(8th) Unit 1: Equations

Content Area: **Math**
Course(s): **Math**
Time Period: **September**
Length: **4 weeks**
Status: **Published**

Unit Overview

In this unit, students will learn about the following topics:

- Order of operations

- Evaluating algebraic expressions

- Solving one-step equations

- Solving two-step equations

- Solving multi-step equations with variables on one or both sides

- Solving equations with special solutions

- Modeling word problems with equations

- Rewriting equations & formulas

Enduring Understandings

SWBAT:

- Utilize order of operations when simplifying a numerical expression

- Evaluate an algebraic expression for one or more variables simultaneously

- Use inverse operations to solve for a variable in an equation

- Solve one-step equations

- Solve two-step equations

- Solve multi-step equations with variables on one or both sides

- Solve equations with special solutions (no solution and infinitely many solutions)

- Model word problems with equations and subsequently solve them to obtain an answer

- Rewrite equations & formulas to solve for one variable in terms of another

- Cancel fractions in an equation by multiplying through by the least common denominator of the fractions

- Translate sentences to algebraic expressions

Essential Questions

How can we:

- use order of operations to simplify numerical expressions?
- evaluate algebraic expressions for one or more variables?

How can we:

- apply properties of equality to produce equivalent equations?
- isolate the variable in an equation using addition, subtraction, multiplication, and division?
- solve one-step equations with integers?
- solve one-step equations with fractions and decimals?
- use equations to model and solve real-life problems?

How can we:

- solve two-step equations involving integers?
- solve two-step equations involving fractions and decimals?

How can we:

- solve multistep equations with variables on one side?
- solve multistep equations with variables on both sides?
- use multistep equations to model and solve real-world problems?

How can we:

- cancel fractions in an equation?
- identify the number of solutions an equation has (one solution, no solution, or infinitely many solutions)?
- use properties of equality to rewrite literal equations?
- utilize the temperature formula to convert between units of measure?

Instructional Strategies & Learning Activities

- Guided Practice
- Daily Do Now
- Extra Practice & Puzzle Time (Resources)
- Scavenger Hunts
- Coloring Activities
- Task Cards (Around the World)
- Maze Activities

- Quizizz Online Assignments
- Kahoot! Online Games
- GimKit Online Games

Integration of 21st Century Themes and Skills

P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
9.4.8.CT.3	Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome.
9.4.8.TL.5	Compare the process and effectiveness of synchronous collaboration and asynchronous collaboration.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP11.1	Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.

Technology & Design Integration

TECH.8.1.8.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.2.8.D.CS1	Apply the design process.

Interdisciplinary Connections

L.KL.8.2.A	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.
L.KL.8.2.B	Gather vocabulary knowledge when selecting a word or phrase important to comprehension or expression.
L.VL.8.3.A	Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
L.VL.8.3.B	Analyze the impact of specific word choices on meaning and tone.
L.VL.8.3.C	Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., precede, recede, secede).
L.VL.8.3.D	Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or

	its part of speech.
MS-PS1-4	Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design.

Differentiation

Definitions of Differentiation Components:

- Content – the specific information that is to be taught in the lesson/unit/course of instruction.
- Process – how the student will acquire the content information.
- Product – how the student will demonstrate understanding of the content.
- Learning Environment – the environment where learning is taking place including physical location and/or student grouping

Differentiation occurring in this unit:

- High-achieving students will assist low-achieving students in mixed ability groupings for games and activities.
- High-achieving students can complete sudoku puzzles and logic puzzles as extension activities.
- Limit number/difficulty of problems for low-achieving students to demonstrate mastery.
- Narrow down problem choice to core concepts for low-achieving students.
- Leveled group-based activities, determined by formative assessment.

Modifications & Accommodations

- High-achieving students will assist low-achieving students in mixed ability groupings for games and activities.
- High-achieving students can complete sudoku puzzles and logic puzzles as extension activities.
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Benchmark Assessments

Schoolwide Benchmark assessments:

- Linkit Benchmarks (Form A in September, Form B in January, Form C in June): Linked to NJSLA standards

Additional Benchmarks used in this unit:

- IXL Diagnostic + continued practice during IXL periods

Formative Assessments

Formative Assessments used in this unit:

- Kahoot! Games

- Quizizz Games

- Homework

- Q & A

- Scavenger Hunts

- Coloring Activities

- Task Cards

- Partner Activities

Summative Assessments

Summative assessments for this unit:

- Chapter Test
- Quizzes

Instructional Materials

1. Big Ideas Math: Math & You 6th Grade Textbook
2. Quizizz
3. Kahoot!
4. Scavenger Hunts
5. Task Cards
6. Coloring Activities

7. GimKit

Standards

7.NS.A.1.a	Describe situations in which opposite quantities combine to make 0.
7.NS.A.1.b	Understand $p + q$ as the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
7.NS.A.1.c	Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
7.NS.A.1.d	Apply properties of operations as strategies to add and subtract rational numbers.
7.NS.A.2.a	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
7.NS.A.2.b	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.
8.EE.C.7.a	Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = p$, $p = p$, or $p = q$ results (where p and q are different numbers).
7.NS.A.2.c	Apply properties of operations as strategies to multiply and divide rational numbers.
8.EE.C.7.b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
7.NS.A.2.d	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
7.NS.A.3	Solve real-world and mathematical problems involving the four operations with rational numbers.