

# Unit 1: Linear Equations

Content Area: **Math**  
Course(s): **Algebra 1**  
Time Period: **SeptOct**  
Length: **8-9 weeks**  
Status: **Published**

## **Title Section**

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## **Department of Curriculum and Instruction**



**Belleville Public Schools**

Curriculum Guide

# Algebra 1 A

## Unit 1: Linear Equations

**Belleville Board of Education**

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**Belleville, NJ 07109**

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## Unit Overview

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Unit 1 : Solving linear equations, equations involving absolute value and problems involving percent.

From this unit students should expect to learn how to solve one and multi-step equations, write mathematical sentences into equations and vice versa, solve absolute value equations, compare ratios, solve proportions, find percent of change and solve problems involving percent.

## NJSLS

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MA.9-12.A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
MA.9-12.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.9-12.A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems.
MA.9-12.A-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
MA.9-12.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.

## Exit Skills

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By the end of Unit 1 Students Should be able to:

- Translate sentences into equations and equations into sentences
- Solve equations involving more than one operation
- Solve equations involving consecutive integers

- Solve equations with the variable on each side
- Solve equations involving grouping symbols
- Justify each step in solving equations using properties
- Evaluate absolute value expressions
- Solve absolute value equations
- Analyze and explain the process of solving an equation and justify the process used in solving a system of equations.
- Develop fluency in writing, interpreting, and translating among various forms of linear equations and use them to solve problems.
- Master the solution of linear equations and apply related solution techniques.
- Compare ratios
- Solve proportions
- Solve problems involving percent
- Find percent of change
- Use formulas to solve real-world problems

## **Enduring Understanding**

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Students will be able to use their learning to:

- Interpret and represent expressions and equations to model real-world situation.
- Use the structure of an expression to help simplify and regroup terms to find solutions to problems. This will help to interpret more complex expressions, as well as equations and inequalities.
- Communicate about ideas in Algebra in a standard and understandable manner.
- Relate the topics learned in Algebra to things that they do in their everyday lives.
- Become proficient in daily skills involving mathematics.

## **Essential Questions**

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- How do you interpret and evaluate algebraic expressions that model real-world situation?
- What kinds of relationships can proportions represent?
- Can equations that appear to be different be equivalent?
- How can you rewrite algebraic expressions?
- How can you solve equations?
- How do you write algebraic expression to model quantities?
- How do you represent relationship algebraically?

## Learning Objectives

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Students will be able to:

- Represent relationships algebraically and evaluate them using properties .
- Interpret and evaluate real-world expressions by introducing a variable.
- Solve one-step equations in one variable using different operations.
- Solve multi-step equations and justify each step using properties.
- Solve equations with the variables on both sides using like terms and the distributive property.
- Identify equations that are identities or have no solution.
- Rewrite and use literal equations and formulas by solving them for the specific variable.
- Convert units and rates into different ones and understand the difference between them.
- Apply proportions to solve the real-world situations by applying the cross product method .
- To solve percent problems and find percent change by using proportions and equations.
- Model real-world situations using expressions and equations.
- Investigate and extend classroom activities into self research and long term projects.

## Interdisciplinary Connections

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Economics, business, financing, geometry, literacy, science.

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.F.1	Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

## Alignment to 21st Century Skills & Technology

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### Key SUBJECTS AND 21st CENTURY THEMES

Mastery of key subjects and 21st century themes is essential for all students in the 21st century.

Key subjects include:

- English, reading or language arts
- World languages

- Arts
- Mathematics
- Economics
- Science
- Geography
- History
- Government and Civics

## **21st Century/Interdisciplinary Themes**

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- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness

## **21st Century Skills**

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- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

## **Suggested Activities and Best Practices**

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Textbook, eAssessment, supplemental materials:

<https://my.mheducation.com/login>

AI Assessment and Learning System:

<https://www.aleks.com/>

Mindset:

<https://www.youtube.com/watch?v=3icoSeGqQtY>

<http://www.youcubed.org/wp-content/uploads/Positive-Classroom-Norms2.pdf>

Teaching Strategies for Improving Algebra Knowledge in Middle and High School Students:

<https://ies.ed.gov/ncee/wwc/PracticeGuide/20>

Algebra Tools - Functions:

<https://www.state.nj.us/education/aps/cccs/math/NJISTFunctions.pdf>

Algebra Tools - Algebra:

<https://www.state.nj.us/education/aps/cccs/math/NJISTAlgebra.pdf>

Misc Mathematics materials:

