Adobe
Dimension CC
2019 release
Adobe
CLASSROOM IN A BOOK®
The official training workbook from Adobe
Keith Gilbert

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Adobe Dimension CC Classroom in a Book®, 2019 release

The official training workbook from Adobe

Keith Gilbert

Adobe Dimension Classroom in a Book® (2019 release)

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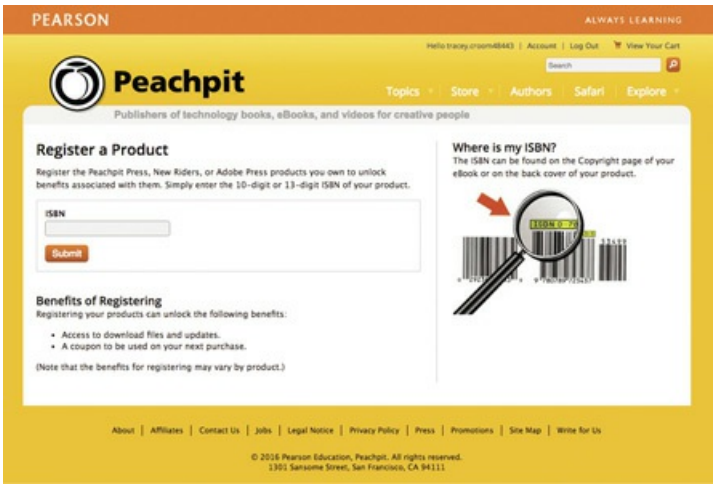

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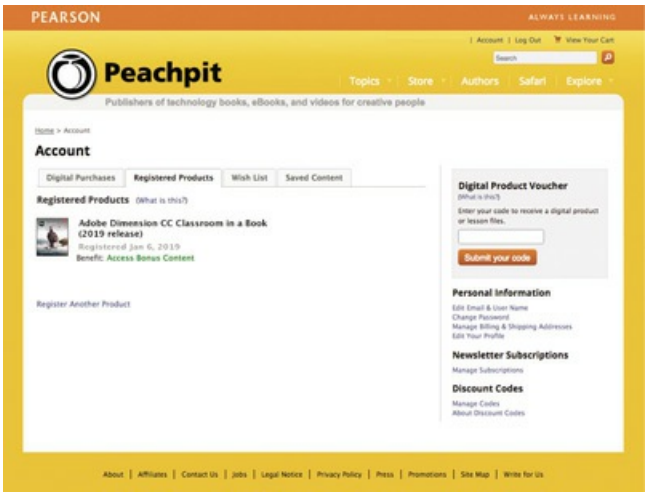

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Getting Started

Adobe Dimension CC gives designers the ability to quickly composite 3D and 2D elements in a scene, customize models, specify materials, and create realistic lighting. Once the final staged scene is assembled, the advanced rendering engine in Dimension will output the scene to a two-dimensional Photoshop file complete with realistic textures, materials, shadows, and reflections. Dimension is perfect for advertising, product design, scene visualization, abstract art, package design, or creative exploration.

About Classroom in a Book

Adobe Dimension CC Classroom in a Book (2019 release) is part of the official training series for Adobe graphics and publishing software, developed with the support of Adobe product experts. The lessons are designed to let you learn at your own pace. If you're new to Adobe Dimension, you'll learn the fundamental concepts and features that you'll need to master the program. And if you've been using Adobe Dimension for a while, you'll find that Classroom in a Book teaches many advanced features, including tips and techniques for using the latest version of the application and creating realistic scenes with 3D models.

Although each lesson provides step-by-step instructions for creating a specific project, there's room for exploration and experimentation. You can follow the book from start to finish or do only the lessons that match your interests and needs. Each lesson concludes with a review section summarizing what you've covered.

Prerequisites

Before you begin to use *Adobe Dimension CC Classroom in a Book (2019 release)*, you should have a working knowledge of your computer and its operating system. Make sure that you know how to use the mouse and standard menus and commands, and also how to open, save, and close files. If you need to review these techniques, see the documentation for your Microsoft Windows PC or Apple Mac computer.

To complete the lessons in this book, you'll need to have Adobe Dimension CC installed. It will also be helpful to have Adobe Photoshop CC and Adobe Illustrator CC installed for exploration in a couple of the lessons.

Installing Adobe Dimension

Before you begin using *Adobe Dimension CC Classroom in a Book (2019 release)*, make sure that your system is set up correctly and that you've installed the required software.

You must license the Adobe Dimension CC software separately. For system requirements and complete instructions on installing the software, visit helpx.adobe.com/dimension/system-requirements.html.

A couple of the lessons in this book use Adobe Photoshop CC and Adobe Illustrator CC. You can install Photoshop and Illustrator on your computer using the Adobe Creative Cloud desktop application, available at adobe.com/creativecloud/desktop-app.html. Follow the on-screen instructions.

Starting Adobe Dimension

You start Dimension just as you do most software applications.

To start Adobe Dimension in Windows: Click the Start button in the taskbar, and in the alphabetical list under A, click Adobe Dimension CC.

To start Adobe Dimension in Mac: Click the Adobe Dimension CC icon in the Launchpad or Dock.

If you don't see Adobe Dimension CC, type **Dimension** into the search box in the taskbar (Windows) or in Spotlight (Mac), and when the Adobe Dimension CC application icon appears, select it and press Return/Enter.

Online content

Your purchase of this Classroom in a Book includes online materials provided by way of your Account page on peachpit.com.

Lesson files

To work through the projects in this book, you will need to download the lesson files from peachpit.com. You can download the files for individual lessons or download them all in a single file.

Web Edition

The Web Edition is an online interactive version of the book, providing an enhanced learning experience. Your Web Edition can be accessed from any device with a connection to the Internet, and it contains the following:

- The complete text of the book
- Hours of instructional video keyed to the text
- Interactive quizzes

In addition, the Web Edition may be updated when Adobe adds significant feature updates between major Creative Cloud releases. To accommodate the changes, sections of the online book may be updated or new sections may be added.

Accessing the lesson files and Web Edition

If you purchased an eBook from peachpit.com or adobepress.com, your Web Edition will automatically appear under the Digital Purchases tab on your Account page. Click the Launch link to access the product. Continue reading to learn how to register your product to get access to the lesson files.

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The lesson files can be accessed through the Registered Products tab on your Account page. Click the Access Bonus Content link below the title of your product to proceed to the download page. Click the lesson file links to download them to your computer.

Note

As you complete each lesson, you may want to keep your start files. In case you overwrite them, you can restore the original files by downloading the corresponding lesson files from your Account page at peachpit.com.

Restoring default preferences

The preferences file stores information about various command settings in Dimension. Each time you quit Dimension, the selections you make in the Preferences dialog are saved in the preferences file.

To ensure that what you see on-screen matches the images and instructions in this book, you should restore the default preferences as you begin each lesson. If you prefer to preserve your preferences, be aware that the settings in Dimension CC may not match those described in this book.

To restore your preferences to the factory default, do the following:

1. Start Adobe Dimension.
2. Choose File > New to create a new, blank file.
3. Choose Adobe Dimension CC > Preferences (Mac) or Edit > Preferences (Windows).
4. Click Reset Preferences.
5. Click OK.

Additional resources

Adobe Dimension CC Classroom in a Book (2019 release) is not meant to replace documentation that comes with the program or to be a comprehensive reference for every feature. Only the commands and options used in the lessons are explained in this book. For comprehensive information about program features and tutorials, refer to these resources:

Adobe Dimension Learn and Support: helpx.adobe.com/support/dimension.html is where you can find and browse Learn and Support content on Adobe.com. You can go there directly from Dimension by choosing Help > Dimension Help.

Start screen: In Dimension, the Start screen contains various links to tutorials and other learning content.

Dimension tutorials: helpx.adobe.com/dimension/tutorials.html lists online tutorials for beginner and experienced users. You can go there directly from Dimension by choosing Help > Learn.

Dimension blog: theblog.adobe.com/creative-cloud/dimension/ brings you tutorials, product news, and inspirational articles about Dimension.

Adobe Forums: forums.adobe.com lets you tap into peer-to-peer discussions, questions, and answers on Adobe products.

Adobe Dimension CC product home page: adobe.com/products/dimension.html provides information about product features and system requirements.

Resources for educators: adobe.com/education and edex.adobe.com offer a trea- sure trove of information for instructors who teach classes on Adobe software. Find solutions for education at all levels, including free curricula that use an integrated approach to teaching Adobe software and can be used to prepare for the Adobe Certified Associate exams.

Adobe Authorized Training Centers

Adobe Authorized Training Centers offer instructor-led courses and training on Adobe products.

A directory of AATCs is available at training.adobe.com/trainingpartners.

1 Introducing Adobe Dimension

Lesson overview

In this lesson, you'll explore the workspace and learn the following:

- What Adobe Dimension is
- How to open a Dimension file
- How to work with the tools and panels
- How to change your view of a scene
- How to make simple edits to a scene

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.

The modern, uncluttered interface of Adobe Dimension makes it easy to find the tools and options you need.

Introducing Adobe Dimension

Adobe Dimension is a desktop program for Macintosh and Windows for creating photorealistic images from 3D assets for branding, product shots, scene visualization, and abstract art.

Dimension makes 3D design, compositing, and rendering accessible to people with little or no 3D software experience. Wherever possible, special terminology that is unique to the 3D modeling world is avoided in both the Dimension program and this book. The Dimension interface should be familiar to users of other Adobe design tools, such as Adobe XD, Illustrator, Photoshop, and InDesign.

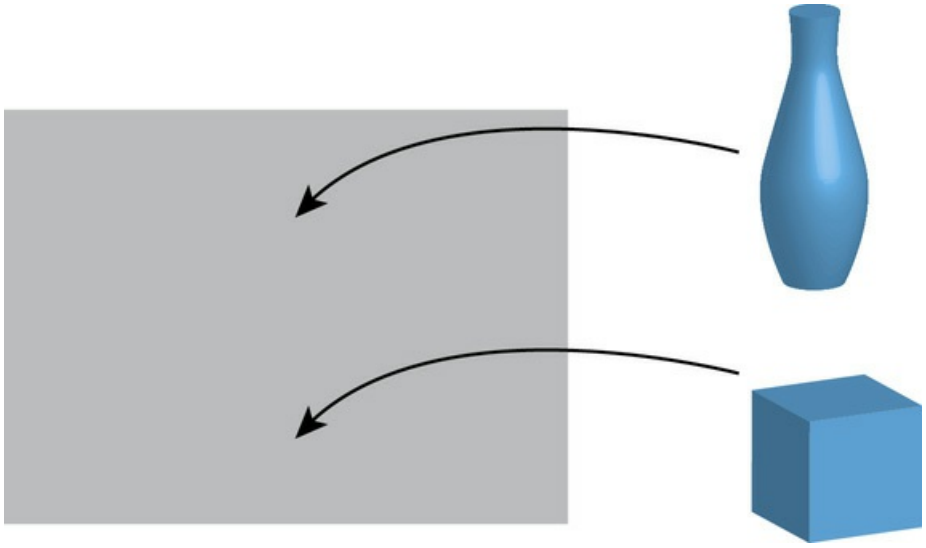
Dimension is a subscription product, available as part of the Adobe Creative Cloud product offering. Depending on your subscription plan, you might be paying only for Dimension, or you might have access to all the Creative Cloud applications, including Adobe Photoshop and Illustrator, which are particularly useful as companions to Adobe Dimension.

Where do 3D models come from?

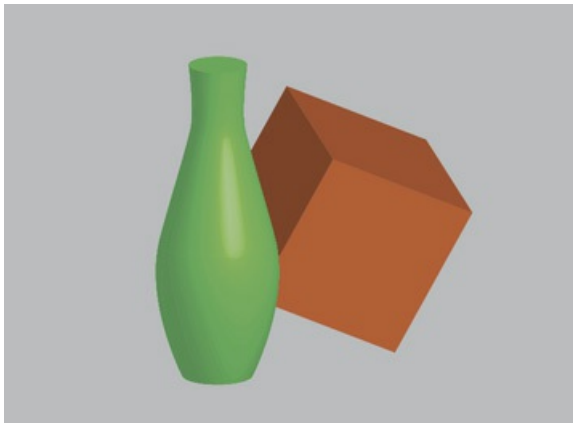
Dimension isn’t intended for creating 3D models. 3D models are usually created with modeling software such as 3ds Max, Blender, Inventor, Maya, Rhino, Sketchup, SolidWorks, Strata 3D, and so on. Most of these products have a fairly steep learning curve, are quite technical, and, due to their complexity, aren’t well-suited for part-time or occasional use.

Dimension’s sweet spot is in importing models from these programs; it can then apply new materials to their surfaces, position them with other models, composite them into 2D scenes, and apply realistic lighting, reflections, and shadows. The result is then “rendered,” or converted into a flat 2D image, as a PSD or PNG file that can be used in print publications or on websites or for other digital uses. Dimension also includes a “beta” feature (at the time of this writing) that lets you export an interactive 3D version of the scene to a website to share with others.

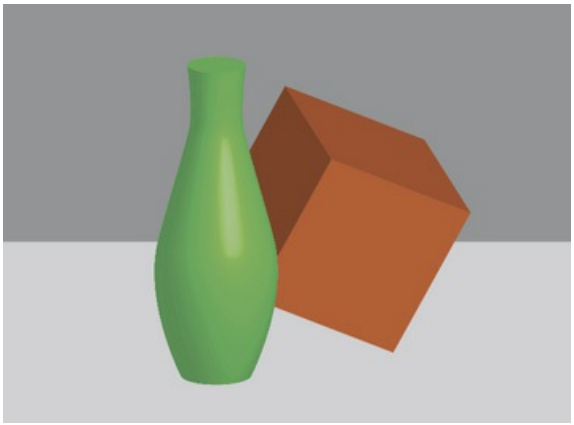
1. Create a scene.



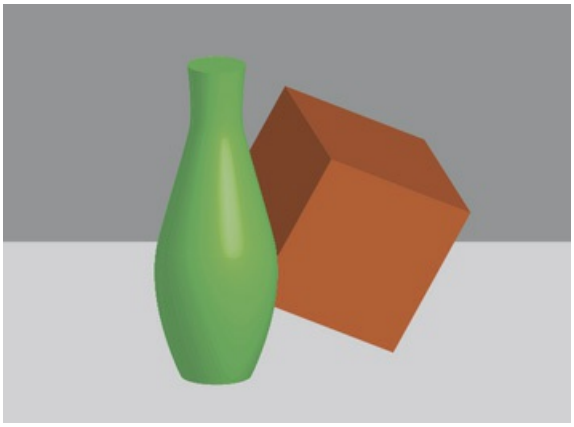
2. Adjust lighting, materials, size, position, rotation, etc.



3. Add background.



4. Output. Publish to Web (Beta). Render to PSD or PNG.



Starting Dimension and opening a file

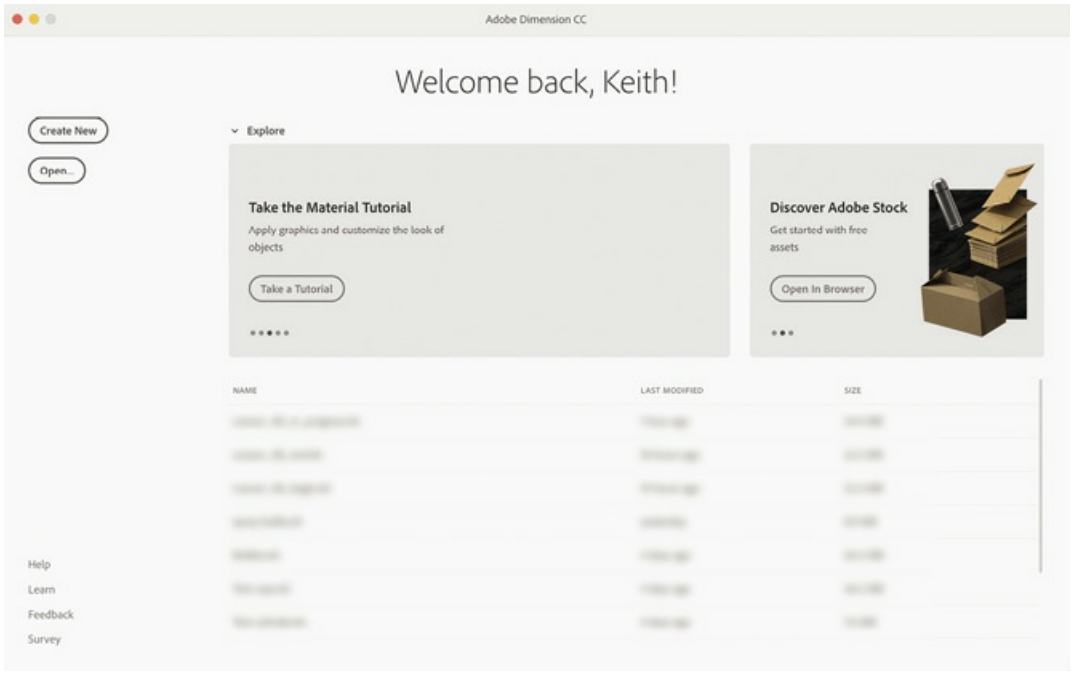
In this lesson, you will open a finished Dimension scene and poke around a bit to learn how Dimension's interface is designed.

1. Launch Adobe Dimension.

   A start screen is displayed. Your screen may look different than the screenshot shown here, and that's OK. The start screen contains links to various tutorials and other Dimension resources.

   If you've worked on Dimension files previously, those files will be displayed in a list at the bottom of the start screen.

   In the lower-left corner of this screen there are links to more helpful learning content, as well as links through which to provide feedback to Adobe about Dimension.



2. Click Open.
3. Select the file named Lesson_01_begin.dn, which is in the Lessons > Lesson01 folder that you copied onto your hard disk, and then click Open.

   You'll use this simple 3D scene to explore the Dimension interface.

Dimension limitation: One file open at a time

3D files can be complex and demand a lot of computer memory and processing power. Because of this, Dimension allows you to open only a single file at a time. In other words, if you have a project open in Dimension and then create a new file or open another file, the file you originally had open will close.

Exploring the tools

The Tools panel on the far left side of the screen contains a handful of tools that you'll use to create and edit your 3D scenes. Let's take a tour of the Tools panel.

1. Hover over each of the tools in the Tools panel, and note that a blue tooltip is displayed. This tooltip tells you the name of the tool, the keyboard or mouse shortcut that can be used to access the tool, and what the tool is used for.

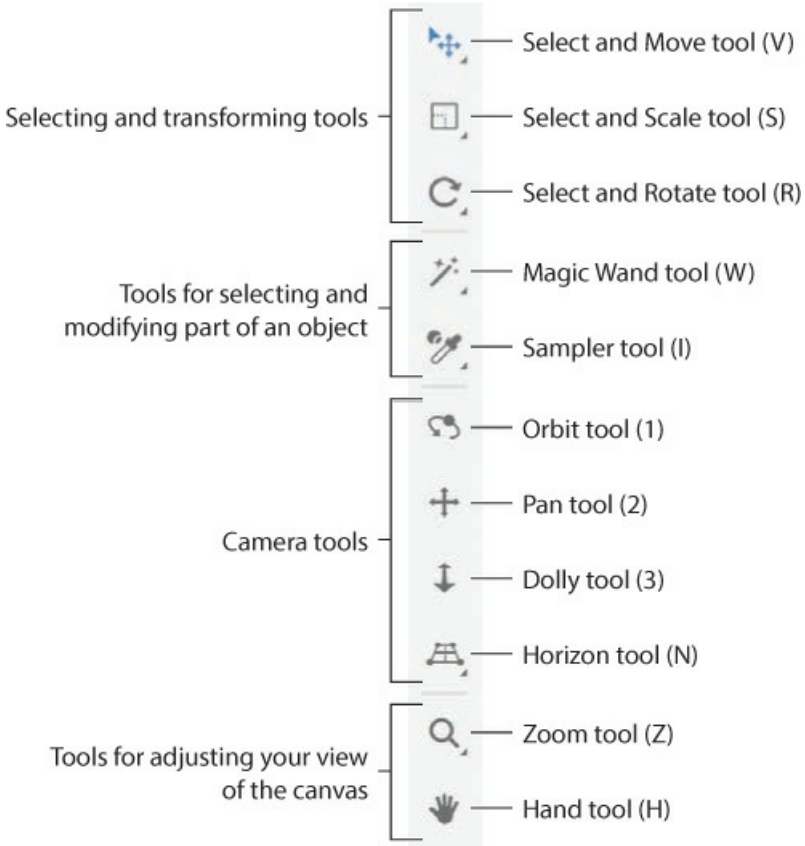
2. Note that the Tools panel is divided into four sections by subtle horizontal lines.

   The top three tools—the Select and Move tool, the Select and Scale tool, and the Select and Rotate tool—are used for selecting and transforming 3D models. Note that there isn't a separate Selection tool like in other Adobe design programs. Instead, each of these tools will allow you to both select 3D objects and transform them.

   The next two tools—the Magic Wand and the Sampler—are grouped together because they are both used for selecting and changing the color or surface materials of just part of a larger 3D object, such as the cap on a bottle or the handle on a mug.

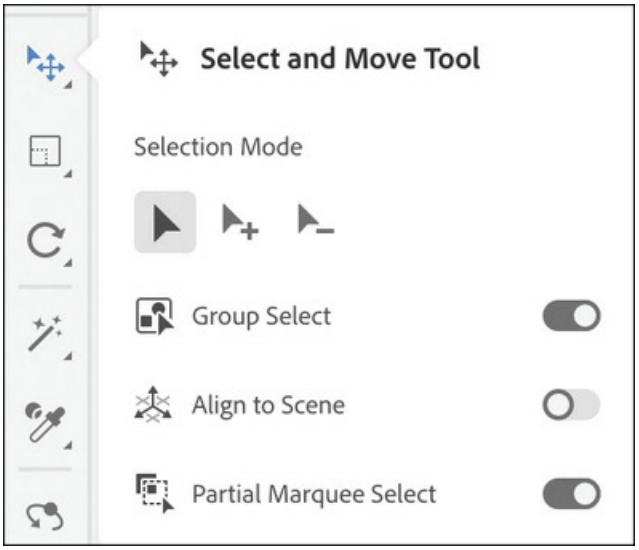
   The next four tools—Orbit, Pan, Dolly, and Horizon—are used for adjusting the position of the "camera" in the 3D scene. These tools are often referred to as the camera tools.

   The bottom two tools—the Zoom tool and the Hand tool—are used to adjust your view of the "canvas," or work area, on the screen. These tools work similarly to the Zoom and Hand tools in Photoshop, Illustrator, and InDesign.



3. Right-click the Select and Move tool, and note that some additional options for this tool appear on the screen.

The small black arrow in the lower-right corner of a tool in the Tools panel indicates that additional tools or tool options will appear if you either right-click the tool or press and hold the mouse button on the tool.



Exploring the panels

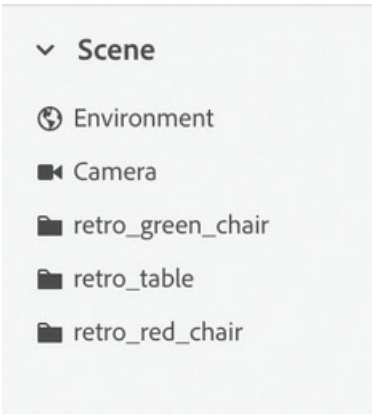
As in many other Adobe design programs, panels on the right side of the screen display the properties of objects that you have selected in the work area; the panels allow you to edit those properties as well. Let's see how this works in Dimension.

1. Select the Select and Move tool (keyboard shortcut: V) in the Tools panel.
2. Click the red chair in the scene. Note that the chair displays with a blue highlight to indicate that it is selected.

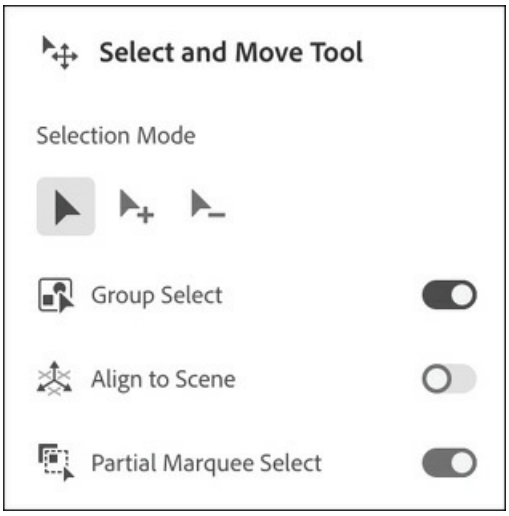
Explore the Scene panel

The Scene panel displays a list of all the components that make up the scene.

1. Look at the Scene panel on the right side of the screen. In this case, there are five objects in the scene: Environment, Camera, retro_green_chair, retro_table, and retro_red_chair.



2. Right-click the Select and Move tool in the Tools panel. In the tool options that appear, turn on the Group Select option. This causes the tool to select the entire group when you click a grouped object, similar to the Selection tool in Photoshop, Illustrator, and InDesign.

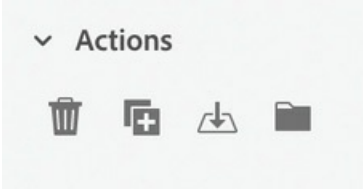


3. Click the green chair on the canvas (the "page" or the work area) to select it. This will highlight the retro_green_chair model in the Scene panel.
4. Hover over the retro_green_chair entry in the Scene panel, and you'll see an eyeball icon to the right of the entry. Click this eyeball icon to hide the green chair on the canvas.
5. Click the eyeball icon again to show the model on the canvas.
6. Click the words "retro_ table" in the Scene panel, and the table will be selected on the canvas. Sometimes clicking an entry in the Properties panel is an easier and more precise way to select models than clicking the models on the canvas.

Explore the Actions panel

Depending on what you have selected in your scene, the Actions panel will display quick shortcuts to various "actions," or things that you can do to your selection.

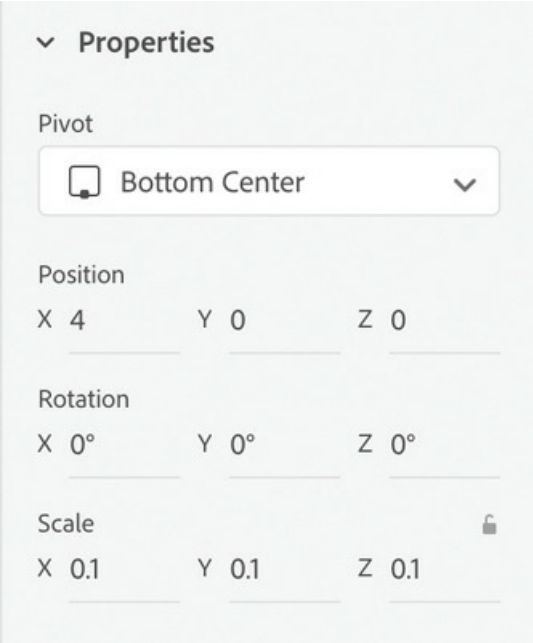
1. With the retro_table model selected, the Actions panel displays the Delete, Duplicate, Move to Ground, and Group actions.
2. Hover over each action icon to see the name of the action as well as a keyboard shortcut that can be used for each.



Explore the Properties panel

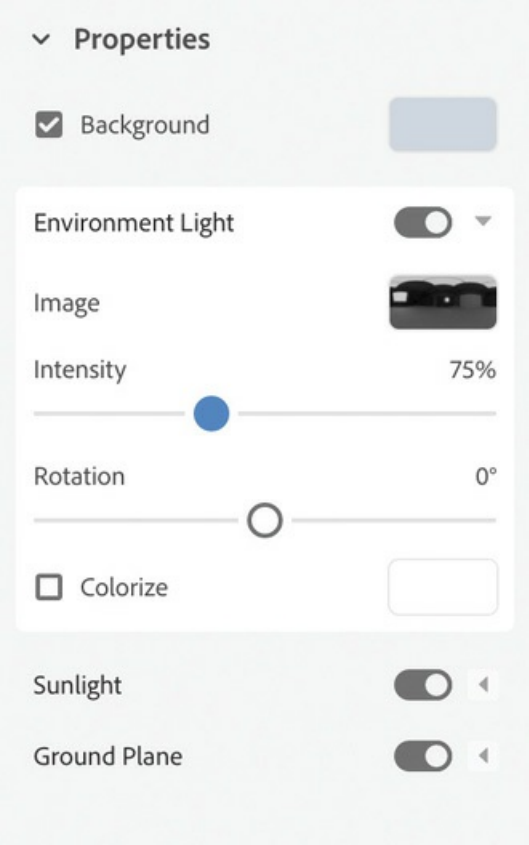
Depending on what you have selected in your scene, the Properties panel displays various properties of the selection.

1. With the retro_table object selected, the Properties panel displays the “pivot” point, as well as X, Y, and Z values for Position, Rotation, and Scale, respectively. Each of these values can be edited.
2. Enter a value of **4** in the X field for Position. This will move the table to the right in the scene.



3. In the Scene panel, click Environment to select the environment, which is the area around the 3D models that controls the lighting and ground properties.

   In the Properties panel, you’ll see settings for Background, Environment Light, Sunlight, and Ground Plane displayed.
4. Under Environment Light, drag the Intensity slider to the left to about 75% to reduce the amount of overall light in the scene.



Note

Unlike in some other Adobe products, these three panels (Scene, Actions, and Properties) cannot be closed or rearranged—they will always be displayed on the screen at the same location. You can collapse and expand each of these panels by clicking the disclosure arrow to the left of the panel name.

Understanding the Camera

Every Dimension project contains a single camera. You can manipulate the camera with the Orbit, Pan, Dolly, and Horizon tools to view the 3D scene from various angles, distances, and perspectives.

1. Choose the Select and Rotate tool in the Tools panel (keyboard shortcut: R).
2. Either click the red chair on the canvas or click the retro_red_chair object in the Scene panel to select the red chair.
3. In the Properties panel, enter ° for the Y value for Rotation, and press Return/Enter. Note that the chair rotates around the vertical (y) axis.

4. Choose Edit > Undo Edit Scene to undo the rotation.
5. Choose Edit > Redo Edit Scene to redo the rotation.

   Note that as the chair rotates, the shadows change in length and appearance but are still cast in the same direction.

6. Choose the Dolly tool in the Tools panel (keyboard shortcut: 3). Drag down on the screen with your mouse to move the camera farther away from the object.
7. Choose Camera > Camera Undo to return to the original view of the object.
8. Choose the Orbit tool in the Tools panel (keyboard shortcut: 1).
9. Drag around on the scene with the Orbit tool. This changes your view of the scene. It is as if you are flying around the scene, viewing the models from different angles through a camera lens.

   Note that as you rotate your view of the scene with the Orbit tool, the shadows change direction but stay the same length and appearance; this is because the models and light source remain the same relative to each other, and you are just moving around the scene.

10. Choose Camera > Camera Undo as many times as necessary to return to the initial view of the scene.

Note

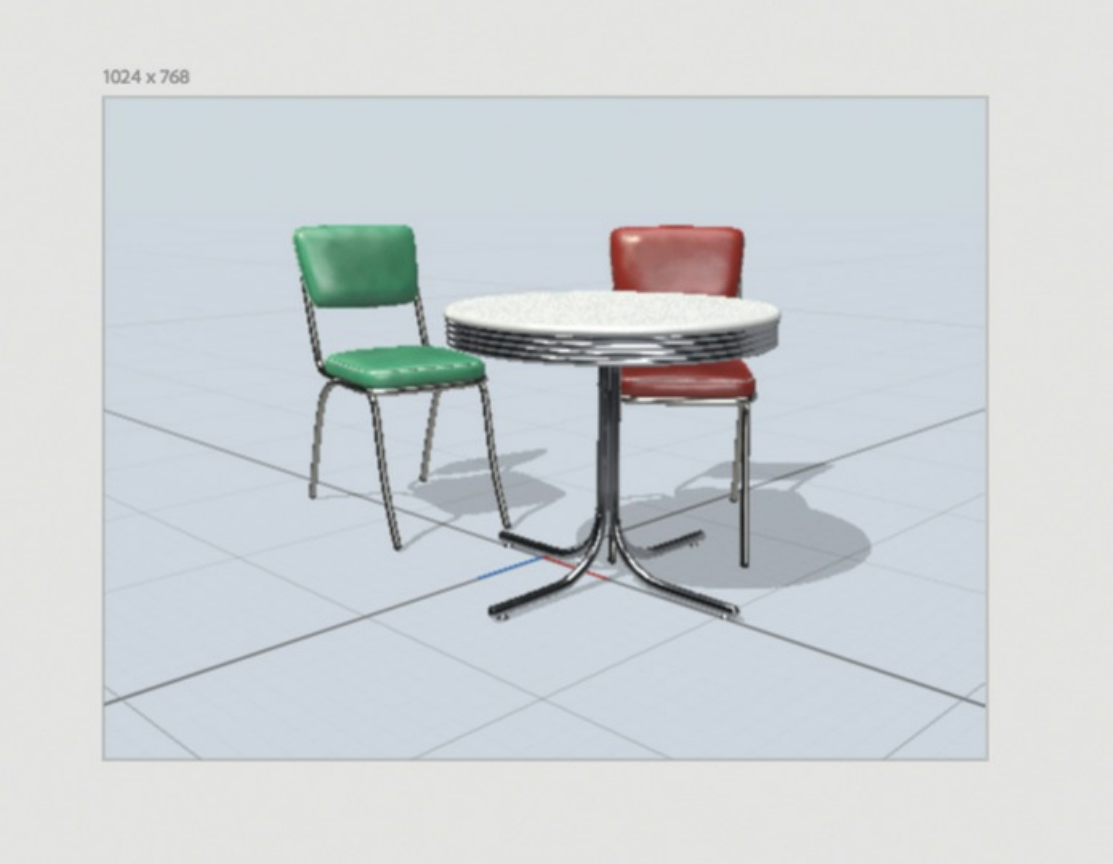
Dimension has two undo commands. Edit > Undo reverses the last actual edit that you made to the objects in your scene. Camera > Camera Undo reverses the last movement of the camera.

Understanding the Canvas

So far, all our manipulation of our 3D scene has occurred inside a large rectangle that occupies most of your work area on the screen. This rectangle is called the “canvas.” Think of the canvas as your “page.” It’s the actual dimensions of the final 2D image that is being created from your 3D objects. Most of the time, you’ll probably just leave this canvas as it is on your screen, using the camera tools to change your view of the scene within the

bounds of the canvas. Depending on what other software programs you may have used, it might be helpful to think of the canvas as the “viewport” into your 3D scene.

If you’ve used Adobe design tools such as Photoshop, Illustrator, or InDesign, you may want to manipulate your view of the canvas independent of the camera tools.



Tip

It might be helpful to think of the canvas this way. The camera tools (Orbit, Pan, Dolly, and Horizon) manipulate your view of the scene within the canvas. The Zoom and Hand tools manipulate your view of the canvas itself.

Tip

As with many other Adobe design tools, you can use the Command+plus and Command+minus (Mac) or Ctrl+plus and Ctrl+minus (Windows) keyboard shortcuts to zoom in and out. Use Command+1 (Mac) or Ctrl+1 (Windows) to see your design at 100%, and use Command+zero (Mac) or Ctrl+zero (Windows) to return to the “fit in window” view.

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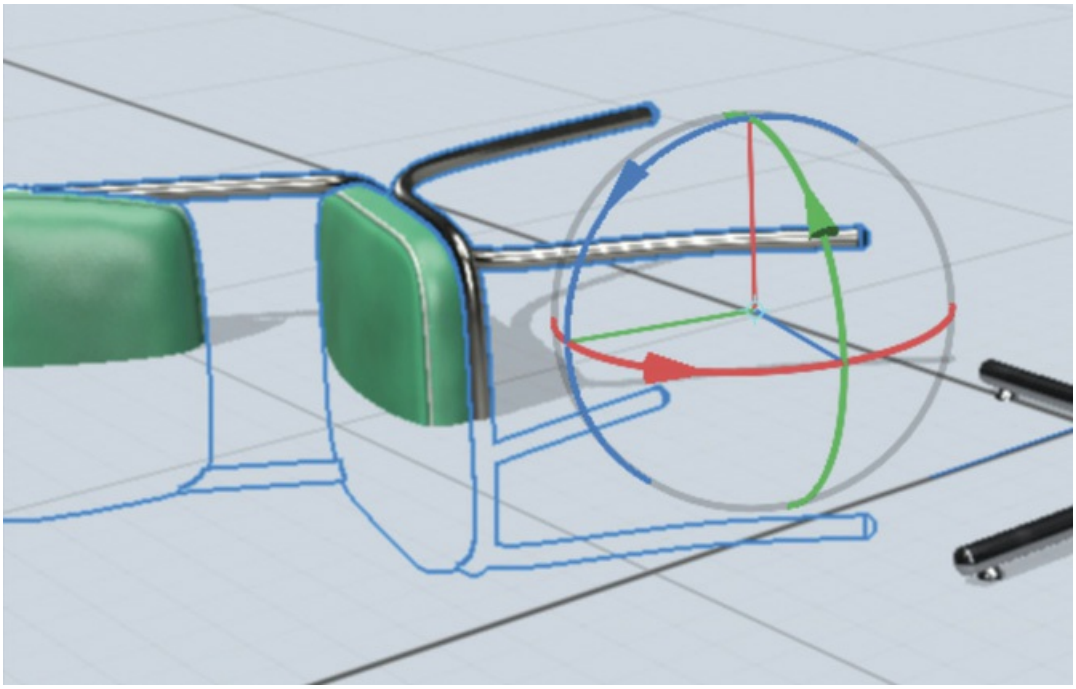
1. Select the Zoom tool in the Tools panel (keyboard shortcut: Z), and click the canvas or drag across the canvas to zoom in.
2. Select the Hand tool in the Tools panel (keyboard shortcut: H), and drag the scene to move the canvas around on the screen.
3. Select the Zoom tool in the Tools panel (keyboard shortcut: Z).
4. Hold down the Option key (Mac) or Alt key (Windows), and click the canvas a couple of times to zoom out.
5. Choose View > Zoom to Fit Canvas to fit the canvas on the screen.

Understanding the Ground Plane

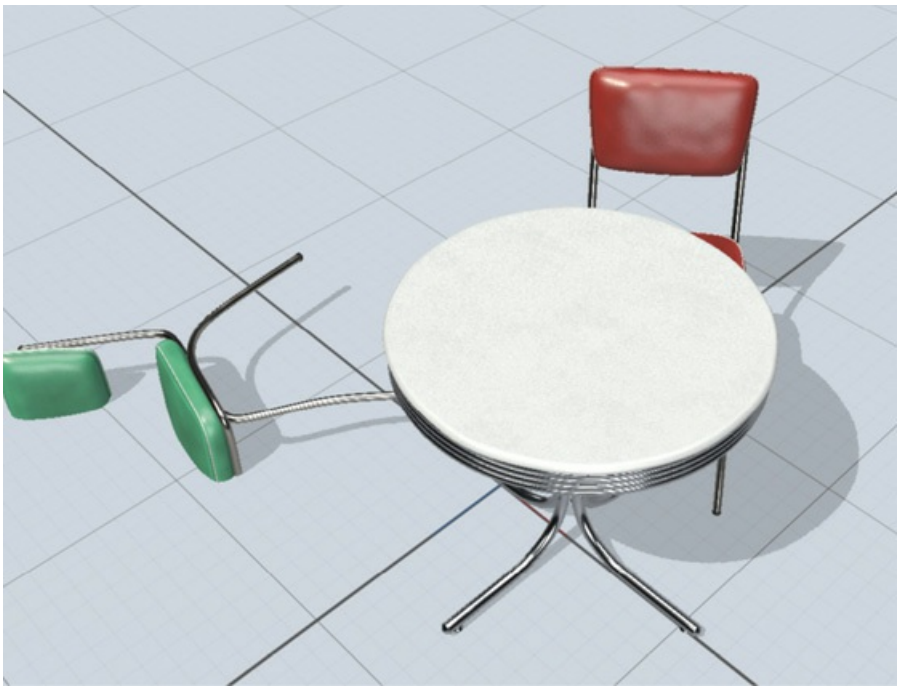
The vanishing lines (the grid of squares that you see on the screen) represent the Ground Plane of the 3D scene. The Ground Plane is the “floor” that objects in the scene typically sit on, although objects can float above this floor or be buried below the floor.

1. Choose Camera > Switch to Home View to ensure that your camera view is back to the way it was at the beginning of this lesson.
2. Choose the Select and Rotate tool in the Tools panel (keyboard shortcut: R).
3. Select the retro_green_chair object in the Scene panel.
4. In the Properties panel, change the Z value for Rotation to **90°**, and press Return/Enter. The chair rotates around the z-axis so that half of the chair disappears into the Ground Plane.



5. Choose the Orbit tool in the Tools panel (keyboard shortcut: 1).
6. Drag down on the screen with the Orbit tool. This changes your view of the scene so that you are viewing it from above.

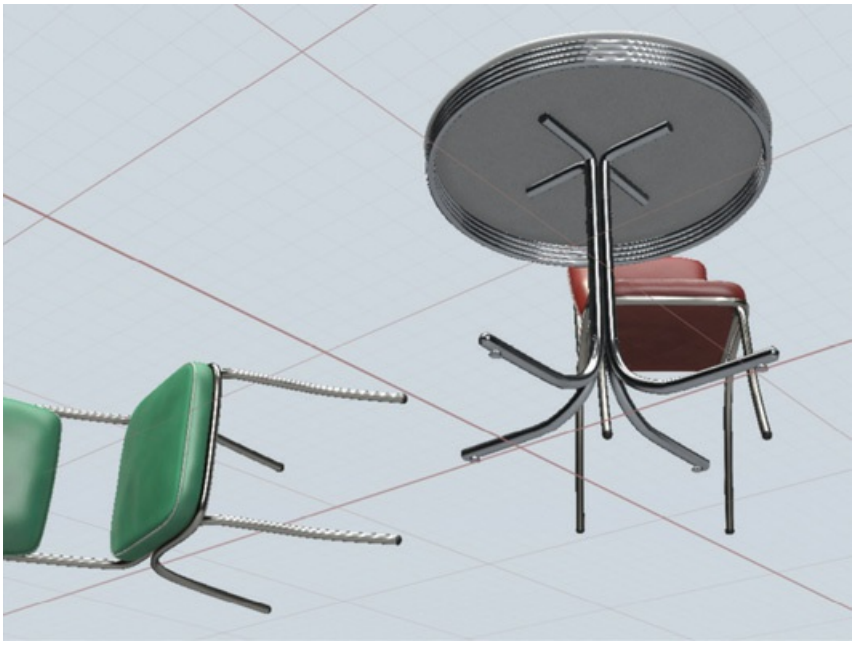
Note that the grid lines on the Ground Plane are dark gray and that the Ground Plane is opaque. In other words, you can't see through the floor to what is underneath.



7. Drag up on the screen with the Orbit tool until you can see the entire green chair. Now you are viewing the scene from below the Ground Plane, looking up at the bottom of the table.

   Note that you can see both the part of the green chair that is sticking "up" from the ground and the part that is "buried" below the ground. When you are viewing the scene from below the Ground Plane, the Ground Plane appears transparent so that you can see through it to the objects above.

   Note also that the grid lines on the underside of the Ground Plane are red. This can help reduce confusion in those instances when you aren't sure if you are viewing a scene upside down or right-side up.



8. Choose the Dolly tool in the Tools panel (keyboard shortcut: 3). Drag down on the screen repeatedly with your mouse to move the camera farther away from the object. Note that the Ground Plane is “infinite.” The camera can be moved a long way away from the object.
9. Choose Camera > Switch to Home View to return the camera view back to the way it was at the beginning of this lesson.

Tip

The grid lines on the Ground Plane can be toggled on and off with View > Toggle Grid. And, the Ground Plane itself can be turned on and off in the Properties panel when Environment is chosen in the Scene panel.

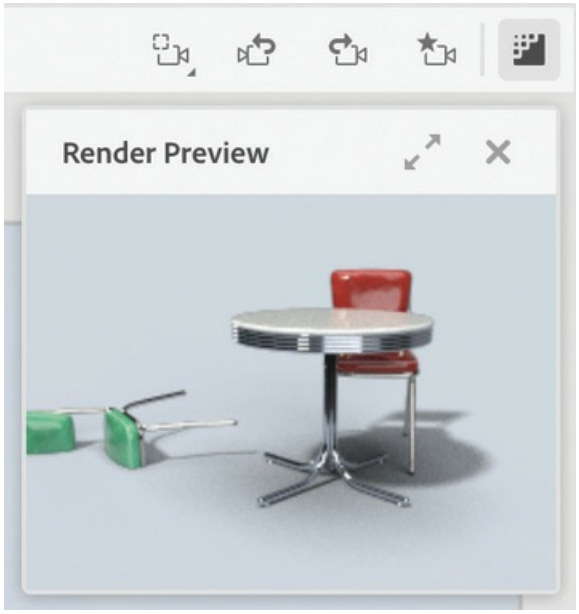
Using Render Preview

Getting an accurate view of the surfaces, colors, lighting, shadows, and reflections in a scene requires that a scene be rendered. Rendering is a processor-intensive, time-consuming task in which the computer analyzes how the objects in a scene interact with each other, the background, and the lighting in the scene, and then calculates accurate shadows, highlights, surface details, and reflections.

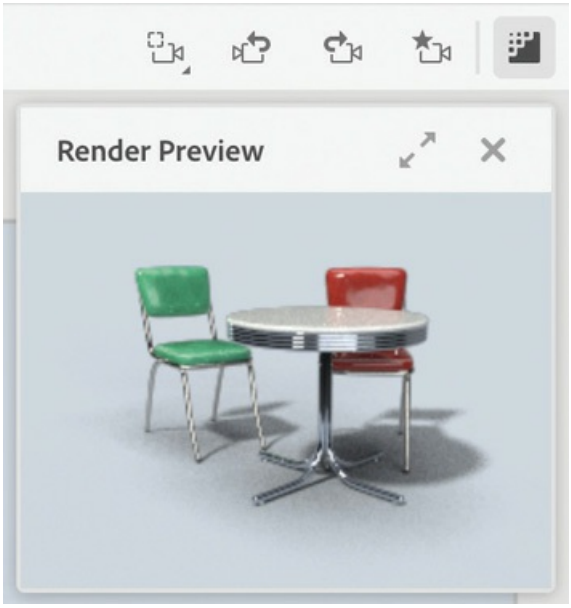
But even the fastest computers today are unable to render a complex scene in real time as you make edits to the scene. This is why rendering isn’t usually done until the final stages of a project. However, the Render Preview window gives you a quick, fairly accurate idea of what the final rendering will look like, almost in real time, as you work on a scene.

1. Click the Render Preview icon in the upper-right corner of the screen.

After a 15- to 20-second delay (depending on the speed of your computer), you'll see a small thumbnail image of what the final render will look like.



2. Choose the Select and Rotate tool in the Tools panel (keyboard shortcut: R).
3. If it isn't already selected, click the retro_green_chair in the Scene panel to select the chair.
4. In the Properties panel, change the Z value for Rotation to **0°**, and press Return/Enter. After a brief delay, you'll see the Render Preview window update to show the new, edited scene.



The two modes of Dimension

The Dimension interface consists of two modes: Design and Render. Design mode is where you'll spend the lion's share of your time creating and editing 3D scenes. Render mode is where you'll create the final, high-quality pixel-perfect output of your scene. You'll learn

all about both of these modes throughout this book.

Note

At the time of this writing, Dimension includes a “Beta” feature called Publish to Web. To try this out, click the share button in the upper-right corner and choose Publish 3D Scene. Dimension will publish your scene to a Web server (hosted by Adobe), and return a URL that you can share. Anyone who follows the URL will be able to interactively change their view of the 3D scene.

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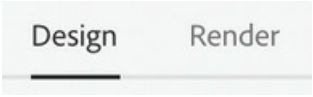
1. In the upper-left corner of the screen, you’ll see a line underneath Design to indicate that we are currently in Design mode. Whenever you open a Dimension file or create a new file, Dimension will initially display the file in Design mode.



2. Click Render to switch to Render mode. Note that the 3D content disappears from view and that all the tools and panels are replaced with new panels for controlling the render settings.

   We’ll cover the details of rendering in a later lesson. For now, I’ve rendered the exercise file used in this lesson for you.

3. Open the Lesson_01_final_render.psd file in Adobe Photoshop to examine the final render and compare it to what you saw in the small Render Preview window earlier.

4. Click Design to switch back to Design mode, making the 3D content visible again.

Note

You can switch between Design and Render modes at any time and as often as you wish. Although rendering is usually done at the end of a project, you may wish to occasionally render your work as it progresses so you can get an accurate view of how your project looks at the moment.

Getting help

The Learn icon in the far upper-right corner of the screen gives you access to online help content for Dimension, including tutorials, videos, keyboard shortcuts, and galleries of finished work.

Review questions

1 How many files can be open at one time in Dimension?

2 What is the purpose of Render mode?

3 Why isn't there a selection tool in Dimension?

4 What is the “floor” that 3D objects rest on called?

Review answers

1 Only one file can be open at a time in Dimension. If you have one file open and then open a second file, the first file will close.

2 Render mode is used to create the final scene with accurate lighting, shadows, reflections, materials, and surface properties. Computers are unable to keep up with rendering in real time as you make edits to a scene, so rendering is a separate process that takes place in Render mode.

3 Dimension instead has the Select and Move, Select and Scale, and Select and Rotate tools, all of which will allow you to select an object in addition to moving, scaling, or rotating the object.

4 The imaginary “floor” in a 3D scene is called the Ground Plane.

2 Exploring Design Mode

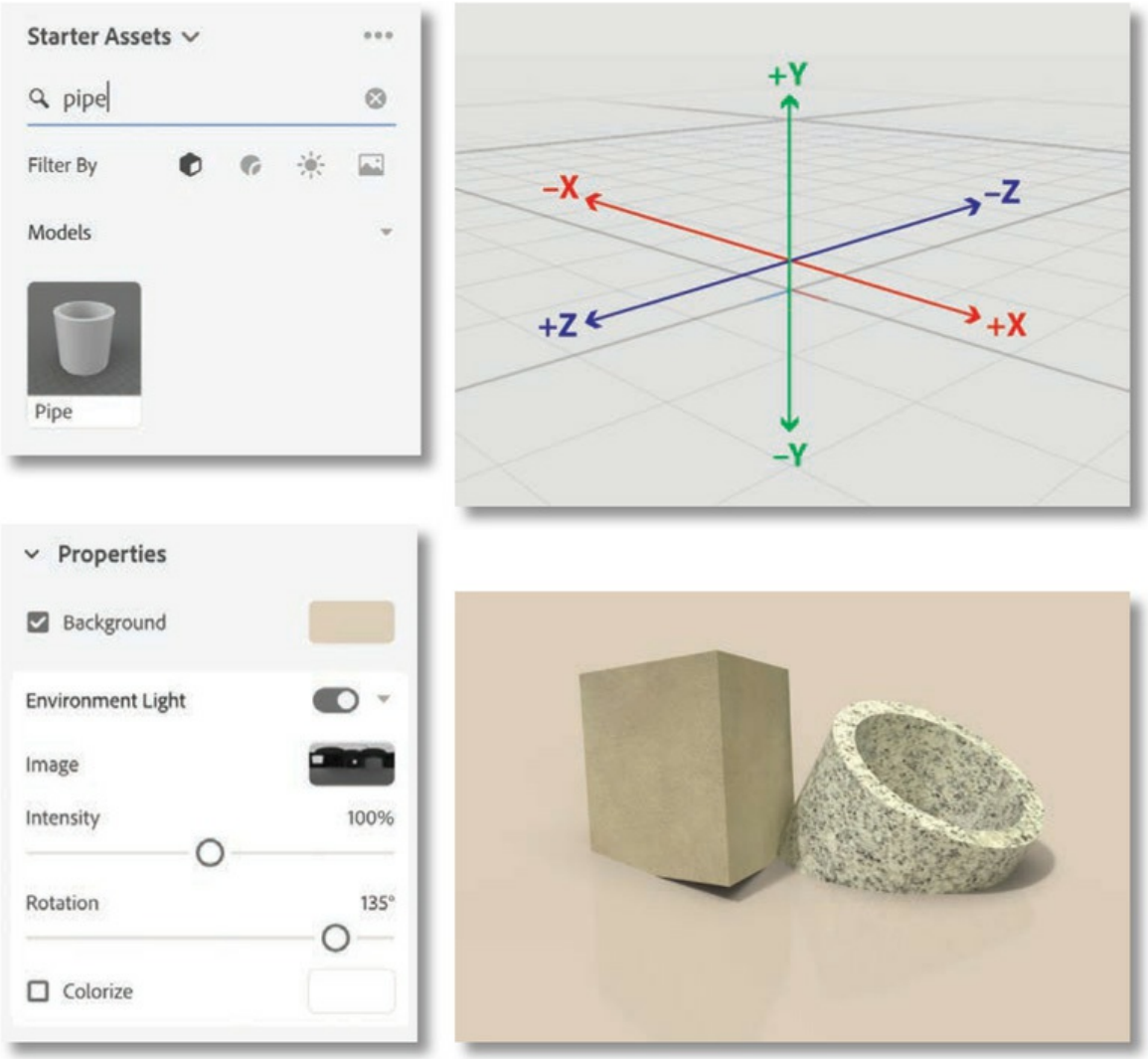
Lesson overview

In this lesson, you'll create a simple 3D scene from scratch and learn the following:

- How to create a new project and specify the canvas size
- How to change the properties of the background
- How to import starter assets
- How to transform 3D objects
- How to apply materials to objects
- How to adjust the lighting
- How to render a scene and produce output that can be used in other programs

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.



Design mode is where you will spend most of your time in Dimension. This is where you'll position, scale, and rotate models, apply materials to surfaces, and adjust lighting and reflections.

Creating a new project

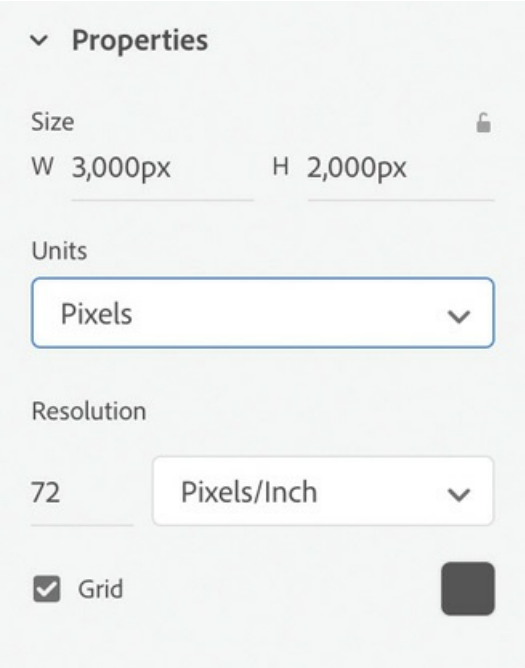
Starting a new project from scratch in Dimension is as easy as choosing File > New.

1. Choose File > New to create a new document. If you currently have another document open, it will close. If that document isn't saved, you'll be prompted to save it before closing.

   Dimension doesn't ask you anything about page size or file size as you create a new file. But you do have control over this.

2. Select the Select and Move tool in the Tools panel (keyboard shortcut: V).
3. Click the 1024 x 768 dimensions that are displayed in the upper-left corner of the canvas. This will select the canvas, and you'll see some options for changing the canvas size appear in the Properties panel on the right.

4. In the Properties panel, change Size to a width of **3000px** and a height of **2000px**.



5. Choose View > Zoom to Fit Canvas to position the new canvas size on the screen.

Note

The appropriate values to enter for the canvas width and height depend on the intended use of the final rendered image. If you just need a low-resolution image to use in a small section of a web page, 600px x 600px might be sufficient. But an image that will be reproduced on the cover of a print magazine may need to be 4000px x 4000px or more. Talk to your web developer or print partner if you need more guidance on this issue. They should be able to tell you the exact pixel dimensions required.

Tip

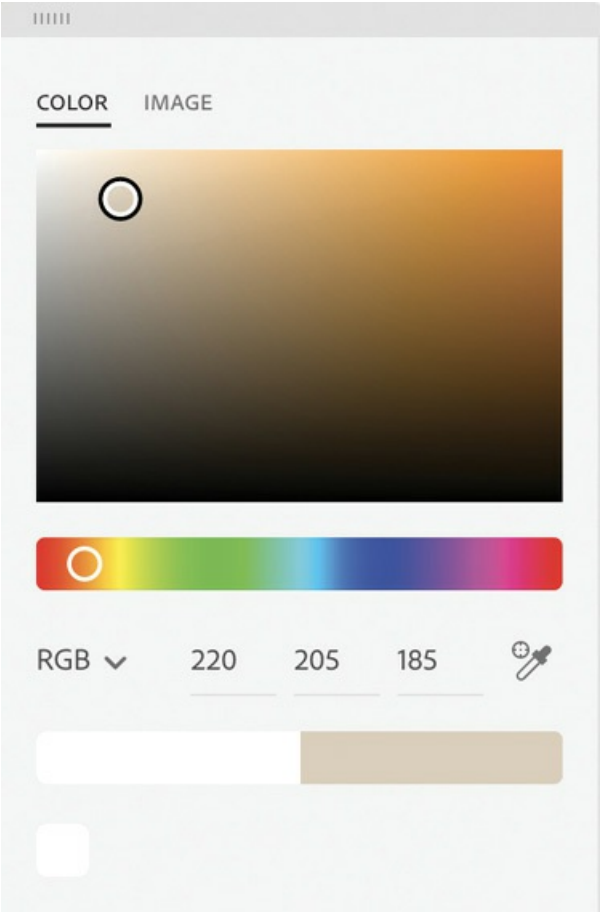
Canvas size significantly influences render time. Use a canvas size that is no larger than necessary.

Change the background color

By default, the background of the scene is white. But you can easily change the background color to any value you want.

1. In the Scene panel, select Environment.

2. In the Properties panel, click the property swatch to the right of the word “Background,” and enter **220**, **205**, **185** for the RGB values to change the background to a light tan color.



