
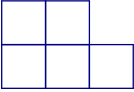
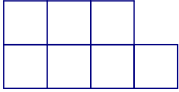


Pattern Lesson 1

figure							
figure number	1	2	3	4	5	...	
number of squares							


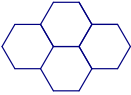
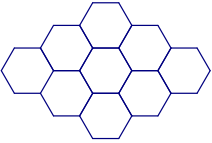
Draw the _____ figure.

Write a number expression that calculates the number of squares in the figure.

Sketch figure _____

Number Expression

Pattern Lesson 2

figure							
figure number	1	2	3	4	5	...	
number of squares							

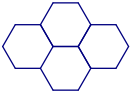
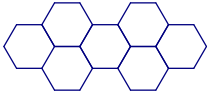
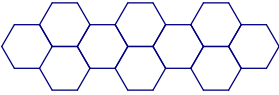
Draw the _____ figure.

Write a number expression that calculates the number of hexagons in the figure.

Sketch figure _____

Number Expression

Pattern Lesson 3

figure							
figure number	1	2	3	4	5	...	
number of squares							

Draw the _____ figure.

Sketch figure _____

Write a number expression that calculates the number of hexagons in the figure.

Number Expression

<p>Recognize and create patterns; use rules to describe patterns.</p> <p>1.2.1.1 Create simple patterns using objects, pictures, numbers and rules. Identify possible rules to complete or extend patterns. Patterns may be repeating, growing or shrinking. Calculators can be used to create and explore patterns.</p>	<p>Recognize, create, describe, and use patterns and rules to solve real-world and mathematical problems.</p> <p>2.2.1.1 Identify, create and describe simple number patterns involving repeated addition or subtraction, skip counting and arrays of objects such as counters or tiles. Use patterns to solve problems in various contexts.</p>	<p>output rules to represent patterns and relationships and to solve real-world and mathematical problems.</p> <p>3.2.1.1 Create, describe, and apply single-operation input-output rules involving addition, subtraction and multiplication to solve problems in various contexts.</p>
<p>Use input-output rules, tables and charts to represent patterns and relationships and to solve real-world and mathematical problems.</p> <p>4.2.1.1 Create and use input-output rules involving addition, subtraction, multiplication and division to solve problems in various contexts. Record the inputs and outputs in a chart or table.</p>	<p>Recognize and represent patterns of change; use patterns, tables, graphs and rules to solve real-world and mathematical problems.</p> <p>5.2.1.1 Create and use rules, tables, spreadsheets and graphs to describe patterns of change and solve problems.</p> <p>5.2.1.2 Use a rule or table to represent ordered pairs of positive integers and graph these ordered pairs on a coordinate system.</p>	<p>Recognize and represent relationships between varying quantities; translate from one representation to another; use patterns, tables, graphs and rules to solve real-world and mathematical problems.</p> <p>6.2.1.1 Understand that a variable can be used to represent a quantity that can change, often in relationship to another changing quantity. Use variables in various contexts.</p> <p>6.2.1.2 Represent the relationship between two varying quantities with function rules, graphs and tables; translate between any two of these representations.</p>
<p>Understand the concept of function in real-world and mathematical situations, and distinguish between linear and nonlinear functions.</p> <p>8.2.1.1 Understand that a function is a relationship between an independent variable and a dependent variable in which the value of the independent variable determines the value of the dependent variable. Use functional notation, such as $f(x)$, to represent such relationships.</p>	<p>8.2.1.2 Use linear functions to represent relationships in which changing the input variable by some amount leads to a change in the output variable that is a constant times that amount.</p> <p>8.2.1.3 Understand that a function is linear if it can be expressed in the form $f(x)=mx+b$ or if its graph is a straight line.</p> <p>8.2.1.4 Understand that an arithmetic sequence is a linear function that can be expressed in the form $f(x)=mx+b$, where $x = 0, 1, 2, 3, \dots$</p> <p>8.2.1.5 Understand that a geometric sequence is a non-linear function that can be expressed in the form $f(x)=ab^x$, where $x = 0, 1, 2, 3, \dots$</p>	

Describe areas of struggle when finding rules to represent growing patterns.

Describe ways that you use to help students with making sense of growing patterns.