<http://www.mathnstuff.com/>

Coaching Corner:

<https://sites.google.com/belleville.k12.nj.us/thecoachingcorner/home>

Solve Equation:

<https://www.youtube.com/watch?v=WHeK1eNy1YQ>

Solving Eq with Variables on both sides

<https://www.youtube.com/watch?v=-NgHrnVgeWY>

Algebra Tic-Tac-Toe

<https://www.education.com/activity/article/tic-tac-equations/>

Activites for Solving Equations:

<https://lzlomek.wordpress.com/2012/10/10/activities-for-solving-equations/>

Find errors in steps when solving an equation:

<https://docs.google.com/document/d/1RNYbDKFKdR8LKYqKmqZkBrx8zgX571Uxdd7YCeXeIx0/edit>

Introduction to Linear Equations:

<https://betterlesson.com/lesson/487890/introduction-to-linear-equations-and-inequalities-in-one-variable>

Solving Equations with a variable on both sides:

<https://whenmathhappens.com/2013/11/12/bothsides1-50min/>

Equations, Choice board:

[https://www.corwin.com/sites/default/files/upm-binaries/18260\\_Gregory\\_ActDiffClssrm\\_MSMath\\_Pages\\_30\\_31.pdf](https://www.corwin.com/sites/default/files/upm-binaries/18260_Gregory_ActDiffClssrm_MSMath_Pages_30_31.pdf)

Misc Problems:

<http://figurethis.nctm.org/challenges/c74/challenge.htm>

Algebra Kahoots:

<https://kahoot.com/explore/collections/math-kahoot-algebra/>

## **Technology Infusion**

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- Youtube
- Khan academy
- MS Excel
- Office 365
- MS Word
- PodCasts
- MS Powerpoint
- Wikipedia
- Skype
- Twitter
- Ted Talks
- QR Barcode Generator
- Calculator/Graphing calculator
- Google Classroom
- McGraw-Hill Education
- Desmos.com
- Geogebra.org

## **Differentiation**

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- Cooperative groups
- Board work
- Team work
- Classroom discussions
- Questions and Answers
- Study guide
- Tests/quizzes reviews
- Notes taking/transparencies
- Organizer
- Calculator/graphing calculator
- Posters display
- Extra time

## **Special Education**

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- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan
- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multiple test sessions
- multi-sensory presentation
- preferential seating



- preview of content, concepts, and vocabulary
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

## **ELL**

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- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarify
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features

## **Intervention Strategies**

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- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives

- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

## **Evidence of Student Learning-CFU's**

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Please list ways educators may effectively check for understanding in this section.

- Admit Tickets
- Anticipation Guide
- Common benchmarks
- Compare & Contrast
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Illustration
- KWL Chart
- Outline
- Quizzes
- Self- assessments
- Study Guide
- Teacher Observation Checklist
- Top 10 List
- Unit tests

## **Primary Resources**

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Glencoe McGraw-Hill Algebra1 2014

Glencoe McGraw-Hill Algebra1 2010

Practice Glencoe Algebra1

Study Guide Glencoe Algebra1

## **Ancillary Resources**

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Houghton Mifflin Harcourt On core Mathematics Algebra I

Glencoe McGraw-Hill Science and Mathematics Lab Manual

## **Sample Lesson**

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One Lesson per Curriculum must be in this lesson plan template. I.e. one lesson in one unit

Unit Name: Linear Equations

NJSLS:

A.REI.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.

A.REI.3 Solve linear equations in one variable, including equations with coefficients represented by letters.

Differentiation/Modifications: Cooperative groups, Study Guide, Teacher's notes, Calculator.

Interdisciplinary Connection: Number Theory, Writing, Financing.

Statement of Objective: After reviewing the Do now and HW students will analyze and translate real-world examples into mathematical equations and solve them by combining like terms and using the distributive property.

Anticipatory Set/Do Now: Do now: Simplify 3 examples using like terms and the distributive property.

Learning Activity: The students will work in small groups analyzing the given assignment to create equations, solve them and discuss the answer and solutions with other groups.

Student Assessment/CFU's: Questions and Answers, Oral Response, Board work, Observation, Self-Assessment

Materials: Notebook, Textbook, Study Guide, Teacher's worksheet.

21st Century Themes and Skills: Global Awareness, Financial, Economic, Business and Entrepreneurial Literacy.

Integration of Technology: MS Powerpoint, Calculator.

