

Exploring Squares and Square Numbers

name: _____


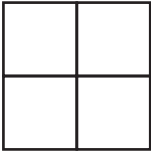
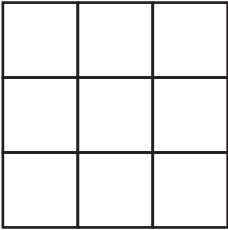
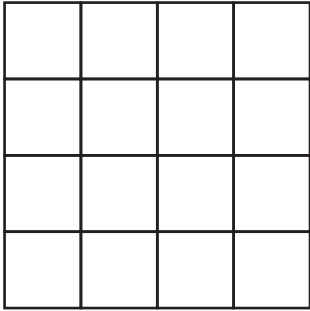
Mathematics is the language of patterns.

Exploring mathematical patterns helps us think about numbers in new ways.

We can find interesting mathematical patterns when looking at square numbers. The first four squares are shown in the box below. They are in order from small to large. The first square has a height of one cm and a width of one cm. There is one square cm in this shape.

Write the number of cells N , the height H , the width W , and the perimeter P , for each square. Then write the difference D between these consecutive square numbers. Write a number sentence that describes the shape. This equation takes the format H times W equals N . When H and W are equal, their product will be a square number. This is because square numbers are the product of multiplying some number by itself. The height of each shape is also the number of rows in the grid. The width equals the number of columns in the grid.

What patterns do you notice? Do you think these patterns will continue as the square numbers get larger? How so?

$1 \times 1 = 1$							
	D:		D:		D:		D:
W:		W:		W:		W:	
N:		N:		N:		N:	
H:		H:		H:		H:	W:
P:		P:		P:		P:	

1. Think about the difference between the square numbers next to each other. What kind of pattern did you find? Do you think this will continue? Why or why not?

2. Think about the perimeter of each square. What pattern did you find? Do you think this continues as squares get larger? Why or why not?

3. Think about the square numbers. Describe the odd/even pattern that you find. Do you think this pattern continues to the very large square numbers? Why or why not?

4. Find the following vocabulary words in the text on these two pages. Highlight or circle them in the text.
Cell - Each small square in a grid is called a cell.
Difference - The answer to a subtraction problem.

Grid - A pattern made up of vertical and horizontal lines that fills a shape such as a square or rectangle

Pattern - A series or sequence that repeats.

Perimeter - The distance around the outside of a shape.

Square number - The product of a number times itself.