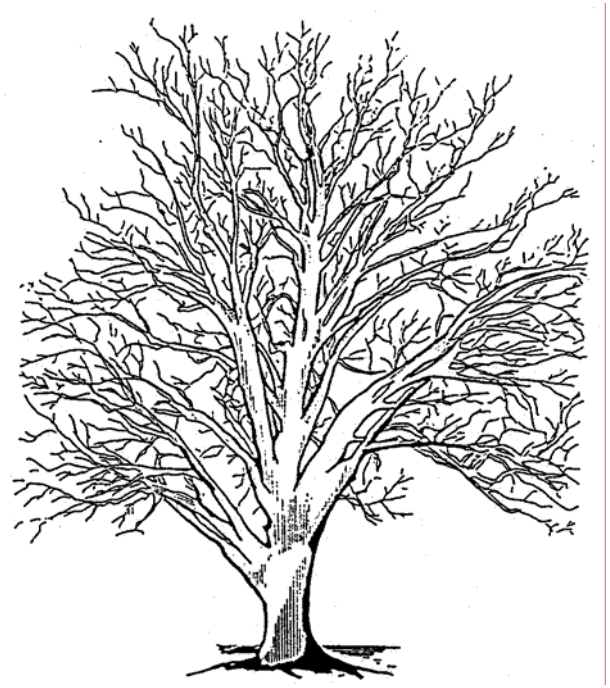
Monroe Township Schools



Curriculum Management System

Gifted & Talented Mathematics

Grades 5 - 8

July 2005

*** For adoption by all regular education programs as specified and for adoption or adaptation by all Special Education Programs in accordance with Board of Education Policy # 2220.**

Board Approved: August 2005

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MONROE TOWNSHIP SCHOOL DISTRICT

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Acknowledgments

The following individuals are acknowledged for their assistance in the preparation of this Curriculum Management System:

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Monroe Township Schools

Mission and Goals

Mission

The mission of the Monroe Township School District, a unique multi-generational community, is to collaboratively develop and facilitate programs that pursue educational excellence and foster character, responsibility, and life-long learning in a safe, stimulating, and challenging environment to empower all individuals to become productive citizens of a dynamic, global society.

Goals

To have an environment that is conducive to learning for all individuals.

To have learning opportunities that are challenging and comprehensive in order to stimulate the intellectual, physical, social and emotional development of the learner.

To procure and manage a variety of resources to meet the needs of all learners.

To have inviting up-to-date, multifunctional facilities that both accommodate the community and are utilized to maximum potential.

To have a system of communication that will effectively connect all facets of the community with the Monroe Township School District.

To have a staff that is highly qualified, motivated, and stable and that is held accountable to deliver a safe, outstanding, and superior education to all individuals.

INTRODUCTION, PHILOSOPHY OF EDUCATION, AND EDUCATIONAL GOALS

Philosophy

Monroe Township Schools are committed to providing students with a quality education resulting in life-long learners who can thrive in a global society. The Gifted & Talented mathematics program, grades 2 - 8, is predicated on that belief and is guided by the following principles as stated by the National Council of Teachers of Mathematics (NCTM) in the *Principles and Standards for School Mathematics, 2000.* First, a mathematics education requires equity. All students will be given worthwhile opportunities and strong support to meet high mathematical expectations. Second, a coherent mathematics curriculum will effectively organize, integrate, and articulate important mathematical ideas across the grades. Third, effective mathematics teaching requires the following: a) knowing and understanding mathematics, students as learners, and pedagogical strategies b) having a challenging and supportive classroom environment and c) continually reflecting on and refining instructional practice. Fourth, students must learn mathematics with understanding. A student's prior experiences and knowledge will actively build new knowledge. Fifth, assessment should support the learning of important mathematics and provide useful information to both teachers and students. Lastly, technology enhances mathematics learning, supports effective mathematics teaching, and influences what mathematics is taught.

As students begin their mathematics education in Monroe Township, classroom instruction will reflect the best thinking of the day. Children will engage in a wide variety of learning activities designed to develop their ability to reason and solve complex problems. Calculators, computers, manipulatives, technology, and the Internet will be used as tools to enhance learning and assist in problem solving. Group work, projects, literature, and interdisciplinary activities will make mathematics more meaningful and aid understanding. Classroom instruction will be designed to meet the learning needs of all children and will reflect a variety of learning styles.

In this changing world those who have a good understanding of mathematics will have many opportunities and doors open to them throughout their lives. Monroe Township Schools are committed to providing all students with the opportunity and the support necessary to learn significant mathematics with depth and understanding. This curriculum guide is designed to be a resource for staff members and to provide guidance in the planning, delivery, and assessment of the mathematics Gifted & Talented program for instruction for grades 2 - 8.

Educational Goals

Children in Monroe Township Schools Gifted & Talented program will develop conceptual understanding, procedural knowledge, and problem solving skills as they become proficient in the areas of: 4.1 Number and Numerical Operations, 4.2 Geometry and Measurement, 4.3 Patterns & Algebra, 4.4 Data Analysis, Probability, & Discrete Mathematics, and 4.5 Mathematical Processes. The district Gifted & Talented Grades 2 – 8 mathematics program recognizes the need to challenge and enable all students to step into the twenty-first century with the mathematical skills, understandings, and attitudes that they will need to be successful in their careers and throughout their daily lives.

New Jersey State Department of Education
Core Curriculum Content Standards

A note about Mathematics Standards and Cumulative Progress Indicators:

The New Jersey Core Curriculum Content Standards for Mathematics were revised in 2002. The Cumulative Progress Indicators (CPI's) referenced in this curriculum guide refer to these new standards and may be found in the Curriculum folder on the district servers. A complete copy of the new Core Curriculum Content Standards for Mathematics may also be found at: http://www.nj.gov/njded/cccs/s4_math.htm

Gifted & Talented Mathematics
Scope and Sequence
Grade 5

Semester I	
I. Platonic Solids	II. Lines of symmetry
III. Tessellations a. Transformations b. Translations c. Rotations	IV. Data and collection methods a. Categorical b. Numerical
V. Median a. Line plot	VI. Collect and display data a. Making predictions
VII. Probability experiments a. Unlikely outcomes b. Using probability to make predictions	VIII. Fair games
IX. Algebraic expressions	X. Functional relationships a. Perimeter b. Area c. Volume
XI. Similarity a. Magnifying b. Shrinking	XII. Rotational symmetry
XIII. Three-dimensional objects a. Isodot paper representations	

Gifted & Talented Mathematics
Scope and Sequence
Grade 5

Semester II	
XIV. Fraction a. Representations b. Models	XV. Mean, median, mode
XVI. Statistics a. Measures of central tendency b. Spread of data c. Outliers d. Error e. Inferences and predictions	XVII. Probability with spinners and dice a. Sample space b. Likely events c. Unlikely events
XVIII. Empirical probability	XIX. Frequency a. Absolute frequency b. Relative frequency
XX. Sequences a. Generalizing nth term	XXI. Properties of two and three dimensional shapes a. Sides b. Angles
XXII. Similar figures a. Dilations b. Similarity & proportionality	XXIII. Graphing in the coordinate plane a. Properties of two-dimensional shapes
XXIV. Data graphing a. Discrete data	XXV. Data a. Central tendencies b. Summary information c. Histogram d. Mean, median, mode
XXVI. Data display a. Compare data sets	

