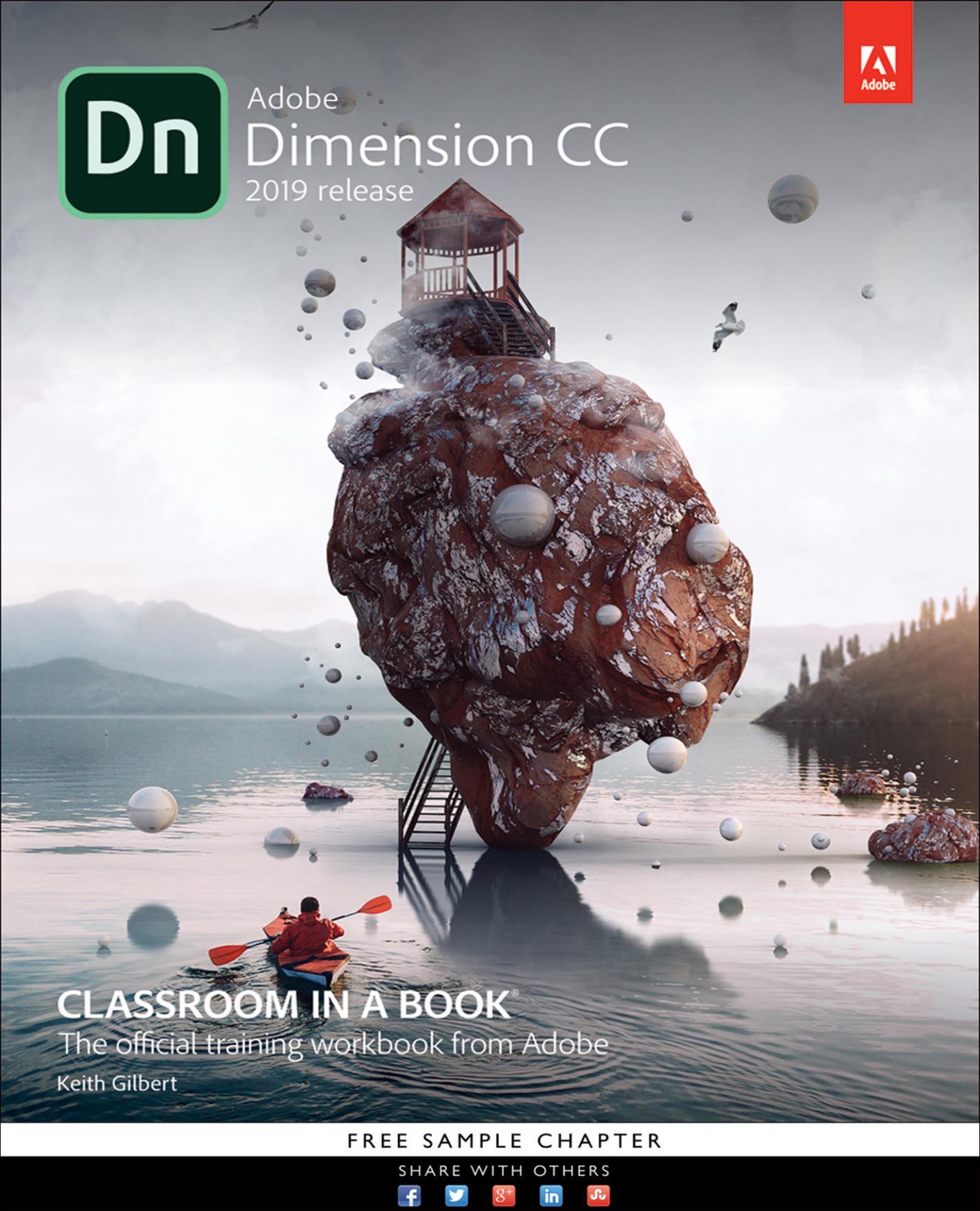




Adobe  
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2019 release



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