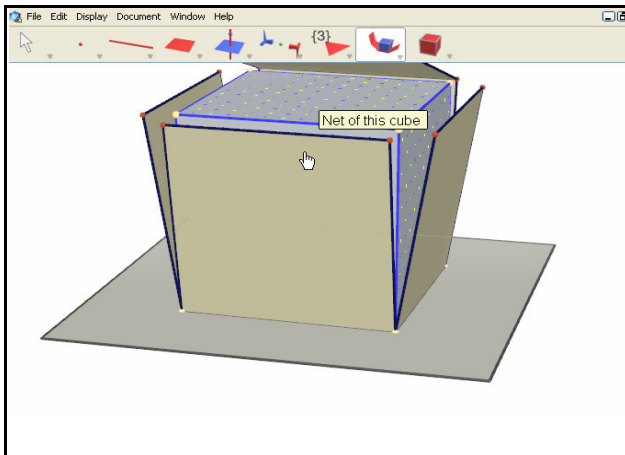


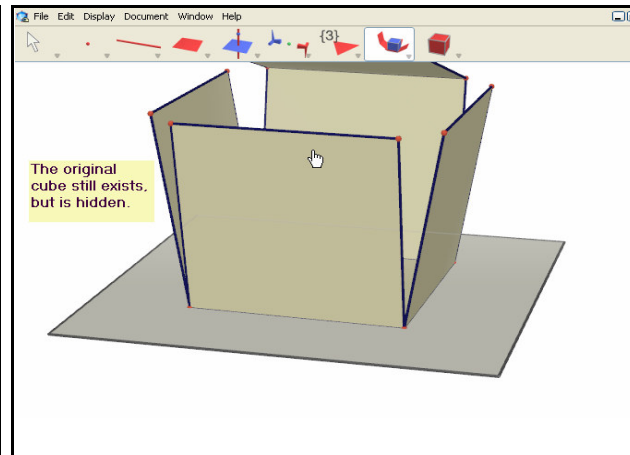
Start by constructing a cube on the grey base plane using the **Cube** tool in the last toolbox of the tool bar. Now select the **Open Polyhedron** tool.

1



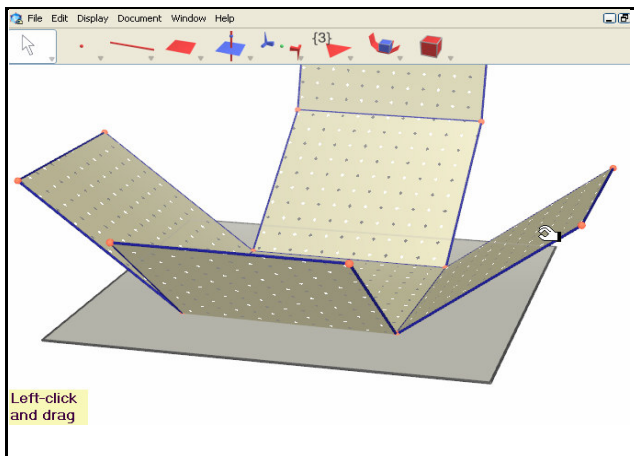
Select the cube.

2



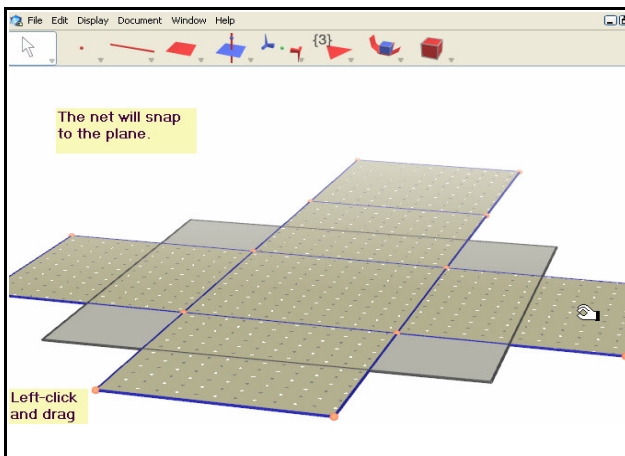
The net is created and the original cube is hidden.

3



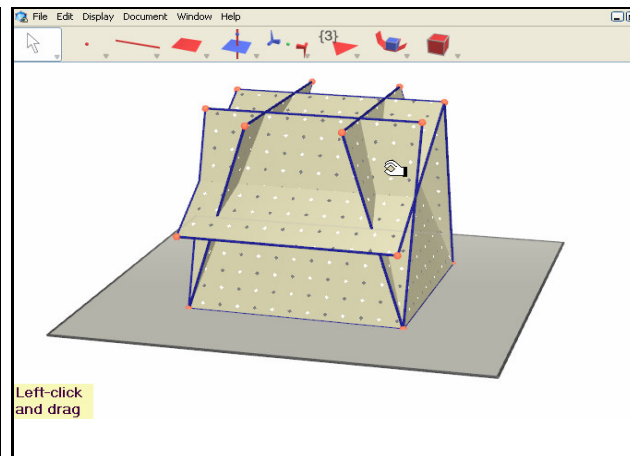
Drag the net to open it.

