|  |  |  |
| --- | --- | --- |
|  | Unit Planner: **UNIVARIATE** **EQ**./INEQ. & LITERAL **EQ**. Math 1  Tuesday, July 7, 2015, 8:55AM |  |

|  |  |
| --- | --- |
| District Wide > 2015-2016 > High School > Mathematics > Math 1 > Week 3 - Week 4 | Last Updated: Tuesday, June 23, 2015 by Mary Wible |

Sarrero, Joseph; Wible, Mary

|  |  |  |  |
| --- | --- | --- | --- |
| |  | | --- | | Big Idea / Conceptual Lens |   **SOLUTION** | |  | | --- | | Focus of Study |  * Multi-step equations & inequalities with one variable. * Multiple representations of equations & inequalities. * Equivalent representations for equations with many variables. |
| |  | | --- | | Standards and Clarifying Objectives |   Choose Standards   |  |  |  | | --- | --- | --- | | ComCore: Mathematics | | | | **ComCore: HS: Num/Quantity** | | | | Quantities | | | | **HSN-Q.A. Reason quantitatively and use units to solve problems.** | | | |  | HSN-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. |  | | **ComCore: HS: Algebra** | | | | Creating Equations | | | | **HSA-CED.A. Create equations that describe numbers or relationships.** | | | |  | HSA-CED.A.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. |  | |  | HSA-CED.A.3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.  Show details  HSA-CED.A.3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.  Hide details  For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. |  | |  | HSA-CED.A.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.  Show details  HSA-CED.A.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.  Hide details  For example, rearrange Ohm’s law V = IR to highlight resistance R. |  | | Reasoning with Equations & Inequalities | | | | **HSA-REI.A. Understand solving equations as a process of reasoning and explain the reasoning.** | | | |  | HSA-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. |  | | **HSA-REI.B. Solve equations and inequalities in one variable.** | | | |  | HSA-REI.B.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. |  | | |  | | --- | | Enduring Understandings |   [Bloom's Taxonomy](http://community.wvu.edu/~lsm018/Articulate%20Blooms%20Wheel/blooms_wheel.html)  **Students understand that...**   * Solutions make mathematical statements true. * Linear relationships have multiple representations. * Equations & inequalities model linear relationships between quantities. |
| |  | | --- | | Essential Concepts and Critical Content |   **Key Academic Vocabulary:**  equation, inequality, solution, unknown, viable, constraint, parameter  (Review: more than, less than, at most, at least, increased by, decreased by, sum, difference)  **Concepts:**  solution, model, constraint, equality  **Critical Content:**  Steps to solve equations & inequalities.  Evaluation of viability of solutions within situation constraints.  Interpretations of word problems & equations.  Creation of various representations - to include tables, graphs & word problems. | |  | | --- | | Processes, Strategies, and Skills |   **Connects with the following Mathematical Practices:**  **MP 1 Make sense of problems, & persevere.**  **MP 2 Reasoning abstractly & quantitatively.**  ***MP 3 Critiquing reasoning of others & justifying own work.***  **MP 4 Model with mathematics.**  **MP 5 Use tools of appropriately.**  **MP 6 Attend to precision.**  **MP 7 Seeing Structure.**  **MP 8 Seeing regularity in repeated reasoning & patterns.**  **Process#1: (connects to MP 1,2,4,6,7,8)**  Analyzing a prompt.  **Strategies:**  Identifying key words in context.  Recognizing format of information.  Creating a visual representation if none is given.  **Skills**:  Identify unknowns.  Create equations from word problems.  Evaluate expressions & solve equations.  **Process#2 (connects to MP 2, 3, 6)**  Explain reasoning and justify mathematical choices.  **Strategies:**  Identify what information is required.  Create a plan to present information verbally or visually in a logical fashion.  **Skills:**  Use content specific vocabulary.  Use transitional phrases.  Show work to reflect the use of mathematical properties & structure.  Compare result to constraints & conditions of problem. |
| |  | | --- | | Essential Questions |   **Factual**   * How do I solve linear equations & inequalities of one variable with multiple steps & fractional coefficients? * How do I represent the solutions of linear equations & inequalities? * How do I write equivalent forms of literal equations? * How can I model a linear relationship? * Is there more than one way to write a linear model for a situation? * How do I create linear equations & inequalities to model situations? * What is a constraint?   **Conceptual**   * What is a solution? * How many solutions could there be for a linear relationship? * When is a solution viable in context? * Why are variables sometimes used to represent coefficients? * What are the similarities & differences between equations and inequalities? * How are tables, graphs, and other representations of linear functions and arithmetic sequences related to each other? * What makes a piece of information in a situation "unknown"? * What is the importance of constraints in a linear relationship? * How does changing one condition in a relationship impact the linear models?   **Provocative**   * What conditions impact the type and number of possible solutions? * Why are some solutions mathematically correct yet not feasible in context? * When is one representation of a linear realtionship more appropriate than another? | |  | | --- | | Resources/Materials |   Resources:  #1 Number of solutions - MATHSHELL lesson plan, assessment & collaborative task complete with suggested questions to lead discussion.  #2 & 3 Equations - word problems wksts  #4 & 5 Equations & Inequalities - Candy Man Performance Task requiring students to work with multiple constraints. Includes lesson suggestions with launch video.  #6 Graphs of Ineq. - Review matching task  #7 Literal equations- Video demonstration for solving literal equations  #8 Literal equations - Website with formative assessment and lesson plan with questions & student work analysis tips.  \*Also see the ***Algebra Tiles lesson plan & Foldable template*** listed in the differentiation box below.  [linear equations - number of solutions.pdf](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49915&) [problem solving Consecutive Number Word Problems.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49912&) [Problem Solvin-equations perimeter.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49913&) [Math1-PA -Candy Man.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49904&) [Math 1 PA -Candy st hdout.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49905&) [AFS Inequality Graph Matching Cards.pdf](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49906&) <https://www.khanacademy.org/math/algebra/solving-linear-equations-and-inequalities/solving_for_variable/v/example-of-solving-for-a-variable> <http://www.cpalms.org/Public/PreviewResource/Preview/55564> |
| |  | | --- | | Formative, Interim, and Summative Assessments |   Add New Assessment   |  |  | | --- | --- | |  | Equation Dominoes  Formative: Performance: Skill Demonstration  Students solve 5 equations using multiple steps. Problems are presented as a "dominoe" set matching problems to answers.  [eq both dominoe1.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49907&SourceSiteID=3005&) [eq both dominoe key.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49908&SourceSiteID=3005&)  2 Standards Assessed  Hide Standards   * HSA-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. * HSA-REI.B.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. | |  | CHOICE BOARD - Solutions  Formative: Performance: Skill Demonstration  Students perform 5 questions of varying difficulty related to solving equations & the concept of solutions.Some questions require students to explain or create and some require computation.  [Eq All Choice Board.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49914&SourceSiteID=3005&)  3 Standards Assessed  Hide Standards   * HSA-CED.A.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. * HSA-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. * HSA-REI.B.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. | |  | Exit Ticket - Solutions of ineq & eq  Formative: Written: Quick Write  Students are prompted to compare & contrast solutions & representations of equations & inequalities with identical terms.  [EXIT TICKET-solutions of ineq.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49916&SourceSiteID=3005&)  1 Standard Assessed  Hide Standards   * HSA-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. | |  | Eq & Ineq Unit Test  Summative: Test: Post Test  12 Questions  Some multiple choice, some open ended  1 question requiring written explanation  [UNIT - eq test.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49878&SourceSiteID=3005&)  6 Standards Assessed  Hide Standards   * HSN-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. * HSA-CED.A.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. * HSA-CED.A.3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. * HSA-CED.A.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. * HSA-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. * HSA-REI.B.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. | |  | BAKERY DECISION  Summative: Performance: Authentic Task  Students must work with multiple constraints & variables to determine what combination of bakery items will allow for the most revenue.    OPTIONAL EXTENSION: phil. chair debating whether bake sales should have to meet food safety guidelines.        [math1 PA -bakery st hdout.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49875&SourceSiteID=3005&) [Math 1-bakery guide.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49876&SourceSiteID=3005&) [Math 1 PA -Bakery Rubric.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49877&SourceSiteID=3005&)  3 Standards Assessed  Hide Standards   * HSN-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. * HSA-CED.A.3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. * HSA-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. |   5 record(s) found. | |
| |  | | --- | | Integration Opportunities (Optional) |   Choose Standards   |  |  |  | | --- | --- | --- | | P21: 21st Century Student Outcomes | | | | **P21: K-12** | | | | Learning & Innovation Skills | | | | **Critical Thinking and Problem Solving Reason Effectively**  **Show details**  **Critical Thinking and Problem Solving Reason Effectively**  **Hide details**  **Learning and innovation skills increasingly are being recognized as those that separate students who are prepared for a more and more complex life and work environments in the 21st century, and those who are not. A focus on creativity, critical thinking, communication and collaboration is essential to prepare students for the future.** | | | |  | Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation |  | | **Solve Problems**  **Show details**  **Solve Problems**  **Hide details**  **Learning and innovation skills increasingly are being recognized as those that separate students who are prepared for a more and more complex life and work environments in the 21st century, and those who are not. A focus on creativity, critical thinking, communication and collaboration is essential to prepare students for the future.