Grade 6 Math 6300 Cover Page

Content Area: **Mathematics**
Course(s):
Time Period: **1st Marking Period**
Length: **180**
Status: **Published**

Course Overview

This Grade 6 math course aligned with the 2023 New Jersey Student Learning Standards (NJSLS) will focus on developing a deeper understanding of core mathematical concepts and procedures and enhancing problem-solving and critical thinking skills. The course will cover the following key areas:

1. **Ratios and Proportional Relationships:** Students will explore the concept of ratios and their relationships, solve unit rate problems, and utilize ratio reasoning to convert measurement units. They will also learn to use ratio and rate language to describe relationships between quantities.

2. **The Number System:** Building on prior knowledge, students will extend their understanding of division, including dividing fractions by fractions. They will compute fluently with multi-digit numbers and find common factors and multiples. Additionally, they will apply and extend previous understandings of numbers to the system of rational numbers.

3. **Expressions and Equations:** Students will apply the properties of operations to generate equivalent expressions. They will also solve one-variable equations and inequalities and represent and analyze quantitative relationships between dependent and independent variables.

4. **Geometry:** The course will introduce the concepts of area and volume. Students will solve real-world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

5. **Statistics and Probability:** Students will develop an understanding of statistical variability and summarize and describe distributions. They will display numerical data on a number line plot, including dot plots, histograms, and box plots.

Students will engage in activities that promote mathematical reasoning and communication throughout the course. They will be encouraged to construct viable arguments and critique the reasoning of others. The course

will emphasize the importance of mathematical modeling and using mathematics to solve problems in various contexts.

Course Name, Length, Date of Revision and Curriculum Writer

Grade 6 Math, May 2024

Course Length: Full Year

Curriculum Writers: Stacy Shiffner

Table of Contents

Unit 1: The Number System

Content Area: **Mathematics**
Course(s): **Math**
Time Period:
Length: **47-59 days**
Status: **Published**

Summary of the Unit

In a Grade 6 math course aligned with the 2023 New Jersey Student Learning Standards (NJSLS), the **Number System** domain focuses on expanding students' understanding of numbers beyond whole numbers and fractions, introducing them to the realm of rational numbers. The key areas of study within this domain are:

- **Division of Fractions:** Students deepen their understanding of division by extending it to fractions. They learn to divide fractions by fractions, interpreting the meaning of this operation and solving real-world problems involving fractional division.

- **Fluency with Multi-Digit Numbers:** Students develop fluency in computing with multi-digit numbers, performing operations such as addition, subtraction, multiplication, and division efficiently and accurately. They also explore the concept of finding common factors and multiples of numbers, reinforcing their understanding of number relationships.

- **Rational Numbers:** The course introduces the system of rational numbers, which includes positive and negative fractions, decimals, and integers. Students learn to represent rational numbers on a number line, compare and order them, and understand their relationships to whole numbers and fractions.

- **Applications of Rational Numbers:** Students apply their knowledge of rational numbers to solve real-world and mathematical problems, interpreting and representing quantities in various contexts. They learn to reason about and make sense of situations involving rational numbers, developing their problem-solving skills.

Throughout the Number System domain, students engage in activities that promote reasoning and communication. They are encouraged to explain their thinking, justify their solutions, and construct viable

arguments, enhancing their mathematical communication skills. The course emphasizes the importance of understanding the underlying concepts of the number system and applying this knowledge to solve problems in various contexts.

Enduring Understandings

The ability to compute numbers as whole numbers and as parts of a whole are basic skills upon which much advanced mathematics is based upon. It also exists throughout the real world and it is the understanding of these concepts that allows people to perform a multitude of tasks both in the classroom and in life.

Essential Questions

- How can estimating products and quotients be helpful?
- What does it mean to multiply and divide fractions?
- How are integers and absolute value used in real-world situations?

Summative Assessment and/or Summative Criteria

- **Summative Assessment Components:**

1. **Written Test:** A comprehensive assessment covering all key concepts and skills taught in the unit. The test will include a variety of question types, such as multiple-choice, short answer, and extended response, to assess different levels of understanding.

2. **Performance Task:** A real-world problem-solving task that requires students to apply their knowledge of rational numbers, fractions, and multi-digit operations in a meaningful context. The task will assess students' ability to reason, communicate mathematically, and utilize appropriate strategies to solve complex problems.

3. **Class Participation and Engagement:** Throughout the unit, students will be assessed on their active participation in class discussions, group activities, and problem-solving sessions. This will provide insights into their ability to collaborate, communicate ideas, and engage with the learning material.

Summative Assessment Criteria:

- **Division of Fractions:**
    - Can fluently divide fractions by fractions, including mixed numbers, using visual models and algorithms.
    - Can interpret the meaning of fraction division and explain why the algorithm works.
    - Can solve real-world problems involving division of fractions, including multi-step problems.
- **Fluency with Multi-Digit Numbers:**
    - Can fluently add, subtract, multiply, and divide multi-digit numbers, including decimals, using the standard algorithm.
    - Can estimate the results of operations with multi-digit numbers and assess the reasonableness of their answers.
    - Can find the greatest common factor (GCF) and least common multiple (LCM) of two whole numbers.
- **Rational Numbers:**

- Can represent rational numbers (fractions, decimals, integers) on a number line and compare their relative magnitudes.
- Can order rational numbers from least to greatest or vice versa.
- Can convert between fractions, decimals, and percentages.
- Can understand the absolute value of a rational number and interpret it in real-world contexts.

- **Applications of Rational Numbers:**

  - Can apply knowledge of rational numbers to solve real-world problems, including those involving measurement, ratios, proportions, and percentages.
  - Can interpret and explain the meaning of solutions in the context of the problem.

- **Mathematical Practices:**

  - Can reason abstractly and quantitatively about problems involving rational numbers.
  - Can construct viable arguments and critique the reasoning of others.
  - Can model with mathematics to represent and solve real-world problems.
  - Can use appropriate tools strategically, such as calculators and number lines.

Resources

1. Textbooks and Workbooks:

- Eureka Math/EngageNY Grade 6 Module 2: This module focuses on arithmetic operations, including dividing fractions by fractions. It provides comprehensive lessons, practice problems, and assessments aligned with the NJSLS.
- Big Ideas Math Grade 6 and Envisions Grade 6: This textbook offers a variety of resources, including lessons, practice problems, and online tools, to support student learning of the number system.

2. Online Resources:

- Khan Academy: Offers instructional videos, practice exercises, and quizzes on all aspects of the number system, including fractions, decimals, integers, and rational numbers.
- IXL Math: Provides interactive skill-building exercises and assessments aligned with the NJSLS for Grade 6.
- Math Playground: Offers a collection of fun and engaging math games and activities to reinforce number system concepts.
- Illustrative Mathematics: Features high-quality tasks and activities aligned with the NJSLS that promote a deeper understanding of the number system.

3. Manipulatives and Tools:

- Fraction Tiles/Circles: Help students visualize fraction division and understand the concept of common denominators.
- Number Lines: Useful for representing and comparing rational numbers, including fractions, decimals, and integers.
- Decimal Squares: Visual models for representing decimals and understanding place value.
- Base Ten Blocks: Help students understand place value and operations with multi-digit numbers.

4. Additional Resources:

- New Jersey Student Learning Standards for Mathematics: Provides the specific standards and learning objectives for the Number System domain in Grade 6.
- Open Middle Math Problems: Offers challenging problems that require students to apply their knowledge of the number system in creative ways.
- Mathalicious Lessons: Real-world lessons that make math relevant and engaging for students.

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments	New Jersey Student Learning Standards
Add and Subtract	1-2 Days	Add and subtract	Complete the Real-	Homework Assigned.	6.NS.3
Estimate Products (3.2)	1-2 Days	Estimate the products of decimals and judge the reasonableness of the results	Emphasis should be put on rounding to reasonable compatible numbers	Homework Assigned. Classwork Assigned. Common Core Review.	6.NS.3
Multiplication of Decimals (3.3-3.4)	4-5 Days	Find the products of problems involving whole numbers and decimals	Use Real World Link as basis for discussion and exploration of the effects of decimals in multiplication	Homework Assigned. Classwork Assigned. Common Core Review. Mini quiz based on previous material.	6.NS.3
Estimate Quotients (3.6)	1-2 Days	Estimate the quotients of decimals and judge the reasonableness of results	Use Vocabulary Start Up and Real World Link to build upon previous estimating work. Emphasis should be put on rounding to reasonable compatible numbers	Homework Assigned. Classwork Assigned. Common Core Review.	6.NS.2

