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| **GRADE: 7th** | |
| **Unit Title: Equations**  **Lesson Title:** Solving One-Step Equations using Addition or Subtraction  **Estimated Duration:** 1 Day | **Real-World Purpose:** Student will use computational methods to find a numerical solution. Equations are also used in the medical field for medications, for different businesses (profit = selling price – cost), and for aircraft (calculate how to load the plane correctly with people and baggage). |
| ***I Can: -*** apply order of operations and inverse operations to solve equations.  **Standard(s):\_\_\_7.EE.4\_\_\_\_\_**  **-** constructan argument to justify my solution process. | |
| **Performance Objective: (Evidence of Learning)**  Students will solve equations by adding or subtracting by completing an exit ticket with a 70% accuracy.  Students will be able to use equations to find missing information by completing an exit ticket with a 70% accuracy. | |
| **Prerequisite Skills:**   * An equation is a sentence stating that two quantities are equal. * The solution of an equation is the value of a variable that makes the equation true. * The coefficient is the numerical factor of a term that contains a variable. * Addition property of equality. * Subtraction property of equality. * How to define a variable and use appropriate units. | |
| **Materials/Resources:**         * Pencils/paper for notes * “One Step Equations” worksheet for each student   (Guided/Independent Practice Problems)  -Student will work in small group to complete guided practice problems and will work individually to complete independent practice.  [One-Step Equations Worksheet- Handout.docx 2.docx](E:\\CCRS-M\\One-Step  Equations Worksheet- Handout.docx 2.docx)   * Whiteboard * Chrome Books * Exit Ticket: Student will complete exit ticket and turn in before they leave (handout). | **Key Vocabulary:**   * One-step equations * Addition property of equality * Subtraction property of equality * Equations * Inverse Operation * Isolate * Constant |
| **Elements of Rigor:**   * Conceptual understanding of key concepts * Procedural skill and fluency * Rigorous application of mathematics in real-world contexts | |
| **Lesson Introduction** | |
| **How will you introduce the lesson?**  I will begin with the essential question: What is an equation?  What does it mean to balance an equation?  **Student Exploration Activity**  Students will view the video Equations with Variables on BrainPOP.  <https://www.brainpop.com/>  Class discussion after video:   * What are those letters inside of algebra equations? * How do you isolate the variable on one side of the equals sign? * Why do we substitute numbers you don’t know for letters? | |
| **Lesson Activities** | |
| 1. Introduce the lesson on One-Step Equations with one of the essential questions. 2. Explain to students that we are about to solve one-step equations using addition and subtraction. 3. I will explain that equations are just like a scale.  Both sides of a scale need to be equal to balance, and both sides of an equation need to be equal to balance. 4. I will write the first example on the board and explain the steps of the procedure used to solve the equation:    1. I will write on the board: x + 5 = 10    2. “First, we want to have the variable all by itself.  To do this, we need to reverse what was done to x in the equation.  Because the problem adds 5 to x, I will subtract 5.  Remember that we need to keep the equation balanced.  What I do on one side of equation, I must do on the other side.  So, I have +5 –5 which = 0, and I have 10 – 5= 5.  The answer to my problem is x = 5.”   On board:x  + 5 = 10                                                                         -5     -5                                                                     x        =  5  -   “To check your answer, substitute it back into the original equation.  For this problem, we would replace the x with 5.”  -   On board: x  + 5 = 10  5 + 5 = 10  -   “Because this is correct, we know that our answer is correct.”   1. I will model a second example with the variable and the constant in the reverse order, explaining that the procedure is the same:  * “To get the variable by itself, we need to subtract 14 from both sides.”   -   Write on the board:    14 + x = 18                    - 14        - 14                              x  = 4  Students will be required to write explanations of the steps they used to solve problems.  I will model this by writing on the board:  -   Because 14 was added to x on the left side of the equation, I subtracted 14 on the left side.  To keep the equation in balance, I also subtracted 14 from 18 on the right side.  This gave me a value of 4 for x.   1. I will now write the third example on the board:    1. I will write on the board: x − 8 = 30    2. “Remember”, we want to have the variable all by itself.  To do this, we need to reverse what was done to x in the equation.  Because the problem subtracts 8 from x, I will add 8.  Remember that we need to keep the equation balanced.  What I do on one side of the equation, I must do on the other side.  So, I have −8 +8 which = 0, and I have 30 + 8= 38.  The answer to my problem is x = 38.”     On board:x – 8 = 30                                                                        +8    + 8                                                                     x        =  38  -   “To check your answer, substitute it back into the original equation.  