Unit 02 - Solving Equations

Content Area: **Mathematics**
Course(s): **Algebra I**
Time Period: **September**
Length: **17 days**
Status: **Published**

Unit Overview

This unit connects and extends the lesson learned in the previous unit to solving equations and proportions. In this unit, students will develop the answers to the Essential Questions in this unit. Students will learn to find equivalent equations using inverse operations and simplification. Students will solve equations using many properties learned in the previous unit.

Enduring Understandings

- Equivalent equations are equations that have the same solutions.
- To solve equations with variables on both sides, you can use properties of equality and inverse operations to write a series of simpler equivalent equations.
- To solve multi-step equations, you form a series of simpler equivalent equations.
- To solve two-step equations, you can use the properties of equality and inverse operations to form a series of simpler equivalent equations.
- When you work with literal equations, you can use the methods you have learned in this unit to isolate any particular variable.
- You can find the solution of a one-step equation using the properties of equality and inverse operations to write a simpler equivalent equation.
- You can use the properties of equality repeatedly to isolate the variable.

Essential Questions

- Can equations that appear to be different be equivalent?
- How are equations with absolute values different from those without? How are they the same?
- How can equations be used to solve everyday problems?
- How can you solve equations?
- How do you solve for a variable in an equation?

Standards/Indicators

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.

MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.N-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MA.N-Q.A.2	Define appropriate quantities for the purpose of descriptive modeling.
MA.K-12.6	Attend to precision.
MA.N-Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems.
MA.A-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
MA.A-REI.A.1	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
MA.A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Student Learning Objectives (SLOs)

- Create linear equations and inequalities in one variable and use them to solve problems. Justify each step in the process and the solution.
- Solve linear equations and inequalities in one variable (including literal equations). Justify each step in the process and solution.
- Solve multi-step problems that can be represented algebraically with accurate and appropriately defined units, scales, and models (such as graphs, tables, and data displays).

Lesson Titles

- Literal Equations and Formulas
- Solving Equations with Variables on Both Sides
- Solving Multi-Step Equations
- Solving One-Step Equations
- Solving Two-Step Equations

Career Readiness, Life Literacies & Key Skills

TECH.9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
TECH.9.4.2.CI.2	Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).

TECH.9.4.2.CT.2	Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
TECH.9.4.2.TL.2	Create a document using a word processing application.
TECH.9.4.2.TL.3	Enter information into a spreadsheet and sort the information.
TECH.9.4.2.IML.2	Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).
	Collaboration can simplify the work an individual has to do and sometimes produce a better product.

Inter-Disciplinary Connections

LA.RL.11-12.4	Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including words with multiple meanings or language that is particularly fresh, engaging, or beautiful. (e.g., Shakespeare as well as other authors.)
LA.RH.9-10.7	Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text, to analyze information presented via different mediums.
LA.RST.9-10.1	Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.
LA.W.9-10.2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
LA.W.9-10.2.A	Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
LA.WHST.9-10.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
LA.W.9-10.6	Use technology, including the Internet, to produce, share, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
9-12.HS-ETS1-4.5	Using Mathematics and Computational Thinking
9-12.HS-PS1-7.5	Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK

- Students will work as a team and explain their work
- #1- Blooms Knowledge - Remember previously learned information
- #2 - Blooms Comprehension - Demonstrate an understanding of facts
- #3 - Blooms Application - Apply Knowledge to actual situations
- #4 - Blooms Analysis - Break down objects or ideas into simpler parts and find evidence to support generalizations
- #5 - Blooms Synthesis - Compile component ideas into a new whole or propose alternative solutions

- #6 - Blooms Evaluation - Make and defend judgments based on internal evidence or external criteria
- Introduction, notes, and examples on solving equations with absolute value
- Introduction, notes, and examples on solving equations with variables on both sides of the equal sign
- Introduction, notes, and examples on solving literal equations
- Introduction, notes, and examples on solving multistep equations
- Introduction, notes, and examples on solving word problems by solving equations
- review homework if needed - answers posted on Google Classroom
- review warm up
- students will work individually
- tutoring during Delsea One

