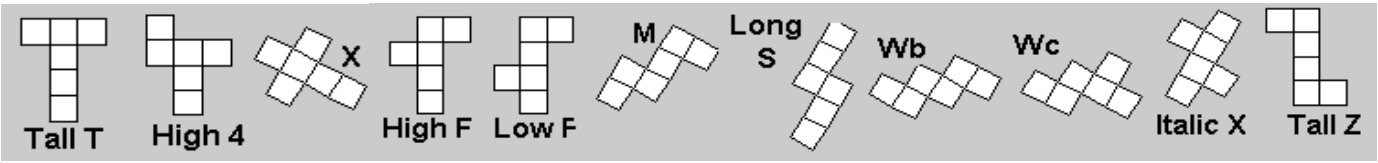
11 Magic Cubes

An original puzzle concept by Kate Jones
presented to the attendees of Gathering for Gardner 11
Atlanta, Georgia—March 2014

Introduction
Hexominoes are shapes made by joining 6 congruent squares on their edges. Of the 35 distinct hexominoes, these 11 can be folded into cubes:



The quaint names make them easier to remember and identify. To see all 35 shapes and names, please visit www.gamepuzzles.com/sxnames.htm .

Magic Squares
Square grids whose cells are filled with numbers so that every row and column has the same sum are known as magic squares. Classically they use consecutive numbers from 1 to *x*, where *x* is the number of cells in the grid.

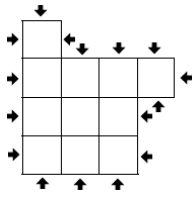
Magic Hexominoes
To make the 11 provided hexominoes "magic", fill their cells with numbers 1 through 6 so that:

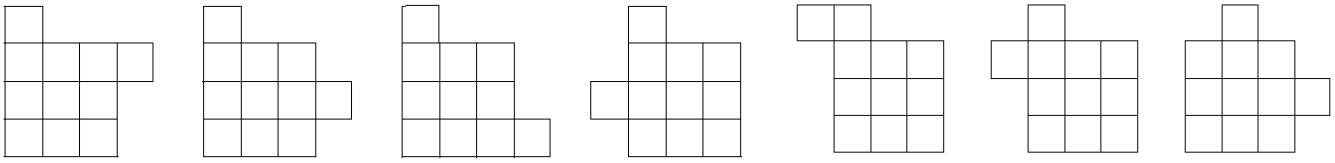
- their rows sum to all *different* numbers, and
- those sums are consecutive integers.

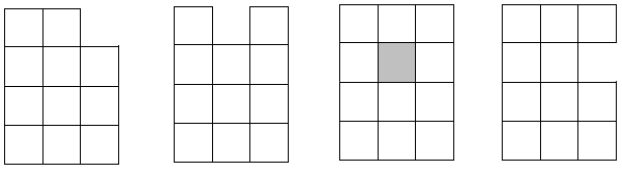
The numbers of rows in the figures above vary from 2 to 5. A row contains at least 2 cells.

