

# Skyscrapers

## Materials

A 3D printer and a saw, mechanical or manual. Paintbrush and paints or coloured sticks

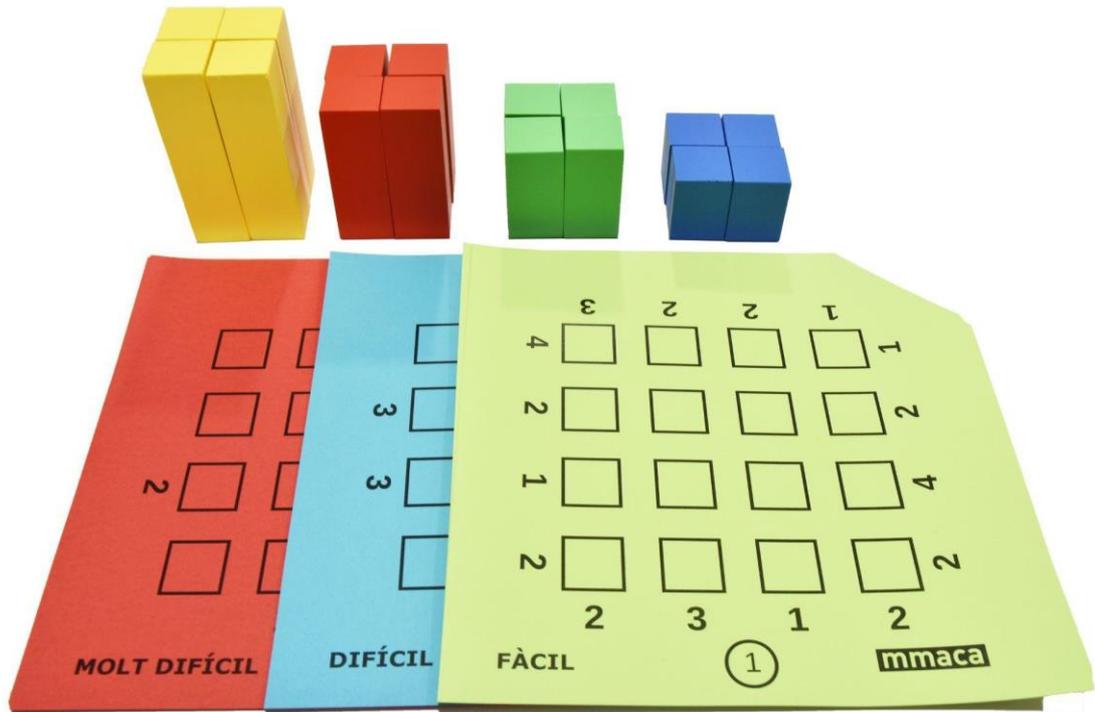
## Brief description

16 skyscrapers that have 4 different heights and colours are placed on a 4x4 board. There must be no empty boxes.



## Assembly

### Design of all the pieces



### Assembly

Fully instructions with the steps for the assembly of the exhibit. A picture of each step.

## The Board (DINA3)

The chessboard can be printed on paper, cardboard or PVC, or be made of wood, like a grid.

The numbers on the edges can be printed on permanent or movable labels, so you can use the same grid for more than one challenge.

### Skyscrapers

Fill the grid with the buildings.

Each row and column can have only one building of each height (colour).

The numbers indicate how many skyscrapers are visible from that point.

	1	2	2	4	
1					4
2					2
2					2
4					1
	4	2	2	1	

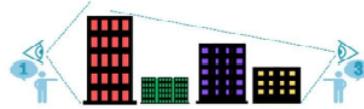


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## The Skyscrapers

Skyscrapers can be prisms or cylinders of different heights, painted in four different colours or printed with a 3D printer.

The activity works in all formats and situations in which it has been tested



## Other Options

Especially if we want to transform this module into a laboratory activity, skyscrapers can be built with generic materials, for example: multilinks.

In an even simpler way, the grid can be drawn on a square sheet and the skyscrapers replaced with a sequence of letters:  $A < B < C < D$ , where D will be the tallest skyscraper.

Talking about the height of buildings brings the discourse back to an experience rooted in the real world.

The different colour of the skyscrapers makes it easier to check that the same pieces are not repeated in the rows and columns of the grid, but the fact that the colors correspond to the different heights makes this module accessible even to people with vision problems or color blindness.

The simplicity and immediacy of the instructions make this module also suitable for people with DYS difficulties.

## Explanation

As in a Sudoku puzzle, identical figures cannot be repeated in rows and columns, and furthermore the indications provided on the edges of the chessboard must be respected: numbers that indicate how many skyscrapers would be seen looking towards the board from that observation point.

The most interesting activity for the classroom is the construction of new problems. You start from a blank chessboard and arrange the pieces only by respecting the Sudoku rule, that is, without repeating the same pieces in the rows or columns.

Then the structure is observed row by row and the quantity of skyscrapers that can be seen is shown on the edge.

The grid is cleared and a new exercise is available for other teammates to solve

## Competences

It's a classic exercise in practicing a trial-and-error methodology.

Grading the difficulty of the subsequent proposals, we stimulate the elaboration of strategies that arise from observation and from deriving some patterns (what does a 4 on the border mean? Or a 1, or a 2 opposite to a 1 ...

## Observations

Any observation to be explained regarding the exhibit, its functioning and assembly.

## For 3d Printers (If applicable)

As said, skyscrapers can be built with a 3D printer, drawn in vector format so that everyone can decide the final dimensions of the product.

The design for the 3D printer allows giving the pieces the shape of existing or otherwise realistic skyscrapers, increasing the relationship between mathematical models and external reality.

