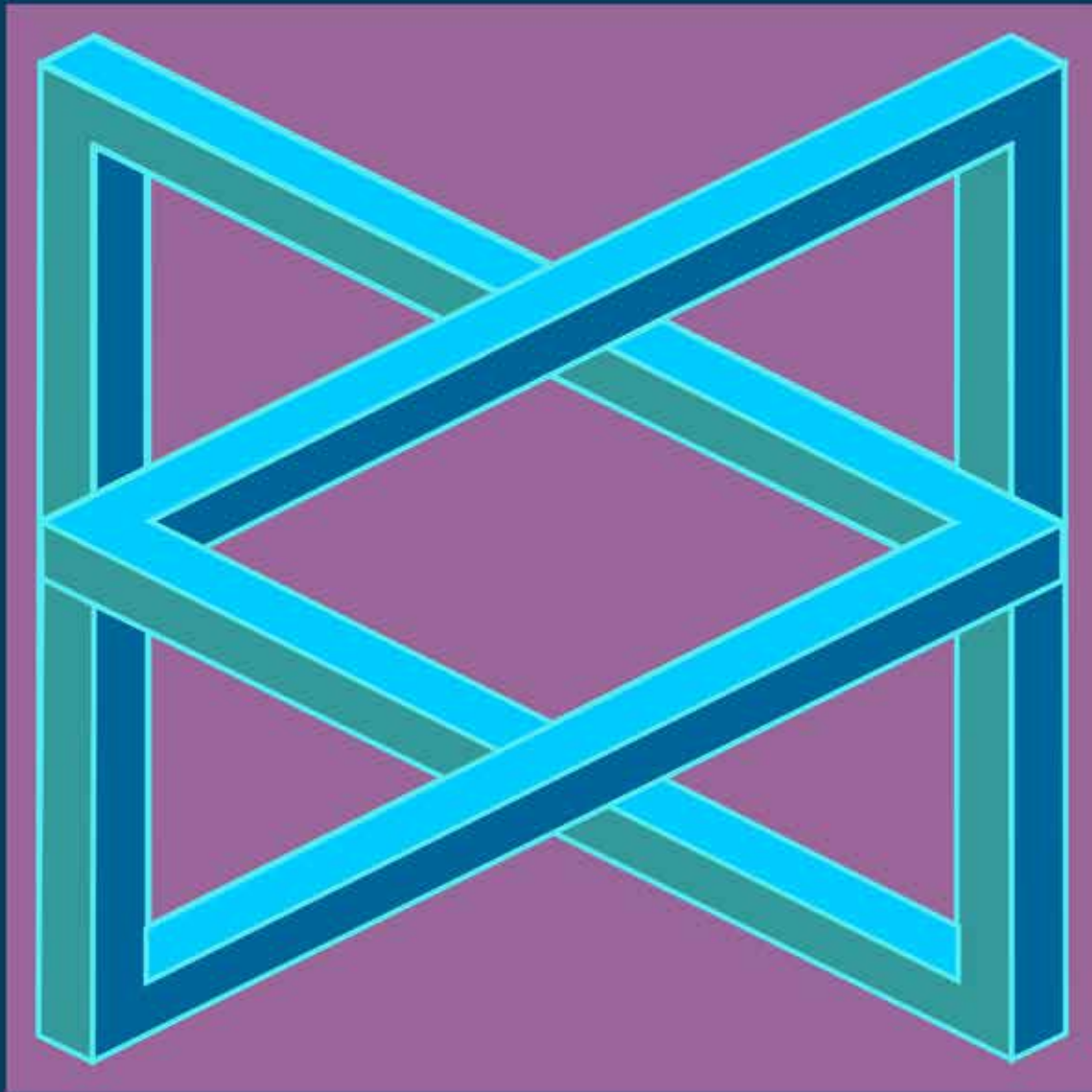


# GEOMETRIC COLORING DESIGNS

3-Isometric Drafting



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# 3D Shapes and Impossible Figures

## Isometric Drafting

ARTISTS WHO WANT TO REPRESENT a three-dimensional object on flat (two-dimensional) paper have three basic options: oblique, isometric, or linear perspective drawing. This math art project explores isometric perspective, as seen in many computer games (do a search for “[isometric game art](#)”). You can read a quick discussion of the other styles on the [Nrich Maths 3D Drawing](#) page.

