Unit 4: Represent and Solve Equations and Inequalities

Content Area: **Mathematics**
Course(s):
Time Period: **December**
Length: **4-5 weeks**
Status: **Published**

Essential Questions

- How can I write and solve equations using addition and subtraction?
- How can I write and solve equations using multiplication and division?
- How can I use an inequality symbol to represent a situation?

Enduring Understandings

- A solution of an equation is a value for the variable that makes the equation true. An equation is true when the expressions or numbers on both sides of the equal sign have the same value.
- The same number can be added to, subtracted from, or multiplied on both sides of an equation and equality is maintained. Dividing both sides of an equation by the same nonzero number also maintains equality.
- A problem situation can be represented by an equation with a variable. The equation can be solved by using the inverse operation and a property of equality.
- A multiplication or division problem situation can be represented by an equation with a variable. The equation can be solved by using the inverse operation.
- Inverse relationships and properties of equality can be used to solve equations with fractions, mixed numbers, and decimals.
- An inequality is a mathematical sentence that contains the inequality symbol <(is less than), >(is greater than), ≤(is less than or equal to), ≥(is greater than or equal to), or ≠(is not equal to). An inequality describes a situation that has an infinite number of numerical possibilities.

Critical Knowledge and Skills

Vocabulary

Equation

Solution of an Equation

Addition Property of Equality

Subtraction Property of Equality

Multiplication Property of Equality

Division Property of Equality

Inverse Relationship

Inequality

Learning Objectives

- 4-1: Understand Equations and Solutions
    - Identify equations and variables
    - Use substitution to find solutions
- 4-2: Apply Properties of Equality
    - Use the properties of equality to keep both sides of an equation equal
    - Identify which properties of equality are used to write equivalent expressions
- 4-3: Write and Solve Addition and Subtraction Equations
    - Write one-variable addition and subtraction equations.
    - Use inverse relationships and properties of equality to solve one-step addition and subtraction equations.
- 4-4: Write and Solve Multiplication and Division Equations
    - Write one-variable multiplication and division equations
    - Use inverse relationships and properties of equality to solve one-step multiplication and division equations.
- 4-5: Write and Solve Equations with Rational Numbers
    - Write and solve equations that involve fractions, decimals, and mixed numbers
- 4-5: Understand and Write Inequalities
    - Understand the symbols required to write and inequality
    - Write inequalities to describe mathematical or real-world situations.

Resources

- Lesson Resources
    - Student Edition
    - Additional Practice Workbook
    - Teaching Resources
        - Reteach to Build Understanding, Additional Vocabulary Support, Build Mathematical Literacy, Enrichment
    - Digital Lesson Courseware

        - Today's Challenge, Visual Learning Animation Plus, Key Concepts, Additional Examples, 3-Act Mathematical Modeling, Online Practice powered by MathXL for School, Virtual Nerd Video Tutorials, Animated Glossary, Digital Math Tools, Online Math Games

- Topic Resources
    - Student's Edition
        - Review What You Know, Build Literacy in Mathematics, Mid-Topic Checkpoint and Performance Task, Topic Review, Fluency Practice Activity, STEM Project
    - Digital Topic Support for Students
        - Math Practice Animations, STEM Project, 3-Act Mathematical Modeling Lesson

Standards for Mathematical Practice and Content

CCSS.Math.Practice.MP1	Make sense of problems and persevere in solving them.
CCSS.Math.Practice.MP2	Reason abstractly and quantitatively.
CCSS.Math.Practice.MP3	Construct viable arguments and critique the reasoning of others.
CCSS.Math.Practice.MP4	Model with mathematics.
CCSS.Math.Practice.MP5	Use appropriate tools strategically.
CCSS.Math.Practice.MP6	Attend to precision.
CCSS.Math.Practice.MP7	Look for and make use of structure.
CCSS.Math.Practice.MP8	Look for and express regularity in repeated reasoning.
MA.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).
MA.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.
MA.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.
MA.6.EE.B.7	Solve real-world and mathematical problems by writing and solving equations of the form □ + □ = □ and □□ = □ for cases in which □, □ and □ are all nonnegative rational numbers.
MA.6.EE.B.8	Write an inequality of the form □ > □ or □ < □ to represent a constraint or condition in a real- world or mathematical problem. Recognize that inequalities of the form □ > □ or □ < □ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

INTERDISCIPLINARY CONNECTIONS

Career Readiness, Life Literacies, & Key Skills (CLKS)

Career Readiness, Life Literacies, and Key Skills Practices describe the habits of the mind that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. These practices should be taught and reinforced in all content areas with increasingly higher levels of complexity and expectation as a student advances through a program of study.

Practices:

Act as a responsible and contributing community members and employee

Attend to financial well-being

Demonstrate creativity and innovation

Utilize critical thinking to make sense of problems and persevere in solving them

Model integrity, ethical leadership and effective management

Use technology to enhance productivity increase collaboration and communicate effectively

Work productively in teams while using cultural/global competence

9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option

9.4.8.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.

9.4.8.IML.2: Identify specific examples of distortion, exaggeration, or misrepresentation of information.

9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b). • 9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations.

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

Computer Science & Design Thinking (CS & DT)

Computing Systems

Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem.

Data & Analysis

People use digital devices and tools to automate the collection, use, and transformation of data.

8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices.

8.2.8.NT.1: Examine a malfunctioning tool, product, or system and propose solutions to the problem.

NJSLS Companion Standards Grades 6-8

RST.6-8.3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

RST.6-8.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST.6-8.7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.