Counting Squares - Activity Sheet 1
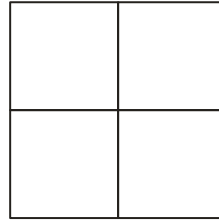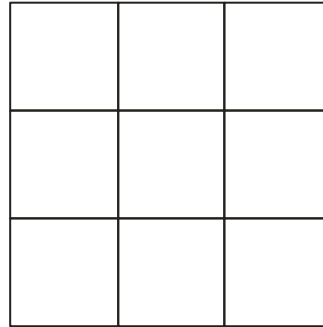
NAME:_____

1. The 2 x 2 square:
   a. How many small squares occur?
   b. How many 2 x 2 squares occur?
   c. How many squares occur all altogether?

2. The 3 x 3 square:
   a. How many small squares occur?
   b. How many 2 x 2 squares occur?
   c. How many 3 x 3 squares occur?
   d. How many squares occur all altogether?

3. The 4 x 4 square:
   a. How many small squares occur?
   b. How many 2 x 2 squares occur?
   c. How many 3 x 3 squares occur?
   d. How many 4 x 4 squares occur?
   e. How many squares occur all altogether?
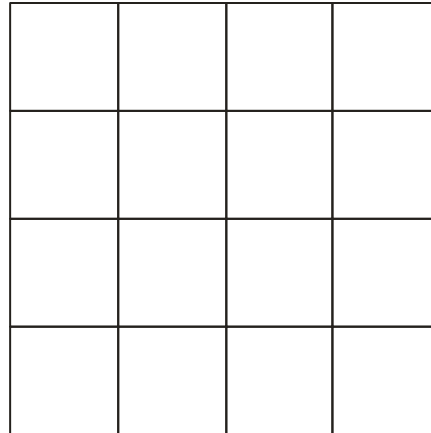
4. Look for a pattern in questions 1 – 3. Made a prediction for the total number of squares in a 5 x 5. Test your prediction.
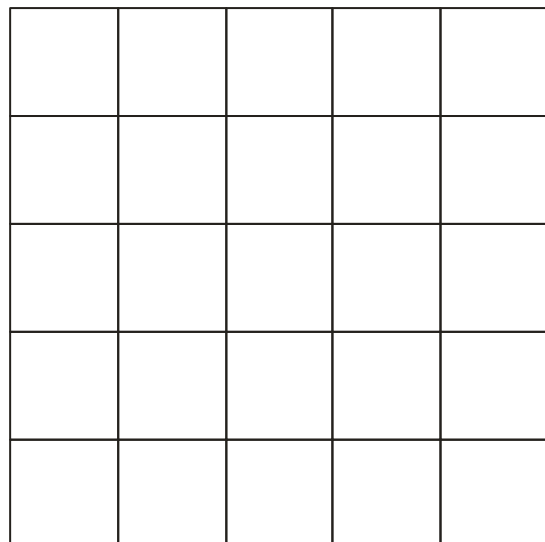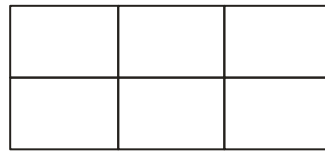
5. How many squares to you think there are in an 8 x 8 square checkerboard? Defend your answer.

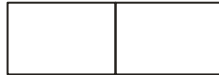# Counting Rectangles
Activity Sheet 2

NAME: _____

1. This figure is a 2 row x 3 column rectangle. How many of each type of rectangle can you find embedded ?
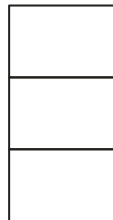
 a. 1 row x 1 column

 b. 1 row x 2 column

 c. 1 row x 3 column
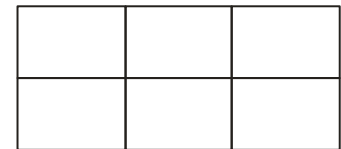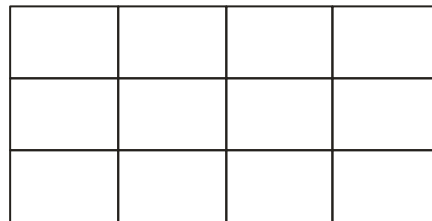
 d. 2 row x 1 column

 e. 2 row x 2 column

 f. 2 row x 3 column

 g. How many rectangles occur all together?

2. This figure is a 3 row x 4 column rectangle. How many of each type of rectangle can you find embedded?

 a. Find the number of rectangles embedded of each size. Organize your findings into the table.

	NUMBER OF COLUMNS			
	1	2	3	4
NUMBER OF ROWS 1				
2				
3				

 b. Find the total number of rectangles that can be embedded in a 3 row x 4 column rectangle.

3. Predict the number of rectangles in a 6 row x 5 column rectangle. Use the pattern you found for the 3 x 4 rectangle. Organize your data to convince a friend without actually counting the rectangles.
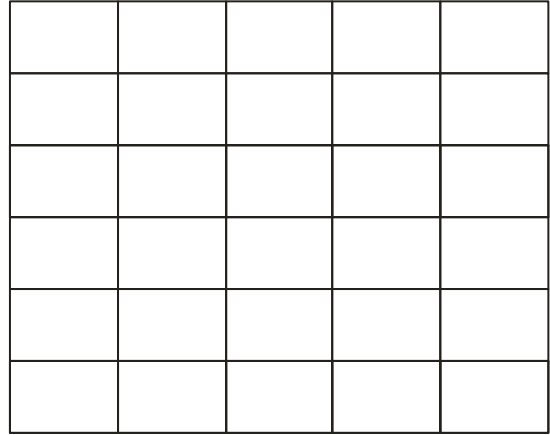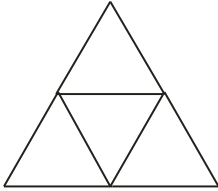

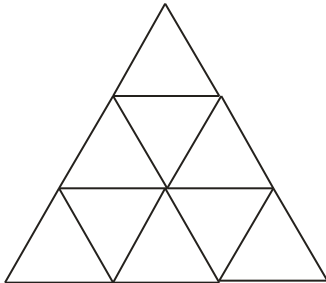**4.** How many rectangles would you predict in a 4 x 4 square? Why?