Gifted & Talented Mathematics
Scope and Sequence
Grade 6

Semester I	
I. Statistics I a. Central tendency b. MATHCOUNTS practice rounds	II. Statistics II a. Central tendency b. MATHCOUNTS practice rounds
III. Probability a. Experimental b. Theoretical c. MATHCOUNTS practice rounds	IV. Probability a. Independent and dependent events b. MATHCOUNTS practice rounds
V. Probability and statistics a. MATHCOUNTS practice rounds b. Pythagorean Theorem	VI. Algebraic Methods Part I a. MATHCOUNTS practice rounds
VII. Algebraic Methods Part II a. MATHCOUNTS practice rounds	VIII. Number sense a. Factorials b. MATHCOUNTS practice rounds
IX. Number sense a. Number bases b. MATHCOUNTS practice rounds	X. Proportional Reasoning Part I a. MATHCOUNTS practice rounds
XI. Proportional Reasoning Part II a. MATHCOUNTS practice rounds	XII. Problem Solving Methods a. MATHCOUNTS practice rounds
XIII. Problem Solving Strategies Part II a. MATHCOUNTS practice rounds	

Gifted & Talented Mathematics
Scope and Sequence
Grade 6

Semester II	
XIV. Probability Distributions	XV. Fairness a. Sample size
XVI. Experimental probability	XVII. Summary statistics a. Comparing multiple data sets
XVIII. Relative-frequency and absolute-frequency graphs a. Quartiles b. Similarities and differences	XIX. Bivariate data a. Scatter plots b. Lines of best fit
XX. Data a. Tables b. Slope of a line	XXI. Change overtime
XXII. Relationships between tables, graph, and symbolic representation	XXIII. Triangles a. Midpoints b. Midsegments c. Pythagorean Theorem
XXIV. Lines, midpoints, and triangles in the coordinate plane	XXV. Similarity and the coordinate plane
XXVI. Translations, Reflections, Rotations, and Scale Factors a. Pre-image and image b. Rigid motion	

Gifted & Talented Mathematics
Scope and Sequence
Grade 7

Semester I	
I. Measures of Central Tendency a. Statistics I b. Fraction/decimal conversions c. MATHCOUNTS Competition Practice Rounds	II. Statistical Measures a. Statistics II b. Numbers/Divisibility Rules c. MATHCOUNTS Competition Practice Rounds
III. Experimental and Theoretical Probability a. Probability I b. Perfect Squares/Cubes c. MATHCOUNTS Competition Practice Rounds	IV. Probability a. Probability II b. Triangle/Circle formulas
V. Geometry and Problem Solving a. Pythagorean Triples. b. MATHCOUNTS Competition Practice Rounds	VI. Algebra and Problem Solving a. Algebra Part I b. MATHCOUNTS Competition Practice Rounds
VII. Algebra and Problem Solving a. Algebra Part II b. MATHCOUNTS Competition Practice Rounds	VIII. Number Sense and Problem Solving a. Factorials b. MATHCOUNTS Competition Practice Rounds
IX. Number Sense and Problem Solving a. Numbers in different bases b. MATHCOUNTS Competition Practice Rounds	X. Proportional Reasoning and Problem Solving a. Squaring b. MATHCOUNTS Competition Practice Rounds
XI. Proportional Reasoning and Problem Solving Part II a. Factorization. b. MATHCOUNTS Competition Practice Rounds	XII. Problem Solving Strategies Part I a. Pascal's Triangle b.. MATHCOUNTS Competition Practice Rounds
XIII. Problem Solving Strategies Part II a. Pascal's Triangle b. MATHCOUNTS Competition from last year	

Gifted & Talented Mathematics
Scope and Sequence
Grade 7

Semester II	
XIV. Microgravity a. Graph data of accelerations b. Calculate "g" for the given data	XV. Packing density a. Tessellations b. Properties of right triangles
XVI. Probability a. Sample space b. Outcomes c. Relative frequencies	XVII. Relative frequencies and theoretical frequencies as probabilities
XVIII. Probability a. Simulated data b. Sample size c. Complementary events d. Expected value	XIX. Rotational Symmetry a. Regular polygons
XX. Spatial Visualization a. Two and three-dimensional representations b. Perspective	XXI. Geometric Modeling a. Perimeter and area b. Indirect measurement
XXII. Histograms and box plots	XXIII. Scatterplots and lines of best fit
XXIV. Linear relationships a. Table, graph, equation, slope, y-intercept	XXV. Slopes of Parallel and Perpendicular Lines
XXVI. Algebraic Representation a. Equivalent expressions b. Distributive Property	

Gifted & Talented Mathematics
Scope and Sequence
Grade 8

Semester I	
I. Measures of Central Tendency a. Statistics I Grade 8 b. Fraction/decimal conversions c. MATHCOUNTS Competition Practice Rounds	II. Statistical Measures a. Statistics II Grade 8 b. Prime Numbers/Divisibility Rules c. MATHCOUNTS Competition Practice Rounds
III. Experimental and Theoretical Probability a. Probability I Grade 8 b. Perfect Squares/Cubes c. MATHCOUNTS Competition Practice Rounds	IV. Probability a. Probability II Grade 8 b. Triangle/Circle formulas c. MATHCOUNTS Competition Practice Rounds
V. Geometry and Problem Solving Grade 8 a. Pythagorean Triples. b. MATHCOUNTS Competition Practice Rounds	VI. Algebra and Problem Solving a. Algebra Part I Grade 8 b. MATHCOUNTS Competition Practice Rounds
VII. Algebra and Problem Solving a. Algebra Part II Grade 8 b. MATHCOUNTS Competition Practice Rounds	VIII. Number Sense and Problem Solving Grade 8 a. Factorials b. MATHCOUNTS Competition Practice Rounds
IX. Number Sense and Problem Solving Grade 8 a. Numbers in different bases b. MATHCOUNTS Competition Practice Rounds	X. Proportional Reasoning and Problem Solving Grade 8 a. Squaring b. MATHCOUNTS Competition Practice Rounds
XI. Proportional Reasoning and Problem Solving Part II Grade 8 a. Factorization. b. MATHCOUNTS Competition Practice Rounds	XII. Problem Solving Strategies Part I Grade 8 a. Pascal's Triangle b.. MATHCOUNTS Competition Practice Rounds
XIII. Problem Solving Strategies Part II Grade 8 a. MATHCOUNTS Competition from last year	

Gifted & Talented Mathematics
Scope and Sequence
Grade 8

Semester II	
XIV. Magic Squares	XV. Cryptanalysis a. Code breaking b. Decrypting cipher-texts
XVI. Real-life applications of coding – NASA Investigations	XVII. Real-life applications of coding – NASA Investigations Part II a. Binary symbols b. Error analysis
XVIII. Real-life applications of coding – NASA Investigations Part III a. Binary trees b. Hamming Codes	XIX. Quadratic Models a. CBL motion detector
XX. Tolerance and Accuracy	XXI. Design testing
XXII. The Golden Ratio Part I a. Proportion b. Irrational numbers c. Quadratic Formula d. Continued fractions	XXIII. The Golden Ratio Part II a. Golden triangles and rectangles b. Regular pentagons c. Nature's pentagrams
XXIV. Fibonacci Sequence Part I	XXV. Fibonacci Sequence Part II a. Binet's Formula b. Pascal's triangle
XXVI. Recursive and iterative forms	