3. Click away from the color picker when you are finished to close it.
4. Choose File > Save, name the file, and save it somewhere you can find it again if necessary.

Note

Dimension files are automatically assigned the .dn filename extension. Depending on how your operating system is configured, you may or may not see this extension displayed at the end of the filename.

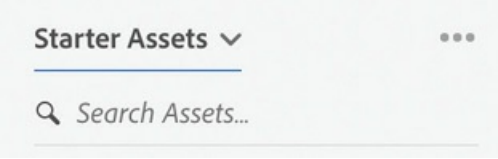
Working with starter assets

Dimension ships with dozens of “starter assets,” including 3D models, materials, lights, and background images you can use to get started creating 3D scenes. You can also use content from Adobe Stock, Creative Cloud Libraries, or your own imported 3D models and 2D images to compose your scenes. In this lesson, we’ll work with the starter assets.

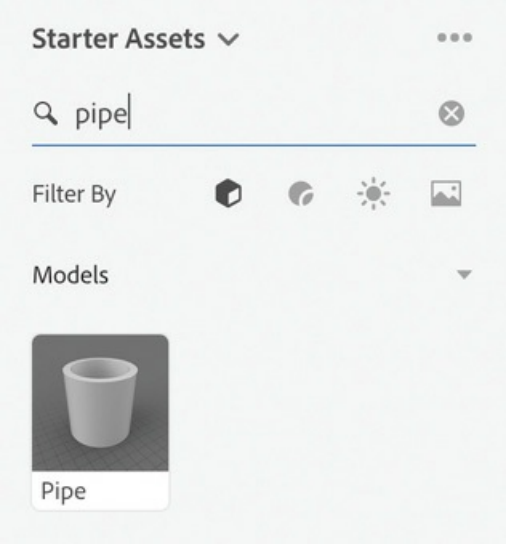
1. Click the Content button in the lower-left corner of the screen. This button displays and hides the Content panel on the left side of the screen. Click the button until the Content panel is displayed.

   The Content panel displays content that you can use in your scene, such as 3D models, materials, lights, and images.

2. If Starter Assets isn't displayed at the top of the Content panel, choose Starter Assets from the dropdown menu.



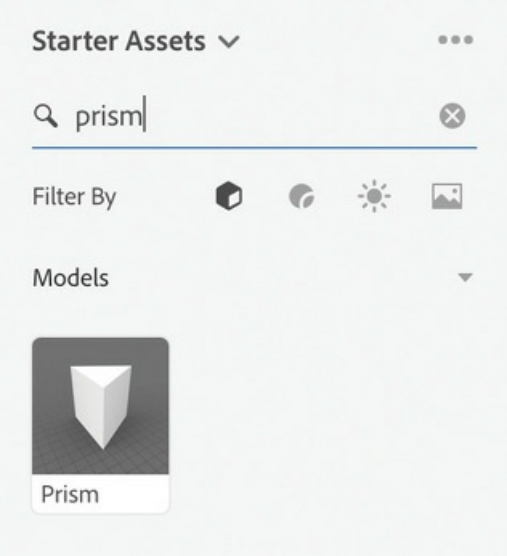
3. Click the model icon at the top of the panel to display only models in the panel.
4. Type **pipe** into the search assets field.



   The Pipe starter asset is located.

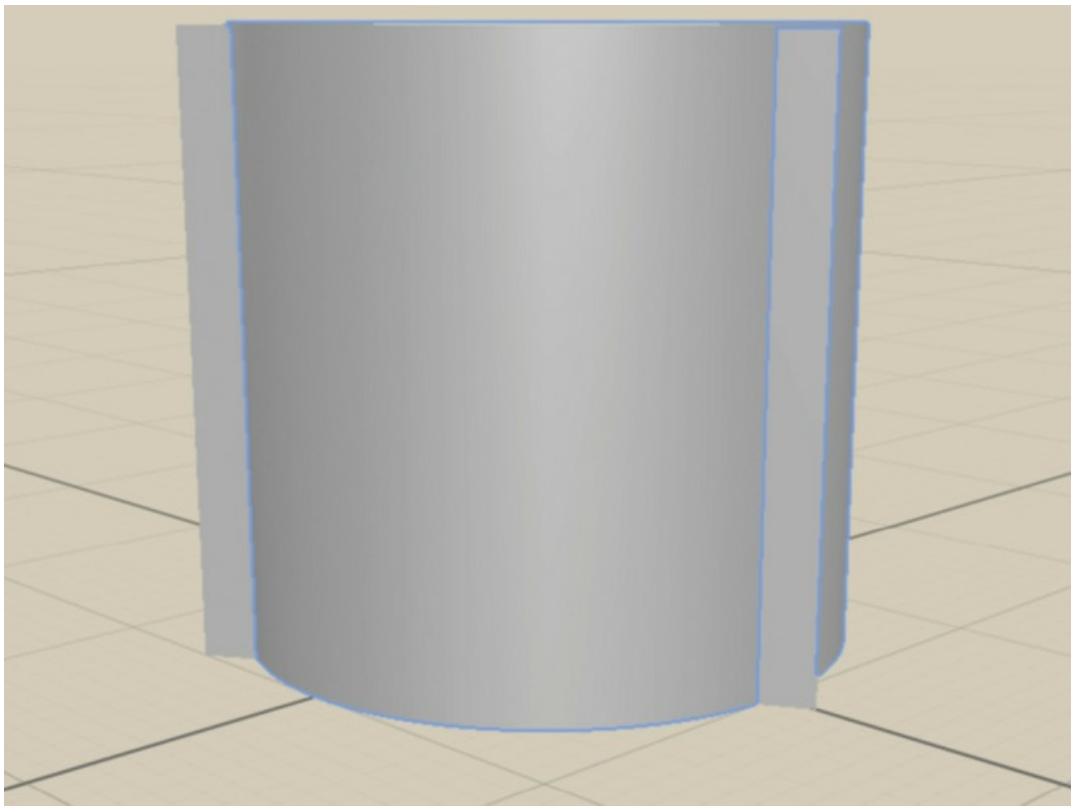
5. Click once on the pipe starter asset to place it into your scene.
6. Type **prism** into the search field.

   The Prism starter asset is located.



7. Click once on the Prism starter asset to place it into your scene.

   Note that the pipe and the prism were both placed at the same location in the scene, so they are intersecting. You'll fix this in the next steps.



Note

When you click a starter asset model, it will always be positioned at the "zero" point in the center of the scene to start. From there, you can move the model to any position in the

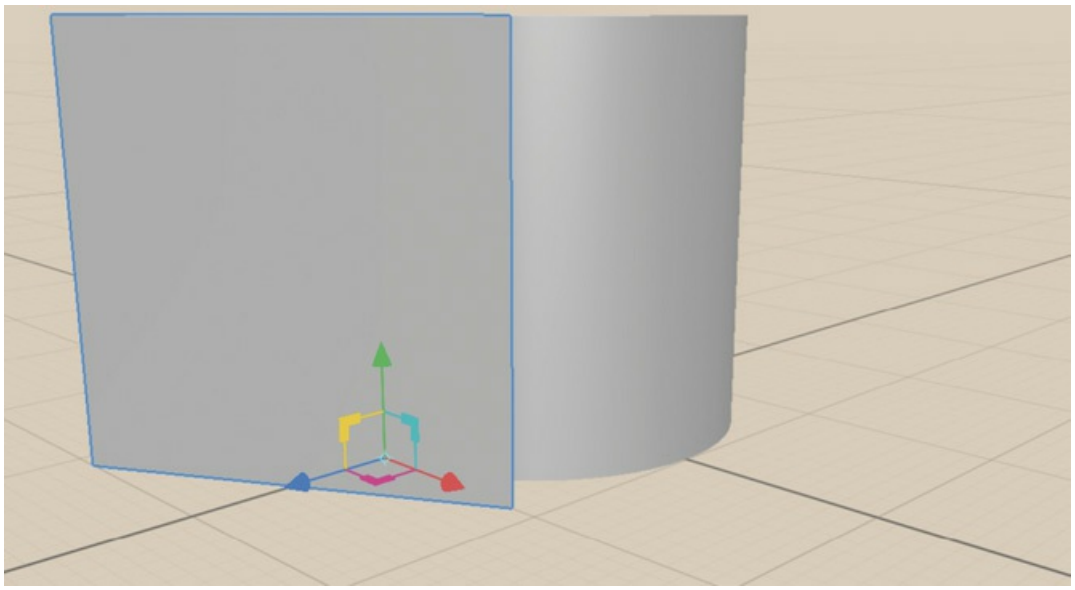
scene that you wish.

Selecting and transforming objects

The Scene panel makes it easy to determine the various pieces that compose a scene, and it can help you select those pieces. Let's rearrange the pipe and the prism in the scene.

Move objects

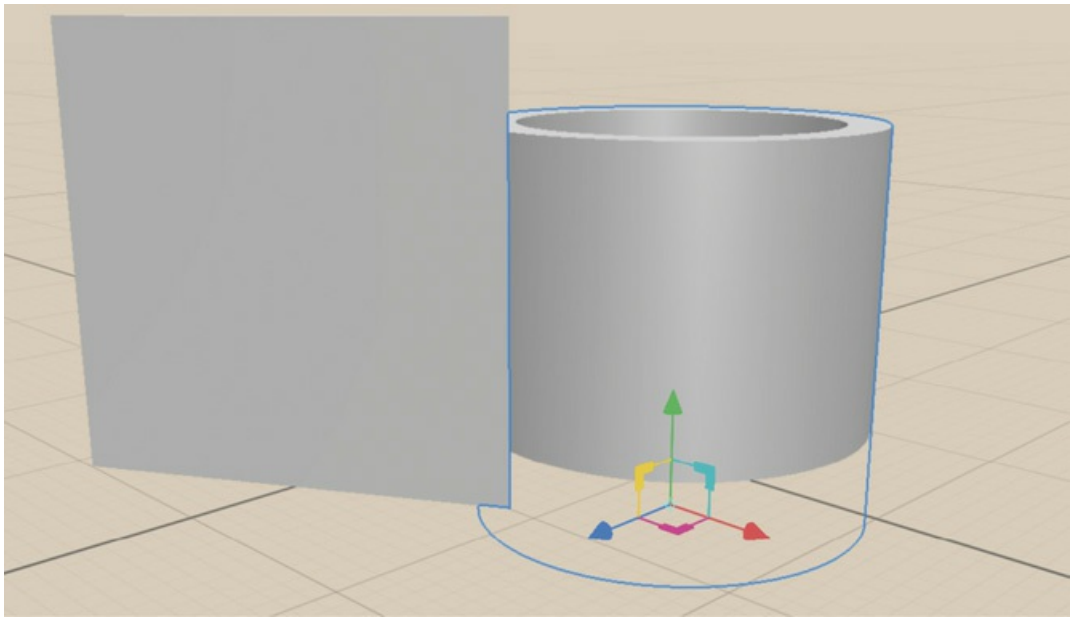
1. Select the Select and Move tool in the Tools panel (keyboard shortcut: V).
2. Select the Prism model in the Scene panel by clicking the word "Prism." You'll see the prism outlined in blue on the canvas to indicate that it is selected.
3. Enter values of X=**0**, Y=**0**, and Z=**10** for Position in the Properties panel. This will move the prism closer to the "front" of the scene.



4. Click the Pipe model in the Scene panel.

   Note the colored widget that appears on the Pipe model. Rather than typing values into the Properties panel, you can use this widget to move the model along the x-, y-, or z-axis.

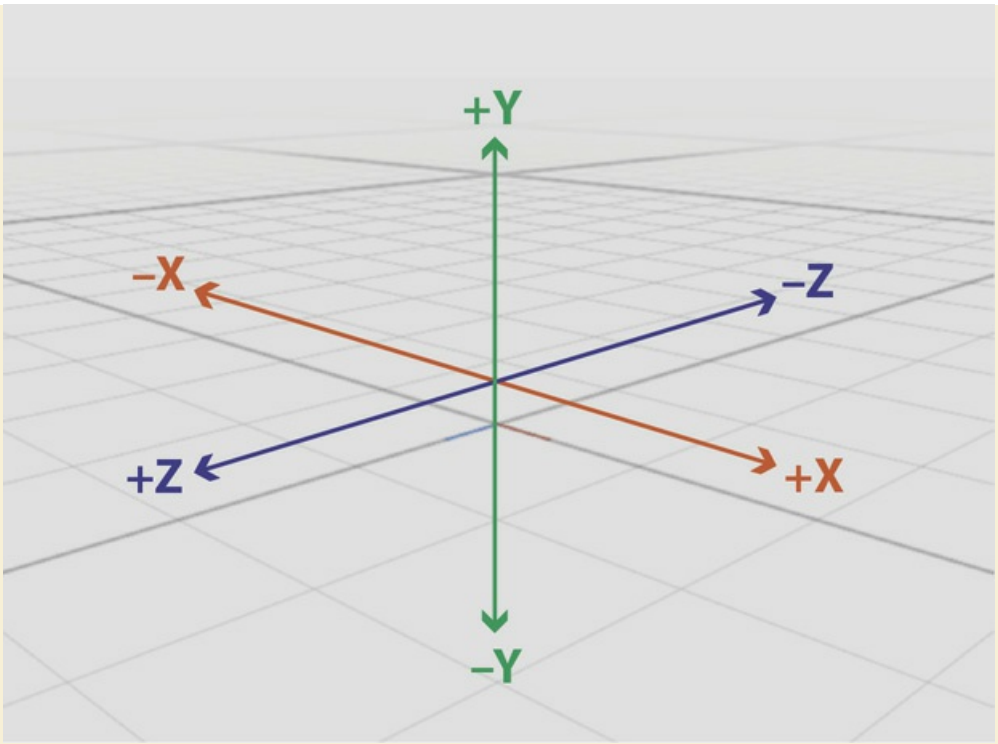
5. Drag the red arrow to the right until 5 is displayed for the X position in the Properties panel.
6. Drag the blue arrow to the right until –5 is displayed for the Z position in the Properties panel.
7. Drag the green arrow down until –5 is displayed for the Y position in the Properties panel. This moves the pipe down so that it is partially "buried."



Understanding the 3D axis

Perhaps you're familiar with the x-axis and y-axis that are used in many 2D design programs. Moving an object along the x-axis moves it from left to right or from right to left. Moving an object along the y-axis moves the object up and down. However, when working in the world of 3D, we need a third axis, the z-axis. Moving an object along the z-axis moves it closer to you or farther away from you.

This is pretty easy to understand and visualize, except that in Dimension the default viewing angle has the x- and z-axes off-center, so you're viewing the objects at an angle. As you move an object closer to you on the z-axis, it also moves right to left across your screen. This can be confusing until you get accustomed to it.



The 3D axes as they are used in the default view of Dimension. The view is off-center, which makes movement along the z-axis easier to see but can be a bit confusing at first.

Rotate and scale objects

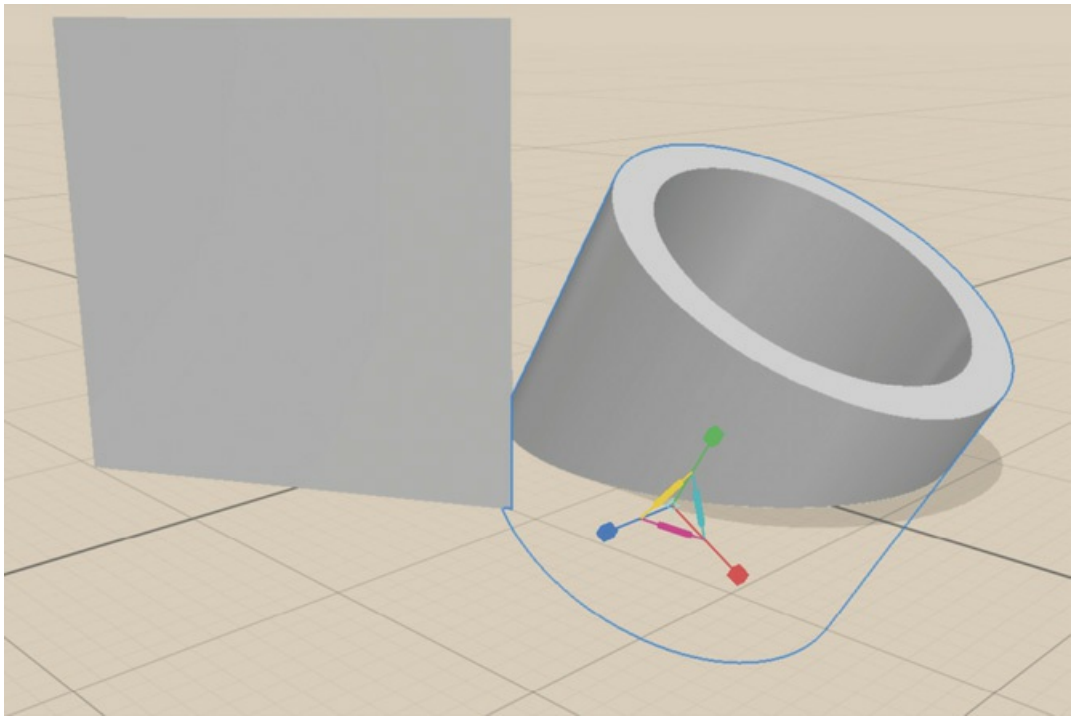
Just as you dragged the arrows with the Select and Move tool to interactively move an object along the x-, y-, and z-axes, you can also drag on-screen widgets to rotate and scale objects.

Tip

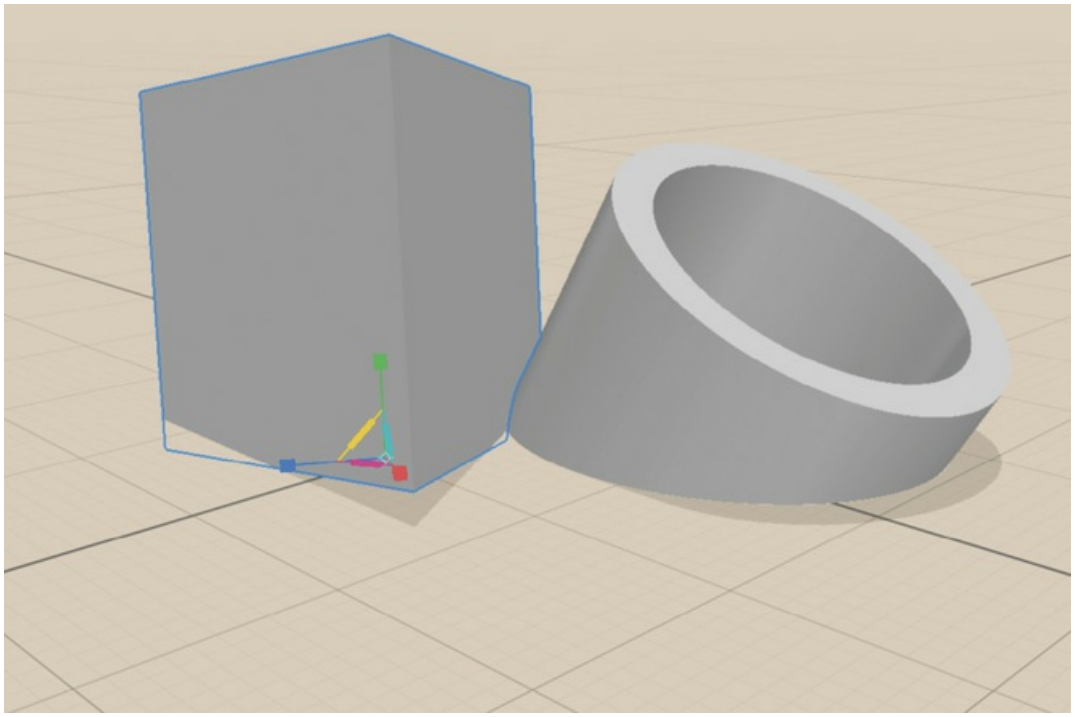
Hold down the Shift key while dragging the rotation widget to constrain the rotation to increments of 15 degrees.

---

1. Select the Select and Rotate tool in the Tools panel (keyboard shortcut: R).
2. Click the Pipe model on the canvas to select it.
3. Drag the blue arrow clockwise on the rotation widget until –30 is displayed in the on-screen widget or in the Z field of the Rotation settings in the Properties panel.
4. Select the Select and Scale tool in the Tools panel (keyboard shortcut: S).
5. Drag the green handle on the scale widget down until a value of .8 is displayed in the Y field of the Scale settings in the Properties panel. This causes the pipe to be scaled only in the Y direction, shortening the pipe. Holding down the Shift key while dragging the handle would have caused the pipe to be scaled proportionally in all directions.



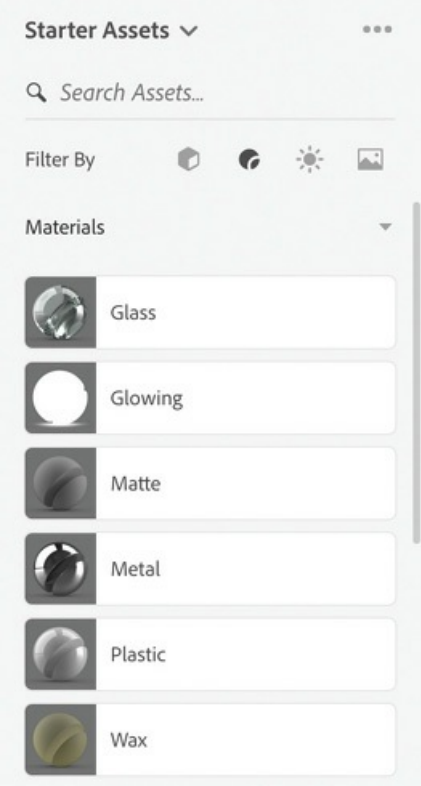
6. Select the Prism object with the Select and Rotate tool (keyboard shortcut: R).
7. Drag the green arrow on the rotation widget to the left until –30 is displayed in the Y field of the Rotation settings in the Properties panel.
8. Drag the blue arrow on the rotation widget up until 10 is displayed in the Z field of the Rotation settings in the Properties panel.
9. Switch to the Select and Scale tool (keyboard shortcut: S).
10. Drag the green handle on the scale widget down until a value of .9 is displayed in the Y field of the Scale settings in the Properties panel.



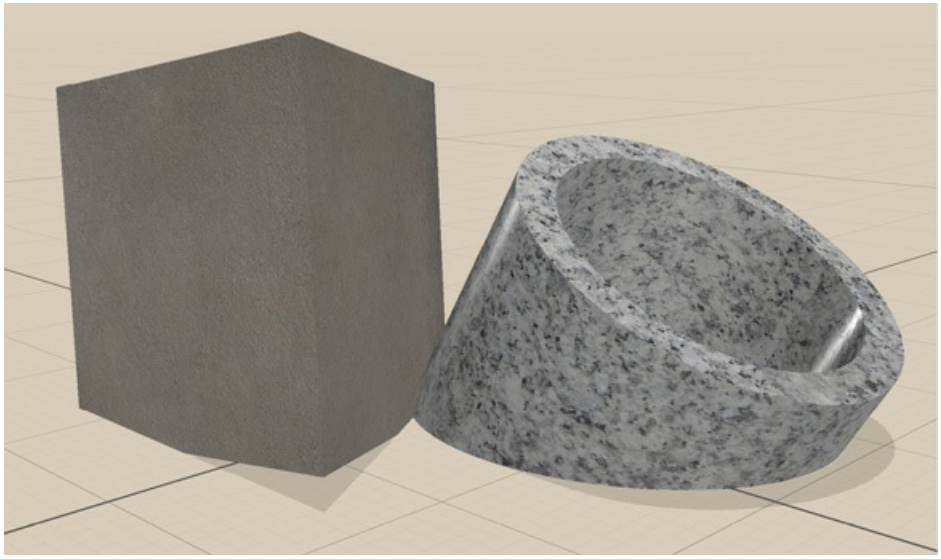
Applying materials to models

When you import a 3D model into a scene, it will arrive with whatever materials were applied to the model when it was created. But Dimension allows you to adjust the properties of materials or to apply entirely new materials to a model. We'll look briefly at this in this lesson and then dive more deeply into materials in a later lesson.

1. Select the Prism object with the Select and Move tool (keyboard shortcut: V).
2. In the Content panel on the left side of the screen, click the X icon next to the search field to clear the previous search term.
3. Click the Materials icon to view only materials in the panel.
4. Click the More icon in the upper-right corner of the panel, and choose Toggle List/Grid View to switch to List view.



5. Experiment by clicking different materials in the list to apply them to the Prism model.
6. Type **concrete** into the search field, and click the Clean Concrete material to apply it to the surface of the Prism model.
7. Click the pipe with the Select and Move tool.
8. Type **Marble** into the search field, and click the Grey Marble material to apply it to the surface of the Pipe model.



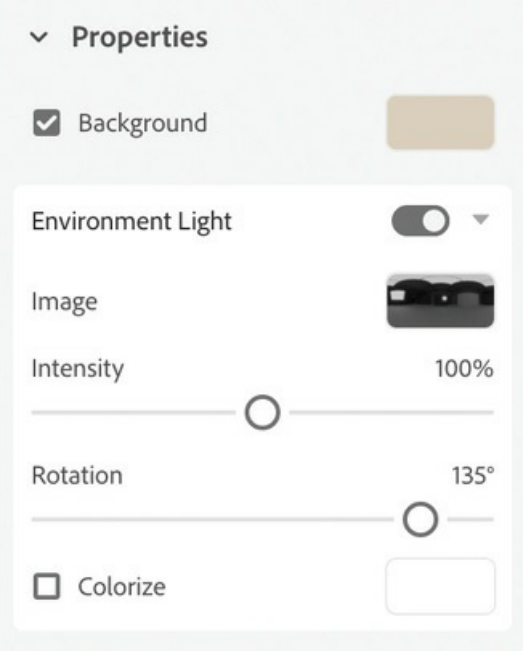
Adjusting the lighting

Dimension scenes can contain two different types of lighting: environment light and sunlight. Environment light is the ambient light that surrounds the scene. Sunlight can be added to, or used in place of, environment light to create strong directional shadows and reflections. Both of these lights can be customized in many ways.

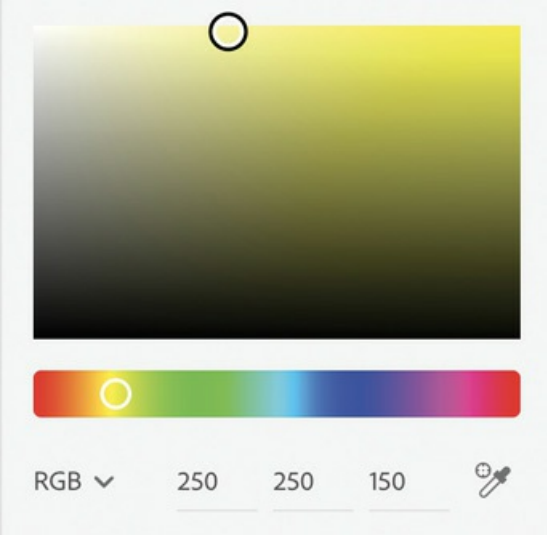
Adjust and preview the environment light

Let's see what happens when we adjust the rotation and color of the environment light.

1. Click the Render Preview icon in the upper-right corner of the screen to display the Render Preview window. You may wish to keep this window open as you work through the following steps.
2. Choose Edit > Deselect All to deselect the Pipe model.
3. Click Environment in the Scene panel to select the environment instead of one of the 3D models.
4. In the Properties panel, adjust the Rotation slider under Environment Light to about 135°. Note that as you do this, the locations of the light and dark areas on the surface of the prism and pipe change.



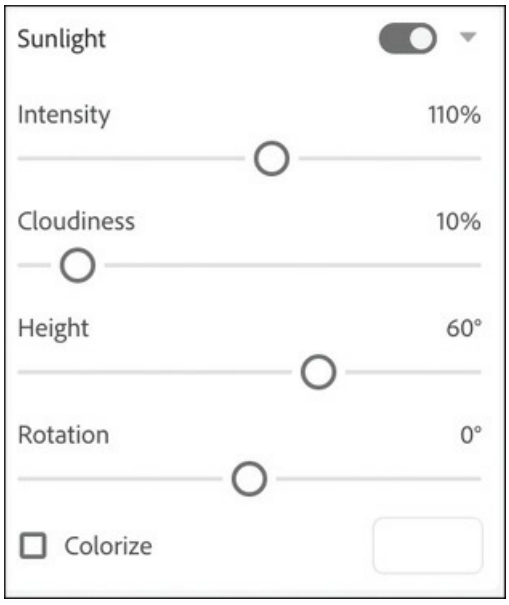
5. In the Properties panel, under Environment Light select the Colorize option.
6. By default the Colorize option is set to white. Click the color swatch next to Colorize and choose a color with RGB values of 250, 250, 150. This will apply a slight yellow warmth to the environment light. When you are finished, click away from the color picker to dismiss it.



Adjust and preview the sunlight

Let’s experiment briefly with the sunlight properties. We’ll examine these in more detail in another lesson.

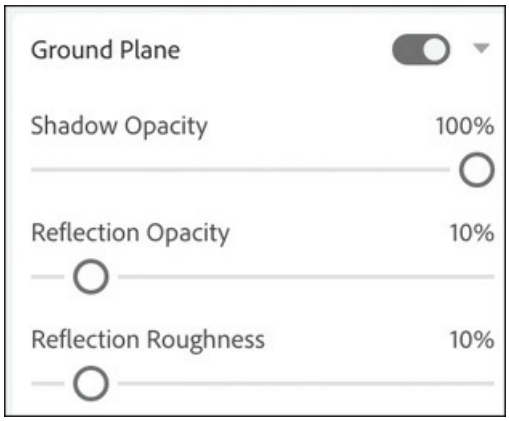
1. In the Properties panel, click the button next to the word “Sunlight” to toggle sunlight on. This causes the scene to immediately brighten, and stronger shadows and highlights appear.
2. Experiment with the Intensity, Cloudiness, Height, and Rotation sliders. I used values of 110% for Intensity, 10% for Cloudiness, 60° for Height, and 0° for Rotation.



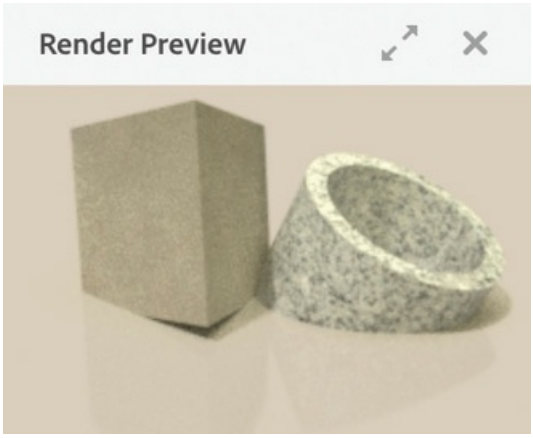
Adjust the ground plane properties

By default, the ground plane is a solid surface with a matte finish, meaning that it will display shadows but won’t show any reflections of objects sitting on it. We can change these properties as we wish.

1. In the Properties panel under Ground Plane, adjust the Reflection Opacity slider to **10%**.
2. Adjust the Reflection Roughness slider to **10%**. This will add a subtle, natural-looking reflection to the surface on which the prism and pipe are sitting. But this will not be visible in the on-canvas preview. This is visible only in the Render Preview panel or in the final render of the scene.



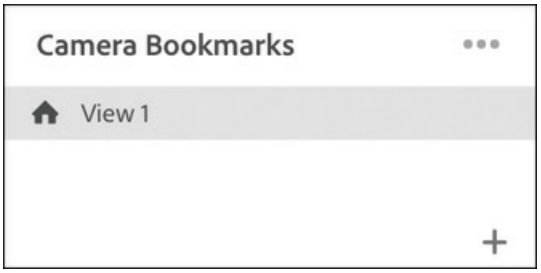
3. Click the Render Preview icon in the upper-right corner of the screen to view the objects reflected on the ground plane.



Adjusting the camera

So far, we've been working on this scene without changing our camera view. But now we want to examine the scene from different angles to see if there is an angle that is more interesting or perhaps to examine more closely how the prism and the pipe intersect.

1. Click the Camera Bookmarks icon in the upper-right corner of the screen.
2. Click the plus button to save a camera bookmark named View 1. This will enable us to easily return to the current camera view later.

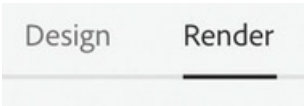


3. Select the Orbit tool in the Tools panel (keyboard shortcut: 1).
4. Drag around the scene with the Orbit tool to examine it from different angles.
5. Select the Pan tool in the Tools panel (keyboard shortcut: 2).
6. Drag around the scene with the Pan tool to pan the camera view.
7. Click the Camera Bookmarks icon .
8. Click View 1 to return to the previously saved camera view.
9. Select the Dolly tool in the Tools panel (keyboard shortcut: 3).
10. Drag down on the scene a bit to zoom out, leaving a little more space around the objects in the scene.
11. Choose File > Save.

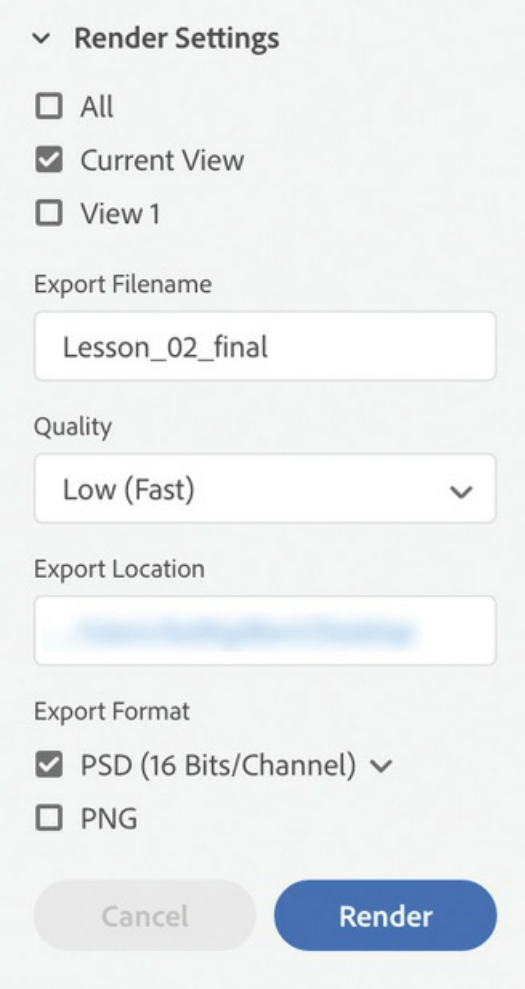
Introduction to scene rendering

The file you've been working on is saved as a Dimension file. The Dimension file format can't be opened with Photoshop, placed in InDesign or Illustrator, or printed to a color printer. Getting output in a form that is useful requires that you render the scene. You'll render this scene in the following steps, and you'll learn much more about rendering in a later lesson.

1. Click the Render tab at the upper-left corner of the screen.



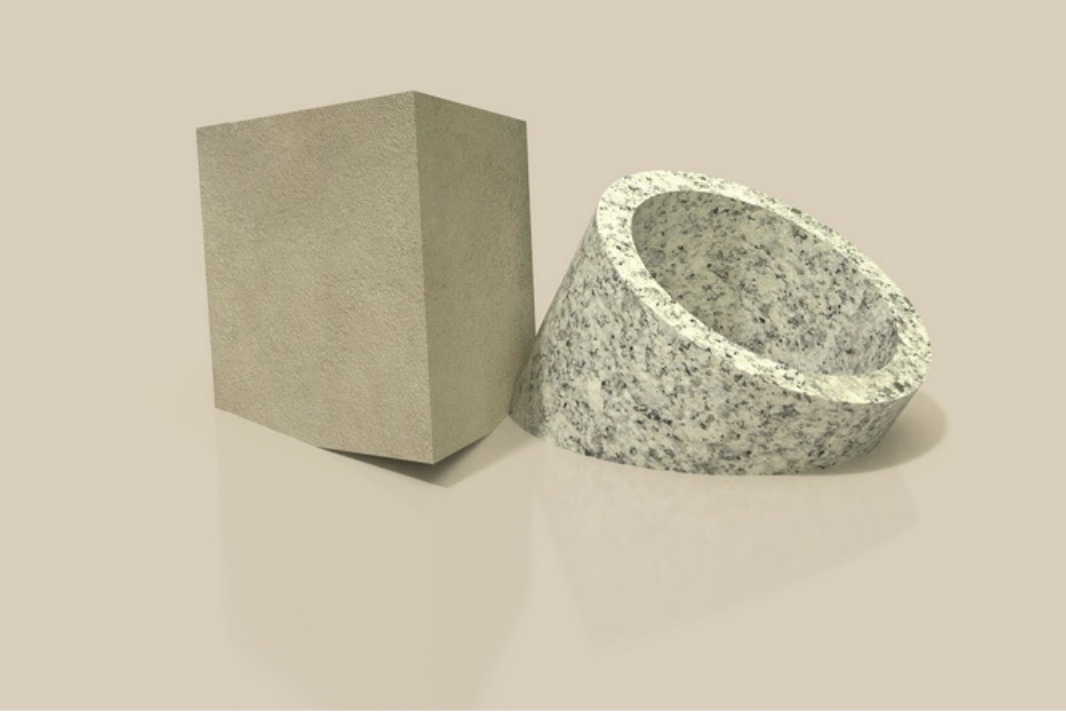
2. Under Render Settings on the right side of the screen, select Current View.
3. Make a note of the filename.
4. Choose Low (Fast) for Quality.
5. Choose an export location.
6. Choose PSD (16 Bits/Channel) for the export format.
7. Click Render.



8. Wait for the render to complete. Depending on the speed of your computer, this can take 15 minutes or more.

   You can't do anything else in Dimension while the render is taking place, but you can use other programs on your computer while the render is finishing.

9. When the render is complete, open and view the completed PSD file in Photoshop.
10. In Photoshop, choose Image > Image Size, and you'll see that the rendered PSD file is 3000px x 2000px, as we specified for the canvas size when we began the project.
11. Zoom in on the image in Photoshop. You'll see that the image contains a lot of "noise," particularly noticeable in the cast shadows. This is because we chose a low quality and fast speed for the render settings. A high-quality, slow-speed render would give much nicer results but take considerably longer to render.



Review questions

1 What filename extension is added to Dimension files?

2 When, and where, do you specify the canvas size in Dimension?

3 When you add a starter asset to a scene, where is the asset positioned in the scene?

4 Moving an object along the z-axis moves the object in what direction?

5 What are two ways to rotate a 3D object?

6 What are the two kinds of lights built into Dimension?

Review answers

1 The filename extension for Dimension files is .dn.

2 The canvas size can be specified after a file is created, in the Properties panel.

3 When you add a starter asset to a scene, it is added to the “middle” of the scene, at X=0, Y=0, and Z=0 in the dimension coordinate system.

4 Moving an object on the z-axis moves it closer to, or farther away from, the viewer.

5 Select the object with the Select and Rotate tool and then either enter values in the Properties panel or drag the rotation widget on the object.

6 There are two types of lights that can be used in Dimension: Environment and Sunlight.

3 Changing Your View of the Scene: Working with the Camera

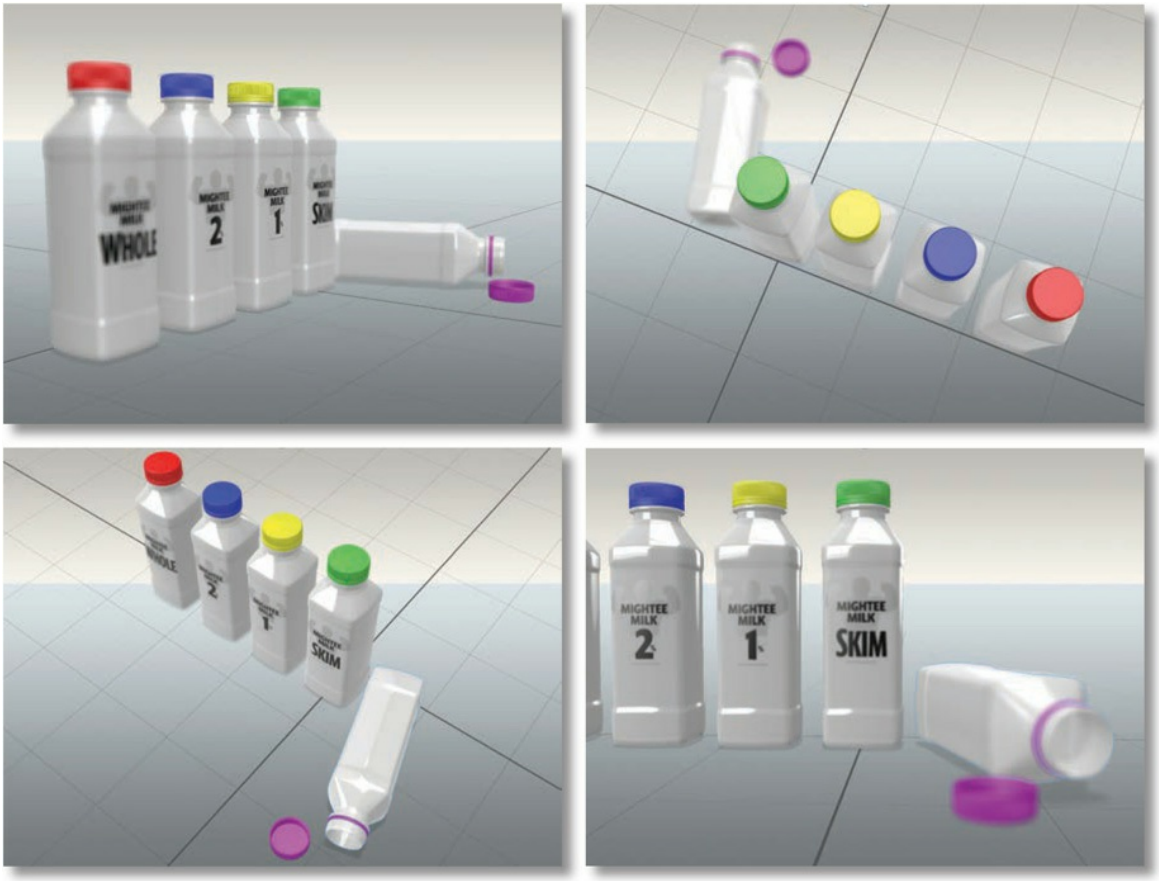
Lesson overview

In this lesson, you'll manipulate your view of an existing 3D scene and learn the following:

- How the Orbit, Pan, Dolly, and Horizon tools work
- When and why to use the camera tools
- How to use bookmarks to save camera angles
- How to simulate camera depth of field in a scene

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.



The Camera tools in Dimension allow you to fly around the scene and view it from different angles and perspectives.

What is the camera?

While you're composing a 3D scene, you'll often need to examine the scene from a variety of angles. For example, if you are trying to position a vase precisely on a tabletop, you may need to view the table with your eye level even with the top of the table so you can see when the vase is resting on the tabletop. When looking down on the table from above, it is difficult to determine whether the vase is "floating" above the table or resting upon it.

Dimension uses the concept of a virtual "camera" through which you view the scene. There are four camera-related tools:

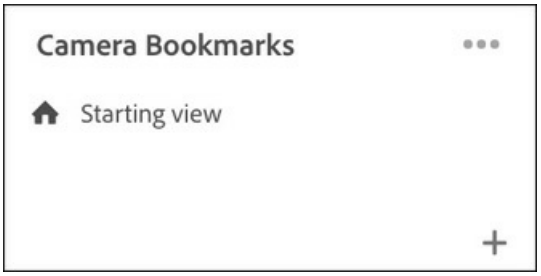
- The Orbit tool
- The Pan tool
- The Dolly tool
- The Horizon tool

In this lesson, we'll look closely at how these tools work.

Saving a camera bookmark

Camera bookmarks provide a way to save a specific view of your scene so that you can quickly and easily return to the view later after you've changed your view with the camera tools. In this exercise, you'll open a file and save a camera bookmark of your initial view of the scene.

1. Launch Adobe Dimension.
2. Click Open, or choose File > Open.
3. Select the file named Lesson_03_begin.dn, which is in the Lessons > Lesson03 folder that you copied onto your hard disk, and then click Open.
4. Click the Camera Bookmarks icon at the top of the screen.
5. Click the plus icon to create a new bookmark.
6. To rename the bookmark, type **Starting view** and press Return/Enter.



Using the Orbit tool

The Orbit tool does what its name suggests: it lets you "orbit" around the scene, examining it from different angles. You can move up, down, clockwise, and counterclockwise around your scene. And, unlike in real life, you can even move the camera "underground" and view the scene looking up from beneath the ground plane. In other words, imagine that the ground plane is ice on a lake. With the Orbit tool, you can dive into the lake, point the camera up at the scene that is sitting on the frozen surface of the ice, and view the scene through the transparent ice.

1. Select the Orbit tool in the Tools panel (keyboard shortcut: 1).
2. Drag from right to left across the screen to "fly" around the scene in a counterclockwise direction.
3. Choose Camera > Camera Undo to reset to the initial view.
4. Drag from left to right across the screen to orbit in a clockwise direction.
5. Drag from the bottom of the screen to the top of the screen to view the scene from below the ground plane.

   As we saw in a previous lesson, the grid lines on the ground plane are black on top and red underneath. This is your visual cue as to where you "are." If you see red lines, you're looking up through the ground plane (the floor). If you see black lines, you're looking down on the ground plane.

6. Click the Camera Bookmarks icon.

7. Click “Starting view” to return to the initial view of the scene.

Tip

If you have a two-button mouse, you can also drag with the right mouse button while any other tool is selected to use the Orbit tool.

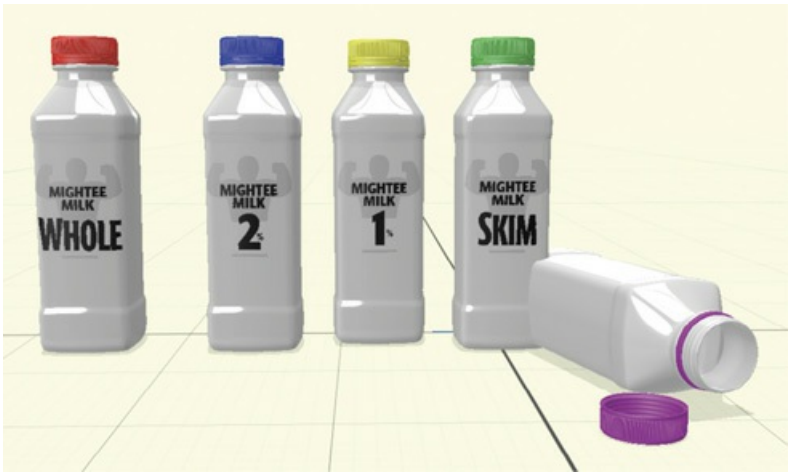
Note

Even though you can “see” up through the floor when viewing the scene from below as you work on the canvas, if you try to render a view from below the floor, you won’t see any models that are above the floor, as the floor is opaque when rendered.

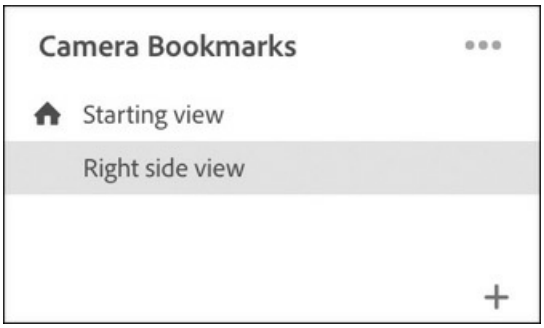
Examine the scene with the Orbit tool

Changing your view of the scene with the Orbit tool is often helpful when you are attempting to precisely align objects.

1. Drag with the Orbit tool until you are viewing the models straight on from the right side, similar to this:



2. Choose Camera > Frame All. This command automatically manipulates the camera so that all the models in the scene are centered on the screen and fill the screen.
3. Click the Camera Bookmarks icon .
4. Click the plus icon to create a new bookmark.
5. To rename the bookmark, type **Right side view** and press Return/Enter.



From this angle, you can see that the space between the red and blue bottles is larger than the space between the rest of the bottles. Let's fix this.

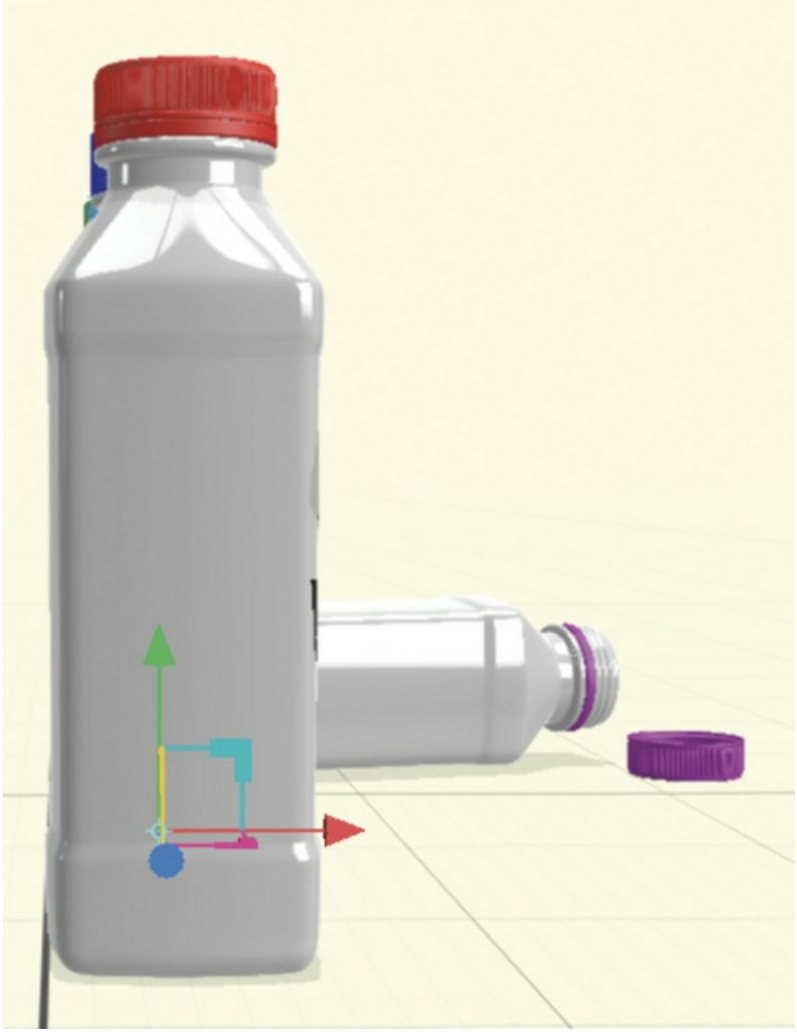
6. Select the Select and Move tool (keyboard shortcut: V).
7. Click the "Whole milk – red" model in the Scene panel to select the bottle with the red cap. Selecting the model in the Scene panel ensures that you get the entire bottle selected, not just the body or the bottle cap.
8. Drag the blue arrow to the right until the bottles are equally spaced.

9. Select the Orbit tool (keyboard shortcut: 1).
10. Drag with the Orbit tool until you're viewing the models from the end, similar to this:

11. Click the Camera Bookmarks icon .
12. Click the plus icon to create a new bookmark.
13. To rename the bookmark, type **Column view** and press Return/Enter.

    From this angle, you can see that one of the upright bottles isn't lined up with the rest of the bottles. Let's fix this.

14. Select the Select and Move tool (keyboard shortcut: V).
15. Click the "1 percent – yellow" model in the Scene panel to select it.
16. Drag the red arrow to the right until the bottles are lined up.



17. Click the Camera Bookmarks icon .
18. Click “Starting view” to return to the initial view of the scene.

Using the Pan tool

The Pan tool is used to move the camera left, right, up, or down. Panning is different from orbiting. When you pan the camera from right to left, it is as if you are simply walking by the scene in a straight line, not curving around the scene. When you pan from the top of the screen to the bottom of the screen, the horizon stays fixed in place, and it appears as if you are climbing a ladder.

1. Select the Pan tool (keyboard shortcut: 2).
2. Drag from right to left across the screen to pan the scene from right to left.
3. Choose Camera > Camera Undo to reset to the initial view.
4. Drag from the bottom of the screen to the top of the screen to view the scene from below the ground plane. Note that the imaginary horizon remains fixed on the screen when you pan vertically.

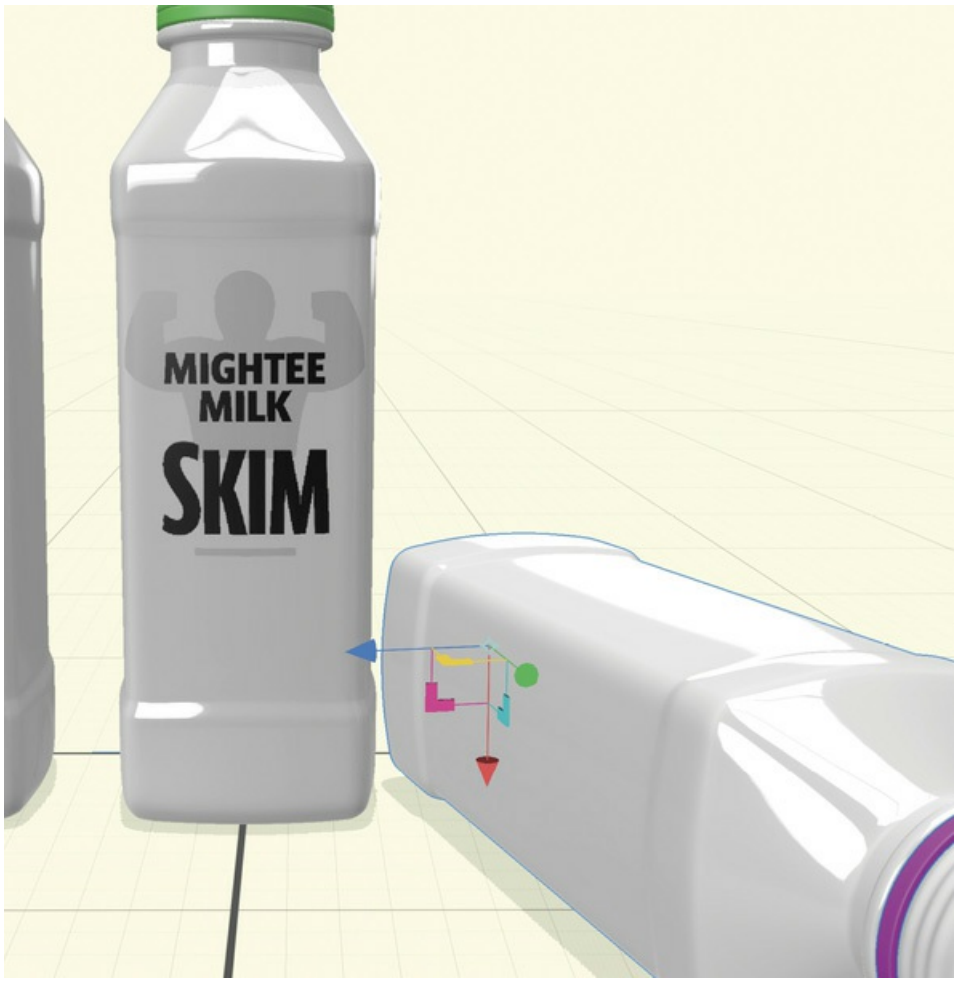
5. Click the Camera Bookmarks icon .
6. Click “Right side view” to go to the side view of the scene.
7. Select the Select and Move tool (keyboard shortcut: V).
8. Click the “Whole milk – red” model in the Scene panel to select it.
9. Choose Camera > Frame Selection.
10. This will reposition the camera to center the single bottle on the screen.
11. Select the Pan tool (keyboard shortcut: 2).
12. Drag from right to left across the screen to pan the scene from right to left until the green and purple bottles are visible on the screen.

From this view, you can see that the two bottles are intersecting. Let’s fix this.

Tip

If you have a three-button mouse, you can drag with the middle mouse button to pan the camera. (On some mice, pressing the scroll wheel acts as a third button.)

13. Select the Select and Move tool (keyboard shortcut: V).
14. Select the purple bottle model in the Scene panel.
15. Drag the blue arrow to the right until the bottles no longer intersect.



Using the Dolly tool

The Dolly tool moves the camera toward the scene or away from the scene. The name of this tool comes from the wheeled camera “dollies” used in film and television production.

Note

Depending on how your mouse preferences are configured on your computer, the direction you drag the Dolly tool may be inverted from what is described here.

Tip

You can also use the scroll wheel to engage the Dolly tool when any other tool is selected.

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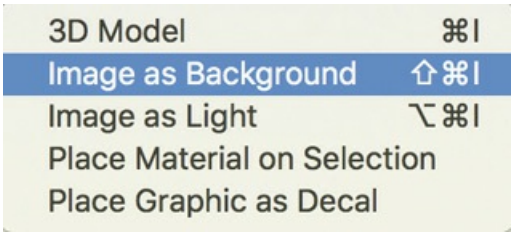
1. Select the Dolly tool (keyboard shortcut: 3).
2. Drag from the bottom to the top of the screen, or from left to right, to move the camera toward the scene, enlarging your view of the models.
3. Drag from the top of the screen to the bottom, or from right to left, to move the camera away from the scene, which makes the models appear smaller.
4. Click the Camera Bookmarks icon .
5. Click “Starting view” to return to the initial view of the scene.

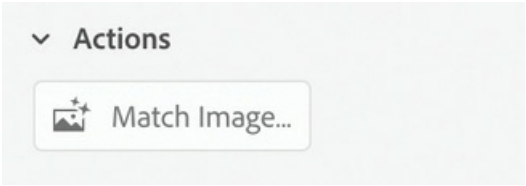
Using the Horizon tool

The Horizon tool allows you to move the horizon in your scene up or down or adjust the tilt of the horizon. This tool is particularly useful when you are trying to place a 3D model in a 2D image.

