

# Math

# Grade 6

**Prepared by:**

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## 6th Grade Mathematics

### Course Description:

The curriculum in the 6th grade mathematics is aligned with the New Jersey Student Learning Standards. Those standards focus on following five areas: ratios and proportional relationships, the number system, equations and expressions, geometry, and statistics and probability. Students will develop their ability to make sense of problems and persevere in solving them, reason abstractly, construct arguments and critique others, model mathematically, attend to precision, and use repeated reasoning. Students will demonstrate understanding of the course material by participating in homework, group and individual class work, quizzes, tests, independent problem solving and Do Now's.

### Course Sequence:

Unit Title	Pacing
Unit 1: The Number System	44 days
Unit 2: Expressions and Equations	43 days
Unit 3: Rates and Ratios	33 days
Unit 4: Geometry	26 days
Unit 5: Statistics and Probability	25 days
State Testing, SGO, Field Trips, End of year promotion activities, Assemblies	9 days

### Pre-requisite:

5th grade math

**UNIT #1****Overview****Content Area:** Mathematics**Unit Title:** The Number System**Grade Level(s):** 6th**Core Ideas:**

- Whole Number Operations
- Fractions
- Decimals

Students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use these operations to solve problems.

**Standards (Content and Technology)****CPI#:****Statement:****Performance Expectations (NJSLs)**

6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm.

6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express  $36 + 8$  as  $4(9 + 2)$ .6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for  $(2/3) \div (3/4)$  and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that  $(2/3) \div (3/4) = 8/9$  because  $3/4$  of  $8/9$  is  $2/3$ . (In general,  $(a/b) \div (c/d) = ad/bc$ ). How much chocolate will each person get if 3 people share  $1/2$  lb of chocolate equally? How many  $3/4$ -cup servings are in  $2/3$  of a cup of yogurt? How wide is a rectangular strip of land with length  $3/4$  mi and area  $1/2$  square mi?

6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

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

SMP.2 Reason abstractly and quantitatively.

SMP.4 Model with mathematics.

SMP.6 Attend to precision.

SMP.8 Look for and express regularity in repeated reasoning.

**Career Readiness (9.2) Life Literacies, and Key Skills (standard 9.1, 9.4)**

9.2.8.CAP.3 Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.

9.2.8.CAP.2 Develop a plan that includes information about career areas of interest.

9.2.8.CAP.12 Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.

9.1.8.CP.1 Compare prices for the same goods or services.

9.1.8.CP.2 Analyze how spending habits affect one's ability to save.

9.1.8.PB.7 Brainstorm techniques that will help decrease expenses including comparison shopping, negotiating, and day-to-day expense management.

9.1.8.EG.7 Explain the effect of the economy (e.g., inflation, unemployment) on personal income, individual and family security, and consumer decisions.

**Computer Science and Design Thinking (standard 8)**

9.4.8.TL.3 Select appropriate tools to organize and present information digitally.

9.4.8.TL.1 Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making.

**Interdisciplinary Connection**

SL.6.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

SL.6.2	Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.
NJSLSA.L2	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

**Cross-cultural Statements/Mandates (*Amistad, Holocaust, LGBT/Disabilities, SEL, etc...*)**

SEL Mandate: References to this mandate are made by studying perseverance through Julia Robinson. After spending decades working on Hilbert's tenth problem, she found a solution in 1980 which was considered a groundbreaking achievement.

**Unit Essential Question(s):**

- How do you divide multi-digit numbers?
- How do you multiply multi-digit numbers?
- How do you write the prime factorization of a number?
- How can you find the least common multiple of two whole numbers?
- How can you find the greatest common factor of two whole numbers?
- How can you compare and order fractions and decimals?
- How do you multiply fractions?
- How do you divide fractions?
- How do you add and subtract multi-digit decimals?
- How do you multiply multi-digit decimals?
- How do you divide decimals by whole numbers?
- How do you divide whole numbers and decimals by decimals?

**Unit Enduring Understandings:**

- Estimation is a very useful mathematical tool.
- It is important to extend knowledge from whole numbers to rational numbers in order to fully understand and solve real world problems.

**Evidence of Learning**

**Formative Assessments:** Teacher observations, exit slips, homework, participation, communicator white boards

**Summative/Benchmark Assessment(s):** Lesson quizzes, Unit Test

**Alternative Assessments:** Modified versions of quizzes and tests

**Resources/Materials:**

- Smart Board
- curriculum folders
- scope and sequence calendar
- math textbook
- math manipulatives
- Online resources such as IXL, Xtramath, Think Central, etc.

**Key Vocabulary:**

- **Whole Numbers:** common factor, greatest common factor, least common multiple, prime factorization, compatible numbers, prime number, composite number, dividend, divisor, quotient, base, exponent, order of operations
- **Fractions:** fraction, numerator, denominator, unit fraction, mixed number, improper fraction, common denominator, least common denominator, simplify, simplest form, benchmark
- **Decimals:** decimal, decimal point, repeating decimal, terminating decimal

**Suggested Pacing Guide**

Lesson Name/Topic	Student Learning Objective(s)	Suggested Tasks/Activities:	Day(s) to Complete
Benchmark Testing	Students will be able to complete a benchmark assessment.	<ul style="list-style-type: none"> <li>• Benchmark assessment</li> </ul>	2 days
Multiply Multi Digit Numbers	Students will be able to Multiply multi digit numbers.	<ul style="list-style-type: none"> <li>• Review multiplying whole numbers using area model, partial products, and traditional method</li> <li>• Guided &amp; independent practice</li> </ul>	1 day

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Divide multi digit numbers	Students will be able to divide multi digit numbers.	<ul style="list-style-type: none"> <li>Review dividing multi-digit numbers using tower up and the traditional method</li> <li>Guided &amp; independent practice</li> </ul>	1 day
Exponents	Students will be able to evaluate expressions involving exponents.	<ul style="list-style-type: none"> <li>Model evaluating exponents</li> <li>Review exponents with a base of ten, power of 1 and power of 0</li> <li>Guided &amp; independent practice</li> </ul>	2 days
Assessment	Students will be able to demonstrate the skills above	<ul style="list-style-type: none"> <li>Assessment</li> </ul>	1 day
Order of Operations	Students will be able to use the order of operations to evaluate expressions involving exponents.	<ul style="list-style-type: none"> <li>Guided notes on order of operations</li> <li>Guided notes on addition and multiplication properties</li> <li>Guided &amp; independent practice</li> </ul>	3 days
Prime Factorization	Students will be able to write the prime factorization of numbers.	<ul style="list-style-type: none"> <li>Model finding the prime factorization of a number by factoring out prime numbers</li> <li>Guided &amp; independent practice</li> </ul>	1 day
Greatest Common Factor	Students will be able to find the greatest common factor of two whole numbers.	<ul style="list-style-type: none"> <li>Model finding the GCF of two whole numbers using the “cake” method</li> <li>Guided &amp; independent practice</li> </ul>	2 days
Least Common Multiple	Students will be able to find the least common multiple of two whole numbers.	<ul style="list-style-type: none"> <li>Model finding the LCM of two whole numbers using the “cake” method</li> <li>Guided &amp; independent practice</li> </ul>	2 days
Assessment	Students will be able to demonstrate the skills above.	<ul style="list-style-type: none"> <li>Assessment</li> </ul>	1 day
Compare and Order Fractions	Students will be able to compare and order fractions	<ul style="list-style-type: none"> <li>Model the six different ways to compare fractions</li> <li>Guided notes on the six different ways to compare fractions</li> <li>Guided &amp; independent practice</li> </ul>	3 days
Adding Fractions	Students will be able to add fractions using a common denominator	<ul style="list-style-type: none"> <li>Review converting mixed numbers and improper fractions</li> <li>Review simplifying fractions</li> <li>Model adding fractions by finding a common denominator</li> </ul>	1 day

