COURSE: Mathematics

GRADE LEVEL: Eighth Grade/Applied

LENGTH OF COURSE: 180 Days/70 Minutes Per Day

TEXT: Middle School Math Course 2

PUBLISHER: Scott Foresman – Addison Wesley

COPYRIGHT: 2002

COURSE DESCRIPTION:

The sixth, seventh and eighth grade math curriculum covers a number of skills and concepts through a rich yet balanced curriculum. The structure of the lessons promotes understanding, retention and preparation for standardized tests.

AREAS OF STUDY:

Number Sense
Computation
Measurement
Estimation
Problem Solving
Statistics and Data Analysis
Probability and Prediction
Algebra and Functions
Geometry
Trigonometry
Concepts of Calculus

CURRICULUM WRITING TEAM:

Michelle Buckman
Kathy Nied
Jerry Capone
Ron Ezzo

DATE OF REVISION:

March 2002

Course: Mathematics

Grade Level: Grade 8
PA Standard: 2.1.8

Topics:	Skills:
Numbers, number systems, number relationships	Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals percents, exponents, scientific notation, square roots) Simplify numerical expressions involving exponents, scientific notation and using order of operations Distinguish between and order rational and irrational numbers Apply ratio and proportion to mathematical problem situations involving distance, rate, time and similar triangles Simplify and expand algebraic expressions using exponential forms Use the number line model to demonstrate integers and their applications Use the inverse relationships between addition, subtraction, multiplication, division, exponentiation and root extraction to determine unknown quantities in equations
Activities:	**Performance Assessments:**
Number line activities Counter method Real world activities and examples P.E.M.D.A.S. (Please Excuse My Dear Aunt Sally) Formula Applications	Teacher Observation Oral questions Board work Classroom participation Paper/pencil activities Teacher made tests Textbook tests Homework Projects

Course: Mathematics

Grade Level: Grade 8
PA Standard: 2.2.8

Topics:	Skills:
Computation and estimation	Complete calculations by applying the order of operations Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions Estimate the value of irrational numbers Estimate amount of tips and discounts using ratios, proportions and percents Determine the appropriateness of overestimating or underestimating in computation Identify the difference between exact value and approximation and determine which is appropriate for a given situation
Activities:	**Performance Assessments:**
Mental math strategies Real life problems Answers make sense Calculator activities	Teacher observation Oral questions Board work Classroom participation Paper/pencil activities Teacher made tests Textbook tests Homework Projects

Wallenpaupack Area School District

Course: Mathematics

Grade Level: Grade 8
PA Standard: 2.3.8

Topics:	Skills:
Measurement and estimation	Develop formulas for determining measurements (e.g., area, volume, distance)
	Solve rate problems (e.g., rate x time=distance, principal x interest rate=interest)
	Measure angles in degrees and determine relations of angles
	Estimate, use and describe measures of distance, rate, perimeter, area, volume, weight, mass and angles
	Describe how a change in linear dimension of an object affects its perimeter, area and volume
	Use scale measurements to interpret maps or drawings
	Create and use scale models
Activities:	**Performance Assessments:**
Construction project	Teacher observation
Trip project	Oral questions
Using formula for everyday activities	Board work
Checking and saving accounts	Classroom participation
	Paper/pencil activities
	Teacher made tests
	Textbook tests
	Homework
	Projects

Course: Mathematics

Grade Level: Grade 8
PA Standard: 2.4.8

Topics:	Skills:
Mathematical reasoning	Make conjectures based on logical reasoning and test conjectures by using counter-examples Combine numeric relationships to arrive at a conclusion Use if…then statements to construct simple, valid arguments Construct, use and explain algorithmic procedures for computing and estimating with whole numbers, fractions, decimals and integers Distinguish between inductive and deductive reasoning Use measurements and statistics to quantify issues
Activities:	**Performance Assessments:**
Real world problems	Teacher Observation Oral questions Board work Classroom participation Paper/pencil activities Teacher made tests Textbook tests Homework Projects

Course: Mathematics

Grade Level: Grade 8
PA Standard: 2.5.8

Topics:	Skills:
Mathematical problem solving	Invent, select, use and justify the appropriate methods, materials and strategies to solve problems Verify and interpret results using precise mathematical language, notation and representations, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs and diagrams Justify strategies and defend approaches used and conclusion reached Determine pertinent information in problem situations and whether any further information is needed for solution
Activities:	**Performance Assessments:**
Reading and making predictions from graphs Showing and explaining your solution methods	Teacher observations Oral questions Board work Classroom participation Paper/pencil activities Teacher made tests Textbook tests Homework Projects

Wallenpaupack Area School District

Course: Mathematics   **Grade Level:** Grade 8
                                         PA Standard: 2.6.8

Topics	Skills:
Statistics and data analysis	Compare and contrast different plots of data using values of mean, median, mode, quartiles and range Explain effects of sampling procedures and missing or incorrect information on reliability Fit a line to the scatter plot of two quantities and describe any correlation of the variables Design and carry out a random sampling procedure Analyze and display data in stem-and leaf and box-and-whisker plots Use scientific and graphing calculators and computer spreadsheets to organize and analyze data Determine the validity of the sampling method described in studies published in local or national newspapers
Activities:	**Performance Assessments:**
Classroom and student examples Line of best fit problems	Teacher observation Oral questions Board work Classroom participation Paper/pencil activities Teacher made tests Textbook tests Homework Projects

