

3D Space

Add a new dimension to your animations.

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▽ Getting Started

Make sure you have copied the **Lesson 08-3D Space** folder from this book's disc onto your hard drive, and make note of where it is; it contains the project files and sources you need to execute this lesson.

3D Space is one of the most rewarding areas to explore in After Effects. A simple switch allows each layer to move in the Z dimension – closer to and farther away from the viewer – in addition to left and right. Layers may also be rotated in 3D, which gives the ability to view them from new angles. You can selectively add cameras and lights to a composition, allowing you to cast shadows and move around your imaginary 3D world. And as of After Effects CS6, certain layer types may be extruded or bent, providing depth.

The beauty of 3D in After Effects is that you don't *have* to build an entire world to use it – you can be quite selective, adding a little perspective here, a little lighting there. If you're new to 3D, don't worry – we'll go slowly, adding to your skill set a step at a time.

Basic 3D

Any After Effects layer can be placed into 3D space. Even without adding lights or cameras, this allows some neat perspective tricks, plus it permits objects to move more naturally as they animate about your composition.

As soon as you enable the magical 3D Layer switch, some of the rules change with regard to how you move and arrange layers in the Comp and Timeline panels. We'll use this first exercise to get you up to speed on this new reality.

1 Open this lesson's project file **Lesson_08.aep**. In the Project panel, locate and double-click **Comp > 01-Basic 3D*starter** to open it. It contains two overlapping text layers. First, let's reinforce the way you would normally interact with these layers:



- With 2D layers, the stacking order in the timeline determines who renders on top. Swap the order of **Enter a New** and **Dimension** in this comp; the higher one in the Timeline panel is the one drawn the most forward in the Comp viewer.
- With 2D layers, you can move them only in the X (left and right) and Y (up and down) dimensions. To make a layer appear to move closer or farther away, you need to play with its Scale value.
- 2D layers rotate like a pinwheel around their Anchor Point. (We've already centered the Anchor in these text layers to get a nice rotation.)

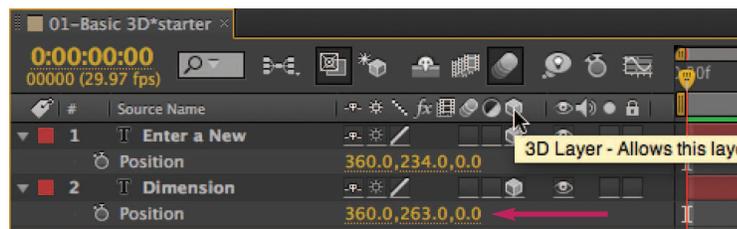
2 Undo any of your experimenting in Step 1 to return to **Enter a New** on top of **Dimension**, both set to 100% scale. Make sure the Switches column is visible in the Timeline panel (press **F4** if it isn't).

Select both layers, then click in the hollow box underneath the three-dimensional cube icon: This is the 3D Layer switch. The layers will not change size or place in the Comp viewer. However, you *will* see red, green, and blue axis arrows sticking out of the Anchor Points of layers that are selected. Press **P** to reveal their Position values: There is now a third value, known as Z. It defaults to 0.0.

Mastering 3D space opens the door to natural multiplaning, bringing illustrations to life, and creating 3D logos or other objects with depth and dimension.



2 When you enable their 3D Layer switch, layers gain a third Position value: Z (below). In the Comp panel, selected 3D layers will have a set of red, green, and blue axis arrows sticking out of their Anchor Points (above).



▼ Scale, Quality, and 3D

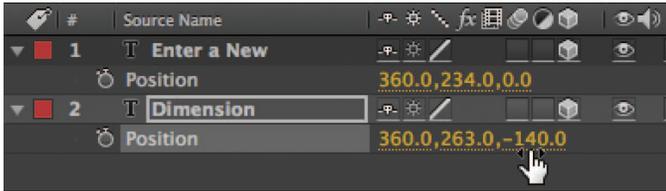
Scaling up layers beyond 100% usually reduces image quality. But with 3D layers, you can't just look at their Scale value; their size also depends on how close the layers are to the virtual camera.