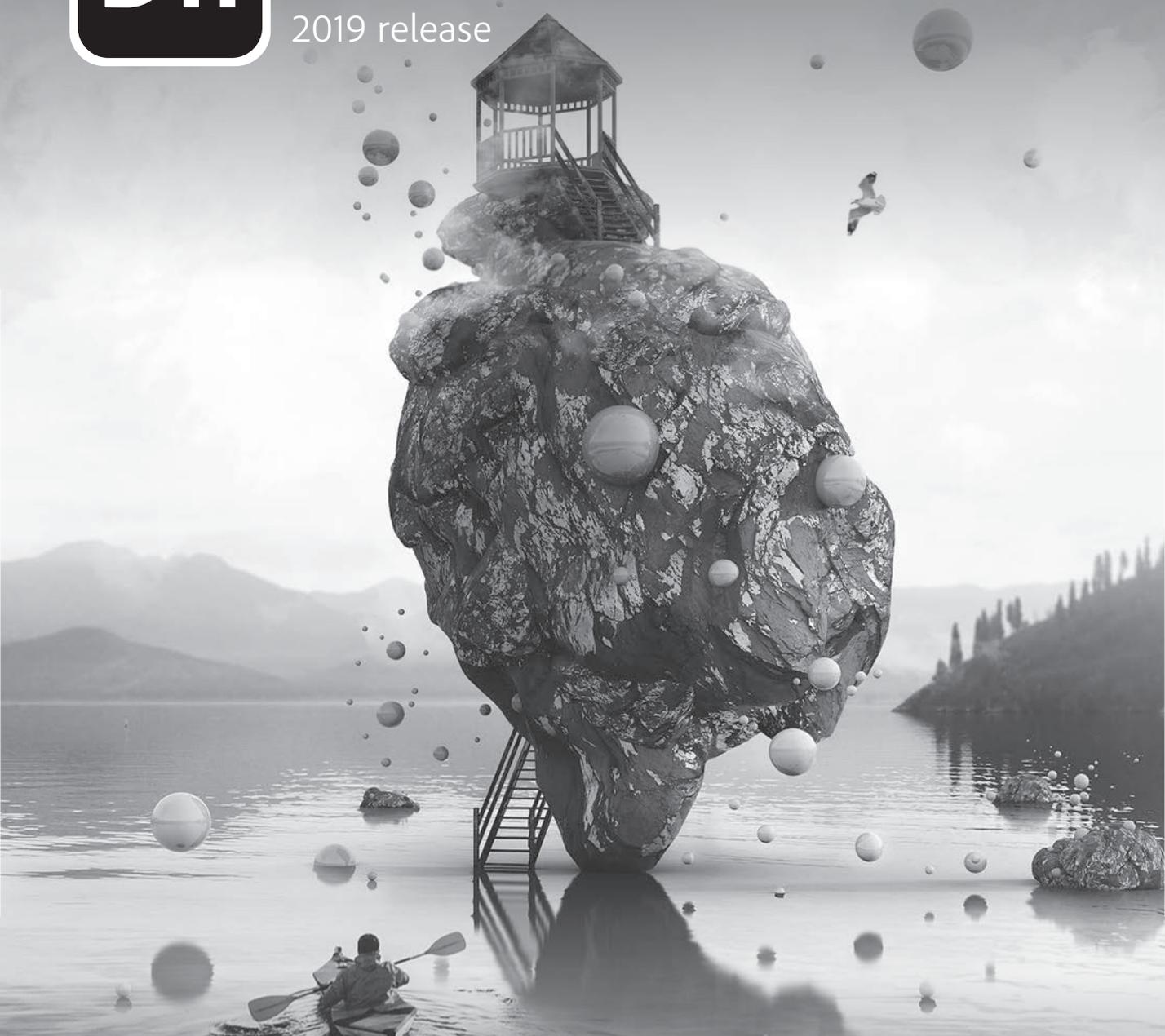
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Adobe Dimension Classroom in a Book® (2019 release)

