Grade 6

Math Curriculum

Oradell Public School District

Oradell, NJ

2023

Born on Date: April 24, 2019
Revised on: July 2022
Annual Revision: OPS BOE Approval September 2023

The Grade 6 Math Curriculum was developed by the Oradell Math Curriculum Team and aligned with the New Jersey Student Learning Standards (NJSLS).

Oradell Public School District

Grade 6 Math Curriculum Committee Credits:

Jamie Caruana
Scott Duthie
Hellen Kapp
Amy Kennedy
Lesley Maklin

Megan Bozios, Superintendent
Michelle Hawley, Principal
Amy Brancato, Director of Curriculum and Instruction

Board Policy

This revision is aligned with the New Jersey Student Learning Standards for Mathematics, the New Jersey Student Learning Standards for Computer Science and Design Thinking, the New Jersey Student Learning Standards for Career Readiness, Life Literacies, and Key Skills, and the inclusion of connections to Social-Emotional Learning Competencies.

Affirmative Action

During the development of this course of study, particular attention was paid to the elimination or exclusion of any materials which might discriminate on the basis of race, color, national origin, ancestry, age, sex, affectional or sexual orientation, gender identity or expression, marital status, familial status, genetic information, mental or physical disabilities, or in educational opportunities. Every effort has been made to uphold both the letter and spirit of Affirmative Action mandates as applied to the content, the texts and the instruction inherent in this course.

Introduction to Teaching Mathematics

For more than a decade, research studies of mathematics education in high-performing countries have concluded that mathematics education in the United States must become substantially more focused and coherent in order to improve mathematics achievement in this country. To deliver on this promise, the New Jersey Student Learning Standards (NJSLS) in Mathematics were designed to address the problem of a curriculum that is “a mile wide and an inch deep.”

The new standards build on the best of high-quality math standards from states across the country. They also draw on the most important international models for mathematical practice, as well as research and input from numerous sources, including state departments of education, scholars, assessment developers, professional organizations, educators, parents and students, and members of the public.

The math standards provide clarity and specificity rather than broad general statements. They follow a design that not only stresses conceptual understanding of key ideas but also the organizing principles such as place value and the laws of arithmetic to structure those ideas.

In addition, the sequence of topics and performances outlined in the body of math standards respects what is known about how students learn, namely, that developing sequenced obstacles and challenges for students, absent from the insights about meaning that derive from careful study, is unwise. Therefore, the development of the standards began with research-based learning progressions detailing what is known today about how students' mathematical knowledge, skill, and understanding develop over time. The knowledge and skills students need to be prepared for mathematics in college, career, and life are woven throughout the mathematics standards.

These standards define what students should understand and be able to do in their study of mathematics. Additionally, this curriculum is written around the Standards for Mathematical Practice. These standards describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem-solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).

Teachers are required to assess understanding by asking the student to justify, in a way that is appropriate to the student's mathematical maturity, why a particular mathematical statement is true or where a mathematical rule comes from. Mathematical understanding and procedural skill are equally important, and both are assessed by using mathematical tasks of sufficient richness. The assessments contained in this curriculum document reflect the level of rigor represented in the state-level assessments and the NJ state Model Curriculum for Math. They serve as guideposts for teachers in determining the level of preparedness students need to reach. This curriculum document will continue to evolve as teachers plan their lessons and gather more resources to teach the units.

All About the Mathematics Curriculum

How was the curriculum developed?

The Oradell Public School District's curriculum consists of units that have been inspired by the New Jersey Student Learning Standards - Mathematics. The main professional resource teachers use is *Big Ideas Math* by Ron Larson and Laurie Boswell. Teachers are encouraged to collaborate to create additional lessons and formative assessments for the whole group, small-group, and individual conferences.

Each unit contains enduring understandings and essential questions with corresponding teaching points. Enduring understandings are statements summarizing important ideas and core processes that are central to math and have lasting value beyond the classroom. They synthesize what students should understand—not just know or do—as a result of studying a particular unit. Moreover, they articulate what students should "revisit" over the course of their lifetimes in relation to the content area. Essential questions are broad questions with many answers. They encourage transfer beyond the specific skill or topic students are studying and should recur over many years to promote curriculum coherence and real-world connections. In math, a teaching point addresses both the skill and strategy that will be practiced in a given math class. The teaching points in the math curriculum are meant to build student skill over the unit and are chosen based on assessment of combined skills.

Modifications

The modifications section at the end of each bend is meant to help guide the differentiation of the units for students with IEPs, English Language Learners, Tier 2 At-Risk students (students in Basic Skills) and Gifted and Talented students. Carol Ann Tomlinson defines differentiation as tailoring instruction to meet individual needs. Whether teachers differentiate content, process, products, or the learning environment, the use of ongoing assessment and flexible grouping makes this a successful approach to instruction. At its most basic level, differentiation consists of the efforts of teachers to respond to variance among learners in the classroom. Whenever a teacher reaches out to an individual or small group to vary his or her teaching in order to create the best learning experience possible, that teacher is differentiating instruction (Tomlinson 2000).

Teachers can differentiate at least four classroom elements based on student readiness, interest, or learning profile:

1. Content: what the student needs to learn or how the student will get access to the information
2. Process: activities in which the student engages in order to make sense of or master the content
3. Products: culminating projects that ask the student to rehearse, apply, and extend what he or she has learned in a unit
4. Learning environment: the way the classroom works and feels

Suggested Pacing Guide for Math
Grade 6

Unit	Approximate Months	Unit	Skills
1	4 Sept - Dec	Rational Numbers, Operations, and Ratios	Order of Operations, factorization, fractions, decimals, ratios and rates, and percents
2	2 Jan - Feb	Algebraic Expressions, Properties, and Equations	Properties of numbers, writing and solving expressions and equations, and factoring expressions
3	2 March	Statistics, Data Display	Box and whiskers, stem leaf, tables and charts
4	2 April- May	Geometry and Coordinate Plane	Coordinate plane, area, perimeter, surface area, and volume
5	1 June	Real-World Application of Math	Use sixth grade skills to solve real-world problems

6th Grade Math Curriculum

Unit 1: Rational Numbers, Operations and Ratios

Unit Overview

In this unit, students will extend their knowledge from prior experiences. It is important for students to become secure in this content, so the foundation is set for completing computational work with fractions and decimals. This unit includes the order of operations, which is an essential understanding for work in mathematics. The inclusion of exponents as they evaluate expressions is new to students. Number theory concepts are presented. By the end of this unit, all students should be proficient in adding, subtracting, multiplying, and dividing fractions and decimals. Students should be able to represent fractions and mixed numbers using area models, tape diagrams, and number lines. All of these models will be used in the lessons on multiplication and division of fractions.

Another focus of this unit is the study of ratios and rates associated with writing and representing ratios. The number a — b is referred to as the value of the ratio a : b. Once the concept of a ratio has been introduced, equivalent ratios can be used to solve a wide variety of problems. Rates, unit rates, and converting measures complete the chapter through the use of common applications, such as miles per hour and cost per ounce. Converting rates, or simply converting a measurement to a different unit, will integrate prior computational skills and ratio work.

Lastly, this unit will describe percents as another way of representing fractions and decimals. More specifically, because the term percent means per one hundred, you can write percentages as fractions or decimals. Mathematical language and models will be used to make these connections. The unit continues with a lesson on comparing and ordering the three representations of numbers. Students will further develop their number sense by working with number line representations of fractions and decimals and solving percent problems.