4



When the net is near the base plane, it will snap to the plane.

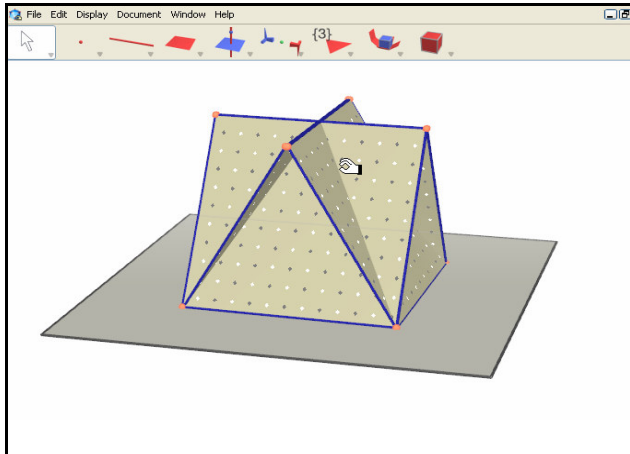
5



The net can also be folded so that squares intersect.

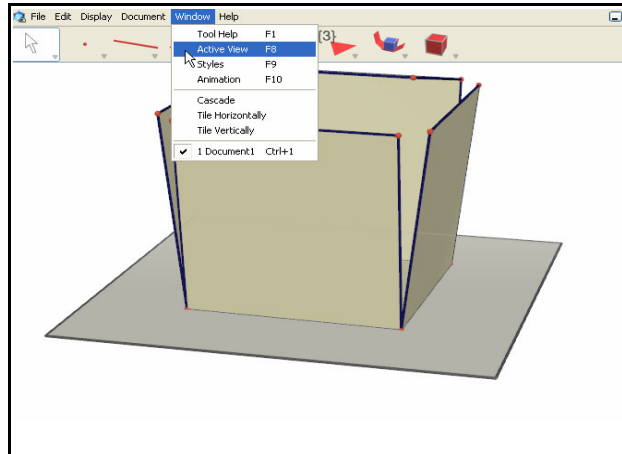
6

Activities with a Cube Net



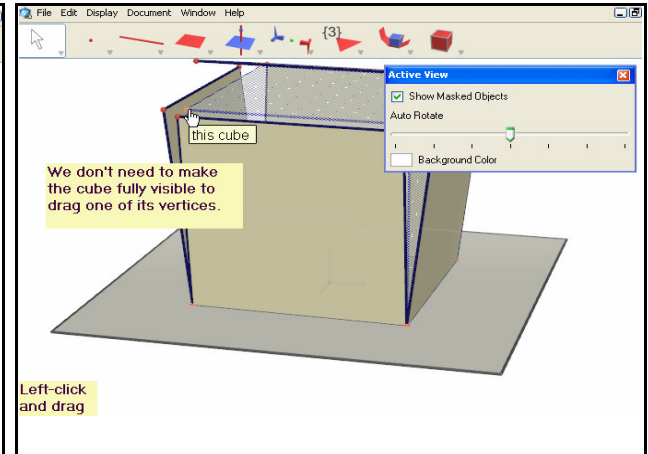
A new shape emerges.

7



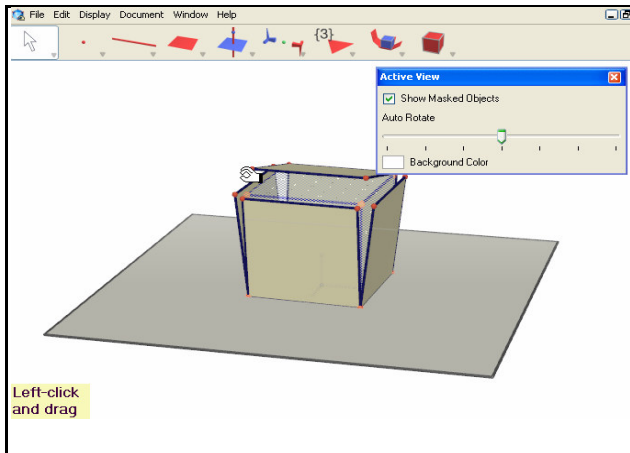
The size of the net can be changed by manipulating the underlying cube. First, make the **Active View** panel appear.