Division of Multi-Digit and Decimals (3.5, 3.7- 3.8)	6-8 Days	Divide with multi-digit whole numbers and decimal numbers	Throughout discussion focus on applying proper vocabulary terms to division problems.	Homework Assigned. Classwork Assigned. Common Core Review. Mini quiz based on previous material. Picture Word Problem Project.	6.NS.2, 6.NS.3
Terminating and Repeating Decimals (5.4)	3 Days	Convert fractions into terminating and repeating decimals	Be sure to relate vocabulary of previous lessons into setting up division for conversions	Homework Assigned. Classwork Assigned. Common Core Review. Ice Cream Sundae Project.	6.NS.3, 6.NS.6c, 6.NS.7a, 9.2.8.B.7, 9.2.8.B.8
Estimate Products of Fraction (4.1)	4 Days	Estimate products with fractions	Bar diagrams and number lines should be used as visual aids. Be sure to continue discussion of compatible numbers	Homework Assigned. Classwork Assigned. Common Core Review. Fantasy Menu Project	6.RP.1, 9.2.8.D.1
Multiplication of Fractions and Mixed Numbers (4.2-4.4)	4-5 Days	Multiply with fractions and mixed numbers	Bar diagrams and number lines should be used as visual aids. Make use of Real World Links to build on previous day's activities	Students to show models and numerical solutions. Mini quiz based on previous material.	6.NS.1
Division of Fractions and Mixed Numbers (4.6-4.8)	4-5 Days	Divide with fractions and mixed numbers	Use inquiry lab as a basis for further understanding. Be sure to define and demonstrate reciprocals. Use "Keep, Change Flip" terminology	Students to show models and numerical solutions. Mini quiz based on previous material.	6.NS.1

Convert Measurement Units (4.5)	5 Days	Change units of measure in the customary system	Be sure to have examples of each unit of measurement discussed	Create a conversion chart for assorted measurement units and their converted equals. Penny Project.	6.NS.1, 6.RP.3, 6.RP.3d
Integers and Graphing (5.1)	2 Days	Use integers to represent real-world situations	Be sure to be prepared with situations from a wide variety of real world situations	Allow students to act out or demonstrate assorted integer values and their meaning in the real world	6.NS.5, 6.NS.6, 6.NS.6a, 6.NS.6c
The Coordinate Plane (5.6-5.7)	6-8 Days	Graph ordered pairs on the coordinate plane	Engage in the Numberline Inquiry Lab before starting Coordinate Planes	Coordinate Plane Picture Project	6.NS.6, 6.NS.6b, 6.NS.6c, 6.NS.8
Absolute Value (5.2)	1-2 Days	Find the absolute value of an integer	Define absolute value. Clarify distance from zero.	Homework Assigned. Classwork Assigned.	
Compare and Order Integers and Rational Numbers (5.3, 5.5)	2-3 Days	Compare and order integers and rational numbers	Define Integers. Define and classify rational numbers.	Homework Assigned. Classwork Assigned. Common Core Review.	6.NS.7, 6.NS.7a
Review and Assess	3 Days	Students demonstrate mastery of topics and concepts presented	Chapter review using varied teacher created/ chosen materials and tasks	End of Unit Test Completion of Journal Activity Completion of Performance Assessment from online resources	6.NS.1, 6.RP.3, 6.RP.3d, 6.NS.5, 6.NS.6, 6.NS.6a, 6.NS.6c, 6.NS.6b, 6.NS.6c, 6.NS.7, 6.NS.7a , 6.NS.8,
	47-59 days				

Standards

MATH.6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
MATH.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.
MATH.6.RP.A.3.d	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
MATH.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.
MATH.6.NS.B.2	With accuracy and efficiency, divide multi-digit numbers using the standard algorithm.
MATH.6.NS.B.3	With accuracy and efficiency, add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
MATH.6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
MATH.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.
MATH.6.NS.C.6.a	Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.
MATH.6.NS.C.6.b	Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
MATH.6.NS.C.6.c	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
MATH.6.NS.C.7	Understand ordering and absolute value of rational numbers.

MATH.6.NS.C.7.a	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
MATH.6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Suggested Modifications for Special Education, ELL and Gifted Students

*Consistent with individual plans, when appropriate.

- Students will be allowed to submit assignments using additional time per IEP modifications.
- Students will be encouraged to use different size and type of font in order to avoid print confusion.
- ML students will be allowed to use an internet translator or language glossary in order to translate vocabulary and assignments properly.
- ML students may be allowed to work with another student who is fluent in their native language.

Suggested Technological Innovations/Use

- Instructional technology should be used to present and assess lessons such as; PowerPoint, Smart Notebook, Glencoe presentation software, NLVM, etc
- Teachers are encouraged to use electronic assessments to determine mastery of concepts taught.
- The use of kahoot, Glencoe Test Creation software or other type of interactive software is encouraged.

Cross Curricular/21st Century Connections

9.1 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem- solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

9.2 21st Century Life and Career Skills: Personal Financial Literacy: All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.

9.3 21st Century Life and Career Skills: Career Awareness, Exploration, and Preparation: All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

NJSLS.ELA-LITERACY.RST.6-8.8 : Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

NJSLS.ELA-LITERACY.RST.6-8.9: Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

Unit 2: Ratio and Proportional Relationships

Content Area: **Mathematics**
Course(s): **Math**
Time Period:
Length: **40-43 days**
Status: **Published**

Summary of the Unit

In Grade 6 Unit 2: Ratios and Proportional Relationships, students delve into the world of comparing quantities and understanding the relationships between them. They begin by exploring the concept of ratios, learning how to express them in various forms (e.g., fractions, decimals, percentages). Students then use ratio reasoning to solve real-world problems, such as calculating unit rates, converting measurements, and analyzing proportional relationships.

A key focus of this unit is understanding proportional relationships, which are characterized by a constant ratio between two quantities. Students learn to identify proportional relationships in tables, graphs, and equations, and they explore the concept of the constant of proportionality. They also use their knowledge of proportional relationships to solve a variety of problems, including those involving scaling, similar figures, and percent problems.

Throughout the unit, students develop their ability to think proportionally, a critical skill for understanding many mathematical and real-world situations. They learn to reason abstractly and quantitatively, construct viable arguments, and use mathematical models to represent and solve problems. By the end of this unit, students will have a solid foundation in ratios and proportional relationships, which will serve them well in future math courses and in their everyday lives.

Enduring Understandings

- Ratios are multiplicative comparisons: Ratios express a multiplicative relationship between two or more quantities, not just additive differences. This understanding is crucial for solving various ratio problems and interpreting real-world situations.
- Proportional relationships involve a constant ratio: In a proportional relationship, the ratio between two quantities remains constant as the corresponding values of the quantities change. Recognizing and utilizing this constant ratio is key to solving proportional reasoning problems.
- Multiple representations of proportional relationships: Proportional relationships can be represented in various ways, including tables, graphs, equations, and verbal descriptions. Understanding these different representations and their connections deepens students' comprehension of proportional relationships and enables them to analyze situations from multiple perspectives.
- Proportional reasoning is a powerful tool: Proportional reasoning is essential for solving a wide range of problems in mathematics and in real-life situations, such as calculating unit rates, converting measurements, scaling recipes, analyzing similar figures, and solving percent problems. Mastering proportional reasoning empowers students to become critical thinkers and problem solvers.
- Multiple strategies for solving ratio and proportion problems: There are various strategies for solving ratio and proportion problems, such as using unit rates, equivalent fractions, cross-multiplication, and proportional reasoning. Students should be flexible in their approach and choose the most appropriate strategy for a given problem.
- Ratio and proportion are connected to other mathematical concepts: Ratios and proportional relationships are closely related to other mathematical concepts, such as fractions, decimals, percentages, and linear functions. Understanding these connections strengthens students' overall mathematical understanding and facilitates the transfer of knowledge across different topics.

Essential Questions

- Conceptual Understanding:
    - What is a ratio, and how can it be used to compare two or more quantities?

- How can we represent ratios in different ways (e.g., fractions, decimals, percentages, colon notation)?
- What is a proportional relationship, and how can we determine if two quantities are in a proportional relationship?
- What is the constant of proportionality, and how can we find it in different representations (e.g., tables, graphs, equations)?
- How are ratios and fractions related, and how can we use our knowledge of fractions to solve ratio problems?

Procedural Skills and Fluency:

1. How can we find unit rates, and how are they useful in solving real-world problems?
2. How can we use proportions to solve problems involving missing values, scaling, and comparisons?
3. How can we convert between different units of measurement using ratio reasoning?
4. How can we use our knowledge of ratios and proportions to solve percent problems?

Application and Problem-Solving:

- How can we use ratios and proportional relationships to model and solve real-world problems involving recipes, scale drawings, map scales, and other scenarios?
- How can we use proportional reasoning to analyze and interpret data presented in tables and graphs?
- How can we use ratios and proportions to make informed decisions in situations involving discounts, sales tax, and tips?

Critical Thinking and Reasoning:

- How can we justify our solutions to ratio and proportion problems using mathematical reasoning and evidence?
- How can we identify and explain the connections between ratios, fractions, decimals, percentages, and linear functions?
- How can we use proportional reasoning to make predictions and generalizations about real-world situations?

Summative Assessment and/or Summative Criteria

- Assessment Components:

    - Written Test: A comprehensive assessment covering all key concepts and skills taught in the unit. The test will include a variety of question types, such as:
        - Multiple-choice questions to assess conceptual understanding and vocabulary.
        - Short answer questions requiring calculations and explanations.
        - Open-ended problems involving real-world scenarios that require the application of ratio and proportion concepts.
    - Performance Task: A project-based assessment where students apply their knowledge of ratios and proportional relationships to a real-world situation. Examples include:
        - Creating a scale drawing or model of a room or object.
        - Planning a recipe for a different number of servings.
        - Analyzing a map and using the scale to calculate distances.
        - Designing a proportional representation of data (e.g., a bar graph or pictograph).
    - Class Participation and Engagement: Ongoing assessment of students' participation in class discussions, group activities, and problem-solving sessions. This will provide insights into their ability to collaborate, communicate ideas, and engage with the learning material.