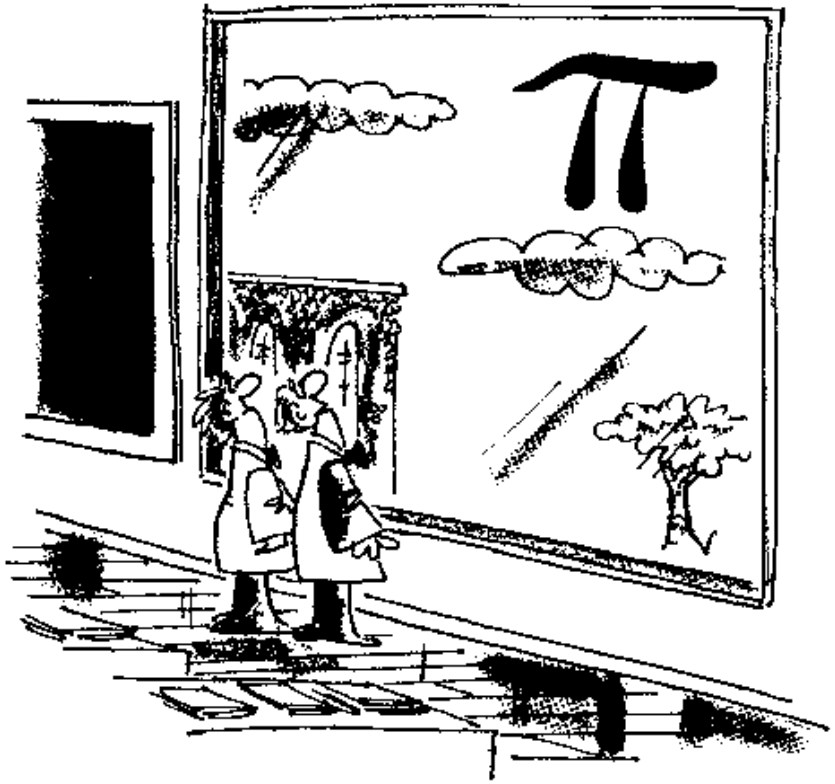
Resources and Materials

The Monroe Township Gifted and Talented Program for Mathematics in Grades 2 - 8 will focus on activities in the areas of Number and Operations, Algebra, Geometry, Data Analysis, Probability, Measurement, and Problem Solving. The Principals and Standards for School Mathematics Navigation Series will be a primary source for these projects and activities. In addition, NCTM Illuminations website will provide a wealth of interactive, multimedia math investigations. Beginning in grades 6 - 8 MATHCOUNTS and the American Mathematics Competition (AMC) will provide additional activities to stimulate and challenge students in this program.

Resources:

1. *NCTM Principals and Standards for School Mathematics Navigation Series:*
   Navigating through Number and Operations in Pre-kindergarten-Grade 2
   Navigating through Algebra in Pre-kindergarten-Grade 2
   Navigating through Geometry in Pre-kindergarten-Grade 2
   Navigating through Data Analysis and Probability in Pre-kindergarten-Grade 2
   Navigating through Measurement in Pre-kindergarten-Grade 2
   Navigating through Problem Solving and Reasoning in Grade 2
   Navigating through Problem Solving and Reasoning in Grade 3
   Navigating through Algebra in Grades 3 - 5
   Navigating through Geometry in Grades 3 - 5
   Navigating through Data Analysis and Probability in Grades 3 - 5
   Navigating through Algebra in Grades 6-8
   Navigating through Geometry in Grades 6-8
   Navigating through Data Analysis in Grades 6 - 8
   Navigating through Probability in Grades 6 – 8
   Navigating through Algebra in Grades 9 - 12
2. *NCTM Illuminations*. Interactive, multimedia math investigations. Http://illumtest.nctm.org/
3. 2005 – 2006 (or current) *MATHCOUNTS SCHOOL Handbook*
4. *The Art of Problem Solving* - Volumes 1 and 2 by Richard Rusczyk and Sandor Lehoczky
5. *Problem Solving Strategies: Crossing the River with Dogs* by Ken Johnson and Ted Herr
6. *Thought Provokers and More Thought Provokers* by Doug Rohrer
7. *NCTM Mission Mathematics II* Grades 9 – 12, Edited by Peggy A. House and Roger P. Day
8. *Algebra in the Real World: 38 Enrichment Lessons for Algebra 2*, Dale Seymour Publications

GIFTED & TALENTED MATHEMATICS
GRADE 5



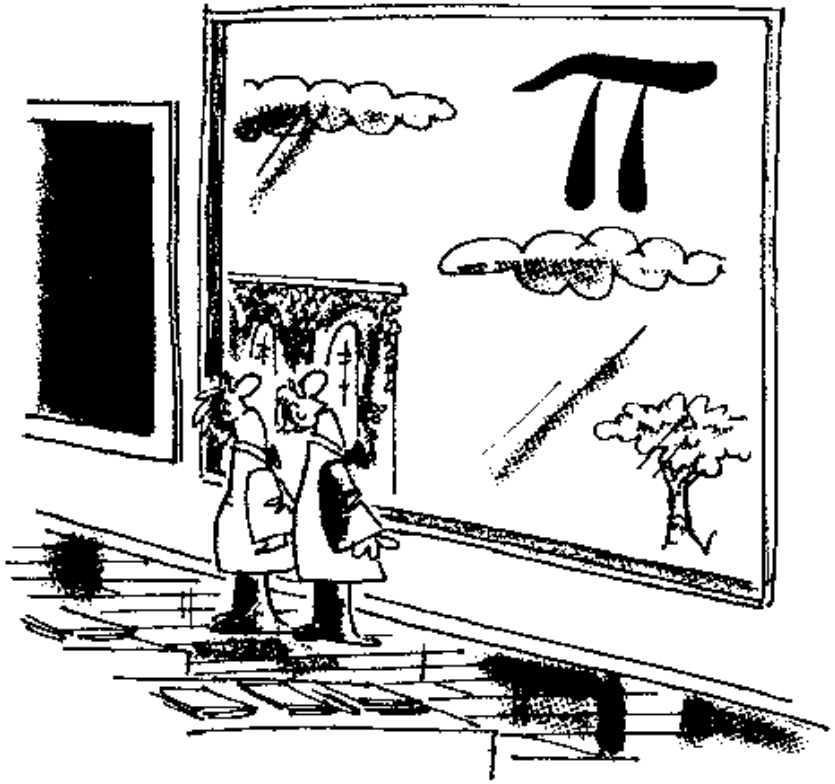
Grade 5				
Lesson	Strand	Grade Level	Topic	Goals
1	Geometry	4, 5	Searching for the Perfect Solids Navigating through Geometry Grades 3-5, pp 31-34	Students will discover the five Platonic Solids and develop mathematical arguments to justify conclusions.
2	Geometry	4, 5	Symmetry Detectives Navigating through Geometry Grades 3-5, pp 52-54	Students will explore lines of symmetry in simple figures and geometric shapes, identify the lines of symmetry in letters of the alphabet, and identify objects in the real world that have line symmetry.
3	Geometry	4, 5	Zany Tessellations Navigating through Geometry Grades 3-5, pp 68-74	Students will explore tessellations like those created by M. C. Escher, identify geometric transformations found in tessellations, and create tessellations using translations (slides) and rotations (turns).
4	Data Analysis and Probability	4, 5	What's My Method? Navigating through Data Analysis & Probability Grades 3-5, pp 17-20	Students will discuss data and collection methods, identify and describe appropriate data collection methods to answer a set of questions, and determine whether the data to be collected will be categorical or numerical.
5	Data Analysis and Probability	4, 5	Do You Get Enough Sleep? Navigating through Data Analysis & Probability Grades 3-5, pp 34-38	Students will identify the median of a data set and of data represented on a line plot, use the median to describe a set of data, and use the medians of two sets of data to compare the distributions.
6	Data Analysis and Probability	4, 5	The Foot, the Whole Foot, and Nothing but the Foot! Navigating through Data Analysis & Probability Grades 3-5, pp 47-50	Students will - collect and display data representing the foot length of a group of students in the class (the sample) to predict information about the whole class (the population); collect and display data about the foot length of a random sample of students in the school to predict information about the school population.
7	Data Analysis and Probability	4, 5	Spin City Navigating through Data Analysis & Probability Grades 3-5, pp 73-78	Students will- use line plots to represent outcomes from probability experiments; examine the distribution of results in probability experiments; investigate situations where the outcomes are not equally likely; calculate experimental probabilities for events; and use probability to predict how often an event will happen in a given number of trials.
8	Data Analysis and Probability	4, 5	Is It Fair? Navigating through Data Analysis & Probability Grades 3-5, pp 79-82	Students will understand that a fair game implies that there are equal probabilities of winning for all players. Students will analyze the fairness of a game.
9	Algebra	5	Building Houses Navigating through Algebra Grades 3-5, pp 51-53	Students will verbalize the numerical relationship in each problem and translate each relation into an algebraic expression.

