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| **Date:** | | | **Duration of Lesson**: 30-45 minutes, 2-3 math blocks | |
| **Title of Unit**: Expressions and Equations | | | **Title of Lesson**: Solving One-Step Equations | |
| **Lesson Objectives:** Students will develop problem solving strategies, using their knowledge of operations, to solve equations by relating them to a diagram and/or model. | | | | |
| **Groupings (e.g., whole class, small groups, co-teaching**): whole-class /independent work | | | | |
| Skills & Standards:CCLS - Math: 6.EE.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.CCLS - Math: 6.EE.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. | | | | |
| **Progression of Learning & Teaching** | | | | |
| Opener: | True or False Numerical Sentences (8 minutes)  Students substitute numbers for the variable in equations to determine if the sentence is true or false. Students understand that the solution of an equation is the value or values of the variable that make the equation true.  Are these true or false:   1. 4*g* = 32, substitute 8 for *g.* 2. 3*g* > 30, *substitute* 8 for *g.* 3. > 2, substitute 8 for *g.* 4. < 38 – *g*, substitute 8 for *g*. 5. = *g* + 42, substitute 8 for *g.* | | | **Points to Remember** |
| Activities & Tasks: | 1) Opening Exercise & also quick review of old terminology: expression, variable, equation.  2) Introduce One-Step Algebraic Equations and model them with students using algebra tiles. Give an example: Use the algebra tiles to show the students how to use inverse operations to isolate the variable by manipulating the equation. Guided practice with Algebra Tiles.  Example equations: ; ;;  3) (Individual practice) Students will use the graphic organizer to relate the algebra tiles with the written steps of solving a one-step equation.  Example equations: ; ; ;  Introduce in stages: Addition / Subtraction / multiplication/ then division  4) Kahoot Review Game Practice-  5) Exit Slip: Solving one-step equations with addition, subtraction, multiplication, and division.  Using the Addition and Subtraction Properties of Equality · Using the Multiplication and Division Properties of Equality · · Writing Equations to Solve Word Problems | | | Resources:  -Algebra Tiles- give each student a set/ or use [virtual tiles](https://www.bigideasmath.com/protected/content/dcs_cc_v2/tools/algebra_tiles_7_2_4/algebra_tiles_7_2_4.html)  -Math Antics YouTube video: One Step Equations Part 1  -Graphic Organizer  <https://www.youtube.com/watch?v=l3XzepN03KQ>  Video: [One-step division equations](https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-one-step-mult-div-equations/v/simple-equations)  [Activities for Solving Equations](https://lzlomek.wordpress.com/2012/10/10/activities-for-solving-equations/)  [Solving Equations with Inverse Operations](https://www.whatcom.edu/home/showpublisheddocument/3861/635859599206000000)  [Open Middle: One Step Equations](https://www.openmiddle.com/solving-one-step-equations/)  Symbolism/Notation:  +, -, x, ÷, <, >, ≤, ≥  Key Vocabulary:   * Algebra tiles - Algebra tiles are square and rectangle-shaped tiles that represent numbers and variables. * Numerical expression - a mathematical statement involving only numbers and one or more operation symbols. * Equation - statement of equality between two expressions consisting of variables and/or numbers. * Operation - a mathematical action. * Inverse operations - two operations that will be performed on a number, or variable, that always results in the original number or variable. * Solution - A value or values which, when substituted for a variable in an equation, make the equation true. * Multiplication property of equality - if we start with two equal quantities and multiply both by the same number, the results are equal. * Division property of equality - when we divide both sides of an equation by the same non-zero number, the two sides remain equal. * Addition property of equality - If two expressions are equal to each other, and you add the same value to both sides of the equation, the equation will remain equal. * Subtraction property of equality - if we subtract from one side of an equation, we must also subtract from the other side of the equation to keep the equation the same. * Reciprocal - the inverse of a value or a number. * Inequality - a statement of an order relationship—greater than, greater than or equal to, less than, or less than or equal to—between two numbers or algebraic expressions. * Algebraic Expression – a symbol or a combination of symbols used in algebra, containing one or more numbers, variables, and arithmetic operations * Term – a single mathematical expression * Coefficient – a numerical or constant quantity placed before and multiplying the variable in an algebraic expression * Variable – a symbol (usually a letter) standing in for an unknown numerical value in an expression and equation * Exponent – a symbol written above and to the right of a mathematical expression to indicate the operation of raising to a power * Like terms – Terms whose variables (such as x or y) with any exponents (such as the 2 in )are the same * Unlike terms - Algebraic terms, which does not have the same literal coefficients, and cannot be raised to the same power * Constant- a value or number that never changes in expression * Decimal - one of the types of numbers, which has a whole number and the fractional part separated by a decimal point. * Integer - a number with no decimal or fractional part, from the set of negative and positive numbers, including zero.   Scaffolding/Differentiation:  The teacher will walk around the room use the [NITE framework](https://aclanthology.org/D17-1280/) to observe how students interact/engage with the material and provide adequate monitoring and scaffolding for students while they create and talk about the model with the algebra tiles and write their equations on the graphic organizer. Some students may have their individual practice shortened. |
| Level of Cognitive Complexity: | Creating  Evaluating  Analyzing | Applying  Understanding  Remembering | |
| Key questions: | What strategies can we use to determine the value of the variable? | | |
| Closure: | The students will demonstrate and discuss how to set up equations using algebra tiles. We will review the inverse operations of solving different types of equations. | | |
| Next Steps: | In the next lesson (continuation of the current lesson) we will solve one step equations involving fractions, decimals, and negative numbers.  Future lessons will also transition into creating one-step equations from a word problem and solving them.  Students will work towards relating between equations and graphing data. | | | **Formative Assessment/ Criteria for Success:**  Exit Tickets (4 problems).  (Students will be allowed to use their algebra tiles while they work on their exit ticket.)  Informal assessment: Students will be given a Kahoot review game to test their skills. |