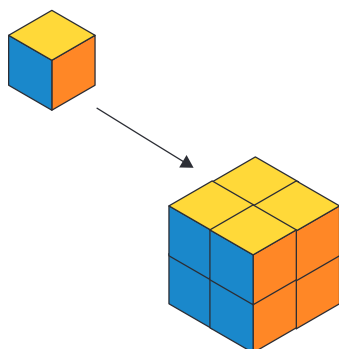# CUBES

The color cubes were first introduced by Percy MacMahon in 1893. There are 30 ways to color a cube with 6 colors so that all 6 colors appear on the cube's 6 faces. To the right is a representation of one of the cubes, with the yellow face on top. The four side faces are green, orange, blue, and red. The 6th face is hidden at the back, but must be purple.

PROBLEM

Start by randomly selecting one of the 30 cubes as the target. The challenge is to find 8 cubes from the remaining ones that can be assembled into a double cube with its outer faces matching the target. In addition, each pair of adjacent faces on the interior of the double cube must match in color. For every target, only one set of 8 cubes can do this, but in two different ways.

SOLUTION

A method to solve the Double Cube problem was presented by Martin Gardner in *Fractal Music, Hypercards, and More*. To the right is a matrix developed by John H. Conway with **15** of the cubes on the upper right, and their mirror cubes on the lower left. Select a cube as target, go to its mirror in the matrix. The 8 cubes lying in the same row and column will provide the solution.

ARTWORK
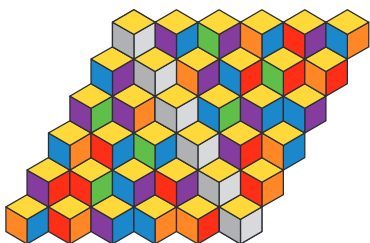
I have created a digital print based on the Conway matrix, using the Tumbling Blocks quilt pattern for its structure. The matrix morphs into a rhombus, the cubes are oriented with one color-side facing up, and only 3 cube faces are displayed. Three such rhombi identify the cubes, and generate the final artwork.

G4G15 Exchange Gift

Tumbling Blocks, Doubling Cubes

Margaret Kepner

Tumbling Blocks, Doubling Cubes
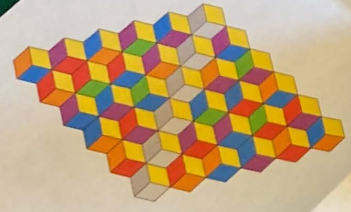
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CUBES

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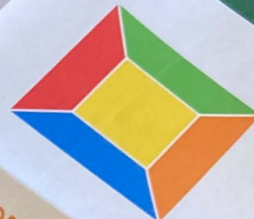
PROBLEM

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ARTWORK

I have created a digital print based on the Conway matrix, using the ... pattern of the ... Blocks quilt. The ...

... and Fractal ... H. Conway with **15** of the cubes on the upper right, and their mirror cubes on the lower left. Select a cube as target, go to its mirror in the same row and cubes lying in the same row and column will provide the solution.