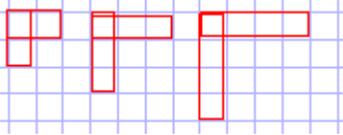


Core Content

Cluster Title: Build a function that models a relationship between two quantities.
Standard: F.BF.1 Write a function that describes a relationship between two quantities. ★ a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations. <i>For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.</i>
Concepts and Skills to Master
<ul style="list-style-type: none"> Given a linear or exponential context, find an expression, recursive process, or steps to model a context with mathematical representations. Combine linear and/or exponential functions using addition, subtraction, multiplication, and division.

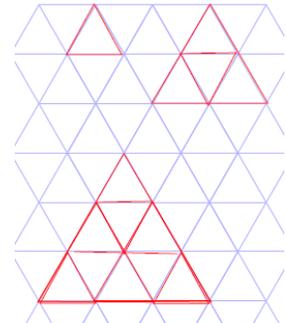
Supports for Teachers

Critical Background Knowledge	
<ul style="list-style-type: none"> Simplifying expressions 	
Academic Vocabulary	
Function, intercepts, explicit expression, recursive	
Suggested Instructional Strategies	Resources
<ul style="list-style-type: none"> Toothpick Patterns Number of knots versus length of rope Give examples and use arithmetic operations to linear and exponential functions to fit the data. 	www.illuminations.NCTM.org <ul style="list-style-type: none"> Function Matching <i>Making It Happen</i> (NCTM)
Sample Formative Assessment Tasks	
Skill-based Task	Problem Task
<p>If $f(x) = x + 4$ and $g(x) = 3x - 5$, find $(f + g)(x)$</p> <p>Anne is shopping and finds a \$30 sweater on sale for 20% off. When she buys the sweater, she must also pay 6% sales tax. Write an expression for the final price of the sweater in such a way that the original price is still evident. (Extension: If the clerk just adds 14% will the price be correct?)</p> <p>★Modeling</p>	<p>Find an expression, process or calculation to determine the number of squares needed to make the next three patterns in the series.</p> 

Core Content

Cluster Title: Build a function that models a relationship between two quantities.
Standard: F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. ★
Concepts and Skills to Master
<ul style="list-style-type: none"> • Write arithmetic sequences both recursively and with an explicit formula. • Write geometric sequences both recursively and with an explicit formula. • Model contextual situations with arithmetic or geometric sequences.

Supports for Teachers

Critical Background Knowledge	
<ul style="list-style-type: none"> • Identify arithmetic and geometric sequences 	
Academic Vocabulary	
Arithmetic sequence, geometric sequence, recursive, explicit	
Suggested Instructional Strategies	Resources
<ul style="list-style-type: none"> • Use tables to elicit the difference between recursive and explicit formulas for the same pattern. • Write recursive and explicit formulas for patterns made by adding toothpicks to existing patterns. • Match sequences expressed recursively with those expressed explicitly. 	www.illustrations.NCTM.org <ul style="list-style-type: none"> • Trout Pond Practice with Arithmetic and Geometric Sequences Word Problems http://www.regentsprep.org/Regents/math/alqtrig/ATP2/SequenceWordpractice.htm
Sample Formative Assessment Tasks	
Skill-based Task	Problem Task
<ul style="list-style-type: none"> • Write two formulas that model the pattern. 3, 9, 27, 81..... 	Continue the pattern for two more iterations graphically and then find a recursive or explicit formula to model the situation. 

★Modeling

I.2.F.BF.2