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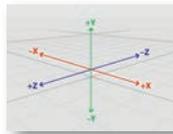
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# 4

## EXPLORING RENDER MODE

### Lesson overview

In this lesson, you'll explore how to render a 3D scene and learn the following:

- The three different places that rendering takes place in Dimension, and how they differ from one another
- The limitations of on-canvas rendering
- The trade-offs between render speed and quality
- How to achieve the highest-quality rendered image



This lesson will take about 45 minutes to complete. Please log in to your account on peachpit.com to download the lesson files for this lesson, or go to the “Getting Started” section at the beginning of this book and follow the instructions under “Accessing the lesson files and Web Edition.” Store the files on your computer in a convenient location.

Your Account page is also where you'll find any updates to the lesson files. Look on the Lesson & Update Files tab to access the most current content.



Dimension's Render Mode produces a 2D scene from 3D models, complete with realistic light, shadow, materials, and reflections.

# What is rendering?

*Rendering* refers to the process of producing a realistic-looking 2D scene from a 3D model or models.

Dimension uses a form of rendering called *ray tracing*. A high-level explanation of ray tracing is that the computer has to calculate a path from each pixel in the scene back to the camera and calculate the color of that pixel based on the environment lighting, the sunlight, the material applied to the surface, and reflections from other objects. This requires a lot of computing horsepower, and is far too complex for today's computers to accomplish in real time as a scene is edited.

Because of this, Dimension offers three levels of rendering: a rough “on-canvas” rendering that Dimension performs as you edit a 3D scene, a render preview, and Render mode.

● **Note:** Dimension uses a proprietary ray tracing renderer owned by Adobe. Earlier versions of Dimension used a ray tracing renderer developed by Chaos Group. If you wish to use this earlier rendering engine, you can switch the renderer in Dimension's Preferences (Adobe Dimension CC > Preferences on the Mac, or Edit > Preferences on Windows).



## On-canvas rendering

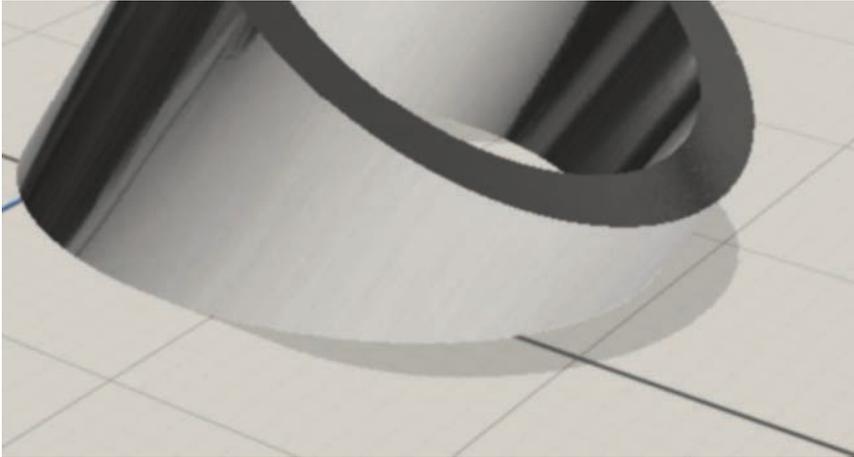
As you position 3D models in Design mode, Dimension attempts to display a realistic preview of the resulting scene on the canvas. Because an accurate rendering of the scene is so time-consuming, this on-canvas preview is only a rough approximation of what the final scene will look like. Effects that will appear especially rough in the on-canvas preview include

- Shadows cast by 3D models on the ground plane
- Glass and other semi-transparent materials applied to 3D model surfaces
- The camera depth of field

