

Cube Construction



Part One:

Start with one snap cube. This will represent a 1 x 1 x 1 cube.

Next add snap cubes to the one snap cube to build a 2 x 2 x 2 cube.
How many snap cubes are needed to create this cube?

Next add snap cubes to the 2 x 2 x 2 cube to build a 3 x 3 x 3 cube.
How many snap cubes are needed to create this cube?

Continue this process until you have completed the table below.

Edge Length Of Cube	Number of Snap Cubes Needed to Create the Cube
1	
2	
3	
4	
5	

1. The numbers on the right side of your table are called cube numbers or perfect cubes. Why?
2. What are the next four perfect cubes after 125? How did you find these four numbers?

Part Two: Looking at patterns of the Sums of Cubes

In this part, you will investigate taking the sum of the cubes of the digits of a positive integer. Once you have computed the sum, the sum of the cubes of the new digits is found. You will continue the process until a termination is reached. Use your list of perfect cubes to help you with this process.

For example:

Choose 27

$$27 \rightarrow 2^3 + 7^3 = 8 + 343 = 351$$

$$351 \rightarrow 3^3 + 5^3 + 1^3 = 27 + 125 + 1 = 153$$

$$153 \rightarrow 1^3 + 5^3 + 3^3 = 1 + 125 + 27 = 153 \text{ (A termination point)}$$

Choose any two or three digit number and follow the process above.
Show your steps on paper.