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		<ul style="list-style-type: none"> <li>• Guided &amp; independent practice</li> </ul>	
Subtracting Fractions	Students will be able to subtract fractions using a common denominator	<ul style="list-style-type: none"> <li>• Model subtracting fractions by finding a common denominator</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Multiply Fractions	Students will be able to multiply fractions.	<ul style="list-style-type: none"> <li>• Review multiplying fractions using the “brownie pan” method</li> <li>• Model multiplying fractions using the standard algorithm (simplify before you multiply)</li> <li>• Review multiplying fractions conclusions</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Divide Fractions	Students will be able to divide proper fractions and mixed numbers using a common denominator.	<ul style="list-style-type: none"> <li>• Review dividing fractions using the “brownie pan” method and fraction tiles</li> <li>• Model dividing fractions using the standard algorithm (find a common denominator)</li> <li>• Guided &amp; independent practice</li> </ul>	3 days
Assessment	Students will be able to demonstrate the skills above	<ul style="list-style-type: none"> <li>• Assessment</li> </ul>	1 day
Order of Operations with fractions	Students will be able to use the order of operations to evaluate expressions involving fractions	<ul style="list-style-type: none"> <li>• Review order of operations notes</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Unit Test	Students will be able to demonstrate the skills above	<ul style="list-style-type: none"> <li>• Assessment</li> </ul>	2 days
Compare and Order Decimals	Students will be able to compare and order decimals	<ul style="list-style-type: none"> <li>• Number line discussion on how for every fraction there is an equivalent decimal</li> <li>• Review decimal place value through the millionths</li> <li>• Practice reading and writing decimals in standard, written, and expanded form</li> <li>• Modeling comparing and ordering decimals using decimal place value</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Add and subtract decimals	Students will be able to add and subtract decimals	<ul style="list-style-type: none"> <li>• Review adding and subtracting decimals</li> <li>• Guided &amp; independent practice</li> </ul>	1 day

Multiply decimals	Students will be able to fluently multiply multi digit decimals	<ul style="list-style-type: none"> <li>Model multiplying decimals</li> <li>Guided notes on multiplying decimals</li> <li>Review the “importance of zero”</li> <li>Guided &amp; independent practice</li> </ul>	1 day
Assessment	Students will be able to demonstrate the skills above.	<ul style="list-style-type: none"> <li>Assessment</li> </ul>	1 day
Dividing Decimals	Students will be able to divide decimals by decimals and decimals by whole numbers	<ul style="list-style-type: none"> <li>Model dividing decimals by decimals and decimals by whole numbers</li> <li>Guided notes</li> <li>Guided &amp; independent practice</li> </ul>	2 days
Order of Operations with Decimals	Students will be able to use the order of operations to evaluate expressions involving decimals	<ul style="list-style-type: none"> <li>Review order of operations notes</li> <li>Guided &amp; independent practice</li> </ul>	2 days
Assessment	Students will be able to demonstrate the skills above.	<ul style="list-style-type: none"> <li>Assessment</li> </ul>	1 day

**Teacher Notes:** Students will use prior knowledge by using the ‘cake method’ for LCM and GCF. Students will be shown 6 ways to compare fractions. Students should use a common denominator to add, subtract and multiply fractions. Students should use the ‘moth method’ to simplify fractions before multiplying them. Use brownie pans to multiply proper fractions. Use of fraction tiles to compare and order fractions.

**Additional Resources:**

- <https://www.ixl.com/>
- <https://www.khanacademy.org/>
- <https://xtramath.org>
- <https://www-k6.thinkcentral.com/ePC/start.do>

**Differentiation/Modification Strategies**

<b>Students with Disabilities</b>	<b>English Language Learners</b>
<ul style="list-style-type: none"> <li>Consult student IEP</li> <li>Allow errors</li> <li>Rephrase questions, directions, and explanations</li> <li>Allow a calculator when necessary</li> <li>Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>Accept participation at any level, even one word</li> <li>Consult with Case Managers and follow IEP</li> </ul>	<ul style="list-style-type: none"> <li>Consult student ELL Plan</li> <li>Assign a buddy, same language or English speaking</li> <li>Allow errors in speaking</li> <li>Rephrase questions, directions, and explanations</li> <li>Allow extended time to answer questions</li> <li>Accept participation at any level, even one word</li> </ul>
<b>Gifted &amp; Talented Students</b>	<b>Students at Risk</b>
<ul style="list-style-type: none"> <li>Consult with G and T teacher</li> <li>Provide extension activities</li> <li>Make peer leaders</li> <li>Build on students’ intrinsic motivations</li> <li>Consult with parents to accommodate students’ interests in completing tasks at their level of engagement</li> </ul>	<ul style="list-style-type: none"> <li>Consult with I &amp;RS as needed</li> <li>Provide extended time to complete tasks</li> <li>Consult with Guidance Counselors and follow I&amp;RS procedures/action plans</li> <li>Consult with classroom teacher(s) for specific behavior interventions</li> <li>Provide rewards as necessary</li> </ul>
<b>504 Students</b>	<b>Other:</b>
<ul style="list-style-type: none"> <li>Consult 504 Plan</li> <li>Allow errors</li> </ul>	

<ul style="list-style-type: none"> <li>• Rephrase questions, directions, and explanations</li> <li>• Allow a calculator when necessary</li> <li>• Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>• Accept participation at any level, even one word</li> <li>• Consult with Case Managers and follow 504</li> </ul>	
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**UNIT #2****Overview****Content Area:** Mathematics**Unit Title:** Expressions and Equations**Grade Level(s):** 6th**Core Ideas:**

- Algebraic Expressions
- Algebraic Equations and Inequalities
- Integers and the Coordinate Plane

Students understand the use of variables in mathematical expressions. They write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems. Students understand that expressions in different forms can be equivalent, and they use the properties of operations to rewrite expressions in equivalent forms. Students know that the solutions of an equation are the values of the variables that make the equation true. Students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations. Students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and they use equations (such as  $3x = y$ ) to describe relationships between quantities.

**Standards (Content and Technology)****CPI#:****Statement:****Performance Expectations (NJSL)**

6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers.
6.EE.A.3	Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$ ; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$ ; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$ .
6.EE.A.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number $y$ stands for.
6.EE.B.5	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
6.EE.B.7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which $p$ , $q$ and $x$ are all nonnegative rational numbers.
6.EE.B.8	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent



	and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time
6.NS.C.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
6.NS.C.7	Understand ordering and absolute value of rational numbers.
SMP.1	Make sense of problems and persevere in solving them.
SMP.2	Reason abstractly and quantitatively.
SMP.3	Construct viable arguments and critique the reasoning of others.
SMP.4	Model with mathematics.
SMP.5	Use appropriate tools strategically.
SMP.6	Attend to precision.
SMP.7	Look for and make use of structure.
SMP.8	Look for and express regularity in repeated reasoning.
<b>Career Readiness (9.2) Life Literacies, and Key Skills (standard 9.1, 9.4)</b>	
9.2.8.CAP.3	Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
9.2.8.CAP.2	Develop a plan that includes information about career areas of interest.
9.2.8.CAP.5	Develop a personal plan with the assistance of an adult mentor that includes information about career areas of interest, goals and an educational plan.
9.4.8.CI.3	Examine challenges that may exist in the adoption of new ideas.
9.4.8.IML.4	Ask insightful questions to organize different types of data and create meaningful visualizations.
9.4.8.IML.12	Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.
<b>Computer Science and Design Thinking (standard 8)</b>	
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
9.4.8.TL.1	Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making.
<b>Interdisciplinary Connection</b>	
SL.6.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.
SL.6.2	Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.
NJSLSA.L4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
<b>Cross-cultural Statements/Mandates (Amistad, Holocaust, LGBT/Disabilities, SEL, etc...)</b>	
Holocaust Mandate: References to this mandate are made by studying Alan Turing. Turing helped the British and its allies win the Second World War by interpreting the Nazi code correctly using patterns and algebra.	
<b>Unit Essential Question(s):</b>	
<ul style="list-style-type: none"> <li>• How do you write and find the value of expressions involving exponents?</li> <li>• How do you use the order of operations to evaluate expressions involving exponents?</li> <li>• How do you write an algebraic expression to represent a situation?</li> <li>• How can you describe the parts of an expression?</li> <li>• How do you evaluate an algebraic expression or a formula?</li> <li>• How can you use variables and algebraic expressions to solve problems?</li> <li>• How can you use the strategy use a model to combine like terms?</li> </ul>	
<b>Unit Enduring Understandings:</b>	
<ul style="list-style-type: none"> <li>• As students write equations to represent situations and solve equations to find solutions to problems, they will recognize that it is important to attend to precision.</li> <li>• Students learn to understand the relationships between variables by examining that relationship and abstracting the general rule from a table of values that relates the variables. This is one way they look</li> </ul>	

<ul style="list-style-type: none"> <li>• How can you use properties of operations to write equivalent algebraic expressions?</li> <li>• How can you identify equivalent algebraic expressions?</li> <li>• How do you determine whether a number is a solution of an equation?</li> <li>• How do you write an equation to represent a situation?</li> <li>• How do you solve addition and subtraction equations?</li> <li>• How do you solve multiplication and division equations?</li> <li>• How do you determine whether a number is a solution of an inequality?</li> <li>• How do you write an inequality to represent a situation?</li> <li>• How can you write an equation to represent the relationship between an independent variable and a dependent variable?</li> <li>• How can you translate between equations and tables?</li> <li>• How can you graph the relationship between two quantities?</li> <li>• How can you translate between equations and graphs?</li> </ul>	<p>for and express regularity in repeated reasoning.</p>
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**Evidence of Learning**

**Formative Assessments:** Teacher observations, exit slips, Do Nows, homework, participation, communicator white boards

**Summative/Benchmark Assessment(s):** Lesson quizzes, Unit Test

**Alternative Assessments:** Modified versions of quizzes and tests

**Resources/Materials:**

- Smart Board
- curriculum folders
- scope and sequence calendar
- math textbook
- math manipulatives
- Online resources such as IXL, Xtramath, Think Central, etc.

**Key Vocabulary:**

- **Algebraic Expressions:** algebraic expression, numerical expression, variable, coefficient, terms, like terms, evaluate, constant, equivalent expressions, substitute, distributive property
- **Algebraic Equations and Inequalities:** equation, solution of an equation, inverse operations, inequality, solution of an inequality, independent variable, dependent variable, solution set, linear equation, substitute, addition property of equality, multiplication property of equality, division property of equality, subtraction property of equality,
- **Integers and the Coordinate Plane:** integer, opposites, rational number, absolute value, coordinate plane, x-axis, y-axis, origin, ordered pairs, quadrants, independent variable, dependent variable, linear equation

**Suggested Pacing Guide**

Lesson Name/Topic	Student Learning Objective(s)	Suggested Tasks/Activities:	Day(s) to Complete
Intro to expressions	Students will be able to write and evaluate expressions involving exponents	<ul style="list-style-type: none"> <li>• Model difference between a numerical expression and an algebraic expression</li> <li>• Guided vocabulary notes on parts of the expression</li> </ul>	1 day

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Expressions	Students will be able to write algebraic expressions.	<ul style="list-style-type: none"> <li>• Model writing expressions from words and using words to write expressions</li> <li>• Guided &amp; independent practice</li> <li>• Algebraic expressions coloring activity</li> </ul>	2 days
Translating and Writing Expressions	Students will be able to evaluate algebraic expressions and formulas.	<ul style="list-style-type: none"> <li>• Model evaluating algebraic expressions using substitution</li> <li>• Model evaluating expressions in T-charts</li> <li>• Guided &amp; independent practice</li> </ul>	3 days
Assessment	Students will be able to demonstrate the skills above	<ul style="list-style-type: none"> <li>• Assessment</li> </ul>	1 day
Properties	Students will be able to use the properties of operations to generate equivalent algebraic expressions.	<ul style="list-style-type: none"> <li>• Guided notes on algebraic properties</li> <li>• Guided &amp; independent practice</li> <li>• Distributive property maze</li> <li>• Distributive property tic-tac-toe</li> </ul>	3 days
Combine Like Terms	Students will be able to identify equivalent algebraic expressions.	<ul style="list-style-type: none"> <li>• Guided notes on combining like terms</li> <li>• Guided &amp; independent practice</li> <li>• Combining like terms maze</li> <li>• Combining like terms color by number</li> </ul>	2 days
Assessment	Students will be able to demonstrate the skills above	<ul style="list-style-type: none"> <li>• Assessment</li> </ul>	1 day
Intro to Equations	Students will be able to determine whether a number is a solution of an equation.	<ul style="list-style-type: none"> <li>• Review different between expressions and equations</li> <li>• Model determining whether a number is a solution to an equation</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Addition and Subtraction Equations	Students will be able to use algebra to solve addition and subtraction equations.	<ul style="list-style-type: none"> <li>• Model balancing an equation using “cups and chips”</li> <li>• Model the 5-step process for solving an addition or subtraction equation using inverse operations</li> <li>• Guided &amp; independent practice</li> <li>• Gallery Walk</li> </ul>	2 days

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Multiplication and Division Equations	Students will be able to use algebra to solve multiplication and division equations.	<ul style="list-style-type: none"> <li>• Model balancing an equation using “cups and chips”</li> <li>• Model the 5-step process for solving a multiplication or division equation using inverse operations</li> <li>• Guided &amp; independent practice</li> <li>• Gallery Walk</li> </ul>	2 days
Mixed Practice	Students will be able to use algebra to solve addition, subtractions, multiplication, and division equations.	<ul style="list-style-type: none"> <li>• Gallery Walk</li> <li>• Independent practice</li> </ul>	1 day
Assessment	Students will be able to demonstrate the skills above	<ul style="list-style-type: none"> <li>• Assessment</li> </ul>	1 day
Intro to Inequalities	Students will be able to determine whether a number is a solution of an inequality.	<ul style="list-style-type: none"> <li>• Guided notes on the four symbols for inequalities</li> <li>• Model determining whether a number is a solution of an inequality</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Inequalities	Students will be able to write algebraic inequalities.	<ul style="list-style-type: none"> <li>• Modeling writing an algebraic inequality from words</li> <li>• Model graphing inequalities and writing inequalities from graphs</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Inequality Word Problems	Students will be able to write and solve algebraic inequalities.	<ul style="list-style-type: none"> <li>• Model solving one-step inequalities</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Assessment	Students will be able to demonstrate the skills above.	<ul style="list-style-type: none"> <li>• Assessment</li> </ul>	1 day
Rational Numbers	Students will be able to compare and order integers.	<ul style="list-style-type: none"> <li>• Class discussion on difference between whole numbers, integers, and rational numbers</li> <li>• Model and discuss the number line to the left of zero</li> <li>• Model comparing and ordering integers on both horizontal and vertical number lines</li> <li>• Have students create their own number lines and graph integers</li> <li>• Guided &amp; independent practice</li> </ul>	2 days

