

# Building Cubes

## Materials

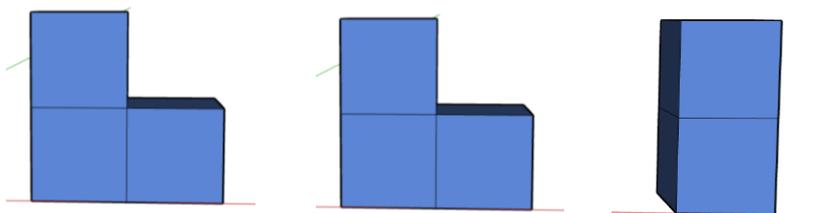
- Board: A3 paper (to be printed and laminated)
- L-shaped cubes options:
  - ⇒ Wood
  - ⇒ PVC
  - ⇒ PLA and a 3D printer

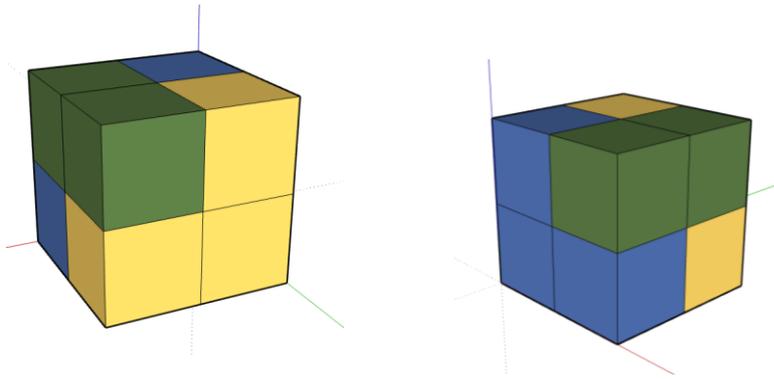
## Brief description

The exhibit is used to assemble a cube of different sizes with L-shaped and double cube pieces. Depending on the complexity, the cube can be a 2 by 2 by 2 (3 pieces) or a 3 by 3 by 3 (7 pieces).

### Creating a 2 x 2 x 2 cube with three pieces:

It uses 2 L-shaped pieces of 3 units and one double cube (the figures below were created using SketchUp). The 2 by 2 by 2 has two solutions.

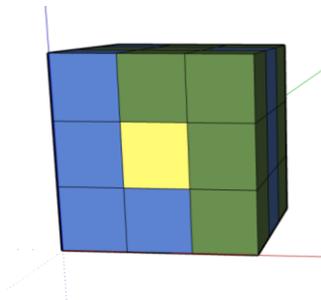
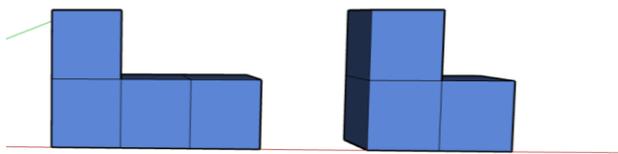




The different colours show how the cube can be formed based on 2 L-shaped pieces and one double cube as an example.

### Creating a 3x3x3 cube with seven pieces:

6 L-shaped pieces of 4 units and one L-shaped piece of 3 units (the figures below were made using SketchUp). The 3 by 3 by 3 has multiple solutions.



## Assembly

### Design of all the pieces

**Pieces of cubes:** The pieces of the two cubes should be of different colours to make it easier for users to distinguish between them. The chosen colours should match the colours of the grids on the board.

