Pine Hill Public Schools

Content Area:	Mathematics		
Course Title/ Grade Level:	Math/Grade 8		
Unit 1:	The Number System	Duration:	9 days
Unit 2:	Expressions and Equations Part 1	Duration:	28 days
Unit 3:	Expressions and Equations Part 2	Duration:	20 days
Unit 4:	Functions	Duration:	23days
Unit 5:	Geometry	Duration:	45 days
Unit 6:	Statistics	Duration:	24 days
Date Created or Revised:	6/19/13		
BOE Approval Date:	8/27/2013		

Pine Hill Public Schools Mathematics Curriculum		
Unit Title: Number System		**Unit 1**
Course or Grade Level: 8	**Length of Time:** 9 days	
Pacing	Battery Pre-Assessment administration: 1 day Rational and Irrational Numbers: 6 instructional days + 1 day re-teaching/enrichment + 1 day for summative assessment	
Essential Questions	• What other types of numbers are there besides rational numbers? • Why do we need numbers besides rational numbers?	
Content	• Rational Number • Irrational Number • Decimal expansion	
Skills	• Know rational and irrational numbers • Compare rational and irrational numbers • Approximate irrational numbers • Locate rational numbers on a number line • Understand decimal expansion • Show decimal expansion repeats • Covert repeating decimal expansion to a rational number	
Assessments	• Homework • Classwork • Quizzes • Battery Pre-Assessment • Topic #1 Test	
Interventions / differentiated instruction	• Readiness assessments to generate study plans, as necessary • Readiness lessons to address weaknesses in prior knowledge, as necessary • Lesson interventions to address weaknesses throughout the units, as necessary • "Help Me Solve This" in MathXL • Lesson materials available online in both English and Spanish • Homework-Individualized to needs of student • Enrichment activities available as needed	
Inter-disciplinary Connections	• Online Technology Tools • Math Literacy-"Close and Check" in Student Companion Journal • Financial Literacy	
Global Awareness , Cultural Diversity & 21st Century Skills	Global Awareness: Word Problems related to global topics when applicable Cultural Diversity: Understanding by Design Hosts/Characters in Word Problems are diverse 21st Century Skills: Problem Solving • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration • Flexibility and Adaptability	

Lesson resources / activities	• www.MyMathUniverse.com • Online tools/Manipulatives • Student Companion Book • Homework Book and Assessments(Math XL)

Common Core State Standards

Domain: Number System

Cluster: Know that there are numbers that are not rational and approximate them by rational numbers.

CCSS.Math.Content.8.NS.A.1 Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.

CCSS.Math.Content.8.NS.A.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations*

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Math Practices:
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Pine Hill Public Schools **Mathematics Curriculum**	
Unit Title: Expressions and Equations Part 1	**Unit 2**
Course or Grade Level: 8	**Length of Time: 28 Days**

Pacing	Linear Equations in One Variable: 6 instructional days + 1 day for re-teaching/enrichment + 1 day for summative assessment Integer Exponents: 8 instructional days + 1 day for re-teaching/enrichment + 1 day for summative assessment Scientific Notation: 6 instructional days + 1 day re-teaching/enrichment + 1 day for summative assessment Benchmark I review/re-teaching: 1 day Benchmark I administration: 1 day
Essential Questions	• Why do we write equations? • How can you make very large or very small numbers easy to use and compare? • How can you make scientific measurements easy to use and compare?
Content	• Linear Equations • Distributive Property • Combine Like Terms • Properties of integer exponents • Square Root • Perfect Square • Cube root • Perfect Cube • Integer Power of 10 (Scientific Notation)
Skills	• Solve two step linear equations • Use distributive property • Estimate large or small quantities • Estimate square and cubed roots • Evaluate perfect squares and perfect cubed roots • Apply properties of integer exponents • Calculate numbers expressed in scientific notation into decimal form • Interpret scientific notation generated by technology • Calculate zero and negative exponents • Calculate multiplication and division of exponents
Assessments	• Homework • Classwork • Quizzes • Topic #2-4 Tests • Benchmark Test I
Interventions / differentiated instruction	• Readiness assessments to generate study plans, as necessary • Readiness lessons to address weaknesses in prior knowledge, as necessary • Lesson interventions to address weaknesses throughout the units, as necessary • "Help Me Solve This" in MathXL • Lesson materials available online in both English and Spanish • Homework-Individualized to needs of student • Enrichment activities available as needed