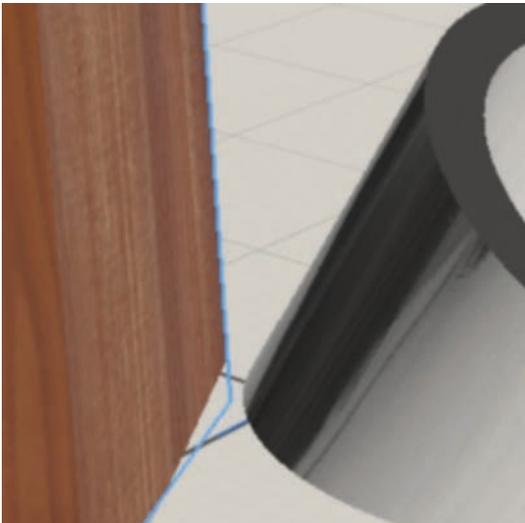
Things that don't display at all in the on-canvas preview include

- Reflections cast on one model by another model
- Reflections cast by models on the ground plane

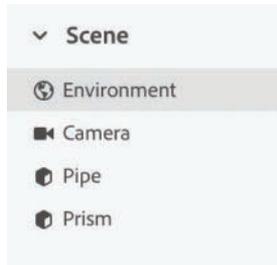
- 1 Launch Adobe Dimension.
- 2 Click Open, or choose File > Open.
- 3 Select the file named Lesson\_04\_begin.dn, which is in the Lessons > Lesson04 folder that you copied onto your hard disk, and then click Open.
- 4 Note some of the limitations of the on-canvas rendering of this scene. The shadows being cast by the two 3D models are hard-edged.



You'd expect to see some part of the wood model being reflected in the shiny silver surface of the Pipe model, but the reflection isn't visible.



- 5 Select Environment in the Scene panel.



- 6 Click the disclosure triangle  to the right of Ground Plane in the Properties panel to reveal the ground plane options.

Because there is a Reflection Opacity value of 10%, you'd expect to see a slight reflection of the 3D models in the ground plane, but no reflection appears in the on-canvas preview.

The bottom line is that the on-canvas preview is useful primarily as a way to judge the position, size, and placement of 3D models within a scene. To see materials, surfaces, and lighting accurately, you must render the scene.

## Render preview

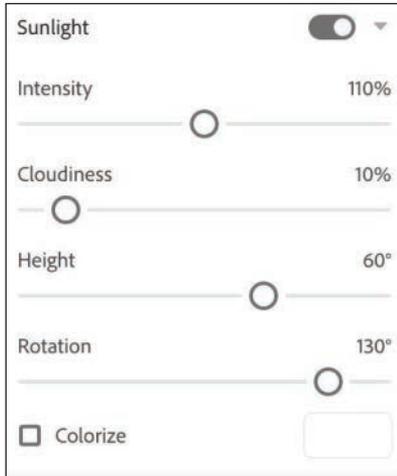
The Render Preview window provides a pretty good idea of what the final render will look like, but the quality of the preview is limited so that the preview can update quickly as you edit the scene.

- 1 Click the Render Preview icon  at the upper-right corner of the work area.
- 2 Wait for the render preview to update.
- 3 Click the Toggle Fullscreen icon  at the top of the Render Preview window to view a larger preview.
- 4 Note the rough, speckled “noise” in the shadows in the render preview. This is a limitation of the render preview.



You can adjust settings in the Properties panel, even while the full-screen Render Preview window is displayed on the screen.

- 5 In the Scene panel, click Environment.
- 6 In the Properties panel, turn on Sunlight.
- 7 Change the Rotation value to **130°**.



You should see new cast shadows, caused by the sunlight, appearing to the left of the objects.

- 8 Click the Close icon  in the upper-right corner of the Render Preview window to close it.
- 9 In the Properties panel, turn off Sunlight.