Modifications

ELL Modifications

- Acquire the help from the Foreign Language Department if possible
- Assess ELL students continuously using formative assessment methods
- Be flexible with time frames and deadlines
- During Delsea One - one on one with a student who speaks the same language
- Intentional scheduling/grouping with student/teacher who speaks the same language if possible
- Offer resources for specific topics in primary language (Youtube web resources)
- Repeat, reword, clarify
- tutoring during Delsea One
- Use google translator, especially for application problems
- Using technology, such as but not limited to: graphing calculator and desmos

IEP & 504 Modifications

- If not in a co-teaching setting allowing time in the schedule for a special education teacher to consult with general education teachers on what specifically can be modified or how to paraphrase things in a different way specific to that lesson
- Allow re-takes only after a tutoring session
- Allowing co-teaching with general education and special education teacher in the same classroom for possible small group instruction

- Assessments will allow for calculator use and/or other math tools
- Give assessments on mathxl that are from the interactive algebra 1; however, the homework/classwork on mathxl will be from algebra 1 to expose them to the material
- Give some worksheets on solving one step and two step equations to get stronger
- Higher level reasoning questions would have less weight than other questions or provide as extra credit questions to provide exposure to these questions but not something that will be a determinant to the student's ability to share knowledge of content
- Less questions overall or possibly break the test into two parts
- Non-verbal redirection of behaviors
- Providing study guides that don't lead too much extraneous information
- Scaffolded notes
- Show solving an equation that includes fractions an alternative way to solve instead of reciprocating the fraction
- Speaking to students privately when redirecting behaviors
- tutoring during Delsea One
- Upload several youtubes on the concepts that are in this specific unit
- Use a colored highlighter to highlight the variable that needs to be isolated

G&T Modifications

- Allow to go ahead on concepts on mathxl
- Ask students' higher level questions that require students to look into causes, experiences, and facts to draw a conclusion or make connections to other areas of learning
- Employ differentiated curriculum to keep interest high
- Encourage students to make transformations- use a common task or item in a different way
- Flip the lessons to push further ahead
- Flip the lessons using videos of more in depth work
- Include more problems involving chemistry formulas provided from chemistry teacher
- Provide additional rigorous challenge problems for advanced students
- Provide more rigorous problems; either off the NJ State website or from the Pearson Algebra 2 textbook (available on mathxl)
- tutoring during Delsea One
- Videos that offer extra practice and examples in all areas are posted on google classroom and taken from: mathispower4u

At Risk Modifications

- Refer students to Organizational Management
- Require Delsea One tutoring
- Stay in contact with parents/guardians and guidance counselors on student progress
- tutoring during Delsea One

Formative Assessment

- Connecting previous lessons
- Connecting vocabulary with root words
- Discussion including vocab review/recall
- Evaluate your understanding of the lesson
- Guided Review
- Homework/classwork
- Mathxlforschool
- NJSLA Math type of question
- Pass out of class
- SAT question of the day
- Skill needed to do lesson
- Teacher observation
- Think-pair-share
- Turn to your partner and discuss
- Use What You Know - type of question
- Video Clip
- Warm up review
- White Boards

Alternate Assessments

- Presentations
- Problem-based assignments
- Project-based assignments

Benchmark Assessments

- Skills Based assessment- math practice

Summative Assessment

- Benchmark Assessment
- Marking Period Assessment
- Quiz on Solving Equations
- Quiz on Solving Literal Equations
- Unit test on Solving Equations

Resources & Materials

- Color pencils/highlighters
- Google Slides
- Mathispower4u video clip to introduce or demonstrate concepts
- Pearson 2015 Algebra 1 Textbook
- Teacher Generated Worksheets
- White board paddles

Technology

- Chromebooks
- Desmos
- Edpuzzle
- Equatio
- Google Classroom
- Google Forms
- Graphing Calculator
- Mathway
- Mathxlforschool
- PearDeck
- Remind
- Video Clips

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.