# HOWELL TOWNSHIP PUBLIC SCHOOLS

# MATHEMATICS CURRICULUM FRAMEWORK

# GRADE 6

**BOARD APPROVED: August 23, 2017**

# 6th Grade Curricular Framework

| Overview | NJSLS Standards | Unit Focus | Standards for Mathematical Practices |
|---|---|---|---|
| **Unit 1** | | | 1. Make sense of problems and persevere in solving them. |
| ● Number Systems | 6.NS.1, 6.NS.2, 6.NS.3, 6NS.4, 6.EE.1, 6.EE.2b | ● Fluently divide<br>● Write and evaluate with whole number exponents.<br>● Find the prime factorization of a number.<br>● Find the GCF and LCM of two whole numbers.<br>● Divide fractions and mixed numbers.<br>● Add, subtract, multiply, and divide decimals efficiently. | 2. Reason abstractly and quantitatively.<br>3. Construct viable arguments and critique the reasoning of others.<br>4. Model with mathematics.<br>5. Use appropriate tools strategically.<br>6. Look for and make use of structure.<br>7. Look for and express regularity in repeated reasoning. |
| **Unit 2** | | | |
| ● Equations and Expressions | 6.EE.2a, 6.EE.2c, 6.EE.3, 6.EE.4, 6.NS.4 | ● Write and evaluate algebraic expressions.<br>● Find the GCF in algebraic expressions.<br>● Apply the Commutative, Associative, and Distributive properties to show expressions are equivalent. | |

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| ● Geometry | 6.G.1, 6.G.3 | <ul><li>Find the area of triangles, special quadrilaterals, and polygons.</li><li>Find the distance between points with the same x or y coordinate.</li><li>Draw polygons in the coordinate plane given vertices and find lengths.</li></ul> | |
| ● Number Systems | 6.RP.1, 6.RP.2, 6.RP.3a, 6.RP.3b, 6.RP.3c, 6.RP.3d, 6.NS.5, 6.NS.6a, 6.NS.6b, 6.NS.6c, 6.NS.7a, 6.NS.7b, 6.NS.7c, 6.NS.7d, 6.NS.8 | <ul><li>Understand ratios, rates, and unit rates</li><li>Compare ratios using tables.</li><li>Find percents as a rate per 100.</li><li>Solve problems involving finding the whole, given a part and percent.</li><li>Use ratio reasoning to convert measurement units.</li><li>Describe quantities with positive and negative numbers.</li><li>Compare and order integers and absolute value.</li><li>Graph ordered pairs in all four quadrants of the coordinate plane.</li></ul> | |

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| Unit 3 | | | |
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| ● Equations and Expressions | 6.EE.5, 6.EE.6, 6.EE.7, 6.EE.8 | <ul><li>Determine if a value is a solution.</li><li>Solve one step equations.</li><li>Represent constraints with inequalities and recognize they can have infinitely many solutions.</li></ul> | |
| ● Geometry | 6.G.2, 6.G.4 | <ul><li>Find areas of triangles, special quadrilaterals, and polygons.</li><li>Use nets made up of rectangles and triangles to find surface area.</li><li>Find the volume of prisms with fractional edge length.</li></ul> | |
| ● Statistics & Probability | 6.SP.1, 6.SP.2, 6.SP.3, 6.SP.4, 6.SP.5a, 6.SP.5b, 6.SP.5c, 6.SP.5d | <ul><li>Recognize statistical questions as ones anticipating variability.</li><li>Understand that data used to answer statistical questions has a distribution that can be described by center and spread.</li><li>Use measure of center to summarize all the values in a data set.</li></ul> | |

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| | | <ul><li>Use measure of variation to summarize how all of the values in a data set.</li><li>Display data on a number line, including line plots, stem and leaf plots, histograms, and box and whisker plots.</li><li>Recognize that a measure of center for a numerical data set summarizes all of its values with a single number and a measure of variation describes how its values vary with a single number.</li><li>Understand that data used to answer statistical questions has a distribution that can be described by center, spread, and shape.</li><li>Choose appropriate measures of center and variation based on shape.</li></ul> | |

| Unit 1:  Number Systems |
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| Learning Goal: Fluently divide, write and evaluate with whole number exponents,find the prime factorization of a number,find GCF and LCM of two whole numbers.  Two divide fractions and mixed numbers.  To add, subtract, multiply and divide decimals efficiently. |

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| Learning Target: Determine which operations are used to perform and divide multi-digit numbers. |
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| Write expressions as powers and evaluate numerical expressions with whole-number exponents. |
| Use divisibility rules to find prime factorizations of numbers. Use diagrams to identify common factors, multiples and GCF and LCM. To add and subtract fractions. To multiply , divide fractions.  To add ,subtract,multiply and divide decimals. |