Counting Triangles
Activity Sheet 3

5. How many triangles are in this equilateral triangle with sides measuring 2 units?

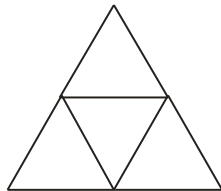**6.** How many triangles are in this equilateral triangle with sides measuring 3 units?

7. On the basis of your answers to questions 1 and 2, predict the number of triangles in an equilateral triangle with sides of 4 units. Check to see if your prediction is correct.

8. Look for patterns. Count how many triangles of each size are in each triangle above. Consider triangles in both the up and the down position. Organize your data into the tables provided.
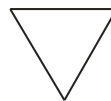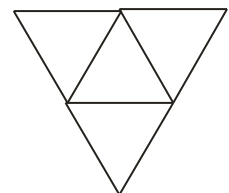
Size 1: Position Up   Size 2: Position Up   Size 1: Position Down   Size 2: Position Down

Triangles with side of 2 units
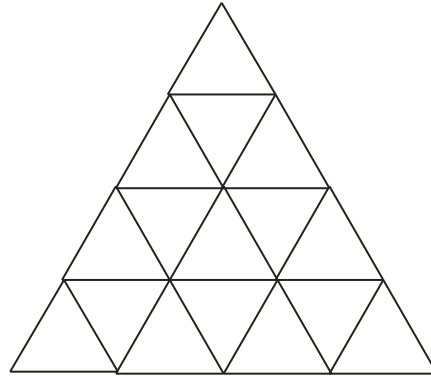
	SIZE 1	SIZE 2
UP △		
DOWN △		
TOTAL		

Total: _____

Triangles with side of 3 units

	SIZE 1	SIZE 2	SIZE 3
UP △			
DOWN △			
TOTAL			

Total: _____

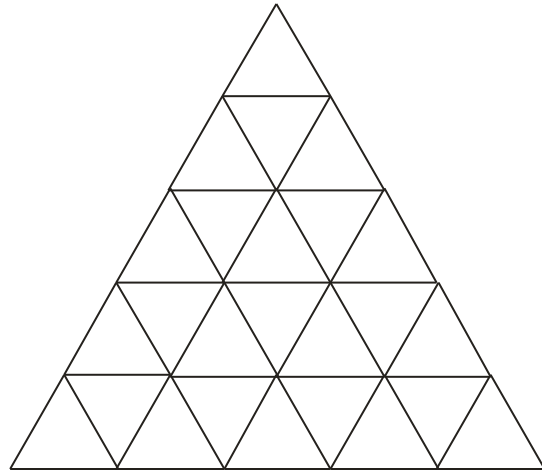**9.** Extend your investigation to an equilateral triangle of side-length 4 in the table.

Triangles with side of 4 units

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
UP △				
DOWN △				
TOTAL				

Total: _____

10. Extend your investigation to an equilateral triangle of side-length 5

11. Predict the number of triangles that are embedded in a triangle with length 6 units. Describe how you made your prediction.

12. What is the largest down triangle that would fit in an equilateral triangle of size 11? How do you know?

13. Explain how you would determine the number of triangles that fit in a triangle of size 10?

Counting Triangles Transformed In Squares - Activity Sheet 4

NAME: _____

14. A square measuring 1 unit on a side has both diagonals drawn. How many triangles are formed? Consider all sizes of triangles that are possible.
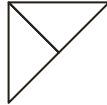
15. A square measuring 2 units on a side is subdivided into squares with their diagonals drawn. How many triangles are formed? Consider all sizes of triangles that are possible.
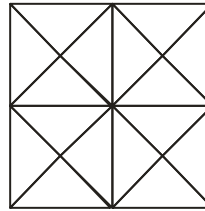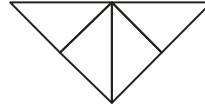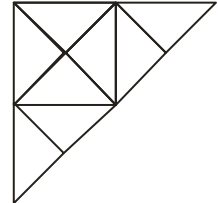
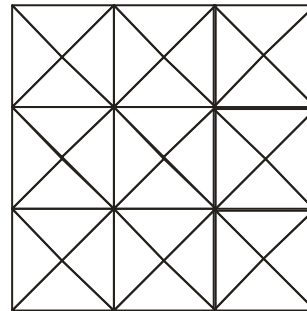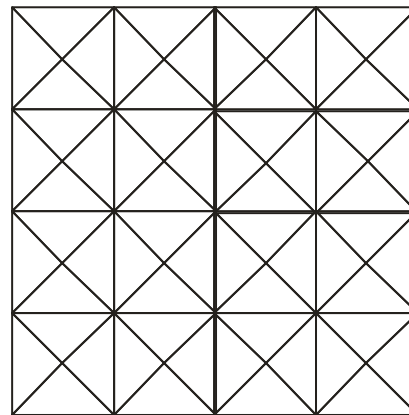| Triangle of 1 small △	Triangle of 2 small △ s	Triangle of 4 small △ s	Triangle of 8 small △ s

16. Examine the square of size 3.
  a. Determine all the different △ s that are embedded.
  b. Find how many of each size there are.

17. Repeat for a square of size 4.

18. What patterns do you see? Find a general method to determine the number of triangles contained in an n x n square subdivided into unit squares with the diagonals drawn.