

Pine Hill Public Schools Curriculum

Content Area:		Mathematics	
Course Title/ Grade Level:		Math Grade 8	
Unit 1:	The Number System	Duration:	30 days
Unit 2:	Expressions and Equations	Duration::	60 days
Unit 3:	Functions	Duration:	25 days
Unit 4:	Geometry	Duration:	40 days
Unit 5:	Scatter Plots & Data Analysis	Duration:	15 days
Date Created or Revised:		September 2018	
BOE Approval Date:			

**Pine Hill Public Schools
Curriculum**

Unit Title Number System		Unit #: 1
Course or Grade Level: 8		Length of Time: 30
Pacing	September- October	
Essential Questions	Why is it helpful to write numbers in different way?	
Content	<ul style="list-style-type: none"> ● Rational Numbers ● Powers and Exponents ● Multiply and Divide Monomials ● Powers Of Monomials ● Negative Exponents ● Scientific Notation ● Roots 	
Skills	<ul style="list-style-type: none"> ● Write Fractions as decimals and decimal as fractions ● Write and evaluate expressions involving powers and exponents ● Simplify real numbers expressions by multiplying and dividing monomials ● Use the Law of Exponents to find powers of monomials 	
Assessments	<ul style="list-style-type: none"> ● Homework ● Classwork ● Quizzes ● Tests 	
Interventions /differentiated instruction	<ul style="list-style-type: none"> ● Online Readiness Quiz ● Self Check Quizzes ● eFlashcard app ● Personal Tutor ● ALEKS 	
Inter-disciplinary Connections	<ul style="list-style-type: none"> ● Online technology tools ● “Real- World Link” 	
Lesson resources / Activities	<ul style="list-style-type: none"> ● www.connectED.mcgraw-hill.com ● www.aleks.com ● Inquiry labs ● performance tasks 	

New Jersey Student Learning Standards for Mathematics

Standard(s) for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
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.

Standards() for Mathematical Content:

Standards(s) for Mathematical Content:

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 $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations*

21st Century Themes							
x	Global Awareness	x	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
21st Century Skills							
x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy	x	ICT Literacy	x	Life and Career Skills		
<p>8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.</p>							
<p>Strand:A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.</p>		<p>Content Statement: Understand and use technology systems.</p>		<p>Indicator: 8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.</p>			

Pine Hill Public Schools
Curriculum

Unit Title Expressions and Equations		Unit #: 2
Course or Grade Level: 8		Length of Time: 55
Pacing	October- December	
Essential Questions	How can we model relationships between quantities?	
Content	<ul style="list-style-type: none"> ● Represent Relationships ● Relations ● Functions ● Linear Functions ● Non-Linear Functions 	
Skills	<ul style="list-style-type: none"> ● Translate tables and graphs into linear equations ● Represent relations using tables and graph ● Find function values and compare function tables ● Represent linear functions using table and graphs ● Compare properties of functions represented in different ways ● Find and interpret the rate of change and initial value of a function ● Determine whether a function is linear or nonlinear ● Graph Quadratic functions ● Sketch and Describe Qualitative Graph ● 	
Assessments	<ul style="list-style-type: none"> ● Homework ● Classwork ● Quizzes ● Tests 	
Interventions /differentiated instruction	<ul style="list-style-type: none"> ● Online Readiness Quiz ● Self Check Quizzes ● eFlashcard app ● Personal Tutor ● ALEKS 	
Inter-disciplinary Connections	<ul style="list-style-type: none"> ● Online technology tools ● “Real- World Link” 	
Lesson resources / Activities	<ul style="list-style-type: none"> ● www.connectED.mcgraw-hill.com ● www.aleks.com ● Inquiry labs ● performance tasks 	

New Jersey Student Learning Standards for Mathematics

<p>Standard(s) for Mathematical Practice:</p> <ol style="list-style-type: none"> 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. 7. Look for and make use of structure. 	<p>Standards() for Mathematical Content:</p> <p><u>CCSS.Math.Content.8.EE.C.7a</u> 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).</p> <p><u>CCSS.Math.Content.8.EE.C.7b</u> Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms</p>
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CCSS.Math.Content.8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.

CCSS.Math.Content.8.EE.A.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.

CCSS.Math.Content.8.EE.A.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. *For example, estimate the population of the United States as 3 times 10^8 and the population of the world as 7 times 10^9 , and determine that the world population is more than 20 times larger.*

CCSS.Math.Content.8.EE.A.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology

21st Century Themes

x	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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21st Century Skills

x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy	x	ICT Literacy	x	Life and Career Skills		

8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Strand: A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.

Content Statement: Select and use applications effectively and productively.

Indicator: 8.1.8.A.2 Create a document (e.g. newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for usability.

