

Unit Goals – Stage 1

Number of Days:

MS 29 days 9/5/17 – 10/13/17

HS 29 days 9/5/17 – 10/13/17

Unit Description: In this unit, students analyze and explain precisely the process of solving an equation. Students, through reasoning, develop fluency writing, interpreting, and translating between various forms of linear equations and inequalities, including literal and absolute-value equations.

Materials: [algebra tiles](#), [protractor](#)

<p>Standards for Mathematical Practice</p> <p>SMP 1 Make sense of problems and persevere in solving them.</p> <p>SMP 2 Reason abstractly and quantitatively.</p> <p>SMP 3 Construct viable arguments and critique the reasoning of others.</p> <p>SMP 4 Model with mathematics.</p> <p>SMP 5 Use appropriate tools strategically.</p> <p>SMP 6 Attend to precision.</p> <p>SMP 7 Look for and make use of structure.</p> <p>SMP 8 Look for and express regularity in repeated reasoning.</p> <p>Standards for Mathematical Content Clusters Addressed</p> <p>[m] A-CED.A Create equations that describe numbers or relationships.</p> <p>[m] A-REI.A Understand solving equations as a process of reasoning and explain the reasoning.</p> <p>[m] A-REI.B Solve equations and inequalities in one variable.</p>	Transfer Goals	
	<p>Students will be able to independently use their learning to...</p> <ul style="list-style-type: none"> • Make sense of never-before-seen problems and persevere in solving them. • Construct viable arguments and critique the reasoning of others. 	
	Making Meaning	
	<p>UNDERSTANDINGS</p> <p>Students will understand that...</p> <ul style="list-style-type: none"> • Linear equations and inequalities in one variable can be used to represent real-world situations. • Solving equations is a process of reasoning in which each step can be justified using the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. • The process for solving equations with numeric coefficients can be applied to solving equations with letter coefficients. • The solution to a linear equation in one variable and a linear inequality in one variable is the value(s) that, when substituted into the equation/inequality for the variable, results in a true number statement. 	<p>ESSENTIAL QUESTIONS</p> <p>Students will keep considering...</p> <ul style="list-style-type: none"> • How can equations and inequalities be used to model, analyze, and solve real-world and mathematical problems? • How can you justify a solution path when solving equations and inequalities? • How is solving linear equations in one variable with numeric coefficients and solving linear equations in one variable with letter coefficients similar? • How do you solve absolute value equations and inequalities?
Acquisition		
<p>KNOWLEDGE</p> <p>Students will know...</p> <ul style="list-style-type: none"> • The definition of academic vocabulary words, such as <i>extraneous solution</i> and <i>literal equations</i>. • You can add, subtract, multiply, or divide both sides of an equation by the same nonzero number and the two sides will remain equal. • The solutions to equations and inequalities can be represented on a number line. 	<p>SKILLS</p> <p>Students will be skilled at and/or be able to...</p> <ul style="list-style-type: none"> • Explain solution steps for solving linear equations in one variable. • Create and solve linear equations and inequalities in one variable to represent a situation. • Solve linear equations in one variable with letter coefficients (literal equations). • Rearrange formulas to highlight a quantity of interest. • Solve absolute value equations and inequalities. • Graph the solution(s) to absolute value equations and inequalities and interpret them in context. 	

Assessed Grade Level Standards

Standards for Mathematical Practice

- SMP 1 Make sense of problems and persevere in solving them.
 SMP 2 Reason abstractly and quantitatively.
 SMP 3 Construct viable arguments and critique the reasoning of others.
 SMP 4 Model with mathematics.
 SMP 5 Use appropriate tools strategically.
 SMP 6 Attend to precision.
 SMP 7 Look for and make use of structure.
 SMP 8 Look for and express regularity in repeated reasoning.

