

## UNITS DESIGN FRAMEWORK (2013-2014)

### PART I: UNIT OVERVIEW

<b>Content</b>	Mathematics
<b>Grade Level</b>	7 <sup>th</sup> Grade Math 1 and 7 <sup>th</sup> Grade Pre-Algebra
<b>Power Standard/CCSS Power Standard</b>	A2A – Use symbolic algebra to represent unknown quantities in expressions or equations and solve linear equations with one variable
<b>Suggested Length of Unit</b>	Two weeks (45 minute Class Periods)

<p><b>Reference Deconstruction Document and Power Standard/CCSS Power Standard</b></p>	<p><b>77.EE.4</b>  <i>Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities</i></p> <p><b>7.EE.4.a</b>  <i>Solve word problems leading to equations of the form <math>px + q = r</math> and <math>p(x + q) = r</math>, where <math>p</math>, <math>q</math>, and <math>r</math> are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</i></p> <p><b><u>Extension of A2A</u></b></p> <p><b>7.EE.4.b</b>  <i>Solve word problems leading to inequalities of the form <math>px + q &gt; r</math> or <math>px + q &lt; r</math>, where <math>p</math>, <math>q</math>, and <math>r</math> are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions</i></p> <p><b>7.G.5.2</b>  <i>Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure</i>  <i>M2B8 solve problems of angle measure, including those involving triangles and parallel lines cut by a transversal</i></p> <p><b>7.RP.2.c</b>  <i>Represent proportional relationship by equations. For example, if total cost <math>t</math> is proportional to the number <math>n</math> of items purchased at a constant price <math>p</math>, the relationship between total cost and the number of items can be expressed as <math>t = pn</math>.</i></p>
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<b>Unwrapped Concept:</b> Pull “the what” from deconstruction documents, should represent what students need to know.	<b>Key Vocabulary:</b> Pull academic vocabulary from deconstruction documents, should represent what students need to be able to do.	<b>Depth of Knowledge (DOK)</b>
<b>Equations, Expressions, Inequalities</b>	<b>Proportional Relationship, Equations, Inequality, Expressions</b>	<b>Solve, Use, Represent DOK 2</b>

<b>Supporting Standards (current and Missouri Learning Standards):</b> Standards that build to the power standard.	<b>Other Vocabulary Terms:</b> Terms worth covering in the unit.
A2B use properties to generate equivalent forms for simple algebraic expressions that include positive rational and integer 7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients 7.RP.2.c <i>Represent proportional relationships by equations. For example, if total cost <math>t</math> is proportional to the number <math>n</math> of items purchased at a constant price <math>p</math>, the relationship between the total cost and the number of items can be expressed as <math>t = pn</math></i>	Supplementary, Complementary, Vertical, Adjacent Angles, Parallel, Transversal, Perpendicular, Constant, Coefficient,, Term, Like Terms, Ratio

<b>Reference to Power Standard Assessment:</b> Paste the link to the appropriate power standard assessment in this box.	camdentonschools.org curriculum page (sign in) mathematics
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<b>Directions:</b>
<ol style="list-style-type: none"> <li>Copy the unwrapped power standard concepts, vocabulary, and DOK into the frames provided below.</li> <li>Brainstorm three to five possible performance tasks that incorporate these concepts, skills, and levels of rigor.</li> <li>Write a synopsis for each selected task and list the tasks in a “learning progressions” sequence. Bold those concepts and skills that are directly represented in the tasks.</li> </ol>