Summative Assessment Criteria:

- Conceptual Understanding:
    - Demonstrates understanding of ratios as multiplicative comparisons of two or more quantities.
    - Identifies and represents proportional relationships in tables, graphs, and equations.
    - Understands the concept of the constant of proportionality (unit rate) and can determine it in various representations.
    - Explains the relationship between ratios, fractions, decimals, and percentages.
- Procedural Skills:
    - Calculates unit rates accurately and uses them to solve problems.
    - Solves proportions using different strategies (e.g., equivalent fractions, cross-multiplication).

        - Converts between different units of measurement using ratio reasoning.
        - Solves percent problems using proportions or other appropriate methods.
    - Application and Problem-Solving:
        - Applies ratio and proportion concepts to solve real-world problems involving scaling, measurement, and percentages.
        - Analyzes and interprets data presented in tables and graphs to identify proportional relationships.
        - Uses proportional reasoning to make predictions and generalizations.
    - Mathematical Practices:
        - Reasons abstractly and quantitatively about ratios and proportional relationships.
        - Constructs viable arguments and critiques the reasoning of others.
        - Models with mathematics to represent and solve real-world problems.
        - Uses appropriate tools strategically (e.g., calculators, diagrams, manipulatives).

Resources

- Textbooks and Workbooks:

    - Eureka Math/EngageNY Grade 6 Module 1: This module is entirely dedicated to ratios and proportional relationships, providing comprehensive lessons, practice problems, and assessments aligned with the standards.
    - Big Ideas / Envision Math Grade 6: This textbook offers a variety of resources, including lessons, practice problems, and online tools to support student learning in this unit.

Online Resources:

- Khan Academy: Offers instructional videos, practice exercises, and quizzes on ratios, proportions, unit rates, and percentages.
- IXL Math: Provides interactive skill-building exercises and assessments aligned with Common Core standards for Grade 6, including specific topics in this unit.
- Math Playground: Offers a collection of fun and engaging math games and activities to reinforce ratio and proportion concepts.

- Illustrative Mathematics: Features high-quality tasks and activities aligned with Common Core standards that promote deeper understanding of ratios and proportional relationships.
- Open Middle Math Problems: Offers challenging problems that require students to apply their knowledge of ratios and proportions in creative ways.

Manipulatives and Tools:

- Ratio Tables: Help students organize and visualize ratios and proportional relationships.
- Double Number Lines: Visual models for representing and comparing ratios and finding missing values in proportions.
- Fraction Bars/Circles: Help students visualize ratios as fractions and understand equivalent ratios.
- Cuisenaire Rods: Hands-on manipulatives for exploring ratios and proportions through measurement and comparison.
- Virtual Manipulatives: Online tools that simulate physical manipulatives, providing interactive and engaging experiences for students.

Additional Resources:

- New Jersey Student Learning Standards for Mathematics: Outlines the specific standards and learning objectives for the Ratios and Proportional Relationships domain in Grade 6.
- Mathalicious Lessons: Real-world lessons that make math relevant and engaging for students, with a focus on ratios and proportions.
- NRICH Maths Project: Offers enriching mathematical tasks and activities to deepen students' understanding of ratios and proportional relationships.

Teacher Resources:

- NCTM Illuminations: Provides lesson plans, activities, and interactive tools for teaching ratios and proportional relationships.
- National Council of Teachers of Mathematics (NCTM): Offers professional development resources and publications related to teaching ratios and proportional relationships.

Standards

MATH.6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
MATH.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.
MATH.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.
MATH.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.

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments	New Jersey Student Learning Standards
Ratios (1.2)	1-2 Days	Write ratios as fractions and use ratios to compare quantities	Use Inquiry Lab and teacher and student created scenarios to further creation of ratios	Homework Assigned. Classwork Assigned. Common Core Review. Inquiry Lab	6.RP.1, 6.RP.3

Unit Rates (1.3)	4-5 Days	Write rates as unit rates	Use Inquiry Lab and real life discussion as	Create a chart with assorted student	6.RP.2, 6.RP.3, 9.2.8.E.1, 9.2.8.E.4
			basis for further discussion. Use real life examples to further understanding: driving speeds, supermarket pricing, etc.	found real world rates made into unit rates. If I Could Hop Like a Frog… Story Activity	
Factors and Multiples (1.1)	1-2 Days	Find GCF and LCM	Be sure to define factors and multiples, as well as give examples of both. Use the Vocabulary Start-Up and Real-World Link as basis for further exploration and discussion leading to finding common denominators and equivalent fractions.	Homework Assigned. Classwork Assigned. Common Core Review.	6.NS.4
Ratio Tables (1.4)	1-2 Days	Use tables to solve ratio and rate	Be sure to include work and	Use student generated rates from Ratio and	6.RP.3

		problems	terminology from factors and multiples into ratio table discussion	Unit Rate work to create ratio tables based on real life scenarios	
Graph Ratio Tables (1.5)	1-2 Days	Graph coordinates from ratio tables on a coordinate plane	Review Coordinate plane vocabulary from previous unit. Tease connection to function tables from future unit.	Extend homework to include ratios tables that involve all four quadrants of the coordinate plane.	6.RP.3
Equivalent Ratios (1.6)	1-2 Days	Find equivalent ratios and rates using unit rates and equivalent fractions	In addition to unit rates and equivalent fractions, offer property of cross	Homework Assigned. Classwork Assigned. Common Core Review.	6.RP.3

Suggested Modifications for Special Education, ELL and Gifted Students

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- Students will be allowed to submit assignments using additional time per IEP modifications.
- Students will be encouraged to use different size and type of font in order to avoid print confusion.
- ML students will be allowed to use an internet translator or language glossary in order to translate vocabulary and assignments properly.

- ML students may be allowed to work with another student who is fluent in their native language.

Suggested Technological Innovations/Use

- Instructional technology should be used to present and assess lessons such as; PowerPoint, Smart Notebook, Glencoe presentation software, NLVM, etc
- Teachers are encouraged to use electronic assessments to determine mastery of concepts taught.
- The use of kahoot, Glencoe Test Creation software or other type of interactive software is encouraged.

Cross Curricular/21st Century Connections

a. 21st Century Life and Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem- solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.
b. 21st Century Life and Career Skills: Personal Financial Literacy: All students will develop skills and strategies that promote personal and financial responsibility related to financial planning, savings, investment, and charitable giving in the global economy.
c. 21st Century Life and Career Skills: Career Awareness, Exploration, and Preparation: All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

NJSLS.ELA-LITERACY.RST.6-8.1: Cite specific textual evidence to support analysis of science and technical texts.
NJSLS.ELA-LITERACY.RST.6-8.3: Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

Unit 3: Expressions and Equations

Content Area: **Mathematics**
Course(s): **Math**
Time Period:
Length: **20-23 days**
Status: **Published**

Summary of the Unit

In this unit, students delve into the world of algebraic thinking by working with expressions and equations. They begin by understanding the concept of variables as placeholders for unknown numbers and learn to write and evaluate expressions involving variables. Students then apply the order of operations to simplify expressions and explore the properties of operations, such as the distributive property, to generate equivalent expressions.

The unit progresses to solving one-variable equations, where students learn to manipulate equations using inverse operations to isolate the variable and find its value. They also learn to represent and analyze quantitative relationships between two variables using equations and tables. Additionally, students explore the concept of inequalities and learn to solve and graph simple inequalities.

Throughout this unit, students develop essential algebraic skills, such as manipulating expressions, solving equations and inequalities, and representing relationships between variables. These skills lay the foundation for further algebraic studies in later grades and provide students with tools for modeling and solving real-world problems.

Enduring Understandings

- Expressions and equations are powerful tools for representing and solving mathematical problems. Students should understand that expressions and equations can be used to model real-world situations and solve problems involving unknown quantities.

- Variables are symbols that represent unknown or varying quantities. Students should grasp the concept of variables as placeholders for numbers and recognize their role in expressions and equations.
- Equivalent expressions have the same value, even though they look different. Students should understand that expressions can be manipulated and rewritten in different forms without changing their value. They should be able to identify and generate equivalent expressions using properties of operations.
- Equations are statements that two expressions are equal. Students should be able to write and solve equations to find the value of an unknown variable. They should also understand the importance of maintaining equality when manipulating equations.
- Inequalities are statements that two expressions are not equal. Students should be able to write and solve inequalities to find a range of possible values for an unknown variable.
- The order of operations dictates the sequence in which operations are performed in an expression. Students should master the order of operations (PEMDAS/BODMAS) to evaluate expressions accurately.
- Properties of operations (commutative, associative, distributive) can be used to simplify and manipulate expressions. Students should be able to apply these properties to rewrite expressions in equivalent forms, making them easier to evaluate or solve.
- Algebraic reasoning involves using symbols and mathematical relationships to solve problems. Students should develop their ability to think abstractly and use algebraic tools to represent and solve problems in various contexts.

Essential Questions

Conceptual Understanding:

- What are expressions and equations, and how are they used to represent mathematical relationships?
- What is a variable, and how can it be used to represent unknown or changing quantities?
- How can we write and interpret expressions and equations that represent real-world situations?
- What does it mean for two expressions to be equivalent, and how can we determine if they are?
- What are the properties of operations (commutative, associative, distributive), and how can we use them to simplify and manipulate expressions?

