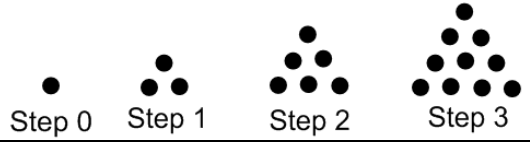
Core Content

Cluster Title: Create equations that describe numbers or relationships.
Standard A.CED.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.)
Concepts and Skills to Master
• Create one-variable linear, exponential, quadratic, and inequalities from contextual situations (stories). • Solve and interpret the solution to linear, exponential, quadratic, and simple rational equations and inequalities in context. • Solve compound inequalities. • Include interval notation to represent inequalities.

Supports for Teachers

Critical Background Knowledge	
• Solve linear equations (Secondary I: A.REI.3). • Solve exponential equations that can be solved using laws of exponents (Sec I: A.REI.3). • Solve quadratic equations and inequalities (Secondary II: A.REI.4). • Write recursive and explicit equations.	
Academic Vocabulary	
recursive, explicit, rational	
Suggested Instructional Strategies	**Resources**
• Connect to the role of first and second differences in patterns of growth. • Connect to when a function is undefined.	Light It Up: http://illuminations.nctm.org/Lessons/LightItUp/LightItUp-AS-All.pdf
Sample Formative Assessment Tasks	
Skill-Based Task: Tran is doing a physics experiment with a steel ball. He throws it upwards with a velocity of 11m/s from a height of 1.2m. When is the height of the steel ball greater than 3m?	**Problem Task:** Write an explicit expression to represent the number of dots in step *n*. 

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Core Content

Cluster Title: Create equations that describe numbers or relationships.
Standard A.CED.2: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
Concepts and Skills to Master
• Write and graph an equation to represent a quadratic relationship between two quantities. • Model a data set using an equation including quadratic relationships. • Choose appropriate scale for the variables.

Supports for Teachers

Critical Background Knowledge	
• Graph a linear equation (Sec. I: F.IF.7). • Graph an exponential equation (Sec. I: F.IF.7). • Understand the meaning of dependent versus independent variables. • Understand rate of change.	
Academic Vocabulary	
dependent variable, independent variable, rate of change	
Suggested Instructional Strategies	**Resources**
• Connect other representations, tabular, contextual, and algebraic to the graph of a quadratic. • Connect to Unit 2, F.BF.1 Write a function that describes a relationship between two quantities. • Graph a quadratic equation in multiple ways by making a table of values; doing transformations; using the vertex, a point, and line of symmetry.	
Sample Formative Assessment Tasks	
Skill-Based Task: Given a rectangle with a perimeter of 100 feet, determine the units and the scales that would represent the length of the rectangle as the independent variable and the area of the rectangle as the dependent variable. Graph this situation.	**Problem Task:** Create a problem situation where a curved or line graph could misrepresent the given data.

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Core Content

Cluster Title: Create equations that describe numbers or relationships.
Standard A.CED.4: Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. (For example, rearrange Ohm's law *V* = *IR* to highlight resistance *R*.)
Concepts and Skills to Master
• Solve a quadratic formula for a variable of interest.

Supports for Teachers

Critical Background Knowledge	
• Recognize variables as representing quantities in context. • Solve quadratic equations (Sec II: A.REI.4).	
Academic Vocabulary	
constant, variable, formula, literal equation	
Suggested Instructional Strategies	**Resources**
• Use position versus time formulas. • Use quadratic formulas from a variety of disciplines such as physics, chemistry, or sports to explore the advantages of different formats of the same formula.	
Sample Formative Assessment Tasks	
Skill-Based Task: Solve the position formula $s(t) = -16t^2 - v_o t + s_o$ for time in reference to position $t(s)$.	**Problem Task:** You are packaging an official game ball for women's professional basketball that has a volume of 130π cubic inches. What must be the minimum dimensions for the box?

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