** | | | |  | Solve different kinds of non-familiar problems in both conventional and innovative ways |  | | **Communication and Collaboration Communicate Clearly**  **Show details**  **Communication and Collaboration Communicate Clearly**  **Hide details**  **Learning and innovation skills increasingly are being recognized as those that separate students who are prepared for a more and more complex life and work environments in the 21st century, and those who are not. A focus on creativity, critical thinking, communication and collaboration is essential to prepare students for the future.** | | | |  | Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts |  | | **Collaborate with Others**  **Show details**  **Collaborate with Others**  **Hide details**  **Learning and innovation skills increasingly are being recognized as those that separate students who are prepared for a more and more complex life and work environments in the 21st century, and those who are not. A focus on creativity, critical thinking, communication and collaboration is essential to prepare students for the future.** | | | |  | Demonstrate ability to work effectively and respectfully with diverse teams |  | | Life & Career Skills | | | | **Be Flexible**  **Show details**  **Be Flexible**  **Hide details**  **Today’s life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills.** | | | |  | Deal positively with praise, setbacks and criticism |  | | **Work Independently**  **Show details**  **Work Independently**  **Hide details**  **Today’s life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills.** | | | |  | Monitor, define, prioritize and complete tasks without direct oversight |  | | **Be Self-directed Learners**  **Show details**  **Be Self-directed Learners**  **Hide details**  **Today’s life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills.** | | | |  | Reflect critically on past experiences in order to inform future progress |  | | **Social and Cross-Cultural Skills Interact Effectively with Others**  **Show details**  **Social and Cross-Cultural Skills Interact Effectively with Others**  **Hide details**  **Today’s life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills.** | | | |  | Know when it is appropriate to listen and when to speak |  | | |  | | --- | | Additional Integration Opportunities (Optional) |   **READING**:  Students will use critical reading strategies listed in processes when analyzing prompts in tasks such as Candy Man & Bakery Decision and other word problems.  **WRITING**:  Students will use mathematically precise vocab to create written arguments and explanations in tasks such as exit tickets & choice board.  **SPEAKING & LISTENING**:  Students will critique reasoning of others & share their own reasoning using mathematically precise vocabulary, appropriate expressions of agreement/disagreement in class room discussion.  **TECHNOLOGY:**  Students will use digital tools to create work product for viewing videos.  **OTHER:**  While solving literal equations there is a great opportunity to connect with science or health through the formulas. |
| |  | | --- | | Character Qualities (Optional) |  |  |  | | --- | --- | | * Self-discipline * Responsibility * Integrity * Cooperation | These character traits should continue to be taught, modeled & reinforced during the first grading period in order to have a smooth functioning classroom. While students "know how to behave" in high school, it is important to set expectations for how acceptable behavior looks in YOUR classroom. | | |  | | --- | | Differentiation/Intervention Focus Areas (Optional |   **# 1 & 2 ALGEBRA TILES**  Visual learners or learners who need more concrete anchor for the concept of solving equations will benefit from using algebra tiles to solve equations. The first is a Powerpoint that models the solution process. The second is a full lesson with practice & follow up task that pushes the work to a more challenging level.  **#3 & 4 & 5 FOLDABLE for Solving Equations**  This will support students who need help developing the process of solving equations independently.The foldable has questions that they ask to determine what to do. The first is the foldable template. The second is a link to a teacher's website with pictures of how she used it in her interactive notebook. The third is a foldable on number of solutions (none, infinite, one).  **#6 GRAPHIC ORGANIZER for unit**  Graphic organizers may help students see the connection between topics & concepts.  -------------------------------------------------------------------------------------------------------  **For students who need more support:**   * Provide step by step instructions. * Provide examples or models. * Teach self-questioning skills to help target "point of confusion". * Teach how to articulate "point of confusion" or request for help. * Provide ways for students to self-check. * Reduce number of problems or stimuli to be worked with at one time.   **For students who need more challenge:**   * Reduce the number of directions, making the tasks more open ended. * Allow students to generate questions to be answered or investigated. * Request that students use multiple models or representations & articulate the connections. * Encourage the students to find patterns, generalizations or "short cuts" and prove that they work for all numbers.   [Solve 2 Step Equations Using Algebra Tiles.ppt](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49919&) [solv eq with alg. tiles lesson & task.pdf](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49920&) [solving-equation-foldable (1).pdf](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49923&) <http://mathequalslove.blogspot.com/2013/11/algebra-1-inb-pages-solving-equations.html?_sm_au_=iVVjDNFHKnsZn8q8> [FOLDABLE for solutions of equations.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=50028&) [GRAPHIC ORGANIZER FOR EQ & INEQ UNIT.docx](https://onslowcounty.rubiconatlas.org/Atlas/View/File?AttachmentID=49928&) |

<< Previous Year

Atlas Version 8.1.1

© [Rubicon International](http://www.rubicon.com/) 2015. All rights reserved