Standards for Mathematical Content

- [m]** **A-CED.A Create equations that describe numbers or relationships.** [Linear, quadratic, and exponential]
 A.CED.1 Create equations and inequalities in one variable **including ones with absolute value** and use them to solve problems. ~~Include equations arising from linear and quadratic functions, and simple rational and exponential functions.~~ **CA***
 A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law $V = IR$ to highlight resistance R .*
[m] **A-REI.A Understand solving equations as a process of reasoning and explain the reasoning.** [Master linear; learn as a general principle.]
 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.
[m] **A-REI.B Solve equations and inequalities in one variable.** [Linear inequalities; literal equations that are linear in the variables being solved for; quadratics with real solutions.]
 A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
A.REI.3.1 Solve one variable equations and inequalities involving absolute value, graphing the solutions and interpreting them in a context. CA

Key:

[m] = major clusters; **[s]** = supporting clusters, **[a]** = additional clusters

* Indicates a modeling standard linking mathematics to everyday life, work, and decision-making

CA Indicates a California-only standard

Evidence of Learning – Stage 2

Assessment Evidence

Unit Assessment

Claim 1: Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.

Concepts and skills that may be assessed in Claim 1:

A-CED.A

- The student creates equations and inequalities in one variable, including ones with absolute value, and uses them to solve problems.
- The student rearranges formulas to highlight a quantity of interest.

A-REI.A

- The student constructs a viable argument to justify a solution method when solving linear equations in one variable.
- The student clearly and precisely constructs viable arguments to support their own reasoning and critique the reasoning of others.

A-REI.B

- The student solves linear equations and inequalities in one variable with numeric coefficients.
- The student solves linear equations in one variable with letter coefficients (literal equations).
- The student solves one variable equations and inequalities involving absolute value, graphs the solutions, and interprets them in a context.

Claim 2: Students can solve a range of well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies. Standard clusters that may be assessed in Claim 2:

- **A-CED.A**
- **A-REI.B**

Claim 3: The student can clearly and precisely construct viable arguments to support their own reasoning and critique the reasoning of others. Standard clusters that may be assessed in Claim 3:

- **A-REI.A**

Claim 4: The student can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

Standard clusters that may be assessed in Claim 4:

- **A-CED.A**
- **A-REI.A**
- **A-REI.B**

Other Evidence

Formative Assessment Opportunities

- Informal teacher observations
- Checking for understanding using active participation strategies
- Exit slips/summaries
- Tasks
- Modeling Lessons (SMP 4)
- Formative Assessment Lessons (FAL)
- Quizzes / Chapter Tests
- SBAC Interim Assessment Blocks

Access [Using Formative Assessment for Differentiation](#) for suggestions. Located on the LBUSD website – “M” Mathematics – Curriculum Documents

Learning Plan – Stage 3				
Suggested Sequence of Key Learning Events and Instruction				
Days	Learning Target	Expectations	Big Ideas Math Algebra 1 (Explorations and Lessons)	Supplemental Resources
1 day	I will explore solving equations by participating in the Opening Task.	<p>OPENING TASK – Mystery Letters</p> <p>This Opening Task can be done as a Solo-Team-Teach activity. First have students work independently, and then have students share their reasoning about the task with their team. After working together, facilitate a class discussion about the task utilizing Talk Moves. This task provides you with information about what the students know about solving equations from previous grades and is a gateway into the entire unit on equations and inequalities.</p>		<p>Conceptual Understanding:</p> <ul style="list-style-type: none"> Mystery Letters
4-5 days	I will review equations by...	<ul style="list-style-type: none"> Solving simple equations, multi-step equations, and equations with variables on both sides of the equal sign. Creating equations to describe numbers or relationships in a context. (SMP 2) Constructing a viable argument to justify my solution method. (SMP 3) Answering questions such as... <ul style="list-style-type: none"> How do you solve simple and multi-step equations? How do you solve equations with variables on both sides of the equal side? Synergy Item Bank: Item ID 50537, 50645 	<ul style="list-style-type: none"> Section 1.1 Section 1.2 Section 1.3 	<p>Conceptual Understanding:</p> <ul style="list-style-type: none"> Create an Equation Given a Solution Set Task <p>Procedural Skills and Fluency:</p> <ul style="list-style-type: none"> Equations with Variables on Both Sides Solo-Team-Teach Multi-Step Equations Carousel Solving Multi-Step Linear Equations Tic-Tac-Toe Khan Academy: Solving equations with one unknown