Absolute Value	Students will be able to find and interpret the absolute value of integers.	<ul style="list-style-type: none"> <li>• Guided notes on absolute value</li> <li>• Model finding the absolute value</li> <li>• Model absolute value with operations</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Intro to the Coordinate Plane	Students will be able to translate between equations and tables.	<ul style="list-style-type: none"> <li>• Guided notes on the coordinate plane (vocabulary, labeling quadrants)</li> <li>• Model graphing coordinates on the coordinate plane and identifying coordinates from the coordinate plane using geoboards</li> <li>• Model finding reflections and finding differences using geoboards</li> <li>• Guided &amp; independent practice</li> <li>• Model translating between equations and tables</li> <li>• Guided &amp; independent practice</li> <li>• Graphing battleship</li> <li>• Graphing pictures</li> <li>• Problem solving gallery walk</li> <li>• “The Point Is..” Activity</li> </ul>	3 days
Coordinate Plane	Students will be able to graph the relationship between two quantities.	<ul style="list-style-type: none"> <li>• Model graphing the relationship between two quantities on the coordinate plane</li> <li>• Guided &amp; independent practice</li> </ul>	3 days
Independent and Dependent Variables	Students will be able to write an equation to represent the relationship between an independent variable and a dependent variable.	<ul style="list-style-type: none"> <li>• Guided notes on independent and dependent variables (use examples from T-charts)</li> <li>• Model writing equations from tables and filling in tables from equations</li> <li>• Have students analyze tables to write equations</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Graphing Linear Equations	Students will be able to translate between equations and graphs.	<ul style="list-style-type: none"> <li>• Model graphing relationships on the coordinate plane</li> <li>• Guided &amp; independent practice</li> </ul>	2 days

		<ul style="list-style-type: none"> <li>• Model graphing linear equations using geoboards</li> <li>• Guided &amp; independent practice</li> </ul>	
Assessment	Students will be able to demonstrate the skills above	<ul style="list-style-type: none"> <li>• Assessment</li> </ul>	1 day

**Teacher Notes:** Use cups and chips to solve one step Algebraic equations. Use geoboards to locate points on the coordinate plane and to graph linear equations.

**Additional Resources:**

<https://www.ixl.com/>

<https://www.khanacademy.org/>

<https://xtramath.org>

<https://www-k6.thinkcentral.com/ePC/start.do>

**Differentiation/Modification Strategies**

<b>Students with Disabilities</b>	<b>English Language Learners</b>
<ul style="list-style-type: none"> <li>• Consult student IEP</li> <li>• Allow errors</li> <li>• Rephrase questions, directions, and explanations</li> <li>• Allow a calculator when necessary</li> <li>• Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>• Accept participation at any level, even one word</li> <li>• Consult with Case Managers and follow IEP</li> </ul>	<ul style="list-style-type: none"> <li>• Consult student ELL Plan</li> <li>• Assign a buddy, same language or English speaking</li> <li>• Allow errors in speaking</li> <li>• Rephrase questions, directions, and explanations</li> <li>• Allow extended time to answer questions</li> <li>• Accept participation at any level, even one word</li> </ul>
<b>Gifted &amp; Talented Students</b>	<b>Students at Risk</b>
<ul style="list-style-type: none"> <li>• Consult with G and T teacher</li> <li>• Provide extension activities</li> <li>• Make peer leaders</li> <li>• Build on students' intrinsic motivations</li> <li>• Consult with parents to accommodate students' interests in completing tasks at their level of engagement</li> </ul>	<ul style="list-style-type: none"> <li>• Consult with I &amp; RS as needed</li> <li>• Provide extended time to complete tasks</li> <li>• Consult with Guidance Counselors and follow I&amp;RS procedures/action plans</li> <li>• Consult with classroom teacher(s) for specific behavior interventions</li> <li>• Provide rewards as necessary</li> </ul>
<b>504 Students</b>	<b>Other:</b>
<ul style="list-style-type: none"> <li>• Consult 504 Plan</li> <li>• Allow errors</li> <li>• Rephrase questions, directions, and explanations</li> <li>• Allow a calculator when necessary</li> <li>• Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>• Accept participation at any level, even one word</li> <li>• Consult with Case Managers and follow 504</li> </ul>	

**UNIT #3****Overview****Content Area:** Mathematics**Unit Title:** Ratios and Proportional Relationships**Grade Level(s):** 6th**Core Ideas:**

- Rates, Ratios and Unit Rates
- Units of Measure
- Percents

Students use reasoning about multiplication and division to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students connect their understanding of multiplication and division with ratios and rates.

**Standards (Content and Technology)****CPI#:****Statement:****Performance Expectations (NJSL)**

6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”
6.RP.A.2	Understand the concept of a unit rate $a/b$ associated with a ratio $a:b$ with $b \neq 0$ , and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar.” “We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.”
6.RP.A.3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
6.RP.A.3.a	Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
6.RP.A.3.b	Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?
6.RP.A.3.c	Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $30/100$ times the quantity); solve problems involving finding the whole, given a part and the percent.
6.RP.A.3.d	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
SMP.1	Make sense of problems and persevere in solving them.
SMP.2	Reason abstractly and quantitatively.
SMP.3	Construct viable arguments and critique the reasoning of others.
SMP.4	Model with mathematics.
SMP.5	Use appropriate tools strategically.
SMP.6	Attend to precision.
SMP.7	Look for and make use of structure.
SMP.8	Look for and express regularity in repeated reasoning.
<b>Career Readiness (9.2) Life Literacies, and Key Skills (standard 9.1, 9.4)</b>	
9.2.8.CAP.3	Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
9.2.8.CAP.2	Develop a plan that includes information about career areas of interest.
9.1.8.CP.1	Compare prices for the same goods or services.
9.1.8.CP.2	Analyze how spending habits affect one’s ability to save.
9.1.8.PB.7	Brainstorm techniques that will help decrease expenses including comparison shopping, negotiating, and day-to-day expense management.
9.1.8.EG.1	Explain how taxes affect disposable income and the difference between net and gross income.
9.1.8.EG.7	Explain the effect of the economy (e.g., inflation, unemployment) on personal income, individual and family security, and consumer decisions.