Grade 5				
Lesson	Strand	Grade Level	Title	Goals
10	Algebra	5	Squares Cubed Navigating through Algebra Grades 3-5, pp 64-66	Students will investigate the functional relationships between the length of the sides of a square and its perimeter and area, describe the functional relationship between the lengths of the sides of squares and their perimeters and areas as the sides increase in length, and describe the functional relationship between the lengths of the sides of cubes and their volumes as the sides increase in length.
11	Geometry	5	Can They Be the Same? Navigating through Algebra Grades 3-5, pp 44-46	Students will explore similar shapes, develop an understanding of similarity, test for similarity of shapes using the coordinate grid, and explore the effects of magnifying or shrinking a shape.
12	Geometry	5	Going Logo for Symmetry Navigating through Geometry Grades 3-5, pp 5-58	Students will explore simple figures and geometric shapes for rotational symmetry, identify rotational symmetry in various corporate logos (trademarks), and design for a school club or activity a logo that has rotational symmetry.
13	Geometry	5	It's the View That Counts! Navigating through Geometry Grades 3-5, pp 86-87	Students will build three-dimensional objects from two-dimensional representations and draw representations of three-dimensional shapes on isodot paper.
14	Geometry	5	Fraction Fantasy Navigating through Geometry Grades 3-5, pp 88-89	Students will create and then cut from a six-inch square congruent representations of halves, thirds, fourths, fifths, sixths, eights, tenths, and twelfths. The students must be able to re-create the original square using the fractional representations they cut. For each of the fractions students will create multiple representations that are not congruent to any previously cut models and identify rotations, reflections, and translations found in the fraction models that have been created.
15	Data Analysis and Probability	5	Exploring the Mean Navigating through Data Analysis & Probability Grades 3-5, pp 39-44	Students will identify the three types of averages: mode, median, and mean; describe the mean as a balance point in a data distribution; create data sets for a given mean; and estimate the mean of small sets of data.
16	Data Analysis and Probability	5	Chores - How Many Hours a Week Are Typical? Navigating through Data Analysis & Probability Grades 3-5, pp 56-60	Students will - recognize that a sample statistic is an estimation of a population parameter; recognize that data collection must be well planned to account for factors causing variations among samples; observe measures of central tendency, the spread of the data, and the effect of outliers on their data in the context of a real-world problem; describe how errors may present themselves in the course of the data collection process; and make observations from the data and then develop and evaluate inferences and predictions.

Grade 5				
Lesson	Strand	Grade Level	Title	Goals
17	Probability	6	The Concept of Probability: Explorations with Spinners and Dice ("Spinners" & "Two Dice" Activities) Navigating through Probability Grades 6-8, pp 17-23	Students will identify which outcome on a spinner is most likely to occur; explain their reasoning using appropriate mathematical vocabulary; understand that rolling two dice is equivalent to rolling one die twice; and use a listing of equally likely outcomes to generate a sample space.
18	Probability	6	Empirical and Theoretical Probabilities ("Pets" and "Ratios" Activities) Navigating through Probability Grades 6-8, pp 23-28	Students will use precise mathematical terminology to describe probability situations; understand relative frequency as empirical probability; and explore how empirical probability stabilizes as the number of rolls of the dice increases.
19	Probability	6	Probability Distributions ("Fair Spinners" Activity) Navigating through Probability Grades 6-8, pp 38-40	Students will compute relative frequencies; compare absolute-frequency and relative-frequency graphs; use date to support conclusions about the fairness of spinners.
20	Algebra	6	Exploring Houses and Buildings Made of Toothpicks Navigating through Algebra Grades 6-8, pp 9-17	Students will explore pattern development; use a table to organize information; choose a problem-solving strategy to make a prediction about terms in a sequence; and generalize a rule that describes how to find the perimeter of the nth shape.
21	Geometry	6	Geodee's Sorting Scheme Navigating through Geometry Grades 6-8, pp 13-15	Students will recognize properties and characteristics of two- and three-dimensional shapes; explore the measures of lengths, angles, and ratios of sides of triangles.
22	Geometry	6	Exploring Similar Figures Navigating through Geometry Grades 6-8, pp 19-22	Students will enlarge figures using dilations; understand similarity and proportionality; and use dilations to draw similar figures.
23	Geometry	6	Constructing Geometric Figures in Coordinate Space Navigating through Geometry Grades 6-8, p 36	Students will develop their graphing skills on the coordinate plane and explore the properties of two-dimensional shapes in a coordinate system.
24	Data Analysis	6	Lengths of Cats & TV Watching Navigating through Data Analysis Grades 6-8, pp 20-25	Students will interpret information presented in a bar graph; make an appropriate graph for discrete data; and develop their skills at reading data, reading between data, and reading beyond data in a graph.

Grade 5				
Lesson	Strand	Grade Level	Title	Goals
25	Data Analysis	6	Making the Data & Drop Off Navigating through Data Analysis Grades 6-8, pp 26-30	Students will construct a data set using summary information about the central tendencies of the data; identify differences in data sets that share common summary information; interpret information presented in a histogram and identify the mean, median, and mode.
26	Data Analysis	6	Students, Basketball Players, and Batteries Navigating through Data Analysis Grades 6-8, pp 37-42	Students will read information from a data display; choose a representative statistic and justify the choice; use representative values to compare data sets; identify characteristics (mean, range, clusters) of data distributions; and compare the characteristics of data in order to make decisions.