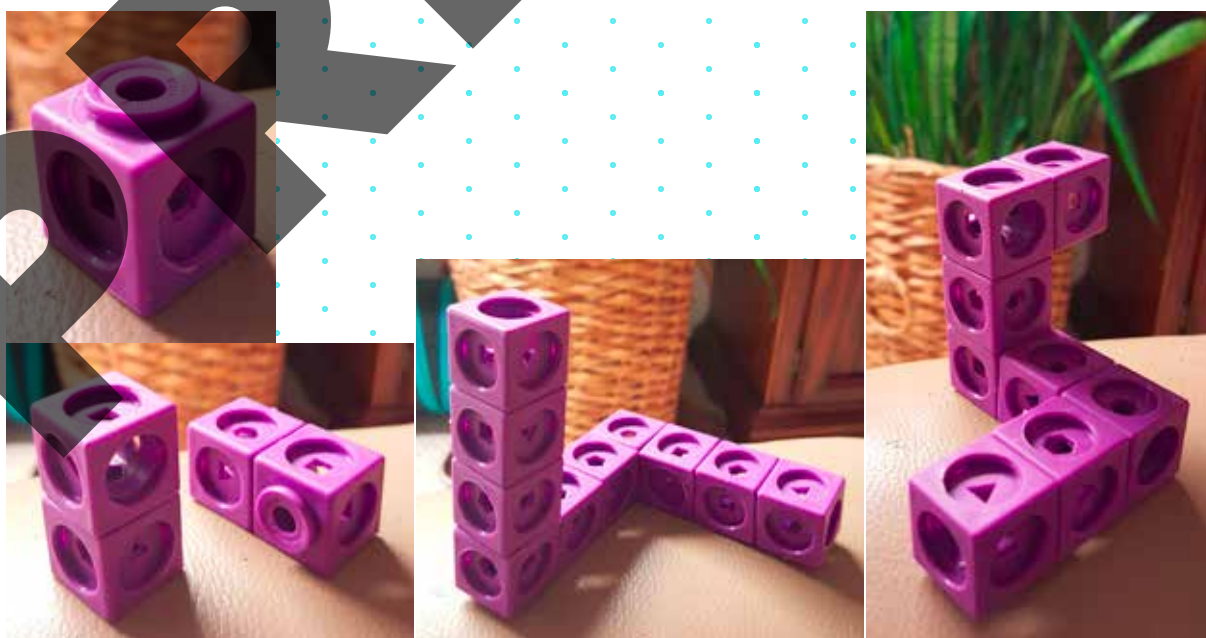
Before you try to draw anything, find a cubic block (or even a cardboard box). Pick it up and look at it from different angles. What do you see? Brainstorm a list of the things you notice.

Can you see the whole block at once? Do the edges appear perpendicular, or do they seem to meet at an angle? How does the light affect the colors of the block's top and sides? Do all the sides of the block look the same, or do they change in different ways as you turn it?

Now take some time to get to know your isometric paper.

First, make sure it's right-side up: Align the paper so you can connect four dots to make a horizontal rhombus that is wider than it is tall. I've provided pages with grids in vertical (portrait) and horizontal (landscape) format, so you can choose the page that best fits what you want to draw.

Notice the lines of evenly-spaced dots running at  $120^\circ$  angles to each other. Trace them with your finger. One set of dots slants from top right to bottom left. Another set slants from top left to bottom right. And the third set goes up and down. By following



this grid, you'll create pictures that appear three dimensional—even if they could never be built in the real world.

Some of the dot grid pages come in pairs. My students complained that the fine dots, which I prefer, were too faint to see. So I made a bolder-dots version of each page.



## How to Draw Minecraft Blocks

### (1) Make a Y.

Choose a dot to be the top front corner of your cube. From that dot, draw three lines that make a Y shape: one straight down, one up to the right, and one up to the left. Follow the grid to the next dot in each direction. That makes three edges of your cube.

### (2) Turn it into an M.

Make the two side edges of your cube by drawing lines from the two top points of your Y straight down to the next grid dot. These new lines will not come as far down the page as your first vertical line (the middle of your M).

### (3) Slant down for the bottom.

Connect the three vertical lines at their bases to make the bottom of your cube. Remember to follow the slanted lines of the isometric grid.

### (4) Slant up for the top.

Finish the top of your cube by turning the top of the Y into a rhombus. It should look like a diamond lying on its side.

The most common problem for beginners is that they try to make the base straight. Children know a block can sit on a table, so the bottom has to be flat, right? But once students get a feel for how the isometric grid works, they can really take off and have fun.

**PREVIEW**

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