8



Click on **Show Masked Objects** and select a vertex of the cube.

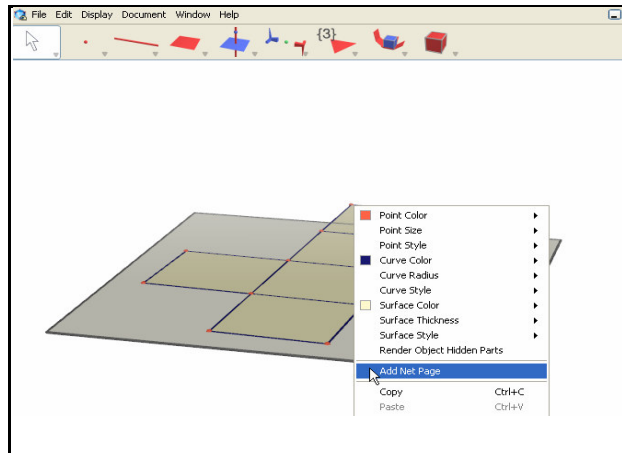
9



Left-click and drag

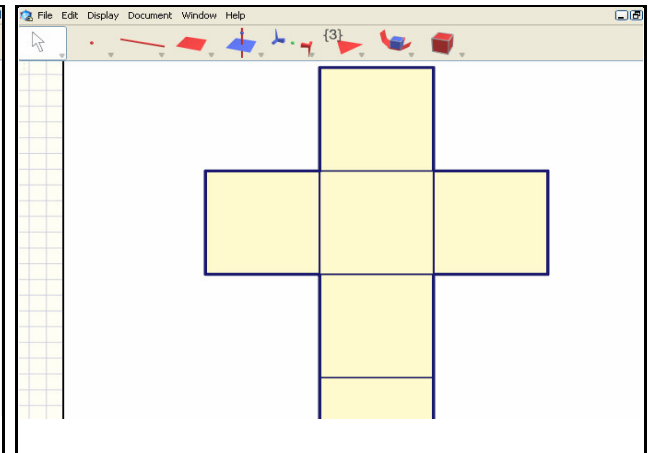
Drag this vertex to make the cube smaller.

10



To create a net that can be printed, right-click on the net and then select **Add Net Page** from the contextual menu that appears.

11



The net will appear in a new page below the original page. Scroll up to return to the original page.

12

Activities with a Cube Net

Three objects have been created.

This segment

This square

This point

Puzzles can be made using the cube net. The first puzzle involves identifying the points and segments that will meet the ones constructed above when the net is folded and identifying the square that will be opposite the one above when the net is folded.

13

Now let's fold up the cube to see if we have guessed correctly.

Two points, a segment and a square have been created. The net can be folded to check whether or not these are the correct objects.

14

We were right with the points, but wrong with the segment.

The points are correct, but not the segment.

15

Correct with the square!

To check whether the square is correct, the contextual menu has been used to make the net transparent.

16

Can you create segments on the flattened net that would "wrap" the cube as shown in the two pictures?

Create some puzzles like these with the nets of other polyhedra.

Here are some further puzzles.

17

Here is the square.

Alternate nets for the cube can also be created. Here, a square has been added to the net by first creating and then rotating a square formed from part of the original net.

18

Activities with a Cube Net

Let's guess that it's this square.

A polygon has been created, coloured red and given the small hatches surface style.

The red square has been created, with the conjecture that this square can be replaced by the new square.

19

Yes!

When the net is folded, the new square and the red square coincide. Hence the new square can replace the red square.

20

The net can now be printed.

In order to make a net that can be printed, the net has been flattened, further squares have been created and then the red square, the net and the base plane have been hidden. The viewing angle has been changed so that the squares are viewed from directly above the base plane.

21

Challenge: how many ways can you add a square to this net to replace the green striped square?

Explore alternative nets for other polyhedra.

Further challenge: can you create a net composed of shapes other than squares? You might want to start by replacing parts of squares with triangles.

Here are some further puzzles involving alternate cube nets.

22

Use the Cut Polyhedron tool to slice off the top part of the cube (as shown in the sliced cube demo) and then hide the plane.

Next, create a net for this polyhedron.

What happens if you fit two of these polyhedra together?

Nets of irregular polyhedra such as the one above can also be created. Here the **Cut Polyhedron** tool has been used to slice the cube by a plane which passes through the midpoints of three of its edges

23

Imagine unfolding this net.

What sort of symmetry does it have?

How does this differ from the symmetry of the cube?

Explore the nets of other irregular polyhedra. Is it possible to find a net with 8 lines of symmetry? Can you find any nets that have no lines of symmetry but have rotational symmetry?

The net has been constructed by using the **Open Polyhedron** tool.

24