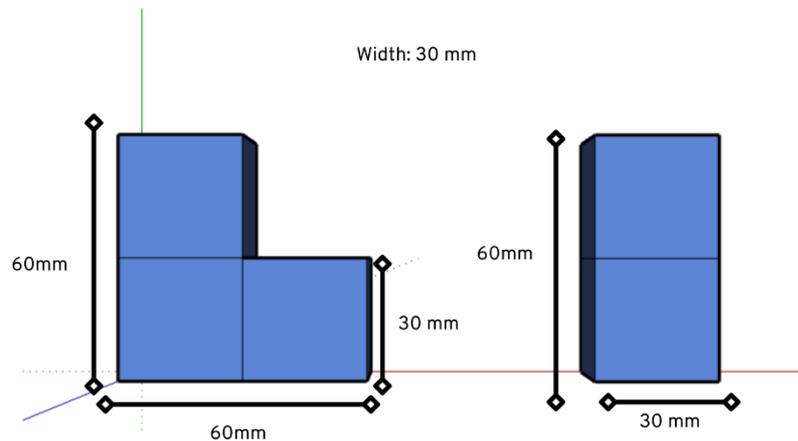


Figure 1. Measurements of 2x2x2 cube pieces

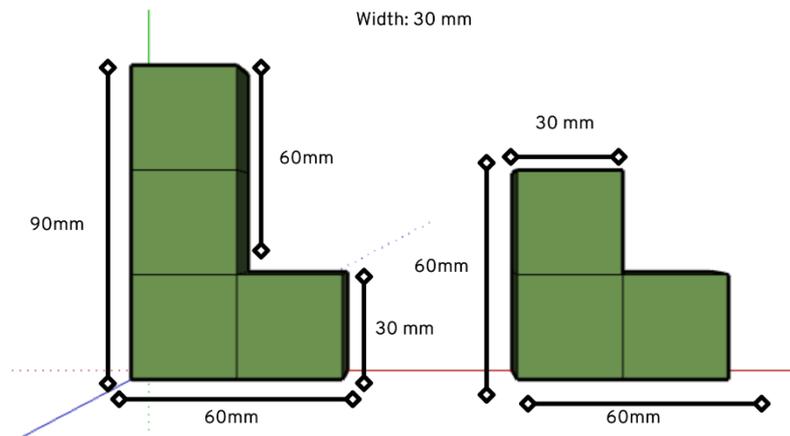
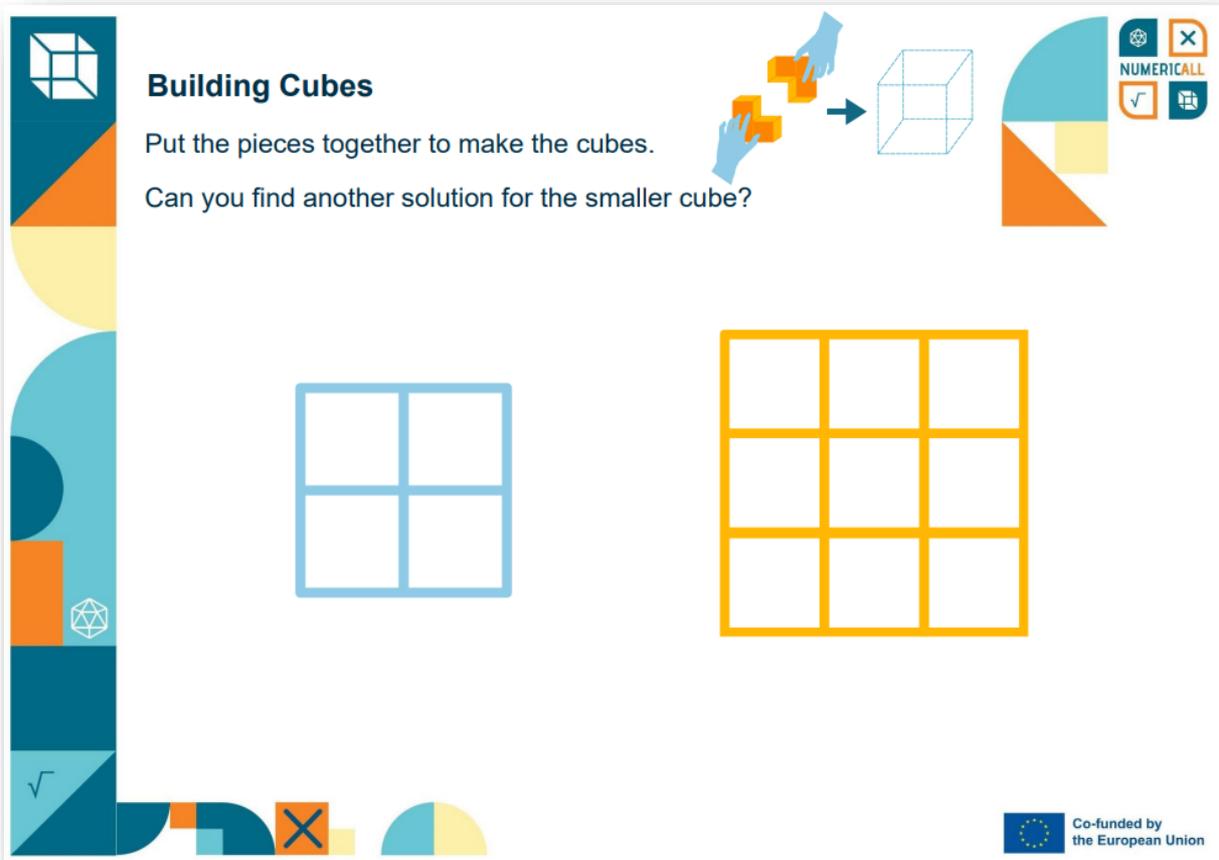


Figure 2. Measurements of 3x3x3 cube

### Assembly

There are no assembly steps required. Once you have the L-shaped pieces and the board, you are ready to use the exhibit.

## The Board (DINA3)



### Other Options

The design of the pieces could incorporate clear divisions between the units to make them easier to distinguish and count. Also, the pieces could have some connecting anchors or magnets to attach and reattach them easily, though this is optional.

### Explanation

This exhibit is used to construct a cube by combining differently shaped pieces. The pieces from the two cubes can also be combined to form cubes with more units. Depending on the difficulty level, the cube can be  $2 \times 2 \times 2$ ,  $3 \times 3 \times 3$ ,  $4 \times 4 \times 4$ , etc., and the pieces can vary in units, containing 2, 3, 4 units or more.

It also offers options for multiple solutions and is open to exploring how a cube can be created. The exhibit aims to engage users in geometrical concepts and increase

their spatial awareness and abstract thinking through a trial-and-error process with multiple solutions.

## Competences

- Abstract Thinking
- Spatial awareness and relationships
- Combinatorics
- Addition/subtraction/multiplication/division
- Geometry

## Observations

The functionality and assembly of this exhibit can be done in multiple ways depending on the materials used to construct the cube.

## For 3D Printers (if applicable)

The pieces of the cube can be constructed using 3D software and printer.