

Toothpick Patterns

Student Name: _____

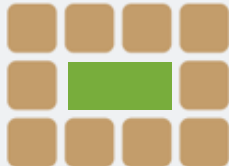
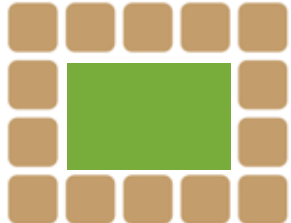
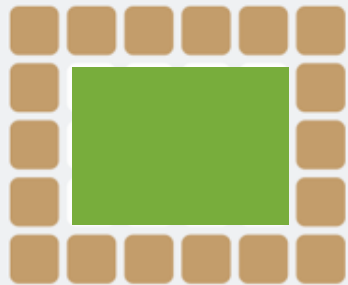
Focus Problems: Stepping Stones Handout

2

Instructions

The illustration shows how a gardening company defines the sizes of its gardens, and shows how it puts stepping stones around the outside of the gardens.

1. Organize the information from the first three designs into a table.
2. For a garden of size 4, how tall and wide will the garden be? (Four tall and five wide. Be sure you understand why!)
3. Extend your table to a garden of size 5.
4. Look for a pattern to calculate the number of stones for each garden size. How would you calculate the number of stepping stones you need for a garden of size 10?
5. What if your garden size is 100—how many stones do you need?
6. *Generalize* your calculation: make a formula for garden size n . What's your formula?
7. Using a diagram, describe how the formula corresponds to the pattern of stepping stones.
8. Find a different equation for the number of stones for a border of size n . Explain it.
9. Show that the two formulas are *equivalent*.

size	pattern
1	
2	
3	

Sample Table

Garden Size	Tall	Wide	# stones
1			
2			
3			
4			
5			
10			
100			