Enduring Understandings

- Solve problems using factors and multiples
- Apply order of operations
- Solve a problem using fractions, decimals, percents, and ratios
- Apply integers to model real-life problems

Essential Questions

- How does understanding the difference between a fraction and a ratio help you solve problems?
- Why is it necessary to use the order of operations?
- How do we use patterns to understand fractions, decimals, percents, and ratios?
- What is the relevance of calculating unit rate?

Assessments

Possible Formative Assessments
● Teacher Observation ● Student Participation ● One-to-One Conferring ● Small Strategy Groups ● LinkIt! Progress Reports ● DreamBox Progress Reports
Summative Assessments
● Chapter Quizzes & Tests ○ Big Ideas chapters 1, 2, 3, 4 , first half of chapter 8 ● Student Self-Reflection by Chapter ● Chapter Performance Tasks (as appropriate) ○ Big Ideas chapters 1, 2, 3, 4, first half of chapter 8 ● Online Math Activity Scores
Benchmark Assessments
● LinkIt! Math Form A
Alternative Assessments
● Modified Unit Assessment ● Modified Chapter Assessment

Standards (NJSLS) Addressed in this Unit

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

Apply and extend previous understandings of numbers to the system of rational numbers.
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.

Understand ordering and absolute value of rational numbers.
6.NS.C.7.A - Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right.
6.NS.C.7.B - Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write –3°C > –7°C to express the fact that –3°C is warmer than –7°C.
6.NS.C.7.C - Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.
6.NS.C.7.D - Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.

EXPRESSIONS AND EQUATIONS

Apply and extend previous understandings of arithmetic to algebraic expressions.
6.EE.A.1 - Write and evaluate numerical expressions involving whole-number exponents.

RATIOS AND PROPORTION

Understand ratio concepts and use ratio reasoning to solve problems.
6.RP.A.1 - Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”
6.RP.A.2 - Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠0, and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar.” “We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger.”
6.RP.A.3 - Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
6.RP.A.3.A - Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
6.RP.A.3.B - Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?
6.RP.A.3.C- Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
6.RP.A.3.D - Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Computer Science and Design Thinking

8.1.8.AP.6: Refine a solution that meets users’ needs by incorporating feedback from team members and

users.
8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.
8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).

Career Readiness, Life Literacies, and Key Skills

LIFE LITERACIES AND KEY SKILLS

- 9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1)

PRACTICES

- **CLKSP5** Utilize critical thinking to make sense of problems and persevere in solving them.

Interdisciplinary Connections

English Language Arts

Reading

- **RI.6.7.** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

Writing

- **W.6.1.** Write arguments to support claims with clear reasons and relevant evidence.

Speaking & Listening

- **SL1.** Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
- **SL4.** Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Language

- **L4.** Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Social Studies

- **6.1.8.B.4.a** Assess the impact of the Louisiana Purchase and western exploration on the expansion and economic development of the United States.

Science

- **MS-PS1-2**. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
- **MS-ESS1-3.** Analyze and interpret data to determine scale properties of objects in the solar system.

Health

- **2.1.6.B.3** Create a daily balanced nutritional meal plan based on nutritional content, value, calories, and cost.

Standards for Mathematical Practice

MP1 - Make sense of problems and persevere in solving them.

MP2 - Reason abstractly and quantitatively.
MP3 - Construct viable arguments and critique the reasoning of others.
MP4 - Model with mathematics.
MP5 - Use appropriate tools strategically.
MP6 - Attend to precision.
MP7 - Look for and make use of structure.
MP8 - Look for and express regularity in repeated reasoning.

Unit 1 Rational Numbers, Operations, and Ratios

Suggested Teaching Points

Numerical Expressions and Factors

Students will/by...

- Write products of repeated factors as powers.
- Evaluate powers.
- Explain why there is a need for a standard order of operations.
- Evaluate numerical expressions involving several operations, exponents, and grouping symbols.
- Write numerical expressions involving exponents to represent a real-life problem.
- Find factor pairs of a number.
- Explain the meanings of prime and composite numbers.
- Create a factor tree to find the prime factors of a number.
- Write the prime factorization of a number.
- Explain the meaning of factors of a number.
- Use lists of factors to identify the greatest common factor of numbers.
- Use prime factors to identify the greatest common factor of numbers.
- Explain the meaning of multiples of a number.
- Use lists of multiples to identify the least common multiple of numbers.
- Use prime factors to identify the least common multiple of numbers.

Fractions and Decimals

Students will/by...

- Draw a model to explain fraction multiplication.
- Multiply fractions.
- Find products involving mixed numbers.
- Interpret products involving fractions and mixed numbers to solve real-life problems.
- Draw a model to explain division of fractions.
- Find reciprocals of numbers.
- Divide fractions by fractions.
- Divide fractions and whole numbers.
- Draw a model to explain division of mixed numbers.
- Write a mixed number as an improper fraction.
- Divide with mixed numbers.
- Evaluate expressions involving mixed numbers using the order of operations.
- Explain why it is necessary to line up the decimal points when adding and subtracting decimals.
- Add and subtract decimals.
- Evaluate expressions involving addition and subtraction of decimals.
- Multiply decimals by whole numbers.
- Multiply decimals by decimals.
- Evaluate expressions involving multiplication of decimals.
- Use long division to divide whole numbers.
- Write a remainder as a fraction.
- Interpret quotients in real-life problems.
- Divide decimals by whole numbers.
- Divide decimals by decimals.
- Divide whole numbers by decimals.

Ratios and Rates

Students will/by...

- Write and interpret ratios using appropriate notation and language.
- Recognize multiplicative relationships in ratios.
- Describe how to determine if ratios are equivalent.
- Name ratios equivalent to a given ratio.
- Interpret tape diagrams that represent ratio relationships.
- Draw tape diagrams to model ratio relationships.
- Find the value of one part of a tape diagram.
- Use tape diagrams to solve ratio problems.
- Use various operations to create tables of equivalent ratios.
- Use ratio tables to solve ratio problems.
- Use ratio tables to compare ratios.
- Create and plot ordered pairs from a ratio relationship.
- Create graphs to solve ratio problems.
- Create graphs to compare ratios.
- Find unit rates.
- Use unit rates to solve rate problems.
- Use unit rates to compare rates.

- Write conversion facts as unit rates.
- Convert units of measure using ratio tables.
- Convert units of measure using conversion factors.
- Convert rates using conversion factors.

Percents

Students will/by...

- Draw models to represent fractions and percents.
- Write percents as fractions.
- Write equivalent fractions with denominators of 100.
- Write fractions as percents.
- Draw models to represent decimals.
- Explain why the decimal point moves when multiplying and dividing by 100.
- Write percents as decimals.
- Write decimals as percents.
- Rewrite a group of fractions, decimals, and percents using the same representation.
- Explain how to compare fractions, decimals, and percents.
- Order fractions, decimals, and percents from least to greatest.
- Represent percents of numbers using an equation, a ratio table, or a model.
- Find percents of numbers.
- Find the whole given a part and the percent.

Integers

Students will/by...

- Write integers to represent quantities in real life.
- Graph integers on a number line.
- Find the opposite of an integer.
- Apply integers to model real-life problems.
- Explain how to determine which of two integers is greater.
- Order a set of integers from least to greatest.
- Interpret statements about order in real-life problems.
- Explain the meaning of a rational number.
- Graph rational numbers on a number line.
- Determine which of two rational numbers is greater.
- Order a set of rational numbers from least to greatest.
- Find the absolute value of a number.
- Make comparisons that involve absolute values of numbers.
- Apply absolute value in real-life problems.