1. Choose File > Import > Image as Background.

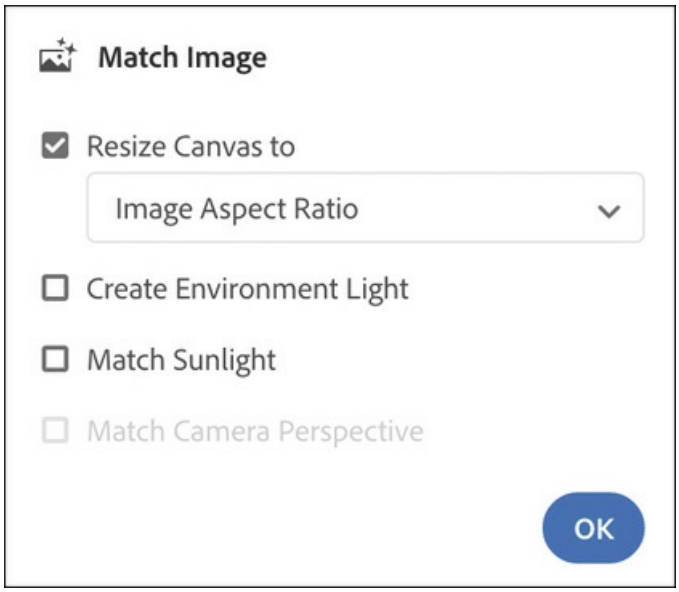


2. Select the Simple_background.psd file in the Lessons > Lesson03 folder that you copied onto your hard disk and then click Open.
3. In the Actions panel, click Match Image.



4. Select the option to resize the canvas, and deselect the options to create environment light and match sunlight.

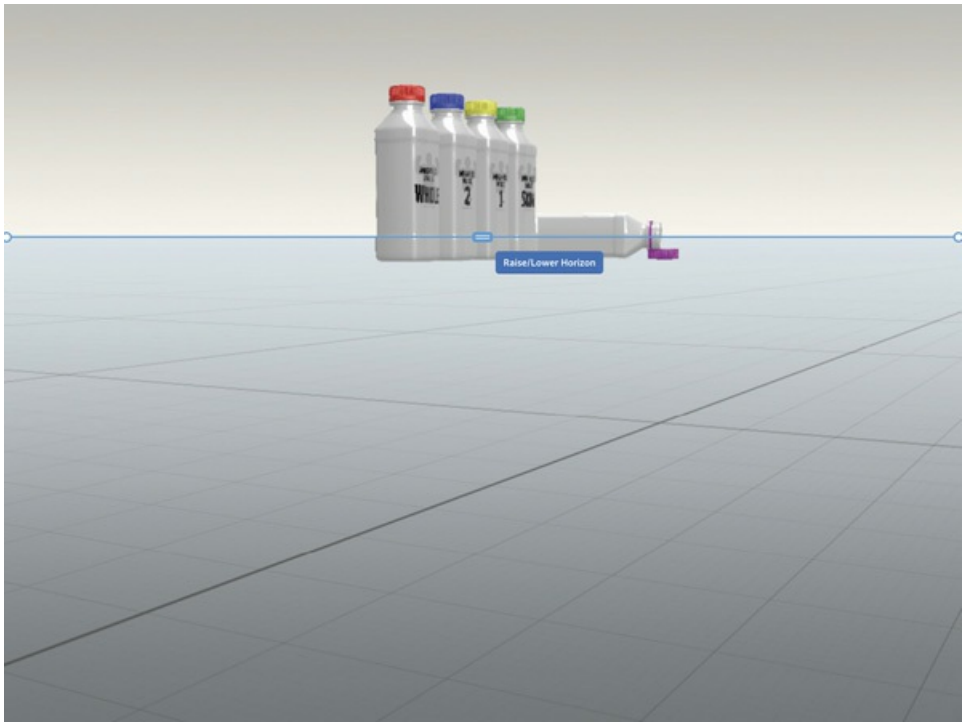
   In this case, note that the Match Camera Perspective option isn’t available. This is because this background image doesn’t have any perspective lines to help it determine a vanishing point.



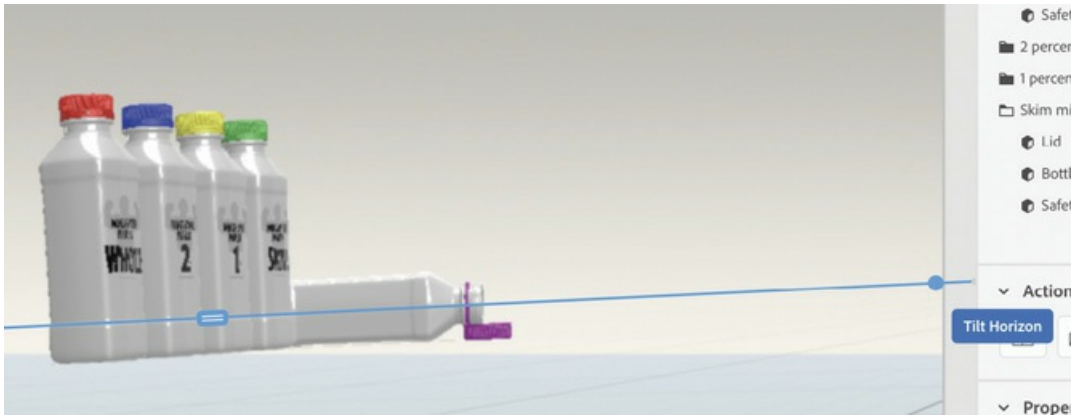
5. Click OK.
6. Select the Horizon tool (keyboard shortcut: N).

   Because this background image doesn't contain any perspective lines to help it determine a vanishing point and horizon, you'll have to set the horizon manually.

7. Drag the middle handle on the blue horizon line on the image until it is lined up with the "horizon" between the tan and gray areas of the background image.



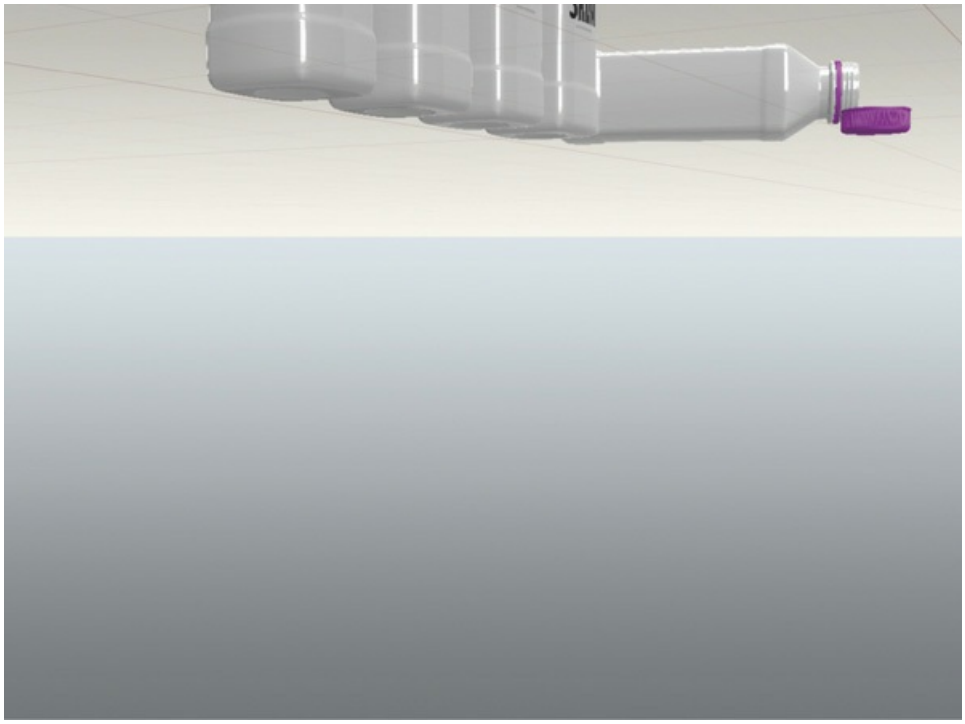
8. Grab the round selection handle on the right end of the horizon line and drag up. This is what you would need to do if the horizon in your scene were tilted.



9. Choose Camera > Camera Undo to return the view to a horizontal horizon.

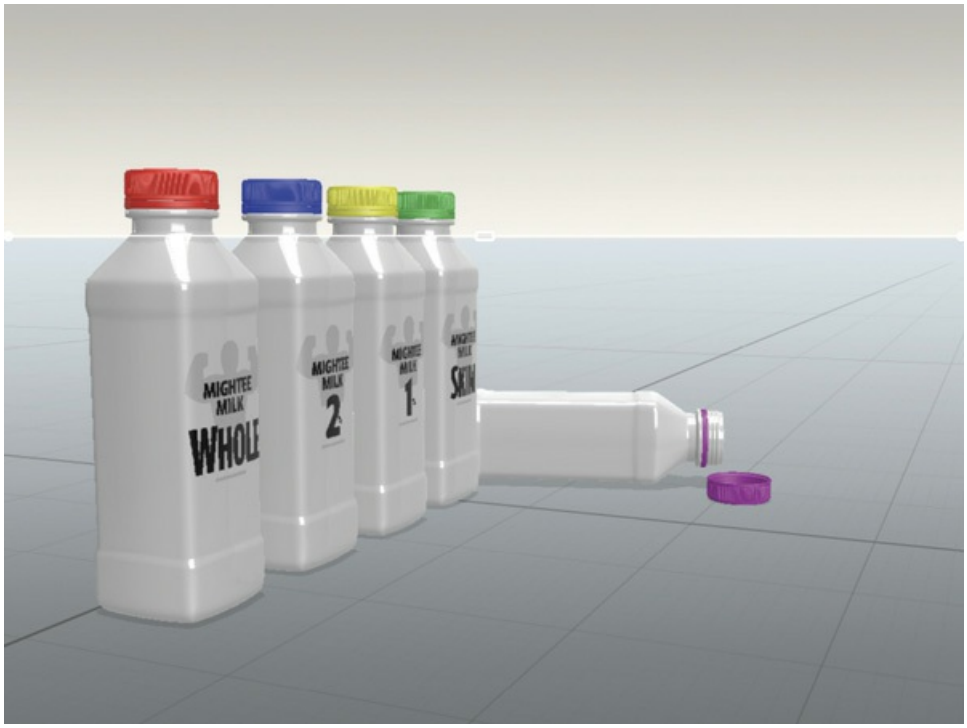
   The bottles are too small in the scene. You can fix this with the Dolly tool.

10. Select the Dolly tool (keyboard shortcut: 3).
11. Drag up on the image to enlarge your view of the bottles.

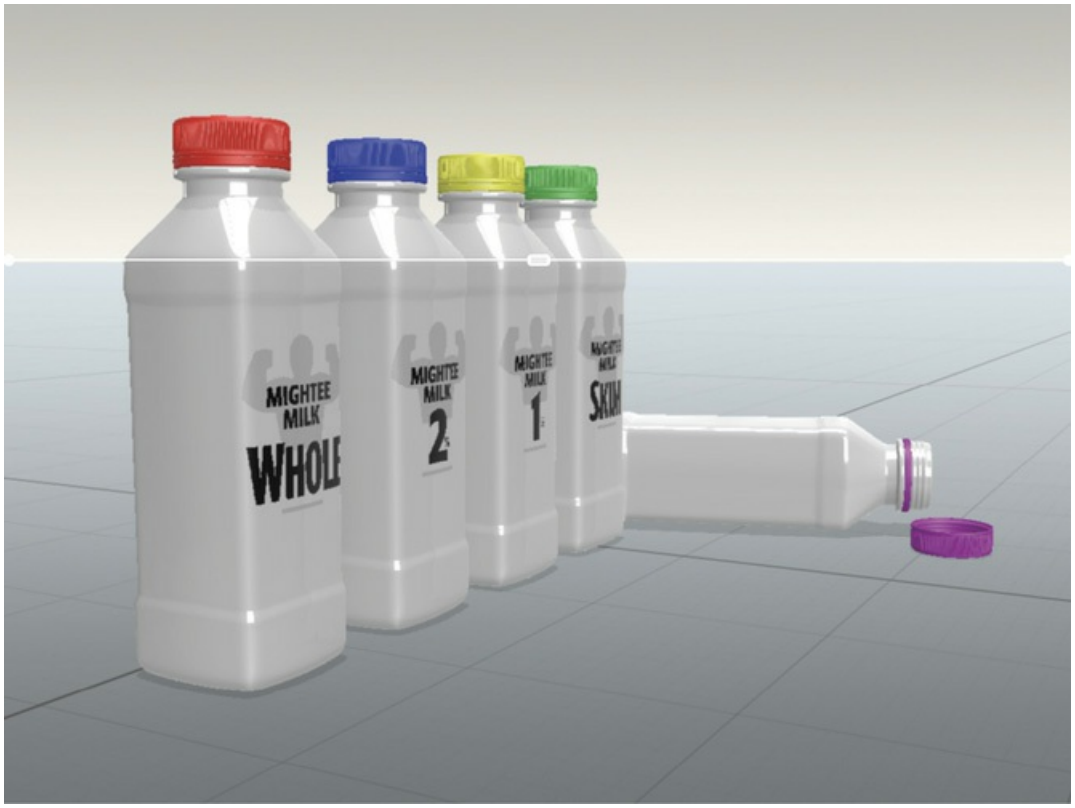


   Now you can't see the tops of the bottles, and you're now looking up on the bottom of the bottles from beneath the ground plane! But the horizon is still intact, so you can easily fix this.

12. Select the Horizon tool again (keyboard shortcut: N).
13. Drag down on the scene to raise the camera so that you are looking down on the bottles. Note that the horizon line remains in place.

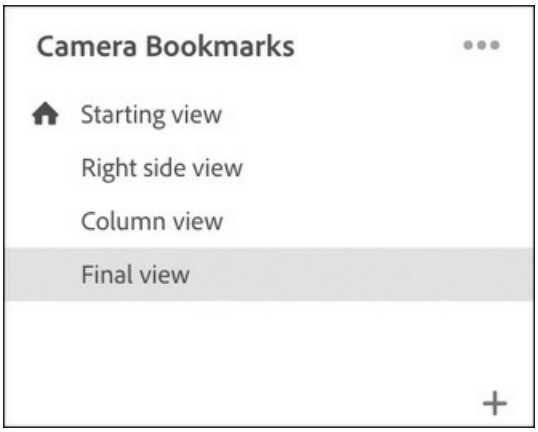


14. If necessary, select the Dolly tool again, and drag up on the image to enlarge the bottles further. Then switch to the Horizon tool and drag up, down, left, or right on the image to reposition the camera so that the scene looks something like this:



15. Click the Camera Bookmarks icon .

16. Click the plus icon to create a new bookmark.
17. To rename the bookmark, type **Final view** and press Return/Enter.

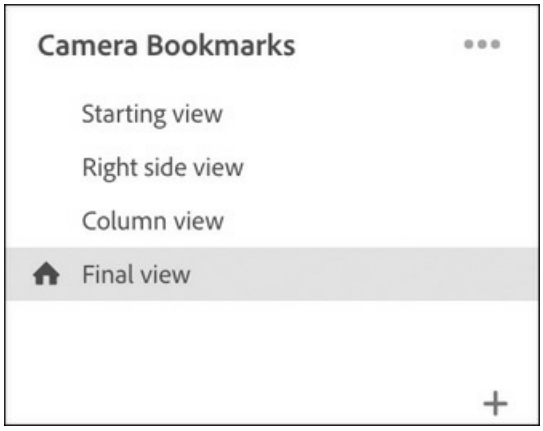


18. Select the Orbit tool (keyboard shortcut: 1).
19. Orbit around the image a bit to change your angle of view.
20. Select the Horizon tool (keyboard shortcut: N). Your horizon line is probably now out of position and no longer lined up with the horizon in the background. This is because the Orbit tool adjusts only your view of the 3D models in the scene, not the background image.
21. Use the Horizon tool to reposition the horizon line on the background image. You may also need to drag up on the image with the Horizon tool to lower the camera for a better view after you've moved the horizon line.

Using camera bookmarks

As you've seen, camera bookmarks are a handy way to save camera angles so that you can quickly return to the same angle at any time. There are a few more details about camera bookmarks that you should know.

1. Earlier, we saved a camera bookmark named "Final view." But we made a few changes to the camera angle and perspective after saving the bookmark. To update the bookmark, click the Camera Bookmarks icon .
2. Hover over the "Final view" bookmark and then click the Update to Current View icon to update the bookmark to match the current camera angle and perspective.
3. The bookmark named "Starting view" has a Home icon next to it. This means that this is the view that the Camera > Switch to Home View command (keyboard shortcut: Command+B/Ctrl+B) will switch to. Hover over the space to the left of the "Final view" bookmark and click the light gray home icon to make this view the Home view.



Note

There is no limit to the number of camera bookmarks that you can save in a Dimension file.

Tip

Use the Page Up and Page Down keys to cycle through each view in the Camera Bookmarks panel.

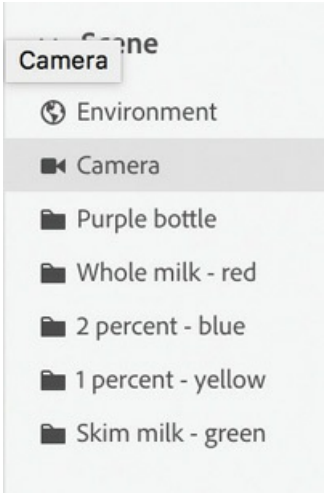
Tip

Another reason to save a camera bookmark is that when you go to Render view, you can tell Dimension to render a specific camera view. So, you could save several different camera views of a scene and then render all the views at once.

Simulating depth of field

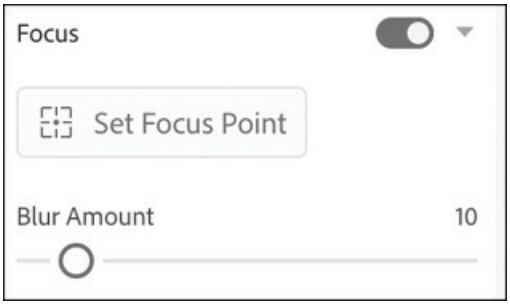
Depth of field is a photographic term that refers to how much of the scene being photographed will be in focus when the shutter is clicked. Depending on the lens and the lighting, the depth of field may be virtually infinite (so that everything is in focus), or it may be shallow (so that only objects at a specific distance from the lens are in focus and everything else is blurry). We can simulate this photographic principle with the Focus controls in Dimension.

1. In the Scene panel, select Camera.



2. In the Properties panel, toggle the Focus option on by clicking the switch to the right of the word “Focus.” This will open the Focus controls.

3. Click the Set Focus Point button and then click the yellow bottle cap. You’ll see an icon that indicates the focus point placed on the scene.
4. Enter a value of **10** for Blur Amount.



5. A rough preview of the result displays on the canvas. To view a more accurate result of the focus controls, click the Render Preview icon .

Note

If you need to reposition the focus point, you'll need to click the Set Focus Point button again and click a new location for the focus point. In other words, the focus point indicator on the Canvas cannot be dragged and moved.

Review questions

1 Which tool moves the camera closer to, or farther away from, the scene?
2 What does the Pan tool do?
3 What is the purpose of saving a camera bookmark?
4 Is there a limit to the number of camera bookmarks you can save?
5 What are the Dimension options called that let you simulate camera depth of field?

Review answers

1 The Dolly tool allows you to move the camera closer to or farther from the scene.

2 The Pan tool is used to move the camera left, right, up, or down. As you do this, the horizon stays in place.

3 You save a camera bookmark so that you can quickly return to a particular view of a scene at any time. Camera bookmarks are also useful for saving specific views to be rendered later.

4 No, there is no limit to the number of camera bookmarks that can be saved with a file.

5 The Focus options in the Properties panel will simulate camera depth of field in your scene.

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.

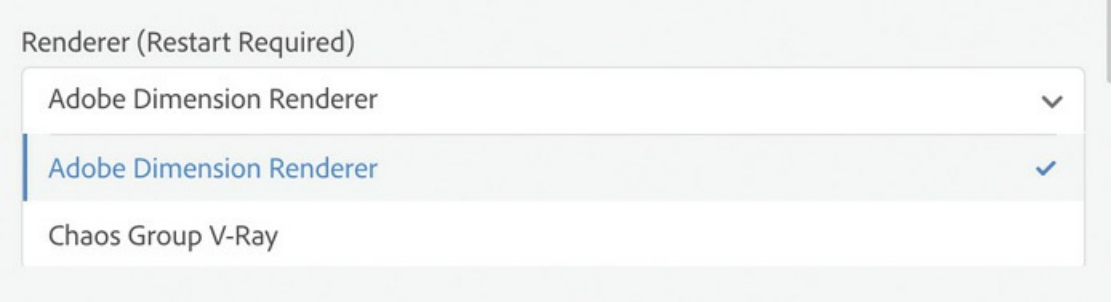
Dimension’s Render Mode produces a 2D scene from 3D models, complete with realistic light, shadow, materials, and reflections.

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

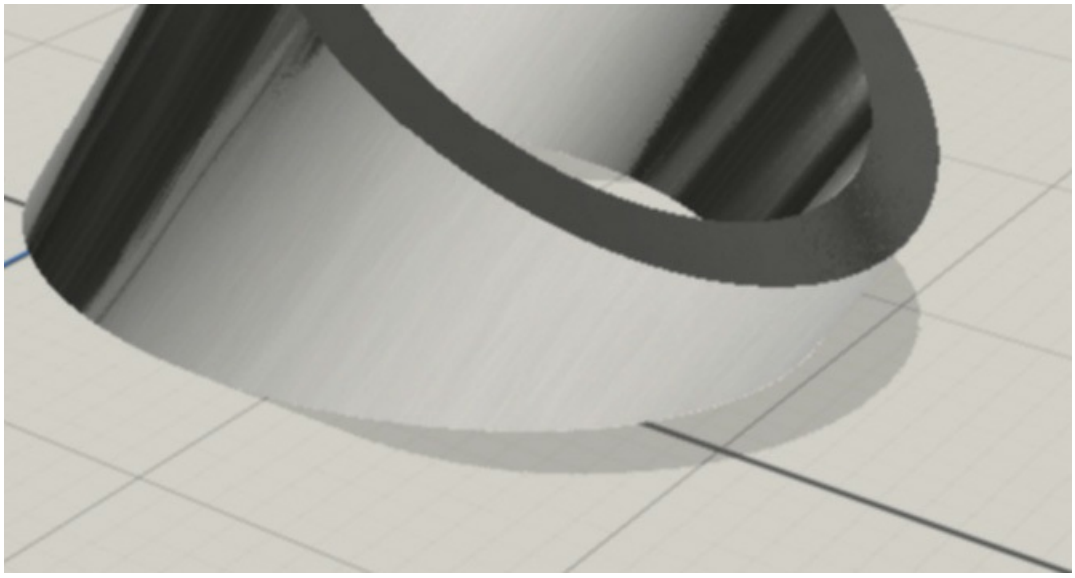
As you position 3D models in Design mode, Dimension attempts to display a realistic preview of the resulting scene on the canvas. Because an accurate rendering of the scene is so time-consuming, this on-canvas preview is only a rough approximation of what the final scene will look like. Effects that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

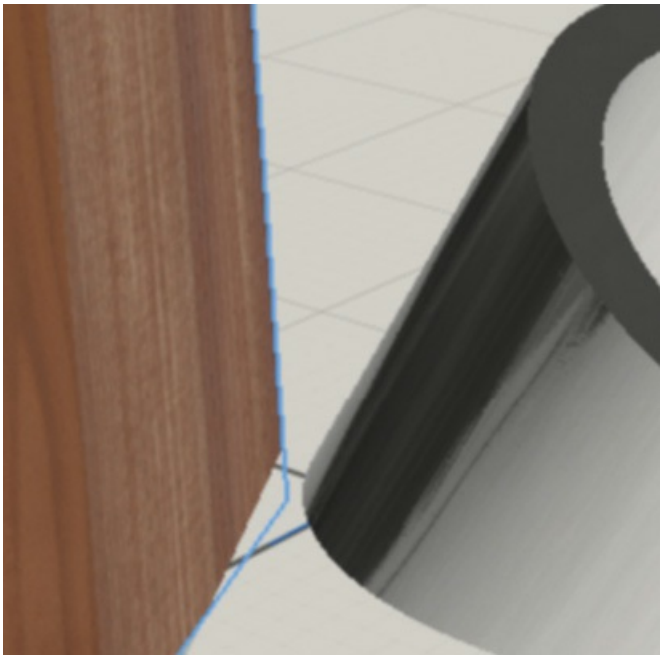
Things that don't display at all in the on-canvas preview include

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

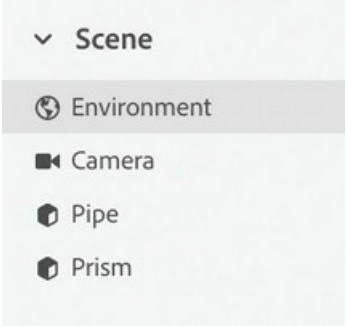
1. Launch Adobe Dimension.
2. Click Open, or choose File > Open.
3. Select the file named Lesson_04_begin.dn, which is in the Lessons > Lesson04 folder that you copied onto your hard disk, and then click Open.
4. Note some of the limitations of the on-canvas rendering of this scene. The shadows being 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.

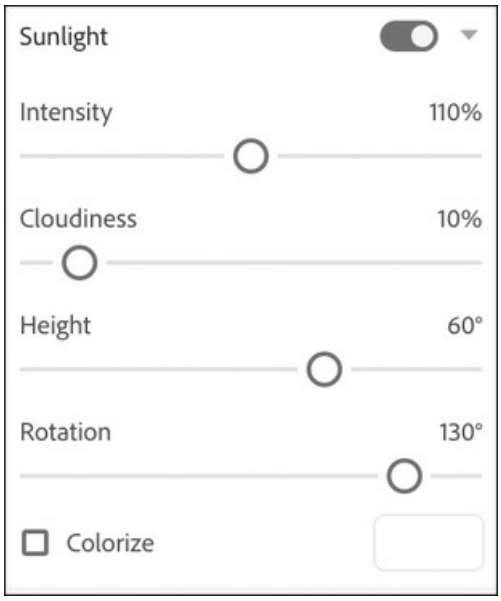
Render preview

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

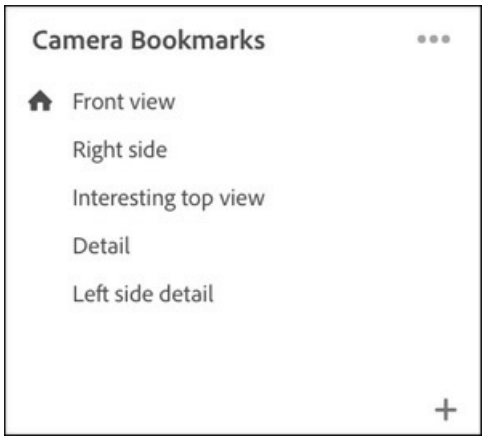
Use the \ key to show and hide the Render Preview window.

Render mode

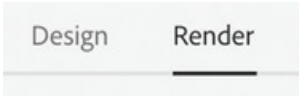
To really see an accurate view of the scene, the scene must be rendered in Render mode.

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

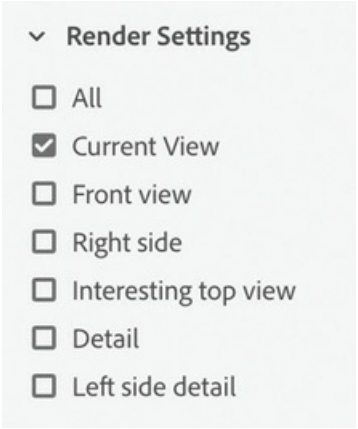
   You'll see that there are five bookmarks saved with this file.



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.

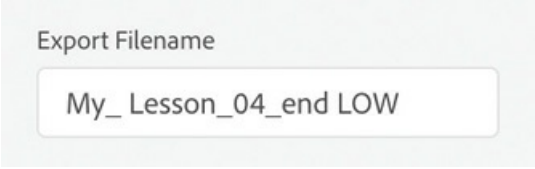


In Render mode, you'll see all five of the camera bookmarks displayed at the top of the Render Settings panel. This handy feature lets you render multiple camera views of a scene all at once. Since rendering can be very time consuming, this provides a way to queue up multiple renders of a scene and let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



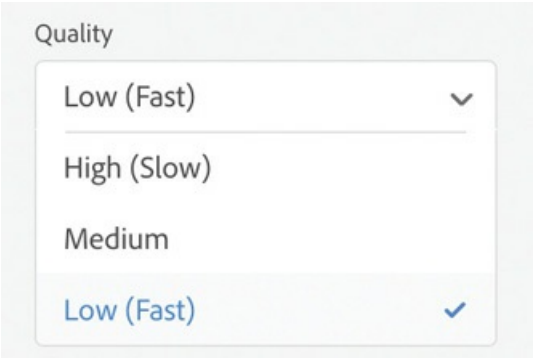
For now, just leave "Current View" selected.

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.

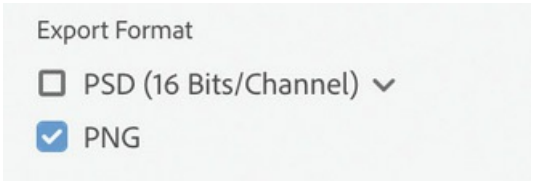


6. If you want to change the export location, click the blue export path and choose a new export location.

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



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



9. Click Render.

Note

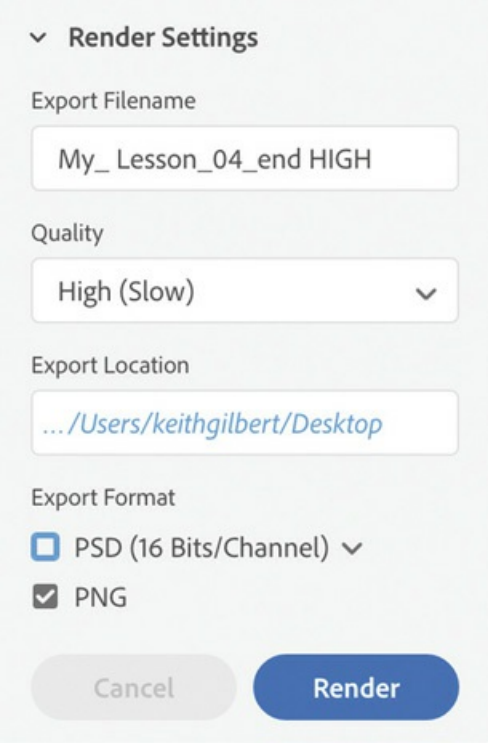
Although you can't continue to work in Dimension while a file is being rendered, you can continue to work in other applications on your computer. If you have notifications turned on in your operating system, you'll receive a notification when the render is complete.

---

10. Wait for the render to finish.

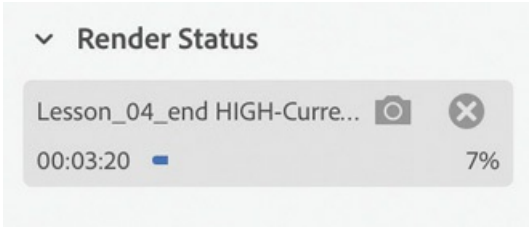
    The render took about 1 minute and 23 seconds on my 3-year-old MacBook Pro. If you don't want to wait for the render to finish, I've saved a copy of the rendered file for you in the lesson files (Lesson_04_end LOW-Current View.png).

11. Now change the Quality setting to High (Slow).
12. Change the filename to **My_Lesson_04_end HIGH**.
13. Click Render.



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.



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.

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.

5 Finding 3D Models and Using CC Libraries

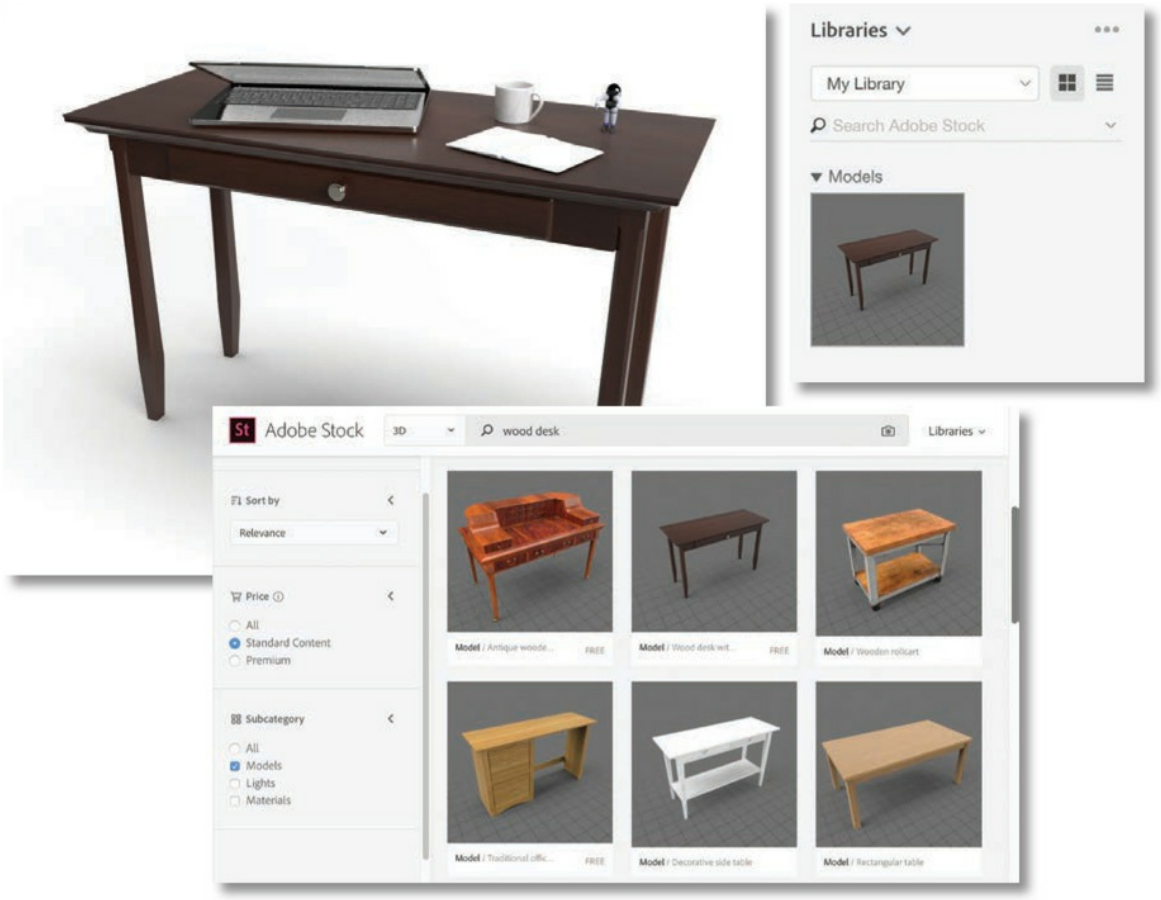
Lesson overview

In this lesson, you'll import models from various sources and learn the following:

- Why the starter assets included with Dimension are a good place to start when learning Dimension
- How to use Adobe Stock to find 3D objects
- How to download a model from Adobe Stock and use it in a scene
- How to use CC Libraries in Dimension
- How to import 3D models in other industry-standard file formats into Dimension

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.



When you obtain a 3D model from Adobe Stock, you can download it to a Creative Cloud Library, and then place it in your scene from the Library.

Using starter assets

As you saw in an earlier lesson, Dimension includes dozens of 3D models, materials, lights, and background images you can use to get started creating 3D scenes. The 3D models included with Dimension as starter assets are excellent for getting started with 3D scene building. They are carefully optimized for use with Dimension—they will import into a scene at a reliable size, arrive at consistent coordinates in the scene, and feature clearly named surfaces and materials.

Once you begin looking elsewhere for 3D models, you'll soon discover that model quality varies widely. You'll find that some models consist of a low number of polygons, so curved surfaces appear as a sequence of straight lines. You might find that a model of a bottle is made up of only a single unit, without the bottle cap consisting of a separate object. A model creator can do any number of things that make it difficult to work with a model in Dimension or any other program.

Even well-designed, high-quality models are sometimes saved in such a way that when placed in Dimension they appear upside down, rotated, huge, or tiny, or behave in some other unpredictable fashion.

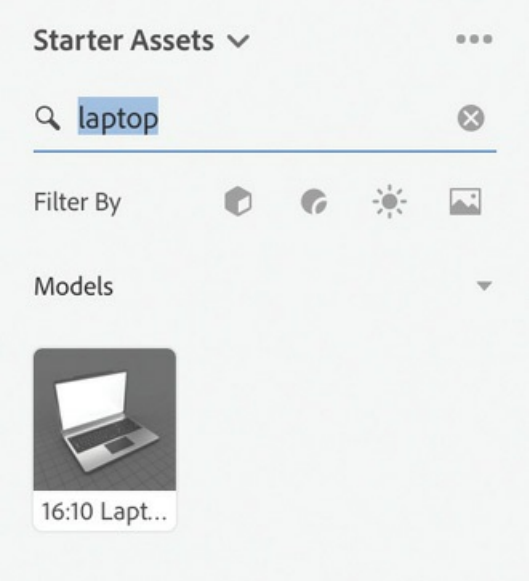
For these reasons, until you become comfortable working in Dimension, working with the starter

assets is easiest.

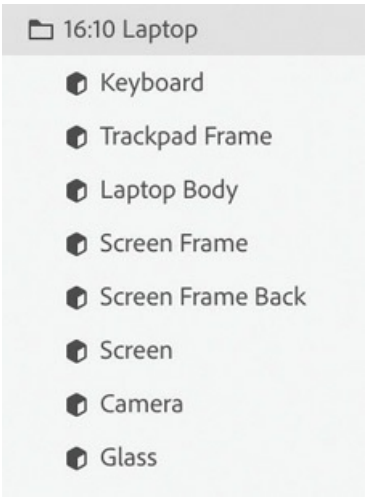
Examine a starter asset

Some of the starter assets are simple objects that consist of just a single model. But other assets are carefully constructed of multiple models grouped together and clearly labeled to make working with them easy. Let's examine one such starter asset and see how it is assembled.

1. Choose File > New to create a new document. If you currently have another document open, it will close. If that document isn't saved, you'll be prompted to save it before closing.
2. Click the Add and Import Content icon at the top of the Tools panel, and choose Starter Assets. This displays the Content panel on the left side of the screen and displays the starter content in the panel.
3. Make sure that none of the "Filter By" icons are selected.
4. Type **laptop** into the Search field at the top of the Content panel.



5. Click the 16:10 Laptop model to place the model in the scene. Note that the laptop neatly lands in the center of the scene.
6. Select the Dolly tool (keyboard shortcut: 3).
7. Drag down on the screen to move farther away from the model so you can see the entire laptop on the screen.
8. In the Scene panel, note that the laptop model is a group of eight models, each clearly labeled.



In the Scene panel, the icon indicates a group that is open, and the icon indicates a group that is closed. You can click either of these icons to open or close the group.

Note

Make sure you have the Filter by Models icon selected

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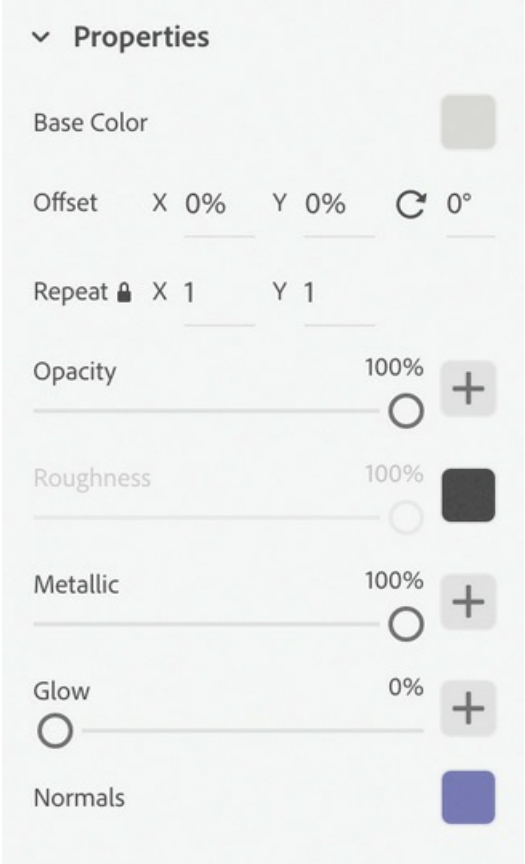
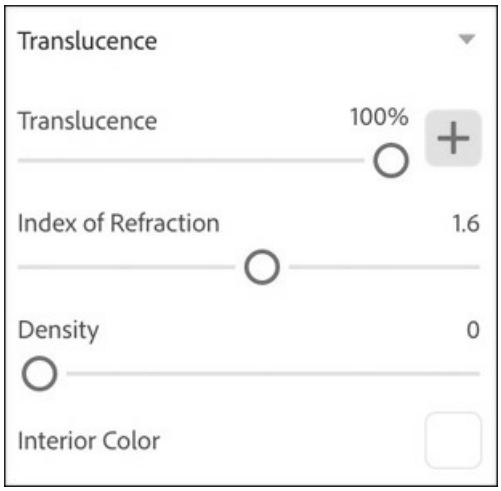
9. Hover over the Laptop Body model in the Scene panel, and click the right-pointing arrow icon displayed to the right of the words “Laptop Body.” This displays a new view in the Properties panel that shows you the material that is applied to the Laptop Body model.
10. With Frame Material selected, examine the Properties panel, and note that the surface properties are set up for a realistic-looking gray metallic finish on the laptop body. (You could of course change this surface to any material you wish.)



11. Click the back arrow in the Scene panel to return to viewing the models in the panel.
12. Hover over the Glass model in the Scene panel, and click the right-pointing arrow icon displayed to the right of the words “Glass.” This displays a new view in the Properties panel that shows you the material that is applied to the Glass model.
13. Examine the Properties panel, and note that the Translucence properties are set up for a glass appearance on the screen.



14. Click the back arrow in the Scene panel to return to viewing the models in the panel.

The starter assets have easily identifiable and clearly named groups, models, and pre-applied materials, making the assets easy to work with.

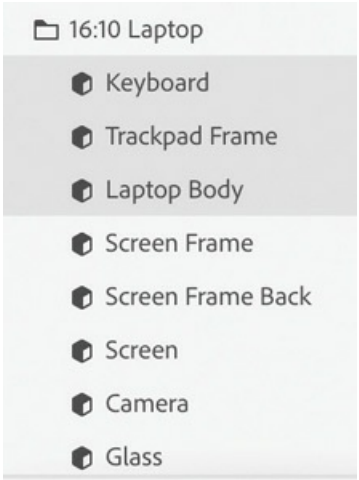
Tip

Use the ` keyboard shortcut to show and hide the Content panel.

Modify a starter asset

One big advantage of a model that is made up of a group of clearly labeled submodels is that the submodels can be transformed just like you would transform the group. In the case of this laptop model, this makes it easy to rotate the screen, “opening” or “closing” it.

1. In the Scene panel, click the Keyboard model.
2. Hold down the Shift key and then click the Laptop Body model to select the Keyboard, Trackpad Frame, and Laptop Body models.



Tip

Just as with most other Adobe design applications, Command+G (Mac) or Ctrl+G (Windows) is the keyboard shortcut for Group, and Command+Shift+G (Mac) or Ctrl+Shift+G (Windows) is the keyboard shortcut for Ungroup.

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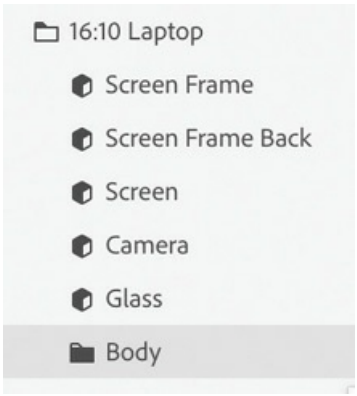
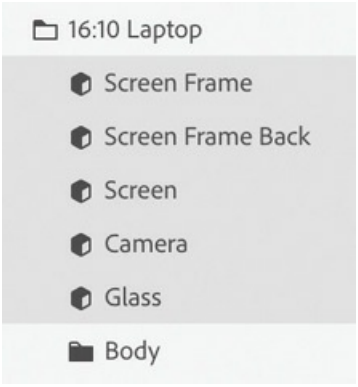
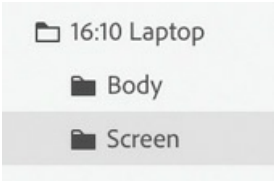
3. Choose Object > Group to group the three models into a single group.
4. Double-click the name of the group to edit it, and name it **Body**.



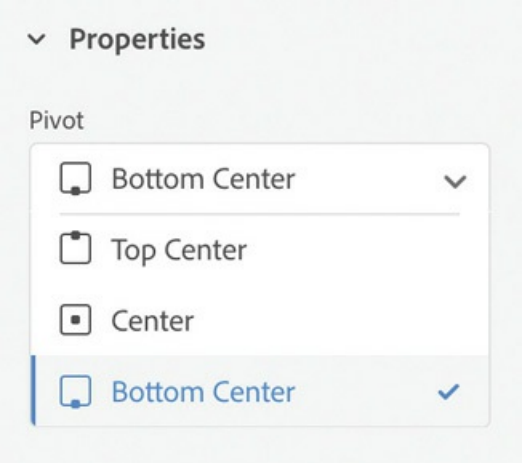
5. In the Scene panel, click the Screen Frame model.
6. Hold down the Shift key and then click the Glass model to select the Screen Frame, Screen Frame Back, Screen, Camera, and Glass models in the Scene panel.



7. Choose Object > Group to group the five models into a single group.
8. Double-click the name of the group to edit it, and name it **Screen**.



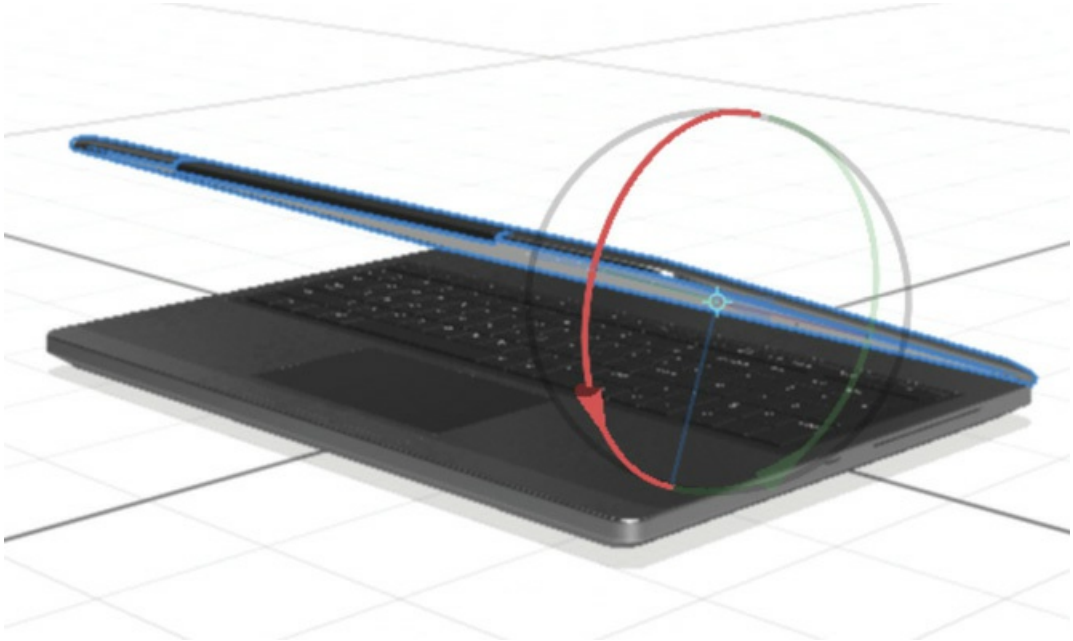
9. Choose the Select and Rotate tool (keyboard shortcut: R).
10. Click the Screen group in the Properties panel to select the models that make up the laptop screen.
11. In the Properties panel, choose Bottom Center for the Pivot.



Note

Some 3D modeling programs allow the user to create “rigged” models. These models contain “knowledge” of how the model parts fit together. A rigged model of a laptop, for example, would allow the user to hinge the laptop screen open and closed, but not detach it from the laptop base or slide it forward or back. Dimension ignores any rigging instructions that may be present in a 3D model.

12. Drag the red rotation arrow on the rotation widget on the canvas until about 70° is displayed for the X rotation value in the Properties panel.



Note

Just like the models that come with Dimension as starter assets, all the 3D assets available on Adobe Stock are carefully optimized for use with Dimension—they will import into a scene at a reliable size, arrive at consistent coordinates in the scene, and feature clearly named models, groups, and materials.

Finding assets on Adobe Stock

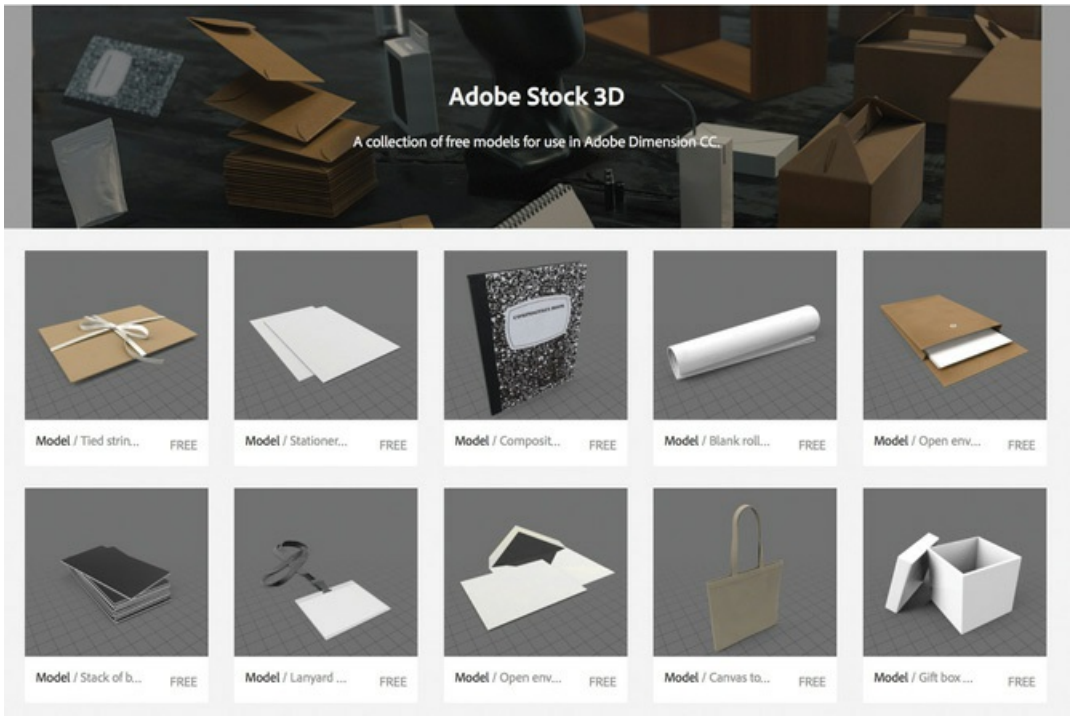
Adobe Stock is a huge collection of royalty-free images, video, artwork, templates, and 3D assets, including models, materials, and lights. These assets can be accessed through a web browser at stock.adobe.com or from within most Creative Cloud applications. The assets can be purchased in a variety of ways, including via a subscription option. See https://stock.adobe.com/plans for pricing information.

Locate free Adobe Stock models

Adobe Stock contains a growing library of thousands of 3D models. Several hundred of these models are free, so you can use these models even without a subscription.

1. Click the Add and Import Content icon at the top of the Tools panel.
2. Choose Browse Adobe Stock.

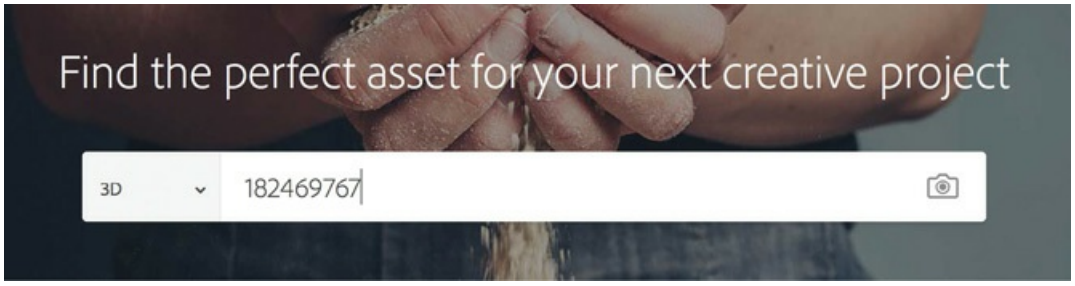
   Your default browser launches, and you are brought to a curated page on https://stock.adobe.com that displays many of the free 3D models offered on Adobe Stock.



Find a model and add it to the scene

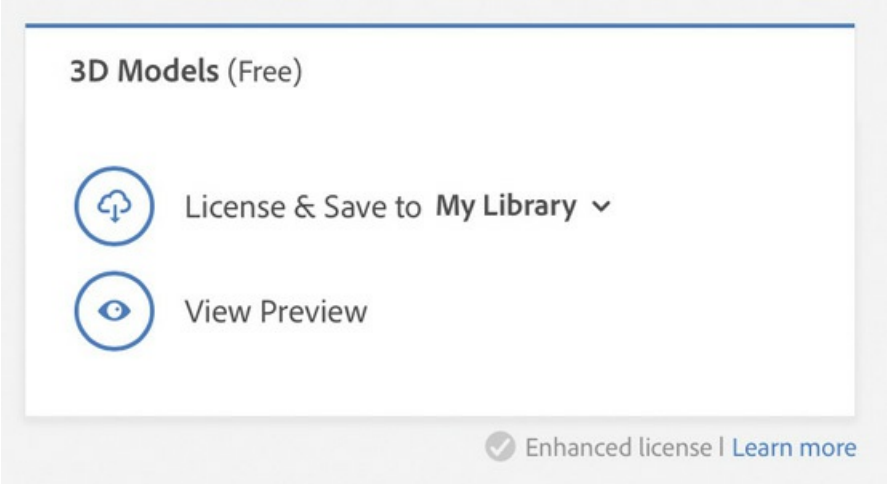
When you purchase a model from Adobe Stock, or choose a free model, the model is first downloaded to a Creative Cloud Library. Then, you import the model from the Creative Cloud Library into Dimension.

1. In your browser on the Adobe Stock page, type **182469767** into the search field at the top of the screen and then press Return/Enter.

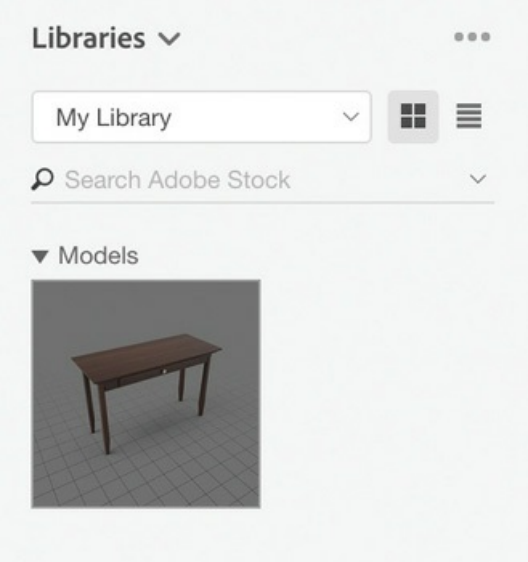


This is the ID number of a specific desk model used in this lesson. This model is free.

2. In the dropdown list next to the download icon, choose the library you want to save the model into. If you're unfamiliar with CC Libraries, just choose My Library. Note that you need to be signed in to Adobe Stock to see the list of libraries.



3. In Dimension, click the Add and Import Content icon and choose CC Libraries.
4. Choose My Library (or whatever library you chose in step 2) from the dropdown list at the top of the CC Libraries panel.



5. Locate the Wood Desk with Single Drawer model in the library, and click it. The model will be placed in the center of the scene.

Note

CC Libraries are available in all Creative Cloud products and are a great way to store assets from various programs and share them between Creative Cloud programs. CC Libraries are used in Dimension as a way to retrieve models, lights, and materials placed in the Library by Adobe Stock or the Adobe Capture mobile app.

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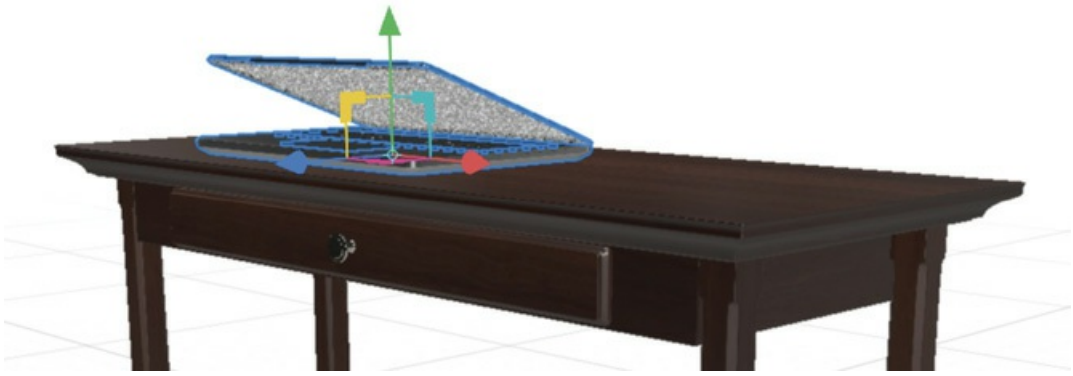
6. Choose Camera > Frame All to position the camera so that you can see the entire desk on the canvas.

