

HOWELL TOWNSHIP
PUBLIC SCHOOLS

**MATHEMATICS CURRICULUM
FRAMEWORK**

GRADE 6 PRE ALGEBRA

BOARD APPROVED: August 23, 2017

7th Grade Pre- Algebra Curricular Framework

Overview	NJSL Standards	Unit Focus	Standards for Mathematical Practices
Unit 1			<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. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.
<ul style="list-style-type: none"> ● Number Systems 	7.NS.1a, 7.NS.1b,7.NS.1c, 7.NS.2a, 7.NS.2b,7.NS.2c, 7.NS.3a, 7.NS.3b, 7.NS.3c	<ul style="list-style-type: none"> ● Apply the rules for all 4 operations of integers. ● Apply properties of operations as strategies to perform operations with rational numbers. 	
<ul style="list-style-type: none"> ● Equations and Expressions 	7.EE.1, 7.EE.2, 7.EE.4a	<ul style="list-style-type: none"> ● Apply properties of operations to devise, graph, and solve one and two step equations. 	
Unit 2			
<ul style="list-style-type: none"> ● Equations and Expressions 	7.EE.4b	<ul style="list-style-type: none"> ● Apply properties of operations to devise, graph, and find the solution set for 1 and 2 step inequalities. 	
<ul style="list-style-type: none"> ● Ratios and Proportions 	7.EE.3, 7.RP.1, 7.RP.2, 7.RP.3,	<ul style="list-style-type: none"> ● Compute unit rates associated with ratios measured in like or unlike units. ● Explain whether two quantities are proportional by using ratio tables and graphs. 	

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		<ul style="list-style-type: none"> ● Compare decimal, fractions, and percent. ● Apply proportionality to solve percent problems 	
<ul style="list-style-type: none"> ● Statistics and Probability 	7.SP.1, 7.SP.2, 7.SP.3, 7.SP.4, 7.SP.5, 7.SP.6, 7.SP.7, 7.SP.8	<ul style="list-style-type: none"> ● Develop a probability model and use to find probabilities of compound events through organized lists, tables, and tree diagrams and simulations. 	
Unit 3			
<ul style="list-style-type: none"> ● Geometry 	7.G.1, 7.G.2, 7.G.3, 7.G.4, 7.G.5, 7.G.6,	<ul style="list-style-type: none"> ● Construct geometric shapes with given conditions focusing on triangles and quadrilaterals. ● Apply the values of Pi to estimate and calculate the area of circumference of a circle. ● Solve real world and mathematical problems by constructing composite 2-dimensional figures to determine perimeter and area. ● Solve real world and mathematical problems involving surface area 	

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		and volumes of prisms, pyramids, and cylinders.	
Unit 4			
<ul style="list-style-type: none"> Graphing and writing linear equations. Exponents and scientific notation 	8.EE.5, 8EE.6,	<ul style="list-style-type: none"> To derive equations $y = mx + b$ for a line given two distinct non-vertical points. 	
<ul style="list-style-type: none"> Real numbers and the pythagorean theorem. 	8.NS.1,8.NS.2, 8.EE.2, 8.G.6, 8.G.7, 8.G.8,	<ul style="list-style-type: none"> To use the pythagorean Theorem to determine unknown side lengths and solve problems. 	
<ul style="list-style-type: none"> Exponents and scientific notation 	8.EE.1, 8.EE.3, 8.EE.4	<ul style="list-style-type: none"> To perform operations with numbers expressed in scientific notation. 	

Unit 1: Number Sense (1,2)			
Learning Goal: To apply the rules and operations for integers and rational numbers			
Learning Target: Find the absolute value of an integer. Find the sum, difference ,product and quotient of integers. To add ,subtract, multiply, and divide rational numbers.			
Prerequisite Skills: <ul style="list-style-type: none"> Fluently divide , whole numbers & fractions Fluently add, subtract , multiply , and divide decimals Identify and represent integers Order and compare integers Identify and describe absolute values of integers Describe quantities with positive and negative numbers 			
Content Standards	Mathematical Practices	Enduring Understandings	Essential Questions
Math: 7.NS.1a, 7.NS.1b,7.NS.1c, 7.NS.2a, 7.NS.2b,7.NS.2c, 7.NS.3a, 7.NS.3b, 7.NS.3c	MP1. MP2. MP3. MP4.	The students will be able to add, subtract, multiply and divide integers and rational numbers, as well as working	<ul style="list-style-type: none"> How can you use integers to represent the velocity and the speed of an object?