Unit Specific Vocabulary

Base (of a power) Common Factors Common Multiples Evaluate (a numerical expression) Exponent	Numerical Expression Order of Operations Common Factors Perfect Square Power

Factor Pair Greatest Common Factor (GCF) Least Common Multiples (LCM) Factor Tree Irrational Number Unit Rate Percent Absolute Value Integers	Prime Factorization Venn Diagram Multiplicative Inverse Reciprocal Rate Ratio Equivalent Ratios Ratio Table Rational Number

Suggested Modifications

These strategies can be adapted to scaffold for students needing more support or extend the learning for higher level students. Differentiation is accomplished through content, process, product, and learning environment.

Instructional Materials and Learning Activities

Core Instructional Materials:

- *Big Ideas Math: Modeling Real Life Grade 6 @ 2019 -Big Ideas Learning.*
    - Student Edition Print Resource, Student Math Journal, Assessment Handbook, Resources by Chapter
- Hands-on Math Manipulatives

Supplemental Materials:

- Bridges in Mathematics for intervention
- Digital Resources:
    - Big Ideas Modeling Real Life Online Learning
        - Dynamic Classroom (Steam Videos, Digital Flashcards, Skills Trainer,) Dynamic Student Edition, Tutorial Videos, Virtual Manipulatives, Dynamic Teaching Tools
    - Online Practice Assignments (Includes, but not limited to: Tenmarks, Illustrative Math Tasks, Xtra Math, Prodigy, Nearpod)
    - DreamBox
    - Bridges in Mathematics (https://bridges.mathlearningcenter.org/) for intervention
    - STEAM video- Human Circulatory System (Ratios and Rates)
    - STEAM video- Chargaff's Rule (Percent)
    - STEAM video- Space is Big (Fractions and Decimals)

Special Education Students

- Use various methods to understand a student's learning style, i.e.- observation, surveys, conferring.
- Ask students to recall together what they have already learned in ways that activate prior knowledge and build on that knowledge.
- Model problem-solving processes.
- Model productive and engaging partner talk.
- Provide direct instruction and/or think aloud for clarity.
- Build and/or use anchor charts with students and continually refer to them while teaching.
- Provide opportunities for students to turn and talk.
- Use modeling and manipulatives.
- Provide graphic organizers for making inferences when possible.
- Use step-by-step how-to sheets to guide student problem-solving.
- Refer to student IEP for goals and modifications.
- Ask students to recall together what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Provide frequent breaks.
- Use problem solving plan to organize mathematical thinking.
- Incorporate place value charts into small group lessons.
- Use Math Tool paper to organize and reinforce problem-solving.
- Big Ideas Chapter 1 Differentiation Plan

Students at Risk

- Skills Review Handbook
- Shorten assignments.
- Ask students to recall together what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Use learning progressions, rubrics, and checklists that are appropriate to the writer's current level.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Set goal for assignment and then focus only on that goal.
- Allow student to type.
- Provide frequent breaks.
- https://www.brainpop.com/math/ratioproportionandpercent/ratios/
- https://www.brainpop.com/math/ratioproportionandpercent/proportions/
- https://www.youtube.com/watch?v=RQ2nYUBVvqI
- https://www.youtube.com/watch?v=HpdMJaKaXXc

English Language Learners

- Glossary of terms from Big Ideas.
- Allow use of bilingual dictionary.
- Allow use of handheld translator.
- Ask students to recall together what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Set goal for assignment and then focus only on that goal.
- https://www.brainpop.com/math/ratioproportionandpercent/ratios/
- https://www.brainpop.com/math/ratioproportionandpercent/proportions/
- https://www.youtube.com/watch?v=RQ2nYUBVvqI
- https://www.youtube.com/watch?v=HpdMJaKaXXc

Gifted and Talented

- Provide opportunities to lead discussion.
- Use flexible grouping.
- Use projects, such as the following:
  Big Burger: (Ratios and Proportions) https://www.yummymath.com/2015/big-burger-2/
  New Baby Giraffe (Proportion, Rate, and Ratios) https://www.yummymath.com/2017/new-baby-giraffe/
  Real Life Tax, Tip, and Discounts (21 Problem Solving Tasks) http://www.cpalms.org/Public/PreviewResourceLesson/Preview/44893
  History and Science Tasks : (Chapters 3 and 4)
  https://static.bigideasmath.com/protected/content/rmt/mod/mod_6thgrade_rmt.pdf

Students with 504 Plans

- Use of manipulatives
- Preferential Seating
- Monitor On-Task Performance
- Establish and maintain eye contact when giving oral directions
- Directions repeated and/or clarified
- Provide copy of class notes
- Homework does not impact grade in class
- Frequent breaks as necessary
- Reduce homework amount
- Modify assessments

Social-Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations

- Connections:
    - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)

- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
    - Connections:
        - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)

- **Social Awareness**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
    - Connections:
        - Students collaborate and help each other during math centers

- **Relationship Skills**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
    - Connections:
        - Class discussions
        - Incentives for individual students and small groups

- **Responsible Decision-Making**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
    - Connections:
        - Class rules and routines
        - Class discussions
        - Following directions for math centers

6th Grade Math Curriculum

Unit 2 ALGEBRAIC EXPRESSIONS, PROPERTIES, AND EQUATIONS

Unit Overview

Algebraic vocabulary (unit specific vocabulary list) will be introduced. Students will then extend an understanding of algebra to include: writing and evaluating algebraic expressions, using properties with algebraic expressions, and factoring expressions. Students learn to write and solve equations with one variable. Students will understand the difference between independent and dependent variables. Students will solve single-step equations and problems using mental math leading to the application of the inverse operation to solve the equation. Documenting the steps is an integral part of the equation-solving process. Students will write and graph equations in two variables. Students will graph the equation by first creating a table of solutions to the equation and then plotting the ordered pairs.

Enduring Understandings

- Identify parts of an algebraic expression.
- Use word sentences to write algebraic expressions.
- Interpret algebraic expressions in real-life problems.
- Write word sentences as algebraic equations.
- Solve equations using properties of equality.
- Create different types of equations to solve real-life problems.
- Graph an equation with two variables

Essential Questions

- What is the difference between an algebraic expression and an algebraic equation?
- What is the difference between dependent and independent variables?
- Why is it important to follow the order of operations when solving algebraic equations?
- How can I solve equations using "*Properties of Equality*?"

Assessments

Possible Formative Assessments
• Teacher Observation • Student Participation • One-to-one Conferring • Small Strategy Groups • LinkIt! Progress Reports • DreamBox Progress Reports
Summative Assessments

• Chapter Quizzes & Tests
  ○ Big Ideas chapters 5 & 6
• Student Self-Reflection by Chapter
• Chapter Performance Tasks (as appropriate)
  ○ Big Ideas chapters 5 & 6

• Online Math Activity Scores
Benchmark Assessments
• LinkIt! Math Form B
Alternative Assessments
• Modified Unit Assessment • Modified Chapter Assessment

Standards (NJSLS) Addressed in this Unit

EXPRESSIONS AND EQUATIONS

Apply and extend previous understandings of arithmetic to algebraic expressions.
6.EE.A.1 - Write and evaluate numerical expressions involving whole-number exponents.
6.EE.A.2 - Write, read, and evaluate expressions in which letters stand for numbers.
6.EE.A.2.A - Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 - y*.
6.EE.A.2.B - Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms*.
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). *For example, use the formulas V = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = 1/2*.
6.EE.A.3 - Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y*.
6.EE.A.4 - Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.*

Reason about and solve one-variable equations and inequalities.
6.EE.B.5 - Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
6. EE.B.6.- Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
6. EE.B.7. - Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q and x are all nonnegative rational numbers.
6. EE. B.8. Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

Represent and analyze quantitative relationships between dependent and independent variables.
6.EE.C.9 - Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.

