Unit 6: Equations and Inequalities

Content Area: **Mathematics**
Course(s):
Time Period: **Trimester 2**
Length: **24 Days**
Status: **Published**

Brief Summary of Unit

In this unit, students will learn to solve one-step equations using addition, subtraction, multiplication, and division. They will also explore inequalities, learning to write, interpret, and graph them on a number line to visualize solution sets. Additionally, students will understand the coordinate grid, plotting points to represent solutions and relationships between variables. These skills help students grasp the relationship between quantities and understand constraints in real-world contexts. The unit prepares students for advanced mathematical concepts and problem-solving, fostering critical thinking and analytical skills.

Revision Date: June 2024

Standards

When addressing inequality in the context of real world situations, the following is being addressed:

In accordance with New Jersey's Chapter 32 Diversity and Inclusion Law, this unit includes instructional materials that highlight and promote diversity, including:

economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance.

MATH.K-12.1	Make sense of problems and persevere in solving them
MATH.K-12.2	Reason abstractly and quantitatively
MATH.K-12.3	Construct viable arguments and critique the reasoning of others
MATH.K-12.4	Model with mathematics
MATH.K-12.5	Use appropriate tools strategically
ELA.L.KL.6.2	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
ELA.L.KL.6.2.A	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.
MATH.K-12.6	Attend to precision

MATH.K-12.7	Look for and make use of structure
ELA.L.VL.6.3	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 6 reading and content, including technical meanings, choosing flexibly from a range of strategies.
MATH.K-12.8	Look for and express regularity in repeated reasoning
MATH.6.EE.B	Reason about and solve one-variable equations and inequalities
MATH.6.EE.B.5	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
MATH.6.EE.B.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.
MATH.6.EE.B.7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.
MATH.6.EE.B.8	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
MATH.6.EE.C	Represent and analyze quantitative relationships between dependent and independent variables
MATH.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.
ELA.SL	Speaking and Listening
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
TECH.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
TECH.K-12.P.9	Work productively in teams while using cultural/global competence.

Essential Questions

- How can we use algebraic concepts to solve real-world problems and make informed decisions based on numerical data?
- How do inequalities differ from equations, and how can we represent and interpret them using mathematical symbols and number lines?
- In what ways do the solutions to equations and inequalities help us understand constraints and conditions in various scenarios?
- What is the significance of the coordinate grid in graphing and understanding relationships between variables?

Enduring Understandings

- Algebraic concepts are not just theoretical but have practical applications in everyday life, enabling us to model and solve real-world problems involving constraints and relationships between quantities.
- Graphing inequalities on number lines and coordinate grids provides a visual representation of solution sets, helping to better understand the range and constraints of possible values.
- Mastering one-step equations, inequalities, and the coordinate grid builds a strong foundation for more advanced algebraic concepts and mathematical reasoning in future studies.
- One-step equations and inequalities are fundamental tools in algebra that help us describe and solve problems involving unknown quantities.
- The coordinate grid is a crucial tool for graphing points and visualizing relationships between variables, which aids in comprehending and solving complex problems.
- The use of symbols in equations and inequalities allows us to generalize mathematical concepts and apply them to various contexts, making problem-solving more efficient and systematic.

Students Will Know

- Students will know how to interpret and represent solutions to inequalities on a number line.
- Students will know the basic algebraic terms such as variable, constant, coefficient, and solution.
- Students will know the definitions and differences between equations and inequalities.
- Students will know the procedures for solving one-step equations by performing inverse operations..
- Students will know the significance of graphing and how it helps visualize relationships between variables and solution sets.
- Students will know the structure and components of a coordinate grid (x-axis, y-axis, origin, coordinates).
- Students will know the symbols used for inequalities (>, <, ≥, ≤) and their meanings.

Students Will Be Skilled At

- Students will be skilled at applying algebraic concepts to solve real-world problems.
- Students will be skilled at completing tables with 2 variables and writing/graphing equations with 2 variables
- Students will be skilled at filling in tables with 2 variables.
- Students will be skilled at graphing inequalities on a number line to represent solution sets visually.
- Students will be skilled at plotting points on a coordinate grid accurately.
- Students will be skilled at solving one-step equations using addition, subtraction, multiplication, and division.
- Students will be skilled at writing and interpreting inequalities from word problems and mathematical statements.
- Students will be skilled at writing equations from a word problem.

Learning Plan

Day 1: Introduction to the coordinate grid

- Understanding the x-axis and y-axis.

Day 2: Plotting points

- X and Y coordinate grid.
- Utilizing hands- on practice

Day 3: Identifying independent and Dependent Variables

- Real World Applications

Day 4: Exploring relationships between variables

- Using tables and graphs

Day 5-6: Representing Data

- Review of completing tables, plotting points, and interpreting graphs.

Day 7: Quiz on Coordinate Grid and Two-Variable Relationships.

Day 8: Introduction to solutions of equations.

- Testing solutions to 1 step equations

Day 9: Solving one-step equations

- Using inverse of addition and subtraction

Day 10: Solving one-step equations

- Using inverse of addition and subtraction incorporating decimals and fractions

Day 11: Solving one-step equations

- Using inverse of multiplication and division.

Day 12: Solving one-step equations

- Using inverse of multiplication and division incorporating decimals and fractions

Day 13: Mixed practice

- Using all four operations in one-step equations
- Incorporating word problems

Day 14: Translating simple word problems

- Involving one-step equations.

Day 15 - 16: Translating Word Problems

- One step equation and solve.

Day 17: Review and Quiz on translating and solving 1-step equations.

Day 18: Introduction to inequalities;

- Understanding inequality symbols.

Day 19: Graphing inequalities

- Using a number line and symbols

Day 20 - 21: Writing inequalities

- From statements and word problems.

Day 22: Quiz on Inequalities.

Day 23: Mixed Review of Equations, Inequalities and Coordinate Graphs

Day 24: Unit Test

Total Number of Days 24

Evidence/Performance Tasks

Assessments

- Formative: Daily assessments using examples from class notes, iReady MyPath, Big Ideas Math online platform problems, and NJSLA test bank problems
- Summative: Teacher-created assessments, NJSLA test bank problems, Big Ideas Math online platform problems, Big Ideas Math unit assessments
- Benchmark: iReady diagnostic assessments and district placement assessments in addition to unit assessments from Big Ideas Math
- Alternative Assessments: Student-centered activities such as scavenger hunts, various projects involving real world applications, and adaptive learning tasks in iReady, Khan Academy, and Big

Ideas Math

Materials

Core: Core Book List including Big Ideas Math Modeling Real Life

Supplemental: Khan Academy, iReady, IXL (for intervention)

Suggested Strategies for Modifications

Suggested Strategies for Modifications for Grade 6