Unit Title Functions		Unit #: 3
Course or Grade Level: 8		Length of Time: 25
Pacing	January- February	
Essential Questions	How can we model relationships between quantities?	
Content	<ul style="list-style-type: none"> ● Represent Relationships ● Relations ● Functions ● Linear Functions ● Non-Linear Functions 	
Skills	<ul style="list-style-type: none"> ● Translate tables and graphs into linear equations ● Represent relations using tables and graph ● Find function values and compare function tables ● Represent linear functions using table and graphs ● Compare properties of functions represented in different ways ● Find and interpret the rate of change and initial value of a function ● Determine whether a function is linear or nonlinear ● Graph Quadratic functions ● Sketch and Describe Qualitative Graph ● 	
Assessments	<ul style="list-style-type: none"> ● Homework ● Classwork ● Quizzes ● Tests 	
Interventions /differentiated instruction	<ul style="list-style-type: none"> ● Online Readiness Quiz ● Self Check Quizzes ● eFlashcard app ● Personal Tutor ● ALEKS 	
Inter-disciplinary Connections	<ul style="list-style-type: none"> ● Online technology tools ● “Real- World Link” ● Inquiry labs ● performance tasks 	
Lesson resources / Activities	<ul style="list-style-type: none"> ● www.connectED.mcgraw-hill.com ● www.aleks.com ● 	

New Jersey Student Learning Standards for Mathematics

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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.E.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.

21st Century Themes

x	Global Awareness	x	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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21st Century Skills

x	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication and Collaboration		Information Literacy
	Media Literacy	x	ICT Literacy	x	Life and Career Skills		

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Content Statement: Select and use applications effectively and productively.

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Unit Title Geometry		Unit #: 4
Course or Grade Level: 8		Length of Time: 40
Pacing	February-April	
Essential Questions	How can algebraic concepts be applied to geometry? How can we best show or describe the change in position of a figure?	
Content	<ul style="list-style-type: none"> ● Parallel Lines ● Angles of triangles ● Polygons and Angles ● Pythagorean Theorem ● Transformations ● Congruence ● Similarity ● Volume ● Surface Area 	
Skills	<ul style="list-style-type: none"> ● Identify relationships of angles formed by two parallel lines cut by a transversal. ● Write geometric proofs ● Find the missing angle measures in triangles ● Find the sum of the angle measures of a polygon and the measure of one interior angle of a regular polygon ● Use the Pythagorean Theorem ● Solve problems using the Pythagorean Theorem ● Find the distance between two points on the coordinate plane ● Graph translations ● Graph reflections ● Graph rotations ● Use scale factor to graph dilations ● Use a series of transformations to create congruent figures ● Write congruence statements for congruent figures ● Use transformations to create similar figures ● Identify similar polygons and find missing measures of similar polygons ● Solve problems involving similar triangles ● relate the slope of a line to similar triangles ● Find the relationship between perimeters and area of similar figures ● 	
Assessments	<ul style="list-style-type: none"> ● Homework ● Classwork ● Quizzes ● Tests 	
Interventions /differentiated instruction	<ul style="list-style-type: none"> ● Online Readiness Quiz ● Self Check Quizzes ● eFlashcard app ● Personal Tutor ● ALEKS 	
Inter-disciplinary Connections	<ul style="list-style-type: none"> ● Online technology tools ● “Real- World Link” ● Inquiry labs ● performance tasks 	
Lesson resources / Activities	<ul style="list-style-type: none"> ● www.connectED.mcgraw-hill.com ● www.aleks.com ● 	
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**Standards() for Mathematical Content:
Standards(s) for Mathematical Content:**

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.

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Pine Hill Public Schools Mathematics Curriculum	
Unit Title: Statistics and Probability	Unit #: 5
Course or Grade Level: 8	Length of Time: 20
Pacing	May- June
Essential Questions	<ul style="list-style-type: none"> Why is learning mathematics important?
Content	<ul style="list-style-type: none"> Scatter Plots

	<ul style="list-style-type: none"> ● Patterns ● Frequencies ● Two-Way Tables ● Line of Best Fit ● Mean absolute deviation
Skills	<ul style="list-style-type: none"> ● Construct and make conjectures about scatter plot ● Use data to make predictions ● Draw lines of best fit ● Construct and interpret two-way tables ● Find and interpret the mean absolute deviation ● Analyze data distribution
Assessments	<ul style="list-style-type: none"> ● Homework ● Classwork ● Quizzes ● Topic Tests #14 & 15 ● Benchmark Tests IV & Post Battery
Interventions / differentiated instruction	<ul style="list-style-type: none"> ● Online Readiness Quiz ● Self Check Quizzes ● eFlashcard app ● Personal Tutor ● ALEKS
Inter-disciplinary Connections	<ul style="list-style-type: none"> ● Online technology tools ● “Real- World Link” ● Inquiry labs ● performance tasks
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- 6.
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- 8.

Standards() for Mathematical Content:

Domain: Statistics and Probability

Cluster: Investigate patterns of association of bivariate data

CCSS.Math.Content.8.SPA.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.SPA.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.SPA.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.SPA.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?*

21st Century Themes

x	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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21st Century Skills

x	Creativity and Innovation	x	Critical Thinking and Problem Solving		Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy		Life and Career Skills		

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<p>Strand: A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.</p>	<p>Content Statement: Select and use applications effectively and productively</p>	<p>Indicator: Graph and calculate data within spreadsheet and present a summary of the results.</p>
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