Computer Science and Design Thinking

8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users.
8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.
8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).

Career Readiness, Life Literacies, and Key Skills

LIFE LITERACIES AND KEY SKILLS

- 9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1)

PRACTICES

- **CLKSP5** Utilize critical thinking to make sense of problems and persevere in solving them.

Interdisciplinary Connections

English Language Arts

Reading

- **RI.6.7.** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

Writing

- **W.6.1.** Write arguments to support claims with clear reasons and relevant evidence.

Speaking & Listening

- **SL1.** Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
- **SL4.** Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Language

- **L4.** Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Standards for Mathematical Practice

MP.1 Make sense of problems and persevere in solving them.
MP.2 Reason abstractly and quantitatively.
MP.3 Construct viable arguments & critique the reasoning of others.
MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically
MP.6 Attend to precision.
MP.7 Look for and make use of structure.
MP.8 Look for and express regularity in repeated reasoning.

Unit 2 ALGEBRAIC EXPRESSIONS, PROPERTIES, AND EQUATIONS

Suggested Teaching Points

Algebraic Expressions and Properties

Students will/by…

- Identify parts of an algebraic expression
- Evaluate algebraic expressions with one or more variables
- Evaluate algebraic expressions with one or more operations
- Write numerical expressions
- Write algebraic expressions
- Write and evaluate algebraic expressions that represent real-life problem
- Explain the meaning of equivalent expressions
- Use properties of addition to generate equivalent expressions
- Use properties of multiplication to generate equivalent expressions
- Explain how to apply the Distributive Property
- Use the Distributive Property to simplify algebraic expressions
- Use the Distributive Property to combine like terms
- Use the Distributive Property to factor numerical expressions
- Identify the greatest common factor of terms including variables
- Use the Distributive Property to factor algebraic expressions
- Interpret factored expressions in real-life problems

Equations

Students will/by...

- Identify keywords and phrases that indicate equality
- Write word sentences as equations
- Create equations to represent real-life problems
- Determine whether a value is a solution of an equation
- Apply the Addition and Subtraction Properties of Equality to generate equivalent equations
- Solve equations using addition or subtraction
- Create equations involving addition or subtraction to solve real-life problems
- Apply the Multiplication and Division Properties of Equality to generate equivalent equations
- Solve equations using multiplication or division.
- Create equations involving multiplication or division to solve real-life problems
- Determine whether an ordered pair is a solution of an equation in two variables
- Distinguish between independent and dependent variables.
- Write and graph an equation in two variables
- Create equations in two variables to solve real-life problems

Unit Specific Vocabulary

Coefficient Dependent Variable Independent Variable Constant Equivalent Expressions Factoring an Expression Term Like Terms Algebraic Expression Algebraic Equation	Addition Property of Zero Associative Property of Addition Associative Property of Multiplication Commutative Property of Addition Commutative Property of Multiplication Distributive Property Multiplication Property of One -Multiplication Property of Zero Multiplicative Inverse Property

Suggested Modifications

These strategies can be adapted to scaffold for students needing more support or extending the learning for higher level students. Differentiation is accomplished through content, process, product, and learning environment.

Instructional Materials and Learning Activities

Core Instructional Materials:

- *Big Ideas Math: Modeling Real Life Grade 6 @ 2019 -Big Ideas Learning.*
  - Student Edition Print Resource, Student Math Journal, Assessment Handbook, Resources by Chapter
- Hands-on Math Manipulatives

Supplemental Materials:

- Bridges in Mathematics for intervention
- Digital Resources:
  - Big Ideas Modeling Real Life Online Learning
    - Dynamic Classroom (Steam Videos, Digital Flashcards, Skills Trainer,) Dynamic Student Edition, Tutorial Videos, Virtual Manipulatives, Dynamic Teaching Tools
  - Online Practice Assignments (Includes, but not limited to: Tenmarks, Illustrative Math Tasks, Xtra Math, Prodigy, Nearpod)
  - DreamBox
  - Bridges in Mathematics (https://bridges.mathlearningcenter.org/) for intervention

Special Education Students

- Use various methods to understand a student's learning style, i.e.- observation, surveys, conferring.
- Ask students to recall together what they have already learned in ways that activate their prior knowledge and build on that knowledge.
- Model problem-solving processes.
- Model productive and engaging partner talk.
- Provide direct instruction and/or think aloud for clarity.
- Build and/or use anchor charts with students and continually refer to them while teaching.
- Provide opportunities for students to turn and talk.
- Use modeling and manipulatives.
- Provide graphic organizers for making inferences when possible.
- Use step-by-step how-to sheets to guide student problem-solving.
- Use problem solving plan to organize mathematical thinking.
- Incorporate place value charts into small group lessons.

- Use Math Tool paper to organize and reinforce problem-solving.
- https://www.youtube.com/watch?v=u3dexXyyb3c
- https://www.youtube.com/watch?v=EWcllbr8Hqs
- https://www.youtube.com/watch?v=RrR_JdSGVwU
- https://www.youtube.com/watch?v=T0a92gEDukY
- https://www.youtube.com/watch?v=RrR_JdSGVwU
- https://www.youtube.com/watch?v=T0a92gEDukY
- https://www.youtube.com/watch?v=Q1vMNyIP4Us
- https://www.youtube.com/watch?v=B51_-YGYchE
- https://www.youtube.com/watch?v=JrolgDL5v3w
- https://www.youtube.com/watch?v=I3XzepN03KQ
- https://www.youtube.com/watch?v=Qyd_v3DGzTM
- https://www.youtube.com/watch?v=8BIqDD0luHc
- https://www.youtube.com/watch?v=C_KffdI34ZU
- https://www.youtube.com/watch?v=Qs5mCkkjdTY
- https://www.youtube.com/watch?v=me_WNQ7Ix_8
- https://www.youtube.com/watch?v=DfbQjiSooOo
- STEAM video- Rock Climbing (Equations)
- STEAM video- Shadow Drawings (Algebraic Expressions and Properties)

Students at Risk

- Skills Review Handbook
- Shorten assignments.
- Ask students to recall together what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Use learning progressions, rubrics, and checklists that are appropriate to the writer's current level.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Set goals for assignment and then focus only on that goal.
- Allow student to type.
- Provide frequent breaks.
- https://www.youtube.com/watch?v=u3dexXyyb3c
- https://www.youtube.com/watch?v=EWcllbr8Hqs
- https://www.youtube.com/watch?v=RrR_JdSGVwU
- https://www.youtube.com/watch?v=T0a92gEDukY
- https://www.youtube.com/watch?v=RrR_JdSGVwU
- https://www.youtube.com/watch?v=T0a92gEDukY
- https://www.youtube.com/watch?v=Q1vMNyIP4Us
- https://www.youtube.com/watch?v=B51_-YGYchE
- https://www.youtube.com/watch?v=I3XzepN03KQ
- https://www.youtube.com/watch?v=Qyd_v3DGzTM
- https://www.youtube.com/watch?v=8BIqDD0luHc
- https://www.youtube.com/watch?v=C_KffdI34ZU
- https://www.youtube.com/watch?v=Qs5mCkkjdTY
- https://www.youtube.com/watch?v=me_WNQ7Ix_8

- https://www.youtube.com/watch?v=DfbQjiSooOo
- STEAM video- Rock Climbing (Equations)
- STEAM video- Shadow Drawings (Algebraic Expressions and Properties)