- What is an inequality, and how does it differ from an equation?

Procedural Skills and Fluency:

- How can we evaluate expressions using the order of operations (PEMDAS/BODMAS)?
- How can we solve one-variable equations using inverse operations?
- How can we write and solve simple inequalities?
- How can we represent and analyze relationships between two variables using tables and equations?

Application and Problem-Solving:

- How can we use expressions and equations to model and solve real-world problems involving unknown quantities or relationships?
- How can we use algebraic reasoning to solve problems that involve multiple steps or require finding patterns?
- How can we interpret the solutions to equations and inequalities in the context of a problem?
- How can we use technology (e.g., calculators, graphing tools) to help us solve and visualize expressions and equations?

Critical Thinking and Reasoning:

- How can we justify our solutions to expressions and equations using mathematical reasoning?
- How can we identify and explain the connections between algebraic expressions and geometric representations (e.g., area models)?
- How can we use algebraic reasoning to make predictions and generalizations about patterns and relationships?
- How does understanding expressions and equations help us to develop a deeper understanding of mathematical concepts?

Summative Assessment and/or Summative Criteria

Summative Assessment Components:

- Written Test: A comprehensive assessment covering all key concepts and skills taught in the unit. The test will include a variety of question types, such as:
    - Multiple-choice questions to assess conceptual understanding and vocabulary (e.g., identifying parts of an expression, recognizing equivalent expressions).
    - Short answer questions requiring calculations and explanations (e.g., evaluating expressions, solving one-variable equations, writing inequalities).
    - Open-ended problems involving real-world scenarios that require the application of algebraic concepts (e.g., writing an equation to model a situation, interpreting the solution of an inequality in context).
- Performance Task: A project-based assessment where students apply their knowledge of expressions and equations to a real-world situation. Examples include:
    - Creating a pattern and representing it with an algebraic expression.
    - Designing a pricing model for a product or service using equations and inequalities.
    - Analyzing a real-world situation and representing it with an equation or inequality.
    - Using a spreadsheet or other technology to model and solve a problem involving expressions and equations.
- Class Participation and Engagement: Ongoing assessment of students' participation in class discussions, group activities, and problem-solving sessions. This will provide insights into their ability to collaborate, communicate ideas, and engage with the learning material.

Summative Assessment Criteria:

- Conceptual Understanding:
    - Demonstrates understanding of variables as representations of unknown or varying quantities.
    - Identifies and explains the parts of an expression (e.g., terms, coefficients, constants).
    - Recognizes equivalent expressions and can generate them using properties of operations.
    - Understands the difference between expressions and equations.
    - Interprets the meaning of solutions to equations and inequalities in context.
- Procedural Skills:
    - Evaluates expressions accurately using the order of operations.
    - Solves one-variable equations using inverse operations.
    - Writes and solves simple inequalities.
    - Represents relationships between two variables using tables and equations.

- Application and Problem-Solving:
    - Applies algebraic concepts to model and solve real-world problems.
    - Uses algebraic reasoning to solve problems that involve multiple steps or patterns.
    - Interprets and explains the meaning of solutions in the context of the problem.
    - Uses technology to support algebraic problem-solving.
- Mathematical Practices:
    - Reasons abstractly and quantitatively about algebraic relationships.
    - Constructs viable arguments and critiques the reasoning of others.
    - Models with mathematics to represent and solve real-world problems.
    - Uses appropriate tools strategically (e.g., calculators, diagrams, manipulative

Resources

Textbooks and Workbooks:

- Eureka Math/EngageNY Grade 6 Module 4: This module focuses specifically on expressions and equations, providing comprehensive lessons, practice problems, and assessments aligned with the standards.
- Big Ideas / Envision Math Grade 6: This textbook offers a variety of resources, including lessons, practice problems, and online tools to support student learning in this unit.

Online Resources:

- Khan Academy: Offers instructional videos, practice exercises, and quizzes on expressions, equations, inequalities, and properties of operations.
- IXL Math: Provides interactive skill-building exercises and assessments aligned with Common Core standards for Grade 6, including specific topics in this unit.
- Math Playground: Offers a collection of fun and engaging math games and activities to reinforce algebraic concepts.
- Illustrative Mathematics: Features high-quality tasks and activities aligned with Common Core standards that promote deeper understanding of expressions and equations.

- Desmos Activities: Offers interactive activities that allow students to explore algebraic concepts visually and manipulate expressions and equations dynamically.
- PhET Simulations: Provides interactive simulations that help students visualize algebraic concepts, such as balancing equations and solving inequalities.

Manipulatives and Tools:

- Algebra Tiles: Hands-on manipulatives for representing and solving equations, especially useful for visualizing the distributive property and combining like terms.
- Balance Scales: Help students understand the concept of equality in equations and the idea of using inverse operations to solve them.
- Number Lines: Useful for representing and solving inequalities.
- Graphing Calculators: Allow students to graph equations and inequalities and explore their solutions visually.
- Online Equation Solvers: Tools like Wolfram Alpha can help students check their answers and see different ways to solve equations.

Additional Resources:

- New Jersey Student Learning Standards for Mathematics: Outlines the specific standards and learning objectives for the Expressions and Equations domain in Grade 6.
- Open Middle Math Problems: Offers challenging problems that require students to apply their knowledge of expressions and equations in creative ways.
- Mathalicious Lessons: Real-world lessons that make math relevant and engaging for students, with a focus on algebraic concepts.
- YouCubed: Provides resources and activities that promote a growth mindset and positive attitude towards mathematics, including tasks related to algebra.

Teacher Resources:

- NCTM Illuminations: Provides lesson plans, activities, and interactive tools for teaching expressions and equations.
- National Council of Teachers of Mathematics (NCTM): Offers professional development resources and publications related to teaching algebra in the middle grades.

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments	New Jersey Student Learning Standards
Powers and Exponents (6.1)	1-2 Days	Represent numbers using exponents	Define base and exponent. Be sure to discuss both the meaning of a number with an exponent and how to both write and evaluate numbers with exponents.	Homework Assigned. Classwork Assigned. NJSLA Review. Inquiry Lab	6.EE.1, 6.NS.3
Numerical Expressions (6.2)	2 Days	Find the value of expressions using order of operations	Define order of operations. Be sure to discuss working left to right within an expression.	Students can create original pneumonic devices to remember order of operations. Homework Assigned. Classwork Assigned. NJSLA Review.	6.EE.1

Algebraic Expressions (6.3)	1-2 Days	Evaluate algebraic expressions	Be sure to build upon the previous day's work and discussion. Give examples of substitution to solidify substituting values for variables.	Homework Assigned. Classwork Assigned. NJSLA Review. Inquiry Lab	6.EE.2, 6.EE.2c
Algebra Properties (6.5-6.6)	1-2 Days	Use properties to simplify, compare and evaluate expressions	Define each property. Be sure to compare and contrast each property's use and purpose. Be sure to include variables in working with Distributive Property.	Homework Assigned. Classwork Assigned. NJSLA Review. Inquiry Lab	6.EE.3, 6.NS.4
Equivalent Expressions (6.7)	3-4 Days	Use properties to simplify expressions	Define term, coefficient, constant and like terms. Build discussion around the idea of sorting into items that are the same and combining them.	Homework Assigned. Classwork Assigned. NJSLA Review. Inquiry Lab. End of Chapter Test.	6.EE.2

Equations (7.1)	1-2 Days	Solve equations by using mental math	Define equations. Build upon previous experiences where question marks were used as variables. Be sure to make the students identify the mathematics involved in solving each equation.	Make tables or lists of opposite operations. Homework Assigned. Classwork Assigned. NJSLA Review.	6.EE.5, 9.2.8.B.6
Solve and Write Addition and Subtraction Equations (7.2-7.3)	2-3 Days	Solve and write addition and subtraction equations	Be sure to build on previous day's activities by solidifying the concept of doing the opposite of what is shown in the original equation.	Allow for students to show calculations and graph bar diagrams to show valid solutions. Inquiry Lab. Mini quiz based on previous material.	6.EE.5, 6.EE.7
Solve and Write Multiplication and Division Equations (7.4-7.5)	5-6 Days	Solve and write multiplication and division equations	Continue to build on previous several day's activities by solidifying the concept of doing the opposite of what is shown in the original equation.	Allow for students to show calculations and graph bar diagrams to show valid solutions. Inquiry Lab. Country Project.	6.EE.5, 6.EE.7, 6.RP.3

Inequalities (8.5-8.7)	4-5 Days	Write and graph inequalities	Define inequality. Be sure to discuss how inequalities differ in meaning	Allow for students to show calculations and graph bar diagrams to show valid solutions.	6.EE.5, 6.EE.8

Standards

MATH.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.
MATH.6.NS.B.3	With accuracy and efficiency, add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
MATH.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.
MATH.6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
MATH.6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers.
MATH.6.EE.A.2.c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
MATH.6.EE.A.3	Apply the properties of operations to generate equivalent expressions.
MATH.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.
MATH.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.

MATH.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.

Suggested Modifications for Special Education, ELL and Gifted Students

*Consistent with individual plans, when appropriate.