Course: Mathematics

Grade Level: Grade 8
PA Standard: 2.7.8

Topics:	Skills:
Probability and predications	Determine the number of combinations and permutations for an event Present the results of an experiment using visual representations (e.g., tables, charts, graphs) Analyze predictions (e.g., election polls) Compare and contrast results from observations and mathematical models Make valid inferences, predictions and arguments based on probability
Activities:	**Performance Assessments:**
Track and field examples Olympics problems	Teacher observation Oral questions Board work Classroom participation Paper/pencil activities Teacher made tests Textbook tests Homework Projects

Wallenpaupack Area School District

Course: Mathematics

Grade Level: Grade 8
PA Standard: 2.8.8

Topics:	Skills:
Algebra	Apply simple algebraic patterns to basic number theory and to spatial relations
	Discover, describe and generalize patterns, including linear, exponential and simple quadratic relationships
	Create and interpret expressions, equations or inequalities that model problem situations
	Use concrete objects to model algebraic concepts
	Select and use a strategy to solve an equation or inequality, explain the solution and check the solution for accuracy
	Represent relationships with tables or graphs in the coordinate plane and verbal or symbolic rules
	Graph a linear function from a rule or table
	Generate a table or graph from and use graphing calculators and computer spreadsheets to graph and analyze functions
	Show that an equality relationship between two quantities remains the same as long as the same change is made to both quantities; explain how a change in one quantity determines another quantity in a functional relationship

Activities:	Performance Assessments:
Everyday algebra problems Graphing problems	Teacher observation Oral questions Board work Classroom participation Paper/pencil activities Teacher made tests Textbook tests Homework Projects

Wallenpaupack Area School District

Course: Mathematics

Grade Level: Grade 8
PA Standard: 2.9.8

Topics:	Skills:
Geometry	Construct figures incorporating perpendicular bisector of a line segment and an angle bisector using computer software Draw, label, measure and list the properties of complementary, supplementary and vertical angles Classify familiar polygons as regular or irregular up to a decagon Identify, name, draw and list all properties of squares, cubes, pyramids, parallelograms, quadrilaterals, trapezoids, polygons, rectangles, rhombi, circles, spheres, triangles, prisms and cylinders Construct parallel lines, draw a transversal and measure and compare angles formed (e.g., alternate interior and exterior angles) Approximate the value of pi through experimentation Use simple geometric figures (e.g., triangles, squares) to create, through rotation, transformational figures in three dimensions Generate transformations using computer software Analyze geometric patterns (e.g., tessellations, sequences of shapes) and develop descriptions of the patterns Analyze objects to determine whether they illustrate tessellations, symmetry, congruence, similarity and scale
Activities:	**Performance Assessments:**
Drawing projects Combining algebra and geometry problems	Teacher observation Oral questions Board work Classroom participation Paper/pencil activities Teacher made tests Textbook tests Homework Projects

Course: Mathematics

Grade Level: Grade 8
PA Standard: 2.10.8

Topics:	Skills:
Trigonometry	Compute measures of sides and angles using proportions, the Pythagorean Theorem and right triangle relationships Solve problems requiring indirect measurement for lengths of sides of triangles
Activities:	**Performance Assessments:**
Real world construction problems	Teacher Observation Oral Questions Board Work Classroom Participation Paper/pencil activities Teacher made tests Textbook tests Homework Projects

Course: Mathematics

Grade Level: Grade 8
PA Standard: 2.11.8.

Topics:	Skills:
Calculus	Analyze graphs of related quantities for minimum and maximum values and justify the findings Describe the concept of unit rate, ratio and slope in the context of rate of change Continue a pattern of number or objects that could be extended infinitely

Activities:	Performance Assessments:
Shopping project	Teacher observation Oral questions Board work Classroom participation Paper/pencil activities Teacher made tests Textbook tests Homework Projects

TERMS USED IN THE ACADEMIC STANDARDS FOR MATHEMATICS THROUGH GRADE 8
Angle Measurement in Degrees
Bisector
Box-and-Whisker Plot
Combination
Complementary Angle
Conjecture
Coordinate Plane
Counter Example
Deductive Reasoning
Dimensions
Equation
Evaluate the Expression
Exponent
Exponential Relationship
Functional Relationship
Inductive Reasoning
Inequality
Irrational Number
Linear Function
Linear Relationship
Logical Reasoning
Number Line
Order of Operations
Percent
Permutation
Proportion
Pythagorean Theorem
Quadratic Relationship
Quartile
Random Sampling
Ratio
Rational Number
Regular Polygon
Reliability
Scale Model
Scientific Notation
Sequence
Slope
Square Root
Stem-and-Leaf Plot
Supplementary Angle
Transformation
Transversal
Unit Rate
Verbal, Symbolic Rules
Vertical Angle

INTERNET RESOURCES:
www.aaamath.com
www.coolmath4kids.com
www.funbrain.com
www.moneyopolis.com (teacher can set up for class access)
www.schoolcentral.com/willoughby
www.stfx.ca/special/mathproblems
www.learningwave.com/abmath