English Language Learners

- Glossary of Terms from Big Ideas.
- Allow use of a bilingual dictionary.
- Allow use of a handheld translator.
- Ask students to recall together what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Set goals for assignment and then focus only on that goal.
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- https://www.youtube.com/watch?v=EWcllbr8Hqs
- https://www.youtube.com/watch?v=RrR_JdSGVwU
- https://www.youtube.com/watch?v=T0a92gEDukY
- https://www.youtube.com/watch?v=RrR_JdSGVwU
- https://www.youtube.com/watch?v=T0a92gEDukY
- https://www.youtube.com/watch?v=Q1vMNyIP4Us
- https://www.youtube.com/watch?v=B51_-YGYchE
- https://www.youtube.com/watch?v=I3XzepN03KQ
- https://www.youtube.com/watch?v=Qyd_v3DGzTM
- https://www.youtube.com/watch?v=8BIqDD0luHc
- https://www.youtube.com/watch?v=C_KffdI34ZU
- https://www.youtube.com/watch?v=Qs5mCkkjdTY
- https://www.youtube.com/watch?v=me_WNQ7Ix_8
- https://www.youtube.com/watch?v=DfbQjiSooOo
- STEAM video- Rock Climbing (Equations)
- STEAM video- Shadow Drawings (Algebraic Expressions and Properties)

Gifted and Talented

- Provide opportunities to lead discussion.
- Use flexible grouping.
- Use projects, such as the following:
  Dog Years: (Algebraic Equations)
  https://www.yummymath.com/2017/jorge-just-turned-12-how-old-is-he-in-human-years/

  Diaper Dilemma (Algebraic Expressions and Equations))
  https://www.yummymath.com/2015/thank-you-mother-and-father-for-all-of-those-diapers/

  Which Equations Best Represent Each Situation. (Match Equations with Real-Life Situations)
  https://www.illustrativemathematics.org/content-standards/6/EE/B/tasks/2204

Wind Chill
https://www.yummymath.com/wp-content/uploads/WindChill.pdf

Students with 504 Plans

- Use of manipulatives
- Preferential Seating
- Monitor On-Task Performance
- Establish and maintain eye contact when giving oral directions
- Directions repeated and/or clarified
- Provide copy of class notes
- Homework does not impact grade in class
- Frequent breaks as necessary
- Reduce homework amount
- Modify assessments

Social-Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
  - Connections:
    - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)

- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
  - Connections:
    - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)

- **Social Awareness**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
  - Connections:
    - Students collaborate and help each other during math centers

- **Relationship Skills**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
  - Connections:
    - Class discussions
    - Incentives for individual students and small groups

- **Responsible Decision-Making**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
    - Connections:
        - Class rules and routines
        - Class discussions
        - Following directions for math centers

6th Grade Math Curriculum

Unit 3 STATISTICS AND DATA DISPLAY

Unit Overview

In this unit, students first need to understand what a statistical question is. Students will learn about statistical questions about categorical data and numeric data then using that data to display measures of central tendency: mean, median, and mode. Students will analyze data displayed in various graphs to determine measures of central tendency. Additionally, learners will understand that measures of variation describe the variability of a data set with a single number. Measures of variation include: range, interquartile range, and mean absolute deviation. Overarching goals of the unit are for students to develop an understanding of statistical variability and to be able to summarize and describe the distribution of a data set. Students will also use a variety of data sets to think about the different ways in which some data sets can be displayed. They will extend their understanding to organize data and create stem-and-leaf plots, histograms, and box-and-whisker plots.

Enduring Understandings

- Construct a data set.
- Explain how a data set can be interpreted.
- Find and interpret the measures of center and the measures of variation for a data set.
- Compare the measures of center and the measures of variation for data sets.
- Organize and construct a data display
- Choose the appropriate measures of center and variation to describe a data set
- Compare and interpret data sets

Essential Questions

- How do we organize data so that it is useful?
- How are graphs used?
- How do we identify mean, median, mode, and range?
- How can different types of graphs be used to organize/show information?

Assessments

Possible Formative Assessments
• Teacher Observation

- Student Participation
- One-to-one Conferring
- Small Strategy Groups
- LinkIt! Progress Reports
- DreamBox Progress Reports

Summative Assessments

- Chapter Quizzes & Tests
  - Big Ideas Chapters 9 & 10
- Student Self-Reflection by Chapter
- Chapter Performance Tasks (as appropriate)
  - Big Ideas Chapters 9 & 10
- Online Math Activity Scores

Alternative Assessments

- Modified Unit Assessment
- Modified Chapter Assessment

Standards (NJSLS) Addressed in this Unit

STATISTICS AND PROBABILITY

Develop understanding of statistical variability.
6.SP.A.1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.
6.SP.A.2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
6.SP.A.3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

Summarize and describe distributions.
6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
6.SP.B.5. Summarize numerical data sets in relation to their context, such as by: **a.** Reporting the number of observations. **b**. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. **c.** Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. **d.** Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Computer Science and Design Thinking

8.1.8.AP.6: Refine a solution that meets users’ needs by incorporating feedback from team members and users.
8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.
8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical

prototype, graphical/technical sketch).

Career Readiness, Life Literacies, and Key Skills

LIFE LITERACIES AND KEY SKILLS

- 9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1)

PRACTICES

- **CLKSP5** Utilize critical thinking to make sense of problems and persevere in solving them.

Interdisciplinary Connections

Reading

- **RI.6.7.** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

Writing

- **W.6.1.** Write arguments to support claims with clear reasons and relevant evidence.

Speaking & Listening

- **SL1.** Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
- **SL4.** Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Language

- **L4.** Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Science

- **MS-PS1-2**. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
- **MS-PS2-1**. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
- **MS-PS3-1**. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
- **MS-ESS1-3.** Analyze and interpret data to determine scale properties of objects in the solar system.

Standards for Mathematical Practice

MP.1 Make sense of problems and persevere in solving them.
MP.2 Reason abstractly and quantitatively.
MP.3 Construct viable arguments & critique the reasoning of others.
MP.4 Model with mathematics.
MP.5 Use appropriate tools strategically
MP.6 Attend to precision.
MP.7 Look for and make use of structure.
MP.8 Look for and express regularity in repeated reasoning.

Unit 3 STATISTICS AND DATA DISPLAY

Suggested Teaching Points

Statistical Measures

Students will/by...

- Recognize questions that anticipate a variety of answers.
- Construct and interpret a dot plot.
- Use data to answer a statistical question.
- Explain how the mean summarizes a data set with a single number.
- Find the mean of a data set.
- Use the mean of a data set to answer a statistical question.
- Explain how the median and mode summarize a data set with a single number.
- Find the median and mode of a data set.
- Explain how changes to a data set affect the measures of center.
- Use a measure of center to answer a statistical question.
- Explain how the range and interquartile range describe the variability of a data set with a single number.
- Find the range and interquartile range of a data set.
- Use the interquartile range to identify outliers.
- Explain how the mean absolute deviation describes the variability of a data set with a single number.
- Find the mean absolute deviation of a data set.
- Compare data sets using the mean absolute deviation to draw conclusions.

