

# MEGAMENGER

## Overview: level-1 Menger sponge

The **level-1 Menger sponge** is the first iteration of the three-dimensional Menger fractal. It is made of 20 cubes arranged in the shape of a cube with holes through the middle in each direction. When building it out of business cards, we need to panel the 24 internal faces to strengthen the structure. Of course, if you aren't planning on linking the level-1 sponge with another structure you can panel the 48 outside faces as well.

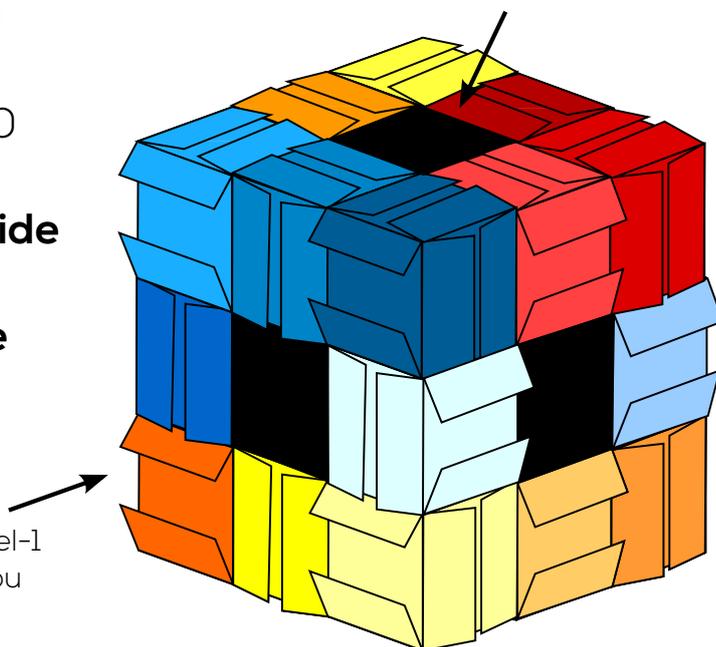
**Number of cubes in each level-1:** 20

**Total number of business cards:** 120

**Panelling cards needed to panel inside the holes:** 24

**Panelling cards needed to cover the outside faces:** 8 per face

The black bits are gaps in the structure.



Whichever way you build your level-1 sponge it will look like this when you are done!

We have come up with three ingenious ways to build the level-1 Menger sponge:

- 1. Cube-by-cube construction** - you link 20 cubes, one at a time, panelling the appropriate internal faces as you go along.
- 2. Layer-by-layer construction** - you build the bottom ring first, then add four supporting cubes and, finally, another ring of cubes at the top (again remembering to panel the necessary faces).
- 3. Tripod construction** - you build and panel four 'single tripods', each consisting of four cubes, and link them together with an additional 4 cubes.

You can find a video of the cube-by-cube construction at [www.megamenger.com](http://www.megamenger.com), and we have made instruction sheets for the other two techniques. Feel free to use whichever one you prefer!

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