9.4.8.CI.3	Examine challenges that may exist in the adoption of new ideas.		
<b>Computer Science and Design Thinking (standard 8)</b>			
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.		
9.4.8.TL.1	Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making.		
<b>Interdisciplinary Connection</b>			
SL.6.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.		
SL.6.2	Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.		
<b>Cross-cultural Statements/Mandates (<i>Amistad, Holocaust, LGBT/Disabilities, SEL, etc...</i>)</b>			
LGBTQ+ Mandate: References to this mandate are made by studying Autumn Kent a pansexual trans woman professor of mathematics at the university of Wisconsin, who in 2019 organized the LGTBQ+ conference to foster collaboration between LGBTQ+ mathematicians working in geometry, topology, and dynamical systems.			
<b>Unit Essential Question(s):</b>		<b>Unit Enduring Understandings:</b>	
<ul style="list-style-type: none"> <li>How can you model ratios?</li> <li>How do you write ratios and rates?</li> <li>How can you use a multiplication table to find equivalent ratios?</li> <li>How can you use tables to solve problems involving equivalent ratios?</li> <li>How can you use unit rates to make comparisons?</li> <li>How can you solve problems using unit rates?</li> <li>How can you use a graph to represent equivalent ratios?</li> <li>How can you use ratio reasoning to convert from one unit of length to another?</li> <li>How can you use ratio reasoning to convert from one unit of capacity to another?</li> <li>How can you use ratio reasoning to convert from one unit of weight or mass to another?</li> <li>How can you transform units to solve problems?</li> <li>How can you use the strategy use a formula to solve problems involving distance, rate, and time?</li> <li>How can you use a model to show a percent?</li> <li>How can you write percents as fractions and decimals?</li> <li>How can you write fractions and decimals as percents?</li> <li>How do you find a percent of a quantity?</li> <li>How can you find the whole given a part and the percent?</li> </ul>		<ul style="list-style-type: none"> <li>Working with ratios, rates, and solving problems involving equivalent ratios, provides students many opportunities to reason abstractly and quantitatively.</li> <li>Students should make sense of problems and persevere in solving them.</li> <li>Percents help students see the power of mathematics to model and solve problems in their everyday life.</li> </ul>	
<b>Evidence of Learning</b>			
<b>Formative Assessments:</b> Teacher observations, exit slips, homework, participation, communicator white boards			
<b>Summative/Benchmark Assessment(s):</b> Lesson quizzes, Unit Test			
<b>Alternative Assessments:</b> Modified versions of quizzes and tests			
<b>Resources/Materials:</b>		<b>Key Vocabulary:</b>	
<ul style="list-style-type: none"> <li>Smart Board</li> <li>curriculum folders</li> <li>scope and sequence calendar</li> <li>math textbook</li> <li>math manipulatives</li> <li>Online resources such as IXL, Xtramath, Think Central, etc.</li> </ul>		<ul style="list-style-type: none"> <li><b>Rates, Ratios and Unit Rates:</b> ratio, rate, unit rate, equivalent ratio, proportion</li> <li><b>Units of Measure:</b> capacity, length, mass, weight, conversion factor, customary system, metric system</li> <li><b>Percents:</b> percent, tax, discount, markup</li> </ul>	
<b>Suggested Pacing Guide</b>			
<b>Lesson Name/Topic</b>	<b>Student Learning Objective(s)</b>	<b>Suggested Tasks/Activities:</b>	<b>Day(s) to Complete</b>



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Intro to Ratios	Students will be able to model ratios.	<ul style="list-style-type: none"> <li>• Model ratios using counters/pictures</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Ratios and Rate	Students will be able to write ratios and rates.	<ul style="list-style-type: none"> <li>• Model the three ways to write a ratio (fraction, :, to)</li> <li>• Class discussion on the difference between ratios and rates</li> <li>• Model writing ratios and rates from word problems</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Unit Rate	Students will be able to <ul style="list-style-type: none"> <li>• use unit rates to make comparisons.</li> <li>• solve problems using unit rates.</li> </ul>	<ul style="list-style-type: none"> <li>• Class discussion on the difference between a rate and a unit rate</li> <li>• Model solving problems using unit rates by setting up proportions</li> <li>• Model comparing two things using unit rates</li> <li>• Guided &amp; independent practice</li> <li>• Unit Prices Activity</li> </ul>	2 days
Equivalent Ratios	Students will be able to <ul style="list-style-type: none"> <li>• use a multiplication table to find equivalent ratios.</li> <li>• use tables to solve problems involving equivalent ratios.</li> </ul>	<ul style="list-style-type: none"> <li>• Model using a multiplication table to find equivalent ratios</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Graphing Ratios	Students will be able to use a graph to represent equivalent ratios.	<ul style="list-style-type: none"> <li>• Model using a graph to represent equivalent ratios</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Assessment	Students will be able to demonstrate the skills above	<ul style="list-style-type: none"> <li>• Assessment</li> </ul>	1 day
Proportion	Students will be able to use tables to solve problems involving equivalent ratios.	<ul style="list-style-type: none"> <li>• Model using tables to solve problems involving equivalent ratios</li> <li>• Guided &amp; independent practice</li> </ul>	3 days
Scale Drawings	Students will be able to use tables to solve problems involving equivalent ratios.	<ul style="list-style-type: none"> <li>• Video on scale Drawings</li> <li>• Class discussion on scale drawings and where we see scaled drawings in real life</li> <li>• Model using a proportion to find scale drawings</li> <li>• Guided &amp; independent practice</li> <li>• Maps Activity</li> </ul>	3 days
Intro to Linear Measurements	Students will be able to use ratio reasoning to convert from one unit of length to another.	<ul style="list-style-type: none"> <li>• Class Discussion on difference between customary units of measure and metric units of measure</li> </ul>	2 days

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		<ul style="list-style-type: none"> <li>• Customary / Metric Guided Notes</li> <li>• Model converting customary and metric units of length</li> <li>• Guided &amp; independent practice</li> </ul>	
Units of Capacity	Students will be able to use ratio reasoning to convert from one unit of capacity to another.	<ul style="list-style-type: none"> <li>• Capacity Guided Notes</li> <li>• Model converting customary and metric units of capacity</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Units of Weight and Mass	Students will be able to use ratio reasoning to convert from one unit of weight mass to another.	<ul style="list-style-type: none"> <li>• Model converting customary and metric units of weight/mass</li> <li>• Guided &amp; independent practice</li> <li>• Units of Measure Gallery Walk</li> </ul>	2 days
Assessment	Students will be able to demonstrate the skills above	<ul style="list-style-type: none"> <li>• Assessment</li> </ul>	1 day
Intro to Percents Use a model to show a percent as a rate per 100.	Students will be able to <ul style="list-style-type: none"> <li>• write percents as fractions and decimals.</li> <li>• write fractions and decimals as percents.</li> </ul>	<ul style="list-style-type: none"> <li>• Class Discussion: Where do you see percentages in the world?</li> <li>• Cube lesson: modeling fractions and decimals as percentages and modeling fractions and decimals as percents</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Percents multiples of 10	Students will be able to <ul style="list-style-type: none"> <li>• find a percent of a quantity.</li> <li>• find the whole given a part and the percent.</li> </ul>	<ul style="list-style-type: none"> <li>• Model using percent bars to find a percent of a quantity</li> <li>• Model using percent bars to find the whole given the part and the percent</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Percents multiples of 20/25	Students will be able to <ul style="list-style-type: none"> <li>• find a percent of a quantity.</li> <li>• find the whole given a part and the percent.</li> </ul>	<ul style="list-style-type: none"> <li>• Model using percent bars to find a percent of a quantity</li> <li>• Model using percent bars to find the whole given the part and the percent</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
All other percents	Students will be able to <ul style="list-style-type: none"> <li>• find a percent of a quantity.</li> <li>• find the whole given a part and the percent.</li> </ul>	<ul style="list-style-type: none"> <li>• Model using standard algorithm to find the percent of a quantity</li> <li>• Model using the standard algorithm to find the whole given the part and the percent</li> </ul>	1 day

		<ul style="list-style-type: none"> <li>• Guided &amp; independent practice</li> </ul>	
Sales Tax and Discount	Students will be able to <ul style="list-style-type: none"> <li>• find a percent of a quantity.</li> <li>• find the whole given a part and the percent.</li> </ul>	<ul style="list-style-type: none"> <li>• Model finding sales tax and discount using the standard algorithm</li> <li>• Guided &amp; independent practice</li> <li>• Sales and Discount Gallery Walk</li> </ul>	2 days
Assessment	Students will be able to demonstrate the skills above	<ul style="list-style-type: none"> <li>• Assessment</li> </ul>	1 day

**Teacher Notes:** Use half inch grid paper to discover and remember units of capacity. Use feet and yard stick for units of measure. Cube lesson for intro to percents. Use percent bars for 10, 20 and 25%.