To tell if a layer is being scaled larger than 100%, duplicate it, turn off the 3D Layer switch for the duplicate, and set its

Scale to 100%. If the duplicate is still the same size or larger than the 3D version, you're okay. If the duplicate is smaller, you are "blowing up" the 3D version: Get a higher resolution source, or move the layer farther away from the camera.

Layers that continuously rasterize (covered in Lesson 6, page 176) are your

friend in 3D space, as After Effects can rerender them as needed so that they stay sharp. This includes text and shape layers (Lesson 11). You can also enable the Continuous Rasterization switch (the sunburst icon) for Illustrator layers; we've already done that for you as required throughout this lesson.



3 As you reduce the Z Position value for a 3D layer (left), it will move toward you, including moving in front of other layers with a higher Z Position value (right), regardless of the stacking order in the Timeline panel.

3 Press **F2** to deselect the layers. While closely watching the Comp viewer, scrub the third Position value (Z) for **Dimension**. As you scrub to the left to reduce the Z Position value, **Dimension** will appear to grow larger as it comes toward you. As you scrub to the right (increasing Z Position), it will appear to grow smaller as it moves away from you.

factoid

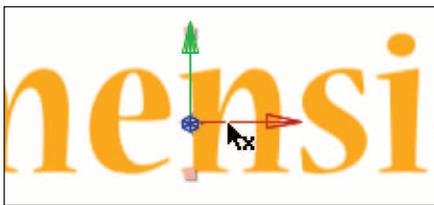
Two Renderers

As of After Effects CS6, you have two 3D rendering engines to choose from: Classic 3D (formerly Advanced 3D) and Ray-traced 3D. This is set in Composition Settings > Advanced and is displayed in the upper right corner of the Comp panel. Use Classic 3D for these initial exercises; it's faster.

Key Concept #1: *The size a 3D layer is drawn is determined by a combination of its Scale value and how close it is to the camera. (If you have not explicitly created a camera, After Effects uses an invisible default 50mm camera.)*

There is a second phenomenon you might have noticed: If the Z Position value for **Dimension** is less than the Z Position for **Enter a New**, **Dimension** will appear to pop in front of **Enter a New**, even though **Dimension** is below it in the timeline.

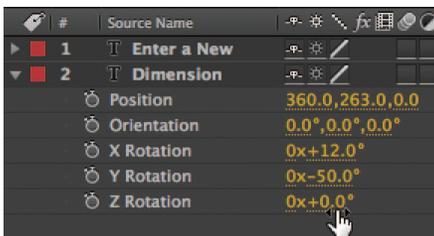
Key Concept #2: *With 3D layers, stacking order in the timeline no longer determines which one draws on top in the Comp viewer. What matters now is how far they are from the camera. (If they are the same distance, then stacking order matters.)*



4 If you see an X, Y, or Z next to the cursor, your dragging will be constrained to this dimension. (X is red, Y is green, and Z is blue.)

4 In addition to scrubbing the Position values for 3D layers, you can also drag the layers around in the Comp panel. However, pay attention to the cursor as you try this:

- If you place the cursor near the layer's Anchor Point and do not see an additional letter at the cursor's tail, you can freely drag a layer in any direction.
- If you see an X, Y, or Z next to the cursor, your dragging will be constrained to that dimension. To ensure you get this special cursor, place it near the desired axis' arrow.



5 3D layers have four rotation parameters: Orientation, plus Rotation for X, Y, and Z.

5 Set **Dimension's** Z Position back to 0. With **Dimension** selected, press **R**: Instead of getting just Rotation, you will see *four* parameters! Here's what they do:

- Orientation is used to "pose" a layer in 3D space – for example, to face up or to the right. This parameter won't animate as you might expect, so don't use it for keyframing.
- Z Rotation is the same as the normal 2D Rotation you're used to.
- Y Rotation spins the layer around its vertical (up/down) axis. Go ahead and scrub it!

- X Rotation spins a layer around its horizontal axis.