For this problem, we would replace the x with 38.”  -   On board: x – 8 = 30  38 − 8 = 30  -   “Because this is correct, we know that our answer is correct.”   1. I will model a fourth example, explaining that the procedure is the same:  * “To get the variable by itself, we need to add 9 to both sides.”   -   Write on the board:  x − 9 = 11                     + 9        +9                              x  =  20  -   “To check your answer, substitute it back into the original equation.  For this problem, we would replace the x with 20.”  -   On board: x − 9 = 11  20 − 9 = 11  -   “Because this is correct, we know that our answer is correct.”   1. Students will be required to write explanations of the steps they used to solve problems. 2. Guided Practice: Students work with partners 3. Independent Practice: Students will work independently and silently 4. Exit Ticket: Before students take the exit ticket, I will ask them to summarize how to solve one-step equations.  After a quick discussion, students will complete the exit ticket   **Exit Ticket:** The exit ticket is to be completed the last 5 minutes of class and turned in as students leave class. Students must complete exit ticket with a 70% accuracy.   1. Define in your own words what an equation is. 2. Solve:   x – 25 = 10  x 17 58   1. What is the inverse of +19?   What is the inverse of 7? | |
| **Lesson Closure** | |
| At the end of the lesson, I will ask the students several questions:   * Who can define an equation? * What are inverse operations? * How can you use inverse operations to solve equations? * Why did we use addition or subtraction to solve the equations? * Why do we need to do the same thing to both sides of an equation? * How do we check our answers? | **Essential Questions:**   * What is an equation? * How do equations help us in finding missing information? * What does it mean to balance an equation? * How can we use inverse operations to solve one-step equations? * In what ways can the problem be solved and why should one method be chosen over another? |
| **Standards for Mathematical Practice** (select all that apply) | |
| * Make sense of problems and persevere in solving them. * Model with mathematics. * Attend to precision. | |
| **Supplemental Activities** | |
| **Intervention**  **ACTIVITY:**  **The students who do not master solving one-step equation and need more practice or help will practice by completing level problems on [www.thatquiz.com](http://www.thatquiz.com). Once students have complete the assignment in [www.thatquiz.com](http://www.thatquiz.com), they will go to the next lesson on [www.nearpod.com](http://www.nearpod.com). If time permits, students will end the practice session with** [www.mathgoodies.com](http://www.mathgoodies.com)**. The students will also be able to continue practicing at home.**   * Go to **www.thatquiz.com** * Click on algebra (under integers) * Choose the length you want (10 is the minimum) * Choose the level you want. Level 1 is simple one-step equations * Check Solve (x) only * **[www.nearpod.com](http://www.nearpod.com)**   students will follow instruction on white board   * **[www.mathgoodies.com](http://www.mathgoodies.com)**   Students will follow instruction on white board   * Teacher will provide a checklist with step by step instruction on how to solve one-step equations. | **Enrichment**  **ACTIVITY:**  **The students who master solving one-step equation and are ready to move on, will practice by completing higher level problems on [www.thatquiz.com](http://www.thatquiz.com). Once students have complete the assignment in [www.thatquiz.com](http://www.thatquiz.com), they will go to the next lesson on [www.quia.com](http://www.quia.com). If time permits, students will end the practice session with <http://hcpssfamilymath.weebly.com/>. The students will also be able to continue practicing at home.**     * Go to**[www.thatquiz.org](http://www.thatquiz.org/)** * Click on algebra (under integers) * Choose the length you want (10 is the minimum) * Choose the level you want. Level 5 is simple one-step equations * Check Solve (x) only * **[www.IXL.com](http://www.IXL.com)**   Students will follow instruction on white board     * **<http://hcpssfamilymath.weebly.com/>**   Students will follow instruction on white board   * Students have to create 3 equations word problems and share with class. |
| **Performance Based Assessment Task** | |

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| **Math Task**  -Students will complete the performance task, Fencing.  -Student may solve the equation in various ways, possibly including solution of the simultaneous equations.  -Students will have to justify that they have the correct answer to the performance task.  -Students will have to complete performance task with a 75% accuracy.  -A rubric is provided to help grade the task.   * Fencing   [fencing\_task.pdf](E:\\fencing_task.pdf)   * Teacher will review the result of the performance task with students * Students will continue practicing solving one-step equations   [www.mapshell.org](http://www.mapshell.org) | **Rubric/ Plausible Student Response(s)**  Scoring Guide   * Fencing Rubric   [fencing\_rubrics.pdf Answer.pdf](E:\\fencing_rubrics.pdf Answer.pdf) |