Learning Plan – Stage 3				
Suggested Sequence of Key Learning Events and Instruction				
Days	Learning Target	Expectations	Big Ideas Math Algebra 1 (Explorations and Lessons)	Supplemental Resources
6-7 days	I will solve linear equations in one variable by...	<ul style="list-style-type: none"> • Creating and solving absolute value equations. • Graphing and interpreting the solutions of absolute value equations in the context of the situation. (SMP 2) • Solving literal equations, including formulas to highlight a quantity of interest. (SMP 7, SMP 8) • Constructing a viable argument to justify my solution method. (SMP 3) • Answering questions such as... <ul style="list-style-type: none"> ○ How do you solve an absolute value equation? ○ Compare and contrast solving equations with numeric coefficients to equations with variable coefficients. ○ Synergy Item Bank: Item ID 54482, 54974, 57317, 69159, 64305, 76195, 76657, 76663 	<ul style="list-style-type: none"> • Section 1.4 • Section 1.5 • STEM Video: Dead Reckoning 	<p>Conceptual Understanding:</p> <ul style="list-style-type: none"> • Absolute Value Equations Scenarios • Absolute Value Equations Task <p>Procedural Skills and Fluency:</p> <ul style="list-style-type: none"> • Equations and Formulas Task • Literal Equations Tic-Tac-Toe • Khan Academy: Solving absolute value equations <p>Application:</p> <ul style="list-style-type: none"> • Building Financial Literacy: Dinner at Pepe's • Fantasy Football Task • Pen Pal Task • STEM Video Performance Task: Dead Reckoning
2-3 days	I will check my understanding of solving equations by participating in the FAL.	<p>FORMATIVE ASSESSMENT LESSON</p> <ul style="list-style-type: none"> • Building and Solving Complex Equations (SMP 1, 5, 6, 7, 8) 		

Learning Plan – Stage 3				
Suggested Sequence of Key Learning Events and Instruction				
Days	Learning Target	Expectations	Big Ideas Math Algebra 1 (Explorations and Lessons)	Supplemental Resources
11-12 days	I will solve linear inequalities in one variable by...	<ul style="list-style-type: none"> Reviewing writing and graphing inequalities and solving simple inequalities. Creating inequalities in one variable to describe numbers or relationships in a context. (SMP 2) Solving multi-step inequalities. Graphing the solution set on a number line. Interpreting a solution set in the context of the situation. (SMP 2) Solving compound and absolute value inequalities. Answering questions such as... <ul style="list-style-type: none"> How do you solve an inequality in one variable? Compare and contrast solving equations to solving inequalities. What does the solution set represent in the context of the situation? How do you solve absolute value inequalities? Synergy Item Bank: Item ID 24348, 64307 	<ul style="list-style-type: none"> Section 2.1 Section 2.2 Section 2.3 Section 2.4 Section 2.5 Section 2.6 STEM Video: Planning Electrical Circuits 	<p>Conceptual Understanding:</p> <ul style="list-style-type: none"> Solving Inequalities Using a Number Line Create an Inequality Given a Solution Set Task Reasoning with Linear Inequalities Task Desmos: Compound Inequalities on the Number Line Desmos: Absolute Value Inequalities on the Number Line Investigating Absolute Value Inequalities <p>Procedural Skills and Fluency:</p> <ul style="list-style-type: none"> Multi-Step Inequalities Partner Coach Direct Hit Game Number Lines of Inequalities Task Khan Academy: Multi-step inequalities Khan Academy: Compound inequalities Khan Academy: Solving absolute value inequalities <p>Application:</p> <ul style="list-style-type: none"> Solving Compound Inequalities: Amusement Park Adventures STEM Video Performance Task: Designing for Electricity

Learning Plan – Stage 3				
<i>Suggested Sequence of Key Learning Events and Instruction</i>				
Days	Learning Target	Expectations	Big Ideas Math Algebra 1 (Explorations and Lessons)	Supplemental Resources
1-2 days	I will prepare for the unit assessment on solving equations and inequalities by...	<ul style="list-style-type: none"> Incorporating the Standards for Mathematical Practice (SMPs) along with the content standards to review the unit. 	<ul style="list-style-type: none"> Ch. 1 Review (p. 44 – 46) Ch. 2 Review (p. 94 – 96) 	
1 day	Unit Assessment Students will take the Synergy Online Unit Assessment. Unit Assessment Resources (Word or PDF) can be used throughout the unit.			