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<p>Technology Standards: 8.1.8.A.1, 8.1.8.D.4</p> <p>Career Readiness Practices: CRP2, CRP4, CRP8, CRP11</p>	<p>MP6. MP7. MP8.</p>	<p>with their absolute value. They will also be able to convert rational numbers to decimals.</p>	<ul style="list-style-type: none"> ● Is the sum of two integers positive, negative or zero? ● How are adding integers and subtracting integers related? ● Is the product of two integers positive, negative or zero? ● Is the quotient of two integers positive, negative or zero? ● How can you use a number line to order rational numbers? ● How can you use what you know about adding integers to add rational numbers? ● How can you use what you know about subtracting integers to subtract rational numbers? ● Why is the product of two negative rational numbers positive? ●
<p>Assessments: STAR Math – Fall Chapter Assessments Trimester Assessments</p>			

Unit 1: Equations and Expressions (3)

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Learning Goal: To solve linear equations			
Learning Target: Simplify algebraic expressions. Solve equations using addition, subtraction , multiplication and division. Solve two-step equations			
Prerequisite Skills: <ul style="list-style-type: none"> ● Write and evaluate numerical expressions involving whole number exponents ● Read, write, and evaluate algebraic expressions ● Apply the properties of operations to generate equivalent expressions ● Factor out the greatest common factor in algebraic and numerical expressions ● Identify equivalent expressions ● Determine if a value is a solution of an equation ● Solve one-step equations 			
Content Standards	Mathematical Practices	Enduring Understandings	Essential Questions
Math: 7.EE.1, 7.EE.2, 7.EE.4a Technology Standards: 8.1.8.A.1, 8.1.8.D.4 Career Readiness Practices: CRP2, CRP4, CRP8, CRP11	MP1. MP2. MP3. MP4. MP6. MP7.	The students will be able to write, graph and solve one and two step equations.	<ul style="list-style-type: none"> ● How can you simplify an algebraic expression? ● How can you use algebra tiles to add or subtract algebraic expressions? ● How can you use addition, subtraction multiplication or division to solve equations? ● How can you use algebra tiles to solve a two-step equation?
Unit 1 Resources: Big Ideas Learning www.bigideasmath.com 7.NS.A.1 Comparing Freezing Points			

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7.NS.A.1b-c Differences of Integers 7.NS.A.2 Why is a Negative Times a Negative Always Positive 7.NS.A.2d Equivalent fractions approach to non-repeating decimals 7.NS.A.2d Repeating decimal as approximation 7.EE.A.1 Writing Expressions 7.EE.A.2 Ticket to Ride
Assessments: STAR Math – Fall Chapter Assessments Trimester Assessments

Unit 2: Expressions and Equations (4)			
Learning Goal: To solve inequalities			
Learning Target: Write and graph inequalities. Solve inequalities using addition, subtraction , multiplication and division. Solve two-step inequalities			
Prerequisite Skills: <ul style="list-style-type: none"> ● Determine whether a value is a solution of an inequality ● Represent constraints with inequalities and recognize that they can have infinitely many solutions ● Solve one-step equations 			
Content Standards	Mathematical Practices	Enduring Understandings	Essential Questions
Math: 7.EE.4b Technology Standards: 8.1.8.A.1 Career Readiness Practices : CRP2.,CRP4.CRP.8,	MP1. MP3. MP4. MP6. MP7.	The students will be able to write, graph and solve one and two- step inequalities.	<ul style="list-style-type: none"> ● How can you use a number line to represent solutions of an inequality? ● How can you use add, subtraction, multiplication or division to solve an inequality? ● How can you use an inequality to describe the dimensions of a figure?

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Assessments:
 STAR Math – Fall
 Chapter Assessments
 Trimester Assessments

Unit 2: Ratio & Proportions (5,6)

Learning Goal: To write and solve ratios and proportions. To compare fractions, decimals, and percents and solve percent problems.

Learning Target: To find unit rate , write and solve proportions and identify the constant of proportionality. To compare fractions, decimals and percents and solve percent problems using proportions and equations.