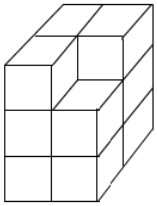
Magic Cubes

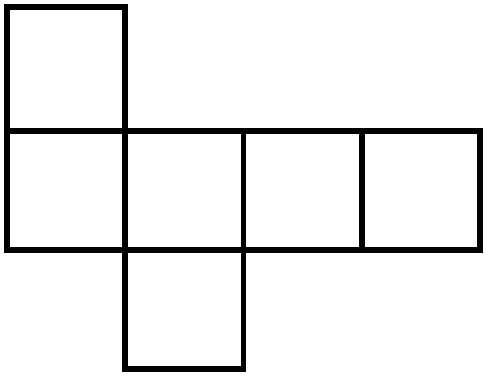
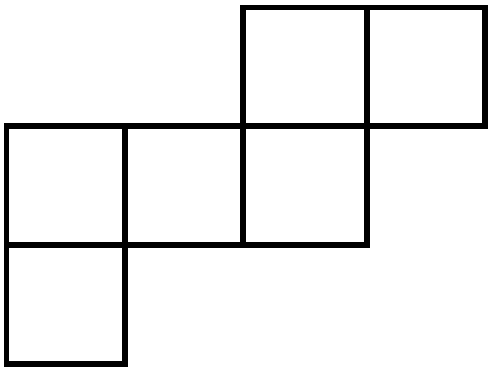
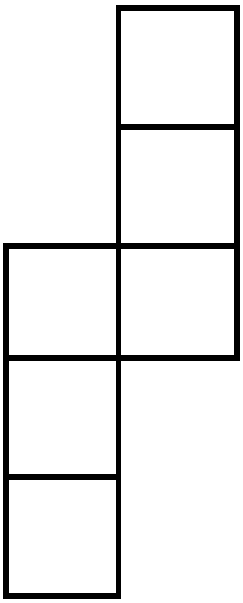
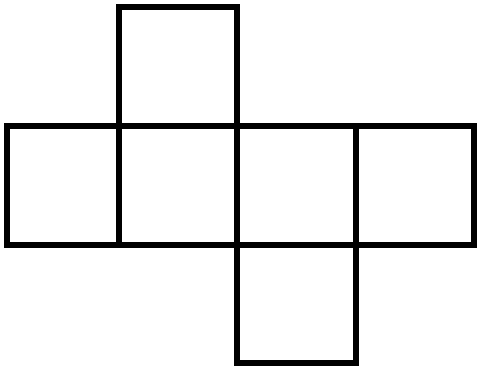
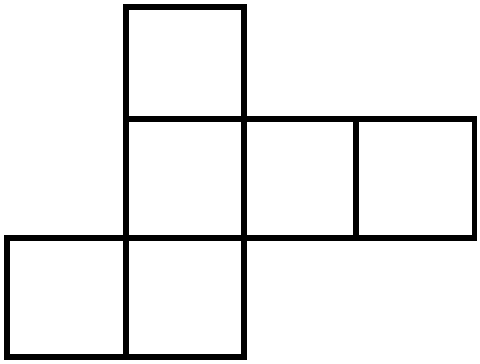
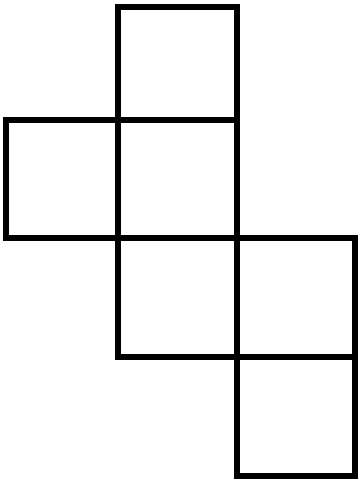
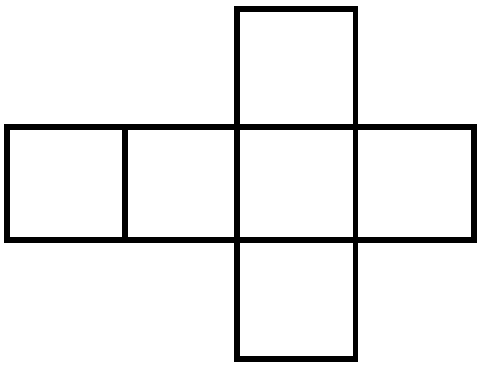
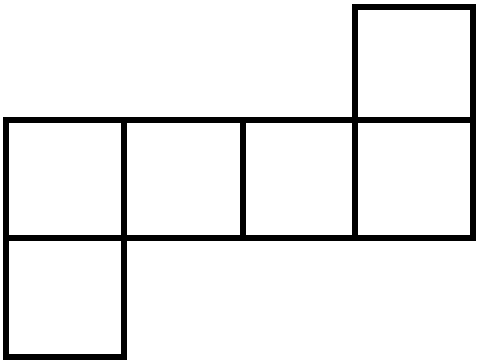
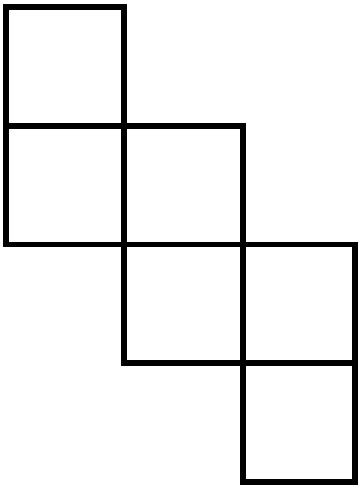
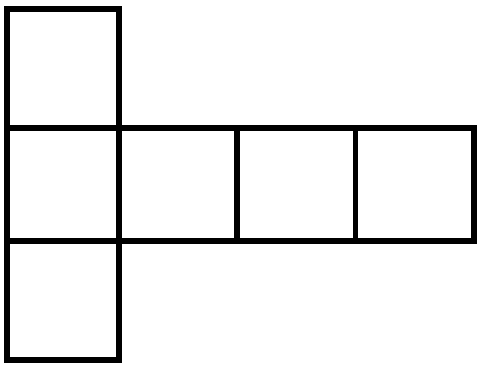
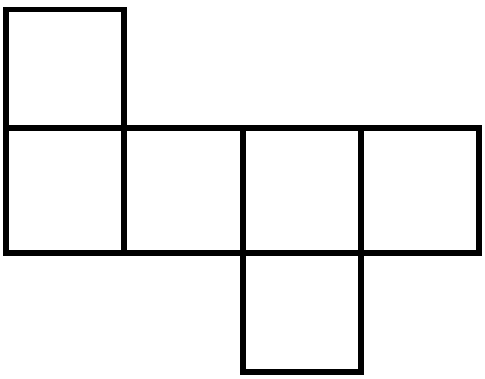
- After filling in your solutions, cut out and fold them into cubes and tape their edges closed.
- Warm-up: fit 9 cubes into a 3x3 so all 6 rows and 4 visible vertical walls have the same sum.
- Arrange the 11 cubes into the 7 figures below so that all rows—north-south and east-west and the vertical walls on all four sides—give the *same* sum. On the verticals, use all the squares you can see, even if some are recessed (arrows).
- Arrange the 11 cubes into the 4 figures (bottom row) so all 11 rows (7 on top, 4 on vertical walls) have *different* sums, and the sums are 11 consecutive integers.









Solve this 3D block so all 6 faces display all *different numbers*, including all 6 visible cells on the 4 vertical faces and 4 cells on top and bottom.

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