- Students will be allowed to submit assignments using additional time per IEP modifications.
- Students will be encouraged to use different size and type of font in order to avoid print confusion.
- ML students will be allowed to use an internet translator or language glossary in order to translate vocabulary and assignments properly.
- ML students may be allowed to work with another student who is fluent in their native language.

Suggested Technological Innovations/Use

1. Online Manipulatives and Virtual Tools:
    - Algebra Tiles (Virtual): These tools allow students to visually represent and manipulate expressions and equations, fostering a deeper understanding of concepts like combining like terms and the distributive property. (Examples: Math Playground, Didax Virtual Manipulatives)
    - Balance Scales (Virtual): These tools help students visualize the process of solving equations by maintaining balance and using inverse operations. (Examples: Math Learning Center, NLVM)
    - Number Line Tools: Interactive number lines allow students to represent and solve inequalities, as well as visualize the solutions of equations. (Examples: Desmos, Math Open Reference)
2. Graphing Calculators or Software:

- Students can use graphing calculators or software like Desmos to graph equations and inequalities, explore the relationship between variables, and visualize solutions.

3. Equation Solver and Expression Simplifier Tools:

    - Online tools like Wolfram Alpha or Symbolab can help students check their answers, see step-by-step solutions, and explore different ways to simplify expressions or solve equations.

4. Interactive Whiteboards or Tablets:

    - These tools can be used to create interactive lessons, display and manipulate algebraic expressions and equations, and facilitate collaborative problem-solving activities.

5. Online Platforms and Apps:

    - Platforms like Khan Academy, IXL Math, and Prodigy offer adaptive learning experiences, providing students with personalized practice and feedback on algebraic concepts.
    - Apps like DragonBox Algebra and Algebra Touch introduce algebraic concepts in a fun and gamified way.

6. Coding Environments:

    - Students can use visual coding platforms like Scratch or block-based coding environments like Blockly to create programs that involve algebraic concepts, such as calculating values based on user input or generating patterns based on formulas.

7. Spreadsheet Software:

    - Students can use spreadsheets like Google Sheets or Microsoft Excel to model real-world scenarios with equations, analyze data, and create graphs to visualize relationships between variables.

Cross Curricular/21st Century Connections

Science:

- Formulas and Laws: Students can explore the use of algebraic expressions and equations in scientific formulas, such as those used to calculate speed, distance, or density.
- Data Analysis: Students can use algebraic expressions to model and analyze scientific data collected from experiments or observations.
- Scientific Modeling: Students can develop algebraic models to represent scientific phenomena, such as population growth or chemical reactions.

Social Studies:

- Economics: Students can use algebraic expressions to model economic concepts, such as supply and demand, profit, or interest.
- Historical Analysis: Students can analyze historical data using algebraic expressions to identify trends or patterns.
- Social Justice Issues: Students can use algebraic equations to analyze and understand social inequalities or disparities.

ELA/Literacy:

- Reading Comprehension: Students can read and interpret word problems that require the use of algebraic expressions and equations.
- Writing: Students can write explanations of their problem-solving strategies or create their own word problems that involve algebraic concepts.
- Vocabulary Development: Students can learn and use the vocabulary of algebra (e.g., variable, coefficient, constant, expression, equation, inequality) in both mathematical and real-world contexts.

Technology:

- Online Tools: Students can use online calculators, graphing tools, and equation solvers to explore and solve algebraic problems.
- Coding: Students can use coding platforms like Scratch or Python to create programs that involve algebraic concepts, such as calculating values or generating patterns.

- Spreadsheets: Students can use spreadsheets to model and analyze data using formulas and equations.

21st Century Skills:

- Critical Thinking: Students develop critical thinking skills by analyzing and solving problems using algebraic reasoning.
- Creativity: Students can use their creativity to create their own algebraic expressions, equations, or word problems.
- Collaboration: Students can work collaboratively to solve complex algebraic problems or create projects that involve algebraic concepts.
- Communication: Students can communicate their mathematical thinking and reasoning both orally and in writing.
- Information Literacy: Students can research and gather information about real-world applications of algebra.

Unit 4: Geometry

Content Area: **Mathematics**
Course(s): **Math**
Time Period:
Length: **25-29 days**
Status: **Published**

Summary of the Unit

The Geometry unit in Grade 6, as outlined by the New Jersey Student Learning Standards (NJSLS), focuses on developing students' spatial reasoning and problem-solving skills related to two- and three-dimensional shapes.

Key Concepts:

- Area of Polygons: Students learn to calculate the area of various polygons (triangles, quadrilaterals, and other shapes) by decomposing them into simpler shapes like rectangles and triangles. They apply these techniques to solve real-world and mathematical problems involving area.

- Volume of Rectangular Prisms: Students explore the concept of volume and learn to calculate the volume of rectangular prisms with fractional edge lengths. They connect the volume formula (V = lwh or V = Bh) to the idea of packing the prism with unit cubes.

- Nets and Surface Area: While not explicitly mentioned in the NJSLS, the concept of nets (two-dimensional representations of three-dimensional shapes) is often introduced in this unit to help students visualize and calculate the surface area of rectangular prisms.

Real-World Applications:

- Calculating the amount of carpet needed for a room.
- Determining the amount of paint needed to cover a wall.
- Designing packaging boxes with specific dimensions.
- Calculating the amount of water a swimming pool can hold.

Skills Developed:

- Decomposing and composing shapes to find area.
- Applying formulas to calculate area and volume.
- Solving real-world problems involving area, surface area, and volume.
- Visualizing and representing three-dimensional shapes using nets.
- Reasoning abstractly and quantitatively about geometric concepts.

Teaching Strategies:

- Use hands-on manipulatives like pattern blocks or grid paper to help students visualize and explore geometric shapes.
- Engage students in real-world problem-solving activities to make the concepts relevant and meaningful.
- Encourage students to use multiple representations (e.g., diagrams, formulas, verbal explanations) to communicate their understanding of geometric concepts.

By the end of this unit, students should have a solid understanding of area and volume and be able to apply this knowledge to solve a variety of problems. This foundational knowledge will prepare them for more advanced geometric concepts in later grades.

Enduring Understandings

- Geometric Attributes Define Shapes: Students should understand that shapes are defined and classified by their attributes, such as the number and types of sides, angles, and faces. Recognizing these attributes is crucial for understanding the relationships between shapes and solving geometric problems.

- Area and Volume are Distinct Measurements: Students should grasp that area is a two-dimensional measure of the space enclosed by a shape, while volume is a three-dimensional measure of the space occupied by a solid figure. Understanding this distinction is essential for applying appropriate formulas and solving problems involving these measurements.

- Shapes Can Be Decomposed and Recomposed: Students should recognize that complex shapes can be broken down into simpler shapes to find their area or volume, and conversely, simpler shapes can be combined to form complex shapes. This understanding allows for flexibility in problem-solving and promotes spatial reasoning skills.

- Geometric Formulas are Tools for Measurement: Students should appreciate that formulas for area and volume are not arbitrary rules but tools derived from the fundamental properties of shapes. Understanding the connections between formulas and the attributes of shapes helps students apply them effectively and make sense of the results.

- Geometry Has Real-World Applications: Students should recognize the relevance of geometry in everyday life, from calculating the amount of materials needed for projects to understanding spatial relationships in the world around them. This understanding helps motivate learning and encourages students to see the practical value of geometric concepts.

Essential Questions

Conceptual Understanding:

- How are geometric shapes classified and defined by their attributes (sides, angles, faces)?
- What is the difference between area and volume, and how are they measured?
- How can we decompose complex shapes into simpler shapes to find their area or volume?
- How can we use nets to represent three-dimensional figures and understand their surface area?
- How are the formulas for area and volume derived, and what do they represent in terms of the shape's attributes?

Procedural Skills and Fluency:

- How can we calculate the area of triangles, quadrilaterals, and other polygons?
- How can we calculate the volume of rectangular prisms with fractional edge lengths?
- How can we use nets to find the surface area of rectangular prisms?
- How can we solve real-world problems involving area, surface area, and volume?

Application and Problem-Solving:

- How can we use our knowledge of area and volume to make decisions in real-world situations (e.g., buying materials, designing objects)?
- How can we use geometric models to represent and solve problems involving area and volume?
- How can we use geometric reasoning to explain and justify our solutions to problems?

Critical Thinking and Reasoning:

- How can we determine the most efficient way to calculate the area or volume of a given shape?
- What are the limitations of using formulas to calculate area and volume, and when might we need to use alternative strategies?
- How can we use our understanding of geometric relationships to make predictions or generalizations about shapes and their measurements?
- How does geometry help us understand and interact with the world around us?

Summative Assessment and/or Summative Criteria

Summative Assessment Components:

- Written Test: A comprehensive assessment covering all key concepts and skills taught in the unit. The test will include a variety of question types, such as:
    - Multiple-choice questions to assess conceptual understanding and vocabulary.

    - Short answer questions requiring calculations, explanations, and justifications of geometric properties.
    - Open-ended problems involving real-world scenarios that require the application of area, surface area, and volume concepts.
    - Diagram interpretation and manipulation questions to assess spatial reasoning skills.