You can scrub these Rotation values, or press **W** to select the “Wotate” (Rotate) tool and manipulate them directly in the Comp panel. (Keep an eye out for the axis letters replacing the circular cursor – like Position, they indicate your dragging will be constrained to that one dimension.)



As you play with X and Y Rotation, notice that **Dimension** will intersect **Enter a New** as portions of them cross – another cool bonus of 3D space. (If layers ever don’t intersect as you expect, check if there is a 2D layer in-between.)

6 Scrub **Dimension**’s X or Y Rotation values to 90° while watching the Comp viewer: They will disappear when viewed on-edge.

Key Concept #3: *By default, 3D Layers in After Effects do not have any thickness. A major new feature in After Effects CS6 is the ability to extrude text and shape layers; we’ll explore that later in this lesson.*

Press **V** to return to the Selection tool. Continue to experiment with Position and Rotation values for **Enter a New** and **Dimension**, including enabling keyframing for them and trying an animation or two.

If you feel more like watching than doing right now, twirl down the **Comps_Finished** folder in the Project panel and double-click **01-Basic 3D_final** to open it. Press **0** on the numeric keypad to RAM Preview. We’ve animated Z Position and Y Rotation for the two text layers to make them fly and swivel into position.

Once you’ve digested this, open **01-Basic 3D_final2** and RAM Preview. In this comp, we removed the Position animation and instead applied a 3D Text Animation Preset to each text layer. (As discussed back in Lesson 5, individual characters in text layers may also exist in 3D space.)

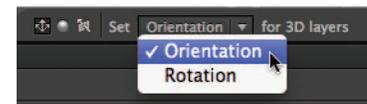


In **Comps_Finished > 01-Basic 3D_final2** we applied 3D Text Animation Presets to our swiveling text.

5–6 You can rotate 3D layers in each of their three dimensions using the Rotation tool. Note how **Dimension** intersects **Enter a New** as they cross.

▽ gotcha

Avoiding the Rotation Flip Flop



When the Rotation tool is selected, a popup menu appears on the right side of the Tools panel. Here you can toggle the tool’s behavior between editing Orientation and editing Rotation values for a 3D layer. However, if you use the Rotate tool to alter Y Rotation or Orientation and go beyond $\pm 90^\circ$, the X and Z values flip by 180° (try it!). That’s why we prefer scrubbing values directly in the Timeline panel.



Since ray-traced layers in After Effects CS6 don't support texture maps, you may want to use reflections to add more interest to the faces of otherwise boring text or shapes.



2 Reflections in After Effects are “energy conserving” – as you increase Reflection Intensity, diffuse and ambient lighting is reduced. If there's nothing to reflect, your layer will go black. However, you can see reflections in the extruded sides of the text.

tip

Ray-tracing Quality

If you notice any unpleasant artifacts, they can be addressed by increasing the Ray-tracing Quality (covered on page 239).

4 To see reflections with the default Material Options settings, the reflection source must not be between the camera and the layer you are viewing. It must also be illuminated to bounce light rays back toward your hero layer.

Reflections

An alternative to seeing through a layer to another behind, is seeing the reflections of other layers that may be in front or off to the sides of the layer you're working on:

1 Open **Comps > RT4-Reflections*starter**. We've already set up some beveled and extruded text as well as a large still image behind. The only layers currently in front of the text are a camera (with a short lens length, to exaggerate the perspective distortion so that we can see the sides of the extruded text) and a Point light (with a slight orange tint to help warm up the color of the text).

2 Select the **Reflect** layer and type **A A** to reveal its Material Options. Slowly increase the Reflection Intensity to 100%; the text will go black! What's going on?

After Effects employs an *energy conserving shader*. This means that as Reflection Intensity is increased – which would normally add illumination to a layer – the effects of diffuse and ambient lights as well as transparency are reduced to help avoid over-illuminating a scene. (Note that the specular highlights keep their intensity; they're affected by Reflection Rolloff, which we'll keep at 0% for this exercise.) As there is no other layer in front of your text, there is nothing to reflect. Combined with the attenuation of the lighting, this means the layer appears darker.