Inter-disciplinary Connections	• Online Technology Tools • Math Literacy-"Close and Check" in Student Companion Journal • Financial Literacy
Global Awareness , Cultural Diversity & 21st Century Skills	Global Awareness: Word Problems related to global topics when applicable Cultural Diversity: Understanding by Design Hosts/Characters in Word Problems are diverse 21st Century Skills: Problem Solving • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration • Flexibility and Adaptability
Lesson resources / activities	• www.MyMathUniverse.com • Online tools/Manipulatives • Student Companion Book • Homework Book and Assessments(Math XL)

Common Core State Standards

Domain: Expressions and Equations

Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations

CCSS.Math.Content.8.EE.C.7 Solve linear equations in one variable.

- CCSS.Math.Content.8.EE.C.7a Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).

- CCSS.Math.Content.8.EE.C.7b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

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Pine Hill Public Schools		
Mathematics Curriculum		
Unit Title: Expressions and Equations Part 2		**Unit 3**
Course or Grade Level: 8	**Length of Time: 20 Days**	
Pacing	Proportional Relationships, Lines, and Linear Functions: 8 instructional days + 1 day for re-teaching/enrichment + 1 day for summative assessment Systems of Two Linear Equations: 8 instructional days + 1 day for re-teaching/enrichment + 1 day for summative assessment	
Essential Questions	• How can you recognize a proportional relationship? • How are proportional relationships and linear equations related? • Do all linear equations model proportional relationships? • What methods can you use to solve pairs of simultaneous linear equations in two variables? • How do you know when to use each method?	
Content	• Proportional relationships • Unit Rate • Slope • Y-intercept • Linear Equations $y = mx + b$ • System of Equations	
Skills	• Graph proportional relationships • Interpret unit rate as slope • Compare proportional relationships • Explain why slope is the same between any two points on a non-vertical line • Derive linear equations • Transform equations • Solve systems of equations through graphing, substitution and elimination	
Assessments	• Homework • Classwork • Quizzes • Topics #5-6 Tests	
Interventions / differentiated instruction	• Readiness assessments to generate study plans, as necessary • Readiness lessons to address weaknesses in prior knowledge, as necessary • Lesson interventions to address weaknesses throughout the units, as necessary • "Help Me Solve This" in MathXL • Lesson materials available online in both English and Spanish • Homework-Individualized to needs of student • Enrichment activities available as needed	
Inter-disciplinary Connections	• Online Technology Tools • Math Literacy-"Close and Check" in Student Companion Journal • Financial Literacy	
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Common Core State Standards

Domain: Expression and Equations Part 2

Cluster: Understand the connection between proportional relationships, lines and linear equations.

CCSS.Math.Content.8.EE.B.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

CCSS.Math.Content.8.EE.B.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at *b*.

Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.

CCSS.Math.Content.8.EE.C.8 Analyze and solve pairs of simultaneous linear equations.

- CCSS.Math.Content.8.EE.C.8a Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

- CCSS.Math.Content.8.EE.C.8b Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6*.

- CCSS.Math.Content.8.EE.C.8c Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair., recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.*

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Pine Hill Public Schools **Mathematics Curriculum**	
Unit Title: Functions	**Unit 4**
Course or Grade Level: 8	**Length of Time: 23 days**

Pacing	Defining and Comparing Functions: 8 instructional days + 1 day for re-teaching/enrichment + 1 day for summative assessment Linear Functions: 9 instructional days + 1 day for re-teaching/enrichment + 1 day for summative assessment Benchmark II review/re-teaching: 1 day Benchmark II administration: 1 day
Essential Questions	• What is a function? • What are functions used for? • How do you know a linear function when you see one?
Content	• Properties of Functions Linear/Non Linear • Ordered pairs • Input/output • Linear/Functional relationship • Rate of Change • Initial Value • Graph • Table
Skills	• Explain why slope is the same between any two points on a non-vertical line • Solve linear equations • Understand function is a rule • Graph ordered pairs • Compare functions Algebraically/Graphically/Numerically in table/Verbal descriptions • Construct functions and Model relationships • Determine rate of change and initial value of function • Read table or graph • Interpret rate of change • Give examples of nonlinear functions • Describe relationship between two quantities
Assessments	• Homework • Classwork • Quizzes • Topics #7-8 Tests • Benchmark Test II
Interventions / differentiated instruction	• Readiness assessments to generate study plans, as necessary • Readiness lessons to address weaknesses in prior knowledge, as necessary • Lesson interventions to address weaknesses throughout the units, as necessary • "Help Me Solve This" in MathXL • Lesson materials available online in both English and Spanish • Homework-Individualized to needs of student • Enrichment activities available as needed

