

## Introduction to 3D Mesh Objects

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### Introduction

AutoCAD 2010 introduces a new kind of 3D object, called "3D mesh objects" or "surface meshes." These new objects act quite differently from AutoCAD's other 3D objects, because they are meant for conceptual modeling. Their surfaces can be pushed and pulled in unusual ways.

In this tutorial, you are introduced to 3D mesh objects.

### Tutorial: Mesh Modeling

1. Start AutoCAD 2010 with a new drawing using the *acad3d.dwt* template file.
2. If necessary, switch to the 3D Modeling workspace.
3. Click on the **Mesh Modeling** tab -- an entire tab just for creating and editing 3D mesh objects.
4. Draw a mesh box, as follows:
  - a. Click the **Mesh Box** button.



*Figure 1: The Mesh Modeling tab.*

- b. In the command prompt area, AutoCAD asks you to specify the corners and height of the box. Ignore them. Instead, just pick points in the perspective 3D drawing area:
  - Pick two points for the base.

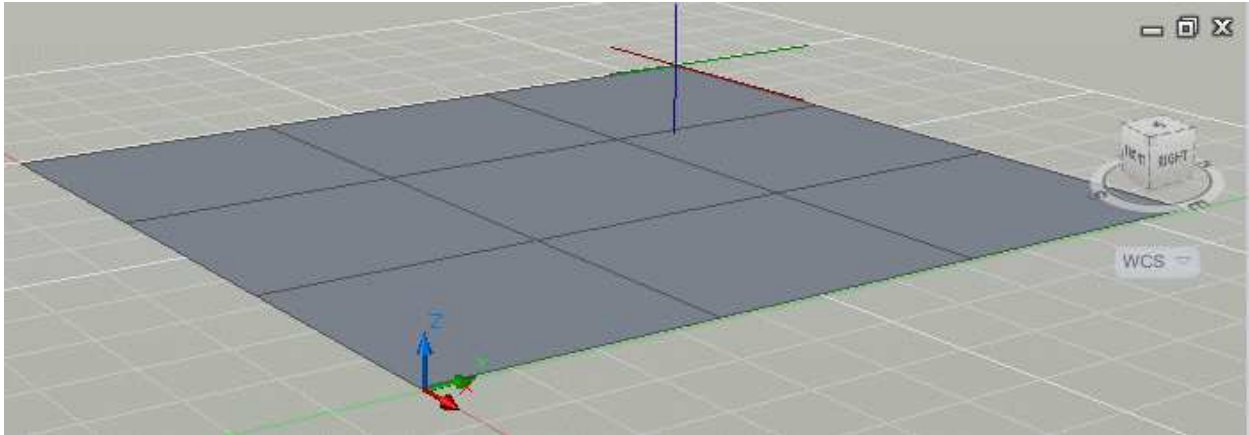


Figure 2: Drawing the base of the 3D mesh box.

- And then pick another point for the height.