Modify the scene

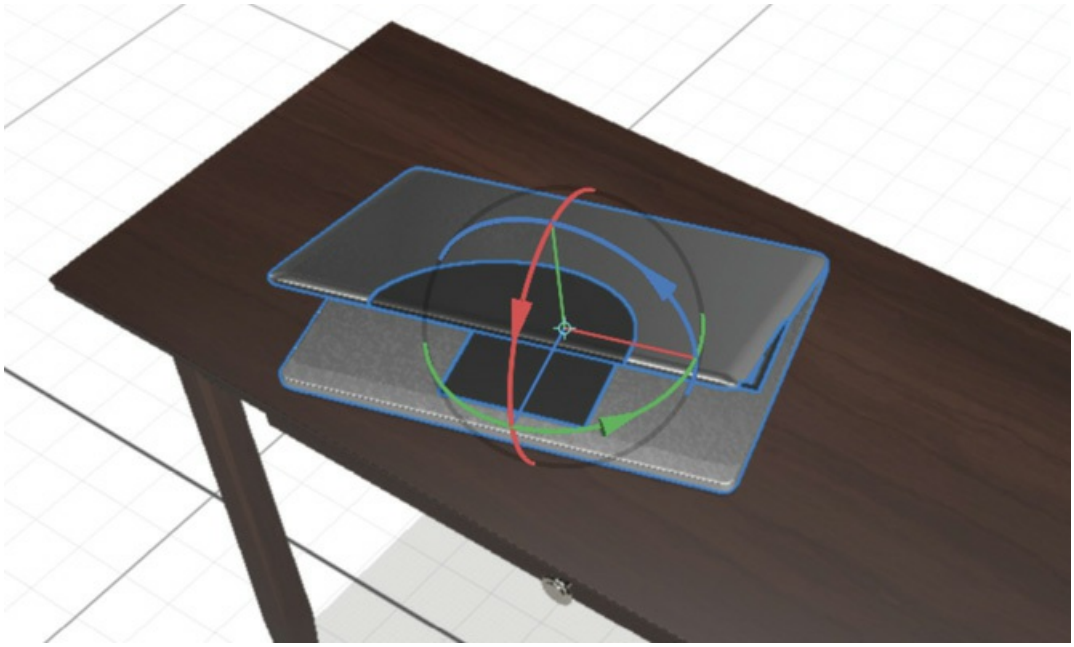
All the 3D models in the Adobe Stock library are optimized for use with Dimension, much like the starter assets. Note that the desk arrived accurately in the scene, just as the laptop did. It is centered on the scene and sitting on the ground plane.

1. Select the Select and Move tool (keyboard shortcut: V).
2. Click 16:10 Laptop in the Scene panel to select the laptop model.
3. Drag the green arrow up until the laptop model appears to sit on the top surface of the desk. You may need to use the Camera tools to alter your view of the scene so that you can determine when the laptop is positioned on the desk surface accurately.
4. Drag the red arrow to the left a bit to move the laptop toward the left side of the desk.



5. Choose the Select and Rotate tool (keyboard shortcut: R).

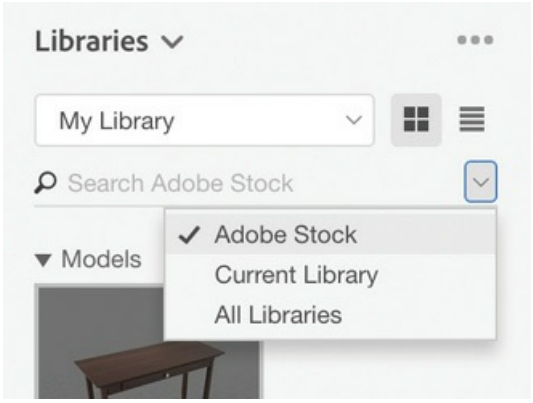
6. Drag the green arrow on the rotation widget to the right so that the laptop is turned a bit on the surface of the desk. Again, you may need to use the Orbit tool or other Camera tools to alter your view of the scene so that you can determine when the laptop is positioned to your liking.



Add more objects to the scene

In addition to searching https://stock.adobe.com through a web browser, you can also search Adobe Stock in the Creative Cloud Libraries panel right in Dimension.

1. In the Creative Cloud Libraries panel in Dimension, in the dropdown list to the right of the search field, choose Adobe Stock.



2. Type **MUG** into the search field. Several different coffee mugs are displayed. To help you quickly locate the one we want, type **172516470** into the search field. A white coffee mug should be displayed.
3. Click the shopping cart icon to save the model to your library. You may be asked if you want to license the free asset. If so, click OK.

4. It may take a few moments for the model to download. When it has finished downloading to your Library, click the model to add it to the scene. It will be added to the center of the scene, and positioned on the ground plane, which in this scene is the floor beneath the desk.

Tip

Two camera commands that you might find useful while positioning this small object in the larger scene are Camera > Frame Selection, which will fill the screen with the selected object, and Camera > Frame All, which will fill the screen with all the objects in the scene.

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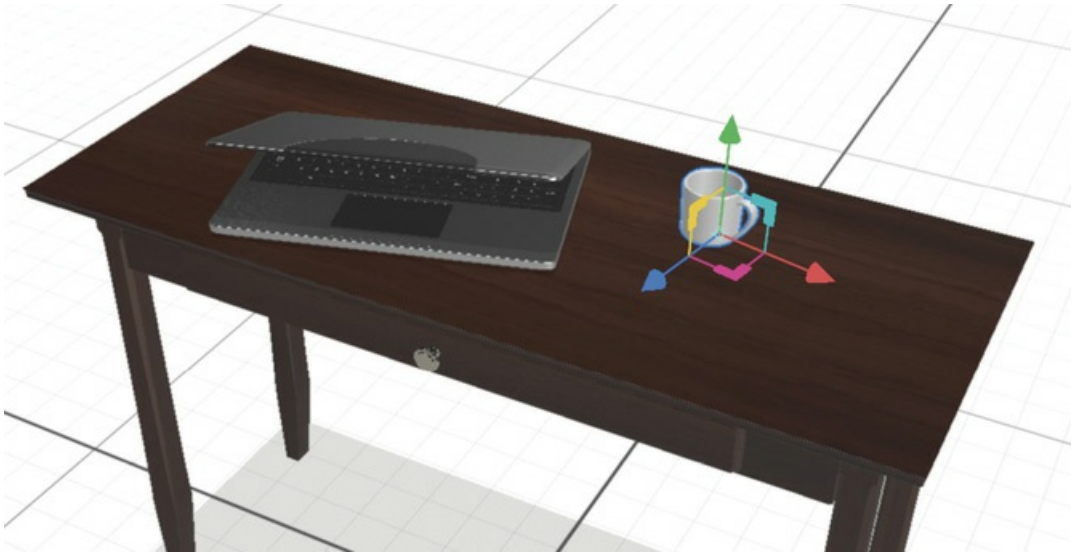
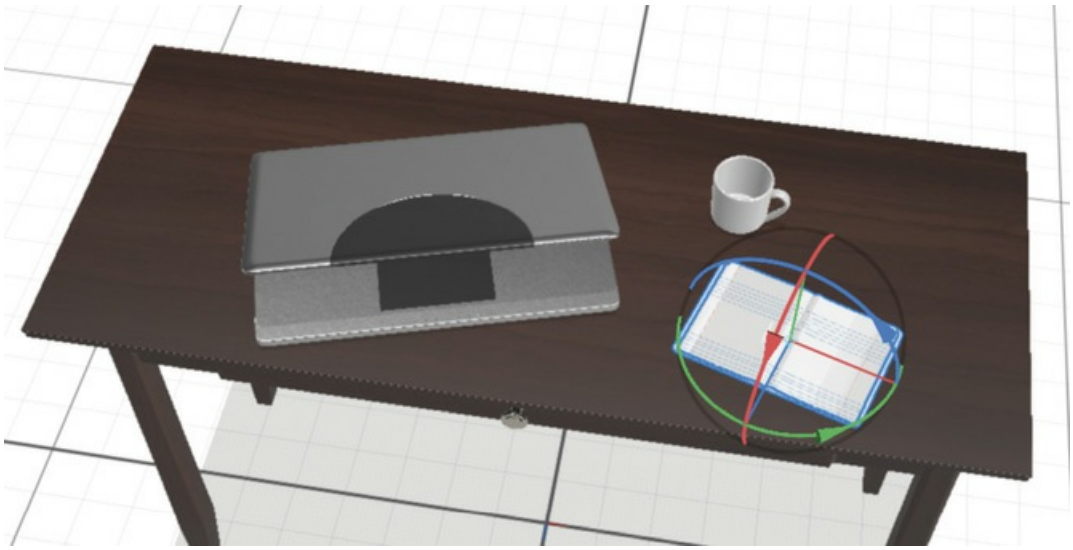
5. Choose the Select and Move tool (keyboard shortcut: V) and use the arrows to position the mug on the desktop surface wherever you wish.



6. In the Creative Cloud Libraries panel, type **notebook** into the search field. Several notebook models will be displayed. To help you quickly locate the one you want, type **213242110** into the search field. A composition notebook model will be displayed.
7. Click the shopping cart icon to save the model to your library. You may be asked if you want to license the free asset. If so, click OK.
8. It may take a few moments for the model to download. When it has finished downloading to your library, click the model to add it to the scene. It will be added to the center of the scene, positioned on the ground plane below the desk.
9. Choose the Select and Move tool (keyboard shortcut: V), and use the arrows to position the composition notebook on the desktop surface wherever you wish.
10. Choose the Select and Rotate tool (keyboard shortcut: R).
11. Drag the green arrow to the left a bit to rotate the notebook.



Importing 3D models from other sources

In addition to working with starter assets and content from Adobe Stock, Dimension will import 3D models in the following industry-standard formats:

- FBX (Filmbox)
- OBJ (Wavefront)
- SKP (SketchUp)
- STL (Stereolithography)

Depending on the skill of the person who created the model and the software used, 3D models can be large and complex. In addition, different 3D modeling programs save their 3D objects into these standard file formats in various ways.

How successful you'll be importing a model in one of these formats, and how useable the resulting model will be, depends on four variables:

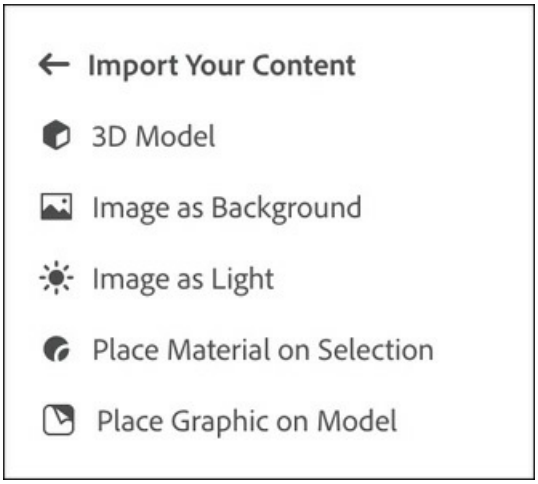
- How well Adobe has written the translation routine being used to translate the file format into Dimension's file format.
- How well the modeler has created the model. For example, if the model is of a wine bottle, did the modeler create the cork in the bottle as a separate object, so that you can apply a different surface to the cork than to the rest of the bottle, or is the entire bottle a single object? Is the model constructed of enough polygons so that the curve of the bottle appears smooth, but not so many polygons that the model is overly complex?
- How accurately, consistently, and reliably the modeling software being used writes its data into the given file format.
- How complex the model is relative to the processing power and memory available on your computer. Some models may import perfectly but slowly and subsequently are slow and unresponsive in Dimension because they are so complex.

Unfortunately, it is nearly impossible to predict how successful a particular model will import into Dimension. You pretty much just need to try importing it to find out! If you have a model in one of Dimension's supported formats that doesn't import properly, you are encouraged to report the issue via the Adobe Dimension feedback website, at https://feedback.adobedimension.com; be sure to attach the problem file and a description of the problem.

Import an OBJ model

Most people have some personal effects, tchotchkes, or toys on their desks. You'll add a toy model of an astronaut to the surface of the desktop.

1. Click the Add and Import Content icon at the top of the Tools panel, and choose Import Your Content.
2. Click 3D model.

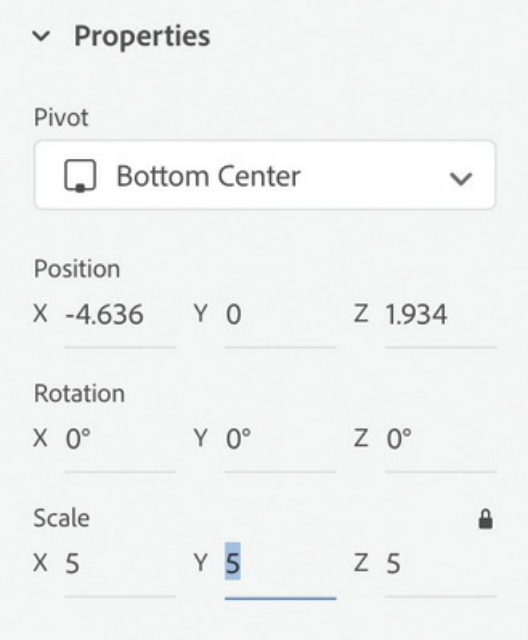


Tip

You can also drag and drop models directly from the Finder (Mac) or File Explorer (Windows) into your scene.

3. 3 Select the file named MKIII.OBJ in the MKIII folder.

   The model is placed in the center of the 3D scene, positioned on the floor beneath the desk. The model will be small relative to the size of the desk.
4. Choose Camera > Frame Selection so that the small model fills the screen.
5. Choose the Select and Scale tool (keyboard shortcut: S).
6. In the Properties panel, click the Lock icon to the right of Scale to lock the aspect ratio of the model.
7. Enter **5** into one of the Scale fields to scale the astronaut five times larger.



8. Choose Camera > Frame All so you can see all the models.

Note

The astronaut model is from the repository of free 3D models available from NASA at https://nasa3d.arc.nasa.gov/models.

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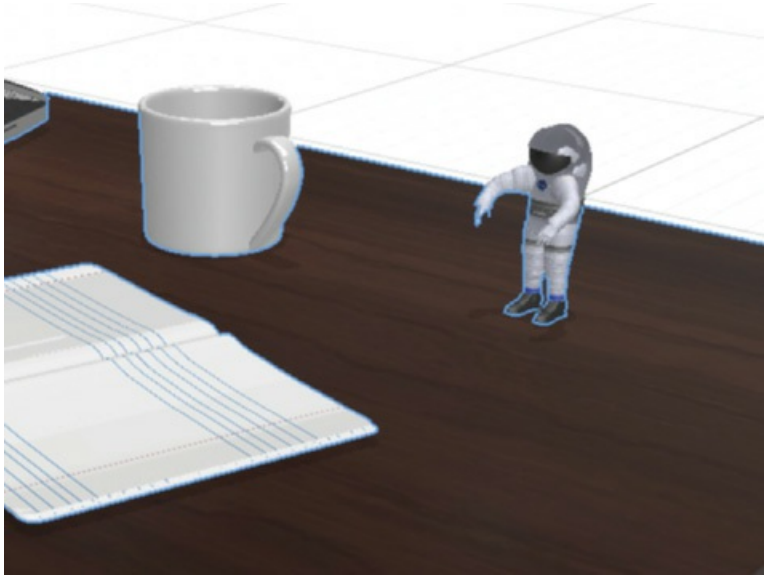
9. Use the Select and Move tool and the Select and Rotate tool to position the astronaut model on the surface of the desk.



10. Click the Render tab, and render the scene if you wish. If you'd rather examine the render

of my completed scene, open the Lesson_05_end_render.psd file in Photoshop.

Other sources for 3D content

There are dozens of web sites that sell stock 3D content. Because of the complexity of 3D models and file formats, it's important that you purchase models from reputable vendors that will stand behind their product if the models won't import into Dimension.

Here is a sampling of some stock 3D sources:

- CGTrader: www.cgtrader.com
- Sketchfab: sketchfab.com/store
- Turbosquid: www.turbosquid.com

There are also various repositories of free 3D content on the web:

- 3D Warehouse: https://3dwarehouse.sketchup.com/
- GrabCAD: https://grabcad.com
- National Institutes of Health: https://3dprint.nih.gov
- Smithsonian: https://3d.si.edu
- Traceparts: www.traceparts.com

Creating 3D models in Photoshop for use in Dimension

You can use Photoshop to create 3D models for use in Dimension. Here_s a simple exercise to get you started.

1. In Photoshop, create a new document that is 1000 px x 1000 px.
2. With the Type tool, create a single word or line of type.
3. Make the text large.
4. Choose 3D > New 3D Extrusion from Selected Layer.
5. If you are asked if you want to switch to the 3D workspace, click Yes.
6. Use the Properties panel to experiment with Shape Preset, Extrusion Depth, and other settings.
7. Once the model looks the way you want, choose 3D > Export 3D Layer.
8. Choose Wavefront|OBJ for the 3D File Format and then click OK.
9. Name the file, and save it somewhere you'll remember.
10. In Dimension, create a new file.
11. Choose File > Import > 3D Model.

Identifying potential problems when importing 3D models

Models that you place in your scene from the starter assets or from Adobe Stock should import into Dimension in a reliable, consistent manner. But models you obtain from other sources may sometimes behave unpredictably when importing them into Dimension. Here are some of the potential problems, as well as a few solutions.

Model appears out of scale

The creator of a model doesn't have any idea what size you want to use the model at, so it may come into Dimension enormous or really tiny. If the problem isn't too extreme, you can scale the object with the Select and Scale tool (keyboard shortcut: S). Or use the Dolly tool (keyboard shortcut: 3) to enlarge or reduce your view of the object.

Sometimes, an object will arrive so large that just a single small surface on the object fills the entire screen, so it is difficult to scale the object or zoom in or out. In this case, the Camera > Frame Selection command (keyboard shortcut: F) will scale your view so that the entire object fits on the screen.

Object positioned outside the viewable area

Sometimes an object won't appear anywhere within the Dimension window. This is caused by the XYZ positioning of the object being out of scale with Dimension's coordinate system. Thankfully, when this happens, a blue dot icon will appear at the edge of the

screen. Clicking this icon will position the screen so that you can see the imported object.

Object positioned below the ground plane

Sometimes an object won't appear on the screen because it is entirely below the ground plane. Choosing Object > Move to Ground will quickly move the object above the ground plane so that it is within view.

Review questions

1 Which of these file formats can be imported as a 3D model into a Dimension scene?

PSD

OBJ

MTL

CAN

2 Are 3D models in the Adobe Stock library free or paid?

3 What does the Object > Move to Ground command do, and when might you need to use it?

Review answers

1 OBJ is an industry-standard 3D file format that can be exported from many different 3D modeling programs and placed into a Dimension scene.

2 The 3D models available in the Adobe Stock library can be purchased via a monthly subscription. However, several hundred of the 3D models on Adobe Stock are free.

3 The Object > Move to Ground command will move the selected object so that it is positioned above the ground plane. This command is sometimes necessary when an imported model doesn't appear within view because it is positioned "underground," beneath the ground plane.

6 Working with Materials

Lesson overview

In this lesson, you'll explore and apply surface materials in a 3D scene and learn the following:

- An overview of the variety of materials included with Dimension
- How to import materials from Adobe Stock
- How to import materials from other sources
- How to select model surfaces with the Magic Wand tool and then apply materials to those surfaces
- How to adjust the properties common to all materials, such as glow, opacity, and translucence
- How different types of materials affect render speeds

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 lessons or to the lesson files. Look on the Lesson & Update Files tab to access the most current content.

You can apply infinite variations of surface materials to models in Dimension, including metals, glass, wood, and more.

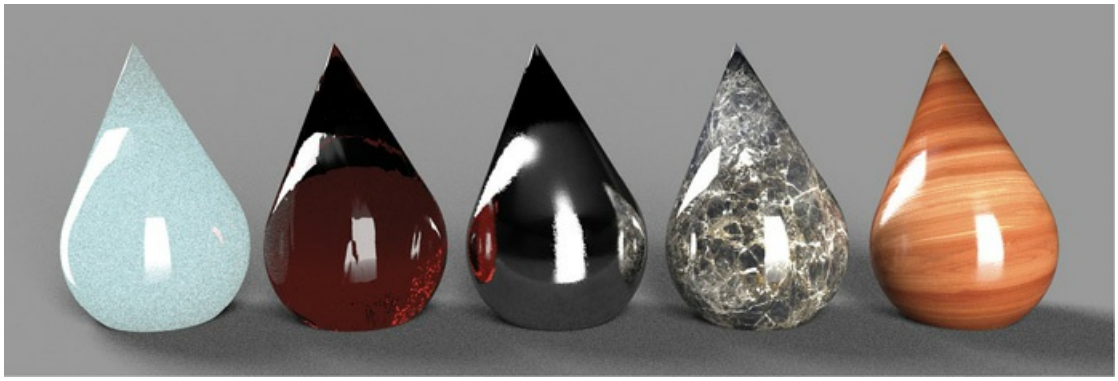
What are materials?

One of the core capabilities of Dimension is the ability to apply a “material” to a 3D object. Dimension uses materials defined in a subset of the NVidia Material Definition Language (MDL). Adobe calls this subset Adobe Standard Material. This format defines how light behaves when it hits the surface of the material. For example, is light emitted from the surface? If so, how much? Is the surface opaque, transparent, or semi-transparent? Is the surface rough or smooth? Does the surface exhibit “luster” like shiny metal? If you can see through the object to the interior, is the interior translucent, and does the object refract the light?

Tip

You can learn much more about Adobe Standard Material at https://helpx.adobe.com/dimension/using/standard-materials.html.

A material can optionally include images that can control properties of the material. For example, a brick material may include a color image for the variations of brick color, a roughness image to give areas shiny or matte effects, and a normal image that adds details like pores to the surface.

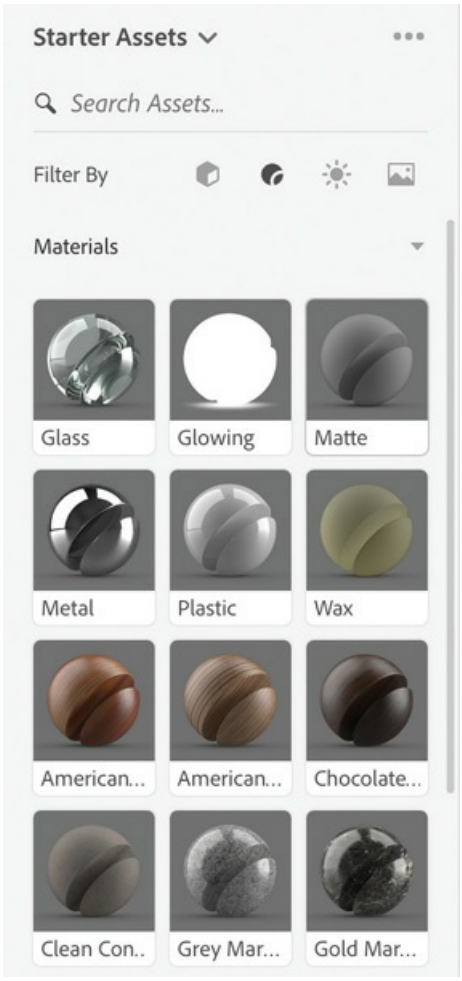


This lesson is a deep dive into materials. But another way to change the appearance of the surface of a model is to apply one or more graphics to the surface. Any JPEG, PNG, AI, PSD, or SVG file can be applied as an image. Applying graphics to model surfaces is covered in depth in a later lesson.

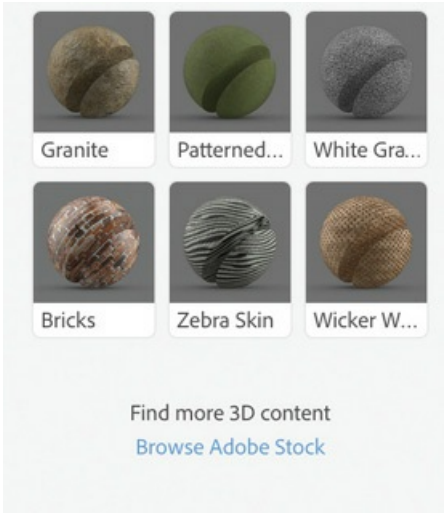
Where to find materials

Several dozen starter asset materials can be found in Dimension's Assets panel, including several types of glass, metals, plastics, woods, papers, fabrics, and marbles, as well as zebra skin and beer. You can also download hundreds of additional materials from Adobe Stock or obtain MDL files from other sources and import them into Dimension.

1. Choose File > Open.
2. Select the file named Lesson_06_01_begin.dn, which is in the Lessons > Lesson06 folder that you copied onto your hard disk, and then click Open.
3. Click the Add and Import Content icon at the top of the Tools panel, and choose Starter Assets.
4. Click the Materials icon to view only materials in the panel.
5. Scroll through the panel and note the many different types of starter materials available. As you'll see, you can change the properties of each of these materials, so these are a good starting point for generating a wide variety of surface materials.



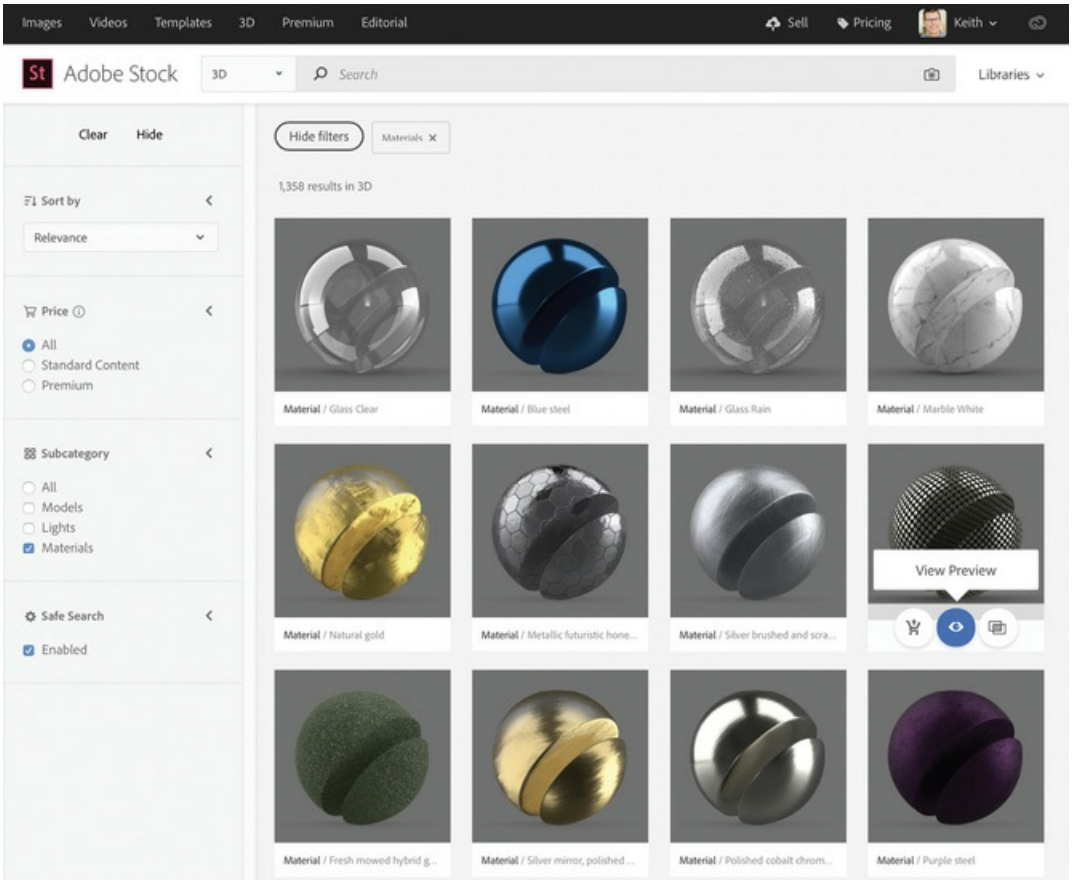
6. Scroll to the bottom of the list of starter materials, and click the words “Browse Adobe Stock.”



Tip

If you have a material from another source that has been saved as a Dimension-compatible MDL file, you can place the material on a model by choosing File > Import > Place Material on Selection.

Your default web browser launches, and you're taken to stock.adobe.com, where you'll see hundreds of additional materials available for purchase.



Applying a material to an object

In this lesson, you're going to apply various materials from the Starter Assets to models in this scene.

Tip

Click the More icon ••• at the top of the Content panel to toggle between List view and Grid view. This offers two ways to view materials, depending on your preference.

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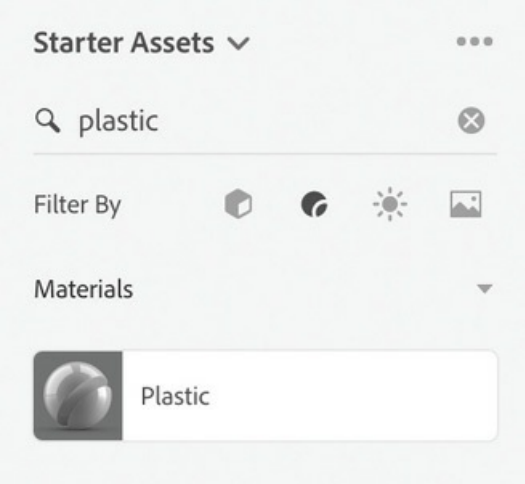
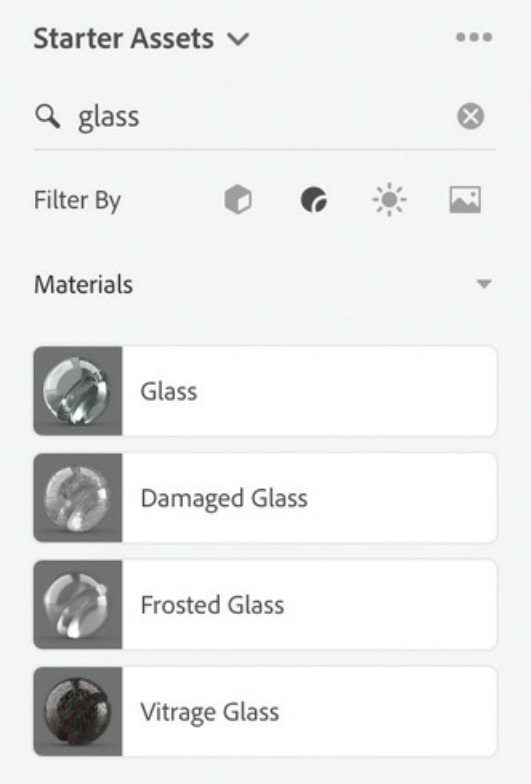
1. Select the Select and Scale tool (keyboard shortcut: S).

2. Click the middle cup to select it.
3. Click the Add and Import Content icon at the top of the Tools panel, and choose Starter Assets.
4. Click the Materials icon if it isn't already selected to view only materials in the panel.
5. In the Search Assets field at the top of the Assets panel, type **plastic**.
6. Click the Plastic material to apply it to the cup.



7. Click the right-most cup to select it.
8. In the Search Assets field at the top of the Assets panel, type **glass**.



9. Click the Glass material to apply it to the cup.

Tip

To speed up the render preview, you can hide all the objects in your scene except the object(s) you need to preview at the moment. To hide a group or model, click the eyeball icon to the right of the relevant group or model in the Scene panel. Hidden models aren't rendered, so the preview will generate much faster.

Note

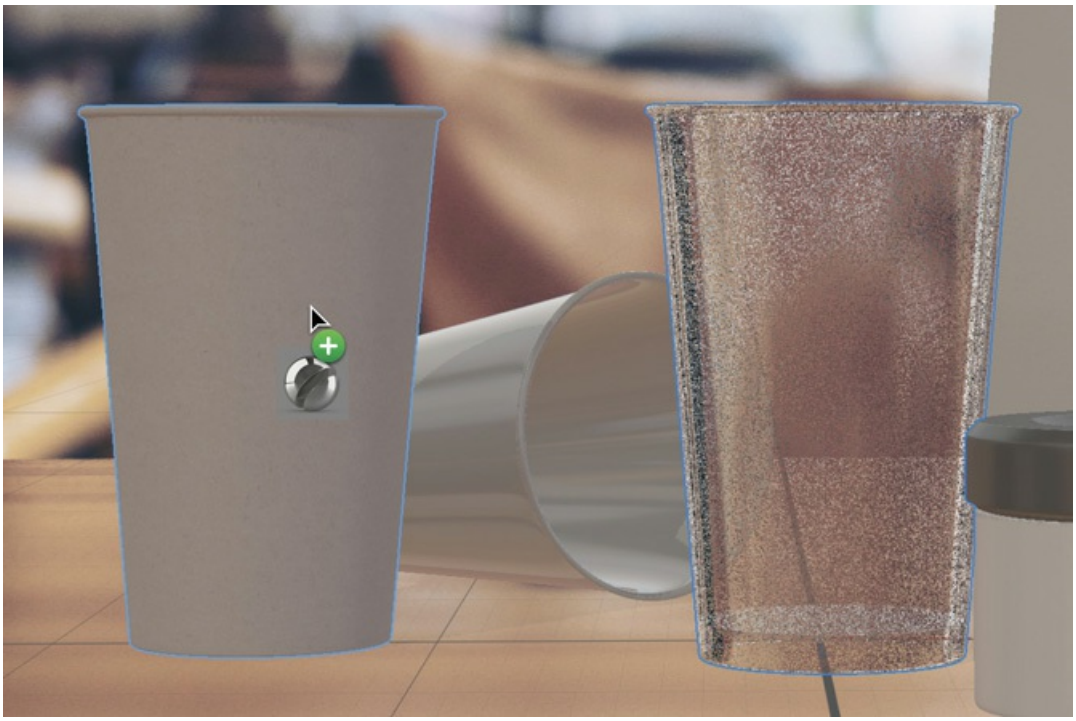
The three cups in this scene were created by placing the starter asset named "Coffee Cup" and then deleting the Lid model from the model group.

10. Note that the cup that has the Plastic material applied looks fairly realistic in the work area, but the cup with the Glass material is speckled. Some types of materials (including glass) require more processing power to render, so to keep things working at an acceptable speed on the canvas, these materials display as only a rough approximation. To see a more accurate preview, click the Render Preview icon .

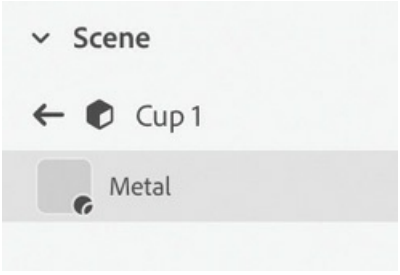
Apply materials via drag and drop

Sometimes, it's more convenient to apply a material to a model by dragging the material from the Starter Assets, from a Library, or from your file system onto the surface of a model.

1. Choose Edit > Deselect All so that none of the objects in the scene are selected.
2. In the Search Assets field at the top of the Assets panel, type **metal**.
3. Drag the Metal material onto the leftmost cup in the scene. Release the mouse button when you see a blue highlight around the cup.



4. Examine the Scene panel. The Scene panel confirms that the Metal material has been applied to the Cup 1 model.



Tip

As an alternative to clicking the back arrow at the top of the Scene panel, you can press the Esc key to “back up” out of the materials view in the Scene panel and return to the model list.

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5. Click the back arrow at the top of the Scene panel to return to the model list.

The Small Jar object is a group, as indicated by the Group icon .

6. Click the Group icon to open the group. You’ll see that the group consists of two models: Lid and Jar. Because this object was modeled as two separate models, you can easily apply separate materials to the lid and the jar. Note that you can open a group without selecting the group. If you accidentally select the Small Jar group, choose Edit > Deselect All.

7. In the Search Assets field at the top of the Assets panel, type **wood**.
8. Drag the American Elm Wood material onto the Jar model in the scene. Release the mouse button when you see a blue highlight around the jar body (not the lid).

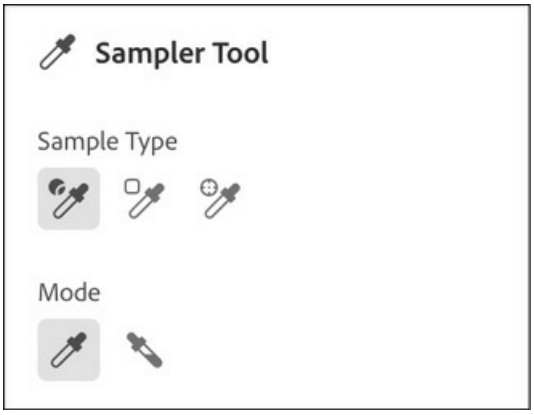
9. In the Search Assets field at the top of the Assets panel, type **paper**.
10. Drag the Glossy Paper material onto the Bag model in the scene. Release the mouse button when you see a blue highlight around the bag.

Sample a material from another model

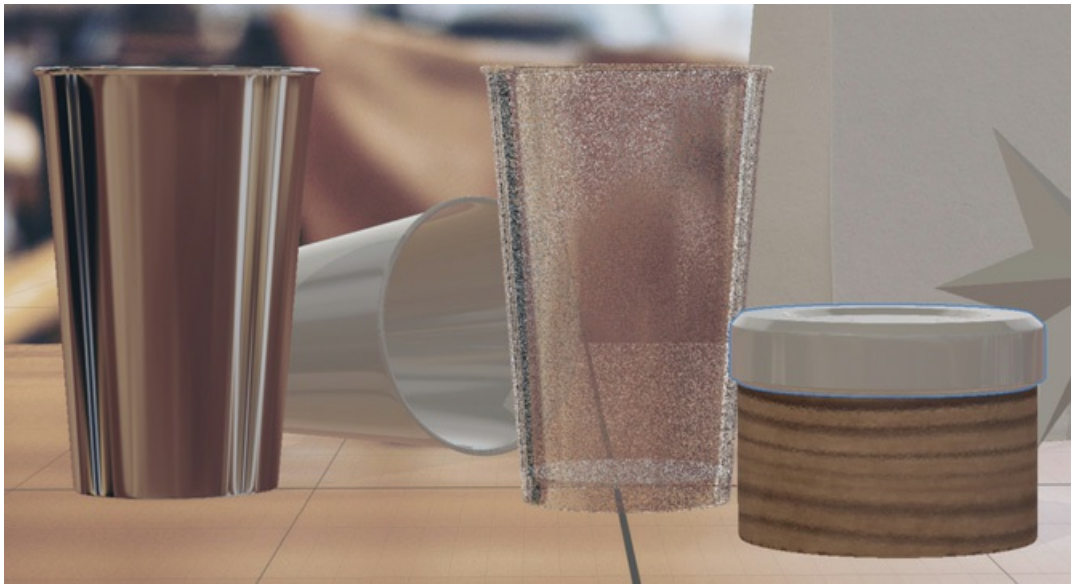
Once you've applied a material to a model, you can easily apply the same material to other models with the Sampler tool.

1. In the Scene panel, select the Lid model under Small Jar.

2. In the Tools panel, select the Sampler tool (keyboard shortcut: I).
3. Right-click the Sampler tool, and verify that Sample Type is set to Material since we want to sample all the material attributes, not just the material color.



4. Click anywhere on the middle cup on the canvas (the plastic cup lying on its side). This will sample the Plastic material from the cup model and apply it to what you have selected (the lid of the small jar).



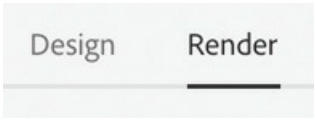
Previewing the materials

Some materials preview better on the canvas than others. To see what the materials really look like under the lighting conditions of your scene, you'll need to refer to the Render Preview window frequently as you work. For some materials, particularly those with transparency such as glass, you'll need to render the scene to see the material accurately.

1. If the Render Preview panel isn't displayed on your screen, click the Render Preview icon to display it.
2. Click the button at the top of the Render Preview window to display a full-screen render preview. Depending on the speed of your computer, it may take quite a while for the preview to display accurately. Notice that the computer takes several passes through the scene, gradually rendering the scene more and more accurately.

Keep in mind that this is still just a render preview—it isn't terribly accurate when rendering certain types of materials. To see the material properties accurately, you'll need to do an actual render.

3. Click the button at the top of the Render Preview window to return to the small render preview window.
4. Click the Render button at the top of the screen to enter Render mode.



5. Select Current View, Low (Fast) quality, and PNG for the output format, and then click the Render button.

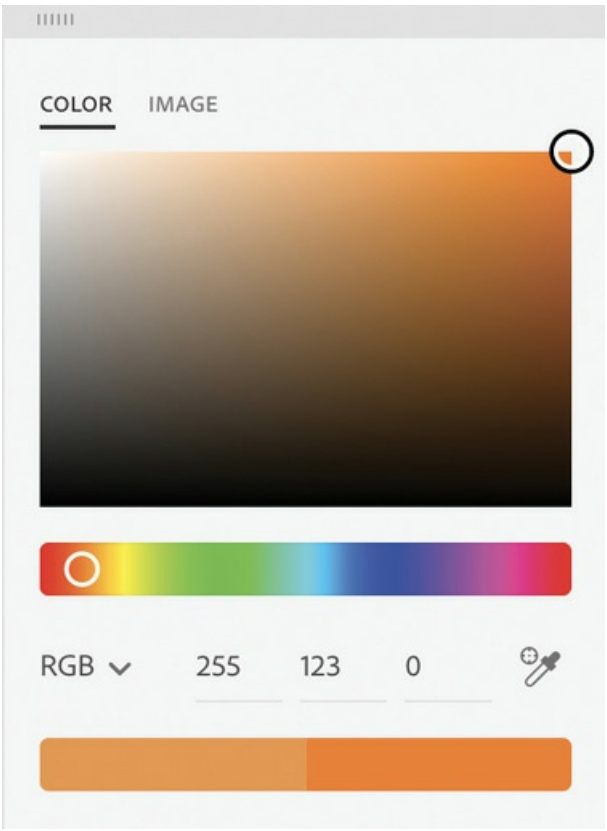
Changing material properties

So far, we've applied starter asset materials without setting any of their properties. But every material can be customized in several ways using the Properties panel.

1. In the Scene panel, hover over the Cup 2 model, and click the right arrow icon to reveal the model materials.

   Let's make the surface a bright orange.

2. In the Properties panel, click the color swatch next to the base color, and change the color to **255** red, **123** green, **0** blue.



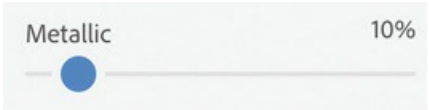
Note

Because the material for the Jar Lid model was sampled from the Cup 2 model, both models use the Plastic material. Changing the properties of the material on one object also changes the properties of the material on the other object. You can sever the relationship between the two instances of the material by clicking the Unlink icon in the Actions panel when editing the material.

Tip

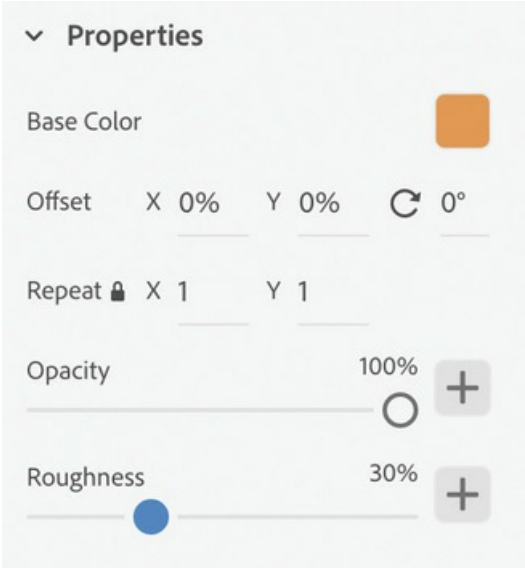
If you hover over a property name in the Properties panel, a question mark will appear. If you click the property name, you'll see an animated visual explanation of what that property does.

3. To make the surface a bit shinier, increase the Metallic value to **10%**.

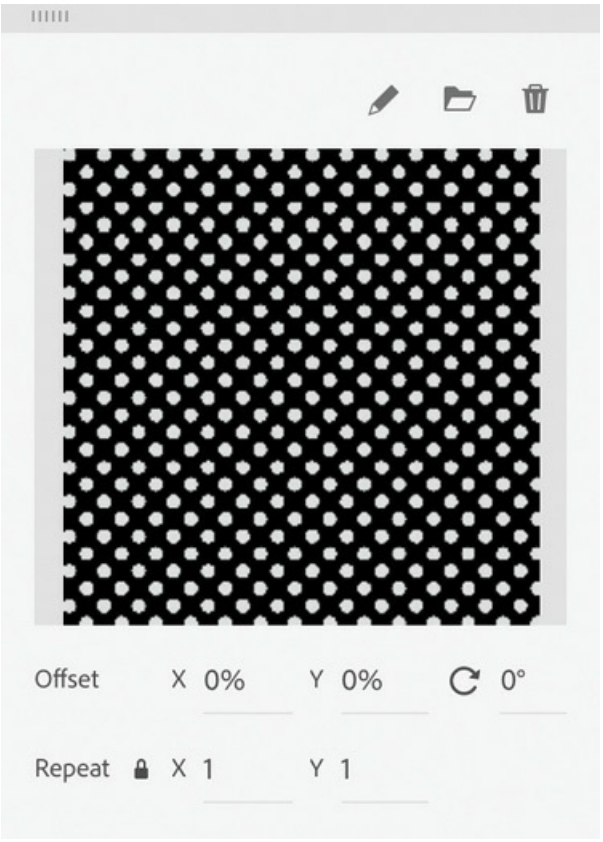


4. Click the back arrow at the top of the Scene panel to return to the model list.

5. Hover over the Cup 1 model, and click the right arrow icon to reveal the model materials.
6. To make the surface a bright orange, in the Properties panel, click the color swatch next to the base color, and change the color to 255 red, 123 green, 0 blue.
7. To make the surface less reflective, increase the Roughness value to **30%**.

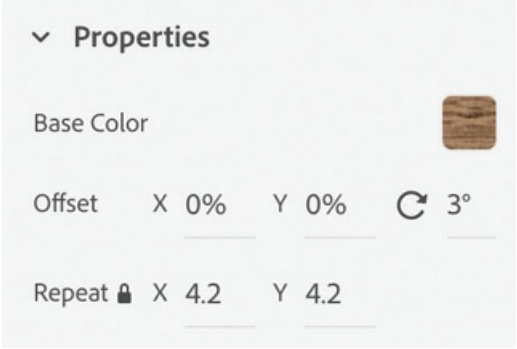


8. Click the plus icon to the right of the Roughness slider.
9. Click Select a File.
10. Select the Dots-white.png file and click Open.



With this PNG mask applied, areas that are black in the PNG will be smooth metallic in the image, and the white areas will be rough.

11. Press the Esc key to close the image picker and return to the model list in the Scene panel.
12. If the Small Jar group isn't open, click its Group icon to open it.
13. Hover over the Jar model (not the lid), and click the right arrow icon to reveal the model materials.
14. To make the wood grain finer and more realistic looking, in the Properties panel under Base Color, change the Rotation value to **3°** and change X and Y Repeat to **4.2**.



How bitmap images affect material properties

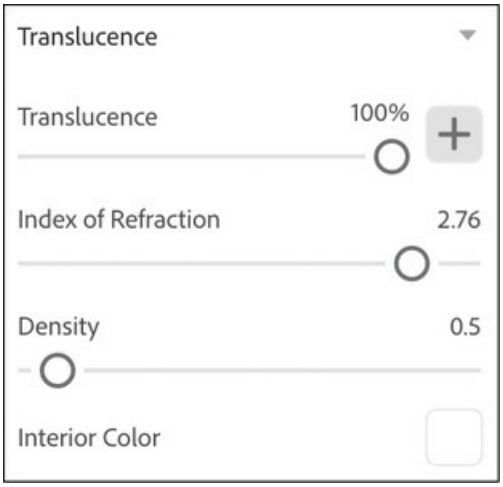
If you examine the Properties panel when a material that is applied to a model is selected, you'll see that you can add a bitmap image to the Opacity, Roughness, Metallic, Glow, and Translucence properties to alter the ways these properties behave.

- When a bitmap image is added to Opacity, black areas are transparent, and white areas are opaque.
- When a bitmap image is added to Roughness, black areas are polished, and white areas are matte.
- When a bitmap image is added to Metallic, black areas are non-metallic, and white areas are metallic.
- When a bitmap image is added to Glow, black areas reflect light, and white areas emit light.
- When a bitmap image is added to Translucence, black areas are non-translucent, and white areas are translucent.

Change glass properties

Adjusting the Translucence properties of a material makes it appear like glass or liquid—you can see through the material. You can alter the Translucence, Index of Refraction, Density, and Interior Color properties in the Properties panel to make models appear to be made of glass, liquid, or gel.

1. Click the back arrow at the top of the Scene panel to return to the model list.
2. Hover over the Cup 3 model, and click the right arrow icon to reveal the model materials.
3. In the Properties panel, click the left arrow icon next to Translucence to reveal the Translucence properties if they aren't already open.
4. To cause the glass to "bend," or refract the light more, increase Index of Refraction to **2.76**.
5. To make the glass more "foggy" or "cloudy," increase Density to **.5**.



Remember that you won't see much of a result from these settings in the on-canvas preview. The Render Preview panel will give you a much clearer picture of the changes you make.

6. Click the back arrow at the top of the Scene panel to return to the model list.

Tip

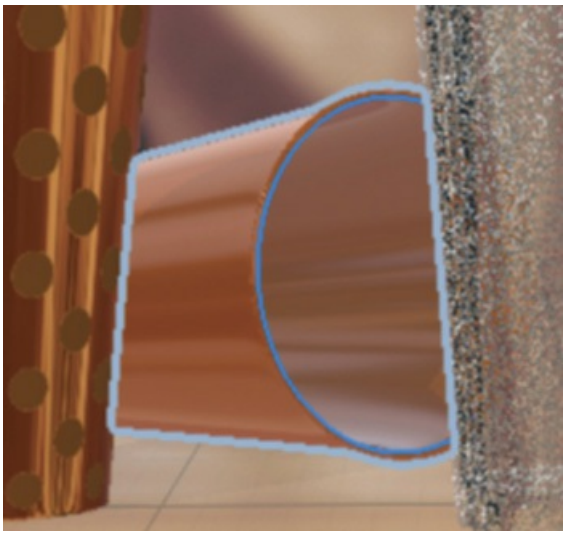
To quickly increase or decrease a numeric value in the Properties panel, use the “scrubby sliders.” Hover over the text to the left of a numeric field, and the cursor will change to a horizontal double-ended arrow. Press the mouse button and drag to the right or left to increase or decrease the numeric value in the field. Add the Shift key to change the value in larger increments.

Sub-selecting model faces

You’ve seen that models can consist of a group of other models. When an object is modeled this way, it is easy to select the various components of the model if each component is a sub-model in a group. Sometimes you may find that you want to apply different materials to different “parts” of a model, but although they look like separate parts to you, they weren’t created as separate sub-models.

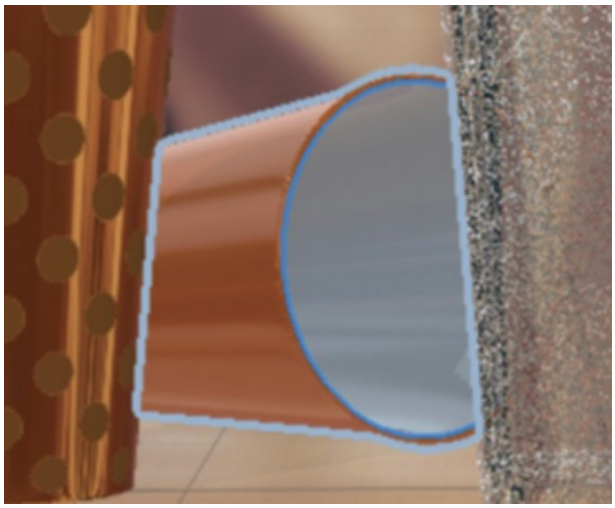
Assuming that the parts in question look different from the surrounding surfaces on the model, there is a way to apply different materials to different surfaces on a single model. The key is to use the Magic Wand tool. The Magic Wand tool works similarly to the Magic Wand tool in Photoshop. When you click a surface with it, Dimension attempts to select the surface up to its “edges.” Let’s try it out.

1. Select the Magic Wand tool (keyboard shortcut: W).
2. Click inside the cup that is on its side on the table. Note that a blue selection boundary appears around the inside area of the cup.



3. In the Content panel, type **plastic** into the search field.
4. Click the Plastic material to apply the original white plastic material to the inside surface of

the cup.



5. In the Scene panel, hover over Cup 2 and click the right arrow icon to reveal the model materials.

   Note that now Cup 2 has two materials applied: Plastic and Plastic 2.

6. Click the back arrow at the top of the Scene panel to return to the model list.

Apply materials to the star

Although the Star model in our scene consists of a single model, you can use the Magic Wand tool to select just some of the surfaces of the star and apply different materials to these surfaces than the rest of the star.

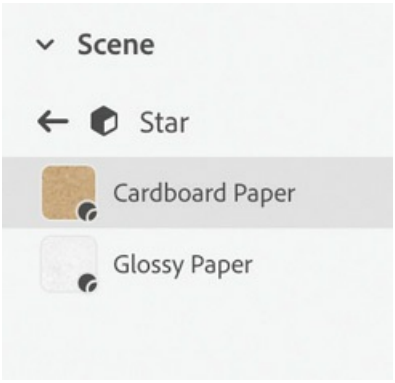
1. Select the Star model in the Scene panel.
2. Choose Camera > Frame Selection to position the camera to give a large view of the Star model.
3. In the Content panel, type **Paper** into the search field.
4. Click the Cardboard Paper material to apply it to the star.
5. Click one of the triangular “sides” of the star with the Magic Wand tool. You’ll see the triangle highlighted in blue to indicate it is selected.

6. Hold down the Shift key, and click every other facet of the star face. Holding down the Shift key lets you add to the selection each time you click with the Magic Wand tool.

7. In the Content panel, click the Glossy Paper material to apply it to the star facets.

8. In the Scene panel, hover over “Star” and click the right arrow icon to reveal the model materials.

   Note that now the Star model has two materials applied: Cardboard Paper and Glossy Paper.



9. Click the Camera Bookmarks icon and click Final View to return to the previous camera view.
10. If you have time, render the scene. Or open and examine the Lesson_06_01_end_render_high.psd file, which has been rendered for you.

Linking and unlinking materials

In the preceding example, you sampled the material for the Jar Lid model from the Cup 2 model. This created a single material instance that was linked between both models. When you changed the material color, it was updated on both models. In cases such as this, you can unlink the material if you want to control the attributes of the material on each object independently.

Dimension follows a fairly subtle set of rules as to when it links materials and when it doesn't. Let's examine material linking more closely and see how Dimension decides when to link materials.

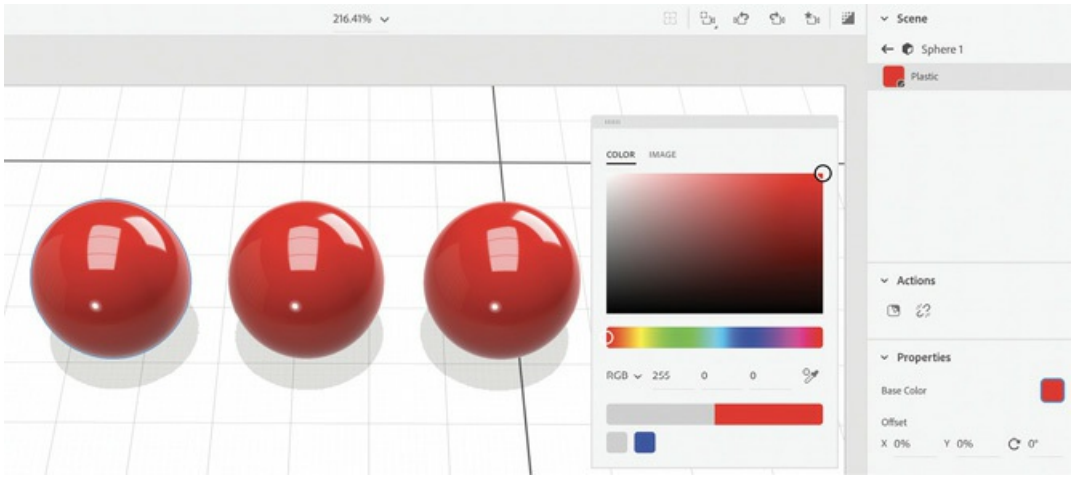
Apply materials en masse

You can apply materials to several models at the same time, resulting in a common linked material, which makes quick work of making changes to those models.

1. Choose File > Open.
2. Select the file named Lesson_06_02_begin.dn, which is in the Lessons > Lesson06 folder that you copied onto your hard disk, and then click Open.
3. Select the Select and Move tool (keyboard shortcut: V).
4. Click one of the sphere models and then hold down the Shift key and click each of the other sphere models to select all three models. Notice that the spheres aren't grouped together.
5. In the Content panel, locate the Plastic material and click it to apply the material to the three selected spheres all at once. When you apply a material to multiple objects with a single click, the material is linked between the objects by default.

6. Choose Edit > Deselect All to deselect the sphere models.
7. In the Scene panel, hover over the Sphere 1 model, and click the right arrow icon to reveal the material applied to the sphere.

   You will see a Break Link to Material icon appear in the Actions panel. The presence of this icon tells you that the material you have selected is linked to at least one other model.
8. In the Properties panel, click the color swatch next to base color, and change the color to a bright red. The material color of all three spheres changes because all three models share a common linked material.

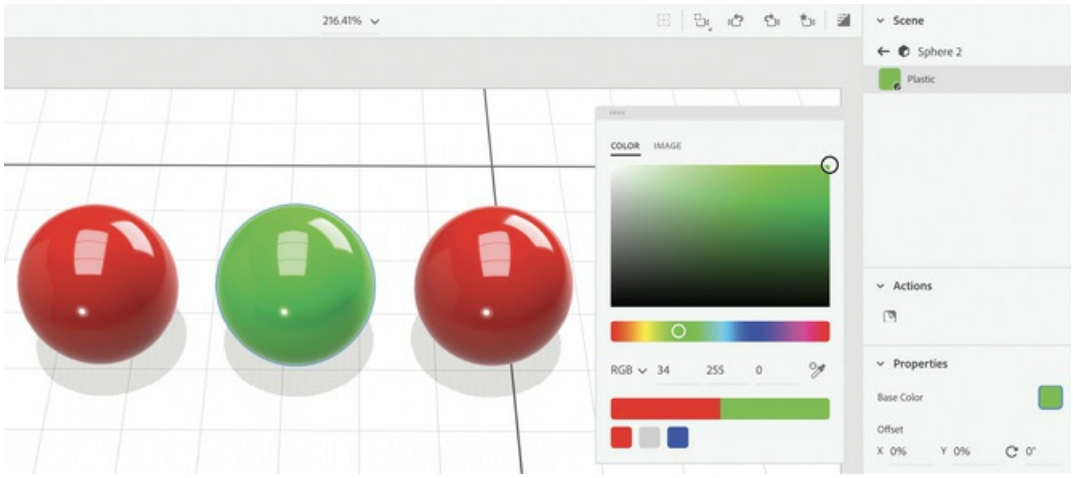


Break a link

When you no longer want the material that is applied to several models to be linked, you can break the link, allowing you to individually modify the material applied to the model.

