

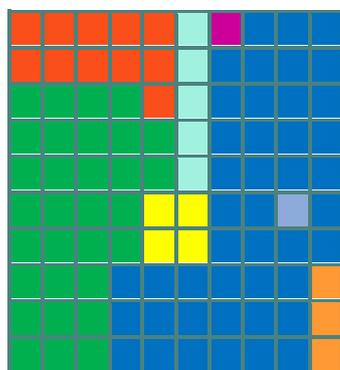
# Statistics Map

## Materials

- Board printed in A3 – preferably laminated
- Scissors
- Glue or tape
- Cubes
  - Paper can be folded to create cubes
  - Can be 3D printed using a standard PLA 3D printer
  - Wooden or plastic cubes can be used as well

## Brief Description

This activity consists of elements of geography, statistics and mathematics. The board is a 10 x 10 grid, with the total surface being 100 squares, representing one percent each. On the grid itself you can observe colored lines which represent borders of selected geographies. Cyprus is orange, Catalonia is red, Portugal is green, Greece is blue, Attica is light blue, Flemish region is yellow, Brussels – Capital Region is Magenta and Walloon region is turquoise. These borders reflect the size of each country or region relative to the sum of the territory of these geographies together.



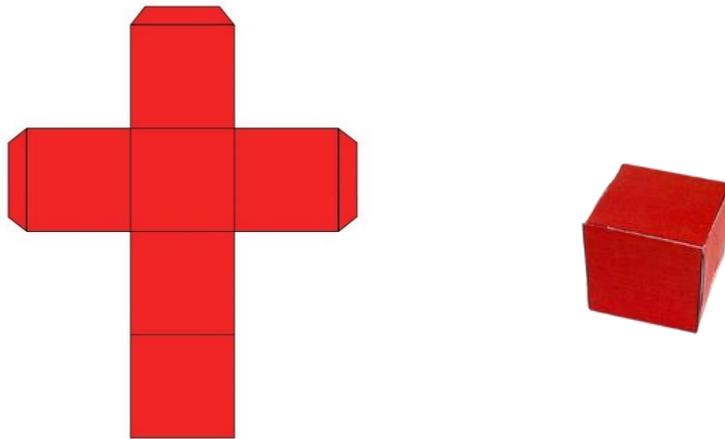
The idea is to use blocks in order to cover the board. However, instead of size, the user must use blocks to represent populations instead. Consequently, the amount of surface populated by each geography will change according to its population density.

Relative to the sum of populations from all geographies, the user is informed that Portugal's population is 25%, Cyprus's 3%, Catalonia's is 18%, Greece's is 26%, Attica's is 9% and is part of Greece, Flemish Region's is 16%, Brussels-Capital Region's is 3% and Walloon Region's is 9%. While, as mentioned, each geography has its color assigned blocks, white or blank blocks may be used for any geography and must be used to supplement any deficit in colored blocks. The user should prioritize the use of colored or assigned blocks wherever possible.

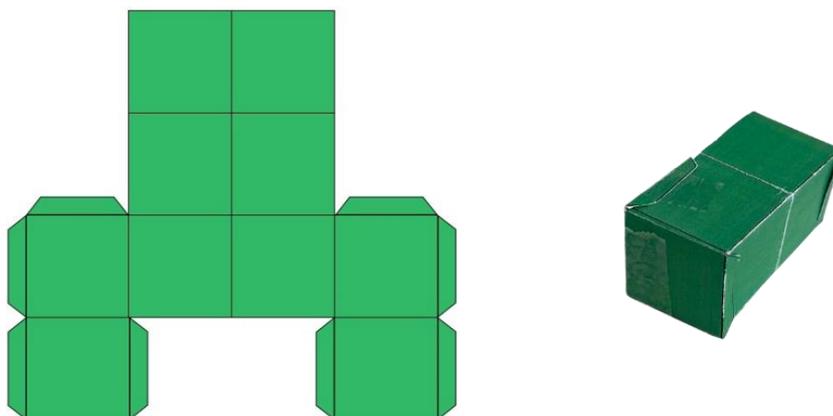
## Assembly

### Types of blocks in terms of size

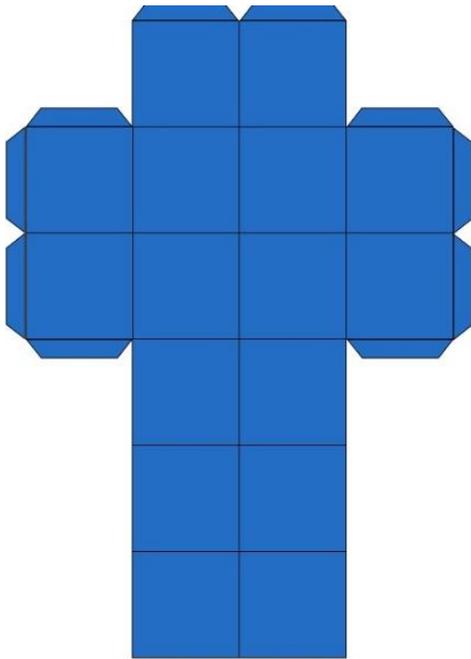
There are four types of blocks: 1x1 blocks, 2x1 blocks, 2x2 blocks and 1x5 blocks.



