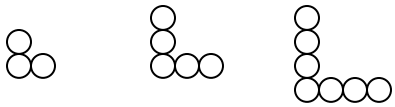
Building Investigative Skills

1. Draw the following patterns and write below the number of dots;



1 2 3 4 5

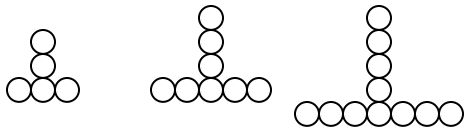
Now draw a table.

Dot Pattern	1	2	3	4	5
Number of Dots	3				

The increase in the number of dots each time is……..

You can calculate the number of dots in each pattern like this;
Multiply the dot pattern number by 2, then add 1.
For example; The number of dots in pattern 100 would be
(100x2)+1=201

2. Draw the following pattern numbers from 1 - 5 and complete the table



1 2 3 4 5

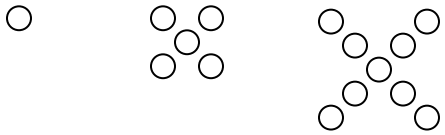
Dot Pattern	1	2	3	4	5
Number of Dots	3				

The increase in the number of dots each time is …….

So, multiply the dot pattern by ……then add 2.

The number of dots in pattern 100 is……

3. Draw the following pattern numbers from 1 - 5 and complete the table.



1 2 3 4 5

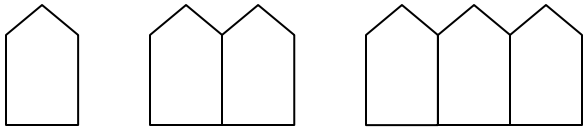
Dot Pattern	1	2	3	4	5
Number of Dots	3				

The increase in the number of dots each time is …….

So, multiply the dot pattern by ……then add ……..

The number of dots in pattern 100 is……

4. Here is a sequence of houses made from sticks. Draw the following pattern numbers from 1 - 5 and complete the table.



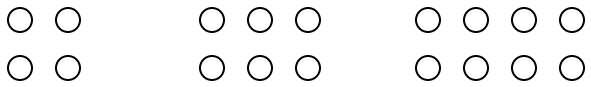
Stick Pattern	1	2	3	4	5
Number of Sticks	3				

4b. Make a prediction for pattern numbers 6 and 7.

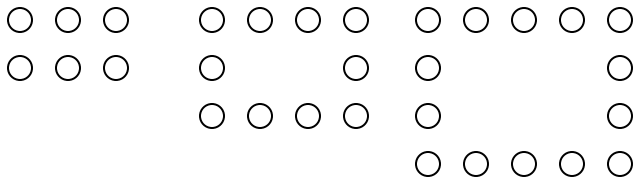
4c. Write the rule

4d. Write the rule in terms of n.

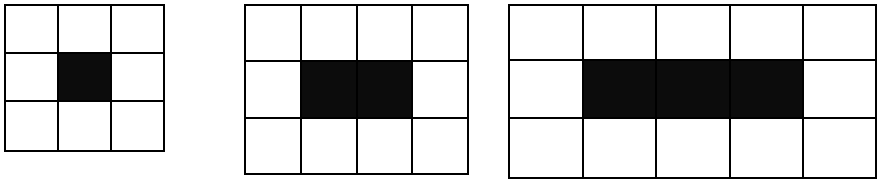
5. Now use the same method that you have been using to work out the number of dots in this pattern.



6. Try this one!



7. In the next sequence black squares are surrounded by white squares.



7a. The rule is; the number of white squares is two times the number of black squares and then add 6. Can you write this in terms of n?

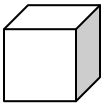
7b. Work out the number of white squares in the diagram which has 20 black squares. Then draw it to check you have the correct answer.

7c. Write the formula, without words for the number of white squares.
Use *b* for the number of black squares and *w* for he white squares.
Start with *w* =

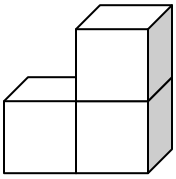
Building with cubes

The cubes below have been arranged to make steps. Can you work out how many cubes will be needed to make 4 steps, 5 steps, 7 steps 10 steps and 20 steps?

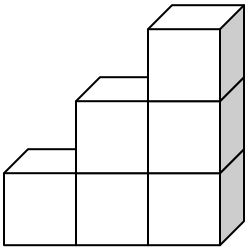
1 step



2 steps



3 steps



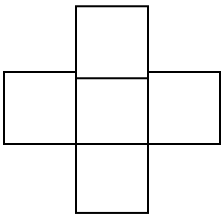
Complete the table:

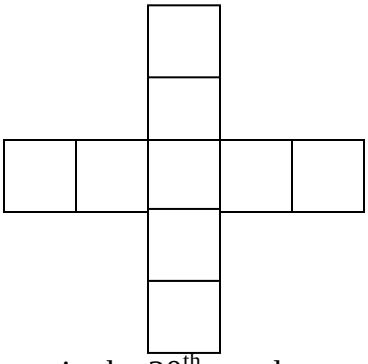
Number of steps	Number of cubes

- Can you see any patterns?
- How can you work out the number of cubes required for different numbers of steps? Show all of your methods for working out.

Draw another shape;

e.g.





Explain how it is made up.
Produce a table and work out the number of squares in the 20^{th} or nth pattern.