<b>Concepts:</b> 7.EE.4 <i>Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reason about the quantities. (</i> 7.EE.4.a <i>Solve word problems leading to equations of the form <math>px + q = r</math> and <math>p(x + q) = r</math>, where <math>p</math>, <math>q</math>, and <math>r</math> are specific rational numbers. Solve equations of these forms fluently.</i>	<b>Vocabulary:</b> <b><u>DESE: DRAFT Missouri Mathematics Core Academic Standards 7th Grade Glossary</u></b>  <u>Variable, Equation, Inequality,</u> Coefficients, Constants, Terms, Like Terms	<b>DOK:</b> 2
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<p>Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? 7.G.5.2</p> <p>Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure</p> <p>7.RP.2.c</p> <p>Represent proportional relationships by equations. For example, if total cost <math>t</math> is proportional to the number <math>n</math> of items purchased at a constant price <math>p</math>, the relationship between the total cost and the number of items can be expressed as <math>t = pn</math></p>	<p><u>Rational Numbers</u>, Order of Operations</p> <p>Parallel , Perpendicular, Transversal</p> <p><u>Supplementary angles</u></p> <p><u>Complementary angles</u></p> <p><u>Vertical angles</u></p> <p><u>Adjacent angles</u></p> <p><u>Proportional Relationship</u>, <u>Ratio</u>, Constant, Varying</p>	
<p><b>Learning Progressions:</b></p> <p><b>*Task 1:</b> Use variables to represent quantities in a real-world or mathematical problems and <u>write expressions</u> Students will take word problems, separate into expressions and equation type of problems. Then students will write out the expressions and compare work to other table groups. Reorganize their work and then simplify expressions using order of operations and solving simple equations, using tiles</p> <p><b>Task 2:</b> Use variables to represent quantities in a real-world or mathematical problem, <u>write one-step equations and equations in the form of <math>px + q = r</math></u> where <math>p</math>, <math>q</math>, and <math>r</math> are rational numbers. Students will work with side partner and read word problems and decide which problems are one step and which are two-step. Students will use tiles to demonstrate one step and two step equations. Students then write into equations formally.</p> <p><b>Task 3:</b> Identify supplementary, complementary, vertical, and adjacent angles involving triangles and parallel lines cut by a transversal. Students will play Matching Game for Special Kinds of Angles</p> <p><b>Task 4:</b> : Solve one step problems involving supplementary, complementary, vertical, and adjacent angles Students will work in small groups using Kagan strategies to collaborate on answers.</p> <p><b>Task 5</b> Write and solve one step equations for an unknown angle in a figure Pre-Algebra book Chapter 10</p> <p><b>Task 6:</b> <u>Solve multi-step</u> problems to write and solve simple equations for an unknown angle in a figure Students will work with table partner to solve angle measurement problems using equations.</p> <p><b>Task 7:</b> Use variables to represent quantities in a real-world or mathematical problem, <u>solve</u> equations in the form of <math>px + q = r</math> where <math>p</math>, <math>q</math>, and <math>r</math> are rational numbers. Students will now progress to writing two step equations and solving equations moving from using tiles to writing out a model for equations. Students will then model to a written equation with all steps and procedures.</p> <p><b>Task 8:</b> Solve word problems leading to inequalities of the form <math>px + q &gt; r</math> or <math>px + q &lt; r</math>, where <math>p</math>, <math>q</math>, and <math>r</math> are specific rational numbers. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions (Included in the Common Core Book online) Students will work with partner to write out inequalities. Students will then graph solutions on a number line. Student will solve inequalities for the variable and compare the procedure of solving equations to inequalities.</p>		

**Task 9: Graph the solution set of inequality and interpret the context of the problem.** (Included in the Common Core Book online)

Student will now graph the solution set for their inequalities of the day prior. An emphasis will be placed on the open or closed dot and the direction of the arrow so the solutions are evident visually.

**Task 10: Unit Assessment**

**\*\*This unit is a reinforcement of A2A It will be completed with Comparing and Scaling Unit in next quarter.\*\***

Concepts:	Vocabulary:	DOK:
7.RP.2.c – Represent proportional relationships by equations	Proportion, ratio	2

**Learning Progressions:**

**Reinforcement of A2A : Related Learning Progressions:**

**This will be implemented in the Comparing and Scaling Unit in Math 1. 7<sup>th</sup> Grade Pre-algebra will not complete this task list.**

**Task 1: Write ratios. (Comparing and Scaling Unit: Investigation 1)**  
 Students will write ratios using data from an advertising campaign on colas. (real-life situations) Students will write ratios in four different ways and compare which are more reliable methods in advertising.

**Task 2: Write ratios and proportions with unknown quantities.**  
 Students will examine similar figures and corresponding sides and write out proportions. Students will solve problems by scaling.

**Task 3: Write ratios and proportions with unknown quantities.**  
 Students will solve proportions by scaling up or down,

**Task 4: Solve proportions using means and extremes. Comparing and Scaling Investigation 4**  
 Student will make a mini poster demonstrating understanding of means and extremes.

**Task 5: Represent proportional relationships by equations**  
 Students will take means and extremes min-poster and compare this method to using equations. Students will analyze the connections between the proportional relationship between the two procedures