However, look at the extruded sides of the text: You *will* see some reflections there, based on light rays bouncing from the layer behind off the sides and toward the camera. That's nice, but clearly what we need is a layer in front of our text for it to reflect.

3 Choose a view layout of 2 Views – Vertical, with the lower view set to Top.

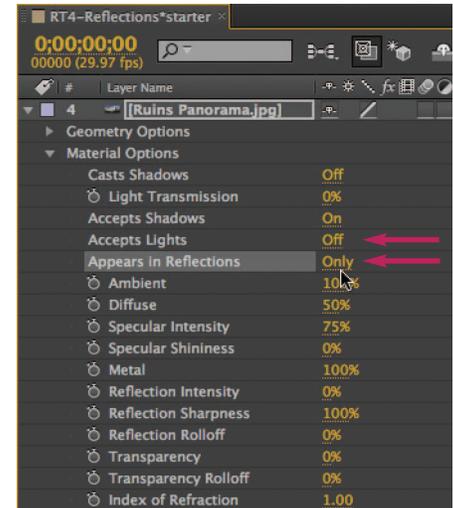
4 Select the layer **Toadstool Rock.jpg** and press **P** to reveal its Position. Scrub its Z Position to the left to pull the layer forward. Initially, the layer will be between the camera and the text, blocking your view; hold **Shift** while scrubbing to move the layer faster. Once it is behind the camera, you can see the text again, but you may not see a reflection yet; you need to illuminate the reflection source for it to bounce light rays back toward the text. Keep scrubbing until **Toadstool Rock.jpg** is behind the light as well.

5 Here are a couple of tricks to sidestep these obscuration and illumination issues: With **Toadstool Rock.jpg** still selected, type **AA** to reveal its Material Options. Toggle **Appears in Reflections** to **Only**; that solves the camera obscuration problem. Then toggle **Accepts Lights** to **Off**: That returns the layer to its original color values regardless of your scene's lighting.

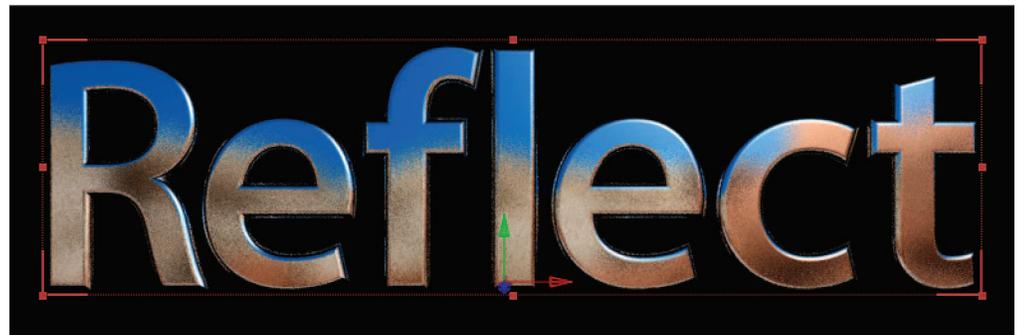
6 With **Toadstool Rock.jpg** still selected, press **P** to reveal its Position again and scrub its values, or move it in your 3D views. Its placement relative to the **Reflect** layer – including rotation – determines the size and framing of the reflections.

7 Reflections are not always mirror-sharp in the real world; quite often they are softened by imperfections on the surface of an object. For the **Reflect** text layer, slowly decrease **Reflection Sharpness**; the reflections will become blurry. This parameter interacts with the distance to the layer being reflected: If the reflection source is close, its reflections will appear sharper. If you are having trouble getting your reflections as soft as you like, move the reflection source farther away and optionally scale it to get the reflection pattern you desire.

You may have noticed that soft reflections look noisy. This is from not having enough rays active in the Ray-traced 3D Renderer. We'll deal with image quality issues like this in a moment. But first, we want to show you one more trick with reflections.



5 To make the position of the reflection source less critical, set **Appears in Reflections** to **Only** and **Accepts Lights** to **Off**.



7 Decrease **Reflection Sharpness** to create blurry reflections.