**Prerequisite Skills:**

- Fluently multiply
- Multiply and divide by powers of 10
- Evaluate expressions with whole number exponents with powers of 10
- Use Parentheses, brackets, or braces in numerical expressions
- Multiply fractions or whole numbers by fractions
- Interpret a fraction as division; solve problems involving division of whole numbers leading to answers in the form of a mixed number
- Add, subtract, multiply , and divide decimals to the hundredths place.

| Content Standards | Mathematical Practices | Enduring Understandings | Essential Questions |
|---|---|---|---|
| Math: 6.NS.1,6.NS.2, 6.NS.3,6.NS.4, 6.EE.1, 6.EE.2b<br><br>Technology Standards:8.1.8.A.1,8.1.8.D.4<br><br>Career Readiness Practices: CRP2,CRP4,CRP8, | MP.1<br>MP.2<br>MP. 3<br>MP.4<br>MP.5<br>MP.6<br>MP. 7 | The students will be able to fluently divide fractions and mixed numbers.  They will be able to find the GCF and LCM of two whole numbers.  The students will also be able to add, subtract, multiply and divide decimals. | <ul><li>How do you know which operation to choose when solving a real-life problem?</li><li>How can you use repeated factors in real-life situations?</li><li>What is the effect of inserting parentheses into a numerical expression?</li><li>Without dividing, how can you tell when a number is divisible by another number?</li><li>How can you find the greatest common factor of two numbers?</li><li>How can you find  the least common multiple of two numbers?</li></ul> |

|  |  |  | <ul><li>What does it mean to multiply fractions?</li><li>How can you divide by a fraction?</li><li>How can you model division by a mixed number ?</li><li>How can you add and subtract decimals?</li><li>How can you multiply decimals?</li><li>How can you use base ten blocks to model decimal division?</li></ul> |
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Resources:
Big Ideas Learning www.bigideasmath.com
6.EE.A.1 The Djinni's Offer
6.EE.A.2 Rectangle Perimeter 1
6.EE.A.4 Rectangle Perimeter 2
6.EE.A.4 Equivalent Expressions

Assessments:
STAR Math – Fall
Chapter Assessments
Trimester Assessments

| Unit 2:  Equations & Expressions |
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| Learning Goal: To write and evaluate algebraic expressions.  To find the GCF in algebraic expressions.  Apply the Commutative, Associative, and Distributive properties. |
| Learning Target:  Use order of operations. Use variable to represent numbers in algebraic expressions<br>Use properties of operations to generate equivalent expressions<br>Use the distributive property . |

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| Pre-requisite Skills: |
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| ● Write and interpret numerical expressions |
| ● Use parentheses, brackets , or braces in numerical expressions |

| Content Standards | Mathematical Practices | Enduring Understandings | Essential Questions |
|---|---|---|---|
| Math:  6.EE.2a, 6.EE.2c, 6.EE.3, 6.EE.4, 6.NS.4<br><br>Technology Standards:<br>8.1.8.A1, 8.1.8.D.4<br><br>Career Readiness Practices:<br>CRP2, CRP4, CRP8, CRP11 | MP.1<br>MP.2<br>MP.3<br>MP.4<br>MP.6<br>MP.7<br>MP.8 | The students will be able to write and evaluate algebraic expressions.  They will be able to apply the Commutative, Associative, and Distributive Properties to show expressions are equivalent. | ● How can you write and evaluate an expression that represents a real-life problem?<br>● How can you write an expression that represents an unknown quantity?<br>● Does the order in which you perform an operation matter?<br>● How do you use mental math to multiply two numbers? |

| Assessments: |
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| STAR Math – Fall |
| Chapter Assessments |
| Trimester Assessments |

| Unit 2:  Geometry |
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| Learning Goal: To find the area of polygons as well as draw them.  To find the distance between points. |
| Learning Target: Find the areas of parallelograms, triangles, trapezoids, composite figures.<br>To draw polygons and find distances in the coordinate plane. |
| Pre-requisite Skills:<br>● Find the area of a rectangle with fractional side lengths<br>● Classify two-dimensional figures into categories based on properties<br>● Generate numerical patterns given rule, identify the relationship , and form ordered pairs |