Data Displays

Students will/by…

- Explain how to choose stems and leaves of a data set.
- Make and interpret a stem-and-leaf plot.
- Use a stem-and-leaf plot to describe the distribution of a data set.
- Explain how to draw a histogram.
- Make and interpret a histogram.
- Determine whether a question can be answered using a histogram.
- Explain what it means for a distribution to be skewed left, skewed right, or symmetric.
- Use data displays to describe shapes of distributions.
- Use shapes of distributions to compare data sets.
- Describe the shape of a distribution.
- Use the shape of a distribution to determine which measure of center best describes the data.
- Use the shape of a distribution to determine which measure of variation best describes the data.
- Find the five-number summary of a data set.
- Make a box-and-whisker plot.
- Explain what the box and the whiskers of a box-and-whisker plot represent.
- Compare data sets represented by box-and-whisker plots.

Unit Specific Vocabulary	
Statistics Statistical Questions Measure of Center Measure of Variation Mean Median Mode Range (of a data set) Outlier Quartiles First Quartile	Third Quartile Interquartile Range Mean Absolute Deviation (MAD) Box and Whisker Plot Five-Number Summary Frequency Frequency Table Histogram Leaf Stem Stem-Leaf Plot

Suggested Modifications

These strategies can be adapted to scaffold for students needing more support or extending the learning for higher level students. Differentiation is accomplished through content, process, product, and learning environment.

Instructional Materials and Learning Activities

Core Instructional Materials:

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Supplemental Materials:

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- Digital Resources:
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  - Online Practice Assignments (Includes, but not limited to: Tenmarks, Illustrative Math Tasks, Xtra Math, Prodigy, Nearpod)
  - DreamBox
  - Bridges in Mathematics (https://bridges.mathlearningcenter.org/) for intervention
  - STEAM video- Daylight in the Big City (Statistical Measures)
  - STEAM video- Choosing a Dog (Data Displays)

Special Education Students

- Use various methods to understand a student's learning style, i.e.- observation, surveys, conferring.
- Ask students to recall together what they already learned in ways that activate their prior knowledge and build on that knowledge.
- Model problem-solving process.
- Model productive and engaging partner talk.
- Provide direct instruction and/or think aloud for clarity.
- Build and/or use anchor charts with students and continually refer to them while teaching.

- Provide opportunities for students to turn and talk.
- Use modeling and manipulatives.
- Provide graphic organizers for making inferences when possible.
- Use step-by-step how-to sheets to guide student problem-solving.
- Use Problem Solving Plan to organize mathematical thinking.
- Use Math Tool paper to organize and reinforce problem-solving.
- Big Ideas Chapters 9-10 differentiation plan

Students at Risk

- Skills Review Handbook
- Shorten assignments.
- Ask students to recall together what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Use learning progressions, rubrics, and checklists that are appropriate to the writer's current level.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Set goal for assignment and then focus only on that goal.
- Allow student to type.
- Provide frequent breaks.

English Language Learners

- Glossary of Terms from Big Ideas.
- Allow use of bilingual dictionary.
- Allow use of handheld translator.
- Ask students to recall together what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Set goal for assignment and then focus only on that goal.

Gifted and Talented

- Provide opportunities to lead discussion.
- Use flexible grouping.
- Use projects, such as the following:
  - Jackie Robinson
  - Estimation to find cost of biggest Lego set: The Millennium Falcon

Students with 504 Plans

- Use of manipulatives

- Preferential Seating
- Monitor On-Task Performance
- Establish and maintain eye contact when giving oral directions
- Directions repeated and/or clarified
- Provide copy of class notes
- Homework does not impact grade in class
- Frequent breaks as necessary
- Reduce homework amount
- Modify assessments

Social-Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
  - Connections:
    - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)

- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
  - Connections:
    - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)

- **Social Awareness**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
  - Connections:
    - Students collaborate and help each other during math centers

- **Relationship Skills**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
  - Connections:
    - Class discussions
    - Incentives for individual students and small groups

- **Responsible Decision-Making**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
  - Connections:
    - Class rules and routines
    - Class discussions
    - Following directions for math centers

6th Grade Math Curriculum

Unit 4 GEOMETRY AND COORDINATE PLANE

Unit Overview

Students will begin investigating the areas of triangles and quadrilaterals. Each of the area formulas can be derived from the formula for the area of a rectangle. The explorations are similar, with students investigating different approaches to make sense of how the dimensions are used to find the area of the figure, and how the formulas relate to one another. Students apply their understanding of when they find the surface area of prisms and pyramids. The approach used to develop an understanding of surface area is to recognize the two-dimensional net that can be folded to form the prism or the pyramid. All of the faces will be polygons. It is very important that students have the tactile experience of drawing, cutting, and folding nets. Students will find the volume of a rectangular prism. Their learning is now extended to include dimensions that are fractional lengths and conversions between different cubic units, such as a cubic yard to a cubic foot.

Students will explore graphing in the coordinate plane. Students will learn to plot negative numbers and work with all four quadrants. Students will connect earlier work with solving equations to solving inequalities. It is important for students to recognize that inequalities, such as $x < 4$, have an infinite number of solution sets that can be represented on a number line. Additionally, students will draw polygons on the coordinate plane and will find differences between the points on the coordinate planes.

Enduring Understandings

Students will:

- Explain how to find the area of a figure
- Explain how to find the surface area and volume of a solids
- Describe and draw three-dimensional figures
- Apply units of measurement to solve real-life problems
- Apply integers to solve real-life problems

Essential Questions

- How does understanding area help you measure the real world?
- When do you use formulas to solve problems?
- In what real-life situations would you need to compute with integers?
- How can we use fractional units to calculate the volume of whole number and/or fractional dimensions?
- How can you find the measure of lengths when drawing polygons on the coordinate plane?

Assessments

Possible Formative Assessments
● Teacher Observation ● Student Participation ● One-to-one Conferring ● Small Strategy Groups ● LinkIt! Progress Reports ● DreamBox Progress Reports
Summative Assessments
● Chapter Quizzes & Chapter Tests ○ Big Ideas Chapters 7 & 8 (Second half of chapter 8) ● Student Self-Reflection by Chapter ● Chapter Performance Tasks (as appropriate) ● Online Math Activity Scores
Alternative Assessments
● Modified Unit Assessment ● Modified Chapter Assessment

Standards (NJSLS) Addressed in this Unit

THE NUMBER SYSTEM
Apply and extend previous understandings of numbers to the system of rational numbers. 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. 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. 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.
EXPRESSIONS AND EQUATIONS
Apply and extend previous understandings of arithmetic to algebraic expressions. 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). *For example, use the formulas V = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = 1/2*. **Reason about and solve one-variable equations and inequalities.** 6.EE.B.5 - Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine

whether a given number in a specified set makes an equation or inequality true.6.EE.B.6 - Use variables to represent numbers and write expressions when solving a real-world or mathematical problem;

GEOMETRY

Solve real-world and mathematical problems involving area, surface area, and volume.
6.G.A.1 - Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
6.G.A.2- Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
6.G.A.3 - Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

Computer Science and Design Thinking

8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users.
8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.
8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).

Career Readiness, Life Literacies, and Key Skills

LIFE LITERACIES AND KEY SKILLS

- 9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1)
- 9.1.8.CP.1: Compare prices for the same goods or services.

PRACTICES

- **CLKSP5** Utilize critical thinking to make sense of problems and persevere in solving them.

Interdisciplinary Connections

<u>English Language Arts</u>
Reading

- **RI.6.7.** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

Writing

- **W.6.1.** Write arguments to support claims with clear reasons and relevant evidence.

Speaking & Listening

- **SL1.** Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
- **SL4.** Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and

audience.

Language

- **L4.** Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Science

- **MS-PS1-2**. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
- **MS-PS2-1**. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
- **MS-PS3-1**. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
- **MS-ESS1-3.** Analyze and interpret data to determine scale properties of objects in the solar system.