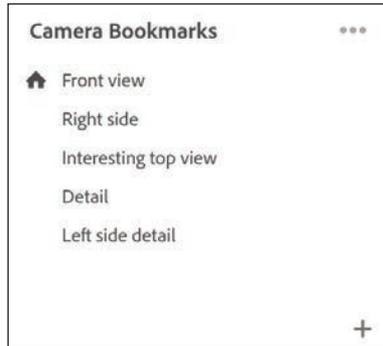
**Tip:** Use the `\` key to show and hide the Render Preview window.

## Render mode

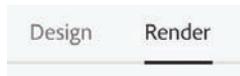
To really see an accurate view of the scene, the scene must be rendered in Render mode.

- 1 Before you go to Render mode, click the Camera Bookmarks icon  at the top of the screen.

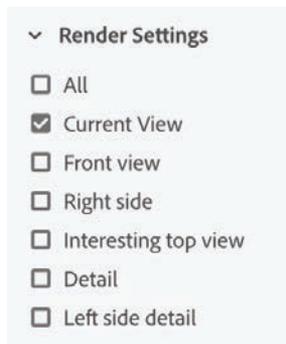
You'll see that there are five bookmarks saved with this file.



- 2 Click each bookmark in turn to see what each view looks like.
- 3 When you're finished, click the "Front view" bookmark to return to that view.
- 4 To enter Render mode, click the Render tab at the top of the screen.



In Render mode, you'll see all five of the camera bookmarks displayed at the top of the Render Settings panel. This handy feature lets you render multiple camera views of a scene all at once. Since rendering can be very time consuming, this provides a way to queue up multiple renders of a scene and let them run overnight or while you're at lunch.



For now, just leave "Current View" selected.

- 5 Type **My\_Lesson\_04\_end LOW** in the Export Filename field. Dimension appends the name of the view to the end of the filename, so this file will be exported as My\_Lesson\_04\_end LOW-Current View.



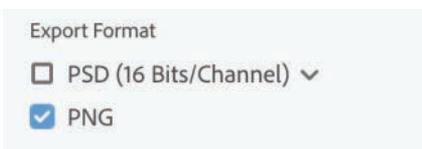
- 6 If you want to change the export location, click the blue export path and choose a new export location.



- 7 In the Quality setting, choose Low (Fast).



- 8 Deselect PSD under Export Format, and select PNG.



- 9 Click Render.

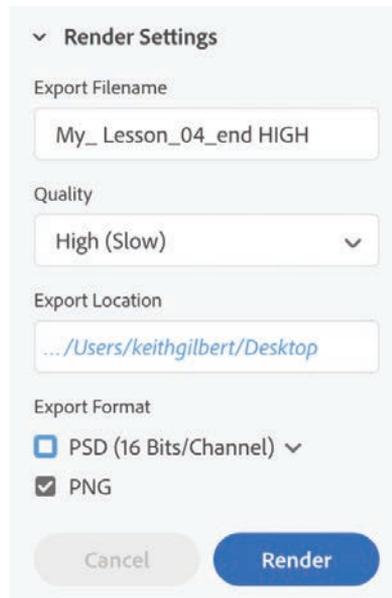


- 10 Wait for the render to finish.

The render took about 1 minute and 23 seconds on my 3-year-old MacBook Pro. If you don't want to wait for the render to finish, I've saved a copy of the rendered file for you in the lesson files (Lesson\_04\_end LOW-Current View.png).

**Note:** Although you can't continue to work in Dimension while a file is being rendered, you can continue to work in other applications on your computer. If you have notifications turned on in your operating system, you'll receive a notification when the render is complete.

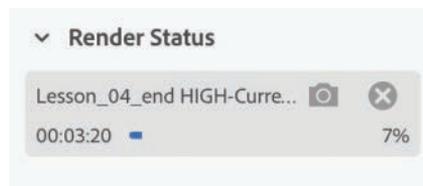
- 11 Now change the Quality setting to High (Slow).
- 12 Change the filename to **My\_Lesson\_04\_end HIGH**.
- 13 Click Render.