# 6th Grade Curricular Framework

<table>
<tr><td colspan="4">● Plot points in the first quadrant of the coordinate plane</td></tr>
<tr><td>Content Standards</td><td>Mathematical Practices</td><td>Enduring Understandings</td><td>Essential Questions</td></tr>
<tr>
<td>Math: 6.G.1, 6.G.3,<br><br>Technology Standards:<br>8.1.8.A.1<br><br>Career Readiness Practices:<br>CRP2, CRP4, CRP6, CRP8,<br>CRP11</td>
<td>MP.1<br>MP.3<br>MP.6<br>MP.7<br>MP.8</td>
<td>The students will be able to find areas of triangles, special quadrilaterals, and polygons. They will be able to draw polygons in the coordinate plane when they are given the vertices and lengths of the sides. They will also be able to find the distance between points.</td>
<td>● How can you derive a formula for the area of a parallelogram?<br>● How can you derive a formula for the area of a triangle or a trapezoid ?<br>● How can you find the lengths of line segments in a coordinate plane?</td>
</tr>
<tr><td colspan="4">Assessments:<br>STAR Math – Fall<br>Chapter Assessments<br>Trimester Assessments</td></tr>
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<table>
<tr><td>Unit 2: Number Systems and Ratios and Rates</td></tr>
<tr><td>Learning Goal: To work with ratios, rates and unit rates.<br>To find the percent of numbers. To convert measurement units.<br>To describe , compare and order integers and absolute value numbers<br>To graph ordered pairs in all four quadrants.</td></tr>
<tr><td>Learning Target: Understand positive and negative integers.<br>Use a number line to compare integers.<br>Find the absolute value of a number.<br>To plot, describe and find the distances between points in the coordinate plane</td></tr>
<tr><td>Pre-requisite Skills:<br>● Multiply and divide decimals<br>● Convert standard measurement units within a measurement system</td></tr>
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|---|---|---|---|
| ● Compare and order decimals to thousandths place<br>● Generate numerical patterns, identify the relationship, and form ordered pairs<br>● Graph ordered pairs in the first quadrant of the coordinate plane | | | |
| Content Standards | Mathematical Practices | Enduring Understandings | Essential Questions |
| Math: 6.RP.1, 6.RP.2, 6.RP.3a, 6.RP.3b, 6.RP.3c, 6.RP.3d, 6.NS.5, 6.NS.6a, 6.NS.6b, 6.NS.6c, 6.NS.7a, 6.NS.7b, 6.NS.7c, 6.NS.7d, 6.NS.8<br><br>Technology Standards: 8.1.8.A.1, 8.1.8.D.4,<br><br>Career Readiness Practices: CRP2, CRP4, CRP6, CRP8, CRP11 | MP.1<br>MP.2<br>MP.3<br>MP.4<br>MP.5<br>MP.6<br>MP.7 | The students will be able to understand ratios, rates and unit rates along with comparing ratios.  They will be able solve problems involving percents.  The students will be able to describe, compare and order integers and absolute value numbers. | ● How can you represent a relationship between two quantities?<br>● How can you find two ratios that describe the same relationship?<br>● How can you use rates to describe changes in real-life problems?<br>● How can you compare two ratios?<br>● What is the connection between ratios, fractions, and percents?<br>● How can you use mental math to find the percent of a number?<br>● How can you compare lengths between the customary and metric systems?<br>● How can you represent numbers that are less than zero? |

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| | | | ● How can you use a number line to order real-life events ? |
| | | | ● How can you use a number line to compare positive and negative fractions and decimals? |
| | | | ● How can you describe how far an object is from sea level? |
| | | | ● How can you graph and locate points that contain negative numbers in a coordinate plane? |

Unit 2 Resources:
Big Ideas Learning www.bigideasmath.com
6.NS.A.1 Traffic Jam
6.RP.A.1 Games at Recess
6.RP.A.2 Price per pound and pounds per dollar
6.RP.A.3 Voting for Three, Variation 1
6.RP.A.3c Shirt Sale
6.NS.B.3 Reasoning about Multiplication and Division and Place Value, Part 1
6.G.A.1, 6.G.A.3 Polygons in the Coordinate Plane

Assessments:
STAR Math – Fall
Chapter Assessments
Trimester Assessments

| Unit 3: Expressions & Equations |
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| Learning Goal: Determine if a value is a solution.  Solve one-step equations and inequalities. |
| Learning Target: Write word sentences as equations and inequalities.  Use addition , subtraction , multiplication, and division to solve equations and inequalities<br>Identify independent and dependent and dependent variables. |
| Prerequisite Skills:<br> ● Generate numerical patterns , identify the relationship, and form ordered pairs |

| Content Standards | Mathematical Practices | Enduring Understandings | Essential Questions |
| --- | --- | --- | --- |
| Math: 6.EE.5, 6.EE.6, 6.EE.7, 6.EE.8<br><br>Technology Standards:<br>8.1.8.A.1, 8.1.8.D.4<br><br>Career Readiness Practices:<br>CRP2, CRP4, CRP8, CRP11 | MP.1<br>MP.3<br>MP.4<br>MP.5<br>MP.6<br>MP.8 | The students will be able to determine if a value is a solution.  They will be able to solve one-step equations and inequalities. | ● How does rewriting a word problem help you solve the word problems?<br>● How can you use addition or subtraction to solve an equation?<br>● How can you use multiplication or division to solve an equation?<br>● How can you write an equation in two variables?<br>● How can you use a number line to represent solutions of an inequality?<br>● How can you use addition or subtraction to solve an inequality?<br>● How can you use multiplication or division to solve an inequality? |
| Assessments: | | | |