1. Click the back arrow at the top of the Scene panel to return to the model list.
2. Hover over the Sphere 2 model, and click the right arrow icon to reveal the material applied to the sphere.
3. Click the Break Link to Material icon in the Actions panel. The icon will disappear from the Actions panel, indicating that the material is no longer linked to another model.
4. In the Properties panel, click the color swatch next to base color, and change the color to a bright green.

   The material color of only Sphere 2 changes since it contains an independent material that is no longer linked to the other spheres.



Apply materials one at a time

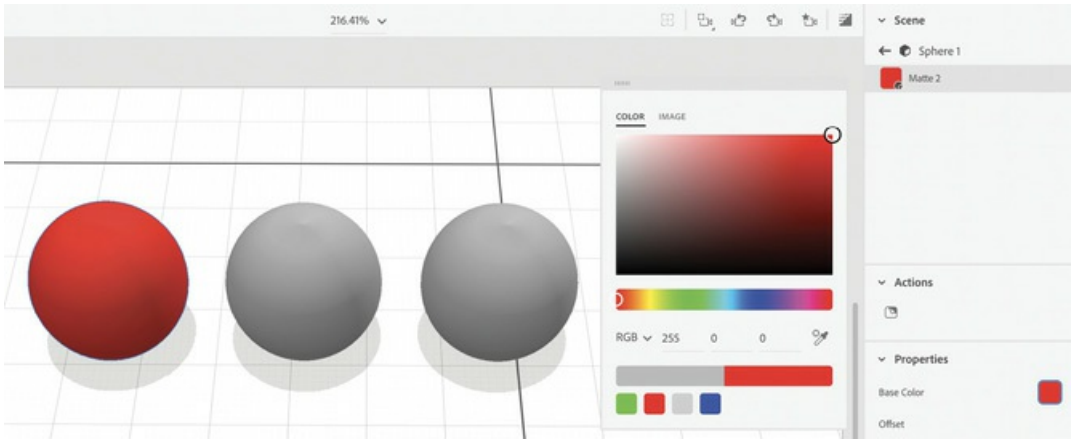
If you apply the same material to several objects one at a time, the result is that the material is not linked between the models. The material applied to each model is a separate "instance" of the material. The properties of the material instance can be changed without affecting the other models.

1. Click the back arrow at the top of the Scene panel to return to the model list.
2. Locate the Matte material in the Content panel, and drag it onto the leftmost sphere model.
3. Drag the Matte material onto the middle sphere model.
4. Drag the Matte material on the rightmost sphere model.
5. Double-click the leftmost sphere to reveal the material applied to the sphere in the Scene panel.

   No Break Link to Material icon is displayed in the Actions panel. This means that the material you have selected is not linked to any other models.

6. In the Properties panel, click the color swatch next to base color, and change the color to a bright red.

   The material color of only Sphere 1 changes, since it contains an independent material that is not linked to the other spheres. When you apply materials independently to objects one at a time, even if you apply the same material to each model, the materials are unlinked by default.

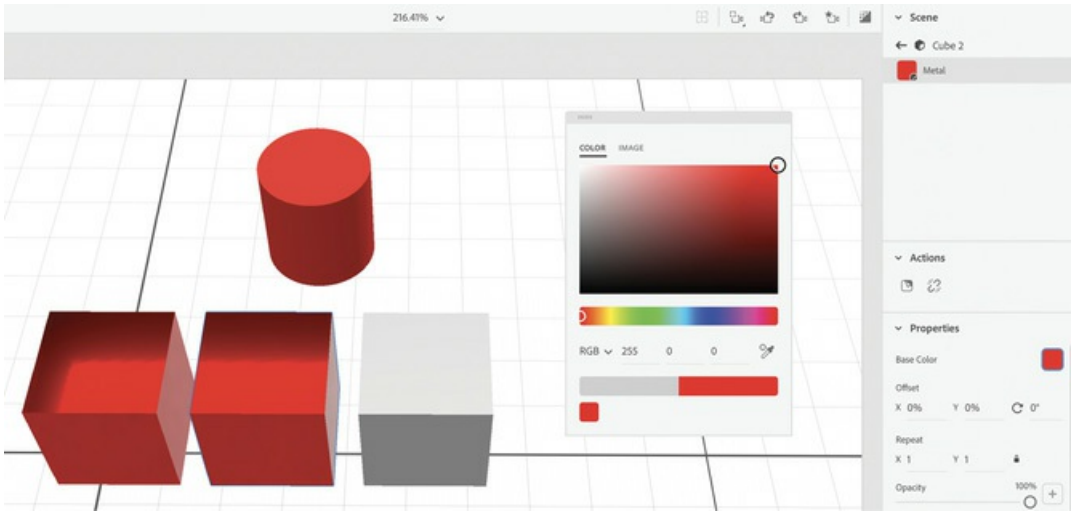


Apply materials with the Sampler tool

If you want to apply a material that is applied to one model to another model, you can do so with the Sampler tool. The result will be a material that is linked between the two models.

1. Click the back arrow at the top of the Scene panel to return to the model list.
2. In the Scene panel, click Cube 1 to select it.
3. Click the Metal material in the Content panel to apply it to the surface of Cube 1.
4. Click the back arrow at the top of the Scene panel to return to the model list.
5. Click Cube 2 in the Scene panel to select it.
6. Select the Sampler tool (keyboard shortcut: I), and click the Cube 1 model (the cube with the metal material applied) on the canvas.
7. The Scene panel shows that the Metal material is applied to the Cube 2 model. Note that the Break Link to Material icon appears in the Actions panel. This is your cue that the metal material used for Cube 1 is linked to Cube 2 also.
8. In the Properties panel, click the color swatch next to base color, and change the color to a bright red.

   The material on both Cube 1 and Cube 2 changes since they are linked. When you use the Sampler tool to sample a material from one model to another, the materials in both models will be linked by default.



Paste vs. Paste as Instance

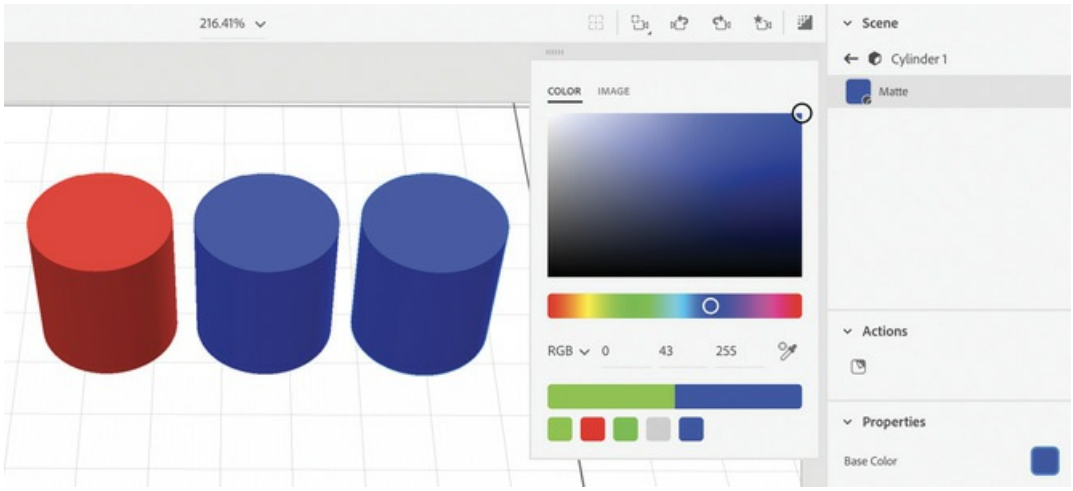
Dimension has two Paste commands in the Edit menu: Paste, and Paste as Instance. After you've copied a model to the clipboard, both of these commands will paste a duplicate of the model. But the two commands differ in how the materials on the duplicates are linked to the original model.

1. Select the Select and Move tool (keyboard shortcut: V).
2. Select the single cylinder model at the top of the scene.
3. Choose Edit > Copy.
4. Choose Edit > Paste.
5. Drag the blue arrow to the right so you can see both cylinders.
6. On the canvas, double-click the duplicate cylinder that you just created to reveal the cylinder material in the Scene panel.
7. In the Properties panel, click the color swatch next to base color, and change the color to a bright green.

   The material on only one of the cylinders changes since they aren't linked. When you copy and paste a model, use the Edit > Duplicate command, or Option/Alt-drag to duplicate a model, the materials of the models aren't linked by default.

8. Select the green cylinder model.
9. Choose Edit > Copy.
10. Choose Edit > Paste as Instance.
11. Drag the blue arrow to the right so you can see both green cylinders.
12. On the canvas, double-click the duplicate green cylinder that you just created to reveal the cylinder material in the Scene panel.
13. In the Properties panel, click the color swatch next to base color, and change the color to blue.

    The material on both cylinders changes since they are linked. When you use the Paste as Instance command, the materials in both models are linked by default.



Linking summary

The subtleties of how Dimension links materials between objects can be boiled down to the following statements:

- When you apply a material to multiple objects with a single click, the material is linked between the objects by default.
- When you apply materials independently to objects one at a time, even if you apply the same material, the materials are unlinked by default.
- When you use the Sampler tool to sample a material from one model to another, the materials in both models are linked by default.
- When you copy and paste, use the Edit > Duplicate command, or Option/Alt-drag to duplicate a model, the materials of the models aren't linked. But when you copy a model and use the Paste as Instance command, the materials in both models are linked by default.

Review questions

1 Why do some materials appear "speckled" on the canvas?

2 What is one way to speed up the render preview?

3 What tool do you use to apply multiple materials to a single model?

4 When using the Magic Wand tool, how do you add to a selection?

5 What tool would you use to sample a material from one model and apply it to another?

6 If you drag the same material onto five objects, one object at a time, will the same material be linked to all five objects?

Review answers

1 Some materials, especially glass, take a long time to render, so the preview on the canvas is a rough approximation of the final result and will appear speckled.

2 You can greatly speed up the render preview by hiding models you don't need to preview. To

hide a model, click the eyeball icon next to a model in the Scene panel.

3 The Magic Wand tool allows you to “subselect” individual surfaces of a model and apply a different material to each surface.

4 After you’ve clicked with the Magic Wand tool to select a surface on a model, hold down the Shift key and click another surface to extend the selection.

5 You can use the Sampler tool (keyboard shortcut: I) to sample a material from one model and quickly apply it to another model.

6 No, if you drag the same material onto five objects, one object at a time, each object will have an independent instance of the material and not be linked to any other models. If you select all five models and apply a material to all five models at once, then the same material is linked to all five models.

7 Creating Materials with Adobe Capture CC

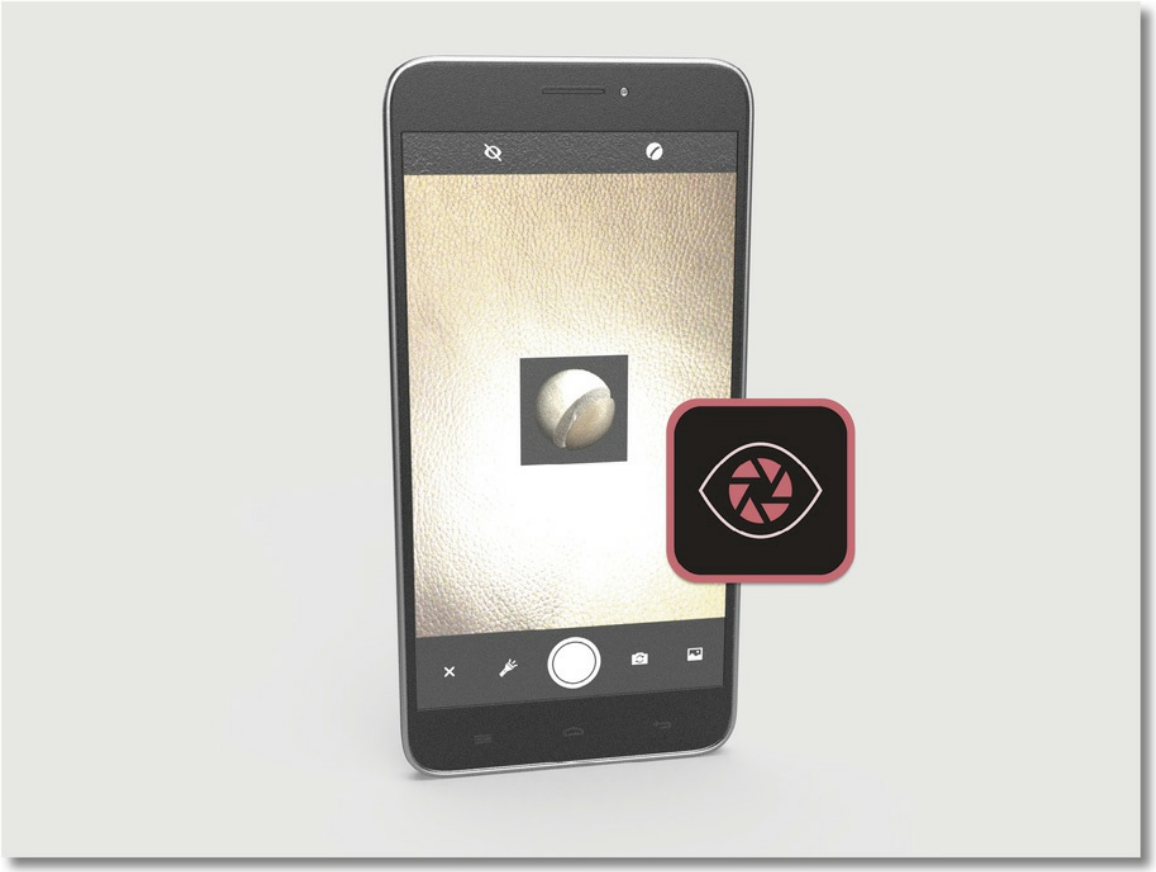
Lesson overview

In this lesson, you'll use the Adobe Capture CC mobile app and learn the following:

- How to use Capture to create unique materials to use in Adobe Dimension
- How to edit materials in Adobe Capture to fit your needs
- How to use materials you've created with Capture in Adobe Dimension

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.



The Adobe Capture mobile app is a fun and powerful way to create interesting materials that you can apply to your models in Adobe Dimension.

About Adobe Capture CC

Adobe Capture CC is a mobile app for iOS and Android devices. The purpose of Capture is to enable you to capture inspiration from the world around you and turn that inspiration into type, brushes, patterns, shapes, colors, and—specifically for our purposes in Dimension—materials.

When you are out and about and see a material or texture that you think would work well for a model in Dimension, you can shoot a photo of the texture with your mobile device's camera and, in a few taps of the screen, turn it into a material ready to apply to a model in Dimension.

You can learn more about Adobe Capture at www.adobe.com/products/capture.html.

Download and install Adobe Capture on your mobile device

To download and install Adobe Capture CC on your iPhone or iPad, go to www.adobe.com/go/getcapture_ios.

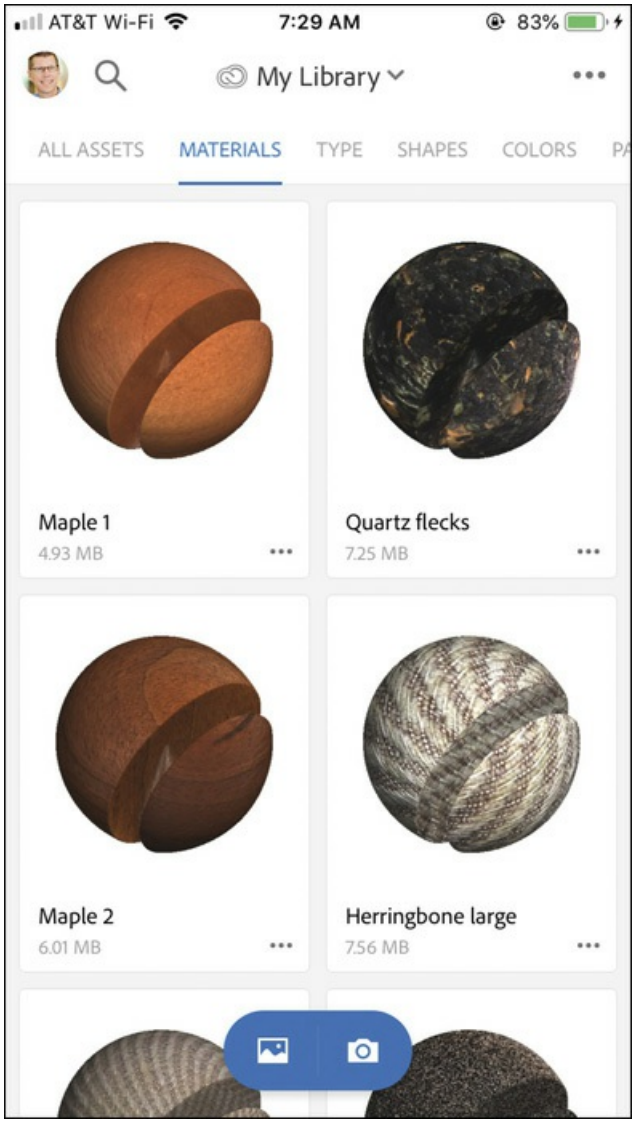
To download and install Adobe Capture CC on your Android mobile device, visit www.adobe.com/go/getcapture_android.

Capturing a material

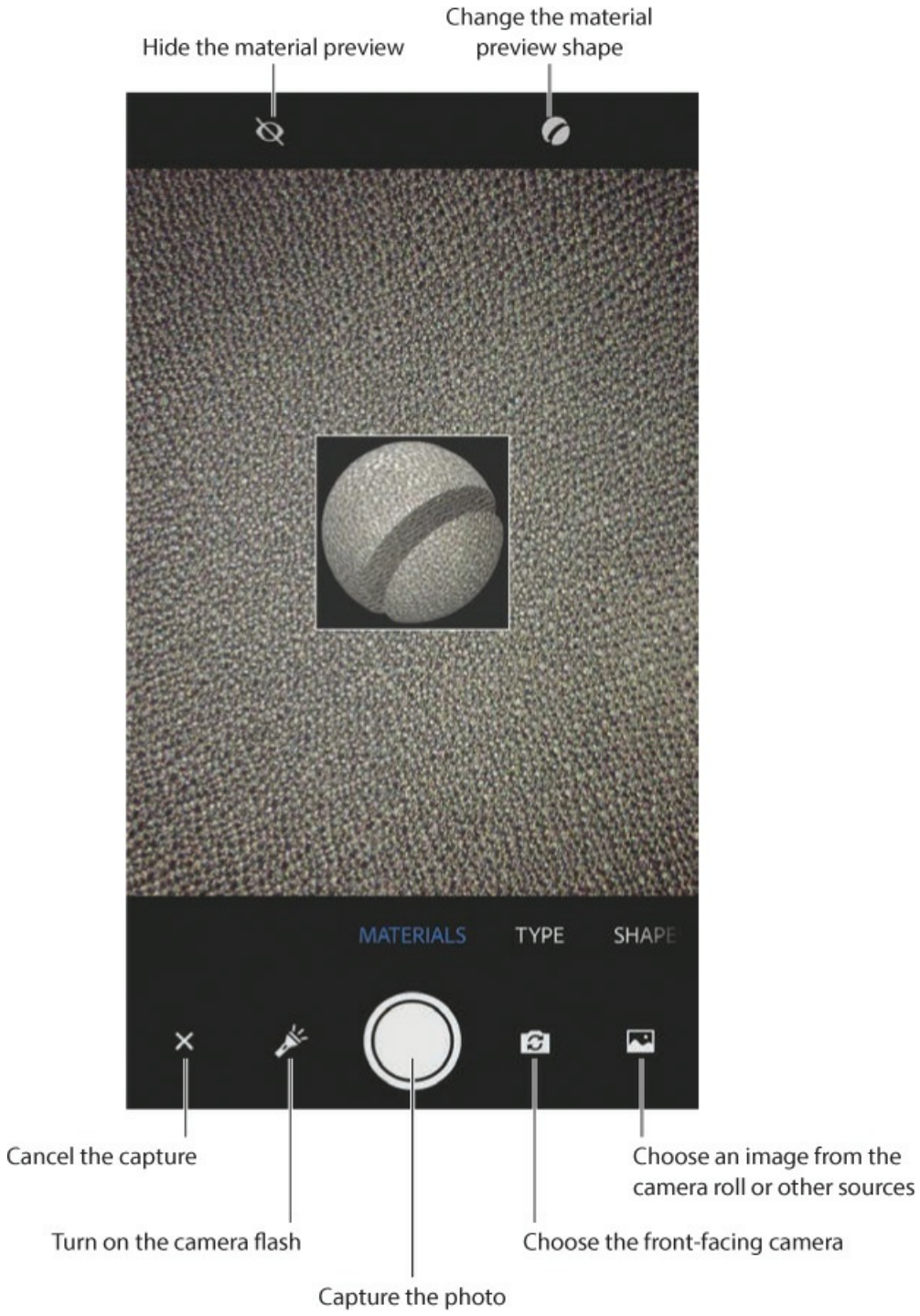
You can capture a material from a photo that you take with your device, from a stock photo, or from any asset you've saved in Creative Cloud. Here's how.

1. Launch Adobe Capture on your mobile device. If prompted, sign in with your Adobe ID.

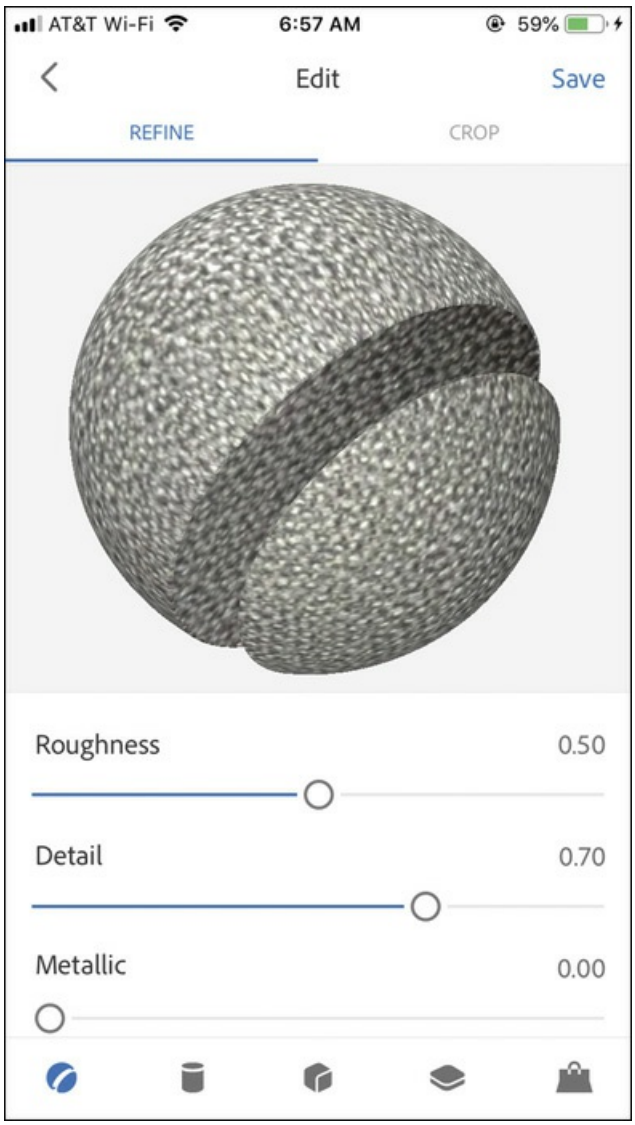
2. (If the Capture preferences on your device are set so that Capture opens directly into camera mode, tap the X in the lower-left corner of the screen to close the camera.) At the top of the screen, choose a CC Library from the dropdown list. If you're unfamiliar with CC Libraries, just choose My Library.
3. Tap Materials at the top of the screen.



4. Tap the Camera icon .
5. Point the camera at an interesting texture or pattern, and then tap the icon to take a photo.

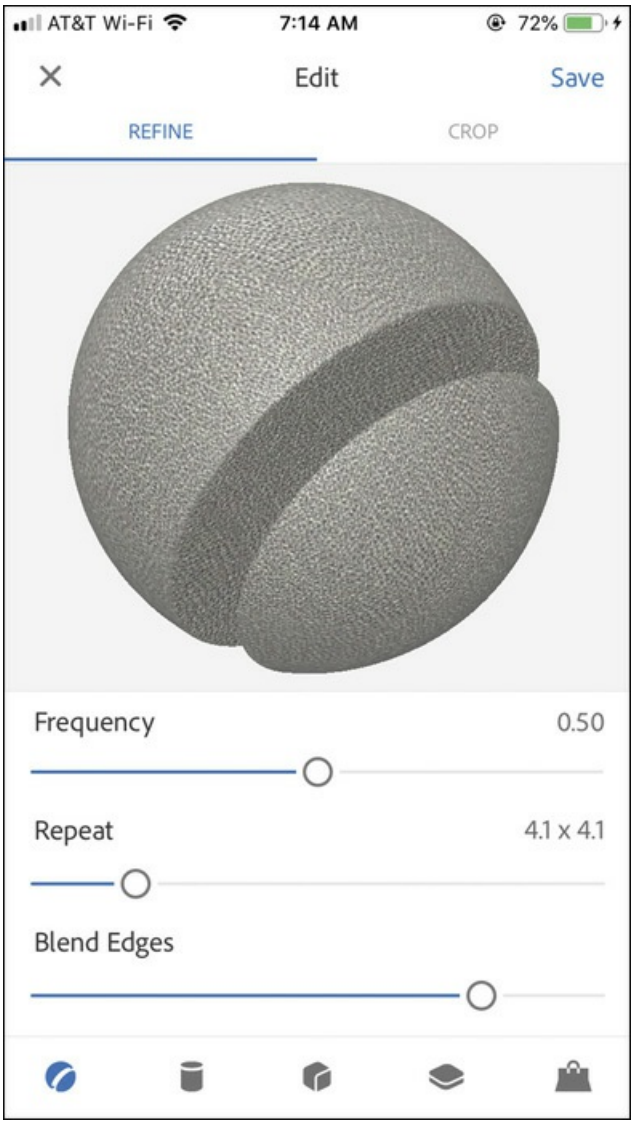


6. Make adjustments to the material attributes, if desired.

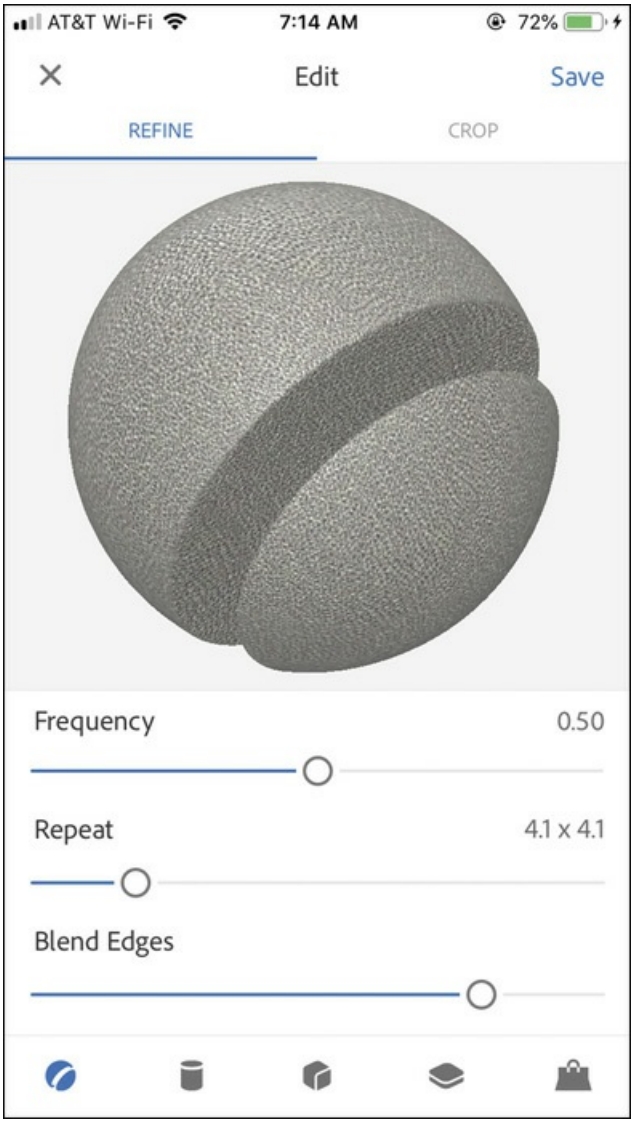


- Roughness controls how shiny the surface is. A higher value makes the surface rougher, allowing less shine on the surface.
- Detail controls the details in the surface. Increasing the Detail value adds detail to the surface with a sharpening effect.
- Metallic controls the degree of metallic luster on the surface. A higher value makes the surface appear more metallic.
- Increasing the Intensity setting makes the surface texture higher, and decreasing the Intensity setting makes it lower. This value affects the “normal map” bitmap image that appears in the Properties panel in Dimension when the material is applied to a model.
- Frequency determines the light and shadow. Adjusting the Frequency value adjusts the sharpening effect to the normal map, changing the appearance of light and shadow on the surface.
- Repeat changes the “tile” size of the material. A larger value results in a smaller image

that will repeat more frequently when used on a large model. A smaller value will repeat less frequently.



- If you increase the Blend Edges value, Capture will attempt to blend the edges between each tile when a material repeats across a model's surface.



7. Tap Save to save the material. The material is added to the CC Library you chose in step 2 and is ready to use in Dimension.

Tip

If you want to change the name of your material, tap the More icon ••• on the material thumbnails screen and tap Rename.

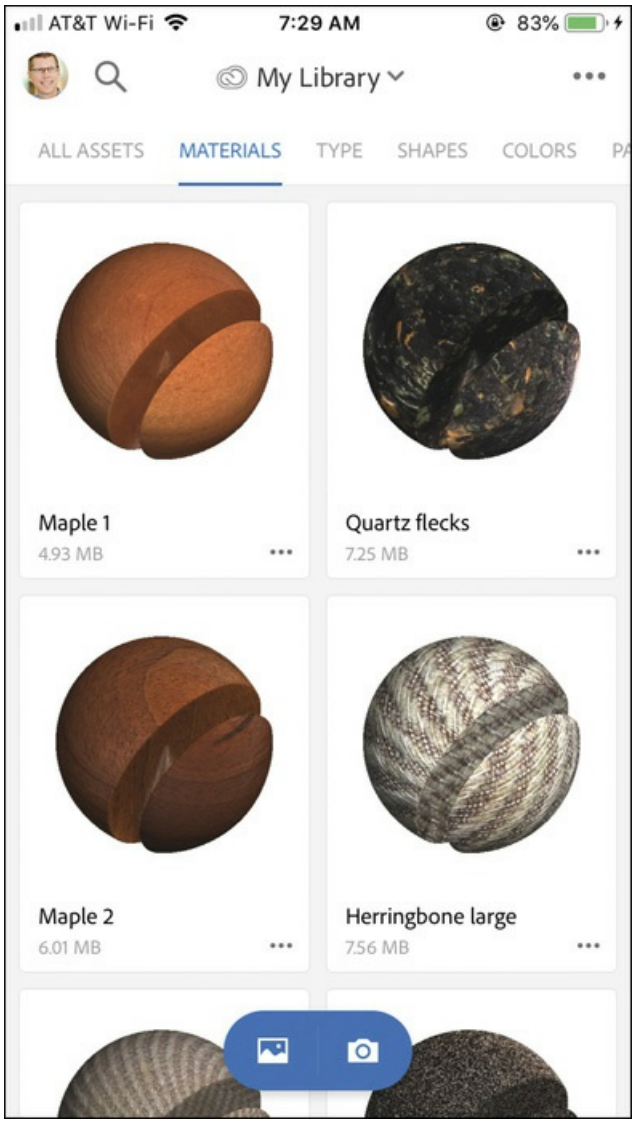
Capture a material from a photo

In addition to capturing materials from your mobile device's camera, you can also capture materials from a photo that is in your device's camera roll, that you previously saved in your Creative Cloud storage, that you've brought into Lightroom, that is from Adobe

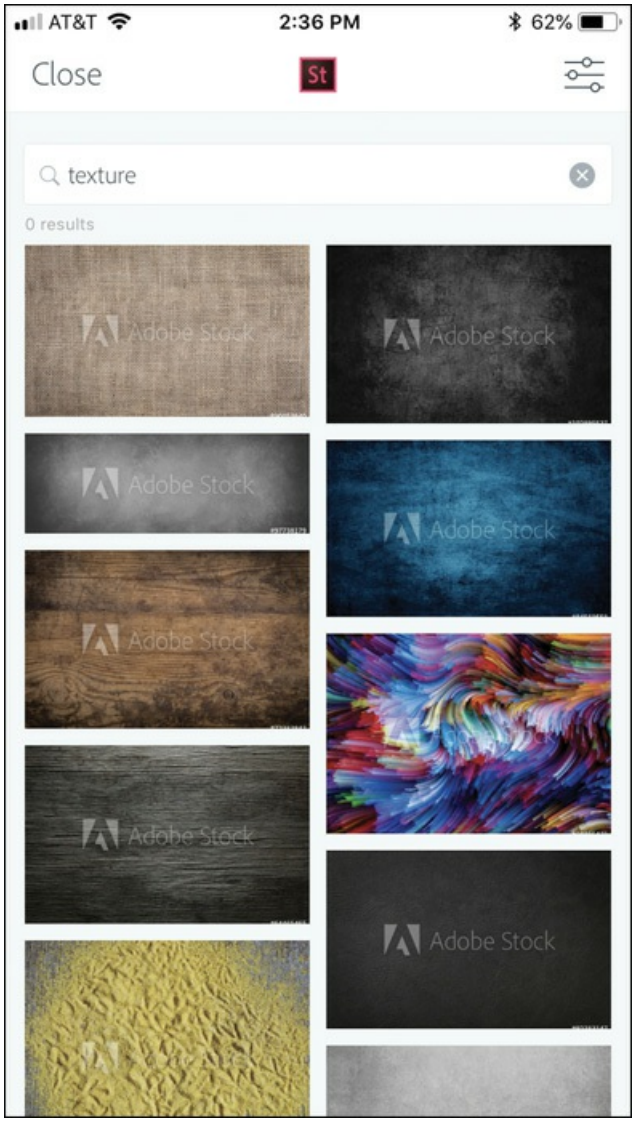
Stock, or that is from any other source you have access to on your device, such as Dropbox or Google Drive.

1. Launch Adobe Capture on your mobile device.

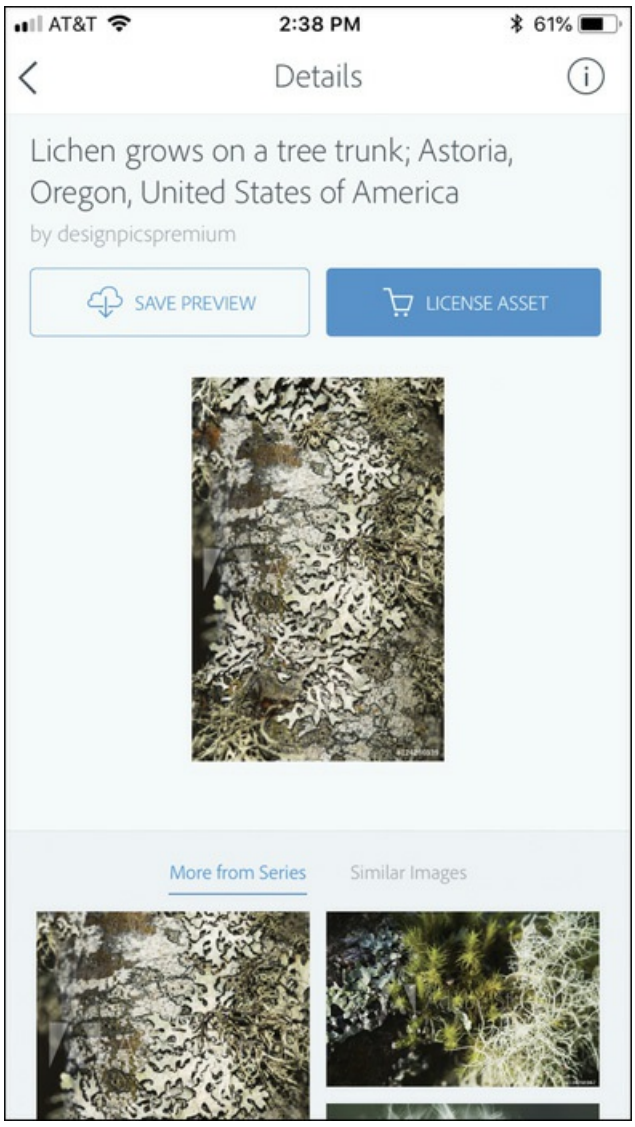
2. If the Capture preferences on your device are set so that Capture opens directly into camera mode, tap the X in the lower-left corner of the screen to close the camera.
3. At the top of the screen, choose a CC Library from the dropdown list. If you're unfamiliar with CC Libraries, just choose My Library.
4. Tap Materials at the top of the screen.



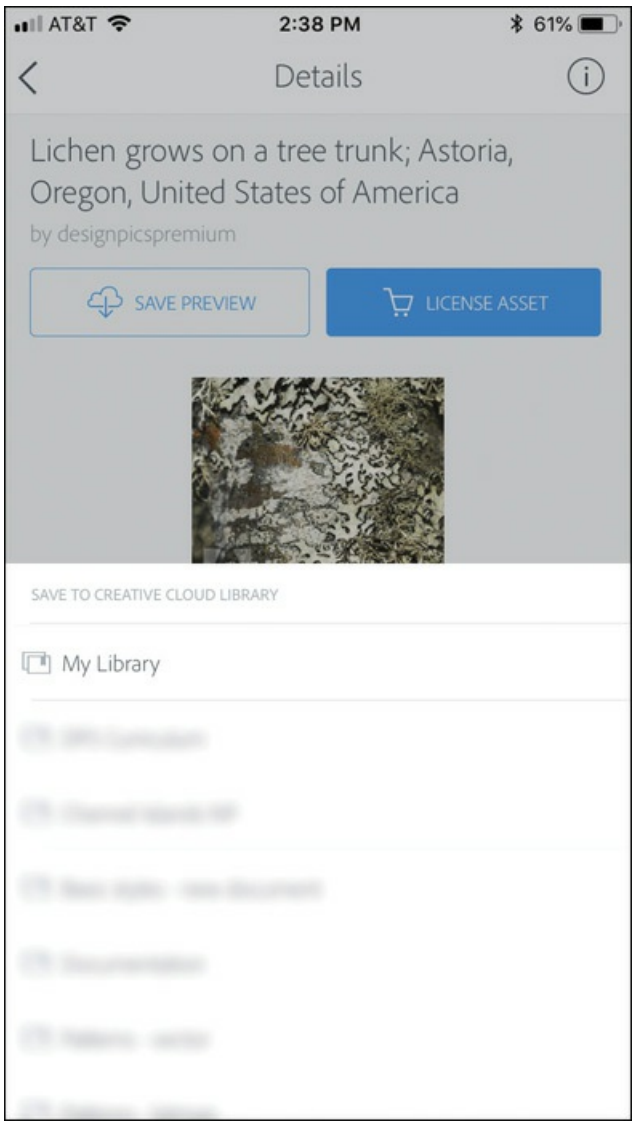
5. Tap the image icon .
6. Tap Stock from the pop-up list to access Adobe Stock.
7. In the search field, type **texture** and then tap Search. This will reveal hundreds of texture images.



8. Tap a texture that you like.
9. Tap either Save Preview (to download a watermarked comp image) or License Asset (to purchase the image).



10. Choose a CC Library to save the stock image to.



11. Tap the icon to bring the image into Adobe Capture.
12. Make adjustments to the material attributes, if desired.
13. Tap Save to save the material to your CC Library.

Using a material from Capture in Dimension

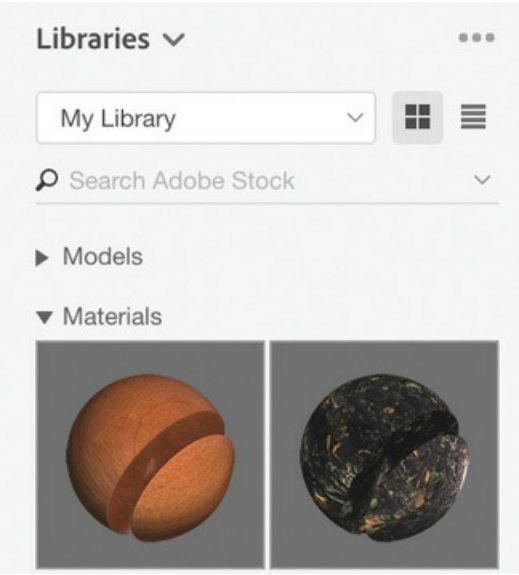
Using a material that was created in Adobe Capture is just like using a material from any other source.

1. Launch Adobe Dimension.
2. Choose File > Open.
3. Select the file named Lesson_07_begin.dn, which is in the Lessons > Lesson07 folder that you copied onto your hard disk, and then click Open.

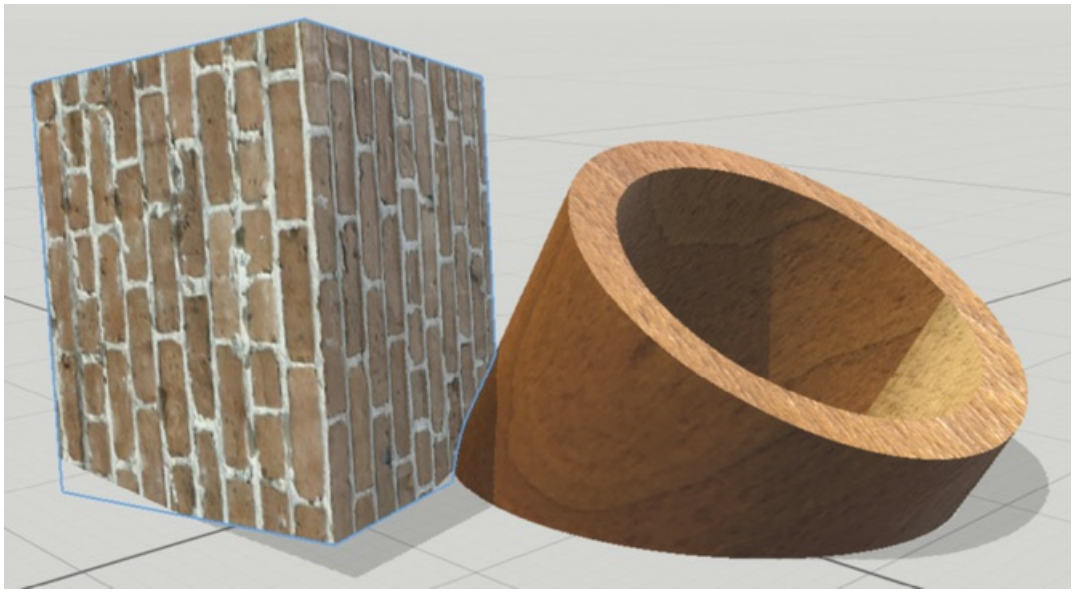
   You'll see that a brick material has been applied to the prism on the left, and a wood

material has been applied to the pipe on the right. Both of these materials were generated by Adobe Capture. You can either work through the rest of this lesson using these materials or follow steps 4–7 to apply the materials that you created with Capture.

4. Click the Add and Import Content icon at the top of the Tools panel, and choose CC Libraries.
5. In the dropdown menu at the top of the Content panel, choose the library that you saved the captured materials into.



6. Drag one of the materials you created with Adobe Capture onto the Prism model on the canvas. Or, if you prefer, choose File > Import > Place Material on Selection and choose the Material_14.mdl file in the Bricks folder to use the Brick material I created with Capture.
7. Drag another one of the materials you created with Adobe Capture onto the Pipe model on the canvas. Or, if you prefer, choose File > Import > Place Material on Selection and choose the Material_6.mdl file in the Maple folder to use the Maple wood material I created with Capture.



Modifying material properties

You may need to adjust several things after applying a material generated by Capture to a model in Dimension. The materials created with Capture are photographic bitmaps of a specific width and height, along with another bitmap (stored in the Normals property) that controls the simulated texture of the bitmap. Since the material is a bitmap of a certain height and width, it might not be the correct size or orientation relative to your model when you first apply it. Here are some ways to rectify these problems.

Material not aligned with model

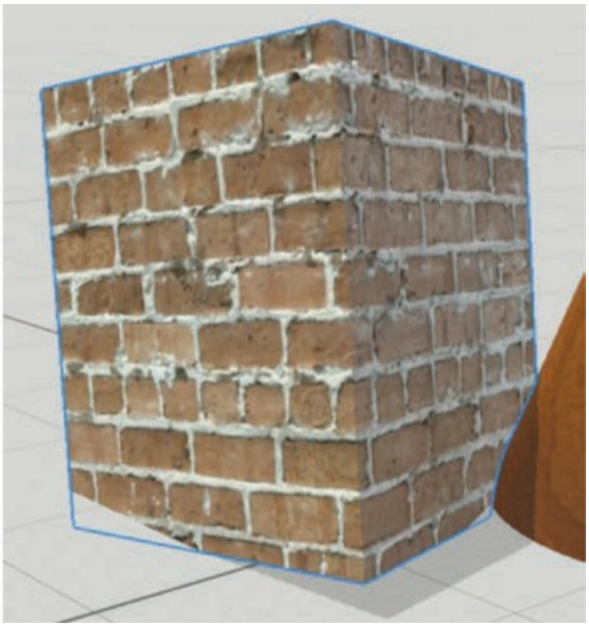
I've applied a brick material to the Prism model. But I don't want the bricks running vertically.

Tip

Since you probably don't know the exact rotation value that you will need, you may find it helpful to hover over the Rotation icon in the Properties panel and drag to the right or left to adjust the numeric rotation value.

---

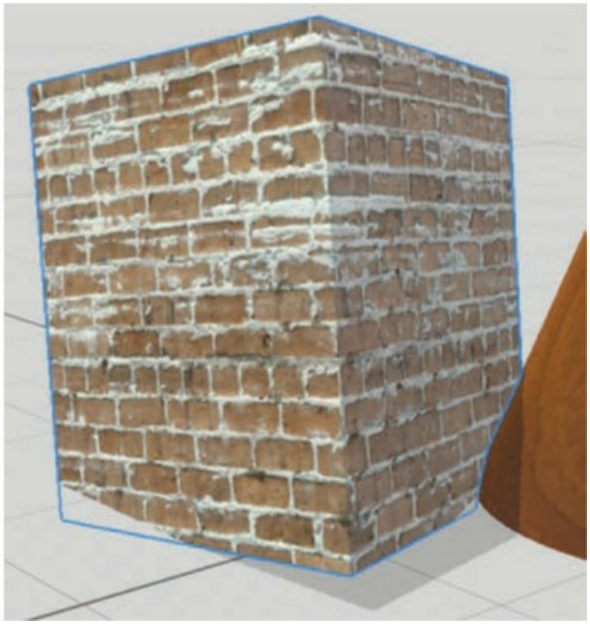
1. Hover over the Prism model, and click the right arrow icon to reveal the material applied to the prism.
2. In the Properties panel, change the Offset, Rotation, or Repeat values as desired. In my case, I entered 90° to rotate the bricks to align with the prism.



Material too small or too large compared to the model

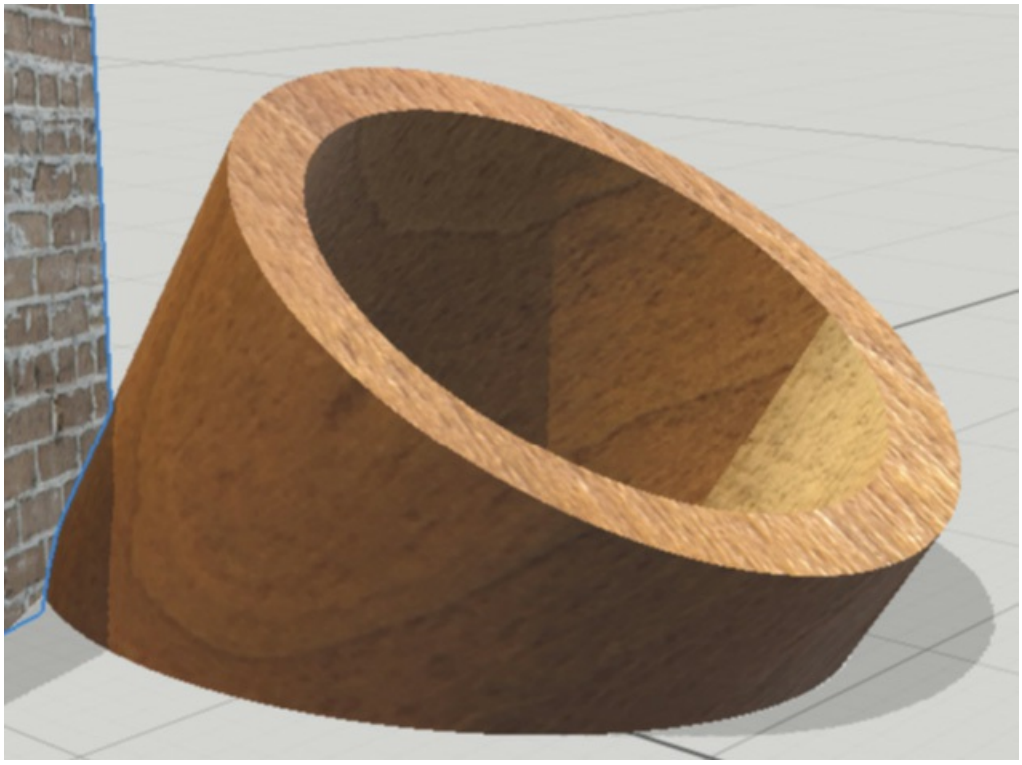
When you create a material with Capture, you won't have a sense of how large or small the pattern or texture will be relative to the model you will apply it to. You can scale the material up or down in Dimension.

To scale the material relative to the model, in the Properties panel, change the Repeat X and Y values as desired. Entering a larger value for Repeat causes the bitmap to shrink in size and to repeat multiple times, if necessary, to cover the entire model surface. Entering a smaller value enlarges the bitmap so that any visible texture in the material becomes larger relative to the model. In my example, I entered a repeat of 1.5 to make the bricks a bit smaller.



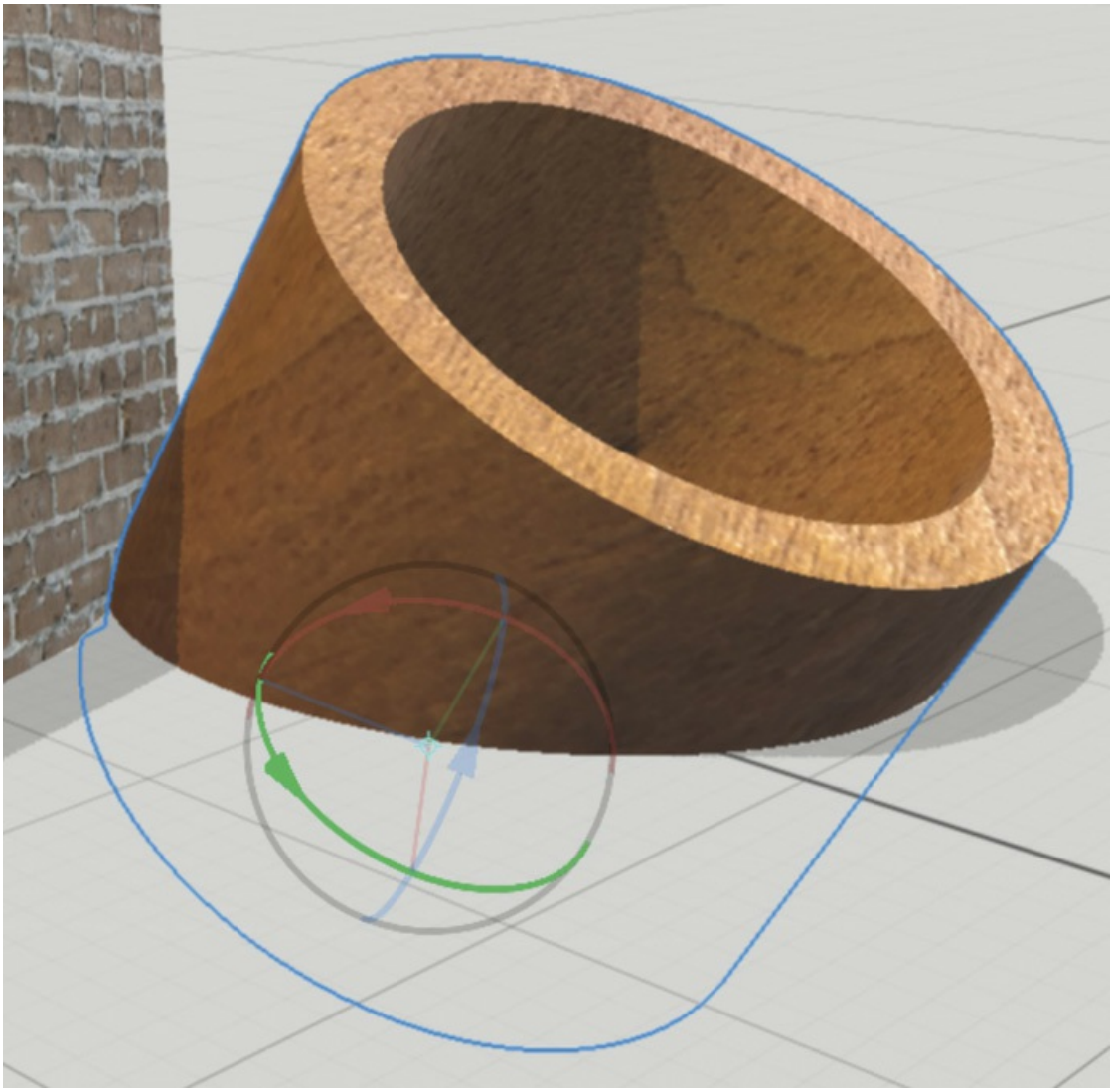
Seam visible in material when applied to the model

If a material is not large enough in width or height to cover the entire surface of the model, it will repeat, or “tile,” across the surface of the model. When this happens, a seam will usually be visible where the material repeats. In my example, this is quite visible on the Maple material that I applied to the pipe.



One way to fix this would be to make the material larger by entering a smaller value for the Repeat, as described earlier. But in this case, I don’t like the way the resulting material looks when enlarged. Another way to fix this is to select the pipe with the Select and Rotate tool and rotate the model so that the seam is hidden.

To achieve a pleasing result, you may also need to change the X and Y Offset values in the Properties panel to change where the tiles begin and end relative to the model.

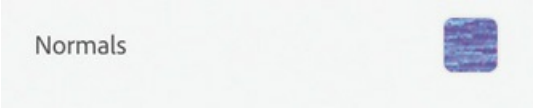


Too much (or too little) surface detail in the material

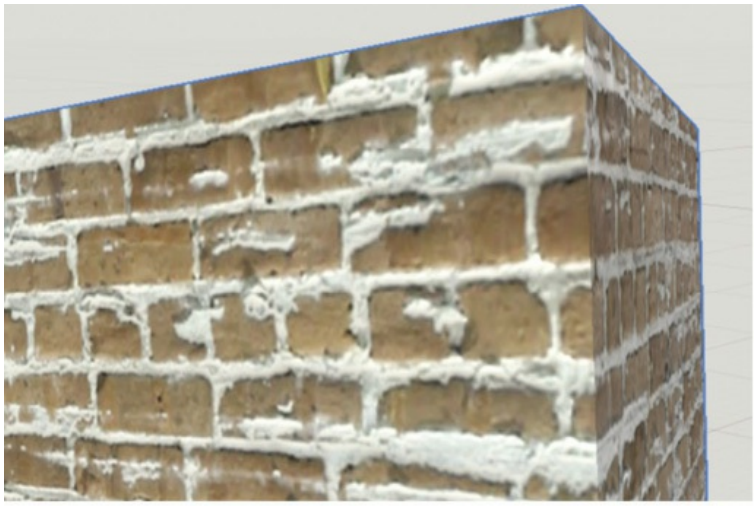
Materials generated by Adobe Capture contain a “normal map.” This is a special bitmap file that controls how the surface affects light and shadows. Light areas in the bitmap will appear slightly raised on the surface, and darker areas will appear slightly depressed. This effect is most noticeable when sunlight hits the surface at certain angles.

In my example, when sunlight hits the brick material, the white mortar appears to ooze out between the bricks.

1. Hover over the Prism model, and click the right arrow icon to reveal the material applied to the prism.
2. In the Properties panel, click the image swatch next to Normals. This reveals the bitmap that is the normal map.



3. Double-click the image to edit it in Photoshop. Adding contrast will make the surface texture more pronounced, and removing contrast will make it less pronounced. Inverting the lights and darks will reverse the texture effect. Deleting the image altogether will remove the texture effect entirely.



