

## Core Content

<b>Cluster Title: Create equations that describe numbers or relationships.</b>
<b>Standard:</b> A.CED.1 Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear <del>and quadratic</del> functions, and simple <del>rational</del> and exponential functions.</i>
<b>Concepts and Skills to Master</b>
<ul style="list-style-type: none"> <li>• Create one variable linear equations and inequalities from contextual situations (stories).</li> <li>• Create one variable exponential equations and inequalities from contextual situations (stories).</li> <li>• Solve and interpret the solution to multi-step linear equations and inequalities in context.</li> <li>• Use properties of exponents to solve and interpret the solution to exponential equations and inequalities in context.</li> </ul>

## Supports for Teachers

<b>Critical Background Knowledge</b>	
<ul style="list-style-type: none"> <li>• Understand and use inverse operations to isolate variables and solve equations.</li> <li>• Efficiently use order of operations.</li> <li>• Understand notation for inequalities.</li> <li>• Understand and use properties of exponents.</li> </ul>	
<b>Academic Vocabulary</b>	
Greater than, less than, at most, at least, =, <, >, ≤, ≥, no more than, no less than	
<b>Suggested Instructional Strategies</b>	<b>Resources</b>
<ul style="list-style-type: none"> <li>• Convert contextual information into mathematical notation.</li> <li>• Use story contexts to create linear and exponential equations and inequalities.</li> </ul>	<i>Making it Happen</i> (NCTM)
<b>Sample Formative Assessment Tasks</b>	
<b>Skill-based Task</b> Juan pays \$52.35 a month for his cable bill and an additional \$1.99 for each streamed movie. If his last cable bill was \$68.27, how many movies did Juan watch?	<b>Problem Task</b> Juan pays \$52.35 a month for his cable bill and an additional \$1.99 for each streamed movie. Gail pays \$40.32 a month for her cable bill and an additional \$2.49 for each streamed movie. Who has the better deal? Justify your choice.

## Core Content

<b>Cluster Title: Create equations that describe numbers or relationships.</b>
<b>Standard:</b> A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
<b>Concepts and Skills to Master</b>
<ul style="list-style-type: none"> <li>• Write and graph an equation to represent a linear relationship.</li> <li>• Write and graph an equation to represent an exponential relationship.</li> <li>• Model a data set using an equation.</li> <li>• Choose the best form of an equation to model linear and exponential functions.</li> </ul>

## Supports for Teachers

<b>Critical Background Knowledge</b>	
<ul style="list-style-type: none"> <li>• Graph points</li> <li>• Choose appropriate scales and label a graph.</li> <li>• Understand slope as a rate of change of one quantity in relation to another quantity</li> </ul>	
<b>Academic Vocabulary</b>	
variable, dependent variable, independent variable, domain, range, scale	
<b>Suggested Instructional Strategies</b>	<b>Resources</b>
<ul style="list-style-type: none"> <li>• Use story contexts to create linear and exponential graphs.</li> <li>• Use technology to explore a variety of linear and exponential graphs.</li> <li>• Use data sets to generate linear and exponential graphs and equations.</li> </ul>	<a href="http://www.illuminations.NCTM.org">www.illuminations.NCTM.org</a> <ul style="list-style-type: none"> <li>• Compound Interest Simulator</li> </ul>
<b>Sample Formative Assessment Tasks</b>	
<b>Skill-based Task</b> Write and graph an equation that models the cost of buying and running an air conditioner with a purchase price of \$250 which costs \$0.38/hr. to run.	<b>Problem Task</b> Jeanette can invest \$2000 at 3% interest compounded annually or she can invest \$1500 at 3.2% interest compounded annually. Which is the better investment and why?

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<b>Cluster Title: Create equations that describe numbers or relationships.</b>
<b>Standard:</b> A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. <i>For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.</i>
<b>Concepts and Skills to Master</b>
<ul style="list-style-type: none"> <li>• Determine whether a point is a solution to an equation or inequality.</li> <li>• Determine whether a solution has meaning in a real world context.</li> <li>• Write and graph equations and inequalities representing constraints in contextual situations.</li> </ul>

## Supports for Teachers

<b>Critical Background Knowledge</b>	
<ul style="list-style-type: none"> <li>• Ability to read and write inequality symbols.</li> <li>• Ability to graph equations and inequalities on the coordinate plane.</li> </ul>	
<b>Academic Vocabulary</b>	
Constraint, greater than, $>$ , less than, $<$ , greater than or equal to, $\geq$ , less than or equal to, $\leq$ , inequality, viable	
<b>Suggested Instructional Strategies</b>	<b>Resources</b>
<ul style="list-style-type: none"> <li>• Use a story context such as those found in linear programming problems to write and graph equations with constraints.</li> <li>• Analyze real-world problems connected to student interest</li> </ul>	Go to <a href="http://www.Illuminations.NCTM.org">www.Illuminations.NCTM.org</a> select <ul style="list-style-type: none"> <li>• Escape from the Tomb</li> <li>• Pedal Power</li> <li>• Supply/Demand</li> </ul>
<b>Sample Formative Assessment Tasks</b>	
<b>Skill-based Task</b> Given $y \leq 2x + 1$ and $y > x - 3$ find a point that <ul style="list-style-type: none"> <li>• Satisfies both,</li> <li>• Satisfies one, but not the other</li> <li>• Satisfies neither.</li> </ul>	<b>Problem Task</b> Iced tea costs \$1.50 a glass and lemonade costs \$2. If you have \$12, what can you buy?

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<b>Standard:</b> A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. <i>For example, rearrange Ohm's law <math>V = IR</math> to highlight resistance <math>R</math>.</i>
<b>Concepts and Skills to Master</b>
<ul style="list-style-type: none"> <li>Extend the concepts used in solving numerical equations to rearranging formulas for a particular variable.</li> </ul>

## Supports for Teachers

<b>Critical Background Knowledge</b>	
<ul style="list-style-type: none"> <li>Recognize variables as representing quantities in context.</li> <li>Solve multi-step equations.</li> </ul>	
<b>Academic Vocabulary</b>	
Constant, variable, formula, literal equation	
<b>Suggested Instructional Strategies</b>	<b>Resources</b>
<ul style="list-style-type: none"> <li>Use formulas from a variety of disciplines such as physics, chemistry, or sports to explore the advantages of different formats of the same formula.</li> </ul>	<a href="http://www.iofm.net/community/kidscorner/maths/common_formulas.htm">www.iofm.net/community/kidscorner/maths/common_formulas.htm</a>
<b>Sample Formative Assessment Tasks</b>	
<b>Skill-based Task</b>	<b>Problem Task</b>
$I = Prt$ Solve for $r$ .	Paul just arrived in England and heard the temperature in degrees Celsius. He remembers that $C = \frac{5}{9}(F - 32)$ . How will Paul find the temperature in Fahrenheit?