Inter-disciplinary Connections	• Online Technology Tools • Math Literacy-"Close and Check" in Student Companion Journal • Financial Literacy
Global Awareness , Cultural Diversity & 21st Century Skills	Global Awareness: Word Problems related to global topics when applicable Cultural Diversity: Understanding by Design Hosts/Characters in Word Problems are diverse 21st Century Skills: Problem Solving • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration • Flexibility and Adaptability
Lesson resources / activities	• www.MyMathUniverse.com • Online tools/Manipulatives • Student Companion Book • Homework Book and Assessments(Math XL)

Common Core State Standards

Domain: Functions

Cluster: Define, evaluate, and compare functions.

Cluster: Use functions to model relationships between quantities

CCSS.Math.Content.8.F.A.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.[1]

CCSS.Math.Content.8.F.A.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change*.

CCSS.Math.Content.8.F.A.3 Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line*.

Cluster: Use functions to model relationships between quantities

CCSS.Math.Content.8.F.B.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (*x, y*) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

CCSS.Math.Content.8.F.B.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

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	Pine Hill Public Schools Mathematics Curriculum	
Unit Title: Geometry		**Unit 5**
Course or Grade Level: 8	**Length of Time: 45 Days**	
Pacing	Congruence: 6 instructional days + 1 day for re-teaching/enrichment + 1 day for summative assessment Similarity: 5 instructional days + 1 day for re-teaching/enrichment + 1 day for summative assessment Reasoning in Geometry: 7 instructional days + 1 day for re-teaching/enrichment + 1 day for summative assessment Using the Pythagorean Theorem: 7 instructional days + 1 day for re-teaching/enrichment + 1 day for summative assessment Surface Area and Volume: 8 instructional days + 1 day for re-teaching/enrichment + 1 day for summative assessment Benchmark III review/re-teaching: 1 day Benchmark III administration: 1 day	
Essential Questions	• What does it mean for two figures to be identical? • How can you be sure they are identical? • Why might you want to represent a real life object on a smaller or larger scale? • How can you be sure that you scale an object correctly? • How do geometric properties and logical reasoning allow you to form arguments and make conclusions about relationships in geometry? • If you do not have measuring tools, how can you deduce what the side lengths are of a right triangle? • How can you deduce that a triangle is right? • How are different three dimensional objects related in the real world? • How can math models help you measure/talk/represent the size of these objects?	
Content	• Rotation • Reflection • Translation • Dilation • Congruence • Similarity • Pythagorean Theorem • Right triangles • Coordinate system • Square root • Perfect square • Formulas – cones, cylinders, spheres	
Skills	• Verify Rotations, Reflections, Translations, and Dilations • Understand congruence & similarity • Describe sequence and effects of rotations, reflections, translations, and dilations • Prove angle relationships in transversals & triangles • Apply Pythagorean theorem – determine unknown sides lengths, find distance between two points • Explain Pythagorean and its converse • Know formulas for volume & surface area • Use formulas for volume & surface area • Solve in context.	

Assessments	• Homework
	• Classwork
	• Quizzes
	• Topics #9-13 Tests
	• Benchmark III
Interventions / differentiated instruction	• Readiness assessments to generate study plans, as necessary
	• Readiness lessons to address weaknesses in prior knowledge, as necessary
	• Lesson interventions to address weaknesses throughout the units, as necessary
	• "Help Me Solve This" in MathXL
	• Lesson materials available online in both English and Spanish
	• Homework-Individualized to needs of student
	• Enrichment activities available as needed
Inter-disciplinary Connections	• Online Technology Tools
	• Math Literacy-"Close and Check" in Student Companion Journal
	• Financial Literacy
Global Awareness , Cultural Diversity & 21st Century Skills	Global Awareness: Word Problems related to global topics when applicable
	Cultural Diversity: Understanding by Design Hosts/Characters in Word Problems are diverse
	21st Century Skills: Problem Solving
	• Creativity and Innovation
	• Critical Thinking and Problem Solving
	• Communication and Collaboration
	• Flexibility and Adaptability
	•
Lesson resources / activities	• www.MyMathUniverse.com
	• Online tools/Manipulatives
	• Student Companion Book
	• Homework Book and Assessments(Math XL)

Common Core State Standards

Domain: Geometry

Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software.