Detail of the Brick material with the original normal map

Edited and inverted normal map

No normal map

Material too flat or too shiny

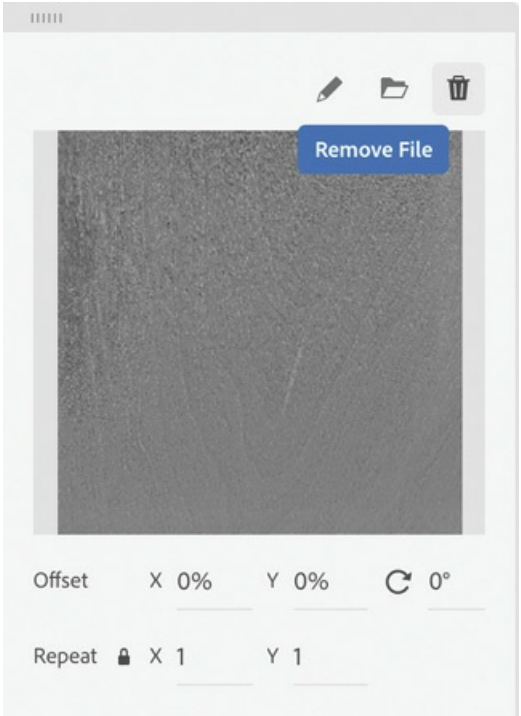
When you create a material with Adobe Capture, you have some control over how metallic the material is. But at first glance, it might appear that you can't edit how metallic a material from Capture is after you've applied it to a model. But if you know a little trick, you can.

1. Hover over the Pipe model, and click the right arrow icon to reveal the material applied to the prism.

   In the Properties panel, you'll see that the sliders for Roughness and Metallic are grayed out, which indicates that you can't change them. But here's the trick.

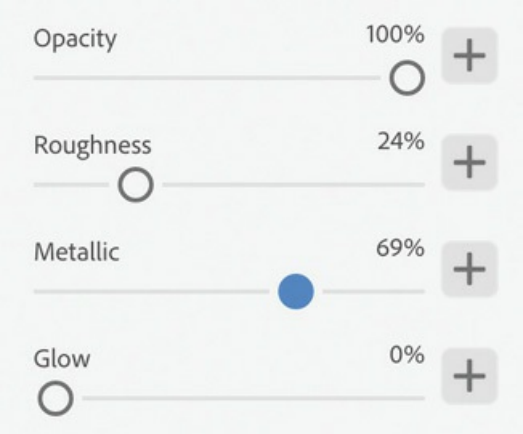
2. Click the properties swatch next to Roughness.

3. Click the trash icon to remove the bitmap that came from Capture. Now you can adjust the Roughness slider.



4. Click the properties swatch next to Metallic.

5. Click the trash icon to remove the bitmap that came from Capture. Now you can adjust the Metallic slider.



Now you have full control over how smooth and shiny the surface of the model is.

Review questions

1 When editing a material in Adobe Capture, what does the Metallic slider do?

2 In addition to creating materials from your mobile device camera, what other sources can you use to create materials with Capture?

3 What should you do if a material created with Capture isn't the right size when applied to a model?

4 Why might you see a "seam" displayed on a model after a material has been applied?

Review answers

1 Adjusting the Metallic value controls the degree of metallic luster (shininess) on the surface of the material.

2 You can create a material with Capture from any image that has been saved to your device's camera roll, Creative Cloud storage, Dropbox, or Google Drive. Capture can also access images in Adobe Lightroom and images in Adobe Stock.

3 To change the size and position of a material that is applied to a model, adjust the Offset, Rotation, or Repeat values as desired in the Properties panel.

4 A seam in the material may be visible if the bitmap image used to create the material isn't large enough to cover the entire model surface. To fix this, you can use the Offset, Rotation, or Repeat values in the Properties panel, or reposition the object to hide the seam.

8 Selecting Objects and Surfaces

Lesson overview

In this lesson, you'll explore how to select objects and surfaces on the canvas and learn the following:

- Two different ways to use the Select and Move, Select and Scale, and Select and Rotate tools to select objects on the canvas
- How to use tool options to modify the behavior of the Selection tools
- How to restrict your selection to only certain models within a model group
- How to precisely select specific surfaces of a model

This lesson will take about 30 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.

In order to make quick and accurate selections of the models in your scene, it is important to understand the options provided by the Select and Move, Select and Scale, and Select and Rotate tools.

Using the Selection tools to select objects

When you needed to select a model in previous lessons, most of the time you did so by clicking the name of the model or the model group in the Scene panel. I am in the habit of making most of my selections this way, as this method has three distinct advantages. First, it is very precise. When you use this selection method, you will end up selecting the model or models you want, and nothing extra. Second, this method makes you focus on the Scene panel as you work, which has the added benefit of making you aware of how your models are grouped, which models are locked, and which models are hidden. It is a best practice to frequently refer to the Scene panel as you work on a complex project. Third, you are able to select models and groups via the Scene panel regardless of which tool you have selected at the moment. You can select an object while the Orbit tool is selected, for example.

But sometimes it's quicker or more convenient to select models and groups directly on the canvas. You can do this with the three selection tools: the Select and Move tool, the Select and Scale tool, and the Select and Rotate tool.

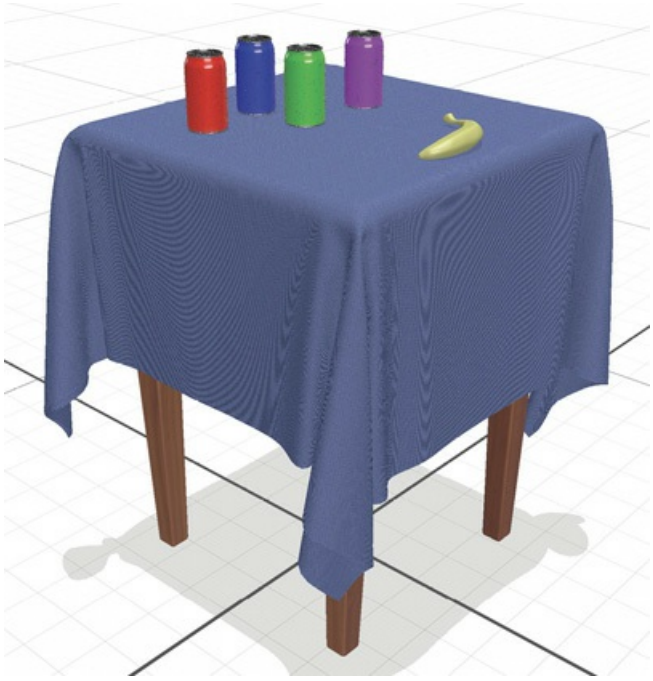
Select multiple objects by clicking

Let's look closely at the various options for selecting objects on the canvas with the Select and Move tool.

1. Choose File > Open.
2. Select the file named Lesson_08_begin.dn, which is in the Lessons > Lesson08 folder that

you copied onto your hard disk, and then click Open.

If you look in the Scene panel, you'll see that this scene consists of five model groups (four cans and a table) as well as a model of a banana.



3. To zoom in on the cans, click the Camera Bookmarks icon and click the "Four cans" bookmark.
4. Select the Select and Move tool (keyboard shortcut: V).
5. Click the red can to select it. You can tell that it is selected because the move widget appears on the can, and the "Red can" model group is highlighted in the Scene panel.

6. Right-click the Select and Move tool in the Tools panel, and click the Add to Selection icon

under Selection Mode.

7. Click a second can, and you'll see that it is added to the selection. You'll see the move widget move to a common center between the two models, and you'll see both models highlighted in the Scene panel.
8. Click a third can and then a fourth can so that all the cans are selected.
9. Right-click the Select and Move tool in the Tools panel, and click the Subtract from Selection icon .

Tip

Instead of right-clicking a selection tool and choosing the Add to Selection or Subtract from Selection icons, it is much more convenient to add to a selection by holding down the Shift key and clicking a model that isn't yet selected; subtract from a selection by holding down the Shift key and clicking a model that is selected.

Note

Any change you make to the options for one of the selection tools will also apply immediately to the other selection tools. In other words, changing the options for the Select and Move tool will also change the options for the Select and Rotate and Select and Scale tools.

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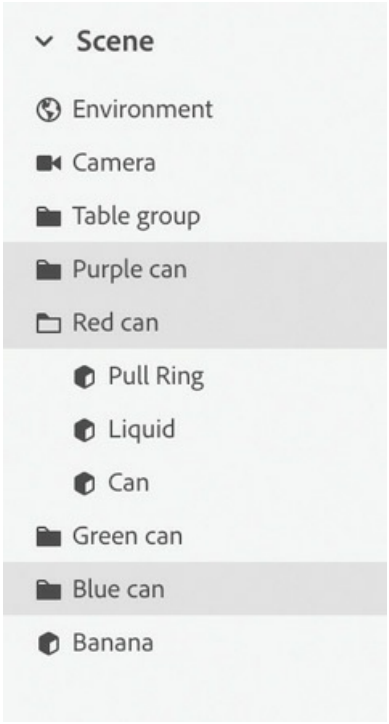
10. Click the green can to deselect it. You should now have three cans selected, and you can verify this in the Scene panel.



11. Drag the blue arrow to the left a bit to move all three selected cans. Note that there is no need to group the cans just to move, rotate, or scale them. As long as all three are selected, they can all be transformed at once.

Select multiple objects with marquee select

The Add to Selection option is good if you need to surgically select several objects in a crowded scene and need to "skip over" some of the objects while selecting others. But if all your objects are positioned close to each other without other objects in the way, another selection method is very useful.

1. Choose Edit > Deselect All to deselect the cans.
2. Right-click the Select and Move tool in the Tools panel, and click the New Selection icon under Selection Mode.

   This returns the Select and Move tool behavior to "normal" so that it will not add to or subtract from the selection. After using the Add to Selection or Subtract from Selection buttons, it is easy to forget that they are chosen, causing the selection tools not to function as you are expecting!

3. Position the mouse somewhere above and to the left of the four cans, and drag a rectangle down and to the right so that the rectangle touches the tops of the cans but nothing else.

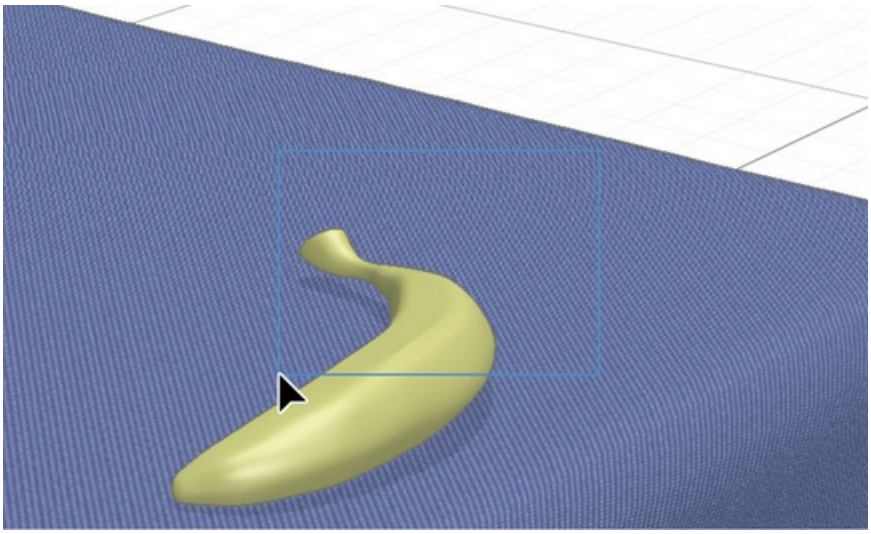
   Anything that is touched by this selection rectangle, or "band select," is selected. You should see in the Scene panel that all four cans are selected. Note that a can didn't have to be entirely inside the band to be selected. The band needs to touch only part of a model or model group to select the entire model or model group.

4. Choose Edit > Deselect All to deselect the cans.
5. To change your view of the scene, click the Camera Bookmarks icon and click Banana.
6. Right-click the Select and Move tool in the Tools panel, and click Partial Marquee Select to turn this option off.

With the Partial Marquee Select option turned off, a model must be entirely surrounded by the selection rectangle to get selected.

7. So that we don't accidentally bump the table while we are working with the banana, hover over the Table group in the Scene panel, and click the light gray lock icon to lock the Table group.
8. Drag a selection rectangle that touches only part of the banana.

The banana is not selected, because the entire model isn't contained within the selection rectangle.

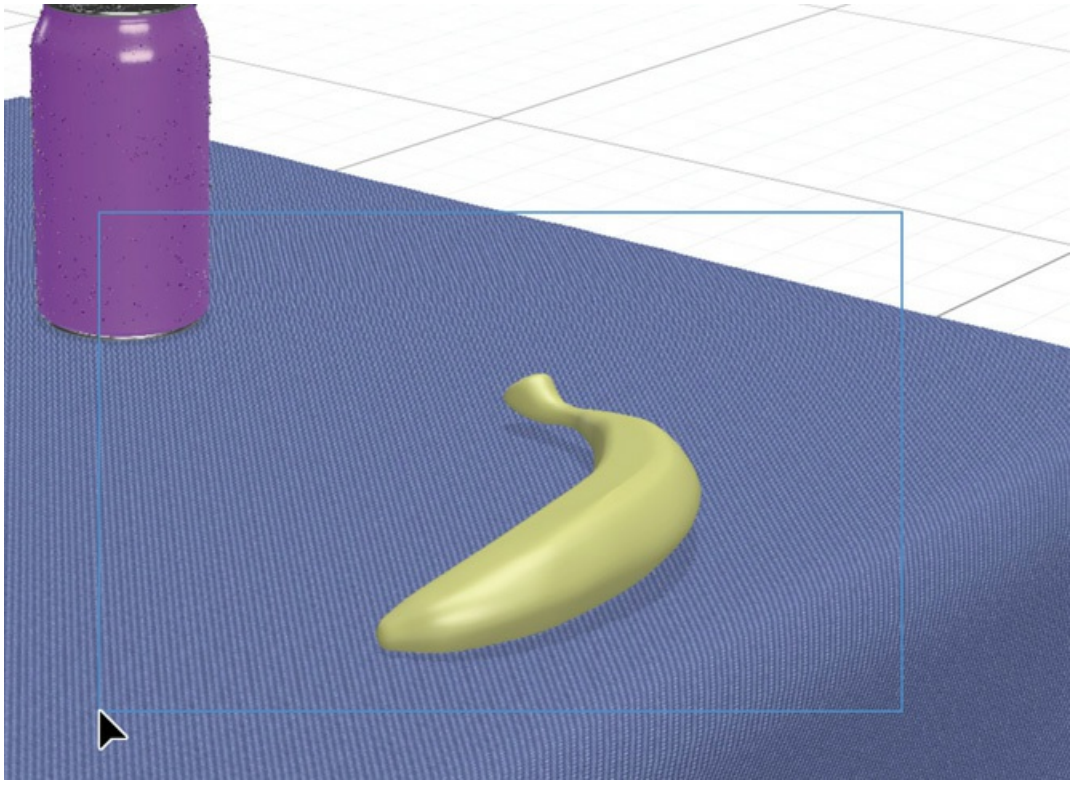


Note

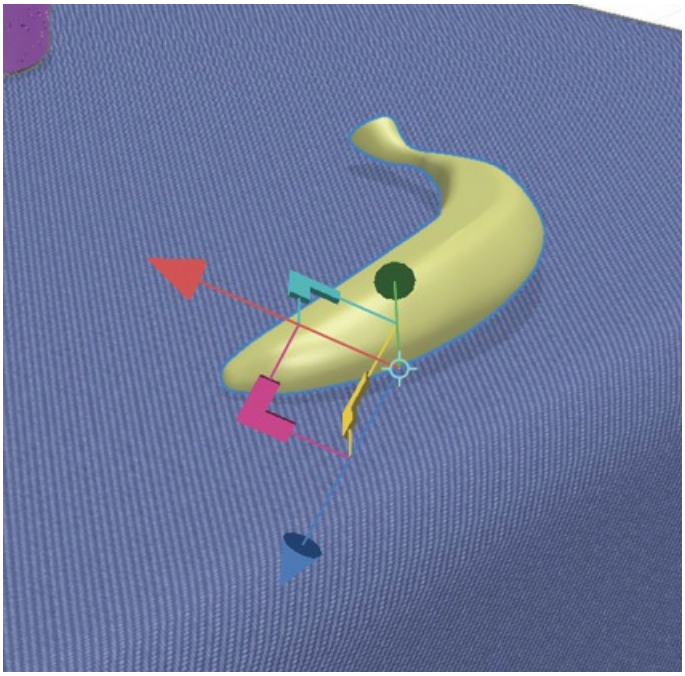
When the Partial Marquee Select option is on, the selection rectangle displays light blue shading. When Partial Marquee Select is off, the selection rectangle is not shaded. This can help you remember whether the option is on or off.

9. Drag a selection rectangle that entirely encloses the banana. It makes no difference if the rectangle touches a part of one of the cans, but the entire banana must be contained in the band.

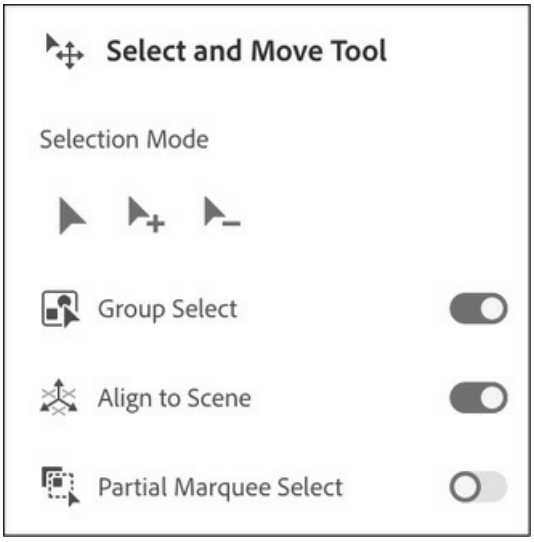
Now the banana is selected.



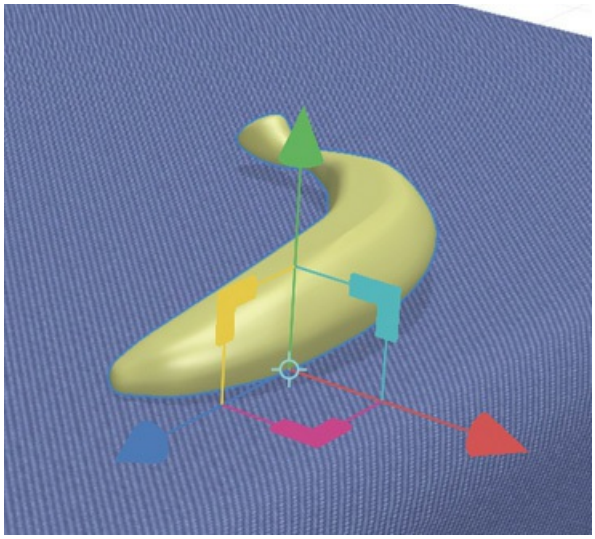
You may notice that the arrows on the move widget aren't aligned with the x-, y-, and z-axes in your scene. This is because the banana was rotated after it was brought into the scene.



10. To make it easier to move the banana around on the tabletop, right-click the Select and Move tool and turn the Align to Scene option on.



Now you should see the arrows on the move widget aligned with the x-, y-, and z-axes.

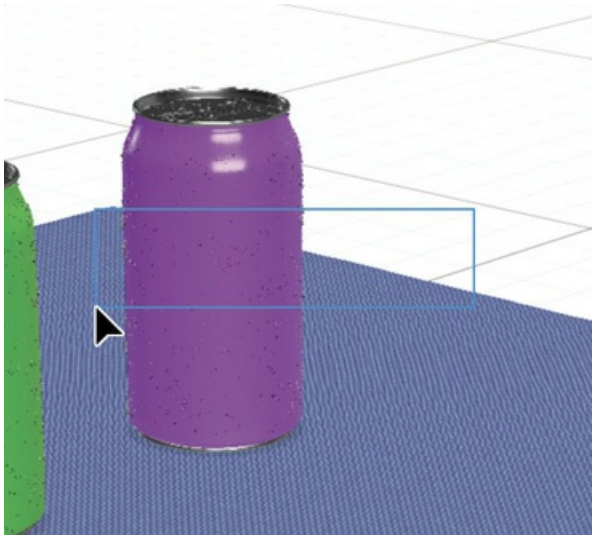


11. Grab the banana (not one of the move widget arrows) and drag it to move it on the tabletop.

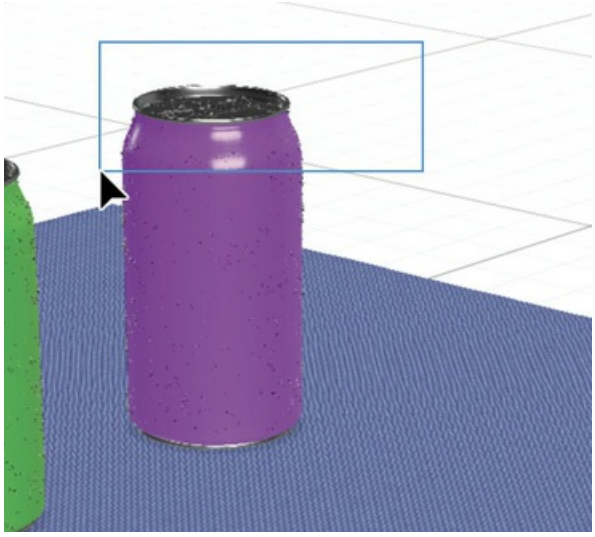
Grabbing the banana directly is the same as grabbing the magenta selection handle on the move widget, restricting movement to the x- and z-axes.

You can choose to set the Partial Marquee Select option on or off. I prefer to leave it on, as this more closely mimics the behavior of the Selection tool in Illustrator and InDesign. However, if you choose to work with the option turned off, you should be aware of how it interacts with a feature called Group Select.

12. With the Partial Marquee Select option still turned off, drag a band select that touches just the middle of one of the cans. When you release the mouse, the can will not be selected. This makes sense, because the entire model wasn't inside your selection rectangle and Partial Marquee Select is turned off.



13. Drag another selection rectangle, but this time enclose the top of one of the cans. When you release the mouse button, you might be surprised to see that the can is selected. But why? The entire can wasn't enclosed in the selection marquee, so why was it selected?



If you look closely at the Scene panel, you'll see that each can is a model group made of three models: a Pull Ring model, a Liquid model, and a Can model. When you dragged your selection marquee around the top of the can, the Pull Ring model was entirely enclosed in the selection rectangle, so that model was selected. And then, by extension, the entire model group was selected since the Group Select option was also turned on in the Select and Move tool options. When the Group Select option is on, selecting a model in a group selects the entire group. You will learn more about the Group Select option in the following section.

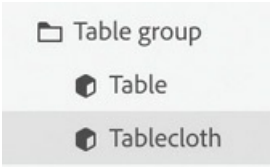
Select part of a group

Normally, when you click a model on the canvas, if that model is part of a model group, the entire model group is selected. This is because by default the Group Select option for the selection tools is turned on. Let's see what happens when you turn this option off.

1. To change your view of the scene, choose Camera > Switch to Home View.
2. With the Select and Move tool, click the blue tablecloth on the canvas. Look in the Scene panel, and you'll see that the entire Table group is selected.
3. To unlock the table group that you had locked earlier, choose Object > Lock/Unlock.
4. Choose Edit > Deselect All to deselect the model group.
5. Right-click the Select and Move tool in the Tools panel, and turn off the Group Select option.

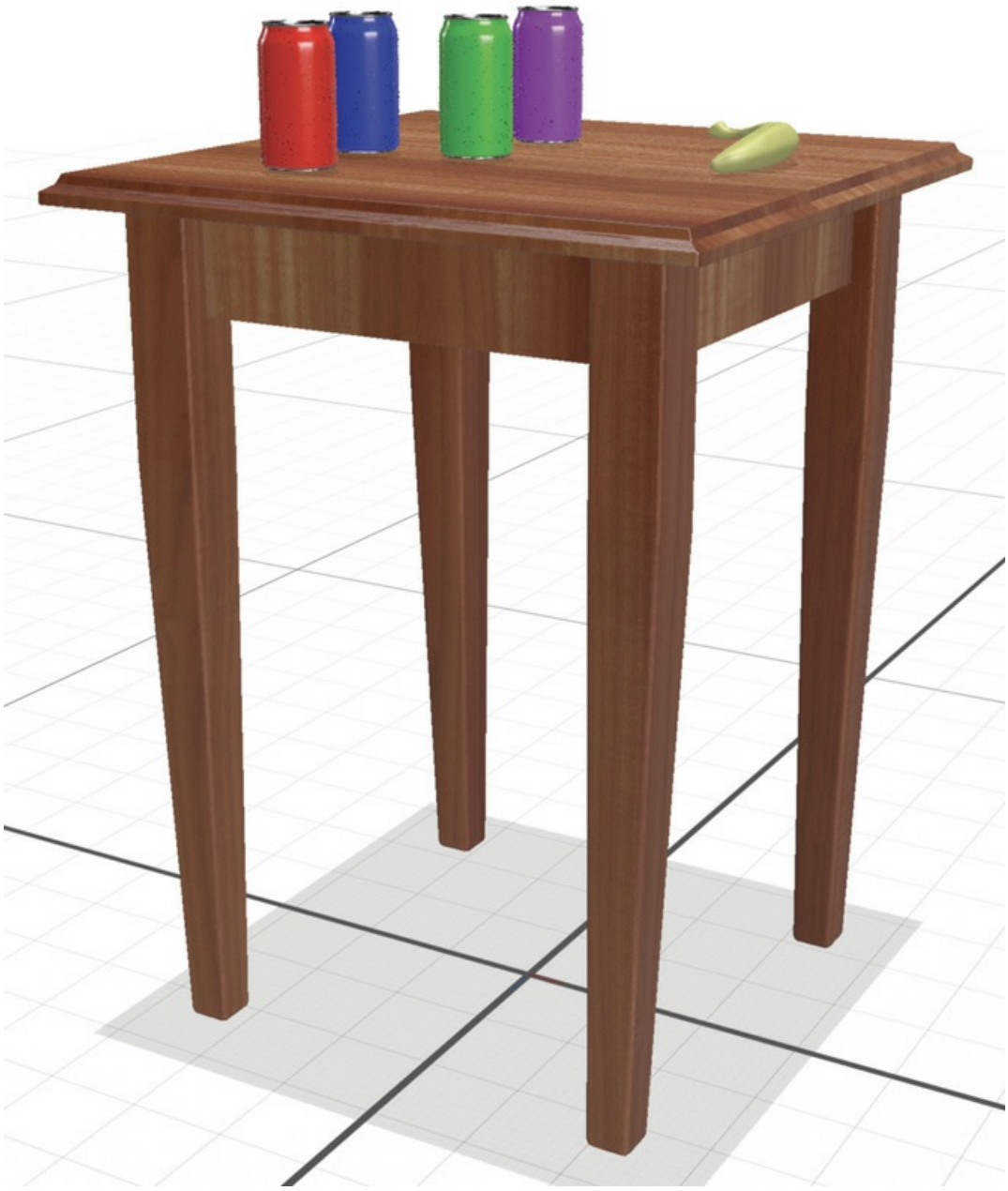
6. Click the blue tablecloth on the canvas.

   Now only the Tablecloth model is selected, as you can see in the Scene panel.



7. Choose Edit > Deselect All to deselect the model group.
8. Right-click the Select and Move tool in the Tools panel, and turn the Group Select option back on.

9. Hold down the Command key (Mac) or Ctrl key (Windows) and click the blue tablecloth on the canvas. Only the Tablecloth model is selected, not the Table group. Holding down the Command/Ctrl key and clicking a model restricts the selection to a single model within a group, the same as turning on the Group Select option.
10. In the Scene panel, hover over the Tablecloth model (in the Table group), and click the eyeball icon to hide the tablecloth.



Tip

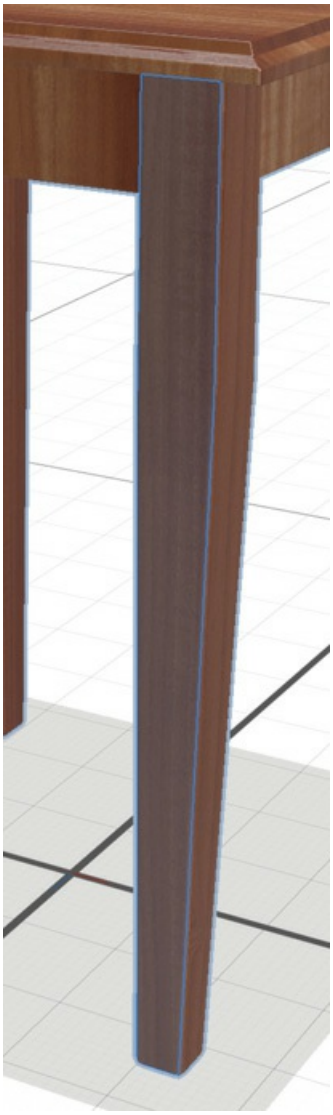
When you have a model in a group selected, pressing the Esc key selects the parent group that the model is in.

Using the Magic Wand tool to select surfaces

While the Select and Move, Select and Scale, and Select and Rotate tools are used to select models and model groups, the Magic Wand tool is used to select individual surfaces on a model. As you'll see, it works a lot like the Magic Wand tool in Adobe Photoshop.

1. Select the Magic Wand tool (keyboard shortcut: W).
2. Click somewhere on the table leg closest to the camera.

   You'll see that part of the surface of the leg is selected. Depending on where you clicked, a different amount may be selected than pictured here, and that's okay. The Magic Wand tool tries to determine different parts of a model surface based on edges and similarity of tone. We want the entire leg selected, but the Magic Wand didn't select enough.



3. Right-click the Magic Wand tool in the Tools panel.
4. Drag the Selection Size slider all the way to the right, to Large.

5. Click again on the leg, and this time the entire leg should be selected.

The attributes of a particular model and what you are trying to select will determine what works best for the Selection Size slider. I tend to leave this slider all the way to the left, on the Tiny setting, and then use the following technique to increase the size of the selection.

6. Double-click the Magic Wand tool in the Tools panel again.
7. Drag the Selection Size slider all the way back to the left, to the Tiny setting.

8. Click the top surface of the tabletop with the Magic Wand tool. With the Selection Size slider set to Tiny, only the top part of the tabletop is selected, not the edges.
9. Hold down the Shift key, and click one of the edge surfaces of the tabletop. This adds that area to the selection. If any other portions of the tabletop need to be added to the selection, Shift-click them.

   An alternative to holding down the Shift key to add to or take away from a selection is to right-click the Magic Wand tool, click either the Add to Selection or Subtract from Selection button, and then click the model. But it is much easier to Shift-click an unselected surface to add it to the selection or to Shift-click a selected surface to remove it from the selection.

Change the material applied to a surface

Now that the tabletop surface is selected separately from the rest of the model, you can change the material applied to its surface.

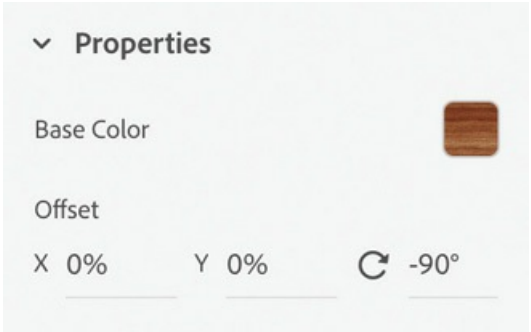
1. In the Content panel, locate and click the Galvanized Metal material (in the starter assets) to add a stylish metal top to the table.

   I don’t like the way the wood grain runs vertically on the horizontal “skirt” pieces under the tabletop. Let’s fix this.

2. With the Magic Wand tool, click the skirt piece under the left side of the tabletop.

3. Hold down the Shift key and click the second skirt piece.

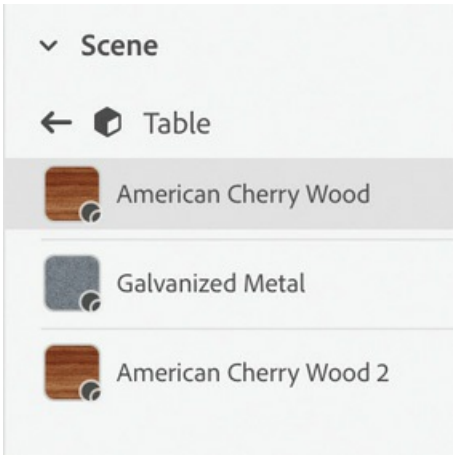
4. In the Scene panel, hover over the Table model, and click the right arrow icon to reveal the materials applied to the table.
5. Select the American Cherry Wood material in the Scene panel.
6. In the Properties panel, under Offset, change the rotation angle to **–90°** and press Enter/Return.



Unfortunately, this rotates the wood grain on the entire Table model, not just on the pieces we selected with the Magic Wand tool.

7. Choose Edit > Undo Selection to undo the rotation. So that we can rotate the wood grain on the skirt pieces independently, we need to apply a separate “instance” of the wood material to the selected skirt pieces.
8. In the Content panel, locate and click the American Cherry Wood material (in the starter assets) to apply it to the skirt pieces. No change will be visible on the canvas.
9. If you no longer see the table materials in the Scene panel, hover over the Table model and click the right arrow icon to reveal them.

   Now you should see three materials: American Cherry Wood, Galvanized Metal, and American Cherry Wood 2.



10. Click American Cherry Wood 2 in the Scene panel.
11. In the Properties panel, under Offset, change the rotation angle to **–90°** and press Enter/Return.

    Now the grain on the table skirt pieces should run in the right direction.

12. In the Properties panel, under Repeat, change the X and Y values to **2.2** and press Enter/Return. This will make the grain look more realistic.

Review questions

1 Aside from using the Add to Selection and Remove from Selection buttons in the selection tool options, how can you select multiple models on the canvas?

2 If you want a marquee selection to select only models that are entirely enclosed in the marquee, should the Partial Marquee Select option be turned on or off?

3 To select only a single model (not the entire group) when the Group Select option is on, what key would you hold down while clicking a model within a group?

4 What should you do if the move, scale, or rotation widget displayed on a model on the canvas isn't aligned with the x-, y-, and z-axes of your scene, making it difficult to transform your model?

Review answers

1 Hold down the Shift key while clicking an additional model to add that model to an existing selection. Or hold down the Shift key while clicking a selected model to remove that model from the selection.

2 Turning the Partial Marquee Select option off in the selection tools options will cause a marquee select to select only models that are entirely enclosed in the marquee selection rectangle.

3 Hold down the Command key (Mac) or Ctrl key (Windows) while clicking a model in a model group to select only the model, not the entire group.

4 When the move, scale, or rotation widget doesn't display as expected on a model on the canvas, right-click one of the selection tools and turn on the Align to Scene option.

9 Applying Graphics to Models

Lesson overview

In this lesson, you'll explore and apply graphics to model surfaces and learn the following:

- What types of graphics can be applied to the surface of a model
- When to use a vector format versus a bitmap format for a graphic
- How to edit a graphic after it has been applied
- How to apply multiple graphics to a model surface

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.

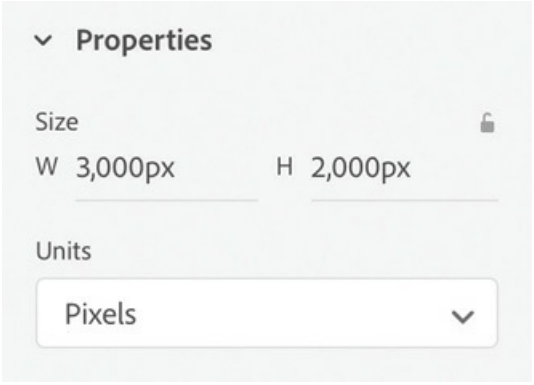
Your Account page is also where you'll find any updates to the lesson files. Look on the Lesson & Update Files tab to access the most current content.

The ability to apply graphics to model surfaces opens all kinds of possibilities for adding labels and other artwork to your models.

Beginning a new project and importing a model

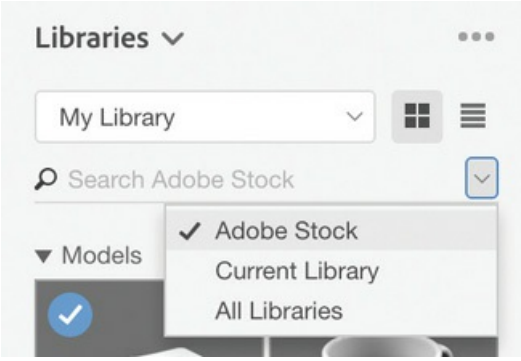
A common task in package design is mocking up a specific type of package with the artwork that is going to be printed on, or affixed to, the package. Since you can import and apply graphics to the surfaces of models, Dimension is useful for this workflow. In this lesson, you will apply some background artwork and a couple of labels to the sides of a metal spray can model.

1. In Adobe Dimension, choose File > New to start a new project.
2. In the Properties panel, change the width to **3000px** and the height to **2000px**. Increasing the pixel dimensions will make your artwork look much better.



3. Choose View > Zoom to Fit Canvas to fit the new canvas size on the screen.

4. Click the Add and Import Content icon at the top of the Tools panel, and choose CC Libraries.
5. In the Creative Cloud Libraries panel, in the dropdown list to the right of the search field, choose Adobe Stock.



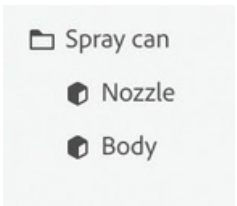
6. Type **208142479** into the search field.

   A spray can model should be displayed.

7. Click the shopping cart icon to save the model to your library. You may be asked if you want to license the free asset. If so, click OK.
8. It may take a few moments for the model to download. When it has finished downloading to your library, click the model to add it to the scene. It will be added to the center of the scene, positioned on the ground plane.

   In the Scene panel, you'll see that the model is a group named tall_spray_can_1530.

9. Double-click the name of the group and change the name to **Spray can**. Change the name of the top model in the group to **Nozzle**, and change the name of the other model to **Body**.



10. Choose Camera > Frame All to position the camera on the model.

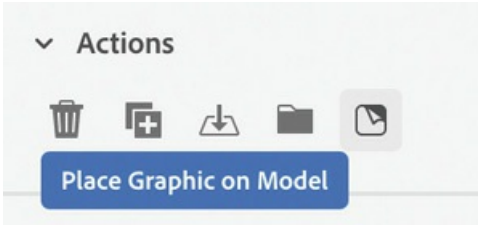
11. Click the Camera Bookmarks icon at the top of the screen.
12. Click the plus icon to create a new bookmark.
13. To rename the bookmark, type **Starting view** and press Return/Enter. Creating a bookmark will allow you to easily return to this view at any time.
14. Choose File > Save to save the file with a name and location that will allow you to find it later.

Applying a background graphic

In previous lessons you learned how to apply materials to the surface of a model to change its look. In addition to color and pattern, materials can contain all kinds of other properties, such as glow, roughness, metallic, and translucence. A graphic is another way to apply color and pattern to a model surface, and this color and pattern works in concert with the model's surface material.

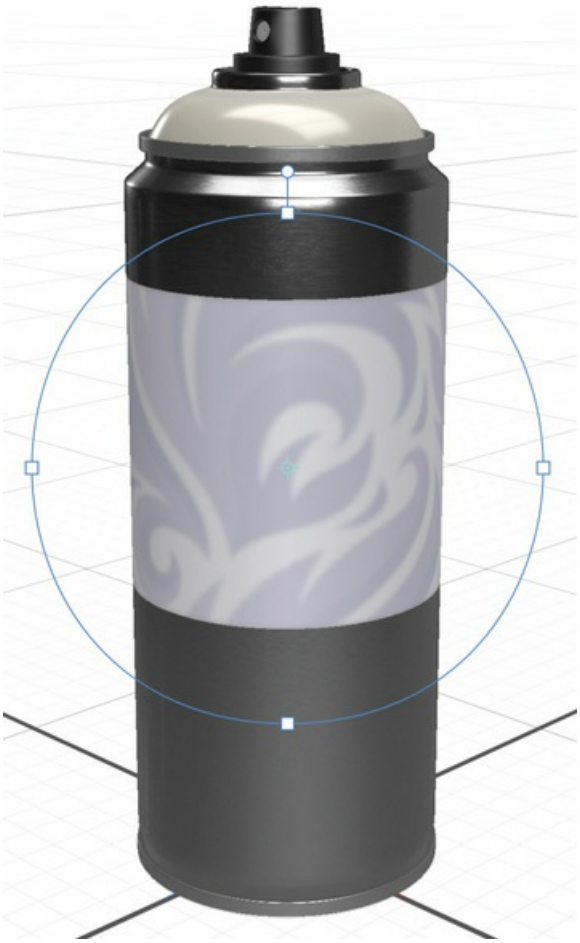
Files in the AI (Adobe Illustrator), PSD (Adobe Photoshop), JPEG, PNG, or TIFF format can be placed as graphics on the surface of a model.

1. In the Scene panel, click the Body model to select it.
2. In the Actions panel, click the Place Graphic on Model icon.



3. Select the file named Background_label.psd and then click Open.

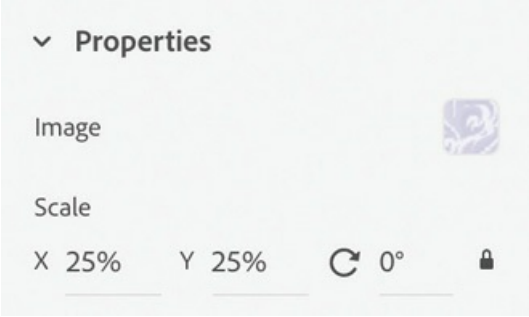
   The label is placed on the body of the spray can, visible to your current view at the size of your model. The label is surrounded by a round selection widget that makes it easy to resize, rotate, or move the label on the model. (If you don"t see the selection widget as pictured here, select the Select and Move tool in the Tools panel (keyboard shortcut: V).



4. Hold down the Shift key, and drag one of the four selection handles on the widget outward to make the label larger. Holding down the Shift key constrains the scaling to be proportional.
5. Choose Edit > Undo Edit Graphic as many times as necessary until the graphic is back to its original size.

   You can also scale the graphic in the Properties panel.

6. Enter **25%** for the X Scale value to make the graphic larger.



7. Drag the label downward on the surface of the model until it is covering only the sides of the can, not the top.

Applying additional graphics

A single model surface can contain as many graphics as you wish. Let’s add a second label to the body of the spray can.

1. In the Actions panel, click the Place Graphic on Model icon .
2. Select the file named Lessence_du_jour_label.ai and then click Open.
3. Scale and position the label on the spray can body as desired.

Note that in the Scene panel, there are now two graphics listed, as well as the original material applied to the spray can body.

4. Double-click Graphic 2 and change the name to **Lessence label graphic**.

Tip

Always take a moment to name models, groups, and labels in the Scene panel. This added clarity will pay off later on when you need to perform further editing in the file.

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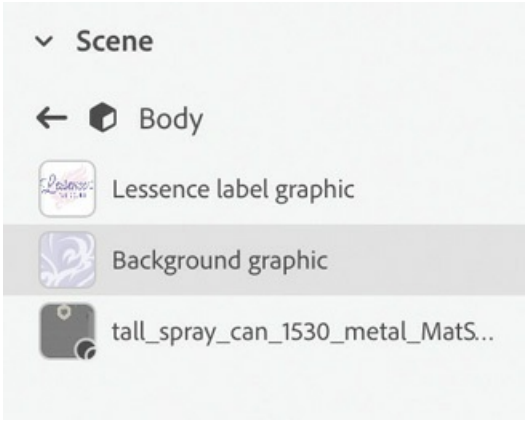
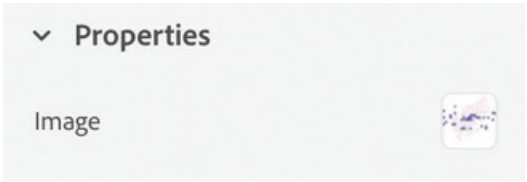
5. Double-click Graphic and change the name to **Background graphic**.

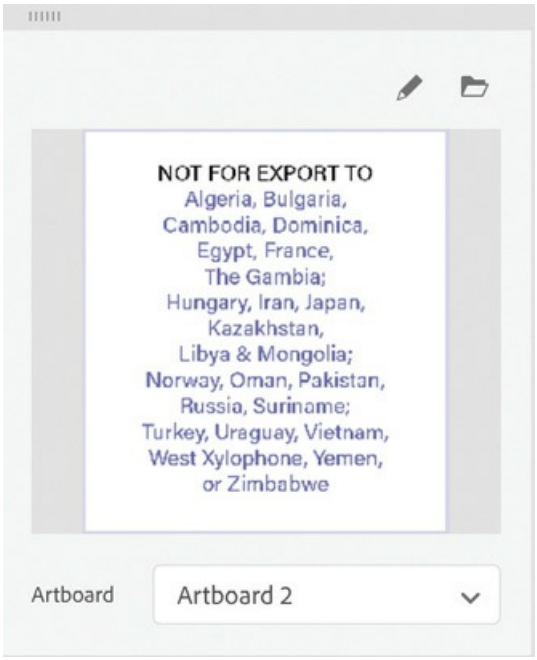


6. Select the Orbit tool in the Tools panel (keyboard shortcut: 1).
7. Drag from right to left across the screen until you can see the back side of the spray can.
8. In the Actions panel, click the Place Graphic on Model icon .
9. Select the file named Lessence_du_jour_label.ai and then click Open.

   Since this is the same file you placed on the front of the can, you get another copy of the L'essence du Jour label on the back of the can. But this is an Illustrator file that contains multiple artboards, and you can choose a different artboard after the graphic is placed.
10. In the Properties panel, click the image swatch next to the word "Image."



11. Choose Artboard 2 from the dropdown list of artboards.



12. Select the Select and Move tool in the Tools panel (keyboard shortcut: V).
13. Scale and position the label as desired.

Note that there are now three graphics listed in the Scene panel. You can change the stacking of these graphics.

14. Drag Graphic 3 below Background graphic in the list, and you'll see that Background graphic covers up Graphic 3.

Tip

You can also drag and drop graphic files from the Macintosh Finder or Windows File Explorer onto a model to place the graphic on the model surface. Or you can copy and paste a graphic from Photoshop or Illustrator onto a selected model in Dimension.

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15. Drag Graphic 3 back up to the top of the list so that it is visible again.

Modifying graphic properties

Each label can have its own properties for opacity, roughness, and metallic.

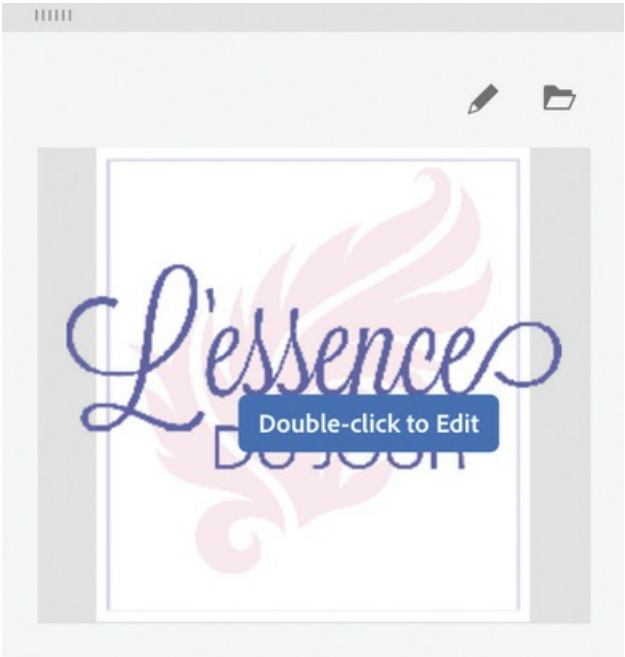
1. Click the Camera Bookmarks icon at the top of the screen.
2. Click Starting View to return to viewing the front of the spray can.
3. Choose Background graphic in the Scene panel.
4. In the Properties panel, change the Roughness slider to **30%** and the Metallic slider to **70%**. This affects only the background graphic.

5. In the Scene panel, select Lessence label graphic. Note that in the Properties panel, the Metallic value is set to **0%**, so this label will have a flatter finish, which is what we want.

Editing a label in Illustrator

After you've placed a label, you can do "round-trip" editing of the file in Illustrator or Photoshop. If you've placed an AI graphic on a model, when you edit the graphic, it will open in Illustrator. If you've placed a JPEG, PNG, or TIFF image, it will open for editing in Photoshop.

1. In the Scene panel, select Lessence label graphic.
2. In the Properties panel, click the image swatch next to the word "Image."
3. In the box that appears, either double-click the image or click the pencil icon to edit the graphic in Illustrator.



4. In Illustrator, change the color of the pink background shape to a light green, or make any other edit to the image that you wish.

Note

When you place a graphic on a model, there isn't a "link" created from the model to the original image. Instead, the placed image is saved internally in the DN file. So when you edit a placed graphic in Illustrator or Photoshop, it is this internally stored image that you are editing and saving back inside the DN file.

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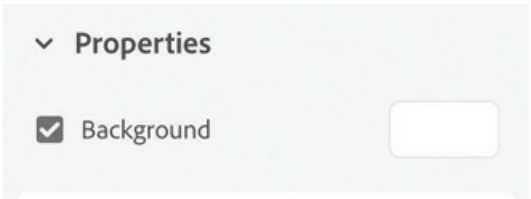
5. In Illustrator, choose File > Close, and when prompted, save the file.

In Dimension, you should see the label update to reflect the changes you made in Illustrator.

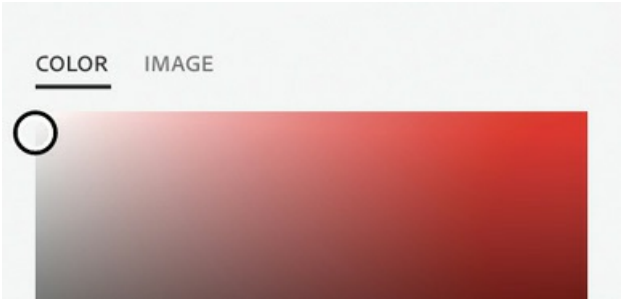
Adding a background color

As a final touch to our project, let's change the color of the scene background.

1. Select the Select and Move tool in the Tools panel (keyboard shortcut: V).
2. Click somewhere on the background area around the model to select the environment.
3. In the Properties panel, click the color swatch next to the word "Background."



4. Click the Color tab.



5. Click the Color Sampler icon in the lower-right corner of the color picker.
6. Click a colored area of the model with the color sampler. Repeat until you've sampled a color that works well for the background.

Using advanced techniques

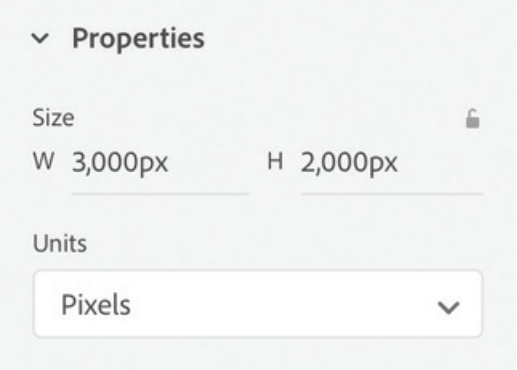
Let’s do one more example to learn some advanced techniques for working with placed graphic images. You’ll learn how to stack semitransparent graphics, how to control where on a model a graphic is initially applied, and how to restrict the application of a graphic image to only certain surfaces on a model.

Begin a new project and import a model

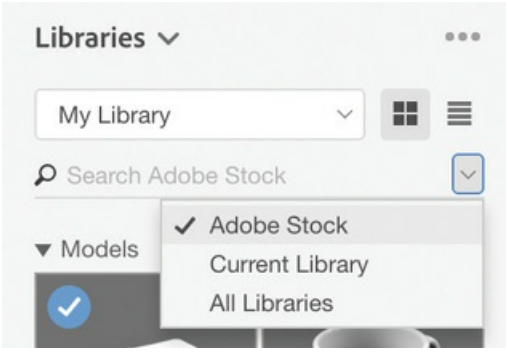
Let’s begin by creating a new file and placing a model of a serving plate from Adobe Stock

in the scene.

1. Choose File > New to start a new project.
2. In the Properties panel, change the width to **3000px** and the height to **2000px**.



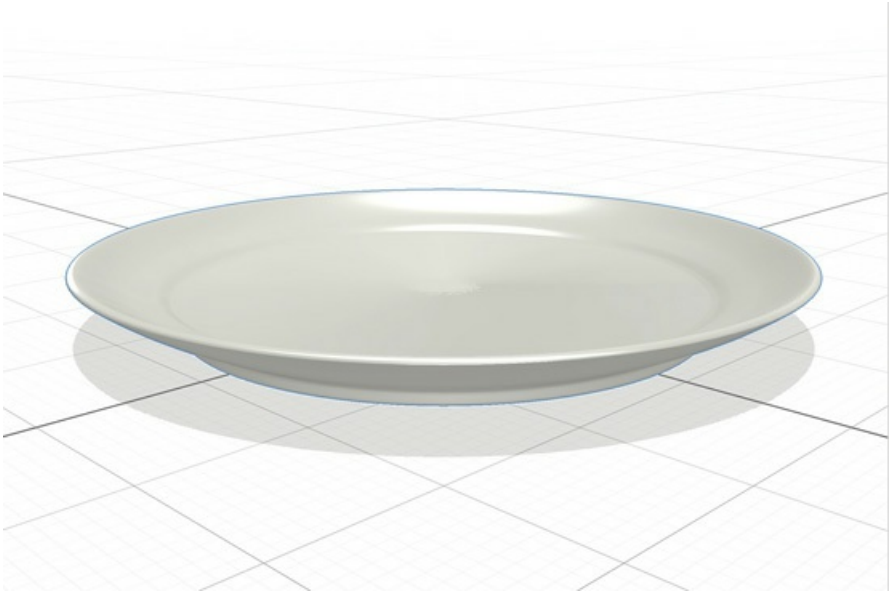
3. Choose View > Zoom to Fit Canvas to fit the new canvas size on the screen.
4. Click the Add and Import Content icon at the top of the Tools panel, and choose CC Libraries.
5. In the Creative Cloud Libraries panel, in the dropdown list to the right of the search field, choose Adobe Stock.



6. Enter **178262437** into the search field.

   A round serving plate model displays.

7. Click the shopping cart icon to save the model to your library. You may be asked if you want to license the free asset. If so, click OK.
8. It may take a few moments for the model to download. When it has finished downloading to your library, click the model to add it to the scene. It will be added to the center of the scene, positioned on the ground plane.
9. Choose Camera > Frame Selection to fit the plate model on the screen.



Place overlapping semitransparent graphics on the model

Any surface of a model can have multiple overlapping graphics applied to the surface. Transparency in the graphics is supported, so if graphics are semi-transparent, the graphics on the bottom will partially show through those on top.

1. Select the Orbit tool (keyboard shortcut: 1) and use it to position your view of the scene so that you are looking directly down on the top of the plate. You may need to choose Camera > Frame Selection again after doing this so you can see the entire plate on the canvas.

When you place a graphic on a model, Dimension will attempt to center the graphic on the surface of the model that is facing the camera. So it usually works best if you point the camera squarely at the location on the model where you want to place the graphic. That way, less adjustment of the graphic will be required after it is placed.

2. Select the Select and Move tool (keyboard shortcut: V) and double-click the plate model on the canvas. This will select the material applied to the surface of the serving plate model.
3. Click the Place Graphic on Model icon in the Actions panel.
4. Select the Blue_watercolors.png file and then click Open.

   This PNG file was created in Photoshop and consists of a transparent background with several semitransparent brush strokes created with a watercolor brush.

5. Grab one of the selection handles on the placed graphic, hold down the Shift key, and drag the handle out to make the graphic large enough to cover the top surface of the plate.

   Holding down the Shift key causes the graphic image to scale proportionally.

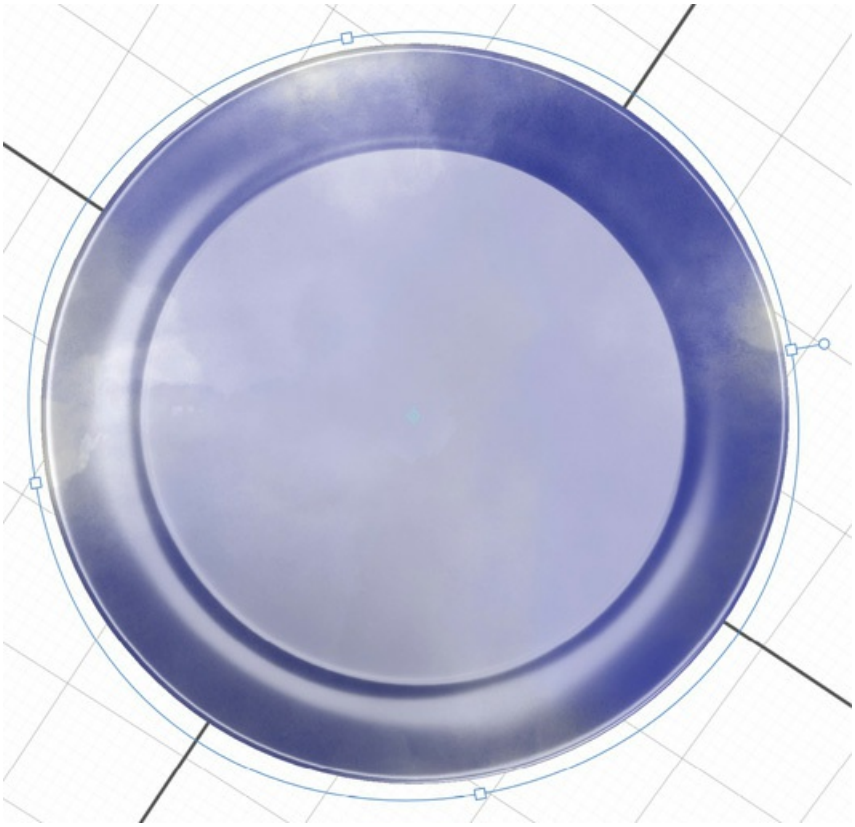
6. Click the Place Graphic on Model icon in the Actions panel.
7. Again, select the Blue_watercolors.png file and then click Open.
8. Grab one of the selection handles on the placed graphic, hold down the Shift key, and drag the handle out to make the graphic large enough to cover the top surface of the plate.

