Lab* 397 *Hands-On Mini Lab* 393, 501 TWE: A 503 B 391 DI 371, 399 *Chapter 9 Resource Masters* page 514
3. Compare results of theoretical probability and experimental probability	SE: 394 Examples 2 and 3, 395 #3-#4 *Hands-On Mini Lab* 393 TWE: ICE 394 #3-#5 *Chapter 9 Resource Masters* pages 510-511
4. Describe the difference between theoretical and experimental probability	SE: 395 #1 *Hands-On Mini Lab* 393 TWE: A 395 B 393 *Chapter 9 Resource Masters* page 513 #6

OBJECTIVES	PAGE REFERENCES
STANDARD 6.0 KNOWLEDGE OF NUMBER RELATIONSHIPS OR COMPUTATION – Students will describe, represent, or apply numbers or their relationships or will estimate or compute using mental strategies, paper/pencil or technology.	
A. Knowledge of Number and Place Value	
1. Apply knowledge of rational numbers and place value a) Read, write, and represent whole numbers b) **Assessment limit:** Use exponential notation with bases no more than 12 and exponents no more than 3, or in standard form (0 – 1000) c) Express decimals using expanded form d) **Assessment limit:** Use decimals with no more than 4 decimal places (0 – 100) e) Determine equivalent forms of rational numbers expressed as fractions, decimal, percents, and ratios f) **Assessment limit:** Use positive rational numbers (0 – 100) g) Compare, order, and describe rational numbers with or without relational symbols (<, >, =) h) **Assessment limit:** Use no more than 4 fractions with denominators that are factors of 300 that are less than 101, decimals with no more than 4 decimal places, percents or integers (0 – 100) i) Express whole numbers and decimals in scientific notation	SE: 10-13, 43-45, 210-213, 216-219, 220-223, 227-231, 288-291, 555 TWE: A 45 *Chapter 1 Resource Masters* pages 6-8 *Chapter 5 Resource Masters* pages 258-260 *Chapter 7 Resource Masters* pages 375-377

OBJECTIVES	PAGE REFERENCES
C. Number Computation	
1. Analyze number relations and compute a) Add, subtract, multiply, and divide integers • **Assessment limit:** Use one operation (-100 to 100) b) Add, subtract, and multiply positive fractions and mixed numbers • **Assessment limit:** Use no more than 2 operations and positive fractions or mixed numbers with denominators as factors of 300 less than 101 (0 – 2000) c) Divide fractions and mixed numbers d) Calculate powers of integers and square roots of perfect square whole numbers • **Assessment limit:** Use no more than 3 exponents for integers (-10 to 20) or square roots of perfect square whole numbers (0 – 100) e) Use the laws of exponents to simplify expressions • **Assessment limit:** Use the rules of exponents (power times power or power divided by power) with the same whole number base (0 – 100) and exponents (0 – 10) f) Identify and use the properties of addition and multiplication to simplify expressions • **Assessment limit**: Use the commutative property of addition or multiplication, associative property of addition or multiplication, additive inverse property, the distributive property, or the identity property for one or zero with whole numbers (0 – 100) g) Determine percent of a number	SE: 10-13, 30-33, 120-124, 128-131, 134-137, 138-141, 244-247, 248-251, 254-257, 264-266, 470-473 *Chapter 1 Resource Masters* pages 6-7 *Chapter 3 Resource Masters* page 144 *Chapter 11 Resource Masters* pages 609-610
2. Estimation a) Determine approximate sums, differences, products, and quotients • **Assessment limit:** Use no more than 3 positive rational numbers (0 – 1000)	SE: 240-243, 334-337, 558 TWE: B 240 ICE 241 *Chapter 6 Resource Masters* pages 303-305 *Chapter 8 Resource Masters* pages 435-437

OBJECTIVES	PAGE REFERENCES
3. Analyze ratios, proportions, or percents a) Determine equivalent ratios • **Assessment limit:** Use denominators as factors of 300 but less than 101 and whole numbers (0 – 100) b) Determine or use ratios, unit rates, and percents in the context of a problem • **Assessment limit:** Use whole numbers (0 – 1000) c) Determine rate of increase and decrease, discounts, simple interest, commission, sales tax d) Determine percent of a number	SE: 288-291, 292-295, 319-321, 350-353, 354-357, 358-360 *Spreadsheet Investigation* 361 TWE: A 291 ICE 289 #4-#5 *Chapter 8 Resource Masters* pages 455-457 *Chapter 8 Resource Masters* pages 460-462
STANDARD 7.0 PROCESSES OF MATHEMATICS – Students demonstrate the processes of mathematics by making connections and applying reasoning to solve and to communicate their findings.	
A. Problem Solving	
1. Apply a variety of concepts, processes, and skills to solve problems a. Identify the question in the problem b. Decide if enough information is present to solve the problem c. Make a plan to solve a problem d. Apply a strategy, i.e., draw a picture, guess and check, finding a pattern, writing an equation e. Select a strategy, i.e., draw a picture, guess and check, finding a pattern, writing an equation f. Identify alternative ways to solve a problem g. Show that a problem might have multiple solutions or no solution h. Extend the solution of a problem to a new problem situation	SE: 6-9 *Problem-Solving Strategy* 22-23, 58-59, 132-133, 164-165, 252-253, 391-392, 444-445, 496-497, 518-519 TWE: B 6 DI 7 *Chapter 1 Resource Masters* pages 1-5
B. Reasoning	
1. Justify ideas or solutions with mathematical concepts or proofs a. Use inductive or deductive reasoning b. Make or test generalizations c. Support or refute mathematical statements or solutions d. Use methods of proof, i.e., direct, indirect, paragraph, or contradiction	SE: 16 #3, 66 #3, 130 #3 *Hands-On Lab* 386 *Hands-On Mini Lab* 38, 60, 428 *Problem-Solving Strategy* 444-445 TWE: B 14, 60

OBJECTIVES	PAGE REFERENCES
C. Communication	
1. Present mathematical ideas using words, symbols, visual displays, or technology a. Use multiple representations to express concepts or solutions b. Express mathematical ideas orally c. Explain mathematical ideas in written form d. Express solutions using concrete materials e. Express solutions using pictorial, tabular, graphical, or algebraic methods f. Explain solutions in written form g. Ask questions about mathematical ideas or problems h. Give or use feedback to revise mathematical thinking	SE: 26 #1, 35 #1-#2, 414 #1 *Graphing Calculator Investigation* 84 *Hands-On Lab* 154-155 *Hands-On Mini Lab* 264 *Study Skill* 474 TWE: A 33, 95, 200 *Chapter 1 Resource Masters* page 14 *Chapter 6 Resource Masters* page 331 *Chapter 10 Resource Masters* page 556 #9 *Chapter 11 Resource Masters* page 627 #7
D. Connections	
1. Relate or apply mathematics within the discipline, to other disciplines, and to life a. Identify mathematical concepts in relationship to other mathematical concepts b. Identify mathematical concepts in relationship to other disciplines c. Identify mathematical concepts in relationship to life d. Use the relationship among mathematical concepts to learn other mathematical concepts	SE: 208 Example 3, 441 Example 2, 473 #37-#44 *Real-Life Careers* 19, 249, 539 *Real-Life Math* 31, 221, 471 TWE: B 418 *Chapter 5 Resource Masters* page 261 #6 *Chapter 10 Resource Masters* page 571 #8

Codes Used for TWE Pages

A	Assess
B	Bellringer
DI	Daily Intervention
ICE	In-Class Examples