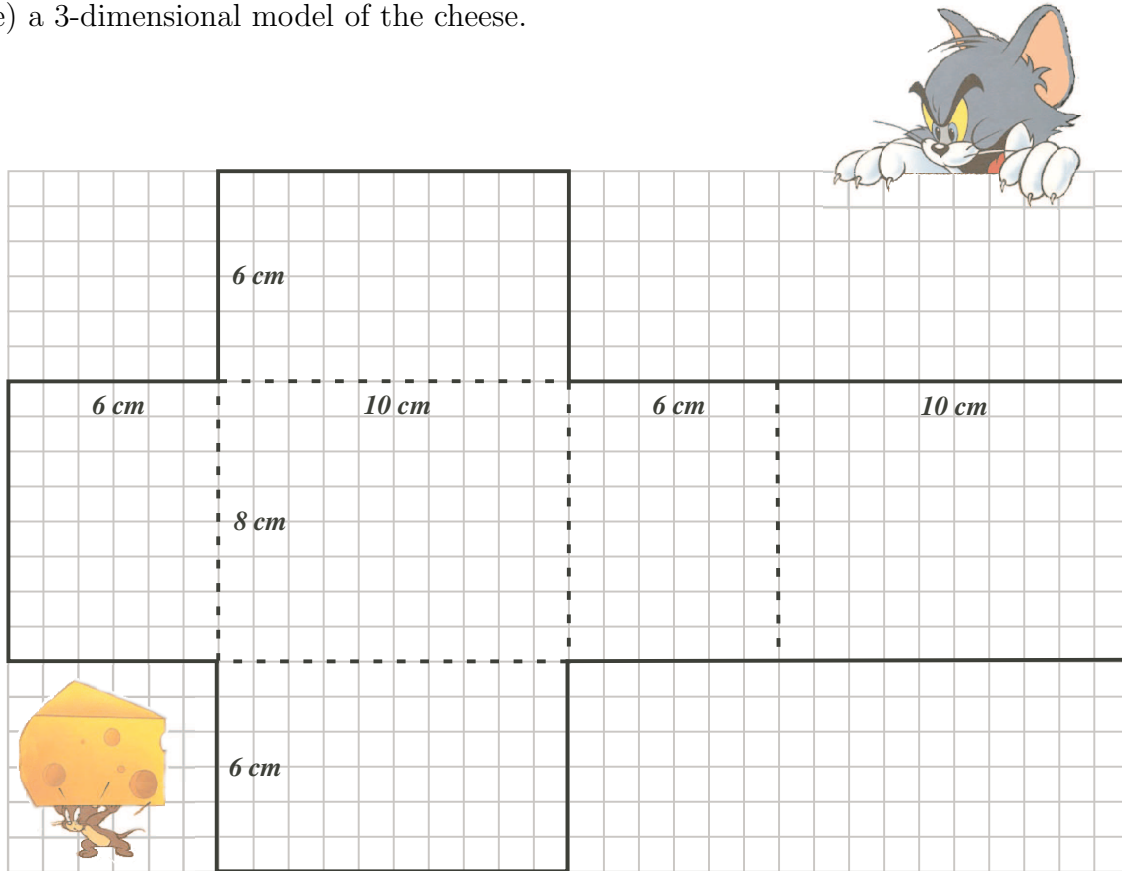


Problem

A rectangular block of cheese covered in wax is 10 cm wide, 6 cm high, and 8 cm deep. (The exterior of the block is covered with wax to keep it fresh.) Use the net given below to construct (mentally or otherwise) a 3-dimensional model of the cheese.



- a) How many 2 cm x 2 cm x 2 cm cubes are there in the block?
- b) How many of these cubes have no wax on them?

Hints**Part a)**

Hint 1 - Use the grid on your model to see how many lengths of 2 cm occur on each of the width, height, and depth of the table.

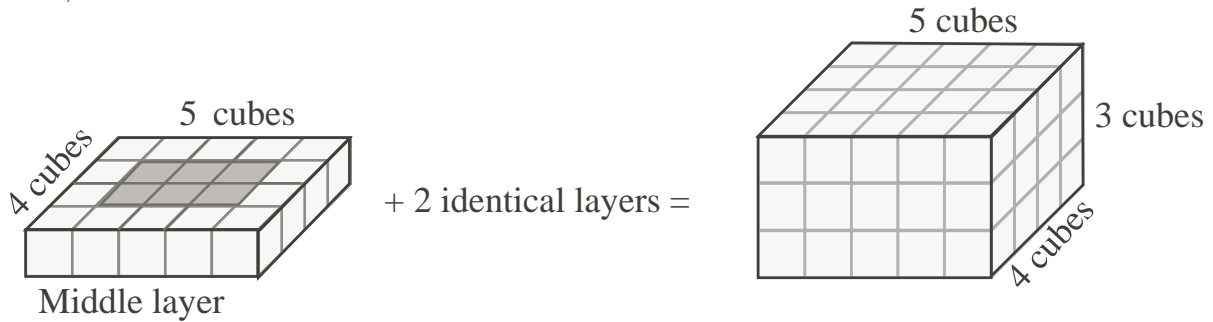
Suggestion: Manipulatives such as Cube-A-Links could be used to make a three-dimensional model of the cheese block.

Part b)

Hint 1 - Which blocks DO have wax on them? How many are there?

Solution

- a) In terms of two-centimetre cubes, the block's dimensions are 5 cubes wide by 3 cubes high by 4 cubes deep. Thus we can picture it as consisting of 3 layers, each with 20 cubes. Thus, in total, there are 60 such cubes in the block.



- b) Since any exterior cube has wax on it, all of the cubes in the top layer and the bottom layer will have wax on them. Further, since the vertical exterior sides also have wax on them, only six cubes in the middle layer have no wax, as shown by the shaded cubes in the left diagram. Thus there are $3 \times 2 = 6$ cubes that are entirely interior to the block of cheese, and hence have no wax on them.