**Additional Resources:**

<https://www.ixl.com/>

<https://www.khanacademy.org/>

<https://xtramath.org>

<https://www-k6.thinkcentral.com/ePC/start.do>

**Differentiation/Modification Strategies**

<b>Students with Disabilities</b>	<b>English Language Learners</b>
<ul style="list-style-type: none"> <li>• Consult student IEP</li> <li>• Allow errors</li> <li>• Rephrase questions, directions, and explanations</li> <li>• Allow a calculator when necessary</li> <li>• Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>• Accept participation at any level, even one word</li> <li>• Consult with Case Managers and follow IEP</li> </ul>	<ul style="list-style-type: none"> <li>• Consult student ELL Plan</li> <li>• Assign a buddy, same language or English speaking</li> <li>• Allow errors in speaking</li> <li>• Rephrase questions, directions, and explanations</li> <li>• Allow extended time to answer questions</li> <li>• Accept participation at any level, even one word</li> </ul>
<b>Gifted &amp; Talented Students</b>	<b>Students at Risk</b>
<ul style="list-style-type: none"> <li>• Consult with G and T teacher</li> <li>• Provide extension activities</li> <li>• Make peer leaders</li> <li>• Build on students' intrinsic motivations</li> <li>• Consult with parents to accommodate students' interests in completing tasks at their level of engagement</li> </ul>	<ul style="list-style-type: none"> <li>• Consult with I &amp;RS as needed</li> <li>• Provide extended time to complete tasks</li> <li>• Consult with Guidance Counselors and follow I&amp;RS procedures/action plans</li> <li>• Consult with classroom teacher(s) for specific behavior interventions</li> <li>• Provide rewards as necessary</li> </ul>
<b>504 Students</b>	<b>Other:</b>
<ul style="list-style-type: none"> <li>• Consult 504 Plan</li> <li>• Allow errors</li> <li>• Rephrase questions, directions, and explanations</li> <li>• Allow a calculator when necessary</li> <li>• Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>• Accept participation at any level, even one word</li> <li>• Consult with Case Managers and follow 504</li> </ul>	

**UNIT #4****Overview****Content Area:** Mathematics**Unit Title:** Geometry**Grade Level(s):** 6th**Core Ideas:**

- Area of two-dimensional figures
- Surface area of three-dimensional figures
- Volume of three-dimensional figures

Students in build on their work with area by reasoning about relationships among shapes to determine area, surface area, and volume. They find areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces, and relating the shapes to rectangles. Students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine. They reason about right rectangular prisms with fractional side lengths to extend formulas for the volume of a right rectangular prism to fractional side lengths.

**Standards (Content and Technology)****CPI#:****Statement:****Performance Expectations (NJSL)**

6.G.A.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
6.G.A.2	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l w h$ and $V = B h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
6.G.A.3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
6.G.A.4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
SMP.1	Make sense of problems and persevere in solving them.
SMP.2	Reason abstractly and quantitatively.
SMP.4	Model with mathematics.
SMP.5	Use appropriate tools strategically.
SMP.6	Attend to precision.
SMP.7	Look for and make use of structure.
SMP.8	Look for and express regularity in repeated reasoning.

**Career Readiness (9.2) Life Literacies, and Key Skills (standard 9.1, 9.4)**

9.2.8.CAP.12	Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.
9.4.8.CI.3	Examine challenges that may exist in the adoption of new ideas.
9.4.8.IML.4	Ask insightful questions to organize different types of data and create meaningful visualizations.
9.4.8.IML.12	Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.

**Computer Science and Design Thinking (standard 8)**

9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
9.4.8.TL.1	Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making.

**Interdisciplinary Connection**

SL.6.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.
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SL.6.2	Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.
NJSLSA.L2	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

**Cross-cultural Statements/Mandates (*Amistad, Holocaust, LGBT/Disabilities, SEL, etc...*)**

Disabilities Mandate: References to this mandate are made by studying Solomon Lefschetz, an amputee and mathematician who did fundamental work on algebraic topology and its applications to algebraic geometry as well as the theory of non-linear ordinary differential equations.

**Unit Essential Question(s):**

- How can you find the area of parallelograms?
- What is the relationship among the areas of triangles, rectangles, and parallelograms?
- How can you find the area of triangles?
- What is the relationship between the areas of trapezoids and parallelograms?
- How can you find the area of trapezoids?
- How can you find the area of regular polygons?
- How can you find the area of composite figures?
- How can you plot polygons on a coordinate plane and find their side lengths?
- How do you use nets to represent three-dimensional figures?
- What is the relationship between a net and the surface area of a prism?
- How can you find the surface area of prisms?
- How can you find the surface area of a pyramid?
- How can you find volumes of rectangular prisms with fractional edge lengths?

**Unit Enduring Understandings:**

- Students reason abstractly and quantitatively when they make sense of area formulas. They do this by using their prior knowledge to derive formulas and represent them symbolically. This reasoning helps students to explain problems, the problem-solving process, and justify their solutions.
- Modeling solid figures can help students make sense of problems and persevere in solving them. Filling spaces with cubes provides an image for students to relate to the formula for the volume of a rectangular prism. Knowing such strategies will encourage students to persevere until they can find a reasonable solution.

**Evidence of Learning**

**Formative Assessments:** Teacher observations, exit slips, homework, participation, communicator white boards, Do Nows

**Summative/Benchmark Assessment(s):** Lesson quizzes

**Alternative Assessments:** Modified versions of quizzes

**Resources/Materials:**

- Smart Board
- curriculum folders
- scope and sequence calendar
- math textbook
- math manipulatives
- Online resources such as IXL, Xtramath, Think Central, etc.

**Key Vocabulary:**

- **Area of two-dimensional figures:** two-dimensional, polygon, regular polygon, congruent, area, perimeter, composite figure, parallel
- **Surface area of three-dimensional figures:** area, lateral area, surface area, three-dimensional figure, net, solid figure, base, polygon, prism, pyramid, vertex, face, edge
- **Volume of three-dimensional figures:** volume, base, prism, face

**Suggested Pacing Guide**

Lesson Name/Topic	Student Learning Objective(s)	Suggested Tasks/Activities:	Day(s) to Complete
Intro to Geometry	Students will be able to demonstrate prior knowledge of polygons	<ul style="list-style-type: none"> <li>• Guided notes on Polygons</li> <li>• Regular &amp; irregular polygon sort</li> <li>• Quadrilateral Hierarchy</li> </ul> Guided notes	1 day

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Area of Polygons	Students will be able to find the area of rectangles, squares, parallelograms, triangles, and trapezoids.	<ul style="list-style-type: none"> <li>• Area of 2D Figures Packet (grid paper), have students use critical thinking skills to determine the area formula for rectangles, squares, parallelograms, triangles, and trapezoids.</li> <li>• Review Area Formulas</li> <li>• Guided &amp; independent practice</li> </ul>	3 days
Area of Regular Polygons	Students will be able to find the area of regular polygons.	<ul style="list-style-type: none"> <li>• Model finding the area of a triangle to find the area of regular polygons</li> <li>• Review Formula</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Area of Composite Figures	Students will be able to find the area of composite figures.	<ul style="list-style-type: none"> <li>• Model breaking down composite figures to find the area</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Polygons on the Coordinate Plane	Students will be able to plot polygons on a coordinate plane and use coordinates to find side lengths.	<ul style="list-style-type: none"> <li>• Model plotting points on a coordinate plane to find area using side lengths</li> <li>• Guided &amp; independent practice</li> <li>• Name the Shape Activity</li> <li>• Find the Missing Coordinate Activity</li> </ul>	1 day
Assessment	Students will be able to demonstrate the skills above	<ul style="list-style-type: none"> <li>• Assessment</li> </ul>	1 day
Intro to 3D shapes	Students will be able to use nets to represent three-dimensional figures.	<ul style="list-style-type: none"> <li>• 3D shapes guided notes (edges, faces, vertices)</li> <li>• Explore with Nets (3D shapes)</li> <li>• Finding 11 nets of a cube activity</li> <li>• Model identifying and drawing nets</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Intro to Surface Area	Students will be able to use nets to recognize that the surface area of a prism is equal to the sum of the areas of its faces.	<ul style="list-style-type: none"> <li>• Model finding surface area of rectangular prisms using nets</li> <li>• Guided &amp; independent practice</li> <li>• Model finding surface area of rectangular prisms using “tulip” method</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Surface Area of Prisms	Students will be able to find the surface area of prisms.	<ul style="list-style-type: none"> <li>• Model finding surface area of prisms</li> </ul>	2 days

		<ul style="list-style-type: none"> <li>• Guided &amp; independent practice</li> <li>• Class discussion on difference between surface area and lateral area</li> </ul>	
Surface Area of Pyramids	Students will be able to find the surface area of pyramids.	<ul style="list-style-type: none"> <li>• Model finding surface area of pyramids</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Volume of Rectangular Prisms	Students will be able to investigate the volume of rectangular prisms with fractional edge lengths.	<ul style="list-style-type: none"> <li>• Review finding volume of rectangular prisms</li> <li>• Review the two formulas for finding volume</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Volume of Prisms with Fractional Side Lengths	Students will be able to use formulas to find the volume of rectangular prisms with fractional edge lengths.	<ul style="list-style-type: none"> <li>• Model finding volume of prisms with fractional side lengths using cubes</li> <li>• Model finding volume of prisms with fractional side lengths using graph paper</li> <li>• Model finding volume of prisms with fractional side lengths using the two volume formulas</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Assessment	Students will be able to demonstrate the skills above	<ul style="list-style-type: none"> <li>• Assessment</li> </ul>	1 day

**Teacher Notes:** Use Quadrilateral Hierarchy when introducing Geometry. Use Geomodels to draw nets of 3D shapes. Use paper nets to discover the nets of a cube.

**Additional Resources:**

<https://www.ixl.com/>

<https://www.khanacademy.org/>

<https://xtramath.org>

<https://www-k6.thinkcentral.com/ePC/start.do>

**Differentiation/Modification Strategies**

<b>Students with Disabilities</b>	<b>English Language Learners</b>
<ul style="list-style-type: none"> <li>• Consult student IEP</li> <li>• Allow errors</li> <li>• Rephrase questions, directions, and explanations</li> <li>• Allow a calculator when necessary</li> <li>• Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>• Accept participation at any level, even one word</li> <li>• Consult with Case Managers and follow IEP</li> </ul>	<ul style="list-style-type: none"> <li>• Consult student ELL Plan</li> <li>• Assign a buddy, same language or English speaking</li> <li>• Allow errors in speaking</li> <li>• Rephrase questions, directions, and explanations</li> <li>• Allow extended time to answer questions</li> <li>• Accept participation at any level, even one word</li> </ul>
<b>Gifted &amp; Talented Students</b>	<b>Students at Risk</b>
<ul style="list-style-type: none"> <li>• Consult with G and T teacher</li> <li>• Provide extension activities</li> <li>• Make peer leaders</li> <li>• Build on students' intrinsic motivations</li> <li>• Consult with parents to accommodate students' interests in completing tasks at their level of engagement</li> </ul>	<ul style="list-style-type: none"> <li>• Consult with I &amp; RS as needed</li> <li>• Provide extended time to complete tasks</li> <li>• Consult with Guidance Counselors and follow I&amp;RS procedures/action plans</li> <li>• Consult with classroom teacher(s) for specific behavior interventions</li> <li>• Provide rewards as necessary</li> </ul>

<b>504 Students</b>	<b>Other:</b>
<ul style="list-style-type: none"><li>• Consult 504 Plan</li><li>• Allow errors</li><li>• Rephrase questions, directions, and explanations</li><li>• Allow a calculator when necessary</li><li>• Allow extended time to answer questions, and permit drawing, as an explanation</li><li>• Accept participation at any level, even one word</li><li>• Consult with Case Managers and follow 504</li></ul>	



**UNIT #5****Overview****Content Area:** Mathematics**Unit Title:** Unit 5: Statistics and Probability**Grade Level(s):** 6th**Core Ideas:**

- Measures of Center
- Data Displays

Students begin to develop their ability to think statistically. Students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values. Students recognize that a measure of variability (interquartile range or mean absolute deviation) can also be useful for summarizing data because two very different sets of data can have the same mean and median yet be distinguished by their variability. Students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected.

**Standards (Content and Technology)****CPI#:****Statement:****Performance Expectations (NJSL)**

6.SP.A.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.
6.SP.A.2	Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
6.SP.A.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
6.SP.B.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
6.SP.B.5	Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.
SMP.1	Make sense of problems and persevere in solving them.
SMP.2	Reason abstractly and quantitatively.
SMP.3	Construct viable arguments and critique the reasoning of others.
SMP.4	Model with mathematics.
SMP.6	Attend to precision.
SMP.8	Look for and express regularity in repeated reasoning.

**Career Readiness (9.2) Life Literacies, and Key Skills (standard 9.1, 9.4)**

9.2.8.CAP.3	Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
9.2.8.CAP.2	Develop a plan that includes information about career areas of interest.
9.1.8.CP.1	Compare prices for the same goods or services.
9.1.8.PB.7	Brainstorm techniques that will help decrease expenses including comparison shopping, negotiating, and day-to-day expense management.
9.4.8.IML.4	Ask insightful questions to organize different types of data and create meaningful visualizations.

**Computer Science and Design Thinking (standard 8)**

9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
9.4.8.TL.1	Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making.

**Interdisciplinary Connection**

SL.6.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.
SL.6.2	Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.
NJSLSA.L2	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
<b>Cross-cultural Statements/Mandates (<i>Amistad, Holocaust, LGBT/Disabilities, SEL, etc...</i>)</b>	
Amistad Mandate: References to this mandate are made by studying David Blackwell, an African American who made significant contributions to statistics.	

<p><b>Unit Essential Question(s):</b></p> <ul style="list-style-type: none"> <li>• How do you divide multi-digit numbers?</li> <li>• How do you identify a statistical question?</li> <li>• How can you describe how a data set was collected?</li> <li>• How can you use dot plots and frequency tables to display data?</li> <li>• How can you use histograms to display data?</li> <li>• How does the mean represent a fair share and balance point?</li> <li>• How can you describe a set of data using mean, median, and mode?</li> <li>• How does an outlier affect measures of center?</li> <li>• How can you describe overall patterns in a data set?</li> <li>• How can you use box plots to display data?</li> <li>• How do you calculate the mean absolute deviation of a data set?</li> <li>• How can you summarize a data set by using range, interquartile range, and mean absolute deviation?</li> <li>• How can you choose appropriate measures of center and variability to describe a data set?</li> <li>• What do measures of center and variability indicate about a data set?</li> <li>• How can you describe the distribution of a data set collected to answer a statistical question?</li> </ul>	<p><b>Unit Enduring Understandings:</b></p> <ul style="list-style-type: none"> <li>• Finding the mean, median, and mode of a set of data and discussing which measure is most appropriate to answer a statistical question provide students an opportunity to construct viable arguments and critique the reasoning of others.</li> <li>• As students work with data, they model with mathematics through dot plots, histograms, and box plots. The models reinforce given numerical information visually and help students analyze and interpret measures of center and dispersion to draw conclusions.</li> </ul>
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**Evidence of Learning**