GIFTED & TALENTED MATHEMATICS
GRADE 6



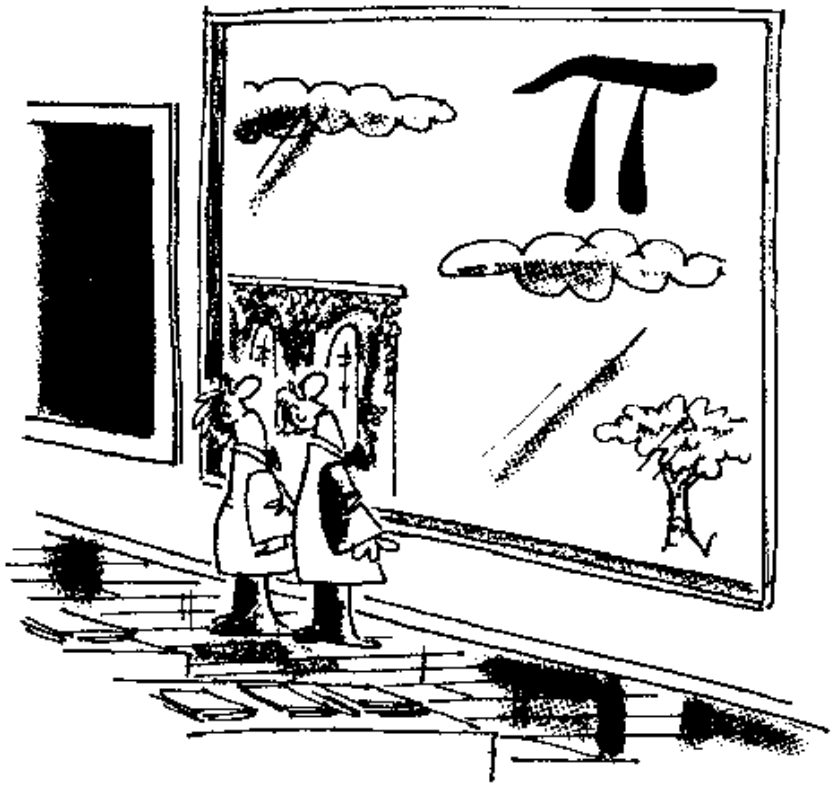
Grade 6				
Lesson	Strand	Grade Level	Title	Goals
1	Statistics & Problem Solving	6	Statistics & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore measures of central tendency in "Stretch - Statistics I - Grade 6" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Fraction/Decimal Conversions, Sprint - Warm-Up 1 #1-4, Target - Workout 1 #1-2, Team - Workout 1 #3-5
2	Statistics & Problem Solving	6	Statistics & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore statistical measures in "Stretch - Statistics II - Grade 6" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Prime Numbers/Divisibility Rules, Sprint - Warm-Up 1 #5-10, Target - Workout 1 #6-7, Team - Workout 1 #8-10
3	Probability & Problem Solving	6	Probability & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore experimental and theoretical probability in "Stretch - Probability I - Grade 6" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Perfect Squares/Cubes, Sprint - Warm-Up 2 #1-7, Target - Warm-Up 2 #8-10, Team - Workout 2 #1-15
4	Probability & Problem Solving	6	Probability & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore probability of independent and dependent events in "Stretch - Probability II - Grade 6" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Triangle/Circle Formulas, Sprint - Warm-Up 3 #1-6, Target - Warm-Up 3 #7-10, Team - Workout 2 #6-10
5	Probability & Problem Solving	6	Probability, Statistics, & Problem Solving for Competition MATHCOUNTS School Handbook	Students will practice both their probability and statistic skills in "Stretch - Potpourri - Grade 6" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Pythagorean Triples, Sprint - Warm-Up 4 #1-5, Target - Warm-Up 4 #6-10, Team - Workout 3 #1-5
6	Algebra & Problem Solving	6	Algebra & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore algebra methods in "Stretch - Algebra Part I - Grade 6" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - MATHCOUNTS Vocabulary, Sprint - Warm-Up 5 #1-10, Target - Warm-Up 6 #1-10, Team - Workout 4 #1-5
7	Algebra & Problem Solving	6	Algebra & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore algebra methods in "Stretch - Algebra Part II - Grade 6" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Pattern Recognition, Sprint - Warm-Up 7 #1-10, Target - Warm-Up 8 #1-10, Team - Workout 4 #6-10
8	Number Sense & Problem Solving	6	Number Sense & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore number sense methods in "Stretch - Number Sense Part I - Grade 6" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Factorials, Sprint - Warm-Up 9 #1-10, Target - Warm-Up 10 #1-10, Team - Workout 5 #1-5

Grade 6				
Lesson	Strand	Grade Level	Title	Goals
9	Number Sense & Problem Solving	6	Number Sense & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore number sense methods in "Stretch - Number Sense Part II - Grade 6" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Numbers in Different Bases, Sprint - Warm-Up 11 #1-10, Target - Warm-Up 12 #1-10, Team - Workout 6 #6-10
10	Proportional Reasoning & Problem Solving	6	Proportional Reasoning & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore proportional reasoning methods in "Stretch - Proportional Reasoning Part I - Grade 6" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Squaring a number with units digit of 5, Sprint - Warm-Up 13 #1-10, Target - Warm-Up 14 #1-10, Team - Workout 7 #6-10
11	Proportional Reasoning & Problem Solving	6	Proportional Reasoning & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore proportional reasoning methods in "Stretch - Proportional Reasoning Part II - Grade 6" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Factorization, Sprint - Warm-Up 15 #1-10, Target - Warm-Up 16 #1-10, Team - Workout 8 #6-10
12	Problem Solving	6	Problem Solving Strategies for Competition - Part I MATHCOUNTS School Handbook	Students will explore problem solving methods in "Stretch - Factoring Part- Grade 6" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Pascal's Triangle, Sprint - Warm-Up 17 #1-10, Target - Warm-Up 18 #1-10, Team - Workout 9 #6-10
13	Problem Solving	6	Problem Solving Strategies for Competition - Part II MATHCOUNTS School Handbook	Students will review the up-coming math competition rules/format and apply their problem solving skills by completing last year's MATHCOUNTS School competition contest for practice Sprint, Target, and Team rounds. **MATHCOUNTS School Competition should be administered in January. The MATHCOUNTS County Competition is held in February as well as the NJ Math League Contest**
14	Probability	6, 7	Number Golf Navigating through Probability Grades 6-8, pp 45-46	Students will play the game "number golf" in order to apply knowledge of probability distribution to the development of a game strategy. Students will compare and contrast "uniform distribution" to "mound-shaped distribution."
15	Probability	7	Racing Game and the Gumball Machine Navigating through Probability Grades 6-8, pp 56-60 and 64-66	Students will determine the fairness of the "racing game"; understand that better inferences can be drawn from larger samples than from smaller ones; explore the concept of independent events; and realize that the distribution of data from small samples often does not reflect the parent distribution.
16	Probability	7	How Will It Land? Navigating through Probability Grades 6-8, pp 67-68	Students will understand that the probability of some events can be determined only through data collection and compute experimental probabilities for samples of increasing size.