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| STAR Math – Fall |
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| Chapter Assessments |
| Trimester Assessments |

| Unit 3:  Geometry |
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| Learning Goal: Find areas of polygons. Find surface areas of rectangles and triangles. Find the volume of prisms. |
| Learning Target: Draw three-dimensional figures. Find the number of faces, edges, and vertices of solids. To use nets to repesnt prisms and find the surface are.  Find the volume of prisms. |
| Prerequisite Skills:<br>● Find the areas of rectangles with fractional side lengths<br>● Classify two-dimensional figures into categories based on properties<br>● Understand volume, and measure it by counting unit cubes<br>● Find the volumes of rectangular prisms using the formula |

| Content Standards | Mathematical Practices | Enduring Understandings | Essential Questions |
| :--- | :--- | :--- | :--- |
| Math: 6.G.2, 6.G.4<br><br>Technology Standards:<br>8.1.8.A.1<br><br>Career Readiness Practices:<br>CRP2, CRP4, CRP6, CRP8, CRP11 | MP.1<br>MP.3<br>MP.5<br>MP.6<br>MP.7<br>MP.8 | The students will be able to find areas of triangle, special quadrilaterals. and polygons. They will also be able to find surface area of rectangles and triangles.  The students will be able to find the volume of prisms as well. | ● How can you draw three-dimensional figures?<br>● How can you find the area of the entire surface of a prism?<br>● How can you use a net to find the surface area of a pyramid?<br>● How can you find the volume of a rectangular prism with fractional edge lengths? |
| Assessments:<br>STAR Math – Fall<br>Chapter Assessments | | | |

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| Trimester Assessments |
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| Unit 3:  Statistics & Probability |
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| Learning Goal: Recognize  and understand statistical questions and data. Use measure of center and variation to summarize values. To display data and understand data used to answer statistical questions. |
| Learning Target:  Recognize statistical questions.  Understand and find the mean of data sets. Find the median and mode of data. To understand and find the mean absolute deviation. Make and interpret stem and leaf plots, histograms, and box- and-whisker plots. Choose appropriate measures of center and variation to represent data sets. |
| Prerequisite Skills:<br>● Use line plots to solve problems involving operations on fractions<br>● Graph ordered pairs in the first quadrant of the coordinate plane. |

| Content Standards | Mathematical Practices | Enduring Understandings | Essential Questions |
| --- | --- | --- | --- |
| Math: 6.SP.1, 6.SP.2, 6.SP.3, 6.SP.4, 6.SP.5a, 6.Sp.5b, 6.SP.5c, 6.SP.5d<br><br>Technology Standards: 8.1.8.A.1, 8.1.8.A.4, 8.1.8.D.4<br><br>Career Readiness Practices: CRP2, CRP4, CRP6, CRP8, CRP11 | MP.1<br>MP.2<br>MP.3<br>MP.4<br>MP.5<br>MP.6<br>MP.8 | The students will be able to understand that the  data is used to answer statistical questions .  They will be able to use measures of center to summarize values in a data set. The students will be able to display data on a number line.  They will also be able to understand that data is used to answer statical questions | ● How can you tell whether a question is a statistical question?<br>● How can you find an average value of a data set?<br>● In what other ways can you describe an average of data set?<br>● How can you describe the spread of a data set?<br>● How can you use the distances between each data value and |

|  |  |  | the mean of a data set to measure the spread of a data set?<br>● How can you use place value to represent data graphically?<br>● How can you use intervals , tables, and graphs to organize data?<br>● How can you describe the shape of the distribution of a data set?<br>● How can you use quartiles to represent data graphically? |
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Unit 3 Resources:
Big Ideas Learning www.bigideasmath.com
6.SP.A.1 Identifying Statistical Questions
6.SP.A.2, 6.SP.B.4 Puppy Weights
6.SP.A.3 Is It Center or Is It Variability?
6.SP.B.5c Number of Siblings
6.G.A.2 Volumes with Fractional Edge Lengths
6.G.A.4 Nets for Pyramids and Prisms

6.SP.B.5d Mean or Median?

Assessments:
STAR Math – Fall
Chapter Assessments
Trimester Assessments