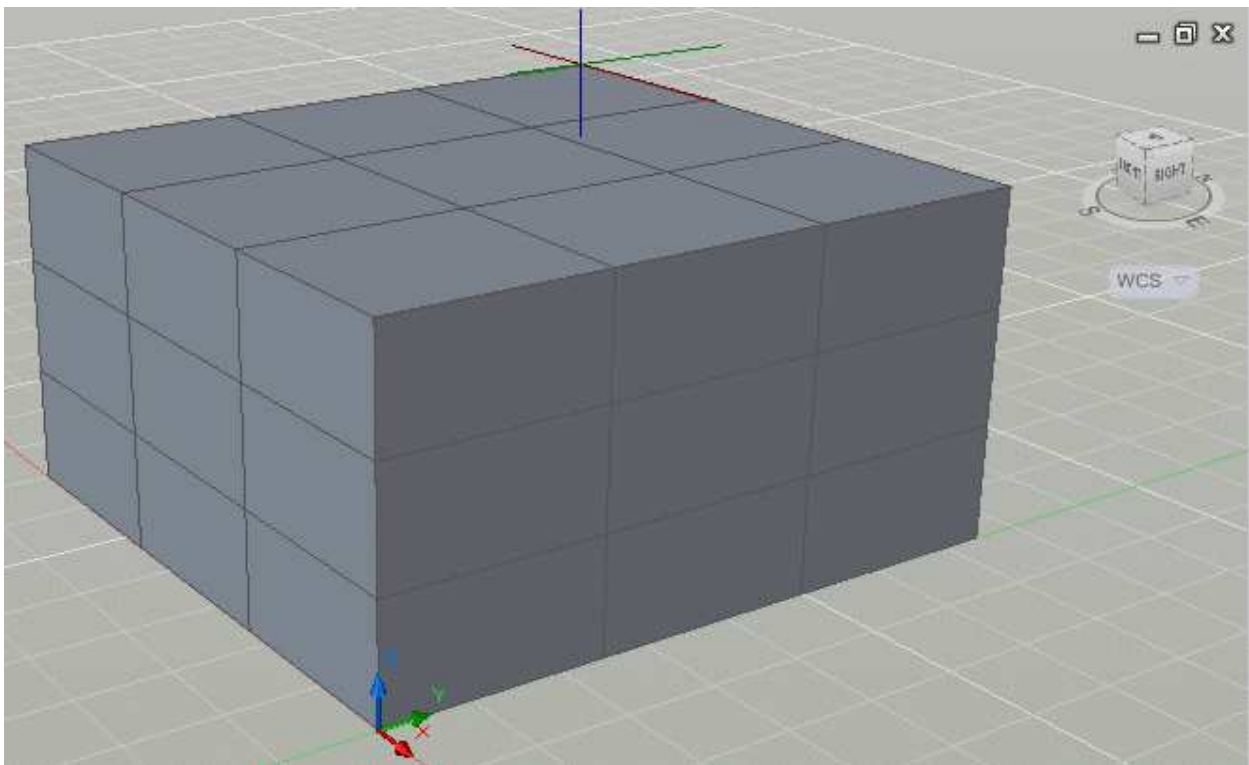


Figure 3: Indicating the height of the 3D mesh box.

Three picks, and the box is drawn!

Once a 3D mesh model is drawn, there are a number of operations you can perform. We'll look at one in this tutorial, push and pull; we'll look at some of the others in the next tutorial.

5. Pass the cursor over the box. Notice that all the vertices are highlighted. If you were to click now, the entire box is selected. However...

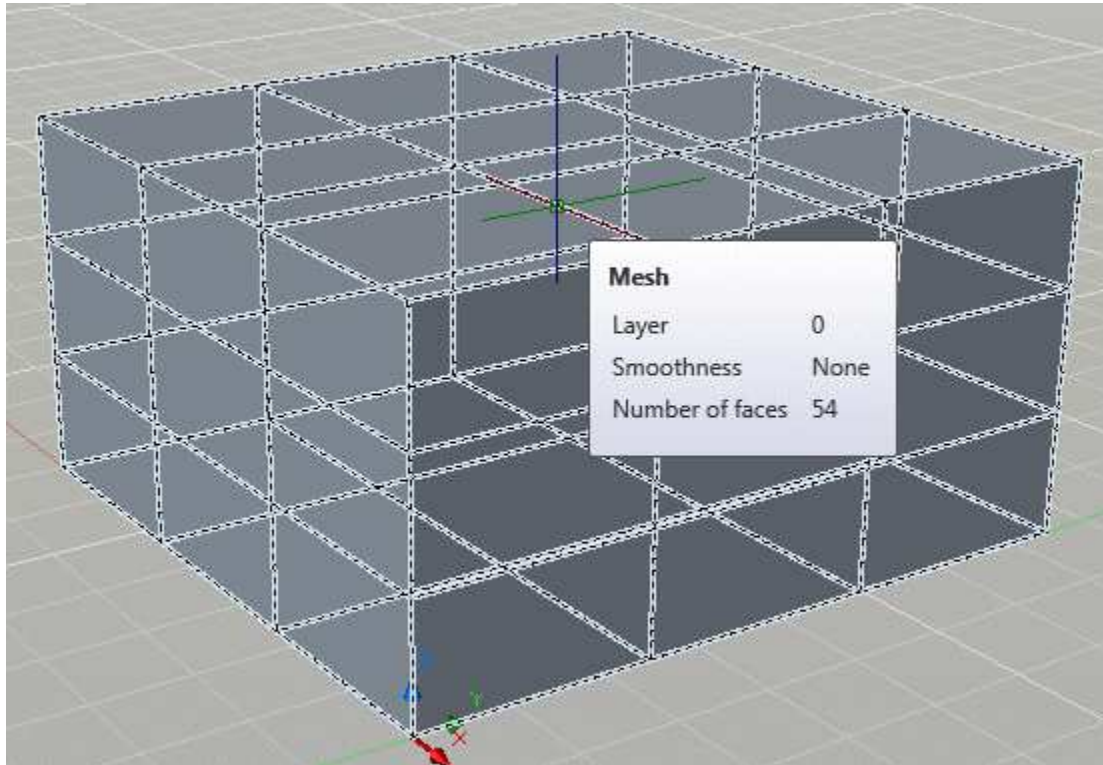
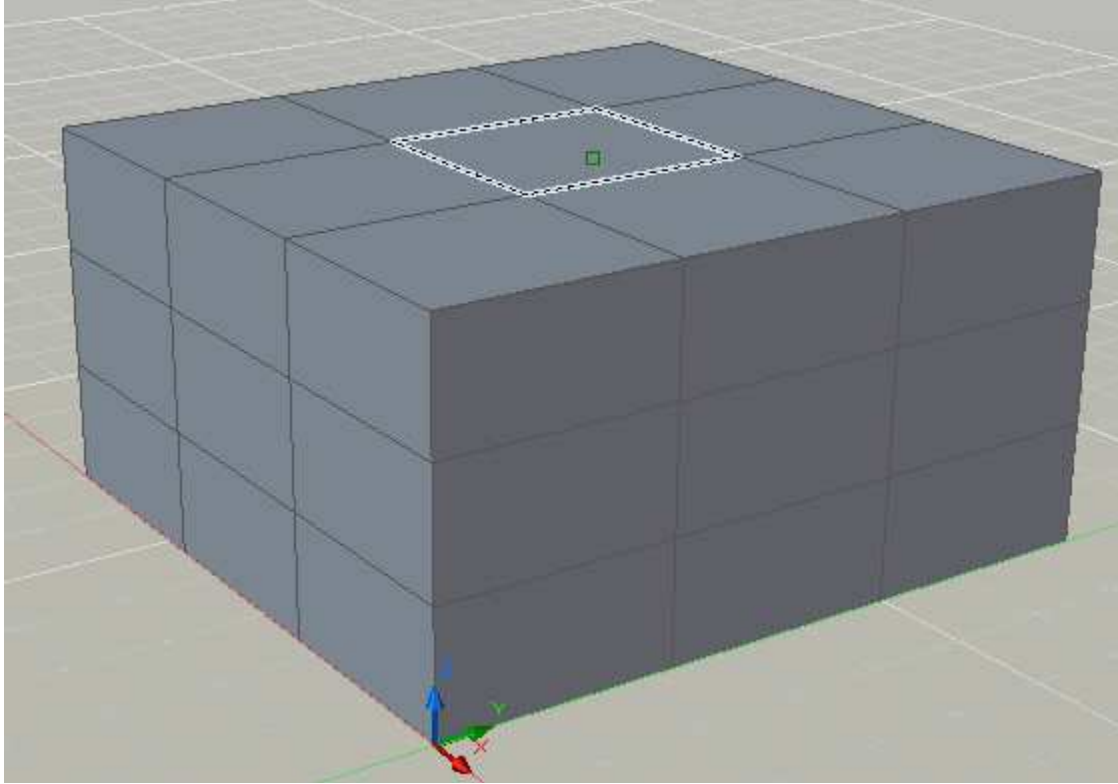


Figure 4: The entire 3D mesh box highlighted.

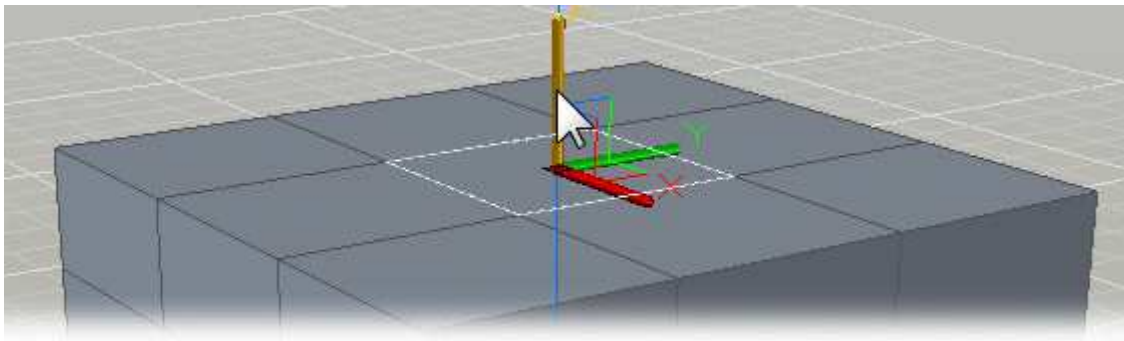
...instead, hold down the **Ctrl** key. Now when you move the cursor around the box, individual faces are highlighted. This is how you can edit parts of 3D mesh models.

**TIP** While the **Ctrl** key is held down, you can select additional faces.



*Figure 5: Highlighting a single face on the 3D mesh box.*

6. Click on the face. Notice the local UCS icon.
7. Move the cursor around the icon until the blue Z axis bar turns to gold.



*Figure 6: Selecting the z axis.*

**TIP** The local USC icon is called the "triad." It is used to move, rotate, and scale faces. Right-click the triad, and then chose an editing mode from the shortcut menu.

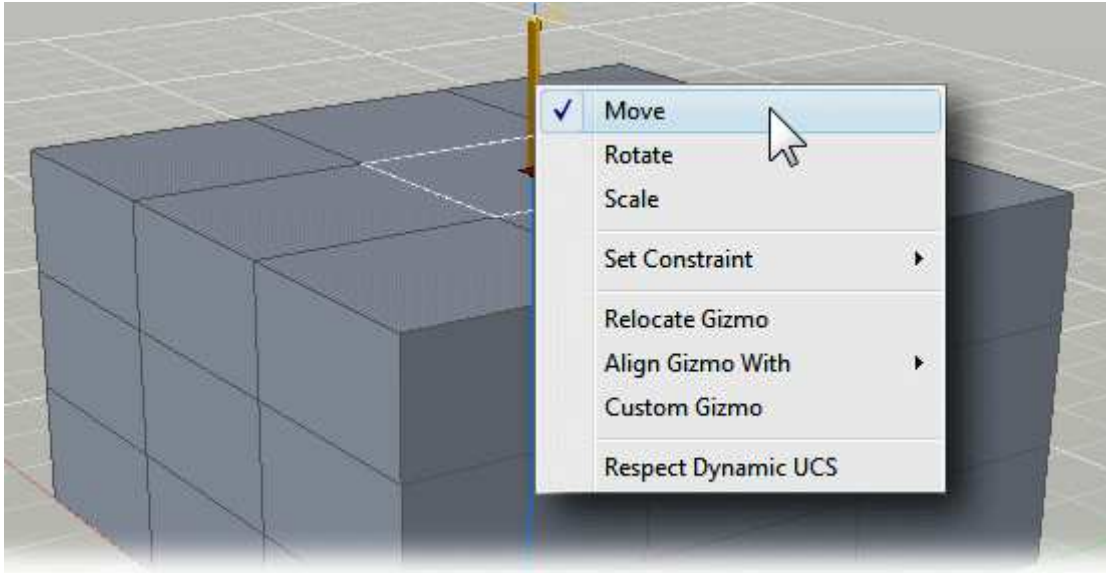


Figure 7: Triad editing choices

8. Now drag the axis up and down. Notice how the mesh surface reacts.

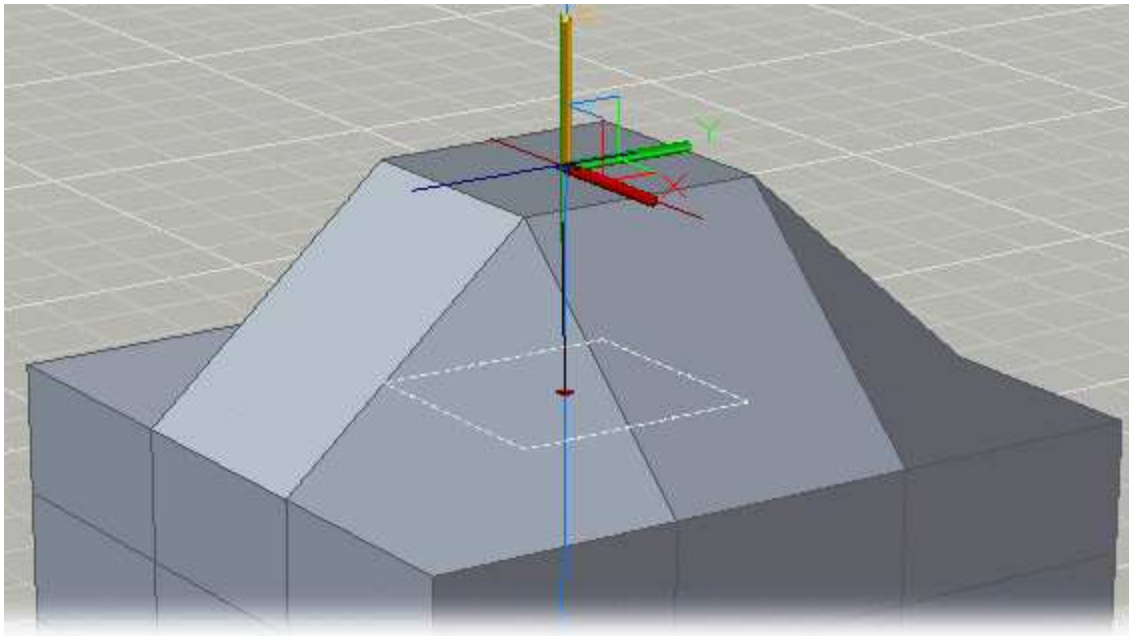


Figure 8: Dragging the surface in the up Z direction...

3D mesh objects are unique in AutoCAD, because adjacent faces partially drag along with the selected one.

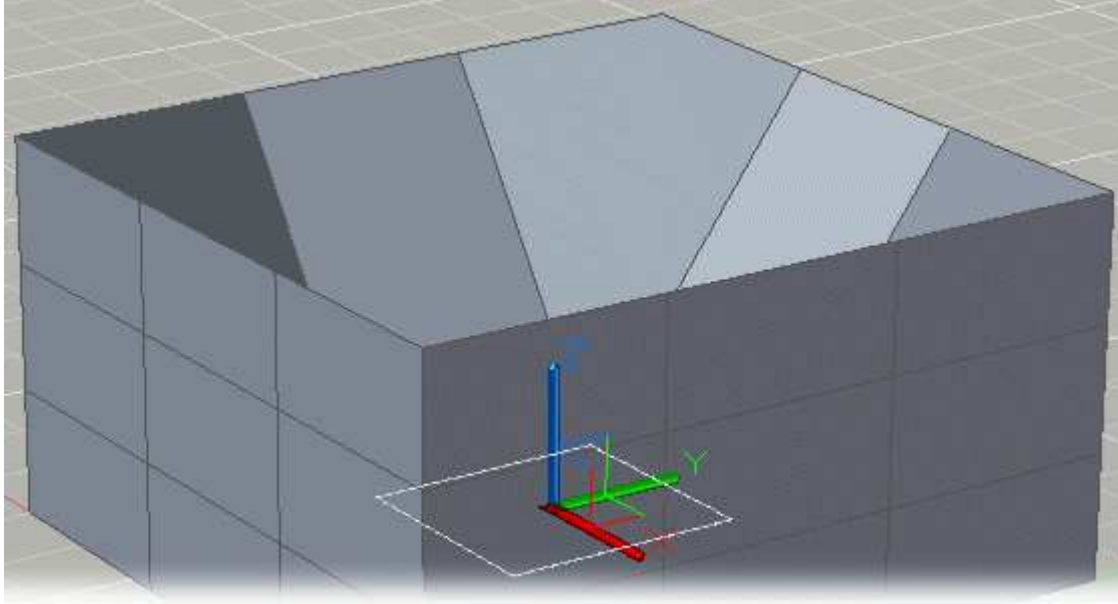


Figure 9: ...and down.