Grade 6				
Lesson	Strand	Grade Level	Title	Goals
17	Data Analysis	7	Stopping Distances & Classroom Climate Navigating through Data Analysis Grades 6-8, pp 43-48	Students will represent summary statistics for stopping distances at two speeds for two automobiles; use characteristics of the data to make decisions about car safety; compare multiple data sets of unequal size about classroom climate; make decisions about classroom comfort based on characteristics of the data.
18	Data Analysis	7	Cereal & A Matter of Opinion Navigating through Data Analysis Grades 6-8, pp 49-57	Students will read information from a relative-frequency graph; understand that it is not possible to read the number of data elements from a relative-frequency graph; identify the quartiles from a relative-frequency chart; construct an absolute-frequency graph; compare the similarities and differences between the two kinds of frequency graphs.
19	Data Analysis	7	People, Congress, and Pizza Navigating through Data Analysis Grades 6-8, pp 71-76	Students will represent bivariate data concerning states' congressional representation and number of pizza places; understand that relationships are not necessarily causal; use scatterplots and approximate lines of fit to predict or interpolate data values.
20	Algebra	7	Bouncing Tennis Balls & Walking Strides Navigating through Algebra Grades 6-8, pp 21-26	Students will collect data and record data in a table; display data using correct labels and scale; name the independent and dependent variables in a problem; recognize what varies in the experiment; and consider how the steepness (slope) of a line relates to distance covered in a given time.
21	Algebra	7	From Stories to Graphs (and back again)! Navigating through Algebra Grades 6-8, pp 27-30	Students will identify the independent and dependent variables in problems; sketch a graph to represent a story context that involves change over time; and describe the story context on the basis of a graph that displays changes over time.
22	Algebra	7	Missing Values and Stacking Cups Navigating through Algebra Grades 6-8, pp 39-43	Students will recognize the relationship among a table, graph, and symbolic expression; connect the concept of linearity with real-world contexts; use a table to organize information; and recognize that constant rate of change exists between the two variables.
23	Geometry	7	Triangles: Midsegments and the Pythagorean Theorem Navigating through Algebra Grades 6-8, pp 25-30	Students will locate the midpoints of sides of triangles; construct midsegments of triangles; become familiar with the Pythagorean Theorem; use an area model to discover the Pythagorean Theorem; make and test conjectures.
24	Geometry	7	Exploring Lines, Midpoints, and Triangles Using Coordinate Geometry Navigating through Algebra Grades 6-8, p 37	Students will recognize relationships among points on a coordinate plane and locate the midpoint between given points.

Grade 6				
Lesson	Strand	Grade Level	Title	Goals
25	Geometry	7	Similarity and the Coordinate Plane Navigating through Algebra Grades 6-8, pp 38-40	Students will explore dilations as a method for creating similar figures in coordinate space and reinforce their skills involving the coordinate plane.
26	Geometry	7	Translations, Reflections, Rotations, and Scale Factors Navigating through Algebra Grades 6-8, pp 46-49	Students will explore relationships between the pre-image and the image in rigid motions; develop appropriate language to describe rigid motion; perform three rigid transformations - reflections, translations, and rotations; draw similar figures using scale factors.

GIFTED & TALENTED MATHEMATICS
GRADE 7



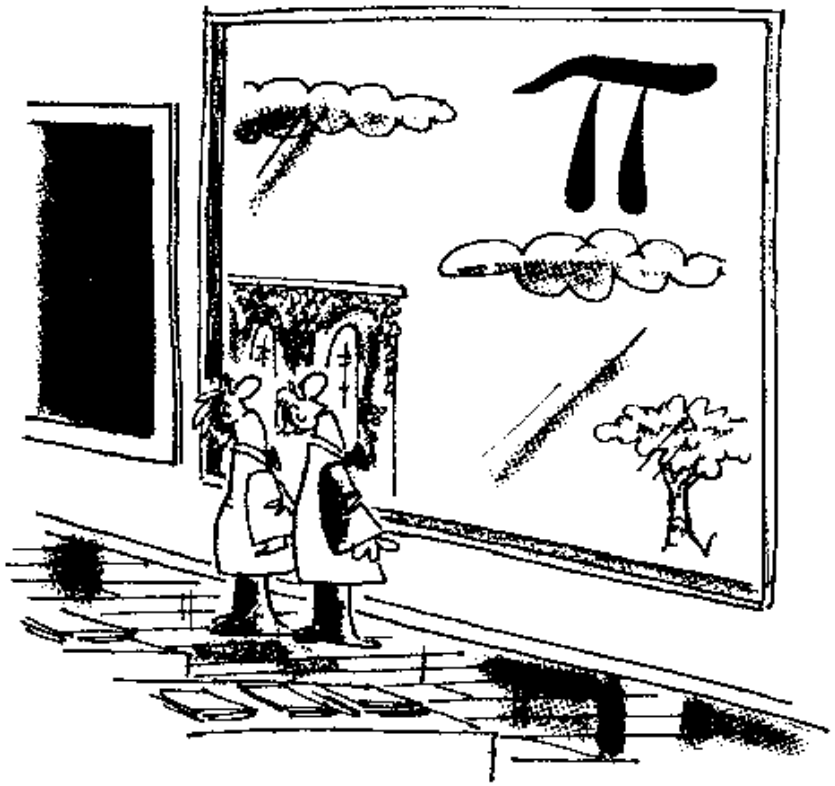
Grade 7				
Lesson	Strand(s)	Grade Level	Title	Goals
1	Statistics & Problem Solving	7, 8	Statistics & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore measures of central tendency in "Stretch - Statistics I - Grade 7" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Fraction/Decimal Conversions, Sprint - Warm-Up 1 #1-4, Target - Workout 1 #1-2, Team - Workout 1 #3-5
2	Statistics & Problem Solving	7, 8	Statistics & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore statistical measures in "Stretch - Statistics II - Grade 7" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Prime Numbers/Divisibility Rules, Sprint - Warm-Up 1 #5-10, Target - Workout 1 #6-7, Team - Workout 1 #8-10
3	Probability & Problem Solving	7, 8	Probability & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore experimental and theoretical probability in "Stretch - Probability I - Grade 7" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Perfect Squares/Cubes, Sprint - Warm-Up 2 #1-7, Target - Warm-Up 2 #8-10, Team - Workout 2 #1-15
4	Probability & Problem Solving	7, 8	Probability & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore probability of independent and dependent events in "Stretch - Probability II - Grade 7" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Triangle/Circle Formulas, Sprint - Warm-Up 3 #1-6, Target - Warm-Up 3 #7-10, Team - Workout 2 #6-10
5	Probability & Problem Solving	7, 8	Geometry & Problem Solving for Competition MATHCOUNTS School Handbook	Students will explore geometry in "Stretch - Geometry - Grade 7" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Pythagorean Triples, Sprint - Warm-Up 4 #1-5, Target - Warm-Up 4 #6-10, Team - Workout 3 #1-5
6	Algebra & Problem Solving	7, 8	Algebra & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore algebra methods in "Stretch - Algebra Part I - Grade 7" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - MATHCOUNTS Vocabulary, Sprint - Warm-Up 5 #1-10, Target - Warm-Up 6 #1-10, Team - Workout 4 #1-5
7	Algebra & Problem Solving	7, 8	Algebra & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore algebra methods in "Stretch - Algebra Part II - Grade 7" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Pattern Recognition, Sprint - Warm-Up 7 #1-10, Target - Warm-Up 8 #1-10, Team - Workout 4 #6-10
8	Number Sense & Problem Solving	7, 8	Number Sense & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore number sense methods in "Stretch - Number Sense Part I - Grade 7" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Factorials, Sprint - Warm-Up 9 #1-10, Target - Warm-Up 10 #1-10, Team - Workout 5 #1-5