Standards for Mathematical Practice

MP1- Make sense of problems and persevere in solving them.
MP2- Reason abstractly and quantitatively.
MP3- Construct viable arguments and critique the reasoning of others.
MP4- Model with mathematics.
MP5- Use appropriate tools strategically.
MP6- Attend to precision.
MP7- Look for and make use of structure.
MP8- Look for and express regularity in repeated reasoning.

Unit 4 GEOMETRY AND THE COORDINATE PLANE

Suggested Teaching Points

Area, Surface Area, and Volume

Students will /by

- Explain how the area of a rectangle is used to find the area of a parallelogram.
- Use the base and the height of a parallelogram to and its area
- Use the area of a parallelogram and one of its dimensions to nd the other dimension.
- Explain how the area of a parallelogram is used to find the area of a triangle.
- Use the base and the height of a triangle to find its area.
- Use the area of a triangle and one of its dimensions to find the other dimension.
- Use decomposition to find the area of a figure.
- Explain how the area of a parallelogram is used to find the area of a trapezoid.
- Decompose trapezoids and kites into smaller shapes.
- Use decomposition to find the area of a figure.
- Use the bases and the height of a trapezoid to find its area.
- Find the numbers of faces, edges, and vertices of a three-dimensional figure.
- Draw prisms and pyramids.
- Draw the front, side, and top views of a three-dimensional figure.
- Draw nets to represent prisms.
- Use nets to find surface areas of prisms.
- Use a formula to find the surface area of a cube.

- Apply surface areas of prisms to solve real-life problems.
- Draw nets to represent pyramids.
- Use nets to find surface areas of pyramids.
- Apply surface areas of pyramids to solve real-life problems.
- Use a formula to find the volume of a rectangular prism.
- Use a formula to find the volume of a cube.
- Use the volume of a rectangular prism and two of its dimensions to find the other dimension.
- Apply volumes of rectangular prisms to solve real-life problems.

Coordinate Plane

Students will/by...

- Identify ordered pairs in a coordinate plane.
- Plot ordered pairs in a coordinate plane and describe their locations.
- Reflect points in the x-axis, the y-axis, or both axes.
- Apply plotting points in all four quadrants to solve real-life problems.
- Draw polygons in the coordinate plane.
- Find distances between points in the coordinate plane with the same x-coordinates or the same y-coordinates.
- Find horizontal and vertical side lengths of polygons in the coordinate plane.
- Draw polygons in the coordinate plane to solve real-life problems.
- Write word sentences as inequalities.
- Determine whether a value is a solution of an inequality.
- Graph the solutions of inequalities.
- Apply the properties of inequality to generate equivalent inequalities.
- Solve inequalities using addition or subtraction.
- Solve inequalities using multiplication or division.
- Write and solve inequalities that represent real-life problems.

Unit Specific Vocabulary

Polygon	Surface Area
Composite Figure	Net
Kite	Volume
Solid	Coordinate Plane
Polyhedron	Origin
Face	Quadrants
Edge	Solution of an inequality
Vertex	Solution set
Prism	Graph of an inequality
Pyramid	

Suggested Modifications

These strategies can be adapted to scaffold for students needing more support or extend the learning for higher level students. Differentiation is accomplished through content, process, product, and learning environment.

Instructional Materials and Learning Activities

Core Instructional Materials:

- *Big Ideas Math: Modeling Real Life Grade 6 @ 2019 -Big Ideas Learning.*
    - Student Edition Print Resource, Student Math Journal, Assessment Handbook, Resources by Chapter
- Hands-on Math Manipulatives

Supplemental Materials:

- Bridges in Mathematics for intervention
- Digital Resources:
    - Big Ideas Modeling Real Life Online Learning
        - Dynamic Classroom (Steam Videos, Digital Flashcards, Skills Trainer,) Dynamic Student Edition, Tutorial Videos, Virtual Manipulatives, Dynamic Teaching Tools
    - Online Practice Assignments (Includes, but not limited to: Tenmarks, Illustrative Math Tasks, Xtra Math, Prodigy, Nearpod)
    - DreamBox
    - Bridges in Mathematics (https://bridges.mathlearningcenter.org/) for intervention
    - **Protractor Practice http://www.mathplayground.com/measuringangles.html**
    - **Discovering Circumference - Can a car drive through a tree? http://www.figurethis.org/challenges/c15/challenge.htm**
    - **Why the formula for the area of circles works?**
    - **http://www.mathsteacher.com.au/year8/ch12_area/07_circle/circle.htm**
    - STEAM video- Packaging Design (Area, Surface Area, and Volume)
    - STEAM video- Designing a CubeSat (Integers, Number Lines, and the Coordinate Plane)

Special Education Students

- Use various methods to understand a student's learning style, i.e.- observation, surveys, conferring.
- Ask students to recall together what they already learned in ways that activate their prior knowledge and allow to build on that knowledge.
- Model problem-solving process.
- Model productive and engaging partner talk.
- Provide direct instruction and/or think aloud for clarity.
- Build and/or use anchor charts with students and continually refer to them while teaching.
- Provide opportunities for students to turn and talk.
- Use modeling and manipulatives.
- Provide graphic organizers for making inferences when possible.
- Use step-by-step how-to sheets to guide student problem-solving.
- Use problem solving plan to organize mathematical thinking.
- Use Math tool paper to organize and reinforce problem-solving.
- Incorporate place value charts into small group lessons.
- Big Ideas Chapter differentiation plan

Students at Risk

- Skills review handbook
- Shorten assignments.

- Ask students to recall together what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Use learning progressions, rubrics, and checklists that are appropriate to the writer's current level.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Set goal for assignment and then focus only on that goal.
- Allow student to type.
- Provide frequent breaks.

English Language Learners

- Glossary of terms from Big Ideas.
- Allow use of bilingual dictionary.
- Allow use of handheld translator.
- Ask students to recall together what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Set goal for assignment and then focus only on that goal.

Gifted and Talented

- Provide opportunities to lead discussion.
- Use flexible grouping.
- Use projects, such as the following:
  Deflategate!
  Do I Have Enough Wrapping Paper?
  How Many Donuts?
  Giant Iceberg

Students with 504 Plans

- Use of manipulatives
- Preferential Seating
- Monitor On-Task Performance
- Establish and maintain eye contact when giving oral directions
- Directions repeated and/or clarified
- Provide copy of class notes
- Homework does not impact grade in class
- Frequent breaks as necessary
- Reduce homework amount
- Modify assessments

Social-Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
  - Connections:
    - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)

- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
  - Connections:
    - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)

- **Social Awareness**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
  - Connections:
    - Students collaborate and help each other during math centers

- **Relationship Skills**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
  - Connections:
    - Class discussions
    - Incentives for individual students and small groups

- **Responsible Decision-Making**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
  - Connections:
    - Class rules and routines
    - Class discussions
    - Following directions for math centers

6th Grade Math Curriculum

Unit 5 REAL-WORLD APPLICATION OF MATH

Unit Overview

The objective of this unit is for students to use the mathematical skills they learned this year to create something new. They will apply sixth grade math skills to real-world situations. Since there are choice activities and various projects in this unit, it allows for easy differentiation and successful student pacing. There are steps and procedures to assist students in these real-world projects but the work and results will be determined by student. Throughout the unit, the students will create a project plan, design their project, assess that the project solves the proposed problem, and present their findings. Three sample projects that can be used are the following:

- Run a Taco Truck
- Movie Marathon - Single Digit Division and Double Digit Division
- Geometrocity

If you choose to create a different project, please consult with the math supervisor for review.

