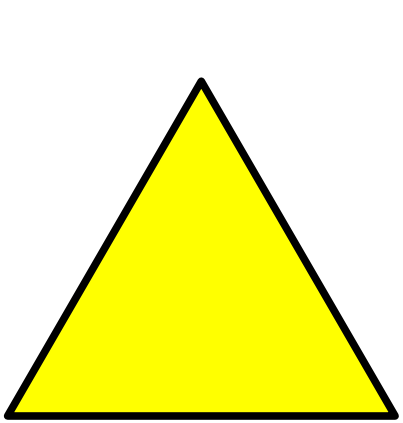
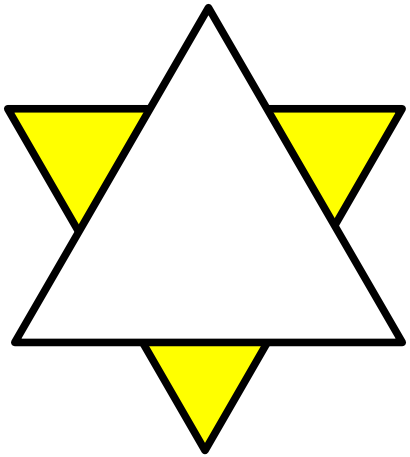
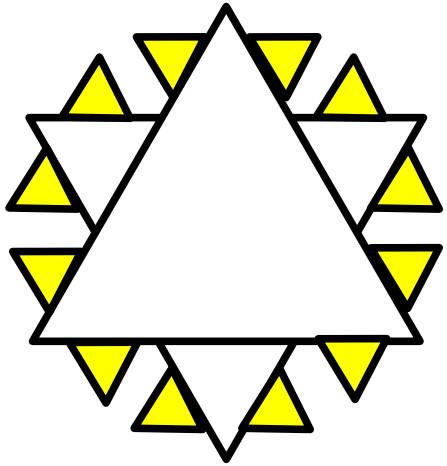
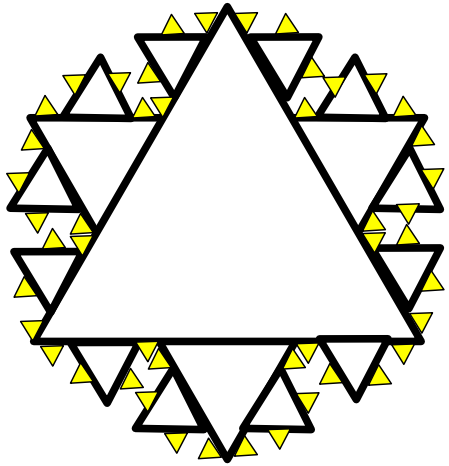
Koch's Snowflake

How Many Triangles Are Added Each Time?









Koch's Snowflake – Looking for Patterns

As you draw your triangles you might like to measure or calculate some or all of the following:

Iteration	Number of Triangles drawn	Length of each side of the triangle	Number of external sides	Length of Perimeter	Area (if you want a real challenge!)
0	1				
1	3				
2					
3					
4					
5					
6					
7					
Is the row increasing or decreasing?					
Is there a pattern in the row?					

Extra Tricky Challenges

Calculating the area

To calculate the area you need to know the area of each triangle you have added, and add those to the previous area. Google provides a handy '[tool to calculate the area of an equilateral triangle]'. The area converges towards a number (this means it gets increasingly close towards that number). If you want a really tricky challenge, can you work out what that number might be?

Calculating for the *n*th row

If you manged to spot any patterns – awesome job! For an extra tricky challenge, can you work out how to turn that pattern into a rule that would help you calculate this information for *any* iteration without having to calculate the previous ones?

Hint: It might help to think through this hypothetical example first

Let's pretend you spotted that a row that started at 0, increased by ten with each iteration (they don't, this is just an example!). You could calculate the value of the *n*th iteration (we use *n* to stand for the number of the iteration when it could be any number) by multiplying *n* by 10. We could write this as *n* x 10. So the value of the third iteration would be 3 x 10 = 30.

But what if the first value, iteration 0, was something other than 10? Let's pretend the starting value was 3, the first iteration 13, the second 23 and etc. Could you alter *n* x 10 to make it work for this sequence?