**Formative Assessments:** Teacher observations, Do Now's exit slips, homework, participation, communicator white boards

**Summative/Benchmark Assessment(s):** Lesson quizzes, Unit Test

**Alternative Assessments:** Modified versions of quizzes and tests

<p><b>Resources/Materials:</b></p> <ul style="list-style-type: none"> <li>• Smart Board</li> <li>• curriculum folders</li> <li>• scope and sequence calendar</li> <li>• math textbook</li> <li>• math manipulatives</li> <li>• Online resources such as IXL, Xtramath, Think Central, etc.</li> </ul>	<p><b>Key Vocabulary:</b></p> <ul style="list-style-type: none"> <li>• Data, observations, statistical question, measure of center, mean, median, mode, range, outlier, attribute, distribution, dot plot, frequency table, histogram, box plot, lower quartile, upper quartile, interquartile range, mean absolute deviation, measure of variability</li> </ul>
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**Suggested Pacing Guide**

Lesson Name/Topic	Student Learning Objective(s)	Suggested Tasks/Activities:	Day(s) to Complete
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Statistical Questions	Students will be able to recognize statistical questions.	<ul style="list-style-type: none"> <li>• Class Discussion on Statistics</li> <li>• Model how to recognize a statistical question</li> <li>• Guided &amp; independent practice</li> <li>• Model writing a statistical question</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Mean, Median, and Mode Summarize a data set by using mean, median, and mode.	Students will be able to understand the mean as a fair share and as a balance point.	<ul style="list-style-type: none"> <li>• Model how to find mean (average) by “leveling out” data values so the value are all equal using virtual katie cubes</li> <li>• Model finding the mean of a data set</li> <li>• Model finding the median of a data set</li> <li>• Model finding the mode of a data set</li> <li>• Model finding the range of a data set</li> <li>• Mean, Median, Mode, &amp; Range guided Notes</li> <li>• Connect mean, median, and mode to careers</li> <li>• Guided &amp; independent practice</li> <li>• Making the Data Activity</li> <li>• Missing Bars Activity</li> <li>• Number Switch Activity</li> <li>• Mean, Median, Mode Gallery Walk</li> </ul>	2 days
Choosing Measures of Center	Students will be able to choose appropriate measures of center and variability to describe data and justify the choice.	<ul style="list-style-type: none"> <li>• Model using reasoning to choose the best measure of center to describe a data set</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Outliers	Students will be able to determine the effects of outliers on measures of center.	<ul style="list-style-type: none"> <li>• Class Discussion: Outliers: how do they effect data?</li> <li>• Model how outliers effect measures of center</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Describe Data	Students will be able to <ul style="list-style-type: none"> <li>• describe a data set by stating what quantity was measured and how it was measured.</li> <li>• describe overall patterns in data, including clusters, peaks, gaps, and symmetry.</li> </ul>	<ul style="list-style-type: none"> <li>• Guided Notes on Vocabulary (attribute, unit of measure, means of measurement)</li> <li>• Model how to use a table to describe the attribute being measured, unit of measure, likely means by which</li> </ul>	2 days

		<p>measurements were made, and the number of observations.</p> <ul style="list-style-type: none"> <li>• Guided &amp; independent practice</li> </ul>	
Dot Plots and Histograms	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>• use frequency tables and dot plots to organize data.</li> <li>• display data in histograms.</li> </ul>	<ul style="list-style-type: none"> <li>• Class discussion on dot plots vs line plots</li> <li>• Model using a frequency table to organize data through dot plots</li> <li>• Model using a table to display data through histograms</li> <li>• Guided &amp; independent practice</li> <li>• Which Graph? Activity</li> </ul>	2 days
Box Plots	<p>Students will be able to display data in box plots.</p>	<ul style="list-style-type: none"> <li>• Guided notes on vocabulary: box plot, least value, lower quartile, median, upper quartile, greatest value</li> <li>• Create large box plot on large graph paper</li> <li>• Model displaying data using box plots</li> <li>• Model reading box plots</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Mean Absolute Deviation	<p>Students will be able to understand mean absolute deviation as a measure of variability from the mean.</p>	<ul style="list-style-type: none"> <li>• Mean Absolute Deviation: penny balancing activity</li> <li>• Connect to basketball players and coaching</li> <li>• Model how to find the Mean Absolute Deviation</li> <li>• Guided &amp; independent practice</li> </ul>	2 days
Summarize Data	<p>Students will be able to summarize a data set by using range, interquartile range, and mean absolute deviation.</p>	<ul style="list-style-type: none"> <li>• Model summarizing a data set by using range, interquartile range, and mean absolute deviation</li> <li>• Guided &amp; independent practice</li> </ul>	1 day
Distribution of Data	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>• recognize what measures of center and variability indicate about a data set.</li> <li>• describe the distribution of a data set collected to answer a statistical question.</li> </ul>	<ul style="list-style-type: none"> <li>• Model recognizing what measures of center and variability indicate about a data set.</li> <li>• Guided &amp; independent practice</li> <li>• Model describing the distribution of a data set to answer a statistical question</li> </ul>	2 days

		<ul style="list-style-type: none"> <li>Guided &amp; independent practice</li> </ul>	
Assessment	Students will be able to demonstrate the skills above.	<ul style="list-style-type: none"> <li>Assessment</li> </ul>	2 days
Benchmark Testing	Students will be able to complete a benchmark assessment.	<ul style="list-style-type: none"> <li>Benchmark assessment</li> </ul>	2 days
<p><b>Teacher Notes:</b> Use chips to find mean as a balance point. Also, use ruler and half paper towel tube to find mean as a balance point and to help explain mean absolute deviation. Use inch cubes for volume of rectangular prisms.</p>			
<p><b>Additional Resources:</b>  <a href="https://www.ixl.com/">https://www.ixl.com/</a>  <a href="https://www.khanacademy.org/">https://www.khanacademy.org/</a>  <a href="https://xtramath.org">https://xtramath.org</a>  <a href="https://www-k6.thinkcentral.com/ePC/start.do">https://www-k6.thinkcentral.com/ePC/start.do</a></p>			
Differentiation/Modification Strategies			
Students with Disabilities		English Language Learners	
<ul style="list-style-type: none"> <li>Consult student IEP</li> <li>Allow errors</li> <li>Rephrase questions, directions, and explanations</li> <li>Allow a calculator when necessary</li> <li>Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>Accept participation at any level, even one word</li> <li>Consult with Case Managers and follow IEP</li> </ul>		<ul style="list-style-type: none"> <li>Consult student ELL Plan</li> <li>Assign a buddy, same language or English speaking</li> <li>Allow errors in speaking</li> <li>Rephrase questions, directions, and explanations</li> <li>Allow extended time to answer questions</li> <li>Accept participation at any level, even one word</li> </ul>	
Gifted & Talented Students		Students at Risk	
<ul style="list-style-type: none"> <li>Consult with G and T teacher</li> <li>Provide extension activities</li> <li>Make peer leaders</li> <li>Build on students' intrinsic motivations</li> <li>Consult with parents to accommodate students' interests in completing tasks at their level of engagement</li> </ul>		<ul style="list-style-type: none"> <li>Consult with I &amp; RS as needed</li> <li>Provide extended time to complete tasks</li> <li>Consult with Guidance Counselors and follow I&amp;RS procedures/action plans</li> <li>Consult with classroom teacher(s) for specific behavior interventions</li> <li>Provide rewards as necessary</li> </ul>	
504 Students		Other:	
<ul style="list-style-type: none"> <li>Consult 504 Plan</li> <li>Allow errors</li> <li>Rephrase questions, directions, and explanations</li> <li>Allow a calculator when necessary</li> <li>Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>Accept participation at any level, even one word</li> <li>Consult with Case Managers and follow 504</li> </ul>			