The Border Problem Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Learning Goals

* Describe border growth in different ways.
* Write about the border’s growth.
* Use variables to create different, but equal, algebraic expressions.

Phet Link: <https://phet.colorado.edu/sims/html/area-builder/latest/area-builder_en.html>

1. **Open Explore**: Take some time to play around with it. What are 3 things that you notice?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Using the smaller colored squares, create three larger **squares**

|  |  |  |  |
| --- | --- | --- | --- |
| Side Length | Area | Border (not perimeter!) | Picture |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

1. Where do you see the area in your shapes?
2. Where do you see the border in your shapes?
3. Without using the sim, write a description for calculating the border of a square that is 10 x 10?

**Compare your results from questions 4-5 with your partner and **

Write down two different strategies for finding the border from the white board:

|  |  |
| --- | --- |
| 1.  | 2.  |

Quick Write!

1. What is a variable?
2. What is an expression?
3. How can we rewrite any border strategy above using variables?

Rewrite the two strategies above using variables:

|  |  |
| --- | --- |
| 1.  | 2.  |

With some algebraic manipulation, each strategy is equivalent to: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Using the expression above, calculate the border of a 75 x 75 square:

Challenge:

Using words, numbers and variables, describe the pattern for the blue squares shown in the squares: