

How to create 3D models and objects

3D software is a great way to create stunning three-dimensional designs and objects (**Figure 1**). Photoshop offers a full suite of 3D image tools for creation, editing, animation, and printing. In this guide, you'll get an overview of the 3D tools available in Photoshop. This guide provides a quick intro to the power of 3D; there's so much more to learn and accomplish using these tools.



Figure 1 Illustration of an 3D automobile model showing mesh, materials, and lighting

3D fundamentals

Let's take a look at the basics of 3D in Photoshop. The tools, objects, and camera views in the app allows you to create, position and animate 3D models. A Photoshop 3D file consists of the following components: meshes, materials, and lights.

Meshes supply the underlying structure of a 3D model. A *mesh* is often visualized as an interlocking framework, a skeletal structure built from thousands of individual polygons (**Figure 2**). A 3D model always has at least one mesh and may combine multiple meshes. In Photoshop you can view meshes in a variety of render modes, and manipulate meshes independently of each other. While you can't alter the actual polygons in a mesh, you can change its orientation and transform it by scaling along different axes. You can also create your own 3D meshes, using pre-supplied shapes or by converting existing 2D layers.

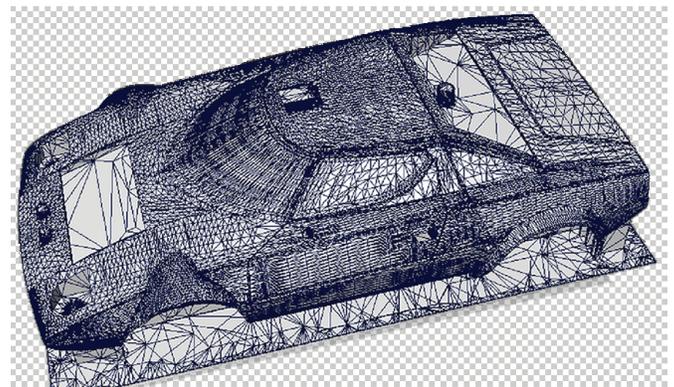


Figure 2 The basic mesh for a automobile model

Materials provide the look and feel for a model. A mesh can have one or more materials associated with it, which control the appearance of all or part of the mesh. The material, in turn, relies on subcomponents called texture maps, whose cumulative effect creates the appearance of a material. The texture map itself is a 2D image file that creates various qualities such as color, pattern, shininess, or bumpiness (**Figure 3**). A Photoshop material can use up to nine different texture map types to define its overall appearance.

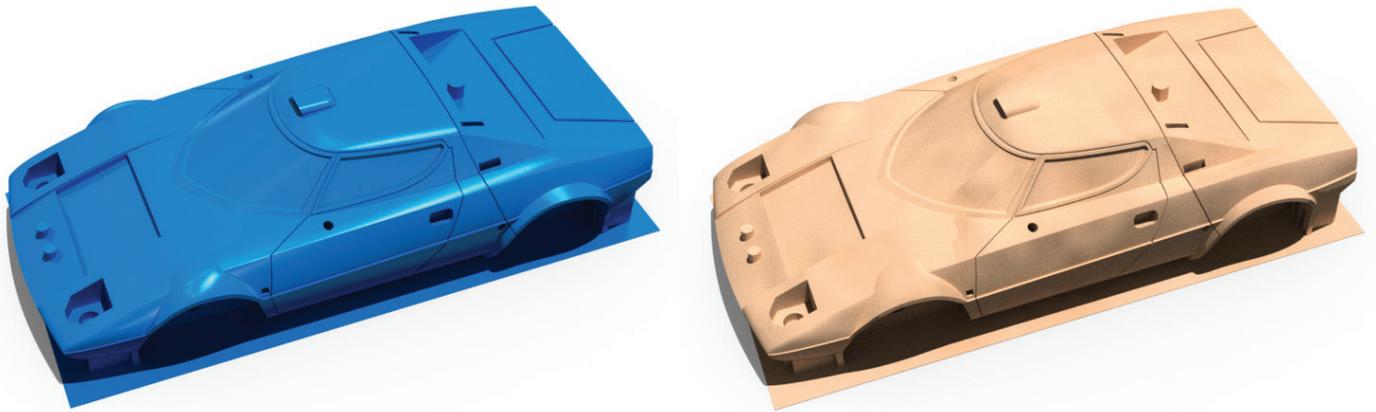


Figure 3 A comparison of materials and textures, smooth glossy plastic (left) and rough balsa wood (right)

Lights enhance an object's 3D and aesthetic characteristics and give perceived depth to a scene. Type of lights includes Infinite, Spot, Point lights (**Figure 4**), as well as image-based lights that wrap around a scene. You can move and adjust color and intensity of existing lights, and add new lights to your 3D scene.

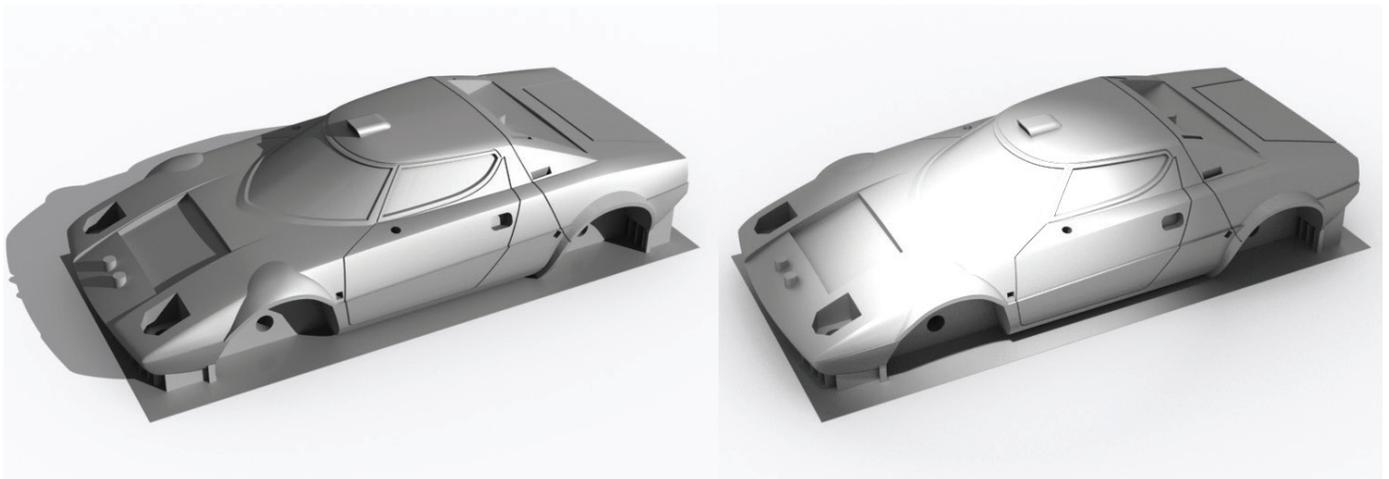


Figure 4 A comparison of light sources, Infinite Light (left) and Spot (right).

Credit: [Lancia Stratos by MakerBot](#), CC BY 3.0.

You can work through the steps in this guide using your own files or download the assets used in [this tutorial here](#).

The 3D workspace

When you create a 3D file or open an existing 3D file, Photoshop gives you the option of working in the 3D workspace (**Figure 5**). This workspace optimizes all the tools and panels you'll need to manage and manipulate meshes, materials, and lights. You use the 3D object tools to change the position or scale of a model, use the camera views to change perspective angles of a scene, and various panels to select and refine model settings. Here's a quick overview of the main components of the 3D workspace.

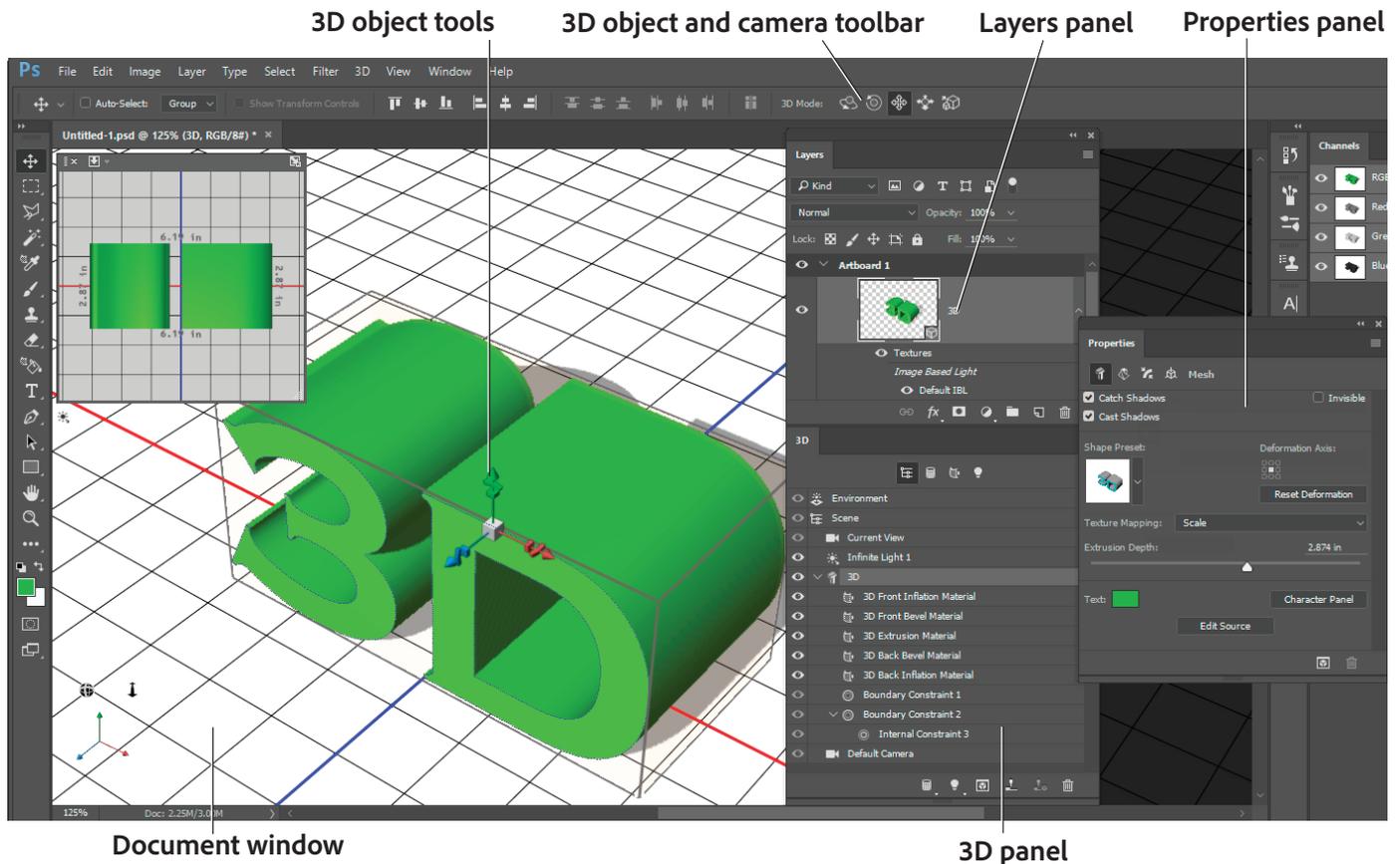


Figure 5 Document window and select panels of the 3D Workspace

Manipulating a model

The 3D object tools let you resize, rotate, or reposition a model in three-dimensional space.

When any 3D tool is selected, a three-point axis appears showing the current X, Y, and Z-axis orientation in space. The axis icon includes handles and options to manipulate the 3D model in three dimensions (**Figure 6**). You can mouse over these controls to reveal the tool hint for each option.

While you manipulate the 3D model, the camera view remains fixed.

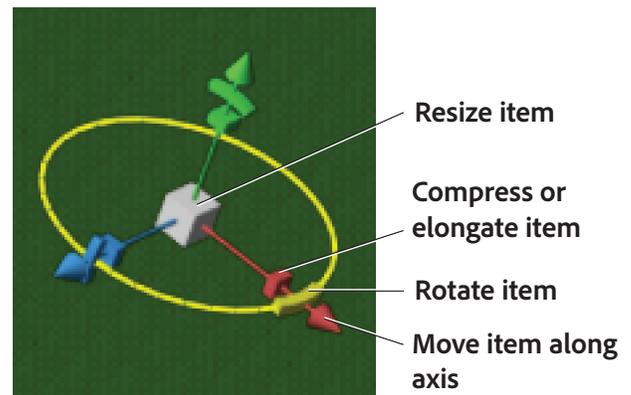


Figure 6 3D Axis with Mesh Rotate tool selected

Moving the camera

It's useful to compare how a 3D object looks from alternate angles. This can be done by moving the 3D camera to different positions in the three-dimensional space (**Figure 7**). When you move the 3D camera, the position of the object and its shadows remain fixed.

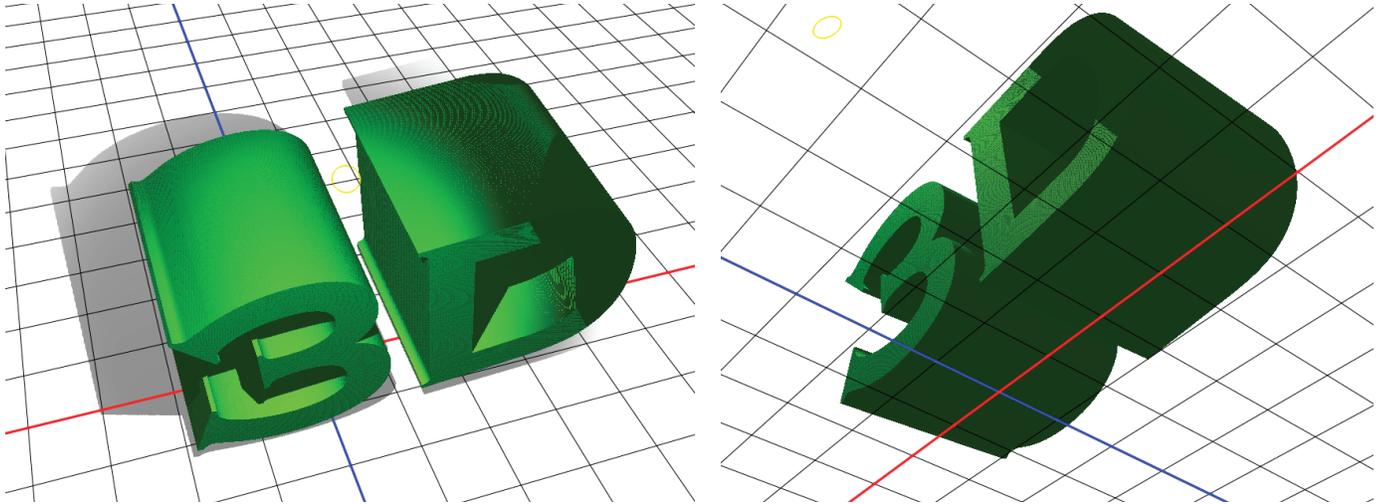


Figure 7 A comparison of camera positions, above (left) and below (right)

Changing object settings and properties

The 3D and Properties panels provide a wide range of options for fine-tuning the camera, lights, object, and material settings for a 3D file. When you select a 3D layer, the 3D panel and Properties panel shows the components of the associated file (**Figure 8**).

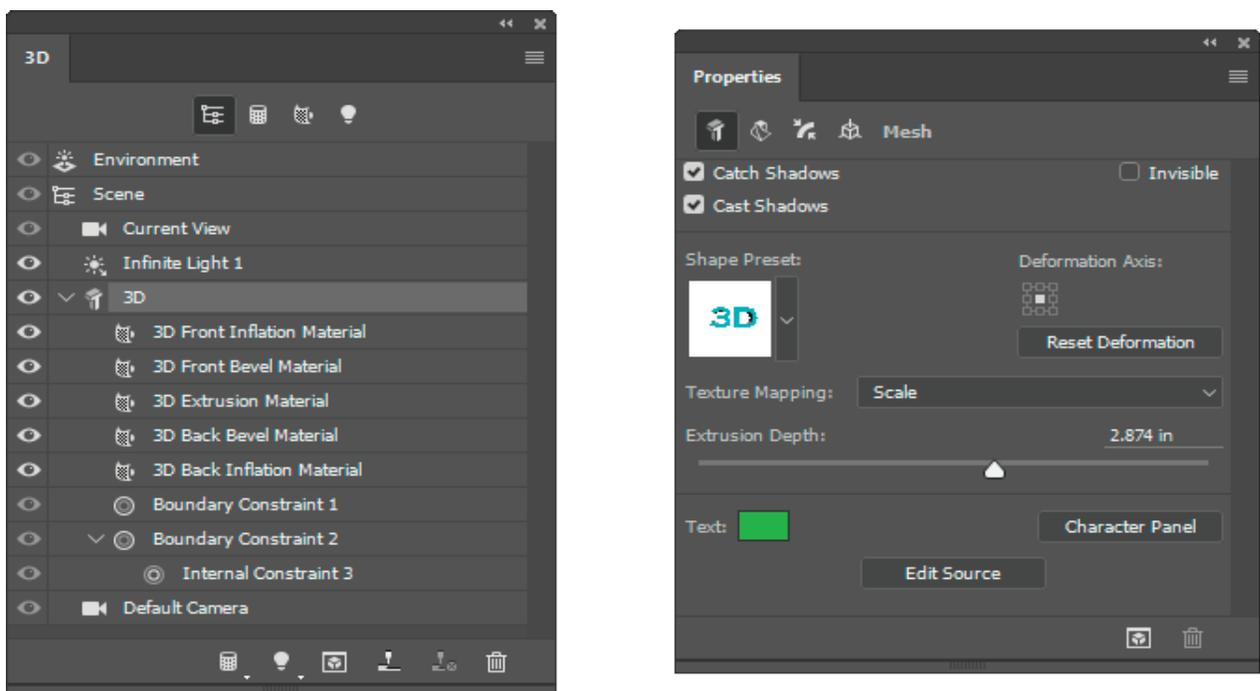


Figure 8 3D panel (left) and Properties panel with 3D project properties shown

Working with 3D files

With Photoshop, you can build a variety of 3D objects using a 2D layer as a starting point. After creating a 3D object, you can move it in space, adjust the lighting, distort the shape, add material textures, and render the file to achieve a high-quality final image. *Render settings* determine how 3D models are drawn in your web, print, or animation project (Figure 9). There's a range of presets with common settings, or you can customize settings to create your own reusable presets. Learn more about [3D render settings here](#).

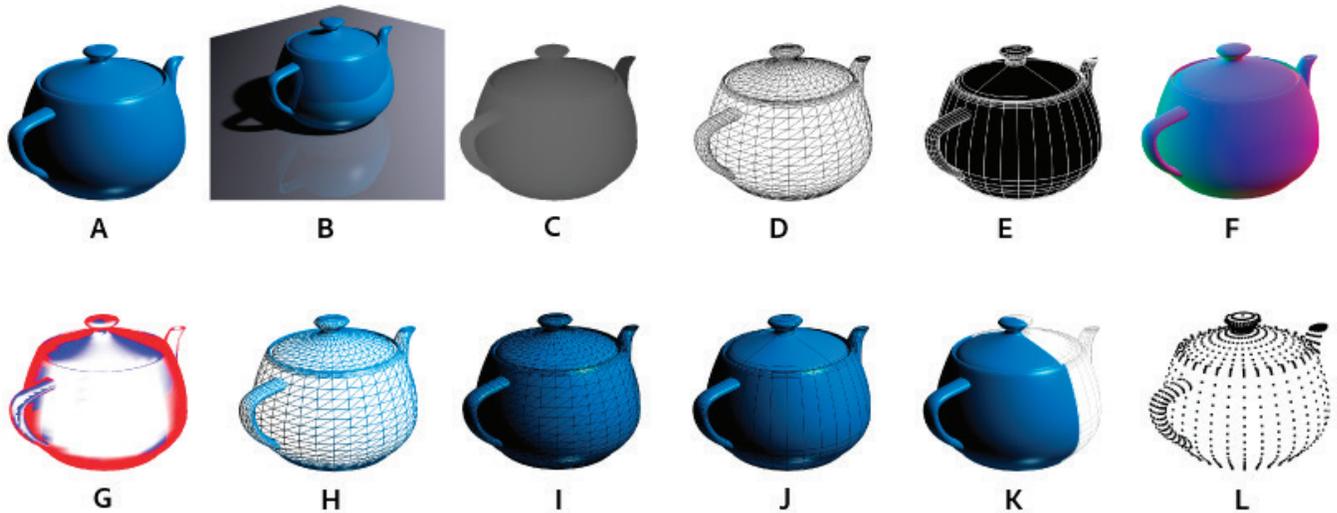


Figure 9 A. Default B. Default (with ground plane) C. Depth Map D. Hidden Wirefram E. Line Illustration F. Normals G. Paint mask H. Shaded Wireframe I. Solid Wireframe J. Shaded Illustration K. Two-Sided L. Shaded Vertices

Create a 3D file from scratch

Here are a few techniques for changing flat images into 3D models with easy-to-use tools. This section explains how to extrude and render a piece of text. Experiment with your 3D project; this is just a start of what's possible.

How to create a 3d object:

1. Create a new, blank Photoshop document, say, 1024x768 pixels.
2. Add some text to the canvas and set the color using the color picker.
3. Choose **Window > 3D**.

The **3D** panel opens (Figure 10).

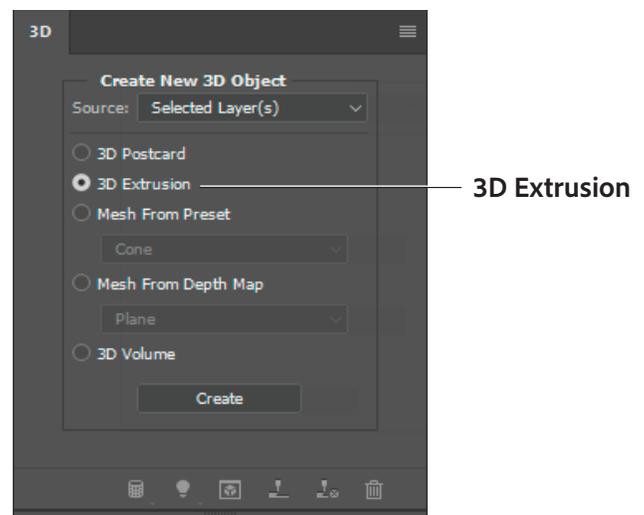


Figure 10 3D panel

- In the Layers panel, confirm that layer that you want to convert is selected, then choose the **3D Extrusion** option in the 3D panel. An *extrusion* extends an object (type, selections, closed paths, shapes, and image layers) into three dimensions.

The 3D panel provides other options for new objects, including:

- 3D Postcard** Creates an image plane with 3D properties.
- Mesh from Preset** Wraps a 2D layer around a 3D object, such as a cone, cube, or cylinder.
- Mesh from Depth Map** Applies an image to an object; lighter values create raised areas in the surface, darker values create lower areas.
- 3D Volume** Select and combine multiple image layers to create a 3D volume.

- Click the **Create** button.

If a dialog box opens asking if you want to switch to the 3D workspace, click **Yes**.

The 3D workspace opens, and the 2D object is extruded (**Figure 11**). When Photoshop creates 3D objects, they are each placed into a 3D layer.

Observe how the **3D** panel changes, now showing all of the elements of a 3D project. The panel becomes a new sort of layers panel for the 3D file, allowing you to select and manipulate camera view, light, whole object, or object materials (**Figure 12**).

- In the **3D** panel, select the **Current View** layer.

This activates the camera mode for the 3D toolbar (**Figure 13**).

Note: Always be mindful of what layer is selected in the 3D panel since slightly different tools and options are available in the 3D toolbar for manipulating the camera, light, and object.

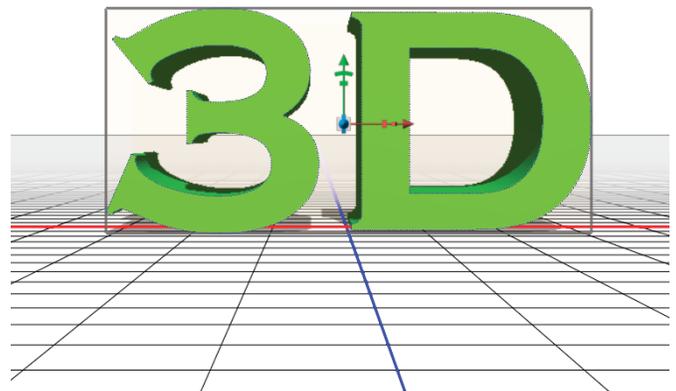


Figure 11 Extruded object

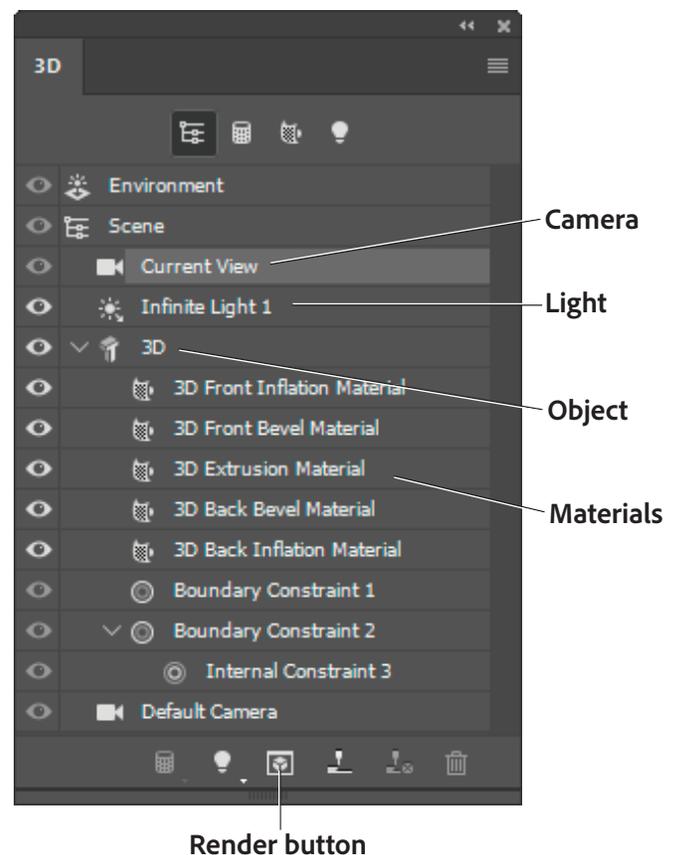


Figure 12 3D panel, whole scene view

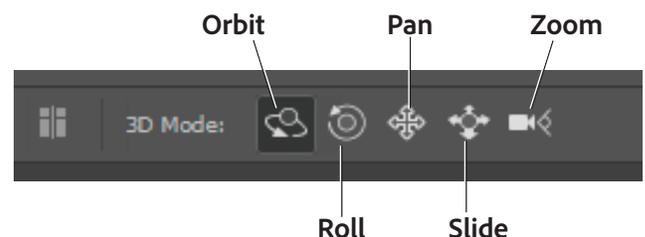


Figure 13 3D toolbar, camera mode

7. Click the **Orbit** button in the 3D toolbar.
The pointer changes to an orbit icon cursor.
8. In the document window, adjust the orbit cursor to rotate the camera in any direction and reposition in the space in the way you want (**Figure 14**). Notice that this action moves the perspective of the camera while keeping the shadows of the object still.
9. Return to the **3D** panel and select the light source layer, in this case, it is **Infinite Light 1**.

The Infinite Light control appears in front of the object (**Figure 15**).

10. Adjust the orbit cursor to rotate the light source in any direction and reposition it in the way you want. In **Figure 15**, the original light source is in front and slightly above. After adjustment, the light source shifts to the right and down.
11. Select the layer with the text in the 3D panel.

An orientation axis appears with the 3D object tools. These tools permit you to scale, rotate, and move the object.

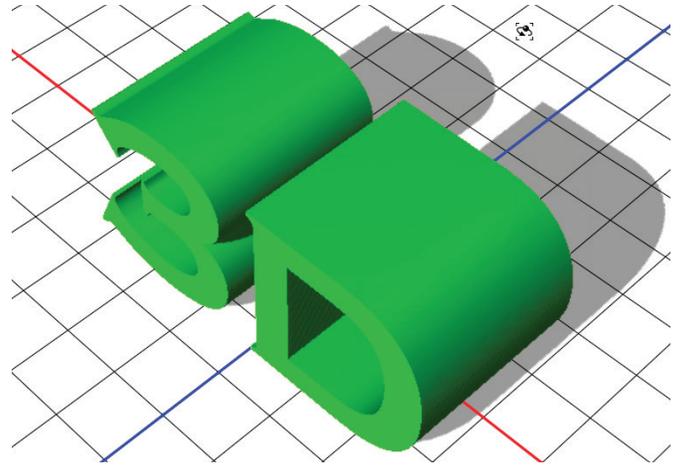


Figure 14 Rotating the camera for a different view

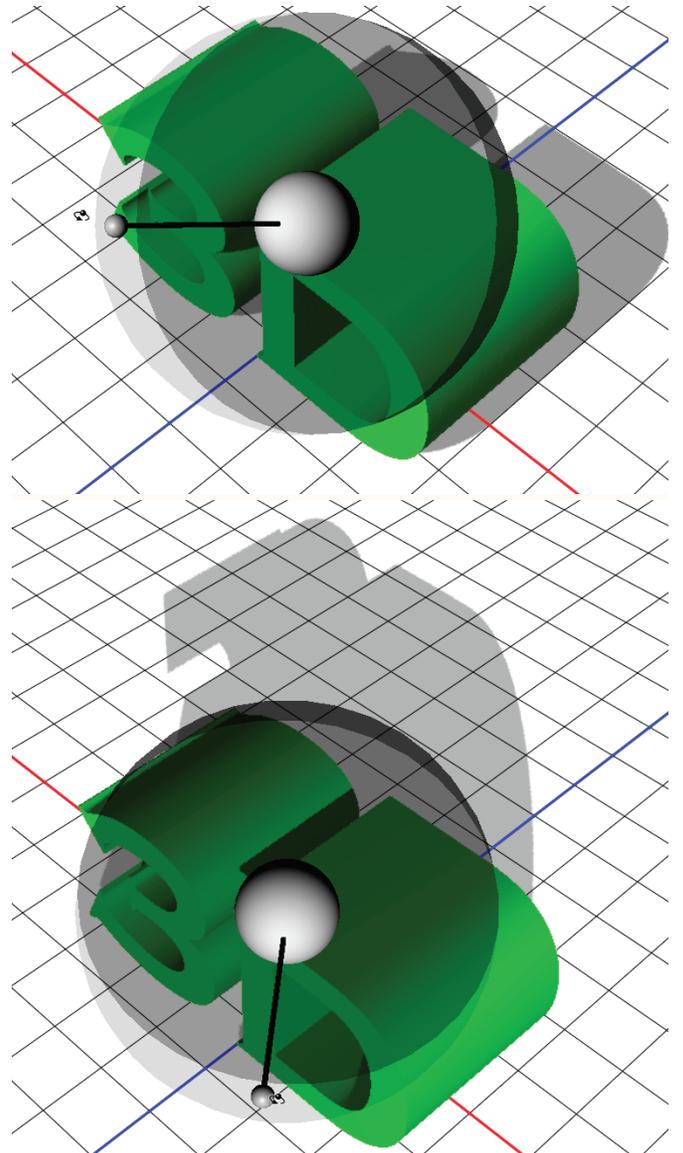


Figure 15 Adjusting light source before (top) and after (bottom)

12. Select the **Rotate Around the X Axis (Figure 16)** and release when you are happy with its position.

Using the 3D object tools, you might also make other object manipulations including scaling or moving the object around in the 3D space.

13. If the Properties panel is not open, select **Window > Properties**.

The options in the **Properties** panel give you ways to enhance and fine-tune your object by using sliders and shape presets (**Figure 17**). For example, the **Deform** tab lets you increase or decrease extrusion depth, twist the object, taper an extrusion, and define its bend or shear across a horizontal or vertical axis.

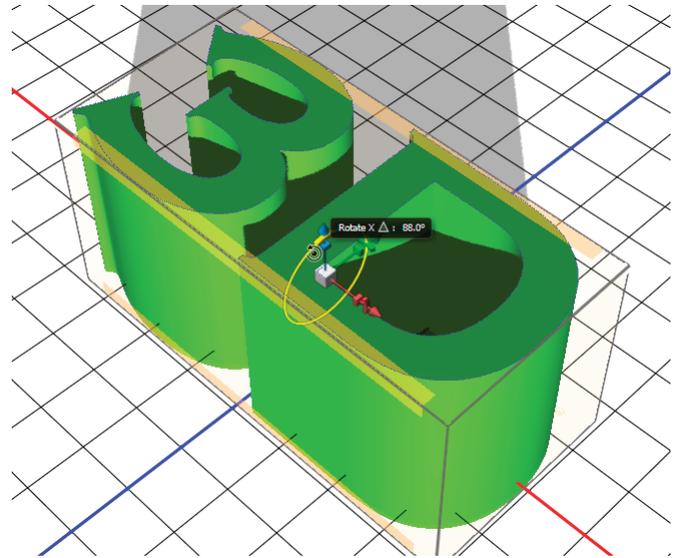


Figure 16 Rotating the object using the 3D object tools

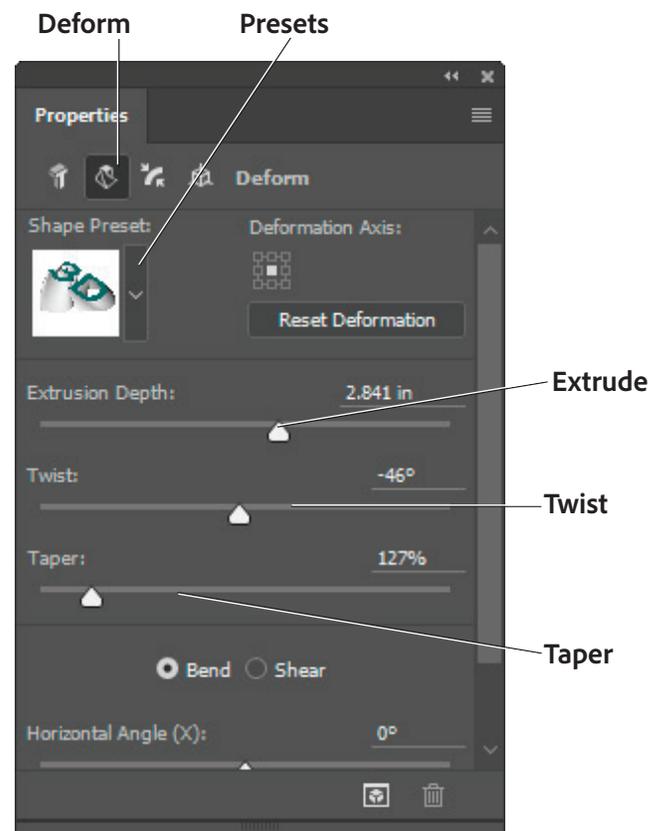


Figure 17 Properties panel, deform tab

14. Click on the **Deform** tab and experiment with a few of the available slider settings. For example, the text in **Figure 18** has had an increase to the extrusion depth, a twist, and an increase to the taper.

Figure 18 also displays on-screen tools that provide an alternative way to sliders on the Properties panel to deform objects. You can adjust extrusion depth, twist, taper, and bend or shear across axes using these on-screen tools. Mousing over these controls shows the tool hint for each option.

15. In the 3D panel, select one of the material layers inside of your object layer.

If you can't see any materials below the object layer, click on the arrow to expand the list.

16. Use the **Materials** picker to apply a new material to the previously-selected surface of the object (**Figure 19**).

In **Figure 20**, the Organic Moss (Synthetic) preset is applied to the Front Inflation Material.

You can apply different materials to different surfaces of the object.

17. Continue developing and experimenting on your 3D object until you are satisfied with all aspects of its shape, lights, and textures.
18. To finish off your project, click the **Render** button at the bottom of either the 3D panel or Properties panel.

Rendering starts, and a progress bar shows you the time remaining. *Rendering* is the process for creating a final, high-quality version for output to web, print, or animation. Final renderings capture more realistic lighting and shadow effects for a 3D object.

19. Save your file when the render is complete.

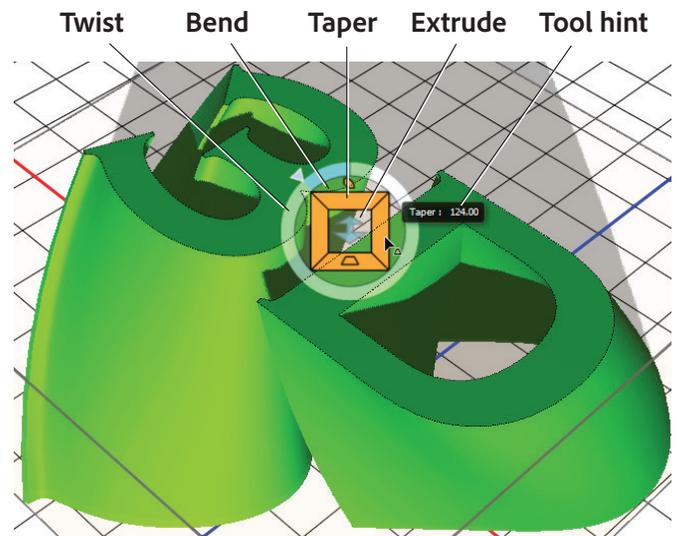


Figure 18 Deform the object using the on-screen tools

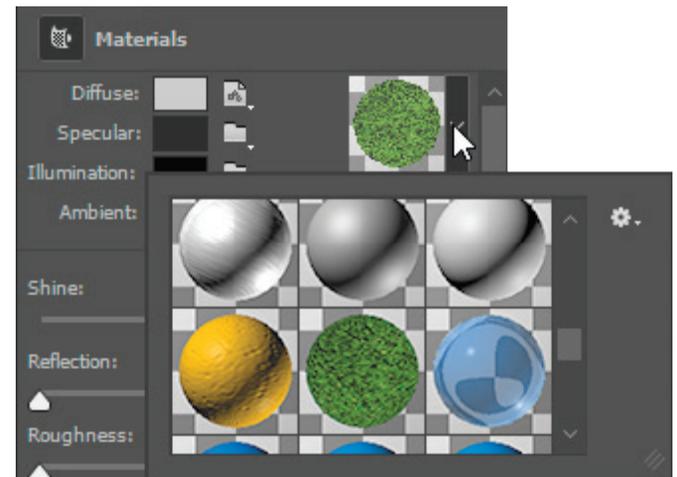


Figure 19 Properties panel with Materials picker

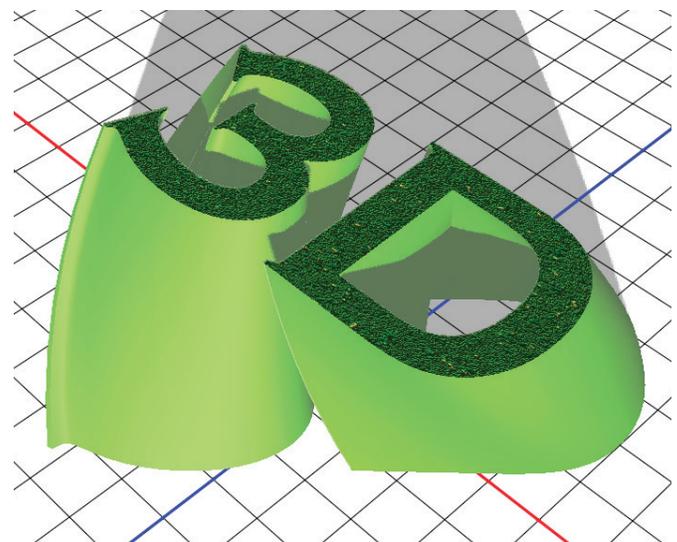


Figure 20 Material applied to front surface of object

Work with a downloaded 3D files

You can work with, add to, and edit existing 3D files that you've downloaded from the web. Shared 3D files can range from simple shapes to complex, articulated figures (**Figure 21**). Photoshop can open the following 3D formats: DAE (Collada), OBJ, 3DS, U3D, and KMZ (Google Earth).



Figure 21 Example of a downloadable and printable 3D file set from thingiverse.com.

Credit: "Braq" jointed dragon by bqLabs, CC BY-SA 3.0.

To open a 3D file:

1. In Photoshop, choose **Window > Get More Content**.

A window browser opens to the Downloadable 3D Content on photoshop.com. You can browse through the many options and models, meshes, materials, sets, and light files offered on this website, and download directly to the desktop.

2. Return to Photoshop and navigate to the location where you saved the 3D file and do one of the following:
 - To open a 3D file on its own, choose **File > Open**, and select the file.
 - To add a 3D file as a layer in an open file, choose **3D > New Layer From 3D File**, and then select the 3D file. The new layer reflects the dimensions of the open file and presents the 3D model over a transparent background (**Figure 22**).

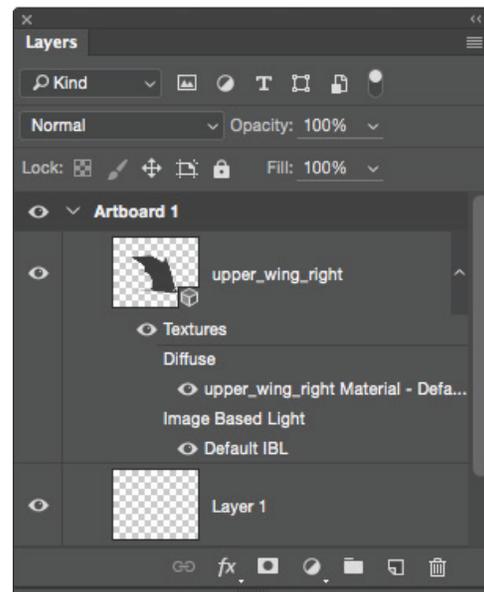


Figure 22 Layers panel

3. Make changes to the file in the same way you did in the previous section.
4. When finished, render the file and save your changes.

Extending your 3D projects

The possibilities to develop and extend your 3D projects are virtually infinite. You can take your 3D models and develop them into photo composites and 3D characters, create animations, render for web and video, or have them printed.

Photo composites and characters

With Photoshop and Fuse CC, you can work with realistic 3D models and create fully poseable 3D characters. Blend your character with photos and design elements to create visually striking composite images (**Figure 23**). Visit this tutorial to see [how to create photo composites and characters](#).

Animations

Use the Photoshop Animation timeline to create 3D animations that move a 3D model through space and change the way it displays over time. You can animate any of the 3D object or camera positions (**Figure 24**), change render modes to simulate the sketching-in of a model's structure over time, and display a changing cross-section of an object over time. See the [how to create 3D animations](#) using Photoshop.



Figure 23 Poseable 3D character

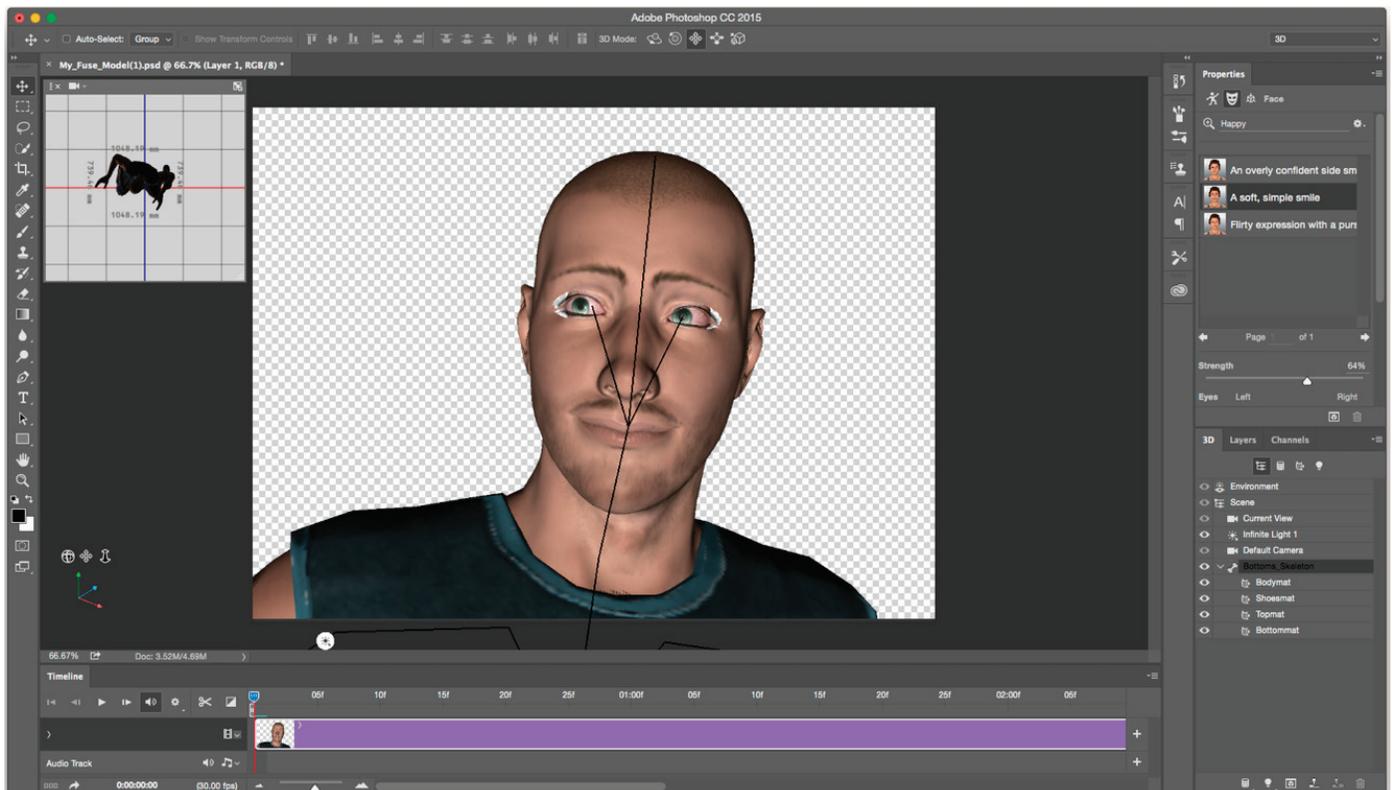


Figure 24 A 3D character and timeline in Photoshop

Printing

Visualize your 3D designs in the real world. Photoshop includes 3D printing features that simplify the process of printing 3D creations (**Figure 25**). The software supports automatic mesh repair for delicate patterns and the generation of support structures and rafts. You can print your 3D objects on your own 3D printer, export the object for printing, or send for print to a 3D printing service directly from within Photoshop. Visit this tutorial to understand [how to print a 3D object in Photoshop](#).

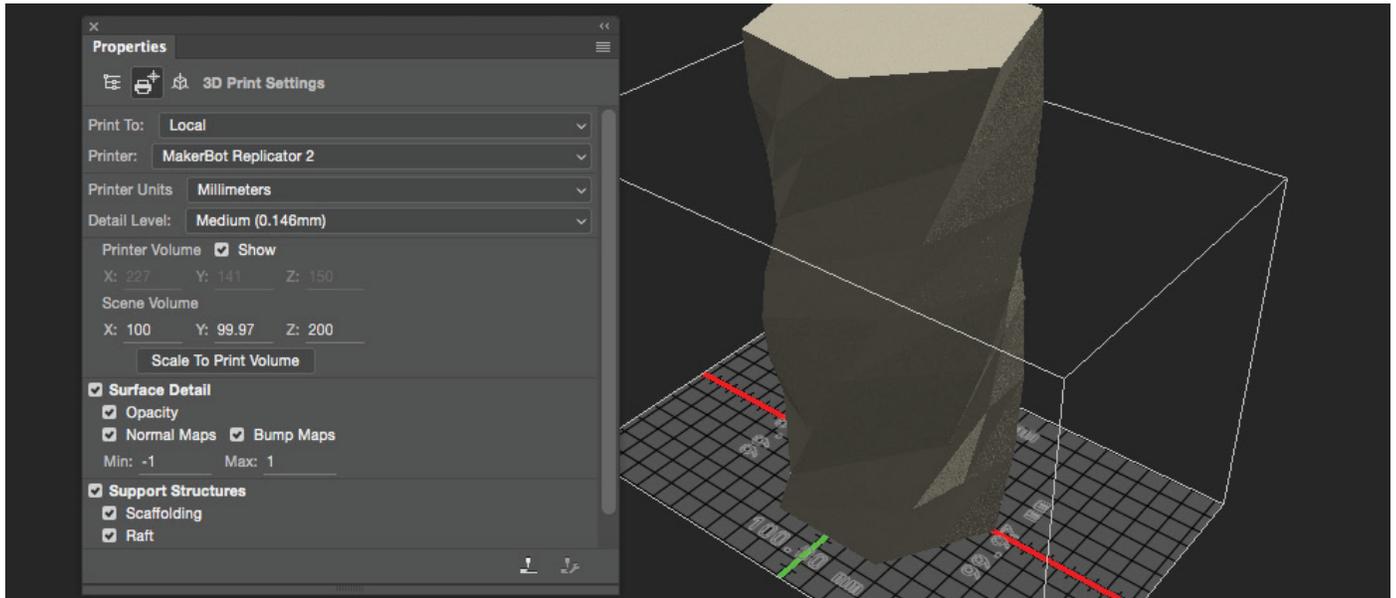


Figure 25 Properties panel, 3D Print Settings tab, and printable 3D file from [thingiverse.com](#).

Credit: [Twisted 6-sided Vase Basic by MaakMijnIdee](#), CC BY-SA 3.0.

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