9. You can use the X and Y axes to drag the surface sideways, as illustrated by the figure.

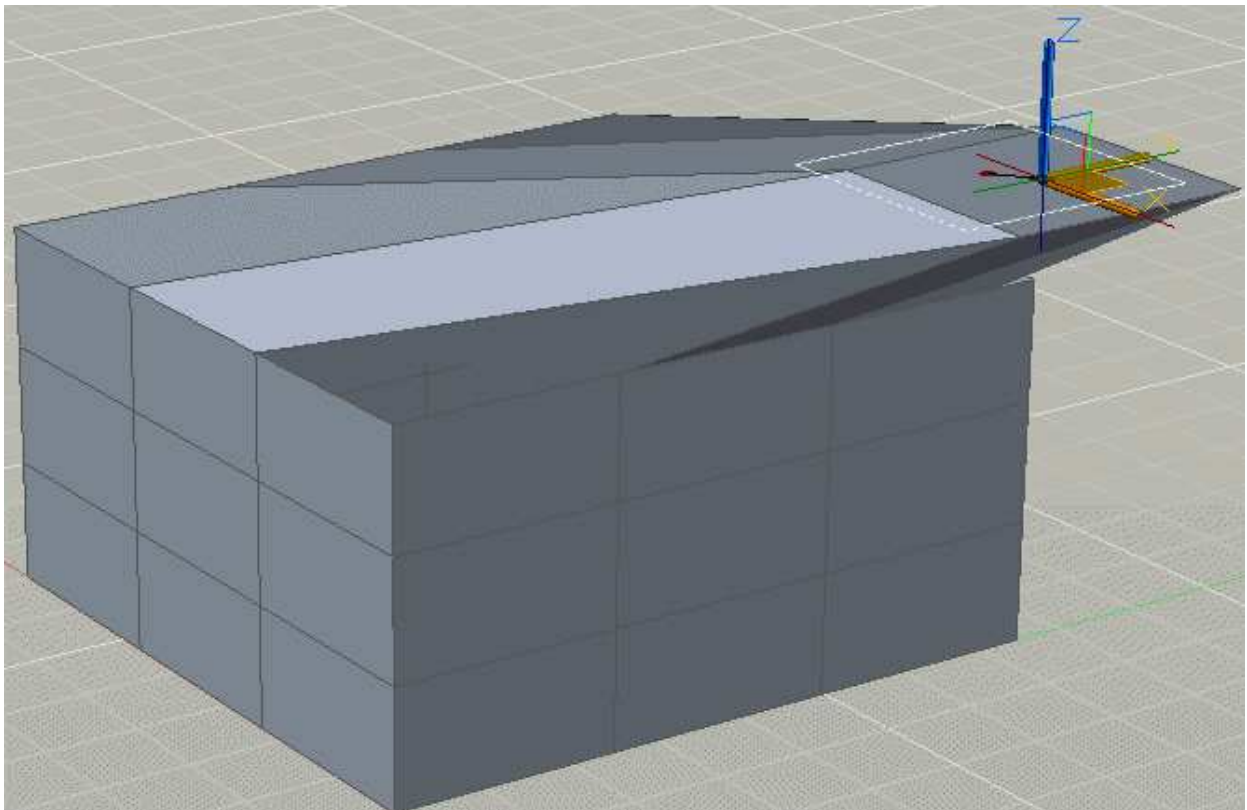


Figure 10: Dragging the face sideways.

10. This ends the tutorial. You will use the drawing in the next tutorial, so save it as

"Mesh-1.dwg."

## Test Yourself

1. How do 3D mesh objects differ from AutoCAD's other 3D objects?
  - a. They are hollow.
  - b. When a face is moved, the entire model moves along.
  - c. When a face is moved, adjacent faces partially move along.
  - d. They come in nice colors.
2. What effect does the **Ctrl** key have on selecting 3D mesh objects?
  - a. No effect.
  - b. The entire model is selected.
  - c. The inside of the model is selected.
  - d. Individual faces are selected.
3. The local UCS icon is known as the Triad.  
True/False.
4. Faces can be dragged in any direction.  
True/False
5. In addition to moving faces, how else can the triad be used?
  - a. Rotating faces.
  - b. Scaling faces.
  - c. Both of the above.
  - d. None of the above.

*Answers:*

1. *c. When a face is moved, adjacent faces partially move along.*
2. *d. Individual faces are selected.*
3. *True*
4. *True*
5. *c. Both of the above.*