Prerequisite Skills:

- Graph ordered pairs in all four quadrants of the coordinate plane
- Understand ratios and describe ratio relationships
- Compare ratios using tables
- Use ratio reasoning to convert measurement units
- Understand rates and unit rates
- Understand and find percent as a rate per 100
- Find the part and the whole of ratio relationships
- Identify equivalent expressions
- Solve one-step equations

Content Standards	Mathematical Practices	Enduring Understandings	Essential Questions
Math:7.RP.1,7.RP.2,7.RP.3,7.E E3 Technology Standards:8.1.8.A.1,8.1.8.A.4 Career Readiness Practices:CRP2.,CRP4.,CRP8.	MP1. MP2. MP3. MP4. MP5. MP6. MP7. MP8.	Students will be able to compute unit rates and decide whether two quantities are proportional, identify the constant of proportionality and use proportionality to solve ratio problems. Students will be able to compare fractions, decimals, and percents and solve	<ul style="list-style-type: none"> ● How do rates help you describe real-life problems? ● How can proportions help you decide when things are “fair”? ● How can you write proportions that solves a problem in real life? ● How can you use ratio tables and cross products to solve proportions?

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		<p>percent problems using both equations and proportions.</p>	<ul style="list-style-type: none"> ● How can you compare two rates graphically? ● How can you use a graph or an equation to show the relationship between two quantities that vary directly? ● How does the decimal point move when you rewrite a percent as a decimal and when you rewrite a decimal as a percent? ● How can you order numbers that are written as fraction, decimal, percent. ● How can you use models to estimate percent questions? ● How can you use an equivalent form of the percent proportion to solve percent problems? ● What is a percent decrease, what is a percent increase? ● How can you find discounts and selling prices? ● How can you find interest?
<p>Assessments: STAR Math – Fall Chapter Assessments Trimester Assessments</p>			

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Unit 2 : Statistics & Probability (10)			
Learning Goal: To develop a probability model and use it to find probabilities of compound events through organized lists, tables, and tree diagrams and simulations.			
Learning Target: To find the probability of an event or compound events. To use data from random samples to make predictions about population and use measure of center of variation to compare populations.			
Prerequisite Skills: <ul style="list-style-type: none"> ● Understand that a measure of center summarizes all of the values in a data set with a single number. ● Understand that a measure of variation summarizes how all of the values in a data set vary with a single number. ● Display data on a number line in dot plots and box-and - whisker plots ● Choose measures of center and variation based on shape. 			
Content Standards	Mathematical Practices	Enduring Understandings	Essential Questions
Math: 7.SP.1, 7.SP.2, 7.SP.3, 7.SP.4, 7.SP.5, 7.SP.6, 7.SP.7, 7.SP.8 Technology Standards: 8.1.8.A.1, 8.1.8.A.4 Career Readiness Practices: CRP2., CRP4., CRP7., CRP8.	MP1. MP2. MP3. MP4. MP5. MP6.	Students will be able to represent and use samples , understand and find probability of events.	<ul style="list-style-type: none"> ● In an experiment, how can you determine the number of possible results? ● How can you describe the likelihood of an event? ● How can you use relative frequencies to find probabilities? ● How can you find the number of possible outcomes of one or more events? ● What is the difference between dependent & independent events? ● How can you determine whether a sample accurately represents a population?

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			<ul style="list-style-type: none">• How can you compare data sets that represent two populations?
<p>Unit 2 Resources:</p> <p>Big Ideas Learning www.bigideasmath.com</p> <p>7.SP.A.1 Mr. Briggs Class Likes Math</p> <p>7.SP.A.2 Valentine Marbles</p> <p>7.SP.B.3.4 College Athletes</p> <p>7.SP.B.3.4 Offensive Linemen</p> <p>7.SP.C.6 Heads or Tails</p> <p>7.SP.C.7, 6 Rolling Dice</p> <p>7.SP.C.7a How Many Buttons</p> <p>7.SP.C.8 Tetrahedral Dice</p> <p>7.SP.C.8 Waiting Times</p> <p>7.RP, 7.EE, 7.NS Drill Rig</p> <p>7.RP.A.3, 7.EE.B.3.4 Gotham City Taxis</p> <p>7.RP.A.1 Cooking with the Whole Cup</p> <p>7.RP.A.2 Sore Throats, Variation 1</p> <p>7.RP.A.2 Buying Coffee</p> <p>7.RP.A.2c Gym Membership Plans</p>			
<p>Assessments:</p> <p>STAR Math – Fall</p> <p>Chapter Assessments</p> <p>Trimester Assessments</p>			

