Haverhill Public Schools

MATHEMATICS CURRICULUM MAP

Working Document, 2008–2009

TERM 1 – AUGUST/SEPTEMBER/OCTOBER	TERM 2 – NOVEMBER/DECEMBER/JANUARY
Introduction to Algebra	Graphs and Linear Equations
Integers and Rational Numbers	Systems of Linear Equations
Linear Equations	Statistics and Data Analysis
TERM 3 – JANUARY/FEBRUARY/.MARCH	**TERM 4 – APRIL/MAY/JUNE**
Polynomials	Rational and Irrational Numbers
Factoring and Quadratic Equations	Rational Expressions and Equations
Functions, Relations, and Graphs	Inequalities
	Systems of Inequalities

Algebra I…grade 8 and HHS

Δ Probability & Statistics, Geometry, and Pythagorean Theorem should be integrated before 8th-grade MCAS.

ΔΔ Problem solving should be on going throughout the year.

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MATHEMATICS CURRICULUM MAP – Algebra I … Grade 8 and HHS

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Term 1:

MA Frameworks – Learning Standards	Objectives/Topics	Instructional Resources
AI.N.1 Identify and use the properties of operations on real numbers, including the associative, commutative, and distributive properties; the existence of the identity and inverse elements for addition and multiplication; and the density of the set of rational numbers in the set of real numbers. AI.N.2 Simplify numerical expressions, including those involving positive integer exponents or the absolute value; apply such simplifications in the solution of problems.	Introduction to Algebra Variable and algebraic expressions Exponents Order of operations Evaluating algebraic expressions Algebraic sentences Properties (commutative, associative, distributive, identity, equality)	Houghton Mifflin: Algebra: Structure & Method – Ch. 1 & 2 McDougal Littell: Algebra 1 – Ch. 1 Addison Wesley: Algebra – Ch 1 Glencoe: Algebra 1 – Ch 1
AI.N.1 AI.N.2	Integers and Rational Numbers Number lines Opposites and absolute value Operations on all types of real numbers Properties of operations to simplify expressions	Houghton Mifflin: Algebra: Structure & Method – Ch. 1 & 2 McDougal Littell: Algebra 1 – Ch. 2 Addison Wesley: Algebra – Ch 2 Glencoe: Algebra 1 – Ch 2 Algeblocks Units 2 & 3

Term 1 cont. AI.N.4 Use estimation to judge the reasonableness of results of computations and of solutions to problems involving real numbers. AI.P.2 Use properties of the real number system to judge the validity of equations and inequalities, to prove or disprove statements, and to justify every step in a sequential argument. AI.P.10 Solve equations and inequalities including those involving absolute value of linear expressions and apply to the solution of problems. (AI.N.10) AI.P.11 Solve everyday problems that can be modeled using linear, reciprocal, quadratic, or exponential functions. Apply appropriate tabular, graphical, or symbolic methods to the solution. Include compound interest, and direct and inverse variation problems. (AI.P.11)	Linear Equations and Word Problems Transforming equations by addition and subtraction Transforming equations by multiplication and division Several transformations Problem solving Transforming equations with variables on both sides Transposition Clearing equations of fractions and decimals Evaluating and solving for a specified variable Absolute value in equations Ratio, proportion and percent Word problems leading to linear equations including problems about numbers, geometry problems, motion problems, mixture problems and percent problems	Houghton Mifflin: Algebra: Structure & Method – Ch. 3, 7.1, 7.2, 7.5, & 7.6 McDougal Littell: Algebra 1 – Ch. 3 Addison Wesley: Algebra – Ch 3 Glencoe: Algebra 1 – Ch 3, 4.1 & 4.4

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Term 2:

MA Frameworks – Learning Standards	Objectives/Topics	Instructional Resources
AI.P.5 Demonstrate an understanding of the relationship between various representations of a line. Determine a line's slope and x- and y-intercepts from its graph or from a linear equation that represents the line. Find a linear equation describing a line from a graph or geometric description of the line, e.g., by using the 'point-slope" or "slope-intercept" formulas. Explain the significance of a positive, negative, zero, or undefined slope. AI.P.6 Find linear equations that represent lines either perpendicular or parallel to a given line and through a point, e.g., by using the "point-slope" form of the equation.	Graphs and Linear Equations Slope of a line Intercepts Graphing lines using slopes and intercepts The slope-intercept equation Determining the equation of the line Parallel lines Perpendicular lines Applications of graphs of linear equations	Houghton Mifflin: Algebra: Structure & Method – Ch. 8 McDougal Littell: Algebra 1 – Ch. 4 & 5 Addison Wesley: Algebra – Ch 7 Glencoe: Algebra 1 – Ch 5 & 6
AI.P.12 Solve everyday problems that can be modeled using systems of linear equations. Apply algebraic and graphical methods to the solution. Use technology when appropriate.	Systems of Linear Equations Solving systems of linear equations by graphing Solving systems of linear equations by substitution Solving a system of linear equations by the addition method Extending the addition method by using multiplication Solving word problems associated with linear Equations	Houghton Mifflin: Algebra: Structure & Method – Ch. 9 McDougal Littell: Algebra 1 – Ch. 7.1 – 7. 5 Addison Wesley: Algebra – Ch 8 Glencoe: Algebra 1 – Ch 8

Term 2 cont. AI.D.1 Select create and interpret an appropriate graphical representation (e.g., scatter plot, table, stem-and-leaf plots, circle graph, line graph and line plot) for a set of data and use appropriate statistics (e.g., mean, median, range and mode) to communicate information about the data. AI.D.2 Approximate a line of best fit (trend line) given a set of data, e.g., scatter plot. Use technology when appropriate. AI.D.3 Describe how sample size and population size affect the validity of predictions from a set of data.	<u>Statistics and Data Analysis</u> Frequency tables Stem-and-leaf plots Line plots, line graphs, histograms Data analysis and measures of central tendency Scatter plots and best-fit lines Box-and-whisker plots Circle graphs (pie charts) *Supplement before 8th –grade MCAS: Pythagorean Theorem, geometry, and probability	Houghton Mifflin: <u>Algebra: Structure & Method</u> – Looking Ahead McDougal Littell: <u>Algebra 1</u> – Scattered throughout Ch. 1, 2, 3, 5, 6, & 12 Addison Wesley: <u>Algebra</u> – Ch. 15 Glencoe: <u>Algebra 1</u> – Scattered throughout book

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Term 3:

MA Frameworks – Learning Standards	Objectives/Topics	Instructional Resources
AI.P.7 Add, subtract, and multiply polynomials. Divide polynomials by monomials. AI.P.8 Demonstrate facility in symbolic manipulation of polynomial and rational expressions by rearranging and collecting terms; factoring; identifying and canceling common factors in rational expressions; and applying the properties of positive integer exponents. Use these in the solution of problems.	Polynomials Addition and subtraction of polynomials Exponents Rules of exponents Multiplying and dividing monomials Multiplying and dividing polynomials Representing polynomials visually using algebra tiles and other manipulatives Problem solving	Houghton Mifflin: Algebra: Structure & Method – Ch. 4 Mc Dougal Littell: Algebra 1 – Scattered throughout Ch. 8 & 10 Addison Wesley: Algebra – Ch. 5 & 6 Glencoe: Algebra 1 – Ch. 9 & 10 Algeblocks Unit 4 Algeblocks Unit 5
AI.P.8 AI.P.9 Find solutions to quadratic equations (with real roots) by factoring, completing the square, or using the quadratic formula. Demonstrate and understanding of the equivalence of the methods. AI.P.11 Solve everyday problems that can be modeled using linear, reciprocal, quadratic or exponential functions. Apply appropriate tabular, graphical or symbolic methods to the solution. Include compound interest, and direct and inverse variation problems.	Factoring and Quadratic Equations Common monomial factor of polynomials Difference of two squares Quadratic trinomials Mixed factoring Solving equations by factoring Word problems associated with equations solved by factoring Other methods of solving quadratic equations	Houghton Mifflin: Algebra: Structure & Method – Ch. 5 McDougal Littell: Algebra 1 – Scattered throughout Ch. 10 Addison Wesley: Algebra – Ch. 6 Glencoe: Algebra 1 – Ch. 9 & 10

