NJCCCS AREA: Math

North Brunswick Township Public Schools

Academic Support for Math – Grade 8

Acknowledgements

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Revision_____

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New Jersey Core Curriculum Content Standard Area: Mathematics

Topic/Course: Academic Support for Math– Grade 8 Grade: 8 Date: 8/2008

Essential Question NJCCC Standard	**NJCCCS –** Skills/Objectives/ Areas of Focus	**Instructional Strategies** Activities/ Materials / Technology Interdisciplinary Connections Cultural Diversity	**Modifications** ELL / Special Education Academic Support/ G&T	**Assessments** Formative Summative Benchmarks	**PACING**
4.3.8.A1 How can we represent, analyze, and generalize mathematical situations using tables, verbal and symbolic rules, graphs, and simple equations? **4.3.8.C1, 2** How can physical models be used to clarify mathematical relationships and model situations? **4.3.8.D** What makes an algebraic algorithm both effective and efficient?	**CMP2 – Thinking With Mathematical Models** *Linear & Inverse Variations* • Recognize problem situations in which two or more variables have a linear relationship to each other. • Construct tables, graphs, and symbolic equations that express linear relationships. • Translate information about linear relations given in a table, graph, or an equation to one of the other forms. • Identify rate of change, slope, and y-intercept on graphs. • Solve linear equations	• Use Algebra Tiles to represent linear relationships and solve linear equations and inequalities • PPH *Skills & Concepts Review* p. 217-231 • Create a flow chart with steps to solving equations and inequalities • Graph functions on dry-erase boards • Have 3 teams – table, equation, & graph. Rotate to translate information into each form. • Use spreadsheets, graphing calculators, and other technology • Use activities from *Navigating through Algebra*	• *Special Needs Handbook* for **Thinking with Mathematical Models** (**not** assessments) • Questions read aloud • Leveled small groups • Calculator (when appropriate) • Vocabulary charts (bilingual for ELL) • Flip book glossary • Word wall of key terms • Additional time • Periodic notebook maintenance assistance • See *Implementing and Teaching Guide* p. 87-101	Pre-Assessment Oral responses Homework Class Practice Quizzes Cooperative work Post-Assessment	September - October (20 days)

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4.2.8.A2 How can we use the Pythagorean Theorem? **4.1.8.A6, 7** How can we construct meaning for repeating decimals as fractions and common irrational numbers, such as pi and the square root of 2? Also addresses: **4.1.8.A1** How can we demonstrate a sense of the relative magnitudes of numbers? **4.1.8.A.B3** How can we find square and cube roots of numbers and understand the inverse nature of powers and roots? **4.2.8.C1** How can we use coordinates in four quadrants to represent geometric concepts?	**CMP2 – Looking for Pythagoras** *The Pythagorean Theorem* • Relate the area of a square to the side length • Estimate the values of square roots of whole numbers • Understand and apply the Pythagorean Theorem to solve everyday problems	• Use graph paper to construct right triangles and study side length relationships • Make a list of perfect squares and their roots • Estimate square roots of numbers; then use the calculator to determine the exact square root • Use *Skills and Concepts Review* 242, 243 • Use activities from *Navigating through Geometry*	• *Special Needs Handbook* for **Looking for Pythagoras** (**not** assessments) • Review rounding decimals • Questions read aloud • Leveled small groups • Calculator (when appropriate) • Vocabulary charts (bilingual for ELL) • Flip book glossary • Word wall of key terms • Additional time • Periodic notebook maintenance assistance • See *Implementing and Teaching Guide* p. 87-101	Pre-Assessment Oral responses Homework Class Practice Quizzes Cooperative work Post-Assessment	November -December (12 Days)

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4.3.8.A1 How can we describe and extend patterns and sequences using equations, graphs and tables? **4.3.8B2** How can we recognize and describe the difference between linear and exponential growth? **4.3.8.C2** How can we use concrete materials to describe growth situations such as population growth? Also addresses: **4.1.8.A1, B1** How can we extend our understanding of number to include exponents and perform mathematical procedures with these?	**CMP2 – Growing, Growing, Growing** *Exponential Relationships* • Recognize situations in which one variable is an exponential function of another variable. • Recognize the connections between exponential equations and growth patterns in tables and graphs of those equations. • Understand and apply the rules for operating on numerical expressions with exponents.	• Use beads, etc. to model exponential growth • Use population growth, cell division, and other real-world examples of exponential relationships. • Graph a linear function and an exponential function on the same graph to compare them • Graph functions on dry-erase boards • Have 3 teams – table, equation, & graph. Rotate to translate information into each form. • Use spreadsheets, graphing calculators, and other technology • Use activities from *Navigating through Algebra*	• *Special Needs Handbook* for **Growing, Growing, Growing** (**not** assessments) • Questions read aloud • Leveled small groups • Calculator (when appropriate) • Vocabulary charts (bilingual for ELL) • Flip book glossary • Word wall of key terms • Additional time • Periodic notebook maintenance assistance • See *Implementing and Teaching Guide* p. 87-101	Pre-Assessment Oral responses Homework Class Practice Quizzes Cooperative work Post-Assessment	December – January (14 Days)