<p>Unit 3 : Geometry (7,8 , 9)</p>
<p>Learning Goal: Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. Draw, construct, and describe geometrical figures and describe the relationships between them. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.</p>

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<p>Learning Target: To classify and construct angles, triangles and quadrilaterals. To calculate circumference and area of circles. To find the surface area and volume of prisms, pyramids and cylinders.</p>			
<p>Prerequisite Skills:</p> <ul style="list-style-type: none"> ● Draw polygons in the coordinate plane given vertices and find lengths of sides. ● Understand and describe ratios relationships. ● Use Ratio reasoning to convert measurement units. ● Use formulas to find areas of polygons. ● Write and evaluate numerical expressions involving whole-number exponents . ● Use nets to find surface area. ● find the volumes of prisms. 			
Content Standards	Mathematical Practices	Enduring Understandings	Essential Questions
<p>Math: 7.G.1, 7.G.2, 7.G.3, 7.G.4, 7.G.5, 7.G.6, Technology Standards: 8.1.8.A.1, 8.1.8.A.4 Career Readiness Practices: CRP2., CRP4., CRP7., CRP8.</p>	<p>MP1. MP2. MP3. MP4. MP5. MP6. MP8.</p>	<p>Students will be able to:</p> <ul style="list-style-type: none"> ● solve problems by finding the area and circumference of circles. ● solve real-world and mathematical problems involving area of two and three dimensional objects. ● Analyze three dimensional shapes (right rectangular pyramids and prisms) by examining and describing all of the 2-dimensional figures that result from slicing it at various angles. 	<ul style="list-style-type: none"> ● What can you conclude about the angles formed by two interesting lines? ● How can you classify two angles as complementary or supplementary? ● How can you construct triangles? ● How can you classify quadrilaterals? ● How can you enlarge or reduce a drawing proportionally? ● How can you find the circumference and area of a circle? ● How can you find the perimeter and area of a composite figure?

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			<ul style="list-style-type: none"> ● How can you find the surface area and volume of a prism, pyramid, and a cylinder ?
<p>Unit 3 Resources:</p> <p>Big Ideas Learning www.bigideasmath.com</p> <p>7.G.B.4 Wedges of a Circle</p> <p>7.G.B.4 Eight Circles</p> <p>7.G.B.6, 7.RP.A.3 Sand under the Swing Set</p> <p>7.G.A.2 A task related to 7.G.A.2</p> <p>7.G.A.3 Cube Ninjas!</p>			
<p>Assessments:</p> <p>STAR Math – Fall</p> <p>Chapter Assessments</p> <p>Trimester Assessments</p>			

Unit 4: Graphing and writing linear equations.			
Learning Goal: To derive equations $y = mx + b$ for a line given two distinct non-vertical points.			
Learning Target: To graph linear equations in slope intercept and standard form. To use slope to determine parallel and perpendicular lines.			
Prerequisite Skills: <ul style="list-style-type: none"> ● Identify the constant of proportionality in tables, graphs, equations, diagrams, and verbal descriptions ● Represent proportional relationships with equations. 			
Content Standards	Mathematical Practices	Enduring Understandings	Essential Questions
Math: 8.EE.5, 8EE.6, Technology Standards: 8.1.8.A.1, 8.1.8.A.4	MP1. MP2. MP3. MP4. MP5.	Students will be able to: <ul style="list-style-type: none"> ● Use similar triangles to explain why the slope is the same between 	<ul style="list-style-type: none"> ● How can you recognize a linear equation? How can you draw its graph? ● How can you use the slope of the line to describe the line?