- Performance Task: A project-based assessment where students apply their knowledge of geometry to a real-world situation. Examples include:

    - Designing a 3D model of a building or object, calculating its surface area and volume.
    - Planning a garden or landscaping project, considering area and perimeter constraints.
    - Creating a net and calculating the surface area of a 3D shape.
    - Investigating and comparing different packaging designs based on their volume and surface area.

- Class Participation and Engagement: Ongoing assessment of students' participation in class discussions, group activities, and problem-solving sessions. This will provide insights into their ability to collaborate, communicate ideas, and engage with the learning material.

Summative Assessment Criteria:

- Conceptual Understanding:
    a. Demonstrates understanding of geometric attributes (sides, angles, faces) and their relationship to shapes.
    b. Distinguishes between area and volume as different measurements and understands their units.
    c. Recognizes the concept of decomposing and recomposing shapes to find area and volume.
    d. Understands the connection between nets and the surface area of 3D figures.
- Procedural Skills:
    a. Calculates the area of triangles, quadrilaterals, and other polygons accurately.
    b. Calculates the volume of rectangular prisms with fractional edge lengths.
    c. Uses nets to find the surface area of rectangular prisms.
    d. Applies formulas and problem-solving strategies to solve real-world problems involving area, surface area, and volume.
- Application and Problem-Solving:

a. Selects appropriate formulas and strategies to solve problems involving area, surface area, and volume.
b. Uses geometric models to represent and solve real-world problems.
c. Interprets and explains the meaning of solutions in the context of the problem.

Resources

Textbooks and Workbooks:

- Eureka Math/EngageNY Grade 6 Module 5: This module is fully dedicated to geometry, covering area, volume, and surface area with comprehensive lessons, practice problems, and assessments.
- Envisions / Big Ideas Math Grade 6: This textbook offers a variety of resources, including lessons, practice problems, and online tools to support student learning in geometry.
- IXL Math: Provides interactive skill-building exercises and assessments aligned with the NJSLS for Grade 6 geometry.
- Illustrative Mathematics: Features high-quality tasks and activities aligned with the NJSLS that promote deeper understanding of geometry.
- Pattern Blocks: These colorful shapes can be used to explore area and perimeter relationships and to build and decompose complex figures.
- Geoboards: Allow students to create and investigate polygons, explore area and perimeter concepts, and visualize transformations.
- Virtual Manipulatives: Online tools that simulate physical manipulatives, providing interactive and engaging student experiences.

- Additional Resources:

    - New Jersey Student Learning Standards for Mathematics: Provides the specific standards and learning objectives for the Geometry domain in Grade 6.
    - Open Middle Math Problems: Offers challenging problems that require students to apply their knowledge of geometry in creative ways.

- Online Resources:
    - Khan Academy: Offers instructional videos, practice exercises, and quizzes on area, volume, and surface area of various shape

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments	New Jersey Student Learning Standards
Parallelograms and Rectangular Prisms (9.1, 10.3, 10.1)	3-5 Days	Use formulas to find area, surface area, and volume of parallelograms and solids built upon parallelograms	Define the appropriate formulas. As lessons progress, be sure to highlight how surface area and volume formulas are built upon the area formula.	Homework Assigned. Classwork Assigned. Common Core Review. Inquiry Lab.	6.G.1, 6.G.2, 6.G.4
Triangles and Triangular Prisms (9.2, 10.4, 10.2)	4-6 Days	Use formulas to find area, surface area, and volume of triangles and solids built upon triangles	Define the appropriate formulas. As lessons progress, be sure to highlight how surface area and	Homework Assigned. Classwork Assigned. Common Core Review. Inquiry Lab. Mini quiz based on previous material	6.G.1, 6.G.2, 6.G.4

			volume formulas are built upon the area formula.		
Surface Area of Pyramids (10.5)	1-2 Days	Use formulas to find the surface area of pyramids	Be sure to use a net to breakdown pyramids into its base shapes. Build upon previously learned formulas. Demonstrate how the surface area is the combination of the basic shapes.	Homework Assigned. Classwork Assigned. Common Core Review. Inquiry Lab.	6.G.4
Area of Trapezoids (9.3)	2 Days	Use formulas to find area of trapezoids	Define the area formula for trapezoids. Be sure to show connections between trapezoids and other polygons.	Homework Assigned. Classwork Assigned. Common Core Review. Inquiry Lab. Mini quiz based on previous material.	6.G.1

Changes in Dimension (9.4)	4-5 Days	Determine how changes in dimensions affect perimeter and area	Spaghetti and Meatballs for All story and activity. Be sure to include real world examples in studying effects of changes.	Spaghetti and Meatballs for All packet completion. Homework Assigned. Classwork Assigned. Common Core Review.	6.G.1, 9.3.8.B.3
Polygons on the Coordinate Plane (9.5)	4-5 Days	Draw polygons in the coordinate plane and use coordinates to find length	Be sure to include the real world applications like blue prints or map layouts.	Create multiple designs project. Homework Assigned. Classwork Assigned. Common Core Review.	6.G.1, 6.G.3, 6.NS.8
Area of Irregular Figures (9.6)	4-6 Days	Find areas of composite figures	Be sure to build upon concepts of nets and previously studied formulas to break composite shapes into their individual basic polygons.	Homework Assigned. Classwork Assigned. Common Core Review. Inquiry Lab. Pool Time Project End of Chapter Test.	6.G.1, 9.2.8.G.2
Review and Assess	3 Days	Students demonstrate mastery of topics and concepts presented	Chapter review using varied teacher created/ chosen materials and tasks	End of Unit Test Completion of Journal Activity Completion of Performance Assessment from online resources	6.G.1, 6.G.2, 6.G.3, 6.G.4, 6.NS.8

	25-29 days				

Standards

MATH.6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
MATH.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.
MATH.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 $V = lwh$ and $V = bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
MATH.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.
MATH.6.G.A.4	Represent three-dimensional figures (e.g., pyramid, triangular prism, rectangular prism) 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.

Suggested Modifications for Special Education, ELL and Gifted Students

*Consistent with individual plans, when appropriate.

- Students will be allowed to submit assignments using additional time per IEP modifications.
- Students will be encouraged to use different size and type of font in order to avoid print confusion.
- ML students will be allowed to use an internet translator or language glossary in order to translate vocabulary and assignments properly.
- ML students may be allowed to work with another student who is fluent in their native language.

Suggested Technological Innovations/Use

- Interactive Geometry Software:

    a. GeoGebra: This free software allows students to construct and manipulate geometric shapes, explore properties, measure angles and sides, and visualize transformations. It can be used for demonstrations, explorations, and assessments.

    b. Desmos Geometry: This online tool provides a similar platform for geometric constructions and investigations, with a focus on interactive learning and collaboration. Students can create and share their own geometric designs.

- Virtual Manipulatives:

    a. Digital Pattern Blocks/Tangrams: These online tools allow students to manipulate virtual shapes to explore area, perimeter, and tessellations. They can be used for individual practice or collaborative activities.

b. 3D Modeling Software (Tinkercad, SketchUp): Students can use these tools to design and visualize three-dimensional objects, helping them develop spatial reasoning skills and understand the relationship between 2D nets and 3D shapes.

- Augmented Reality (AR) Apps:

    a. Apps like GeoGebra AR allow students to explore geometric shapes and concepts in a more immersive way by superimposing 3D models onto the real world through their device's camera. This can be used for visualizing cross-sections of shapes or exploring the relationship between 2D and 3D representations.

- Online Games and Activities:

    a. Math Playground: Offers a variety of engaging geometry games and activities that reinforce concepts like area, perimeter, and angles in a fun and interactive way.
    b. Sheppard Software: Provides a collection of geometry games and puzzles that challenge students to think critically and apply their knowledge of geometric concepts.

- Interactive Whiteboards or Tablets:

    a. These tools can be used to display interactive geometry software, virtual manipulatives, and other online resources. Students can interact with these resources directly, manipulating shapes and exploring concepts in a more engaging way.

- 3D Printing:

    a. If available, 3D printing can be used to create physical models of geometric shapes that students have designed in 3D modeling software. This allows for tactile exploration and a deeper understanding of the relationship between 2D representations and 3D objects.

By incorporating these technological innovations into the Grade 6 Geometry unit, teachers can create a more dynamic, interactive, and engaging learning experience for students. These tools can enhance visualization, promote active learning, and cater to diverse learning styles, ultimately leading to a deeper understanding of geometric concepts and their applications in the real world.

Cross Curricular/21st Century Connections

Science:

- Surface Area and Volume in Biology: Students can explore the relationship between surface area and volume in living organisms, such as the efficiency of gas exchange in the lungs or the absorption of nutrients in the small intestine.
- Geometry in Astronomy: Students can learn about the shapes and sizes of celestial objects, such as planets and stars, and calculate their distances using geometric principles.
- Crystals and Minerals: Students can investigate the geometric structures of crystals and minerals, connecting their properties to their shapes.

Social Studies/History:

- Architecture and Design: Students can explore the use of geometric principles in historical and modern architecture, analyzing the shapes and forms of famous buildings and structures.
- Mapping and Navigation: Students can use their knowledge of area, perimeter, and scale to interpret maps and understand the concept of distance and direction.
- Art and Culture: Students can study the geometric patterns and designs found in various cultures and art forms, appreciating the role of geometry in aesthetics and cultural expression.