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4.2.8.C.1, 2 How can we use a coordinate grid to model and quantify transformations (e.g., translate right 4 units)? **4.2.8.A3** How can we understand and apply properties of polygons and determine which polygons can be used alone to generate a tessellation and why?	**CMP2 – Kaleidoscopes, Hubcaps, & Mirrors** *Symmetry & Transformations* • Perform symmetry transformations of figures, including reflections, translations, and rotations. • Write coordinate rules for specifying the image of a point under particular transformations. • Examine and describe the symmetries of a design made from a figure and its image(s) under a symmetry transformation.	• Use traceable figures to draw transformations on graph paper. • Use dry erase boards to draw transformations. • Have students use plastic shapes to experiment and determine which polygons can tessellate at why. • Use *Skills and Concepts Review* 232, 233, 234, 249 • Play a game in groups in which one person draws a figure on graph paper, one chooses a transformation rule, one writes new coordinates, and one graphs the new figure. • Use prints of MC Escher's work to demonstrate adaptations of tessellations.	• *Special Needs Handbook* for **Kaleidoscopes, Hubcaps, & Mirrors** (**not** assessments) • Questions read aloud • Leveled small groups • Calculator (when appropriate) • Vocabulary charts (bilingual for ELL) • Flip book glossary • Word wall of key terms • Additional time • Periodic notebook maintenance assistance • See *Implementing and Teaching Guide* p. 87-101	Pre-Assessment Oral responses Homework Class Practice Quizzes Cooperative work Post-Assessment	February through Mid-March (13 Days)

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4.4.8.A1, 2 How can we select and use appropriate representations for sets of data? How can we select the type of display most appropriate for given data, including box-and-whisker plot & scatter plot? How can we find the median and mean (weighted average) using frequency data and determine the effect of additional data on measures of central tendency? **4.4.8.B2** How can we determine probabilities of compound events? **4.4.8.C1** How can we apply the multiplication principle to permutations and combinations? **4.4.8.D.1** How can we use vertex-edge graphs to represent and find solutions to practical problems?	**CMP2 – Samples & Populations** *Data & Probability* • Use information from samples to draw conclusions about population. • Use probability to analyze situations. • Compare a sample using measures of center (mean, median), measures of variability (range, minimum and maximum data values, percentiles) and data displays that group data (histogram, box and whisker plots).	• Create graph displays based on real-world data and develop questions for the graphs. • Model situations involving probability using spinners, dice, calculators and computers • Play and analyze probability-based games, and discuss the concepts of fairness and expected value. • *Sample:* Design a spinner that has the following probabilities: P(red) = 3/8 P(blue) = 25 % P(yellow) = 12 ½ % P(white) = remaining section. Is this a fair spinner? Why or why not? Devise a fair game using this spinner. Describe your game. • *Sample:* Five classmates greet each other with a handshake so that each person shakes the hand of every other person once and only once. Graph the network of handshakes. How many distinct handshakes were made? If 2 more classmates join the group, how many handshakes would then be possible? Explain clearly how you arrived at this answer. • Find the shortest route on a map. • Use *Skills & Concepts Review* 286,287,289,290,291,301	• *Special Needs Handbook* for **Samples & Populations** (**not** assessments) • Questions read aloud • Use of materials to solve probability problems • Leveled small groups • Calculator (when appropriate) • Vocabulary charts (bilingual for ELL) • Flip book glossary • Word wall of key terms • Additional time • Periodic notebook maintenance assistance • See *Implementing and Teaching Guide* p. 87-101	Pre-Assessment Oral responses Homework Class Practice Quizzes Cooperative work Post-Assessment	Mid-March through April (15 Days)

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4.3.8.D2 How can we create, evaluate, and simplify algebraic expressions involving variables using order of operations, distributive property; substitution of a number for a variable, translation of a verbal phrase or sentence into an algebraic expression, equation, or inequality, and vice versa. **4.3.8.D4, 5** How can we solve simple linear equations informally, graphically, and using formal algebraic methods?	**CMP2 – Say It With Symbols** *Variables & Expressions* • Model situations with symbolic statements • Write equivalent expressions • Solve linear equations involving parenthesis.	• Use Algebra Tiles to represent linear relationships and solve linear equations and inequalities • Create a flow chart with steps to solving equations • Graph functions on dry-erase boards • Use spreadsheets, graphing calculators, and other technology • Use activities from *Navigating through Algebra*	• *Special Needs Handbook* for **Say It With Symbols** (**not** assessments) • Questions read aloud • Leveled small groups • Calculator (when appropriate) • Vocabulary charts (bilingual for ELL) • Flip book glossary • Word wall of key terms • Additional time • Periodic notebook maintenance assistance • See *Implementing and Teaching Guide* p. 87-101	Pre-Assessment Oral responses Homework Class Practice Quizzes Cooperative work Post-Assessment	May-June (10 Days)

Other Essential Standards:				
4.2.8.A1 Understand and apply concepts involving lines, angles, and planes: Complementary and supplementary angles; Vertical angles; Bisectors and perpendicular bisectors; Parallel, perpendicular, and intersecting planes; Intersection of plane with cube, cylinder, cone, and sphere. 4.2.8.A.4 Understand and apply the concept of similarity: Using proportions to find missing measures; Scale drawings; Models of 3D objects. 4.2.8.A6 Create two-dimensional representations (e.g., nets or projective views) for the surfaces of three-dimensional objects. 4.2.8.B2 Use iterative procedures to generate geometric patterns: Fractals (e.g., the Koch Snowflake); Self-similarity; Construction of initial stages; Patterns in successive stages (e.g.,	4.4.8.A3 Estimate lines of best fit and use them to interpolate within the range of the data.			

number of triangles in each stage of Sierpinski's Triangle). 4.2.8.E.1,3,4 Develop and apply strategies and formulas for finding the surface area and volume of a three-dimensional figure: Volume —prism, cone, pyramid; Surface area —prism (triangular or rectangular base), pyramid (triangular or rectangular base); Impact of a dilation on the surface area and volume of a three-dimensional figure. Use formulas to find the volume and surface area of a sphere.				