Grade 7				
Lesson	Strand(s)	Grade Level	Title	Goals
9	Number Sense & Problem Solving	7, 8	Number Sense & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore number sense methods in "Stretch - Number Sense Part II - Grade 7" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Numbers in Different Bases, Sprint - Warm-Up 11 #1-10, Target - Warm-Up 12 #1-10, Team - Workout 6 #6-10
10	Proportional Reasoning & Problem Solving	7, 8	Proportional Reasoning & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore proportional reasoning methods in "Stretch - Proportional Reasoning Part I - Grade 7" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Squaring a number with units digit of 5, Sprint - Warm-Up 13 #1-10, Target - Warm-Up 14 #1-10, Team - Workout 7 #6-10
11	Proportional Reasoning & Problem Solving	7, 8	Proportional Reasoning & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore proportional reasoning methods in "Stretch - Proportional Reasoning Part II - Grade 7" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Factorization, Sprint - Warm-Up 15 #1-10, Target - Warm-Up 16 #1-10, Team - Workout 8 #6-10
12	Problem Solving	7, 8	Problem Solving Strategies for Competition - Part I MATHCOUNTS School Handbook	Students will explore problem solving methods in "Stretch - Factoring Part- Grade 7" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Pascal's Triangle, Sprint - Warm-Up 17 #1-10, Target - Warm-Up 18 #1-10, Team - Workout 9 #6-10
13	Problem Solving	7, 8	Problem Solving Strategies for Competition - Part II MATHCOUNTS School Handbook	Students will review the up-coming math competition rules/format and apply their problem solving skills by completing last year's MATHCOUNTS School competition contest for practice Sprint, Target, and Team rounds. **MATHCOUNTS School Competition should be administered in January. The MATHCOUNTS County Competition is held in February as well as the NJ MathLeague Contest**
14	Algebra, Geometry	7,8	Defying Gravity: A Microgravity Experimental Design http://spacelink.nasa.gov/Instructional.Materials/NASA.Educational.Products/Microgravity-Fall.Into.Mathematics/ AND MATHCOUNTS Handbook 2004-2005 Project pp 75-79	Students will explore the concept of microgravity; graph data showing the different accelerations of gravity that can be produced by NASA's KC-135A; and calculate "g" for given data and data from their own experimental design.
15	Algebra, Geometry	8,9	Packing Problems Algebra in the Real World: 38 Enrichment Lessons for Algebra 2, pp 11-18	Students will analyze "packing density" by measuring how well different packings of circles fill up a square; using densities, tessellations, and properties of right triangles, students will explore why the honeybee's regular hexagon is the most efficient and economical choice for packing.

Grade 7				
Lesson	Strand(s)	Grade Level	Title	Goals
16	Probability	8	Dice Differences & Test Guessing Navigating through Probability Grades 6-8, pp 41-44	Students will understand sample space and the numeric outcomes associated with it; organize the results of a random experiment; understand the pooling of results; calculate the relative frequencies of outcomes and interpret them as probabilities; and analyze the empirical probabilities for an experiment.
17	Probability	8	Strings of Heads Navigating through Probability Grades 6-8, pp 47-50	Students will calculate the relative frequencies of events; interpret relative frequencies as probabilities; and compare relative frequencies with theoretical frequencies.
18	Probability	8	Probability Investigations: The Long Flight Home, Dixie's Basketball Contest, and The Newspaper Route Navigating through Probability Grades 6-8, pp 70-71, 78-83	Students will use simulated data to make estimates of theoretical probabilities; understand that better inferences can be made from a larger sample than from a smaller sample; understand the probabilities of complementary events; choose a random device for generating specified probabilities; and determine the expected value both theoretically and experimentally.
19	Geometry	8	Rotational Symmetry and Regular Polygons Navigating through Geometry Grades 6-8, pp 52-55	Students will develop skills with rotational motion; identify the number of rotational symmetries of regular polygons; formulate and test conjectures about geometric relationships; and represent geometric relationships using algebra.
20	Geometry	8	Spatial Visualization: I Took a Trip on a Train & Constructing 3-Dimensional Shapes Navigating through Geometry Grades 6-8, pp 69-72	Students will understand the attributes and component parts of two-dimensional representations of three-dimensional objects; develop spatial-visualization skills by analyzing perspective views of three-dimensional objects; use spatial reasoning to position objects in perspective view; and investigate the characteristics of solids by constructing and disassembling shapes.
21	Geometry	8	Geometric Modeling: Minimizing Perimeter and Measuring Indirectly Navigating through Geometry Grades 6-8, pp 73-80	Students will explore the relationship between perimeter and area; use geometry for real-world applications; apply similarity to problems; and use indirect measurement.
22	Data Analysis	8	Migraines: Histograms and Box Plots Navigating through Data Analysis Grades 6-8, pp 60-66	Students will use histograms and relative-frequency histograms to analyze migraine data; practice creating box plots; extract information from histograms and box plots in order to make decisions.
23	Data Analysis	8	Predicting and Exploring Trends: U.S. population, the Olympics,… Navigating through Data Analysis Grades 6-8, pp 77-80	Students will use scatterplots and approximate lines of fit to predict or interpolate data values; explore relationships in data; analyze the limitations of predictions made about the data.

Grade 7				
Lesson	Strand(s)	Grade Level	Title	Goals
24	Algebra	8	Exploring Linear Relationships: Walking Rates, Pledge Plans, and Fund Raising Navigating through Algebra Grades 6-8, pp 44-55	Students will connect the concept of linearity with real-world contexts; use a table to organize information; make graphs using correct labels and scales; recognize the relationship among the table, the graph, the equation, and the slope of the line; and identify the y-intercept from a graph or table.
25	Geometry	8	Exploring the Slopes of Parallel and Perpendicular Lines Navigating through Geometry Grades 6-8, pp 41-42	Students will develop an understanding of slope; compute and compare the slopes of line segments; and explore the characteristics of parallel and perpendicular lines.
26	Algebra	8	Using Algebraic Symbols: Tiling Tubs and Plotting Land Navigating through Algebra Grades 6-8, pp 63-70	Students will write equations to describe the relationships among variables; determine when expressions are equivalent; and explore the use of the distributive property.

GIFTED & TALENTED MATHEMATICS
GRADE 8



Grade 8				
Lesson	Strand	Grade Level	Title	Goals
1	Statistics & Problem Solving	8	Statistics & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore measures of central tendency in "Stretch - Statistics I - Grade 8" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Fraction/Decimal Conversions, Sprint - Warm-Up 1 #1-4, Target - Workout 1 #1-2, Team - Workout 1 #3-5
2	Statistics & Problem Solving	8	Statistics & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore statistical measures in "Stretch - Statistics II - Grade 8" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Prime Numbers/Divisibility Rules, Sprint - Warm-Up 1 #5-10, Target - Workout 1 #6-7, Team - Workout 1 #8-10
3	Probability & Problem Solving	8	Probability & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore experimental and theoretical probability in "Stretch - Probability I - Grade 8" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Perfect Squares/Cubes, Sprint - Warm-Up 2 #1-7, Target - Warm-Up 2 #8-10, Team - Workout 2 #1-15
4	Probability & Problem Solving	8	Probability & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore probability of independent and dependent events in "Stretch - Probability II - Grade 8" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Triangle/Circle Formulas, Sprint - Warm-Up 3 #1-6, Target - Warm-Up 3 #7-10, Team - Workout 2 #6-10
5	Probability & Problem Solving	8	Geometry & Problem Solving for Competition MATHCOUNTS School Handbook	Students will explore geometry in "Stretch - Geometry - Grade 8" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Pythagorean Triples, Sprint - Warm-Up 4 #1-5, Target - Warm-Up 4 #6-10, Team - Workout 3 #1-5
6	Algebra & Problem Solving	8	Algebra & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore algebra methods in "Stretch - Algebra Part I - Grade 8" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - MATHCOUNTS Vocabulary, Sprint - Warm-Up 5 #1-10, Target - Warm-Up 6 #1-10, Team - Workout 4 #1-5