Term 3 cont. AI.P.1 Describe, complete, extend, analyze, generalize, and create a wide variety of patterns, including iterative, recursive (e.g., Fibonnacci Numbers), linear, quadratic, and exponential functional relationships. AI.P.3 Demonstrate an understanding of relations and functions. Identify the domain, range, dependent, and independent variables of functions. AI.P.4 Translate between different representations of functions and relations: graphs, equations, point sets, and tabular.	<u>Functions, Relations and Graphs</u> Functions and relations expressed in tabular form Patterns including iterative, recursive, linear, quadratic, reciprocal and exponential functional relationships The Cartesian coordinate system Graphing points and functions Solutions to equations containing two variables Graphing solutions to equations in two variables Solving equations graphically Graphing linear functions	Houghton Mifflin: <u>Algebra: Structure & Method</u> – Ch. 8 McDougal Littell: <u>Algebra 1</u> – Scattered throughout Ch. 9 Addison Wesley: <u>Algebra</u> – Ch. 9 Glencoe: <u>Algebra 1</u> – Ch. 10

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MATHEMATICS CURRICULUM MAP – Algebra I … Grade 8 and HHS
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Term 4:

MA Frameworks – Learning Standards	Objectives/Topics	Instructional Resources
AI.N.3 Find the approximate value for solutions to problems involving square roots and cube roots without the use of a calculator. AI.N.10 Solve equations and inequalities including those involving absolute value of linear expressions and apply to the solution of problems.	Rational and Irrational Numbers Rational and irrational square and cube roots Square rots of variable expressions The Pythagorean Theorem Multiplying, dividing and simplifying radicals Multiplication of binomials containing radicals Simple radical equations	Houghton Mifflin: Algebra: Structure & Method – Ch. 11.3 through 11.10 McDougal Littell: Algebra 1 – Ch. 9.1, 9.2 & 12.5 Addison Wesley: Algebra – Ch. 11 Glencoe: Algebra 1 – Ch. 13.1 – 13.3
AI.P.7 Add, subtract and multiply polynomials. Divide polynomials by monomials. AI.P.8 Demonstrate facility in symbolic manipulation of polynomial and rational expressions by rearranging and collecting terms; factoring; identifying and canceling common factors in rational expressions; and applying the properties of positive integer exponents. Use these in the solution of problems.	Rational Expressions and Equations Simplifying fractions Multiplying fractions Dividing fractions Adding and subtracting fractions Polynomial division Polynomial long division Equations with fractional coefficients Fractional equations	Houghton Mifflin: Algebra: Structure & Method – Ch. 6, 7.3 & 7.4 McDougal Littell: Algebra 1 – Ch. 11.4 through 11.8 Addison Wesley: Algebra – Ch. 4 Glencoe: Algebra 1 – Ch. 7

Term 4 cont. AI.P.1 Use properties of the real number system to judge the validity of equations and inequalities, to prove or disprove statements, and to justify every step in a sequential argument. AI.P.10 Solve equations and inequalities including those involving absolute value of linear expressions and apply to the solution of problems.	Inequalities Inequalities and their graphs Solving inequalities by addition and multiplication Problem solving involving inequalities Compound inequalities Absolute value in equalities	Houghton Mifflin: Algebra: Structure & Method – Ch. 10 McDougal Littell: Algebra 1 – Ch. 4 & 5 Addison Wesley: Algebra – Ch. 10 Glencoe: Algebra 1 – Ch. 12
AI.P.12 Solve everyday problems that can be modeled using systems of linear equations. Apply algebraic and graphical methods to the solution. Use technology when appropriate.	Systems of Linear Inequalities Graphs of linear inequalities Systems of linear inequalities	Houghton Mifflin: Algebra: Structure & Method – Ch. 9 McDougal Littell: Algebra 1 – Ch. 7.1 through 7.5 Addison Wesley: Algebra – Ch. 8 Glencoe: Algebra 1 – Ch. 8