CCSS.Math.Content.8.G.A.1 Verify experimentally the properties of rotations, reflections, and translations:

- CCSS.Math.Content.8.G.A.1a Lines are taken to lines, and line segments to line segments of the same length.

- CCSS.Math.Content.8.G.A.1b Angles are taken to angles of the same measure.

- CCSS.Math.Content.8.G.A.1c Parallel lines are taken to parallel lines.

CCSS.Math.Content.8.G.A.2 Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

CCSS.Math.Content.8.G.A.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

CCSS.Math.Content.8.G.A.4 Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

CCSS.Math.Content.8.G.A.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so*.

Cluster: Understand and apply the Pythagorean Theorem.

CCSS.Math.Content.8.G.B.6 Explain a proof of the Pythagorean Theorem and its converse.

CCSS.Math.Content.8.G.B.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

CCSS.Math.Content.8.G.B.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

Cluster: Understand and apply the Pythagorean Theorem.

CCSS.Math.Content.8.G.C.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

Domain: Geometry

Cluster: Understand the connections between proportional relationships, lines, and linear equations.

CCSS.Math.Content.8.EE.B.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.

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	Pine Hill Public Schools Mathematics Curriculum	
Unit Title: Statistics		**Unit 6**
Course or Grade Level: 8	**Length of Time: 24**	
Pacing	Scatter Plots: 8 instructional days + 1 day for re-teaching/enrichment + 1 day for summative assessment Relative Frequency: 8 instructional days + 1 day for re-teaching/enrichment + 1 day for summative assessment Benchmark IV review/re-teaching- 1 day Benchmark IV administration: 1 day End of Year Battery Assessment review/re-teaching: 1 day End of Year Battery Assessment administration: 1 day	
Essential Questions	• How can you make sense of real-world data? • How is it possible to use the same data to support two different conclusions? • When is one conclusion about data better than another one?	
Content	• Scatter Plots • Patterns • Frequencies • Two-Way Tables • Line of Best Fit	
Skills	• Construct scatter plot • Interpret scatter plot • Investigate Pattern • Describe Pattern • Use equations of a linear model • Understand patterns of association in data • Display frequencies and relative frequencies • Describe association between variables • Draw line of best fit	
Assessments	• Homework • Classwork • Quizzes • Topics #14- 15 Tests • Benchmark Tests IV & End of Year Battery Assessment	
Interventions / differentiated instruction	• Readiness assessments to generate study plans, as necessary • Readiness lessons to address weaknesses in prior knowledge, as necessary • Lesson interventions to address weaknesses throughout the units, as necessary • "Help Me Solve This" in MathXL • Lesson materials available online in both English and Spanish • Homework-Individualized to needs of student • Enrichment activities available as needed	
Inter-disciplinary Connections	• Online Technology Tools • Math Literacy-"Close and Check" in Student Companion Journal • Financial Literacy	
Global Awareness , Cultural Diversity & 21st Century Skills	Global Awareness: Word Problems related to global topics when applicable Cultural Diversity: Understanding by Design Hosts/Characters in Word Problems are diverse 21st Century Skills: Problem Solving • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration	

	• Flexibility and Adaptability
Lesson resources / activities	• www.MyMathUniverse.com • Online tools/Manipulatives • Student Companion Book • Homework Book and Assessments(Math XL)

Common Core State Standards

Domain: Statistics and Probability

Cluster: Investigate patterns of association of bivariate data

CCSS.Math.Content.8.SP.A.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

CCSS.Math.Content.8.SP.A.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.

CCSS.Math.Content.8.SP.A.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr. as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.*

CCSS.Math.Content.8.SP.A.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*

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