Grade 8				
Lesson	Strand	Grade Level	Title	Goals
7	Algebra & Problem Solving	8	Algebra & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore algebra methods in "Stretch - Algebra Part II - Grade 8" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Pattern Recognition, Sprint - Warm-Up 7 #1-10, Target - Warm-Up 8 #1-10, Team - Workout 4 #6-10
8	Number Sense & Problem Solving	8	Number Sense & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore number sense methods in "Stretch - Number Sense Part I - Grade 8" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Factorials, Sprint - Warm-Up 9 #1-10, Target - Warm-Up 10 #1-10, Team - Workout 5 #1-5
9	Number Sense & Problem Solving	8	Number Sense & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore number sense methods in "Stretch - Number Sense Part II - Grade 8" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Numbers in Different Bases, Sprint - Warm-Up 11 #1-10, Target - Warm-Up 12 #1-10, Team - Workout 6 #6-10
10	Proportional Reasoning & Problem Solving	8	Proportional Reasoning & Problem Solving for Competition - Part I MATHCOUNTS School Handbook	Students will explore proportional reasoning methods in "Stretch - Proportional Reasoning Part I - Grade 8" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Squaring a number with units digit of 5, Sprint - Warm-Up 13 #1-10, Target - Warm-Up 14 #1-10, Team - Workout 7 #6-10
11	Proportional Reasoning & Problem Solving	8	Proportional Reasoning & Problem Solving for Competition - Part II MATHCOUNTS School Handbook	Students will explore proportional reasoning methods in "Stretch - Proportional Reasoning Part II - Grade 8" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Factorization, Sprint - Warm-Up 15 #1-10, Target - Warm-Up 16 #1-10, Team - Workout 8 #6-10
12	Problem Solving	8	Problem Solving Strategies for Competition - Part I MATHCOUNTS School Handbook	Students will explore problem solving methods in "Stretch - Factoring Part- Grade 8" and apply their problem solving skills by completing "Competition Practice Rounds" from the current MATHCOUNTS School Handbook: Drill - Pascal's Triangle, Sprint - Warm-Up 17 #1-10, Target - Warm-Up 18 #1-10, Team - Workout 9 #6-10
13	Problem Solving	8	Problem Solving Strategies for Competition - Part II MATHCOUNTS School Handbook	Students will review the up-coming math competition rules/format and apply their problem solving skills by completing last year's MATHCOUNTS School competition contest for practice Sprint, Target, and Team rounds. **MATHCOUNTS School Competition should be administered in January. The MATHCOUNTS County Competition is held in February as well as the NJ MathLeague Contest**

Grade 8				
Lesson	Strand	Grade Level	Title	Goals
14	Number Sense	8, 9	Making "Magic Squares" MATHCOUNTS Website - "MATHCOUNTS Coaching Kit: Magic Squares Lesson" http://www.mathcounts.org	Students will be able to appreciate and explore the history of magic squares and generate 3x3, 5x5, and 7x7 magic squares as well as develop an algorithm for creating magic squares.
15	Data Analysis	9,10	Cryptanalysis - Part I - History & Exploration of Basic Methods; Cryptanalysis - Part II - Breaking the Code! The Code Book by Simon Singh	Students will be able to appreciate and understand the history of cryptanalysis; encrypt with different famous mono- (and poly-) alphabetic substitution ciphers; and explore frequency analysis as a basic method of "code breaking." Students will be able to practice decrypting cipher-texts from Simon Singh's Code Book and apply their knowledge of frequency analysis for given sets of "intercepted code" in a contest.
16	Data Analysis	9,10	Communicating through Space - Part I - Representing the Image Data Mission Mathematics II, Grades 9-12, pp 155-162	Students will be able to investigate real-life applications of coding with the following NASA investigations: "pixels in the news," "crafty coding," "ambiguity in the code," and "does a new code do the trick?"; students will formulate, approach, and solve problems involving representation of shuttle image data.
17	Algebra, Data Analysis	9,10	Communicating through Space - Part II - Compressing the Data Mission Mathematics II, Grades 9-12, pp 162-168	Students will be able to investigate real-life applications of coding with the following NASA investigations: "data transmission in the news: Galileo," "Letters! We've got lots of letters," and "Show your Encoding Expertise"; students will decode and encode binary symbols and analyze data for error.
18	Algebra, Data Analysis	9,10	Communicating through Space - Part III - Detecting and Correcting Errors Mission Mathematics II, Grades 9-12, pp 168-200	Students will be able to investigate real-life applications of coding with the following NASA investigations: "Binary Trees and other coding schemes" and "Hamming Codes in Use"; students will be able detect and correct errors in code as well as explore & use Hamming codes to derive other codes.
19	Algebra	9,10,11	Galileo and Gravity: Why was the trajectory parabolic? Navigating through Algebra Grades 9-12, pp 41-46	Students will analyze data gathered by rolling a ball down an inclined plane and consider the difference sequences of the distance data in order to develop a quadratic model. Students will use data gathered by a CBL motion detector to conduct more motion data for analysis.
20	Algebra	9,10,11	Tolerance and Accuracy Navigating Through Algebra in Grades 9-12, pp 18-22	Students will examine a mapping diagram in a real-world context; look at a function to see how changes in the domain affect the range; use class measurements to see how tolerance must be involved in measuring; use a graphic model to see how one tolerance affects another; and examine inequalities in an application setting with algebra and geometry.

Grade 8				
Lesson	Strand	Grade Level	Title	Goals
21	Geometry, Data Analysis	8,9	The "Wright Flight": Is Bigger Always Better? Mathematical Errors Can Be Deadly! MATHCOUNTS 2003-2004 Extended Activity pp 33-38 AND http://www.wrightexperience.com/index.htm	Students will compare various aspects of the 1899-1903 glider designs the Wright brothers tested. Students will calculate area, perimeter, and percentage of change between each subsequent wing design and compare these changes with mathematical errors the Wright brothers discovered while testing these designs.
22	Algebra, Geometry	9,10,11	The Golden Ratio - Part I Algebra in the Real World: 38 Enrichment Lessons for Algebra 2, pp 51-72	Students will explore a variety of the appearances of the golden number within natural phenomena; define the golden number with a proportion, irrational numbers, and the quadratic formula; express the golden number with continued fractions.
23	Algebra, Geometry	9,10,11	The Golden Ratio - Part II Algebra in the Real World: 38 Enrichment Lessons for Algebra 2, pp 51-72	Students will apply proportional reasoning and geometric knowledge to explorations of the golden ratio in "golden" triangles and rectangles, regular pentagons, and nature's pentagrams.
24	Algebra, Number Theory	9,10,11	The 13th Century Lives On - Part I - Fibonacci Algebra in the Real World: 38 Enrichment Lessons for Algebra 2, pp 73-84	Students will explore the famous Fibonacci sequence in both historical and natural contexts; connect the limit of ratios of consecutive Fibonacci numbers to the Golden Ratio.
25	Algebra, Number Theory	9,10,11	The 13th Century Lives On - Part II - Binet's Formula Algebra in the Real World: 38 Enrichment Lessons for Algebra 2, pp 73-84	Students will find an algebraic expression for the general term of the Fibonacci sequence known as "Binet's Formula" and analyze Pascal's triangle for Fibonacci (and other) patterns.
26	Algebra	9,10,11	Would You Work for Me? The Story of the Devil and Daniel Webster Navigating through Algebra Grades 9-12, pp 26-27	Students will use recursive or iterative forms to represent relationships; approximate and interpret rates of change from numerical data; and draw reasonable conclusions about the situations being modeled.

Addendum

Supplementary Materials

Please see the print copy of the full Gifted & Talented curriculum for grade level worksheets referred to in this guide. In addition, the Navigation series and other sources referenced contain detailed teacher notes and lesson plans for each lesson.