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Career Readiness Practices:CRP2., CRP4., CRP7., CRP8.	MP6. MP8.	any two points on a line. <ul style="list-style-type: none"> ● Graph proportional relationships, interpreting the unit rate as the slope. ● Compare proportional relationships represented in different ways. ● Derive $y=mx$ and $y=mx+b$. 	<ul style="list-style-type: none"> ● How can you describe the graph of the equation $y = mx$ and $y = mx + b$? ● How can you describe the graph of the equation $ax + by = c$? ● How can you write the equation of a line when you are given the slope and the y-intercept of the line? ● How can you write the equation of a line when you are given the slope and a point on the line?
Assessments: STAR Math – Fall Chapter Assessments Trimester Assessments			

Unit 4: Real numbers and the pythagorean theorem.
Learning Goal: To use the pythagorean Theorem to determine unknown side lengths and solve problems.
Learning Target:To find square roots , cubed roots and perfect squares. To apply the pythagorean theorem to solve side lengths of right triangles.
Prerequisite Skills: <ul style="list-style-type: none"> ● Convert rational numbers to decimals using long division. ● Add,subtract, multiply and divide rational numbers

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<ul style="list-style-type: none"> Understand that every quotient of integers(non-zero divisor) is a rational number 			
Content Standards	Mathematical Practices	Enduring Understandings	Essential Questions
Math:8.NS.1,8.NS.2, 8.EE.2, 8.G.6, 8.G.7, 8.G.8, Technology Standards:8.1.8.A.1, 8.1.8.A.4 Career Readiness Practices:CRP2., CRP4., CRP7., CRP8.	MP1. MP2. MP3. MP4. MP5. MP6. MP8.	Students will be able to: <ul style="list-style-type: none"> Understand that every rational number has a decimal expansion that terminates or repeats Understand that numbers that are not rational are irrational. Compare irrational numbers using rational approximations. Evaluate square roots and cube roots, including those resulting from solving equations. Explain a proof of the Pythagorean Theorem and its converse. Use the Pythagorean Theorem to find missing measures of right triangles and distances between points in the coordinate plane. 	<ul style="list-style-type: none"> How can you find the dimensions of a square or a circle when you are given its area? How is the cubed root of a number different from the square root of a number? How are the lengths of the sides of a right triangle related? How can you find decimal approximations of square roots that are not rational? In what other ways can you use the pythagorean theorem?
Assessments: STAR Math – Fall			

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Unit 4: Exponents and scientific notation .			
Learning Goal: To perform operations with numbers expressed in scientific notation.			
Learning Target: To write simplify and evaluate powers. To use the product, quotient, negative and zero properties of exponents.			
Prerequisite Skills:			
<ul style="list-style-type: none"> ● Solve problems involving operations with rational numbers ● Understand that rewriting expressions in different forms can show how quantities are related. 			
Content Standards	Mathematical Practices	Enduring Understandings	Essential Questions
Math: 8.EE.1, 8.EE.3, 8.EE.4 Technology Standards: 8.1.8.A.1, 8.1.8.A.4 Career Readiness Practices: CRP2., CRP4., CRP7., CRP8.	MP1. MP2. MP3. MP4. MP5. MP6. MP8.	Students will be able to: <ul style="list-style-type: none"> ● Use the properties of integer exponents to generate equivalent expressions. ● Use scientific notation to estimate very large or very small quantities. ● Perform operations with numbers expressed in scientific notation and other forms. ● Interpret scientific notation that has been generated by technology. 	<ul style="list-style-type: none"> ● How can you use exponents to write numbers? ● How can you use inductive reasoning to observe patterns and write general rules involving properties of exponents? ● How can you divide two powers that have the same base? ● How can you evaluate a nonzero number with an exponent of zero? ● How can you evaluate a nonzero number with a negative integer exponent? ● How can you read and write numbers in scientific notation?

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			<ul style="list-style-type: none">• How can you perform operations with numbers written in scientific notation?
<p>Unit 4 Resources:</p> <p>Big Ideas Learning www.bigideasmath.com</p> <p>8.EE.A.1 Extending the Definitions of Exponents</p> <p>8.EE.A.3 Ant and Elephant</p> <p>8.EE.A.4 Giantburgers</p> <p>8.NS.A.1 Converting Decimal Representations of Rational Numbers to Fraction Representations</p> <p>8.NS.A.2 Irrational Numbers on the Number Line</p> <p>8.EE.B.5 Who Has the Best Job?</p> <p>8.EE.B.6 Slopes Between Points on a Line8.G.B.6 Converse of the Pythagorean Theorem</p> <p>8.G.B.7 Running on the Football Field</p> <p>8.G.B.8 Finding isosceles triangles</p>			
<p>Assessments:</p> <p>STAR Math – Fall</p> <p>Chapter Assessments</p> <p>Trimester Assessments</p>			