Enduring Understandings

Students will:

- Explain how to find the area of a figure
- Explain how to find the surface area and volume of a solids
- Apply units of measurement to solve real-life problems
- Apply integers to solve real-life problems

Essential Questions

- How does understanding area help you measure the real world?
- When do you use formulas to solve problems?
- In what real-life situations would you need to compute with integers?

Assessments

Possible Formative Assessments
• Teacher Observation • Student Participation • One-to-one Conferring • Small Strategy Groups • LinkIt! Progress Reports • DreamBox Progress Reports
Summative Assessments
• Student records of project progress • Student Self-Reflection • Performance Tasks (as appropriate) • Online Math Activity Scores

Benchmark Assessments
● LinkIt! Math Form C
Alternative Assessments
● Modified Unit Assessment ● Modified Chapter Assessment

Standards (NJSLS) Addressed in this Unit

THE NUMBER SYSTEM
Apply and extend previous understandings of multiplication and division to divide fractions by fractions. 6.NS.A.1 - Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc). How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4- cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi? **Compute fluently with multi-digit numbers and find common factors and multiples.** 6.NS.B.2 - Fluently divide multi-digit numbers using the standard algorithm. 6.NS.B.3 - Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
EXPRESSIONS AND EQUATIONS
Apply and extend previous understandings of arithmetic to algebraic expressions. 6.EE.A.1 - Write and evaluate numerical expressions involving whole-number exponents. **Represent and analyze quantitative relationships between dependent and independent variables.** 6.EE.C.9 - Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.
Develop understanding of statistical variability.
6.SP.A.1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages. 6.SP.A.2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
GEOMETRY

Solve real-world and mathematical problems involving area, surface area, and volume.
6.G.A.1 - Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
6.G.A.2- Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
6.G.A.3 - Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

Computer Science and Design Thinking

8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users.
8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.
8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).

Career Readiness, Life Literacies, and Key Skills

LIFE LITERACIES AND KEY SKILLS

- 9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1)

PRACTICES

- **CLKSP5** Utilize critical thinking to make sense of problems and persevere in solving them.

Interdisciplinary Connections

Reading

- **RI.6.7.** Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

Writing

- **W.6.1.** Write arguments to support claims with clear reasons and relevant evidence.

Speaking & Listening

- **SL1.** Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
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Language

- **L4.** Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

Standards for Mathematical Practice

MP1- Make sense of problems and persevere in solving them.
MP2- Reason abstractly and quantitatively.
MP3- Construct viable arguments and critique the reasoning of others.
MP4- Model with mathematics.
MP5- Use appropriate tools strategically.
MP6- Attend to precision.
MP7- Look for and make use of structure.
MP8- Look for and express regularity in repeated reasoning.

Unit 5 Title

Suggested Teaching Points

Project Planning

Students will

- Investigate various ways to solve the given problem
- Create a project plan to present ideas on how to solve the given problem
- Share proposed project plan
- The project must review the following skills:
    - Explain why there is a need for a standard order of operations.
    - Work with fractions
    - Write percents as decimals
    - Write decimals as percents
    - Use statistics to work with data
    - Display data
    - Use geometry to create business spaces
- The following skills may be involved in this project
    - Evaluate numerical expressions involving several operations, exponents, and grouping symbols.
    - Write numerical expressions involving exponents to represent a real-life problem
    - Apply ratios/rates
    - Rewrite a group of fractions, decimals, and percents using the same representation
    - Explain how to compare fractions, decimals, and percents
    - Work with algebraic expressions and properties
    - Create equations

Design

Students will

- Create a design plan to solve the proposed problem
- The project must review the following skills:
    - Explain why there is a need for a standard order of operations.
    - Work with fractions
    - Write percents as decimals
    - Write decimals as percents
    - Use statistics to work with data
    - Display data
    - Use geometry to create business spaces

- The following skills may be involved in this project
    - Evaluate numerical expressions involving several operations, exponents, and grouping symbols.
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    - Apply ratios/rates
    - Rewrite a group of fractions, decimals, and percents using the same representation
    - Explain how to compare fractions, decimals, and percents
    - Work with algebraic expressions and properties
    - Create equations

Self-Assessment

Students will

- Review design plan and assess if it is feasible
- Display mathematical equations and data to support that the design plan is feasible
- Work with peers and teacher to share design plan
- The project must review the following skills:
    - Explain why there is a need for a standard order of operations.
    - Work with fractions
    - Write percents as decimals
    - Write decimals as percents
    - Use statistics to work with data
    - Display data
    - Use geometry to create business spaces
- The following skills may be involved in this project
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    - Apply ratios/rates
    - Rewrite a group of fractions, decimals, and percents using the same representation
    - Explain how to compare fractions, decimals, and percents
    - Work with algebraic expressions and properties
    - Create equations

Presentation

Students will

- Present findings to solve the proposed problem
- The project must review the following skills:
    - Explain why there is a need for a standard order of operations.
    - Work with fractions
    - Write percents as decimals
    - Write decimals as percents
    - Use statistics to work with data
    - Display data
    - Use geometry to create business spaces
- The following skills may be involved in this project
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symbols.
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- Rewrite a group of fractions, decimals, and percents using the same representation
- Explain how to compare fractions, decimals, and percents
- Work with algebraic expressions and properties
- Create equations

Unit Specific Vocabulary

See math terms in Units 1-4

Suggested Modifications

These strategies can be adapted to scaffold for students needing more support or extending the learning for higher level students. Differentiation is accomplished through content, process, product, and learning environment.

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  - DreamBox
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Special Education Students

- Use various methods to understand a student's learning style, i.e.- observation, surveys, conferring.
- Ask students to recall together what they already learned in ways that activate their prior knowledge and build on that knowledge.
- Model problem-solving process.
- Allow to work in a group instead of individually.
- Model productive and engaging partner talk.
- Provide direct instruction and/or think aloud for clarity.
- Build and/or use anchor charts with students and continually refer to them while teaching.

- Provide opportunities for students to turn and talk.
- Use modeling and manipulatives.
- Provide graphic organizers for making inferences when possible.
- Use step-by-step how-to sheets to guide student problem-solving.
- Use Problem Solving Plan to organize mathematical thinking.
- Use Math Tool paper to organize and reinforce problem-solving.

Students at Risk

- Shorten assignments.
- Ask students to recall together what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Use learning progressions, rubrics, and checklists that are appropriate to the writer's current level.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Set goal for assignment and then focus only on that goal.
- Allow student to type.
- Provide frequent breaks.

English Language Learners

- Allow use of bilingual dictionary.
- Allow use of handheld translator.
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- Use preferential seating.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Set goal for assignment and then focus only on that goal.

Gifted and Talented

- Provide opportunities to lead discussion.
- Use flexible grouping.
- Share projects with a wider audience--podcast, slideshow
- Experts to conduct small group
- create step by guide for students
- Use additional projects, such as the following: Aluminum Foil Prank

Students with 504 Plans

- Use of manipulatives
- Preferential Seating
- Monitor On-Task Performance

- Establish and maintain eye contact when giving oral directions
- Directions repeated and/or clarified
- Provide copy of class notes
- Homework does not impact grade in class
- Frequent breaks as necessary
- Reduce homework amount
- Modify assessments

Social-Emotional Learning Competencies

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- **Relationship Skills**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
  - Connections:
    - Class discussions
    - Incentives for individual students and small groups

- **Responsible Decision-Making**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
  - Connections:
    - Class rules and routines
    - Class discussions
    - Following directions for math centers