► **Tip:** While a file is rendering, you can click the Snapshot icon  at any time to save a PNG or PSD file of the render in progress. Since the render engine performs multiple “passes” through the scene, a partially completed render may be far enough along to give you a good idea of what the final render will look like.

Wait for the render to finish. This render took almost 6 minutes on my computer. If you don’t want for it to finish, I’ve saved a copy of the file for you in the lesson files (Lesson\_04\_end HIGH-Current View.png).

While a file is rendering, the Render Status panel displays a progress bar that provides a rough approximation of how much of the render has completed.



## Render speed and quality

As you’ve seen, there are three Quality settings available in Render mode: Low (Fast), Medium, and High (Slow). How do these settings compare?

- 1 Use Adobe Photoshop to open the two files you just rendered or, if you wish, the Lesson\_04\_end HIGH-Current View.png and Lesson\_04\_end LOW-Current view.png files included in the lesson files.

- 2 Examine the files closely. You'll see that the low-quality render (on the left in the accompanying image) contains a lot of noise, which is particularly visible in the shadows. The high-quality render (on the right) contains much smoother shadows and less noise.



You'll need to determine which render quality you need when you render. Rendering can be very slow. This is a simple file, and it's only 1200 x 800 pixels in size. Larger, more complex files can take much, much longer to render.

## Render export formats

So far, you've been rendering into the PNG format. But you may have noted that you can also choose PSD as an output format. What are the advantages to rendering as a PSD file?

There is no difference in the quality of the rendered image between the two formats. The difference is that the PSD file will contain extra layers and masks that would make it easier to edit the 2D scene later if necessary. You'll learn about this in more detail in a later lesson. But for now, open the lesson file named Lesson\_04\_end HIGH-Current View.psd and examine the Layers panel in Photoshop to view the extra data included in a PSD render.

## Factors that influence render speed

The time it takes for Dimension to render a scene can vary significantly from file to file and is influenced by a number of factors. I've ranked these factors from most significant (hardware) to least significant (memory).

### Hardware

The speed of the CPU (central processing unit) on your computer has a big effect on render speed. Generally speaking, the faster your processor, the quicker rendering will complete. Modern CPUs with more cores and higher speeds will render fastest.

### Materials

More than any other factor, the combination of materials used in a scene has a huge impact on the length of time it takes to render the scene. In general, translucent materials like glass, liquids, or gels render more slowly than other materials.

### Reflections

Reflections on shiny surfaces slow rendering. This includes objects that are reflected on the shiny surfaces of other objects around them, as well as a ground plane with a Reflection Opacity greater than zero so that models reflect on it.

### Focus

The Focus feature, which simulates depth of field—causing some objects to be blurred and others to be crisp—slows rendering times.

### Canvas size

The total pixel dimensions of the canvas affects render speed. The more pixels, the slower the render time.

### Number and complexity of models

Surprisingly, the complexity and number of models in the scene don't have a very large effect on render speeds.

### Memory

The amount of memory you have installed on your computer has little effect on rendering speeds.

## Review questions

- 1 What is ray tracing?
- 2 What are the three places that the 3D scene is rendered into 2D in Dimension?
- 3 Do reflections appear in the on-canvas preview?
- 4 What is the most visible limitation of the render preview?

## Review answers

- 1 Ray tracing refers to the rendering method used by the rendering engine built into Dimension. Ray tracing performs complex mathematical calculations to determine the precise color of each pixel in the scene.
- 2 Dimension performs rendering in three places: the on-canvas preview, the Render Preview window, and Render mode.
- 3 No. Reflections cast by objects on the ground plane, and cast by objects on other objects, will not appear in the on-canvas preview.
- 4 Because it renders as quickly as possible, the render preview displays a lot of noise, especially in shadows.

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