   Now we have two copies of the watercolor graphic placed on top of each other. You can see both copies in the Scene panel.

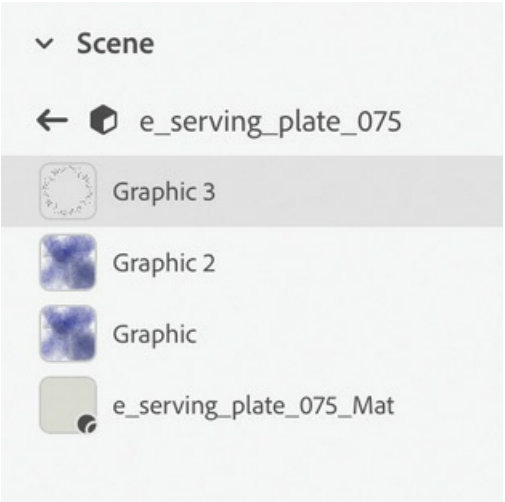
   Now let's rotate one of the copies so that the overlapping semitransparent strokes create an interesting texture.

9. Grab the rotation handle at the top of the placed graphic, and pull to rotate the graphic so

that the two graphics aren't lined up exactly on top of each other.



10. Click the Place Graphic on Model icon in the Actions panel.
11. Select the Floral_border.png file, and then click Open.
12. Size and position the floral border on the plate as desired. In the Scene panel, you should see all three graphics stacked up above the e_serving_plate_075_Mat material.



13. Select the e_serving_plate_075_Mat material in the Scene panel.
14. In the Properties panel, click the color swatch next to the words "Base Color," and change the color to **230** red, **255** green, **230** blue.

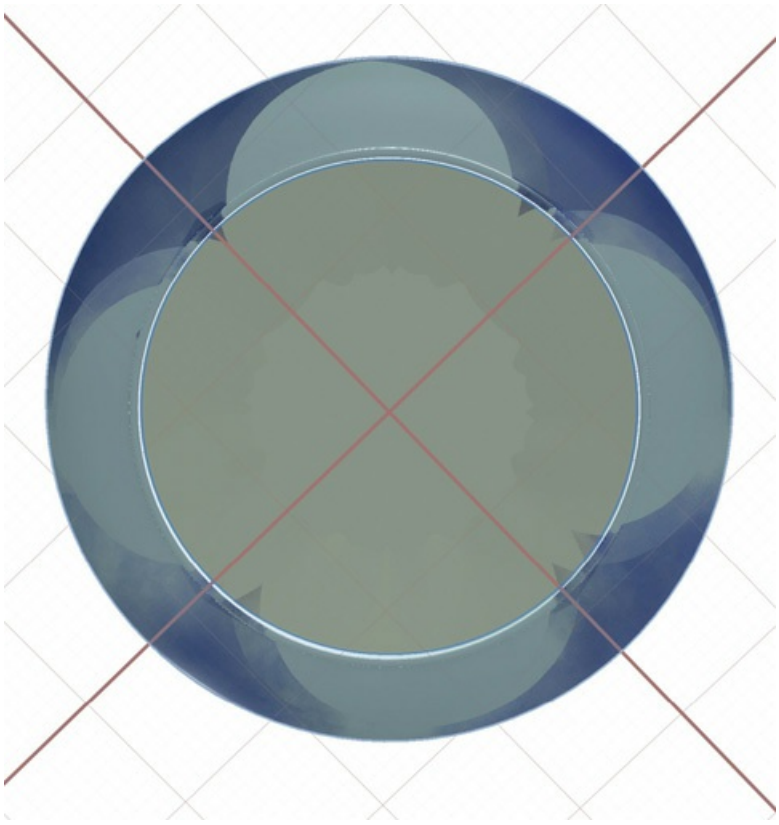
Fix graphic overlap

When applying graphics to models, it is common for the graphic to “overlap” or wrap around to an area or surface of the model where you don’t want the graphic to appear. Here’s a technique that can help fix the problem.

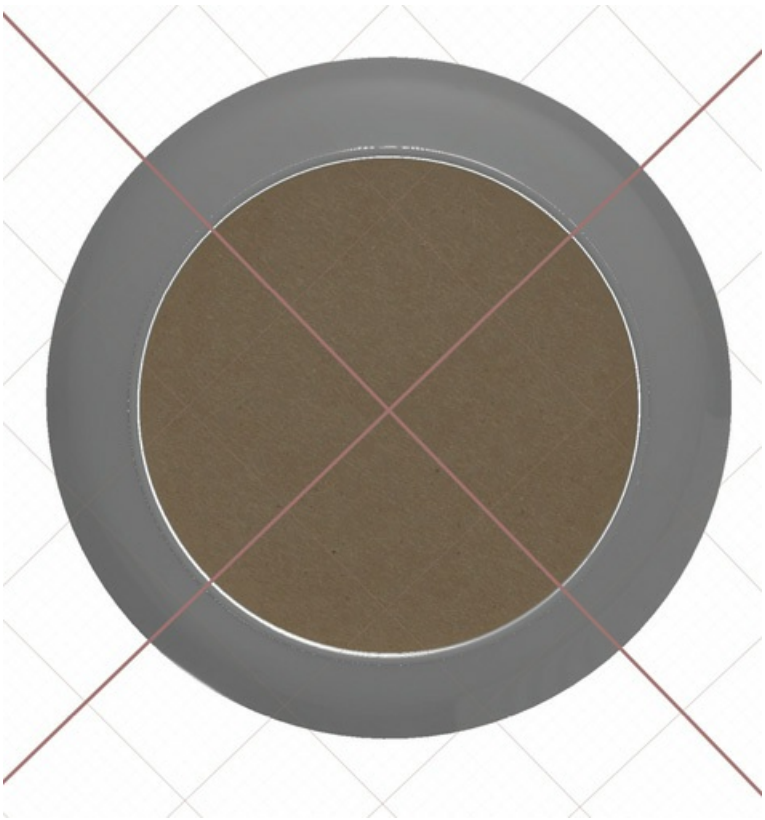
1. Select the Orbit tool (keyboard shortcut: 1), and drag up on the canvas to position your view of the scene so that you are looking directly up through the ground plane to the bottom and sides of the plate.

   You can see that the graphics we added to the top of the plate wrap around onto the sides of the plate. This is because the entire plate surface is a single model with a single applied material. Luckily, there is a technique we can use to restrict the application of the graphic to only the top surface of the plate.

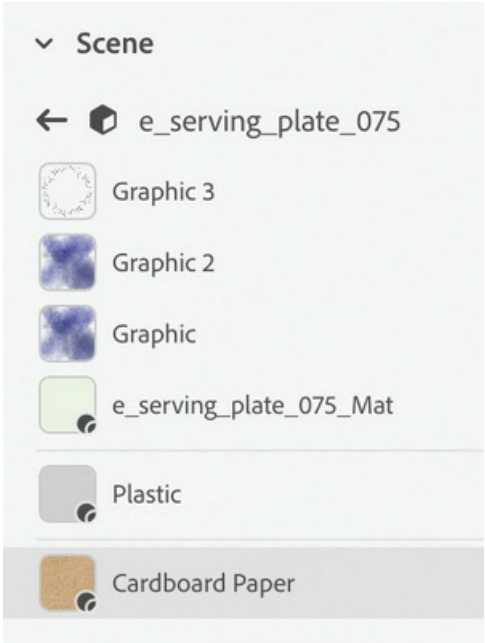
2. Select the Magic Wand tool (keyboard shortcut: W).
3. Click the side area of the plate to select it.



4. Click the Add and Import Content icon at the top of the Tools panel, and choose Starter Assets.
5. Click the Plastic material in the Content panel to apply it to the selected area of the plate. You'll see that now the graphics don't wrap onto the sides of the plate since a graphic applies only to a single material on a model.
6. Click the bottom center of the plate to select it.
7. Click the Cardboard Paper material in the Content panel to apply it to the bottom area of the plate.
8. Choose Edit > Deselect All.

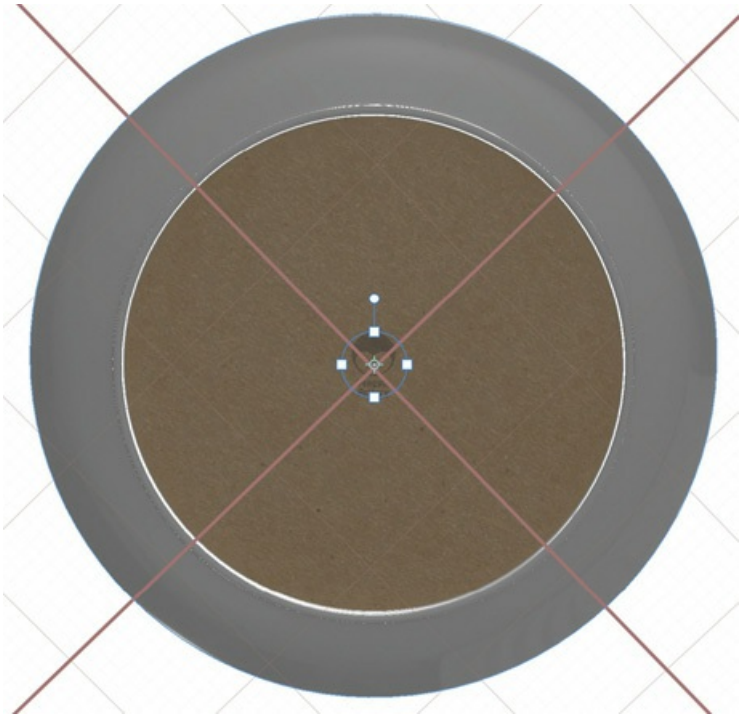


9. Select the Select and Move tool (keyboard shortcut: V).
10. Double-click the plate model on the canvas to reveal the materials applied to the plate in the Scene panel. You'll see the three materials applied to the individual surfaces of the plate, each separated by a horizontal line. One or more graphics can be applied to each material on a model independently.



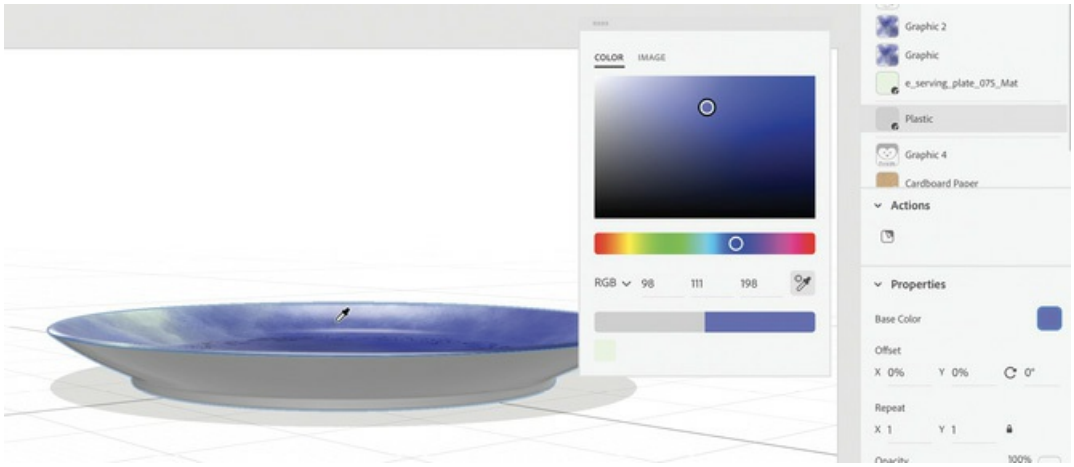
11. Select the Cardboard Paper material in the Scene panel.

12. Click the Place Graphic on Model icon in the Actions panel.
13. Select the Penguin_pottery_logo.png file and then click Open.
14. Size and position the logo on the plate as desired.



You'll now see in the Scene panel that the e_serving_plate_075_Mat material has three graphics applied to it, and the Cardboard Paper material has one graphic applied.

15. Select the Orbit tool (keyboard shortcut: 1), and drag down on the canvas so that you can see the side of the plate as well as some of the top.
16. Select the Plastic material in the Scene panel.
17. In the Properties panel, click the color swatch next to base color.
18. In the color picker, click the Sample Color icon and click a blue area on the top surface of the plate to sample a blue color and apply it to the sides of the plate.



19. In the Properties panel, increase Roughness to **20%** to make the sides of the plate less shiny.
20. Select the Orbit tool (keyboard shortcut: 1) and examine your finished plate from different angles.

Review questions

1 What is the difference between a material and a graphic?

2 What file formats can be used for graphics?

3 When an image is placed as a graphic on the surface of a model, is the image linked to the

original graphics file, or does the image become part of the Dimension file?

4 Besides scaling, rotating, or moving a graphic on the model surface, what other properties of a graphic can be changed?

5 If a graphic overlaps an area of the model where you don't want the graphic to appear, what is one technique you may be able to use to prevent this?

Review answers

1 Both materials and graphics can be used to apply color and pattern to the surface of a model. But a material can contain properties such as glow, roughness, metallic, and translucence. A graphic is a simple image that can be wrapped around the surface of the model.

- Materials cannot be stacked on the surface of a model, but multiple graphics can be stacked on top of each other on the surface.
- The surface of a model can contain a material as well as one or more graphics.

2 Graphic files in the AI (Adobe Illustrator), PSD (Adobe Photoshop), JPEG, PNG, or TIFF file formats can be place on a model surface.

3 Graphics become part of the Dimension file. They are not linked to the original graphics file.

4 The opacity, roughness, and metallic properties can be adjusted for each graphic applied to a model.

5 If a graphic "bleeds" over a surface of a model where you don't want it to appear, you may be able to prevent this by selecting the surface where you don't want the graphic to appear with the Magic Wand tool and then applying a new material (or another instance of the existing material) to the surface.

10 Working with Backgrounds

Lesson overview

In this lesson, you'll explore how to add a 2D background image to your scene and learn the following:

- What file formats can be imported
- What types of images work best as background images
- How to automatically match your models to a background image so that they look like they belong in the image
- What to do when the automatic image matching feature can't match the perspective in an 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.

If you have a background photo with strong, clear perspective lines, Dimension’s image-matching features enable you to quickly pose your 3D models in the background.

What you can do with background images

The main purpose of Dimension is to create scenes from one or more 3D models. Every file you create from scratch initially features a plain white background. You can change this background color to whatever you wish, and the color will be applied to the floor (the ground plane) as well as to the rest of the scene background.

However, you can also import a graphic image to be used as a 2D background in your scene. You can use a graphic saved in most of the common image file formats, including AI, JPEG, PNG, PSD, and TIFF, in the CMYK, RGB, grayscale, or indexed color space.

These background images are static. They remain stationary in the background when you adjust your view of the models in your scene with the camera tools. So a common workflow is that you’ll compose a 3D scene consisting of some 3D models and then use the camera tools to adjust your perspective and angle of view so that the models appear as if they are part of the background image. As you’ll see, Dimension has some powerful features that can help you with this process.

Background image workflows

Sometimes, you’ll have a particular background image in mind from the start, so you’ll import the image into your scene before adding and positioning your models.

Other times, you'll create a scene with one or more models in Dimension and then decide to add a background image near the end of the project.

On other occasions you won't be able to locate a suitable background image at all, and you will need to construct your own image.

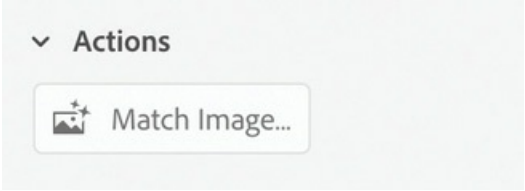
In this lesson, you'll examine each of these workflows.

Starting a project with a background image

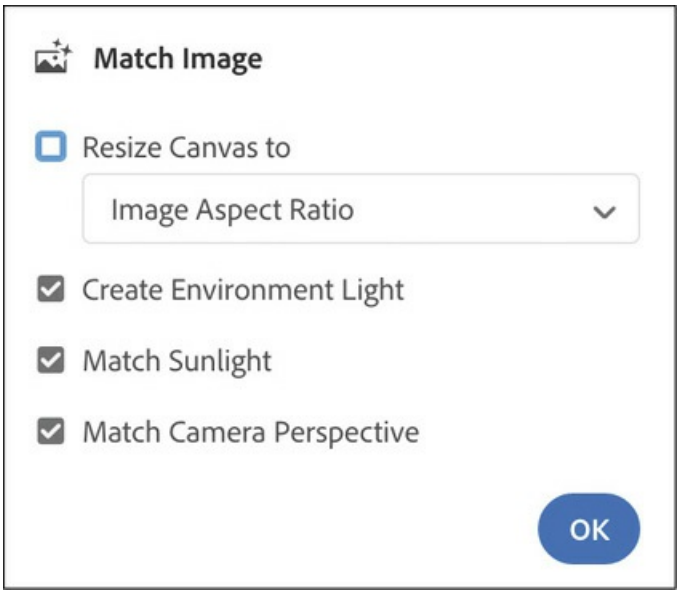
Let's begin by creating a project where you import the background image, specify the camera perspective, and then place the models in the scene.

1. In Dimension, choose File > New to create a new file.
2. Choose File > Import > Image as Background.
3. Select the Evening_party_tabletop.jpg file, and click Open.

   By default, the image arrives centered on the canvas and cropped to fill the canvas. We'll leave the image as it is for this lesson.
4. In the Properties panel, click the Match Image button.



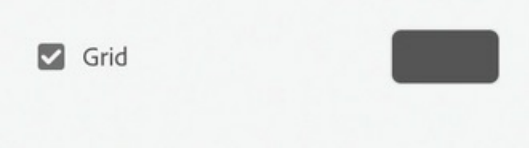
5. Deselect the "Resize Canvas to" option, select the other three options in the Match Image dialog, and click OK.



   Because of the strong, clear perspective lines created by the boards in the photo, Dimension is able to perfectly match the camera perspective to the image.

To make it easier to see the grid lines on the ground plane, let's change them to a bright green.

6. Select the Select and Move tool (keyboard shortcut: V).
7. Click somewhere in the gray area outside the canvas.
8. Click the color swatch next to Grid in the Properties panel.



9. Change the color to **0** red, **255** green, **0** blue; then press the Esc key to close the color picker.

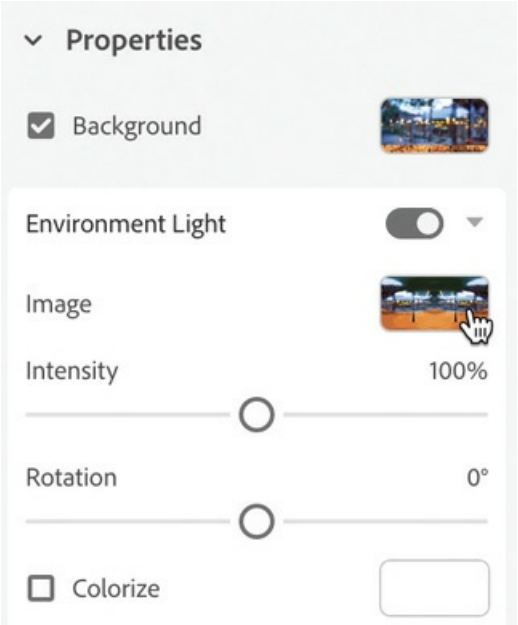
Once you get the camera perspective just right, it is a good practice to save a camera bookmark in case you accidentally change the perspective later with one of the camera tools.

10. Click the Camera Bookmarks icon at the top of the screen.
11. Click the plus icon to create a new bookmark.
12. To rename the bookmark, type **Ending view** and press Enter/Return.

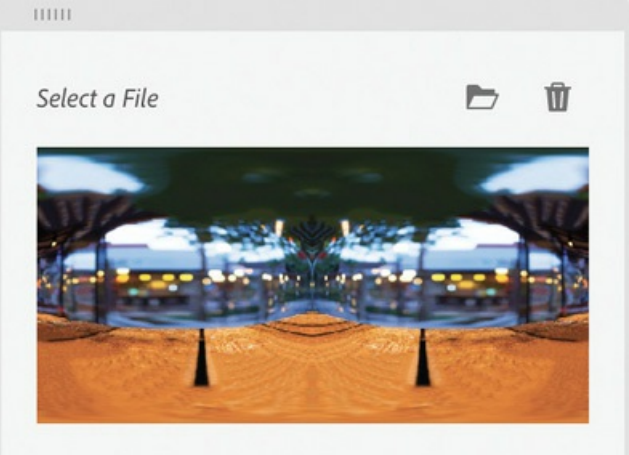
Examine the auto-generated lights

Dimension uses the background image to automatically extract and build lighting and reflection information for the scene.

1. Click the background image to select it.
2. In the Properties panel, click the image swatch to the right of Image.

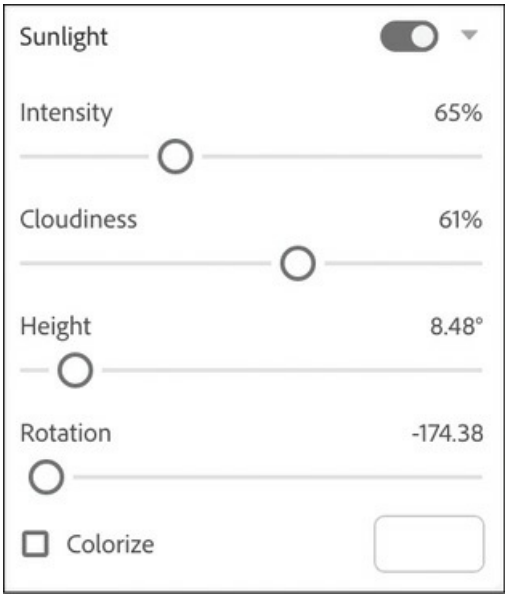


This lets you view the spherical bitmap that Dimension generated automatically from the background image. Dimension uses this bitmap image to create the environment light and reflections.



3. Click away from the image picker to close it.
4. In the Properties panel, click the disclosure triangle icon next to Sunlight to open the Sunlight options.

Dimension has calculated values for the sunlight attributes based on the background image. For a complex image like this one, without a strong directional sunlight, these may or may not be the values you want for your scene.

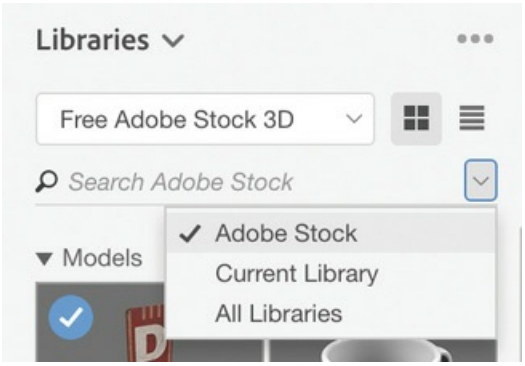


You'll explore the options for environment light and sunlight in a later lesson.

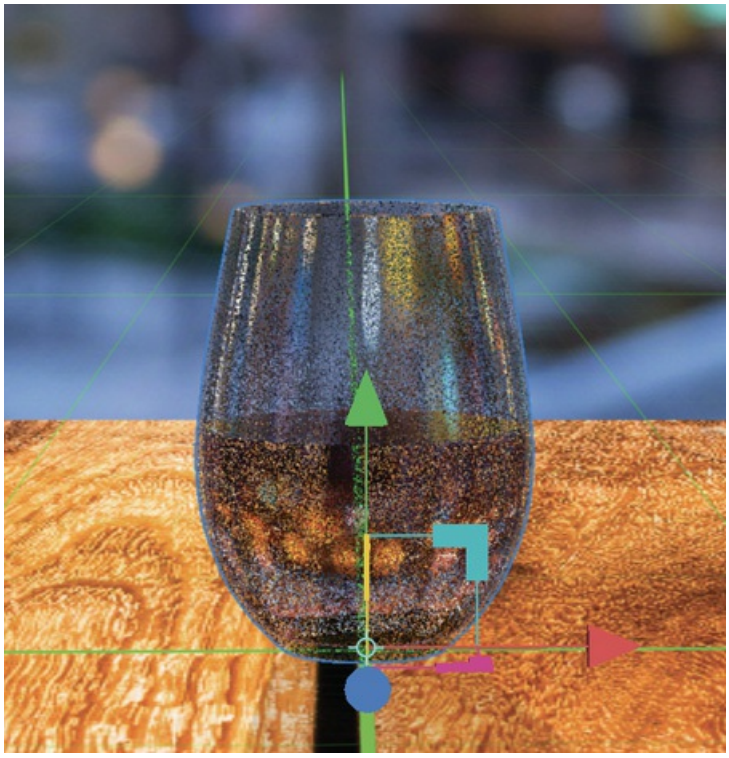
Add models to the scene

Once the background image and perspective are aligned properly, positioning models in the scene is easy.

1. Click the Add and Import Content icon at the top of the Tools panel, and choose CC Libraries.
2. In the search field at the top of the Libraries panel, click the down arrow and choose Adobe Stock.



3. Enter **199461253** into the search field. A glass of red wine should display. This is a free asset.
4. Click the shopping cart icon to save the model to your library. You may be asked if you want to license the free asset. If so, click OK.
5. It may take a few moments for the model to download. When it has finished downloading to your library, click the model to add it to the scene. It will be added to the center of the scene and positioned on the ground plane, which is positioned on the wood boards.



6. Use the Select and Move tool (keyboard shortcut: V) and the Select and Scale tool (keyboard shortcut: S) to size and position the glass on the wood as desired.

7. Select the Select and Move tool (keyboard shortcut: V).
8. Hold down the Option key (Mac) or Alt key (Windows), and drag out a duplicate of the wine glass. As long as you drag only the red or blue arrows, the glass will remain on the ground plane (aligned with the wood in our scene) as you move it.
9. Repeat step 8 two more times, positioning the resulting four glasses how you want them to appear.
10. You may want to select the Orbit tool (keyboard shortcut: 1) and rotate your view of the glasses temporarily so that you can see how they are positioned relative to each other. When you are finished, choose Camera > Switch to Home View to return to the camera bookmark we saved.

    Remember that your view of the background image doesn't transform with the camera tools. It's static. The camera tools transform only your view of the 3D models in the scene.

Adding a background image to an existing scene

Sometimes, you'll assemble a scene in Dimension with one or more models and then decide later to composite the scene with a background image. Let's try this.

1. In Dimension, choose File > Open.
2. Select the file Lesson_10_02_begin.dn and click Open.

   This is a scene consisting of chairs, a table, and four soda cans. The scene was created without a background image in mind. The camera view was changed many times during the composition to aid in placing objects accurately in the scene. Now, we've decided to add a

background image and realistically incorporate the table and chairs into the image.

Tip

You can also drag a graphic file from the Finder (Mac), File Explorer (Windows), or Adobe Bridge and drop it onto the canvas to import a background image.

3. Choose File > Import > Image as Background.
4. Select the file Village_square.jpg and click Open.

The background image arrives centered on the Dimension file. But the aspect ratio of the background is different from that of the Dimension file. You want the Dimension canvas to match the aspect ratio of the background image, and you want to increase the pixel dimensions of the Dimension file.

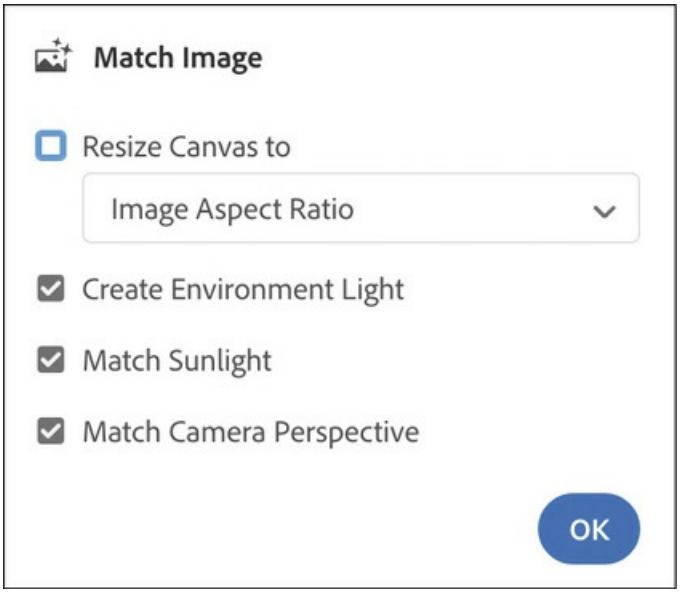
5. With the Select and Move tool (keyboard shortcut: V), click the gray area surrounding the canvas.
6. In the Actions panel, click the Match Background Aspect Ratio icon . This changes the dimensions of the Dimension file to match the aspect ratio of the image.
7. In the Properties panel, click the lock icon next to the Width and Height fields to constrain the proportions.
8. In the Width field, type ***3** after the 508px text to multiply the width by 3 and then press Enter/Return.

   Because you constrained the proportions by clicking the lock icon, the height is automatically calculated to keep the canvas proportional.
9. Choose View > Zoom to Fit Canvas.

Match the scene to the image

If your background image contains strong perspective lines, as the image of the village square does, Dimension can attempt to match the camera perspective to the background image. This can save a lot of work fussing with the camera tools to get the perspective just right.

1. Choose Image > Match Image.
2. Deselect the “Resize Canvas to” option, select the other three options in the Match Image dialog, and click OK.



Note that the objects are aligned with the new perspective and camera angle, and their relationship to each other stays the same.

3. Select the Select and Move tool (keyboard shortcut: V).
4. To select all the models, choose Edit > Select All.
5. Drag the red and blue arrows to position the models as desired.

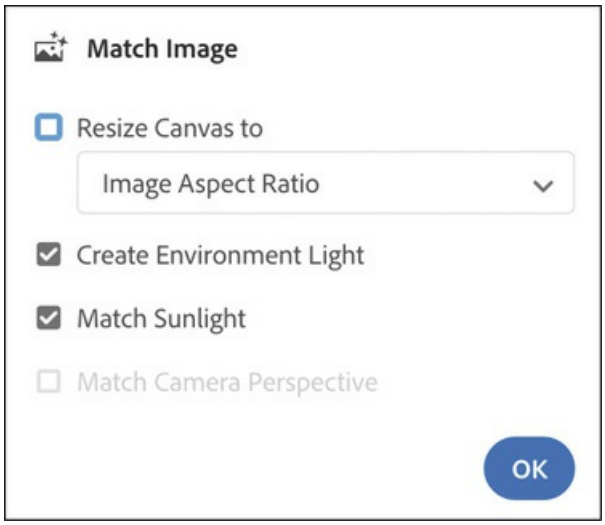
What to do when Match Image doesn’t set the perspective correctly

In the first two exercises in this lesson, the Match Image command worked flawlessly, so creating the scene was easy. But sometimes Dimension isn’t able to work out the perspective in the image and will need some help from you. This can happen for a variety of reasons. For example, the image might have distortion that was introduced by a wide-angle lens or by editing. Or sometimes an image won’t have any visible vanishing lines with which Dimension can determine the perspective.

1. In Dimension, choose File > Open.
2. Select the file Lesson_10_03_begin.dn and click Open.

   To save you time, I've placed the background image into this file and changed the color of the grid lines to red.

3. Click Environment in the Scene panel if it isn't already selected.
4. Choose Image > Match Image.
5. In the Match Image dialog, deselect the "Resize Canvas to" option and select the Create Environment Light and Match Sunlight options. Note that in this case, the Match Camera Perspective option may be grayed out, indicating that Dimension can't extract enough information from the file to determine the perspective. If the Match Camera Perspective option is not grayed out, deselect the option so that you can learn what to do when Dimension is unable to help you with the perspective. Click the OK button.



6. To begin to set the camera perspective manually, select the Horizon tool (keyboard shortcut: N).
7. Grab the horizon line at the top of the screen, and drag it down a bit. Aim for a location approximately where the two parking stripes would meet if they extended away from the camera.
8. Right-click the Horizon tool, and click the Turn Camera tool to select it.

Note

Because of the distortion introduced by some camera lenses, sometimes it is impossible to map the vanishing lines with exact precision. The key is to get close enough so that when you position your models in the scene, they look as if they belong there.

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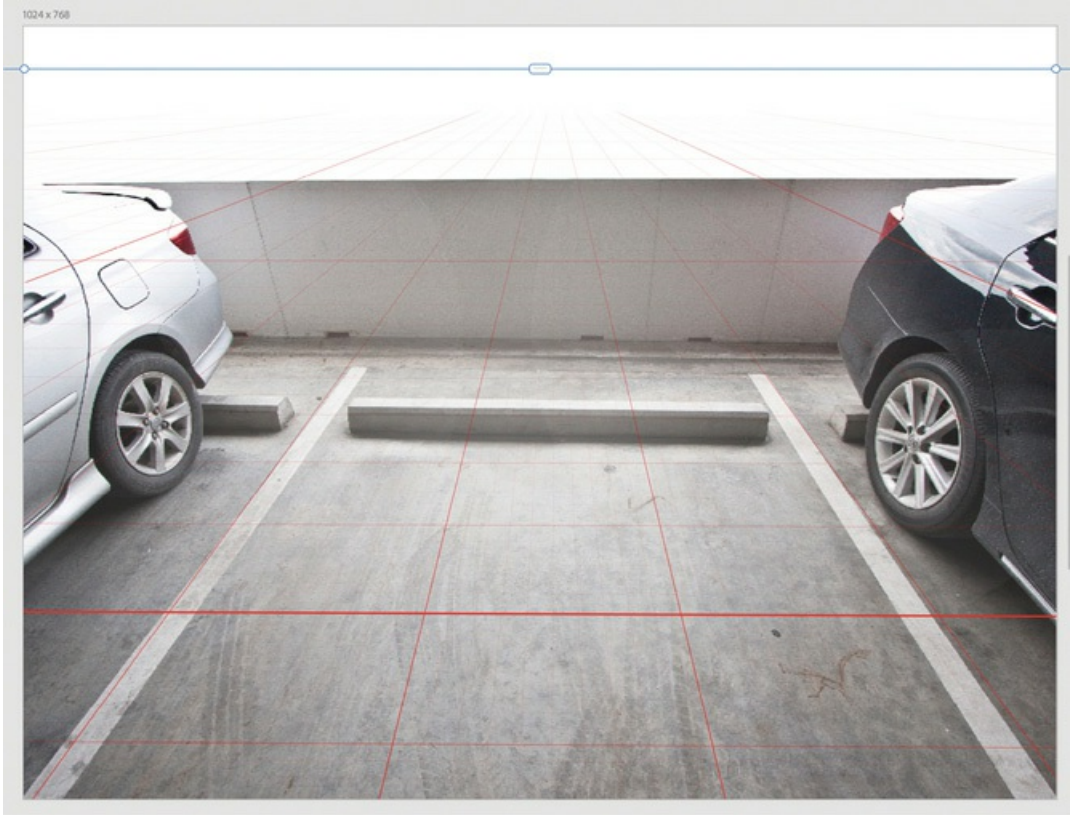
9. Click the image and then drag to the right repeatedly until the grid lines are vanishing toward the horizon in the middle of the screen.



10. Once you have the perspective the way you want it, save the camera location as a bookmark. Click the Camera Bookmarks icon at the top of the screen.
11. Click the plus icon to create a new bookmark.
12. To rename the bookmark, type **Ending view** and press Enter/Return.

Add a model to the scene

Once you've established perspective in your scene that matches the background image, you can use this information to realistically position a model into the scene.

1. Click the Add and Import Content icon at the top of the Tools panel, and choose CC Libraries.
2. In the search field at the top of the Libraries panel, click the down arrow and choose Adobe Stock.
3. Type **201384101** into the search field. A red pickup truck model should display. This is a free asset.
4. Click the shopping cart icon to save the model to your library. You may be asked if you want to license the free asset. If so, click OK.
5. It may take a few moments for the model to download. When it has finished downloading to your library, click the model to add it to the scene.

Since we have radically modified the perspective, the model is placed in the scene

somewhere off the canvas, so it isn't visible from our current perspective.

6. To make the truck better fit the scene, choose Camera > Frame Selection (keyboard shortcut: F).

7. With the Select and Rotate tool (keyboard shortcut: R), drag the green arrow to rotate the truck around the y-axis.
8. In the Properties panel, click the lock icon next to the Scale values.
9. To make the truck larger, type **1.4** in the X field and press Enter/Return.
10. Use the Select and Move tool (keyboard shortcut: V) to position the truck as desired.

Building your own background

If you can’t locate a suitable background image for your scene, you can either create a 2D background in a graphics program like Adobe Photoshop or Illustrator or construct a background using geometric models in Dimension.

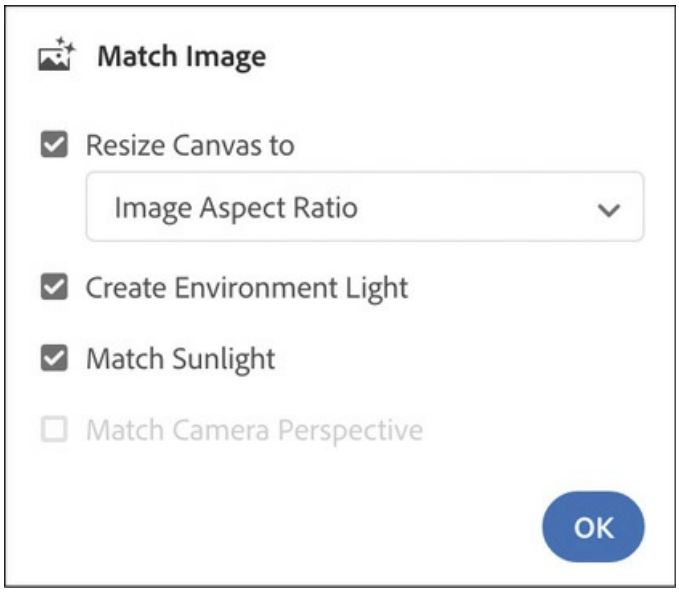
Use a 2D background built in Photoshop

Sometimes all you need to make your scene look realistic is a very simple background that can be easily constructed with a couple of colors or gradients in Photoshop.

1. In Dimension, choose File > Open.
2. Select the file Lesson_10_04_begin.dn and click Open.
3. Choose File > Import > Image as Background.
4. Select the file named Simple_background.psd and click Open.

   This is just a simple image created in Photoshop with two different gradients that represent a “floor” and a “wall,” or a “ground” and a “sky.” You could of course create something much more complex using various colors, textures, and patterns.

5. Choose Image > Match Image.
6. In the Match Image dialog, deselect the “Resize Canvas to” option, and select the Create Environment Light and Match Sunlight options. Note that in this case, the Match Camera Perspective option is grayed out, indicating that Dimension can’t extract enough information from the file to determine the perspective. Click the OK button.



Dimension couldn't match the perspective for you because there are no perspective lines in this simple image. You'll need to position the horizon manually.

7. Select the Horizon tool (keyboard shortcut: N).

   Note that no horizon line shows up. That's because, due to the camera angle in this case, the horizon is way off the top of the canvas, indicated by the two off-screen icons at the top left and top right of the document window.

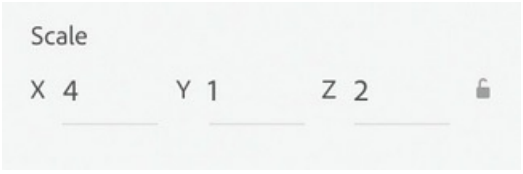
8. Select the Orbit tool (keyboard shortcut: 1).
9. Drag up on the image until you are viewing the scene from the side.
10. Select the Horizon tool (keyboard shortcut: N).
11. Position the horizon line on the horizon line of the background image.

12. Click the Camera Bookmarks icon at the top of the screen.
13. Click the plus icon to create a new bookmark.
14. To rename the bookmark, type **Starting view** and press Enter/Return.
15. Use the Select and Move, Select and Scale, Select and Rotate, Pan, and Dolly tools to position the models in the scene as you see fit.

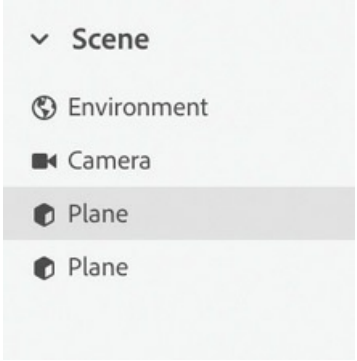
Build a 3D background in Dimension

Dimension includes some simple models—such as Curved Plane, Cloth Backdrop, Beach Towel, Hollow Sphere, Hollow Cube, Half Pipe, and Plane—that we can use to construct a virtual “set” or “room” in which to pose our models.

1. In Dimension, choose File > New.
2. Select the Select and Move tool (keyboard shortcut: V).
3. Click the Add and Import Content icon at the top of the Tools panel, and choose Starter Assets.
4. Locate the Plane model, and click it to place it in the scene.
5. To make the plane larger, in the Properties panel enter a value of **4** for the X scale and **2** for Z.



6. Choose Edit > Copy.
7. Choose Edit > Paste. You can see in the Scene panel that there are now two Plane models.



8. Select the Select and Rotate tool (keyboard shortcut: R).

Note

The Plane object has only one “good” side that will display materials properly. So it is important that the good side face the desired direction. The good side is up initially, so if you rotate the plane, you need to be sure that you rotate it in such a way that the “up” side faces in the direction you want.

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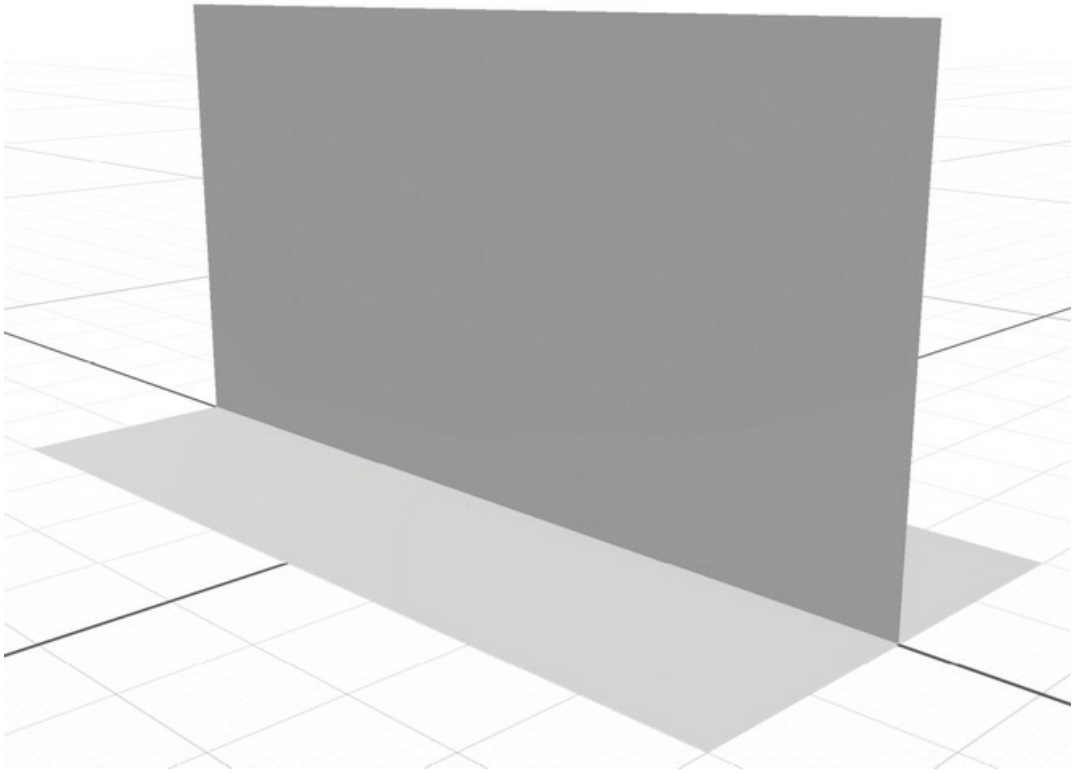
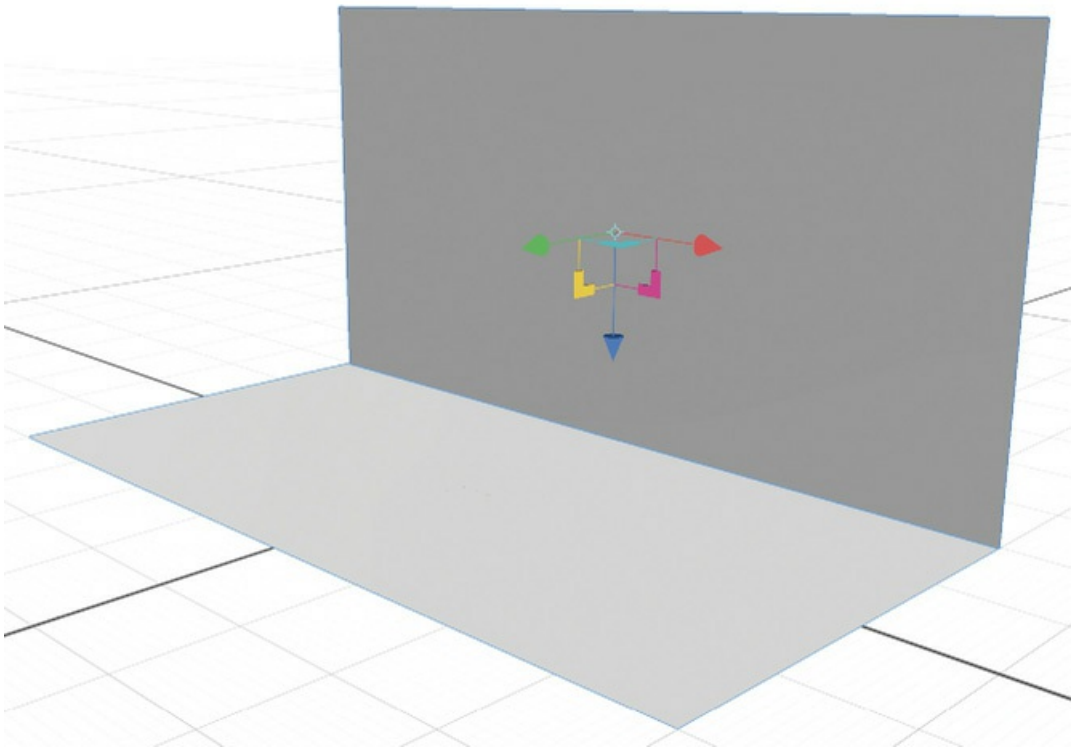
9. Drag the red arrow counterclockwise to rotate the plane until it is vertical (holding down the Shift key as you rotate will constrain your movement to 15° increments, making this easier).
10. Choose Object > Move to Ground to slide the plane up so its bottom edge rests on the ground plane.
11. Choose Camera > Frame All so that you can see both planes in their entirety.



12. Select the Select and Move tool (keyboard shortcut: V).
13. Drag the green arrow to the right until the vertical plane is aligned with the back of the horizontal plane.



14. In the Starter Assets list, locate the Aluminum material and drag it onto the vertical plane.
15. In the Starter Assets list, locate the American Cherry Wood material and drag it onto the horizontal plane.
16. Click somewhere on the canvas but not on either of the planes to deselect everything.
17. Select both of the Plane models, and choose Object > Lock/Unlock. You'll see a padlock icon appear next to the models in the Scene panel. Now you don't have to worry about bumping this "backdrop" as you position models on it.
18. Position a model or models on the bottom plane, adjust your camera angle as desired, and render your scene.

Review questions

1 What are two ways to import a background image into a scene?

2 What are the four things that the Match Image feature attempts to do?

3 If the Match Image feature doesn't get the perspective correct, what tool would you use to begin correcting the perspective?

4 What are two ways to access the Match Image command?

Review answers

1 You can import a background image into a scene by choosing File > Import > Image as Background or by dragging and dropping an image onto the canvas from the Mac Finder, Windows File Explorer, or Adobe Bridge.

2 The Match Image feature allows you to resize the canvas to match the image size or aspect ratio, create a custom environment light based on the background image, extract the direction and angle of the sunlight from the image, and match the perspective of the camera.

3 The Horizon tool is the primary tool you would use to correct or tweak perspective.

4 Match Image can be found in Image > Match Image, as well as in the Actions panel when a background image is selected.

11 Working with Lights

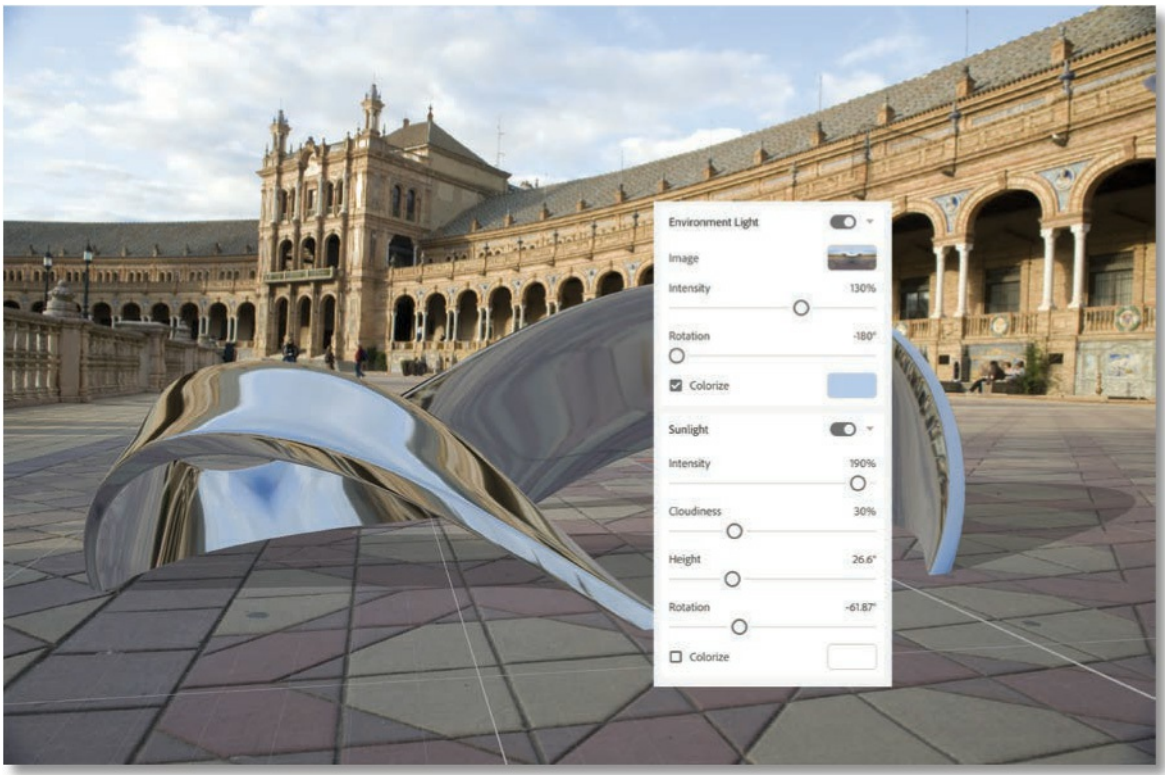
Lesson overview

In this lesson, you'll explore and apply lights in a 3D scene and learn the following:

- The difference between environment light and sunlight
- How to automatically create environment light from a background image
- How to change the properties of the sunlight
- How to load a new environment light and change its properties

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.



The Environment Light and Sunlight properties in Dimension allow you to create realistic looking highlights, shadows, and reflections.

Exploring two types of lights

Dimension files can contain two types of lighting: environment light and sunlight. Environment light provides general ambient lighting, shadows, and reflections. Sunlight refers to a strong directional light that can be manipulated separately from the environment light. A scene may contain only environment light, only sunlight, or both types of light.

The attributes of both types of lighting are controlled by settings in the Properties panel.

Experimenting with environment light

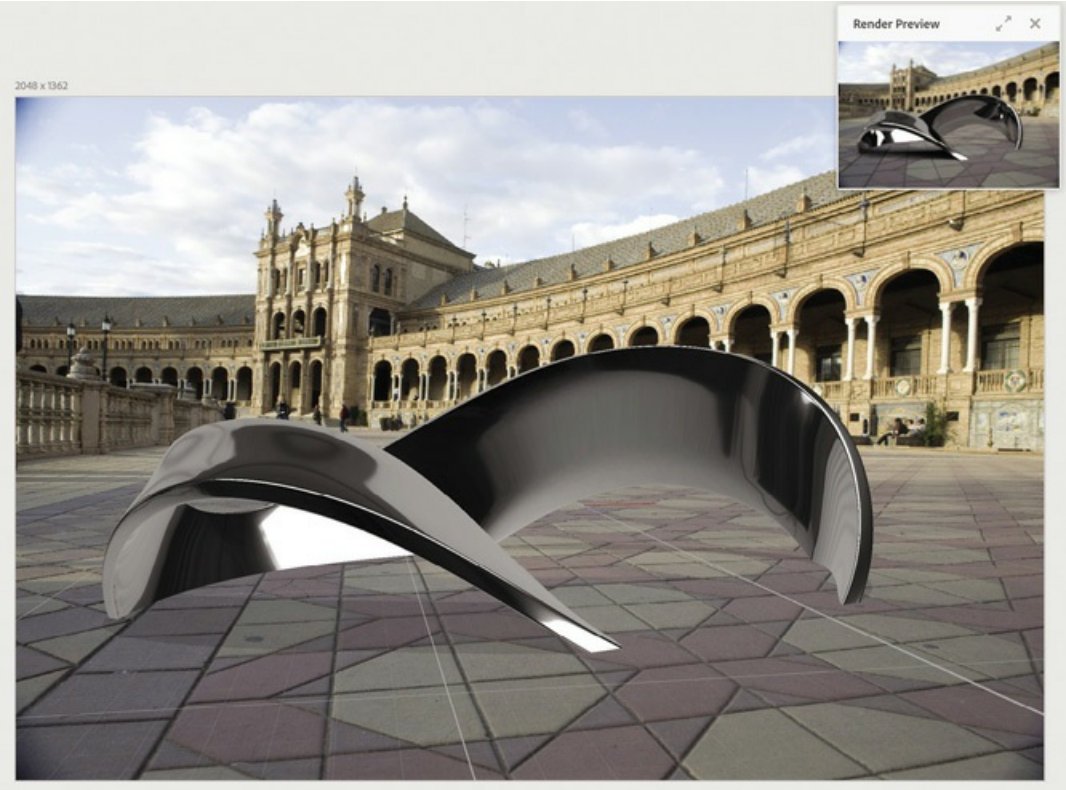
In this exercise, you'll experiment with the environment light in a partially completed scene and observe the results.

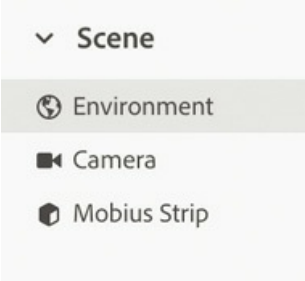
1. In Dimension, choose File > Open.
2. Select the file named Lesson_11_begin.dn, which is in the Lessons > Lesson11 folder that you copied onto your hard disk, and then click Open.

   To simulate what the plaza background image would look like with a modern sculpture added to it, I've placed the Mobius Strip model from the starter assets into the scene and applied the Metal material to the model surface. I've also already matched the camera perspective to the model and saved it as a camera bookmark. But I haven't yet done anything with the lighting.

3. Since the on-canvas render shows only a very rough approximation of lighting, you'll want to display the Render Preview window while you work on this lesson. To do this, click the Render Preview icon .

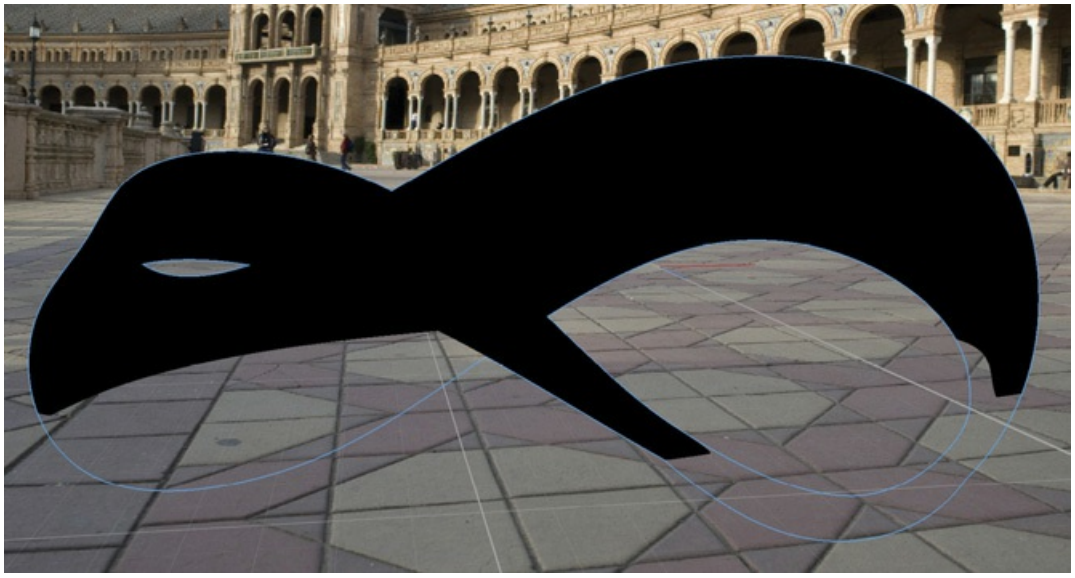
4. If your render preview defaults to full-screen view, click the Toggle Fullscreen icon at the top of the Render Preview window to view a smaller preview so you can see both the render preview and the canvas.





5. In the Scene panel, click Environment.
6. In the Properties panel, click the switch next to Environment Light to turn off the environment light.

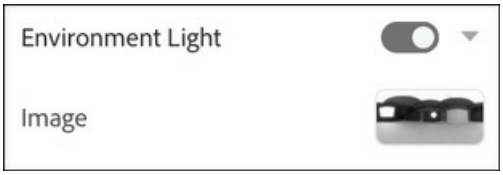
   You see that the model goes completely dark because there is no environment light or sunlight hitting the model surface. In the render preview, the ground plane also becomes completely black.