ELA/Literacy:

- Vocabulary Development: Students can expand their vocabulary by learning and using geometric terms, such as polygon, perimeter, area, volume, surface area, and net.
- Reading Comprehension: Students can read and interpret informational texts about geometry, such as articles about architecture, engineering, or nature.
- Writing: Students can write explanations of their geometric reasoning, describe the properties of shapes, or create their own word problems involving area and volume.

Art:

- Geometric Art: Students can create their own geometric art using shapes, patterns, and symmetry.

- Perspective Drawing: Students can explore the use of geometric principles in perspective drawing to create realistic representations of three-dimensional objects on a two-dimensional surface.
- Tessellations: Students can create tessellations (repeating patterns of shapes) using geometric transformations, such as translations, rotations, and reflections.

Technology:

- 3D Modeling Software: Students can use 3D modeling software (e.g., Tinkercad, SketchUp) to create and manipulate virtual models of geometric shapes and explore their properties.
- GeoGebra: This free software allows students to explore geometric constructions, transformations, and measurements in an interactive environment.
- Virtual Manipulatives: Students can use online tools that simulate physical manipulatives, such as pattern blocks and geoboards, to explore geometric concepts.

21st Century Skills:

- Critical Thinking and Problem Solving: Geometry provides opportunities for students to apply critical thinking skills to solve complex problems involving spatial reasoning and measurement.
- Creativity: Students can express their creativity through geometric art, design, and modeling.
- Collaboration: Students can work together on projects that require them to apply geometric concepts to real-world situations.
- Communication: Students can develop their communication skills by explaining their geometric reasoning, presenting their findings, and participating in discussions about geometric concepts.

Unit 5: Statistics and Probability

Content Area: **Mathematics**
Course(s): **Math**
Time Period:
Length: **27-34 days**
Status: **Published**

Summary of the Unit

The Grade 6 Statistics and Probability unit, aligned with the New Jersey Student Learning Standards (NJSLS), introduces students to the fundamental concepts of data analysis and chance. Students will develop skills in collecting, organizing, displaying, and interpreting data. They will learn how to describe the distribution of data using measures of center (mean, median) and variability (range, interquartile range, mean absolute deviation). Additionally, students will explore probability by describing possible outcomes of events, calculating probabilities, and conducting simple experiments.

Key topics covered in this unit include:

- Statistical Questions: Understanding the difference between statistical questions that anticipate variability and those that do not.
- Data Collection: Gathering data through surveys, experiments, or other means.
- Data Representation: Displaying data using various graphs, such as dot plots, histograms, and box plots.
- Measures of Center: Calculating and interpreting the mean, median, and mode of a data set.
- Measures of Variability: Calculating and interpreting the range, interquartile range, and mean absolute deviation of a data set.

- Probability: Understanding the concept of probability and using it to describe the likelihood of events.
- Sample Spaces: Listing all possible outcomes of a chance event.
- Probability Experiments: Designing and conducting simple experiments to explore probability concepts.

By the end of this unit, students will be able to:

- Formulate statistical questions and collect relevant data.
- Organize and display data using appropriate graphs.
- Describe the distribution of data using measures of center and variability.
- Understand and apply basic probability concepts to real-world situations.
- Design and conduct simple probability experiments.
- Develop critical thinking and problem-solving skills in the context of data analysis and probability.

This unit provides a foundation for further studies in statistics and probability and equips students with essential skills for understanding and interpreting data in their daily lives.

Enduring Understandings

- Statistical questions anticipate variability in data: Students should understand that not all questions can be answered with statistics, and that statistical questions are designed to account for the variability and distribution of data.
- Data can be collected, organized, and displayed in different ways: Students should recognize that the choice of data collection method, organization, and display can influence how the data is interpreted and used.
- Measures of center and variability provide different perspectives on data: Students should understand that measures of center (mean, median, mode) describe the typical value of a data set, while measures

of variability (range, interquartile range, mean absolute deviation) describe how spread out the data is. Both are necessary for a complete understanding of the data.

- Probability describes the likelihood of events: Students should grasp that probability is a way to quantify the chance of an event happening, ranging from impossible (0) to certain (1).
- Probability can be estimated through experiments or calculated theoretically: Students should understand that probability can be determined both through conducting experiments and analyzing sample spaces, and through theoretical calculations based on the possible outcomes of an event.
- Statistical knowledge is applicable to real-world situations: Students should recognize the practical applications of statistics and probability in various fields, such as analyzing survey results, making predictions, and evaluating the fairness of games.
- Data analysis can be used to inform decision-making: Students should understand that data analysis can help them make informed decisions by providing insights and evidence-based conclusions.
- Statistical literacy is essential for understanding and evaluating information: Students should recognize the importance of being able to interpret statistical information critically, identify potential biases, and question the validity of claims based on data.

Essential Questions

Conceptual Understanding:

- What is a statistical question, and how does it differ from a non-statistical question?
- How can we collect data to answer a statistical question, and what are the different ways to represent the collected data?
- What are measures of center (mean, median, mode) and measures of variability (range, interquartile range, mean absolute deviation), and how can they be used to describe a data set?
- What is probability, and how can it be used to describe the likelihood of events?
- What are the different ways to represent probability (fractions, decimals, percentages)?
- What is a sample space, and how can we use it to determine probabilities?

Procedural Skills and Fluency:

- How can we construct dot plots, histograms, and box plots to represent data?

- How can we calculate and interpret measures of center (mean, median, mode) and measures of variability (range, interquartile range, mean absolute deviation) for a given data set?
- How can we calculate probabilities of simple events using fractions, decimals, and percentages?
- How can we design and conduct simple probability experiments?

Application and Problem-Solving:

- How can we use data displays and measures of center and variability to compare different data sets and draw conclusions?
- How can we use probability to make predictions about future events?
- How can we use statistical reasoning to evaluate claims and arguments based on data?
- How can we use our knowledge of statistics and probability to make informed decisions in real-world situations?

Critical Thinking and Reasoning:

- How does the choice of data display affect our interpretation of the data?
- Which measure of center (mean, median, mode) is most appropriate for a given data set, and why?
- How can we use measures of variability to determine the spread and consistency of data?
- How can we determine if a probability experiment is fair or unfair?
- How can we use probability to assess risk and make informed choices?

These essential questions are designed to promote critical thinking, problem-solving, and deeper understanding of statistics and probability concepts in Grade 6. By exploring these questions, students will develop the skills and knowledge necessary to analyze data, make predictions, and draw conclusions based on evidence.

Summative Assessment and/or Summative Criteria

Summative Assessment Components:

- Written Test: A comprehensive assessment covering all key concepts and skills taught in the unit. The test will include a variety of question types, such as:
    - Multiple-choice questions to assess conceptual understanding and vocabulary (e.g., identifying statistical questions, distinguishing between measures of center and variability).
    - Short answer questions requiring calculations and interpretations of data displays (e.g., creating dot plots, calculating mean/median/mode, finding range/IQR/MAD).
    - Open-ended problems involving real-world scenarios that require the application of statistical and probability concepts (e.g., analyzing data from a survey, predicting outcomes of an experiment, evaluating the fairness of a game).
- Performance Task: A project-based assessment where students apply their knowledge of statistics and probability to a real-world situation. Examples include:
    - Designing and conducting a survey or experiment, collecting and analyzing data, and presenting findings using appropriate graphs and measures.
    - Analyzing a real-world data set (e.g., sports statistics, weather data) and drawing conclusions using statistical measures.
    - Creating a game of chance and calculating probabilities to determine the fairness of the game.
- Class Participation and Engagement: Ongoing assessment of students' participation in class discussions, group activities, and problem-solving sessions. This will provide insights into their ability to collaborate, communicate ideas, and engage with the learning material.

Summative Assessment Criteria:

- Conceptual Understanding:
    - Demonstrates understanding of statistical questions and the importance of variability in data.
    - Differentiates between measures of center and measures of variability.
    - Understands the concept of probability and its different representations (fractions, decimals, percentages).
    - Interprets the meaning of measures of center and variability in the context of a given data set.
- Procedural Skills:
    - Constructs dot plots, histograms, and box plots accurately.

    - Calculates and interprets measures of center (mean, median, mode) and measures of variability (range, interquartile range, mean absolute deviation).
    - Calculates probabilities of simple events and understands the concept of sample spaces.
    - Designs and conducts simple probability experiments.
- Application and Problem-Solving:
    - Analyzes data using appropriate statistical measures and draws conclusions.
    - Uses probability to make predictions about future events and assess risk.
    - Evaluates claims and arguments based on statistical evidence.
    - Applies statistical and probability concepts to solve real-world problems.

Resources

Textbooks and Workbooks:

- Eureka Math/EngageNY Grade 6 Module 6: This module is fully dedicated to statistics and probability, providing comprehensive lessons, practice problems, and assessments aligned with the standards.
- Big Ideas Math Grade 6: This textbook offers a variety of resources, including lessons, practice problems, and online tools to support student learning in statistics and probability.

Online Resources:

- Khan Academy: Offers instructional videos, practice exercises, and quizzes on statistical questions, data displays, measures of center and variability, and probability concepts.
- IXL Math: Provides interactive skill-building exercises and assessments aligned with the NJSLS for Grade 6 statistics and probability.
- Math Playground: Offers a collection of fun and engaging math games and activities to reinforce statistical and probability concepts.
- Illustrative Mathematics: Features high-quality tasks and activities aligned with the NJSLS that promote deeper understanding of statistics and probability.