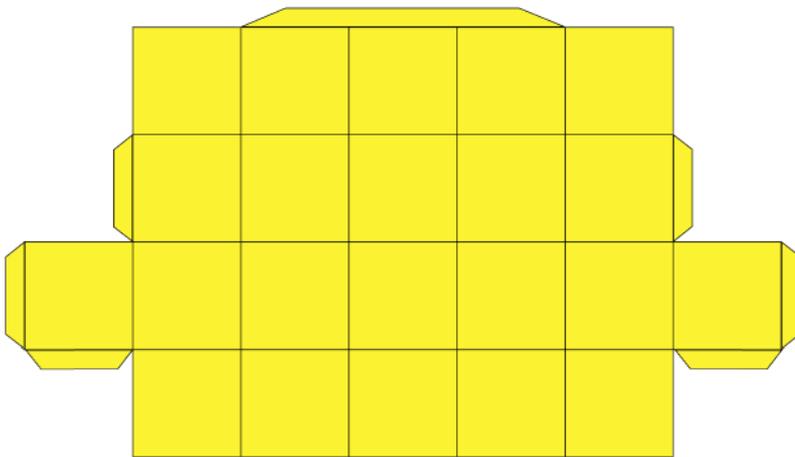
1x1 block



2x1 block



*2x2 block*



*1x5 block*

In total you should print, draw or construct eight (8) 1x1 blocks (1% each), eight (8) 2x1 blocks (2% each), eight (8) 2x2 blocks (4% each) and fifteen (15) 1x5 blocks (5% each). If you use paper, you can print or design the structures on paper and fold them into three-dimensional shapes. The use of glue or tape is recommended to consolidate the shapes once they are folded. Alternatively, you can easily design cubes for 3D printing or use plastic or wooden cubes. You may construct all four types directly or glue individual 1x1 cubes together to create the rest. The recommended size of one block's side is 2.6 cm based on the size of the grid on the A3 paper.

### Types of blocks in terms of colour:

Portugal (green) should have four 1x5 blocks.

Cyprus (orange) should have one 2x1 block and one 2x2 block.

Catalonia (red) has two 1x5 blocks, one 1x1 block and one 2x1 block.

The Flemish Region (yellow) has two 2x2 blocks.

The Walloon (turquoise) region has one 1x5 block.

Brussels (magenta) has one 1x1 block.

Greece (blue) has one 2x2 block, three 2x1 blocks, and two 1x1 blocks.

Attica (light blue) has two 2x2 blocks and one 1x1 block.

The rest are white or unassigned (six 1x5, three 1x1, two 2x2, three 2x1).

Alternatively, if you wish to avoid the use of colours, it is possible to mark the shapes in any possible way to make them distinct.

# The Board (DINA3)

**Statistics Map**

This grid reflects the size of a region or country relative to the total size of these geographies together.

Can you use blocks on the grid to represent the size of population instead? **Portugal's** population is 25%, **Cyprus's** 3%, **Catalonia's** is 18%, **Greece's** is 26%, **Affica's** is 9% and is part of **Greece**, **Flemish Region's** is 16%, **Brussels-Capital Region's** is 3% and **Walloon Region's** is 9%.

Each geography has its individual blocks of the same color but white blocks can be used by any.

**Statistics Map**

This grid reflects the size of a region or country relative to the total size of these geographies together.

Can you use blocks on the grid to represent the size of population instead? **Portugal's** population is 25%, **Cyprus's** 3%, **Catalonia's** is 18%, **Greece's** is 26%, **Affica's** is 9% and is part of **Greece**, **Flemish Region's** is 16%, **Brussels-Capital Region's** is 3% and **Walloon Region's** is 9%.

Each geography has its individual blocks of the same color but white blocks can be used by any.

## Other Options

If 3D printed, the assignment of blocks to geographies can be done through raised pumps on the blocks, which can help adults with visual impairment to understand the region or country.

## Explanation

The exhibit is designed to display how statistical representations of geographies differ depending on the parameters measured. While population is positively correlated with size of geography, smaller regions and highly urbanized geographies may be very densely populated. For example, the Greek region of Attica is only a small part of Greece but contains an enormous part of its population. In this regard, the initial setting of borders on the grid serves the purpose of setting expectations to the user. It is expected for the users to underestimate the number in smaller regions and the element of surprise creates a better learning experience, which helps understanding statistical biases. Statistical analysis can ignore or cherry-pick data depending on geography, which is why it is important for users to understand the basics of it.

The number of colored blocks per geography is random. When the percentage of population exceeds the number of assigned blocks, the user is expected to use white blocks. Be aware that Attica is the only geography within a broader geography within the framework of the puzzle.

## Competences

- Mathematics
- Percentages and fractions
- Geography and demography
- Data visualization

## Observations

The data on size and population number per geography reflects the reality and is collected from available sources. First, the total size is calculated. Then, the surface of every particular geography was divided by the total surface and multiplied by 100 to calculate the percentage of surface covered by it. The same exact procedure was followed regarding population size.

Inevitably, some data was rounded up in order to address the limitations set by the board, as it is impossible to represent fractions of a percentage on a 10x10 grid. However, this does not hinder the main goals or functions of the exhibit in any way as the margins are insignificant.

## For 3D printers

Blocks can be constructed as cubes and groups of cubes with 3D software and a printer.