- NCTM Illuminations: Provides lesson plans, activities, and interactive tools for teaching statistics and probability.

Manipulatives and Tools:

- Dice and Spinners: Used for conducting probability experiments and simulating random events.
- Playing Cards: Useful for exploring probability concepts and conducting simulations.
- Graph Paper: Used for creating dot plots, histograms, and box plots by hand.
- Data Collection Tools: Surveys, questionnaires, and online forms can be used to collect data from classmates or the wider community.
- Online Data Analysis Tools: Websites like Google Sheets or Microsoft Excel can be used to organize, analyze, and graph data.

Additional Resources:

- New Jersey Student Learning Standards for Mathematics: Outlines the specific standards and learning objectives for the Statistics and Probability domain in Grade 6.
- What's Going On in This Graph?: A weekly feature from the New York Times Learning Network that provides real-world data sets for students to analyze and interpret.
- Gapminder: An online platform that offers interactive data visualizations and tools for exploring global trends and statistics.
- Census at School: A project that allows students to participate in real-world data collection and analysis activities.

Teacher Resources:

- National Council of Teachers of Mathematics (NCTM): Offers professional development resources and publications related to teaching statistics and probability in the middle grades.
- American Statistical Association (ASA): Provides resources and professional development opportunities for statistics educators.

Unit Plan

Topic/ Selection	Suggested Timeline per topic	General Objectives	Instructional Activities	Suggested Benchmarks/ Assessments	New Jersey Student Learning Standards
Measures of Central Tendency (11.1-11.2)	4-5 Days	Find and interpret mean, median and mode of a set of data	Define mean, median, mode and range. Be sure to include discussion of the different meanings of mean, median and mode. Tikki Tikki Tembo Story Activity.	Homework Assigned. Classwork Assigned. Common Core Review. Inquiry Lab. Tikki Tikki Tembo Activity. Mini quiz based on previous material	6.SP.3, 6.SP.5, 6.SP.5b, 6.SP.5c, 9.2.8.G.2, 9.2.8.A.2, 9.2.8.A.3
Measures of Variation (11.3)	5-7 Days	Find the measures of variation	Define measures of variation, quartiles, interquartile range, range and outlier. Be sure to include examples of how describing data using these terms can be helpful.	Homework Assigned. Classwork Assigned. Common Core Review. Business Project.	6.SP.3, 6.SP.5, 6.SP.5c, 9.3.8.B.3, 9.3.8.B.7
Mean Absolute Deviation (11.4)	3-4 Days	Find and interpret the mean absolute deviation for a data set	Be sure to build upon previous graphing on number line activities. Use the number line as a visual aid to show it is the	Homework Assigned. Classwork Assigned. Common Core Review. End of Chapter Test.	6.SP.5, 6.SP.5b, 6.SP.5c

			average distance from the mean that is being found.		
Reading and Creating Basic Graphs (12.1-12.3)	3-4 Days	Construct and analyze line plots, histograms and box plots	Define line plots, histograms, and box plots. Discuss the purposes of each graph. Give real world based examples for each type of graph. Ask the students to analyze the information contained therein	Homework Assigned. Classwork Assigned. Common Core Review. Mini quiz based on previous material	6.SP.2, 6.SP.4, 6.SP.5, 6.SP.5a, 6.SP.5b, 6.SP.5c, 9.3.8.B.3, 9.3.8.B.7
Interpreting Graphs (12.4-12.5)	2-3 Days	Interpret graphs and describe a data distribution by its characteristics	Define distribution, cluster, gap, peak, symmetry. Discuss how these characteristics shape the type of data and inferences that can be made	Homework Assigned. Classwork Assigned. Common Core Review. Inquiry Lab.	6.SP.2, 6.SP.4, 6.SP.5, 6.SP.5d, 9.3.8.B.3, 9.3.8.B.7

Selecting Appropriate Displays (12.6)	7-8 Days	Select an appropriate display for a set of data	Define the purpose of each type of graph studied. Use real world data to illustrate how graphs are made and influence decisions made in business.	Homework Assigned. Classwork Assigned. Common Core Review. Inquiry Lab. End of Chapter Test. Mars Rover Project.	6.SP.4, 9.3.8.B.8
Review and Assess	3 Days	Students demonstrate mastery of topics and concepts presented	Chapter review using varied teacher created/ chosen materials and tasks	End of Unit Test Completion of Journal Activity Completion of Performance Assessment from online resources	6.SP.2, 6.SP.3, 6.SP.4, 6.SP.5, 6.SP.5a, 6.SP.5b, 6.SP.5c, 6.SP.5d
	27-34 days				

Standards

MATH.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.
MATH.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.
MATH.6.SP.B.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
MATH.6.SP.B.5	Summarize numerical data sets in relation to their context, such as by:
MATH.6.SP.B.5.a	Reporting the number of observations.
MATH.6.SP.B.5.b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MATH.6.SP.B.5.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.
MATH.6.SP.B.5.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.

Suggested Modifications for Special Education, ELL and Gifted Students

*Consistent with individual plans, when appropriate.

- Students will be allowed to submit assignments using additional time per IEP modifications.
- Students will be encouraged to use different size and type of font in order to avoid print confusion.
- ML students will be allowed to use an internet translator or language glossary in order to translate vocabulary and assignments properly.
- ML students may be allowed to work with another student who is fluent in their native language.

Suggested Technological Innovations/Use

- Online Data Collection and Analysis Tools:
    - Google Forms/Microsoft Forms: These tools allow students to create surveys and collect data easily from their peers or a wider audience.
    - TinkerPlots/CODAP: These data analysis software tools enable students to explore and visualize data, create graphs, and calculate statistical measures.
    - Tableau Public: This free software allows students to create interactive visualizations and dashboards to present their data analysis findings.
- Interactive Simulations and Games:
    - Probability Simulations: Online simulations (e.g., PhET Interactive Simulations) allow students to experiment with probability concepts, such as coin flips, dice rolls, and spinners, and visualize the results over multiple trials.
    - Statistics Games: Online games (e.g., Mangahigh, Math Playground) engage students in fun activities that reinforce statistical concepts like measures of center and variability.
- Data Visualization Tools:
    - Infogram: This tool allows students to create visually appealing infographics to communicate their data analysis findings.
    - Google Charts/Datawrapper: These tools provide easy-to-use templates for creating various types of graphs and charts, making data presentation more engaging.
- Collaborative Online Whiteboards:
    - Miro/Mural: These platforms allow students to collaborate in real-time on data analysis projects, sharing ideas, brainstorming, and visualizing data together.
- Online Learning Platforms:
    - Khan Academy: Offers instructional videos, practice exercises, and quizzes on statistics and probability concepts.
    - IXL Math: Provides interactive skill-building exercises and assessments aligned with the NJSLS for Grade 6 statistics and probability.

- Data Logging Tools:
    - Vernier Sensors: These sensors (e.g., temperature, light, motion) can be used to collect real-time data for analysis and graphing, providing students with hands-on experience with data collection and analysis.
- Social Media Analysis:
    - Students can explore how statistics and probability are used in social media algorithms, advertising targeting, and sentiment analysis. They can use online tools to analyze their own social media usage and data.

Cross Curricular/21st Century Connections

Science:

- Data Analysis in Scientific Investigations: Students can apply their statistical knowledge to analyze data collected from science experiments or research studies. They can use measures of center and variability to describe their findings and draw conclusions.
- Probability in Genetics: Students can explore the probability of inheriting certain traits based on Mendelian genetics, using Punnett squares and probability calculations.
- Weather Forecasting: Students can investigate how meteorologists use probability to predict weather patterns and make forecasts.

Social Studies:

- Population Demographics: Students can analyze census data to understand the distribution of age, race, income, and other demographic factors in different regions or countries.

- Election Polls: Students can examine how pollsters use sampling and statistical analysis to predict election outcomes.
- Historical Trends: Students can use statistical data to analyze historical trends, such as changes in population, economic growth, or social movements.

ELA/Literacy:

- Data Journalism: Students can read and interpret news articles that present data and statistics, evaluating the validity of the claims and conclusions.
- Writing Persuasive Arguments: Students can use statistical evidence to support their arguments in persuasive essays or debates.
- Research Skills: Students can conduct research projects that involve collecting and analyzing data to answer a specific question.

Health/Physical Education:

- Nutrition Analysis: Students can analyze nutritional information on food labels, comparing different products based on their calorie, fat, and sugar content.
- Fitness Tracking: Students can use wearable technology or fitness trackers to collect data on their physical activity and analyze trends over time.
- Sports Statistics: Students can analyze sports statistics to compare the performance of different players or teams, using measures of center and variability.

21st Century Skills:

- Critical Thinking: Students develop critical thinking skills by analyzing and interpreting data, evaluating statistical claims, and making informed decisions based on evidence.
- Data Literacy: Students become proficient in understanding and working with data, a crucial skill in the 21st century.
- Communication: Students practice communicating their findings effectively through graphs, charts, and written reports.
- Collaboration: Students can work collaboratively to collect and analyze data, share their interpretations, and develop conclusions.
- Information Literacy: Students learn to evaluate the quality and reliability of data sources and identify potential biases.