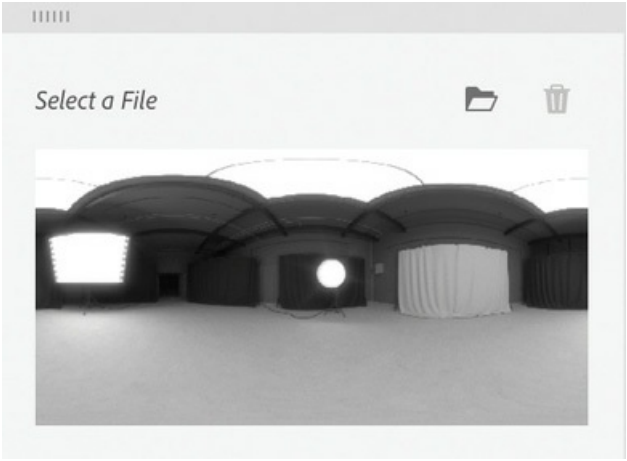
7. Click the switch next to Environment Light again to turn the environment light back on.

   You can see that the model has highlights and reflections on the metallic surface, but they don't seem to relate to the background image in any way.

8. In the Properties panel under Environment Light, click the image swatch next to Image.



   This displays the graphic that is being used for the environment light. This is the default environment light that is used for new files if no other environment light is specified. This default light simulates a typical studio lighting setup.

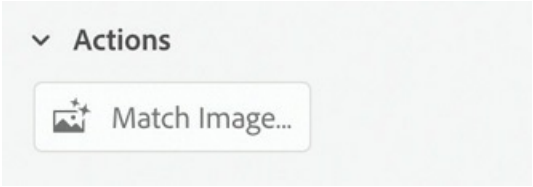


Create a custom environment light

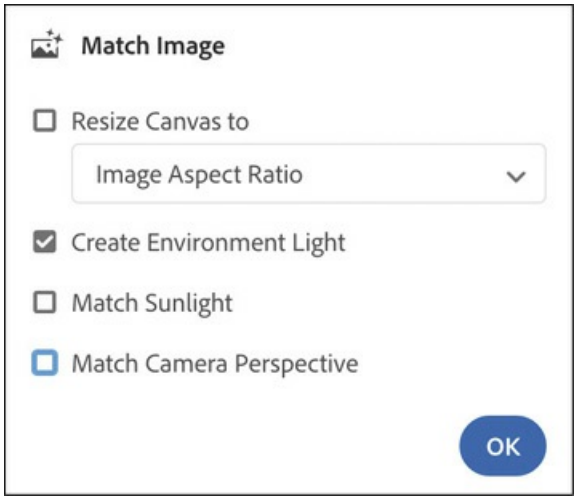
This scene would look much more realistic if the light hitting the model matched the light hitting the walls of the building and if the plaza and building were reflected on the shiny

surface of the model. Dimension can automatically extract this information from the background image for you.

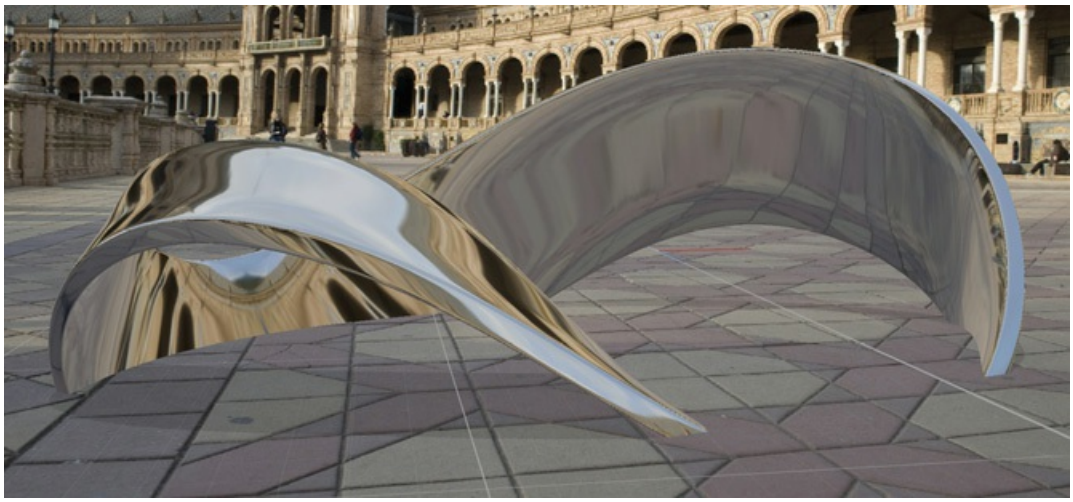
1. In the Actions panel, click the Match Image button.



2. Deselect all the options except Create Environment Light, and click OK.

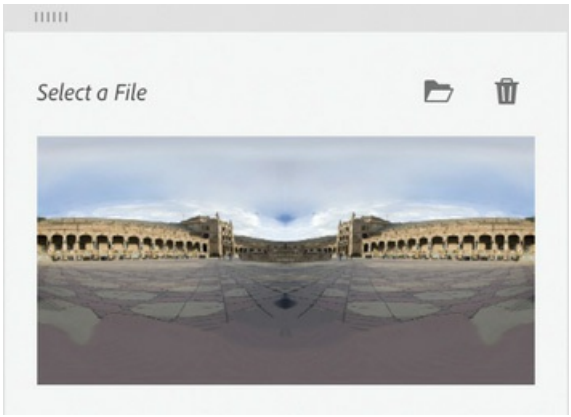


You'll see that the metallic surface reflects the pattern on the concrete and the arches on the building.



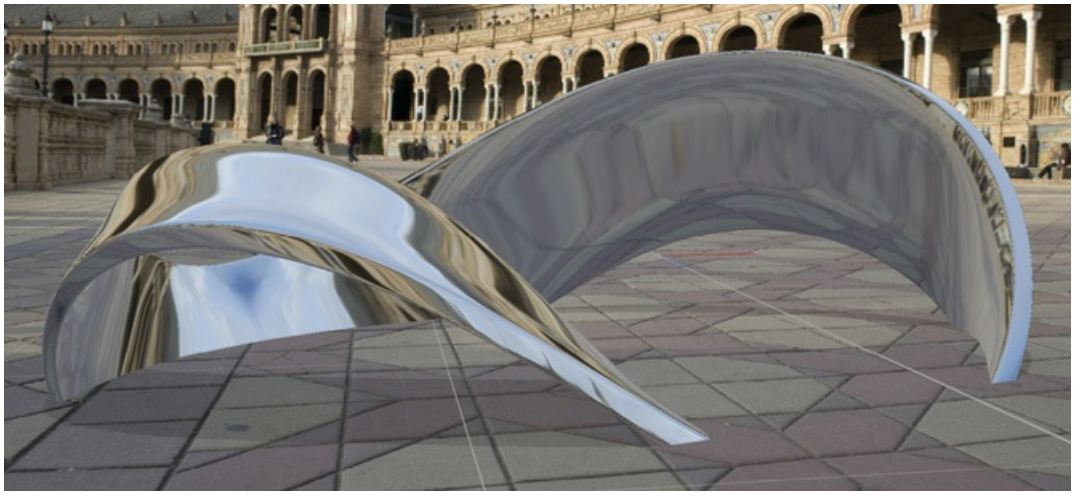
3. In the Properties panel under Environment Light, click the image swatch next to Image.

This displays a flat representation of the spherical image that Dimension automatically created from the background image.



4. Click the image swatch again to close the image picker.
5. In the Properties panel under Environment Light, increase Intensity to **130%**. This makes the model, but not the background image, brighter.
6. In the Properties panel, pull the Environment Light Rotation slider all the way to the left.

   As you pull the slider, you'll see the spherical projection of the environment light rotate horizontally, providing different reflections, highlights, and shadows on the model's surface.
7. In the Properties panel under Environment Light, click the white color swatch next to Colorize. Click the color sampler icon in the color picker, and click somewhere in the light blue area of the sky. You'll see the environment light take on a blue cast.



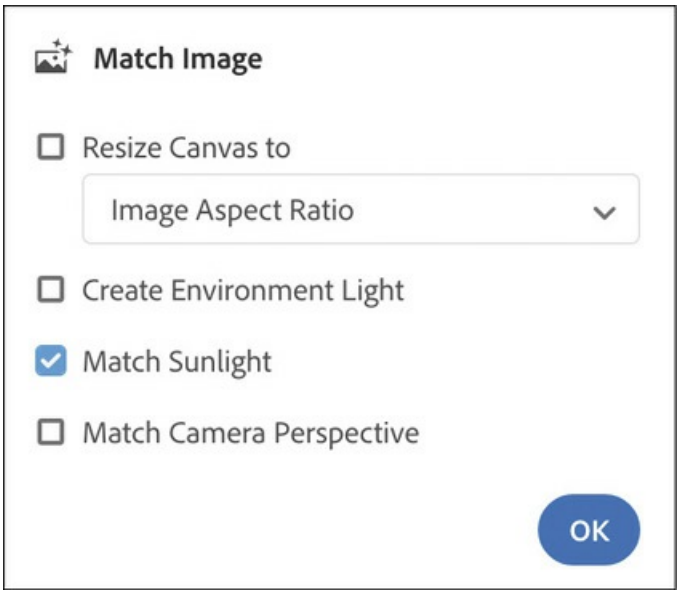
8. Select the model with the Select and Rotate tool (keyboard shortcut: R).
9. Drag the green rotation arrow to rotate the model around the x-axis. As you do so, you'll see the reflections, highlights, and shadows on the model surface change.
10. Select Edit > Undo Transform to rotate the model back to its original position.

Experimenting with sunlight

In addition to the environment light, a scene can contain a second light source, called

sunlight. Even though this light source is called sunlight and by default it has many of the properties of actual sunlight, think of it as just another light source. By manipulating its height, angle, intensity, and color, this light source can simulate a wide variety of directional light sources.

1. Click Environment in the Scene panel to select the environment.
2. In the Actions panel, click Match Image.
3. Deselect all the options except Match Sunlight, and click OK.



In the Properties panel, you'll see that the Sunlight option has been turned on, and the model is casting shadows on the ground as if the sun were somewhere over the viewer's left shoulder.

4. Click the disclosure arrow next to Sunlight to reveal the Sunlight options if they aren't already open.

Note

The Intensity property controls the brightness of the light generated by the sun. Dimension automatically makes the sun brighter when it's high and dimmer when it's near the horizon. You can manipulate the height of the sun with the Height slider in the Sunlight properties.

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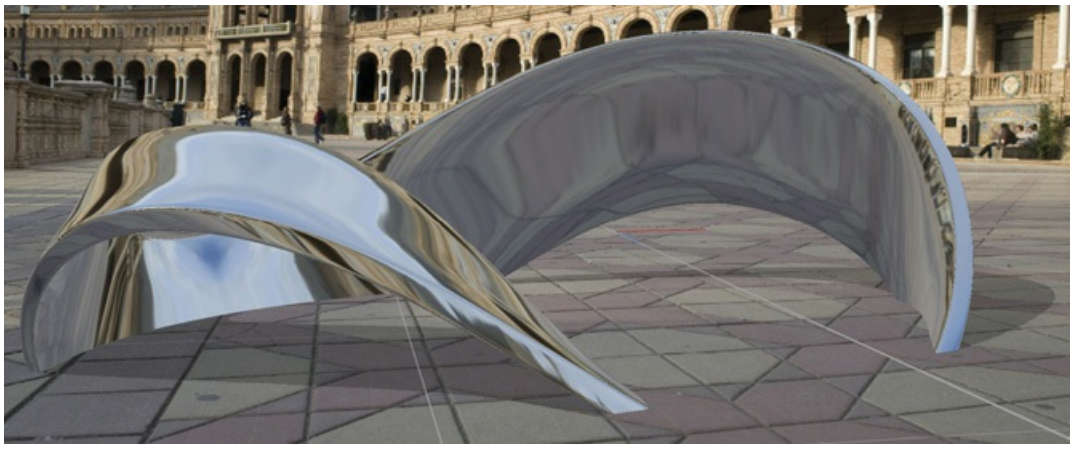
5. Increase the Intensity setting of the sunlight to **190%**. You should see the shadows being cast by the model get darker.



6. Drag the Cloudiness slider all the way to the left. You'll see the cast shadows get darker with a cloudiness of 0%.
7. Drag the Cloudiness slider all the way to the right. You'll see the cast shadows get lighter with a cloudiness of 100%.

   The Cloudiness property affects the "softness" of the cast shadows as well as the darkness. A cloudiness value of 0% creates shadows with hard edges, while a cloudiness value of 100% creates shadows with soft edges. This difference in the edges of the shadows doesn't display in the on-canvas preview; it displays only in the render preview or when the scene is rendered.

Note

In addition to changing the length of the shadows, the Height slider also changes the color of the light produced by the sun. A low sun angle produces reddish lighting, as you might find at dawn or dusk, while a value near 90° produces a bright white light, as you'd typically find near noon. This automatic coloring is overridden if the Colorize option is selected, which lets you choose your own color value for the sunlight.

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8. Experiment with the Height slider in the Sunlight properties.

   The Height property controls the vertical rotation of the sun. The sun remains shining from the same "direction," but the height in the sky changes. A value near 0° provides a very low light angle, producing long shadows. A value of 90° provides top-down lighting, as you would observe at noon, producing very short shadows.

9. Experiment with the Rotation slider in the Sunlight properties. This slider controls the horizontal rotation of the light around the scene, which changes the direction of the shadows.

Using a custom environment light

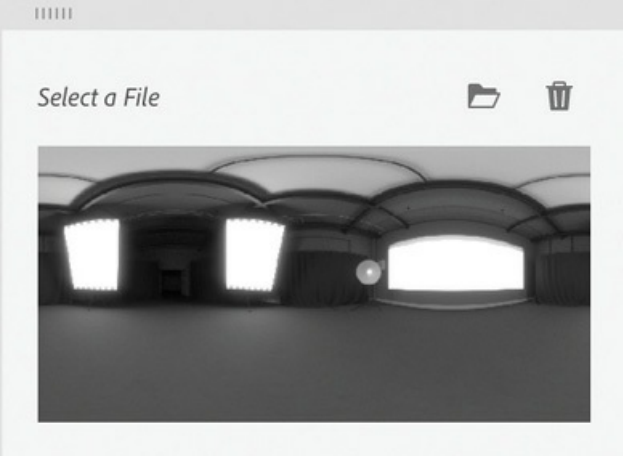
Instead of creating a custom environment light from a background image, you may wish to use a different image for the environment light. This is particularly useful for scenes where there is no background image or where the background image is very simple.

1. In the Properties panel, deselect the Background option.

   This will make the background image disappear from the scene. Note that even though the background image is no longer visible, the reflections on the model still show the background image, since the light created from the background image is still being applied to the scene.

2. Click the Add and Import Content icon at the top of the Tools panel, and choose Starter Assets.
3. Click the Lights icon to view only lights in the panel.
4. Click Studio Panels Light in the Content panel. Studio-style lighting will be applied to the scene, and the Sunlight will be turned off. The Render Preview window shows a much better preview of the reflections on the shiny metallic surface of the model.

5. Click the image swatch next to Image in the Properties panel to view the spherical representation of Studio Panels Light.



Tip

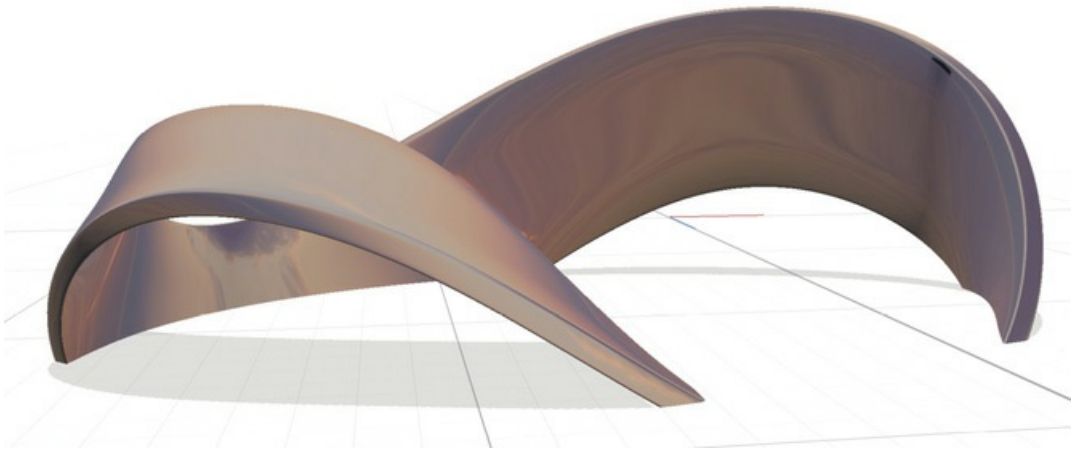
Hundreds of additional image-based environment lights, optimized specifically for use in Dimension, are available for purchase on Adobe Stock at stock.adobe.com.

6. Click some of the other lights in the Content panel to see the variety of lights that are available in the starter assets.

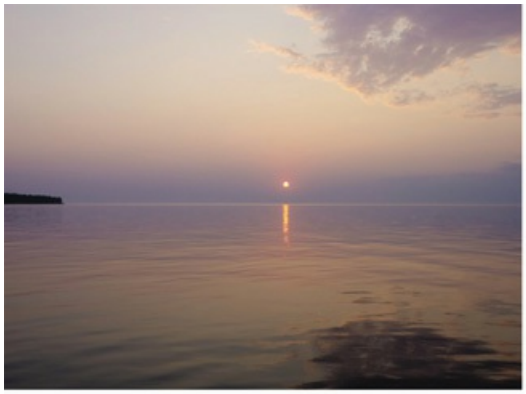
Use a bitmap image for the environment light

In addition to lights from the starter assets or Adobe Stock, you can also use any JPEG or PNG image as an environment light. When you do so, Dimension converts the image into a 360° panorama image, using Content Aware Fill technology from Photoshop to fill in the missing areas.

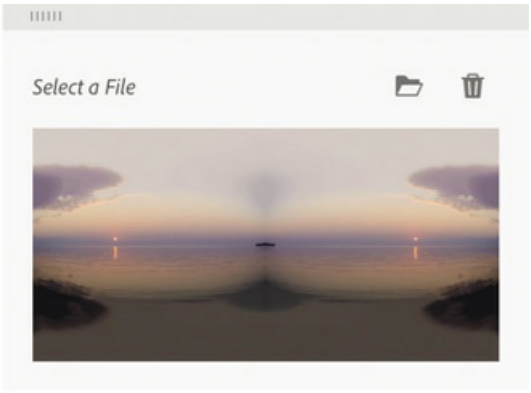
1. Choose File > Import > Image as Light.
2. Select the file named Sunrise.jpg, and click Open.



3. In the Properties panel, click the image thumbnail next to Image to see the spherical image that Dimension produced from the JPEG image.



Original JPEG image imported as a light



Spherical image created by Photoshop from the image

4. Select the Orbit tool (keyboard shortcut: 1), and rotate your view of the scene to view how the light appears on the model surface when the model is viewed from different angles.
5. Choose Camera > Switch to Home View to return to the original camera view.

Lights and file formats

When you use a JPEG or PNG image as an environment light, dramatic lighting and shadows are not produced, since the images are low dynamic range. The images provide only ambient lighting and reflections. You can add dramatic lighting and shadows with sunlight.

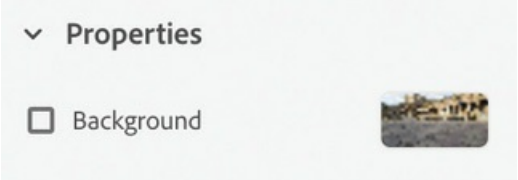
You can import an HDR or EXR image as an environment light. These high dynamic range images produce ambient lighting, reflections, and dramatic lighting and shadows.

You can import files in the IBL (Image Based Light) format as environment lights. IBL files are packaged containers that hold multiple images for lighting, reflections, and backgrounds in a single package. This format produces very realistic-looking lighting, but due to inconsistencies in the file format, some IBL files that you find on the web will import and some will not.

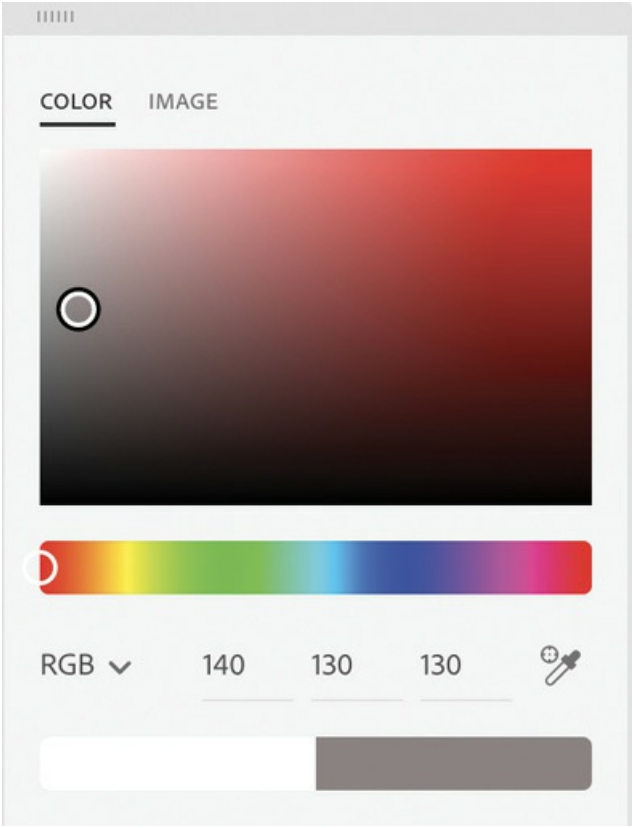
Experimenting with glow

There is one other source of light that a scene may contain: materials that glow.
The material called Glowing (in the starter assets) is an example of such a material. This material creates its own light, unlike all the other starter asset materials, which only reflect light by default.

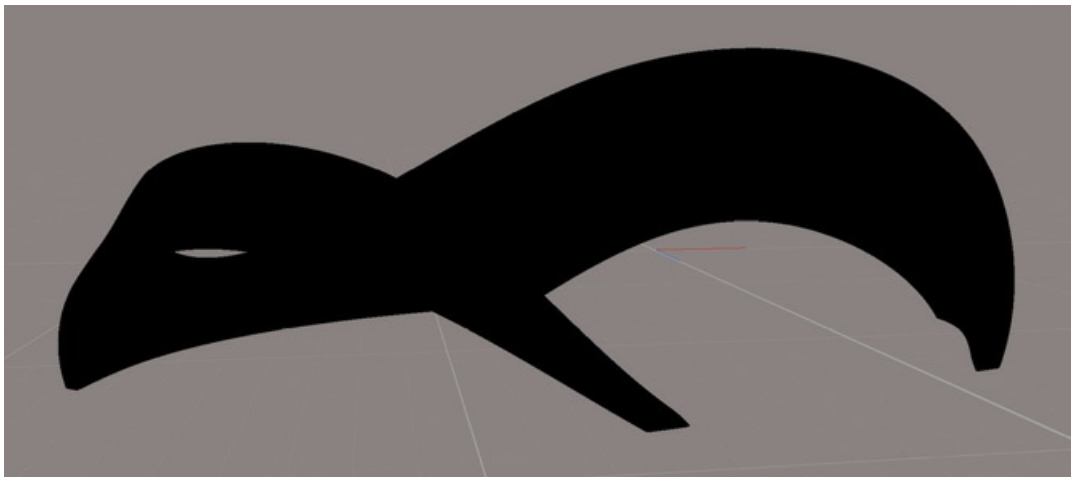
1. In the Properties panel, click the image swatch next to Background.



2. Click the Color tab.
3. Enter a value of **140** red, **130** green, **130** blue and then press the Esc key to close the color picker.
4. Click Environment in the Scene panel.

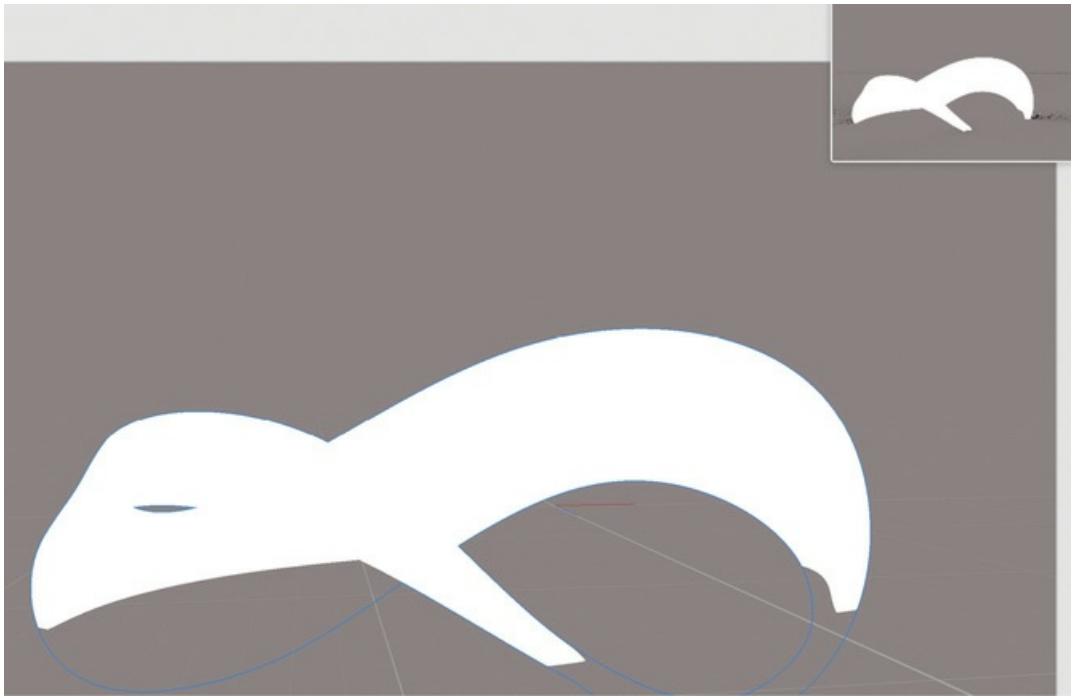


5. In the Properties panel, turn off Environment Light and Sunlight. You'll see the model turn completely black on the canvas since there is no light being produced by the environment or the sunlight to reflect off the model.



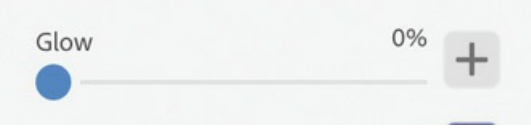
6. In the Content panel, click the Materials icon to view only materials in the panel.
7. Drag the Glowing material onto the model surface.

   Now the model is “glowing,” emitting light onto the dark ground plane. In the Render Preview window you should see faint shadows being created because of the light emitted by the model.



8. In the Content panel, locate the Brass material and drag it on to the Mobius Strip model.

   The model turns black again because there is no lighting in the scene and the Brass material doesn’t glow. But in the Properties panel, you’ll see that the Brass material has a Glow property.



9. Drag the Glow slider to **40%**, and you'll see the model emit light again.
10. In the Content panel, click the Model icon to view only models in the panel.

Tip

You can make any of the materials found in the starter assets "glow," or emit light, by dragging the Glow slider to the right.

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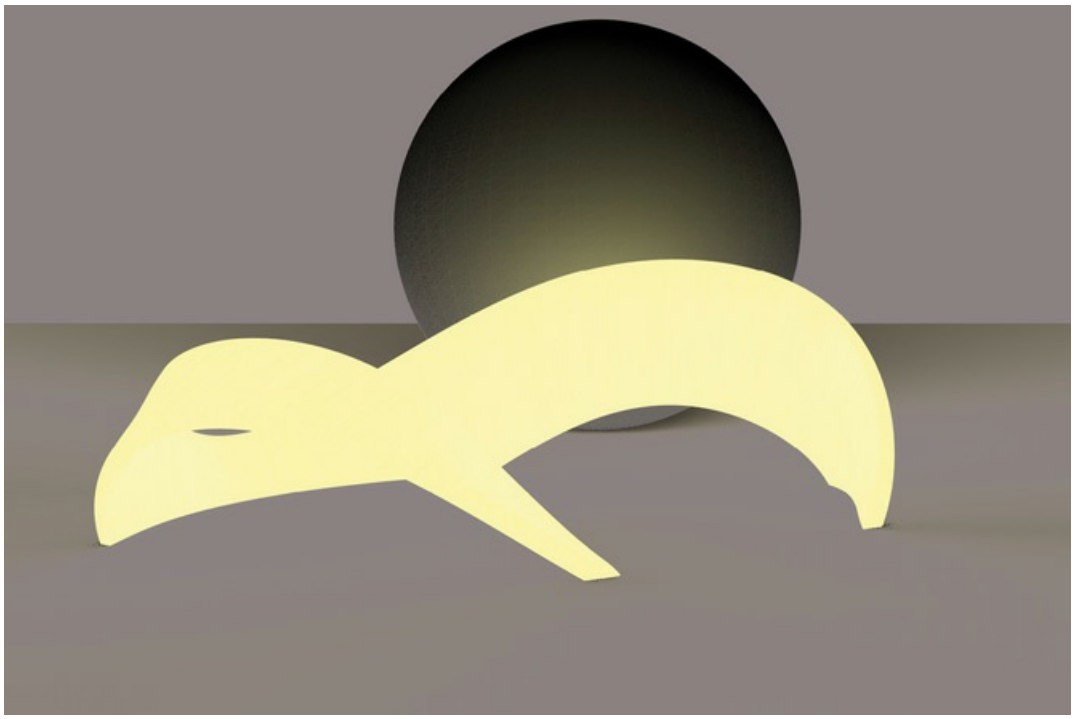
11. Locate the Sphere model, and click it to add it to the scene. It will be added behind the Mobius Strip model.

    In the Render Preview panel, you should see a faint yellow glow on the surface of the sphere. Light emitted from a material with a Glow property will light up other models in the scene.



Review questions

1 What are the three sources of light that can exist in a Dimension file?

2 What happens if a scene has no environment light and no sunlight?

3 What effect does the Cloudiness property have on a scene?

4 What effect does increasing the height of the sun have on a scene?

5 What file formats can be used for creating custom environment light?

Review answers

1 The three possible sources of light in a Dimension file are Environment Light, Sunlight, and a material with the Glow property.

2 Models in the scene become completely black, and the ground plane also becomes solid black.

3 Increasing the Cloudiness property makes cast shadows lighter and softens the edges of the shadows.

4 As you increase the angle of the sun, shadows grow shorter, and the color of the sunlight becomes more white.

5 Files in the following formats can be used to create custom environment light: IBL, JPEG, PNG, HDR, and EXR.

12 Pushing the Limits: Model- and Scene-Building Techniques

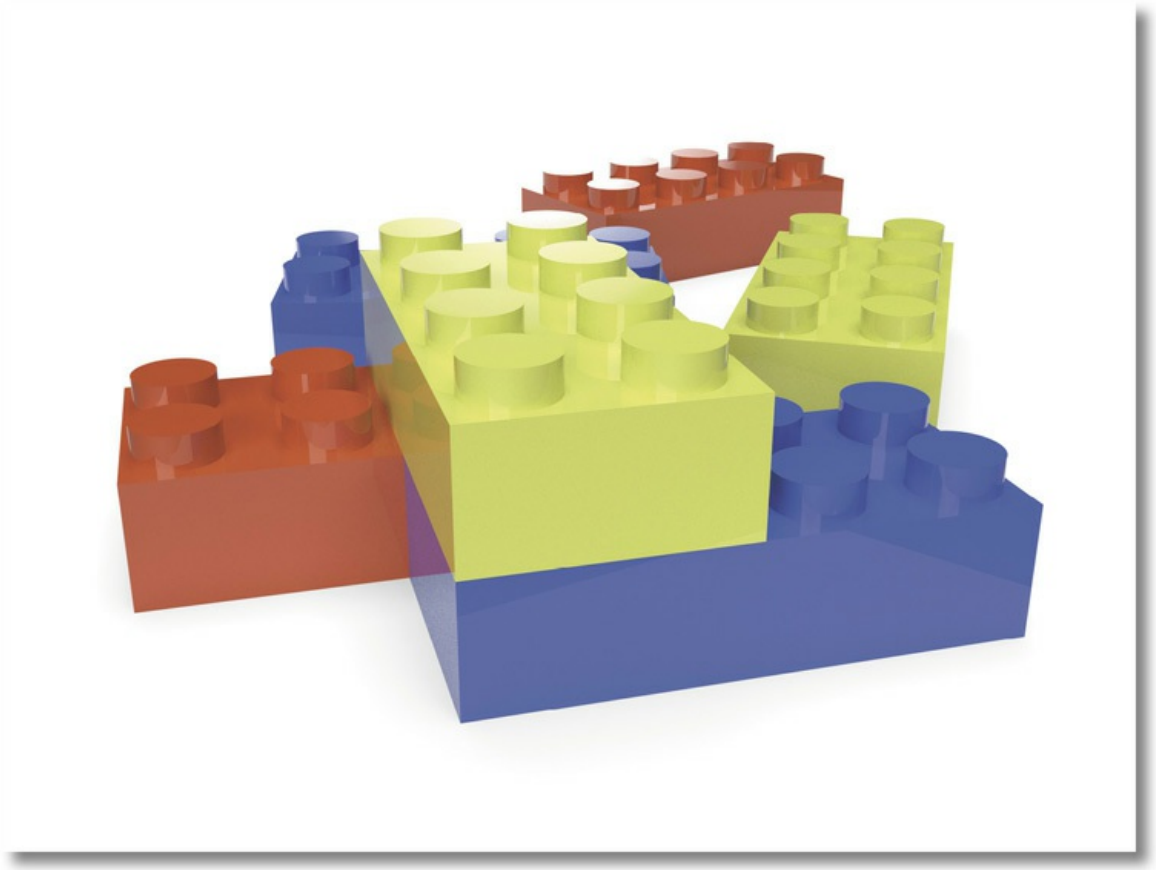
Lesson overview

In this lesson, you'll explore how to push the limits of what Dimension is intended to do by using it to assemble new models and scenes from parts of other models and simple geometric objects. You'll learn the following:

- How to locate and use the simple geometric shapes that come with Dimension to build more complex models and designs
- How to step and repeat objects to create geometric models
- The limitations of working with plane objects
- How to creatively extract and reuse parts and materials from other models in your scenes

This lesson will take about 60 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 isn’t really intended for building models from scratch. But with some ingenuity, you can assemble more complex models by combining and intersecting simpler models. Each of these bricks is a combination of eight cylinder models and a cube model.

Understanding Dimension’s intended use

Dimension isn’t intended to be a three-dimensional modeling program. It isn’t intended to be used to create models. It’s assumed that you’ll get your models from sources such as the Starter Assets, Adobe Stock, or elsewhere, and use Dimension to arrange these models, apply materials to their surfaces, customize the lighting, and pose them with a background image.

3D modeling software is typically quite complex to master, with a steep learning curve. But with some ingenuity and creativity, you can sometimes create a model right in Dimension by grouping geometric shapes and scavenging bits and pieces from other models.

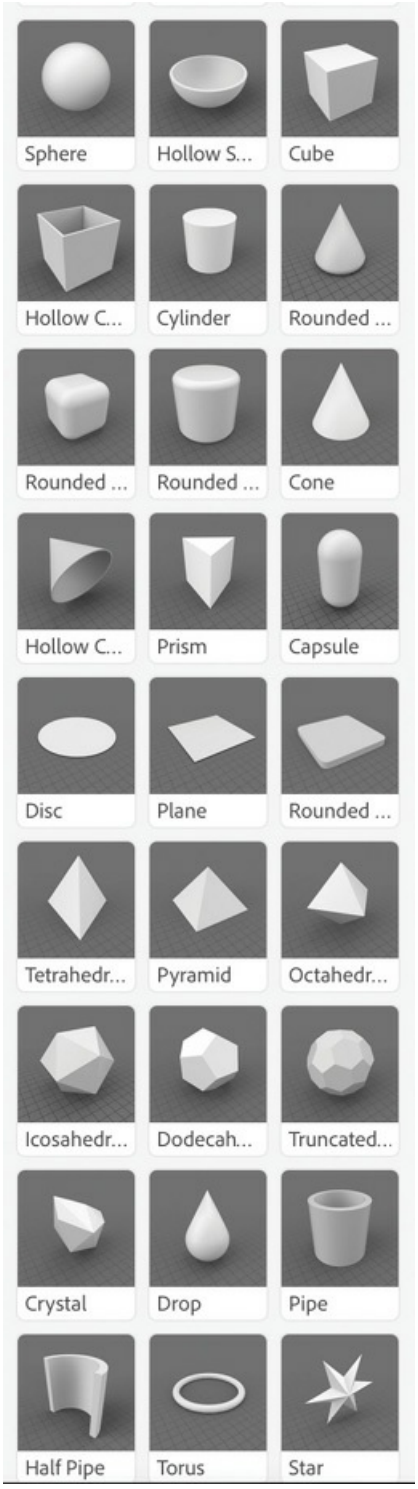
This lesson consists of a series of explorations to get you thinking about some of the possibilities for pushing the limits of modeling and scene building with Dimension.

Using geometric shapes from starter assets

The starter assets include the following geometric models:

- Sphere, Hollow Sphere
- Cube, Hollow Cube, Rounded Cube, Rounded Cube Flat
- Cylinder, Rounded Cylinder
- Cone, Hollow Cone, Rounded Cone
- Prism
- Capsule
- Disc, Plane
- Tetrahedron (4 sides), Pyramid (5 sides), Octahedron (8 sides), Dodecahedron (12 sides), Truncated Icosahedron (32 sides, the shape used for soccer balls)
- Crystal
- Drop
- Pipe, Half Pipe
- Torus
- Star
- Mobius Strip
- Abstract Curves

These models can be scaled, stretched, and combined in various ways and are much more useful for scene-building than they might first appear.

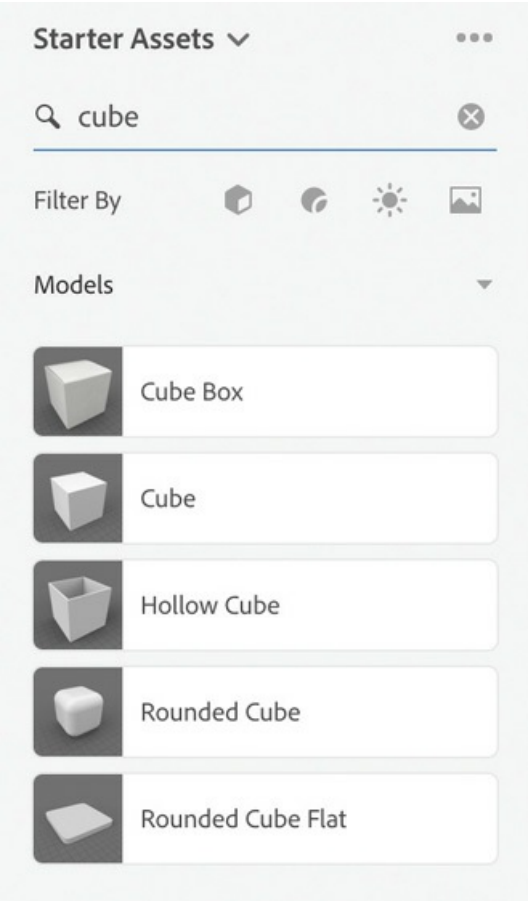


Build a Lego brick

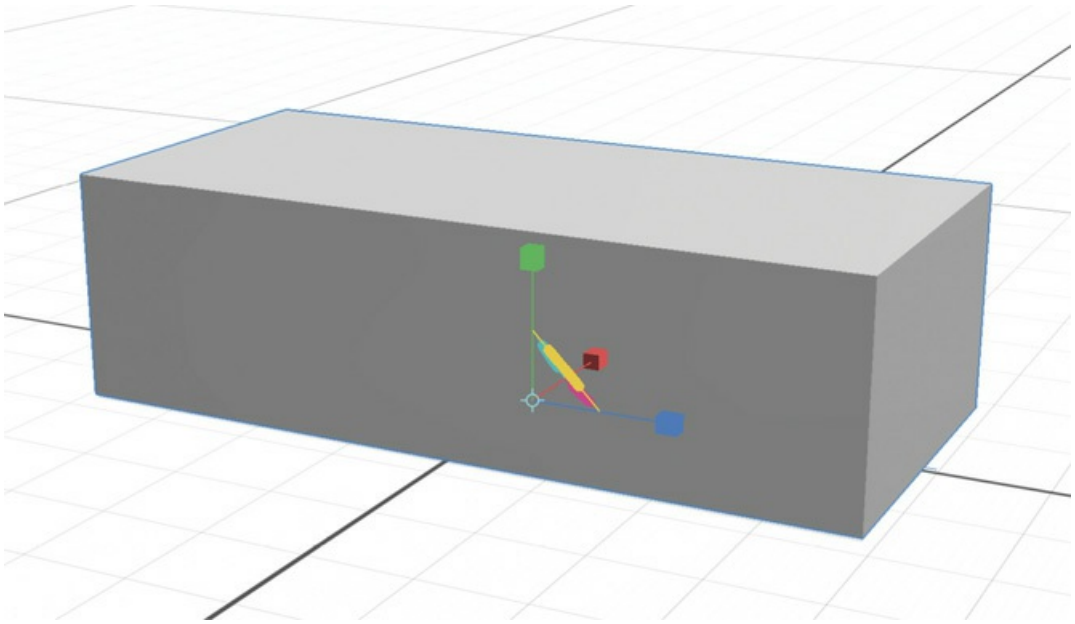
In this exploration, you'll use the Cube and Cylinder models to create a Lego-style brick.

1. Choose File > New to create a new document.

2. Click the Add and Import Content icon at the top of the Tools panel, and choose Starter Assets.
3. Type **cube** into the Search field at the top of the Content panel.



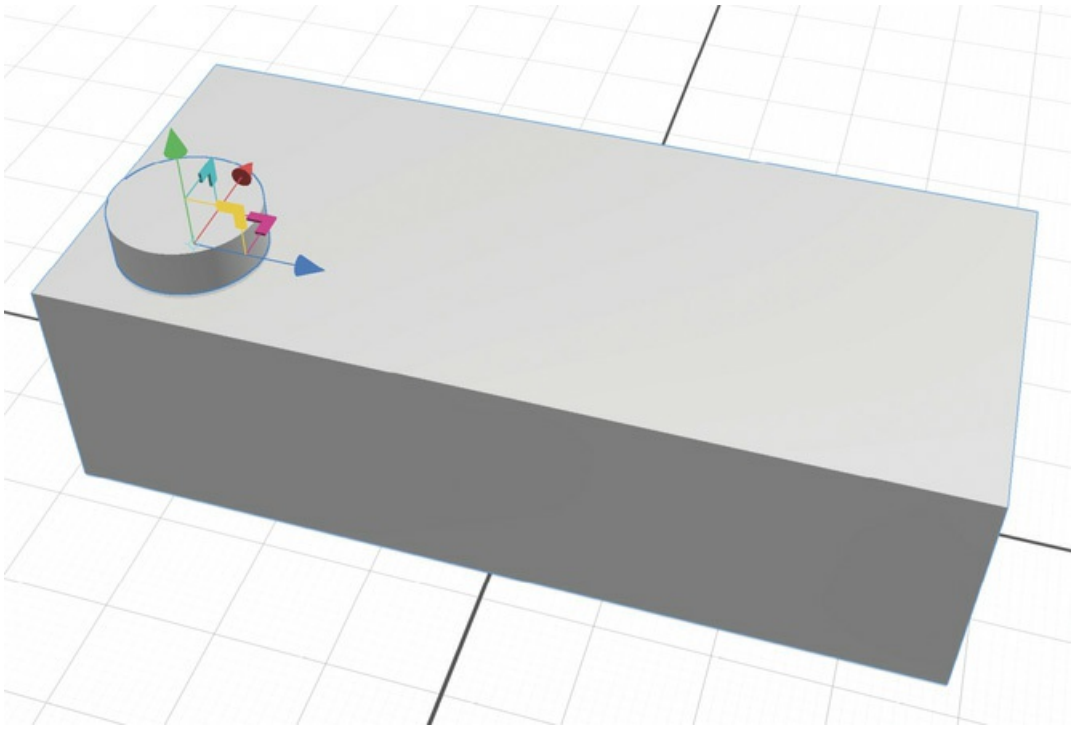
4. Click the Cube model to place the model in the scene.
5. Use the Select and Scale tool (keyboard shortcut: S) to stretch the cube into a rectangle the approximate proportions of a Lego brick.



6. Type **cylinder** into the Search field at the top of the Content panel.
7. Click the Cylinder model to place the model in the scene.
8. Choose Camera > Frame All so you can see all the models (the cylinder may be much larger than the Lego brick model that you scaled, depending on how you scaled the cube).
9. Use the Select and Scale tool (keyboard shortcut: S) and the Select and Move tool (keyboard shortcut: V) to size the cylinder to create one of the bumps at the top of the brick and move it into place.

   Because the brick is going to be totally opaque, it doesn't matter how far the cylinder sticks into the rectangle. In other words, there's no reason to fuss with trying to make the cylinder sit on top of the brick surface. The cylinder can instead be taller than you need it to be, with the extra cylinder height hidden in the brick interior.

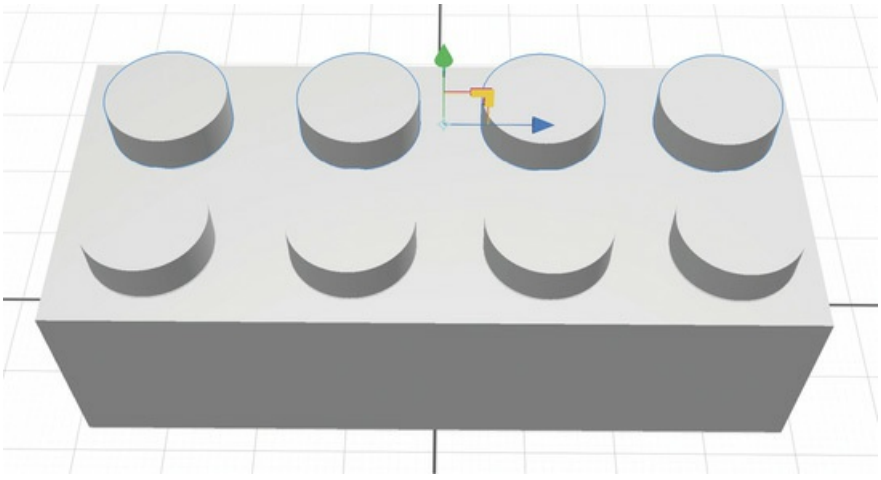
   You may need to use the camera tools (Orbit, Pan, and Dolly) to frequently change your view of the model as you size and position the cylinder.



10. Choose Edit > Duplicate seven times to create seven duplicate cylinders. Use the Select and Move tool (keyboard shortcut: V) to drag the duplicate cylinders into place on the brick.

    There is no Alignment function or Snap to Grid functionality to help you align the cylinders on the top of the brick. You must eyeball the position.

    Careful use of the Select and Move tool arrows can help with this somewhat—for instance, you could have dragged four of the cylinders in the Z direction so that they all line up in a row before duplicating all four in the X direction to create a second row.

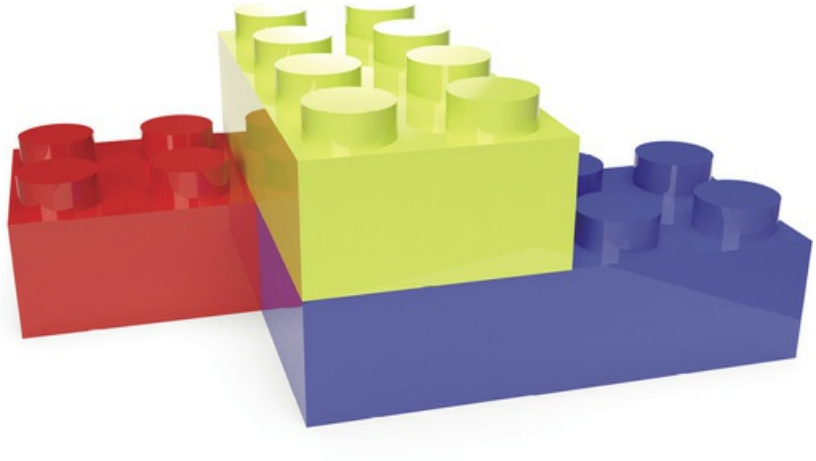


11. Select all the pieces of the brick by dragging around all the models with the Select and Move tool.
12. Choose Object > Group to group all the objects together.
13. Type **plastic** into the Search field at the top of the Content panel.
14. Click the Plastic material to apply it to the group.

15. Double-click anywhere on the Lego brick on the canvas to reveal the material applied to the model in the Scene panel.
16. Click the color swatch next to Base Color in the Properties panel, and select a bright red color.

    Even though you are changing the material color on only one of the models in the group, the color of all the models changes because the material is linked to all the models.

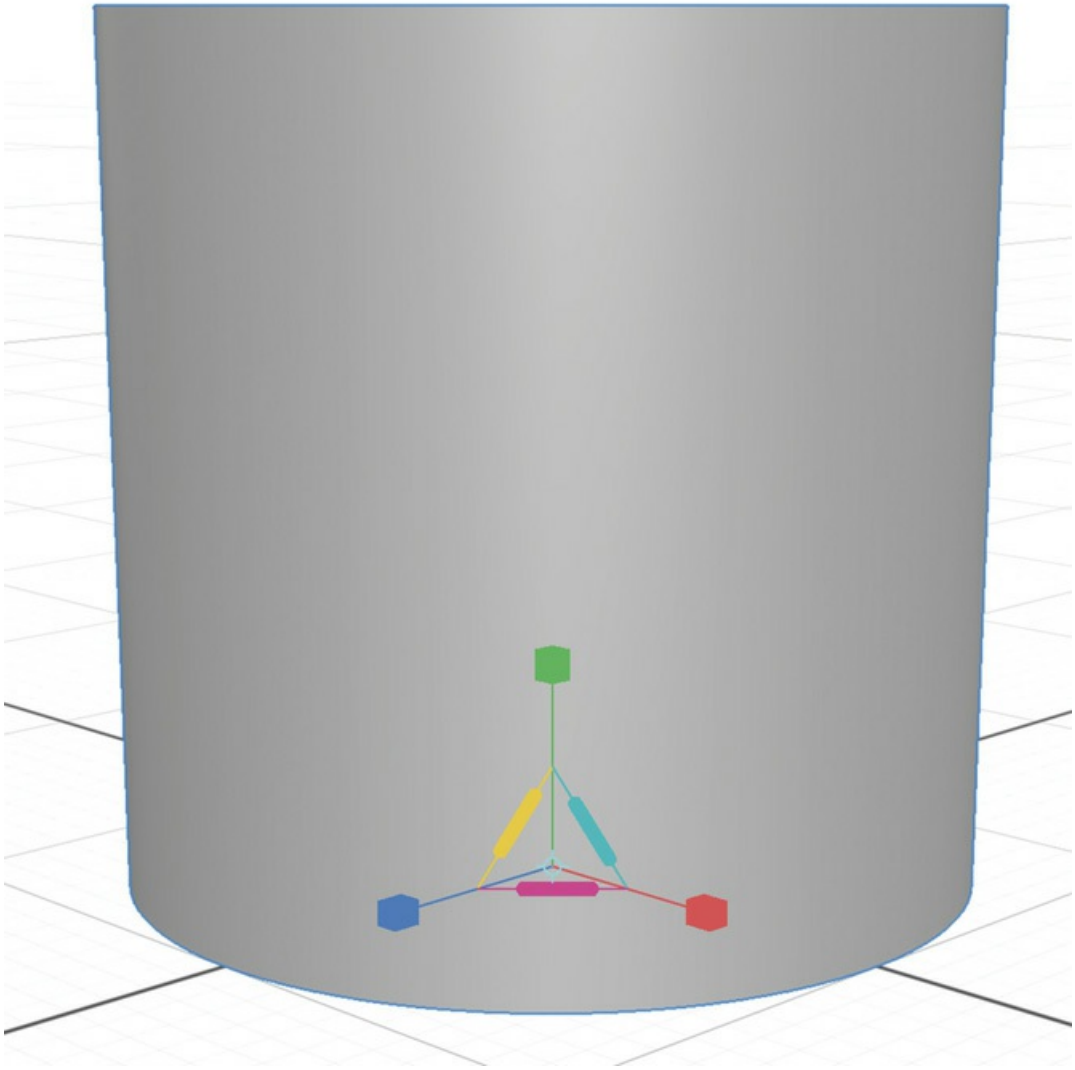
    You may wish to experiment further by duplicating the brick group, changing the color of the duplicate brick, and working to stack the bricks.



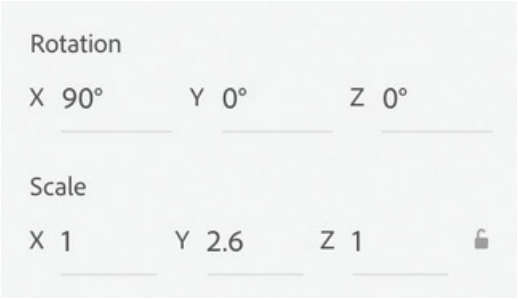
Build a submarine

In this exploration, you'll use the Capsule, Sphere, Cylinder, and Cube models to build a submarine model.

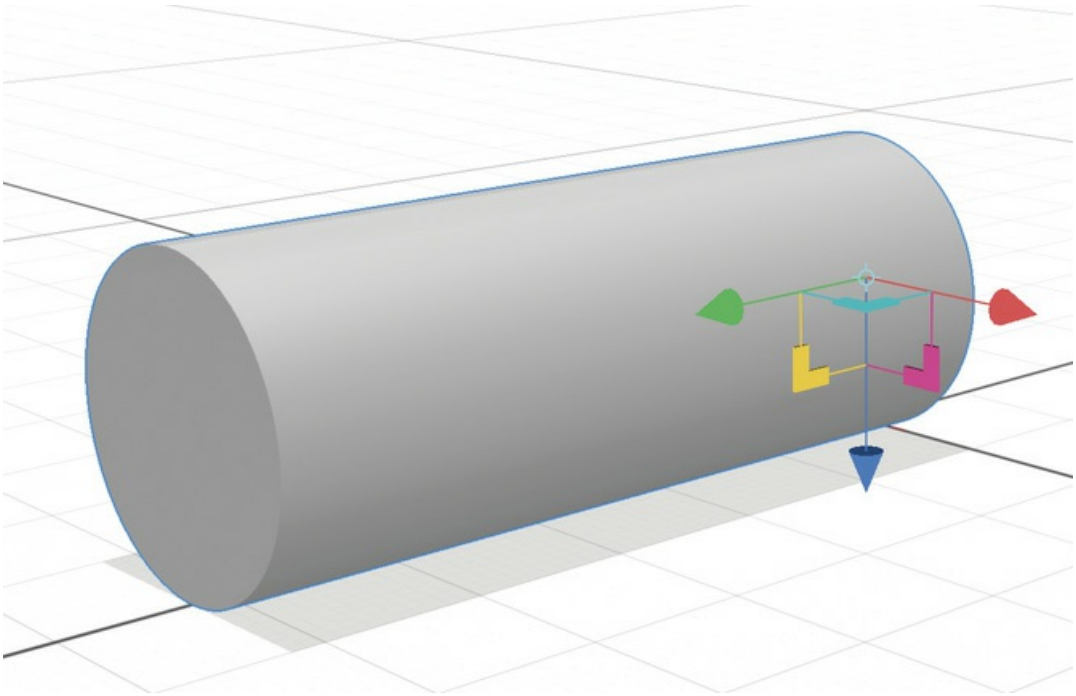
1. Choose File > New to create a new document.
2. Click the Add and Import Content icon at the top of the Tools panel, and choose Starter Assets.
3. Type **cylinder** into the Search field at the top of the Content panel.
4. Click the Cylinder model to place the model in the scene. This cylinder will be the main body of the submarine.



5. To rotate the cylinder so it is lying on its side, enter **90°** in the X Rotation field in the Properties panel.
6. To make the cylinder longer, enter **2.6** in the Y Scale field in the Properties panel.



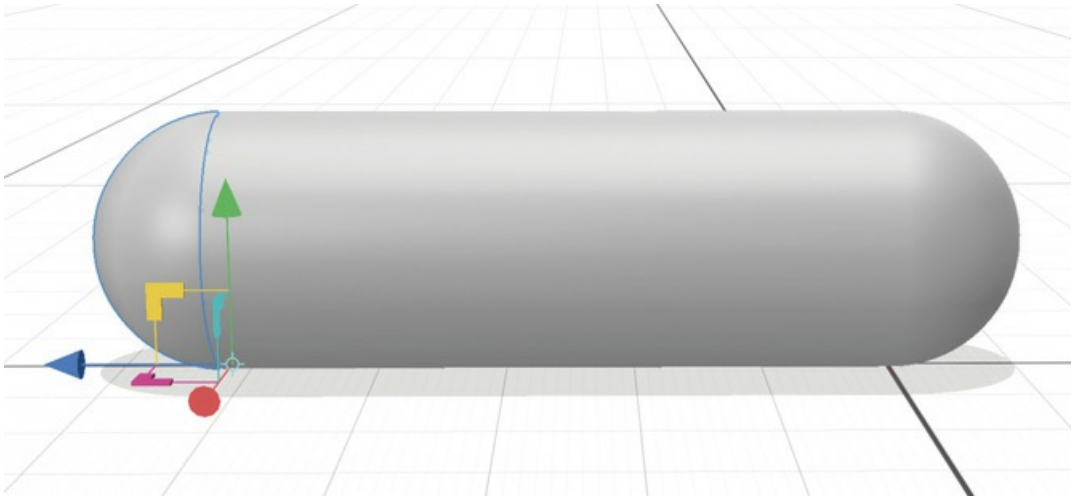
7. Select the Dolly tool (keyboard shortcut: 3) and pull down on the screen a bit so that you can see the entire cylinder.
8. Choose Object > Move to Ground so that the cylinder sits on the ground plane.



9. Type **sphere** into the Search field at the top of the Content panel.
10. Click the Sphere model to place the model in the scene. Since we haven't moved the cylinder from the zero point in the scene, the sphere aligns nicely with the cylinder.

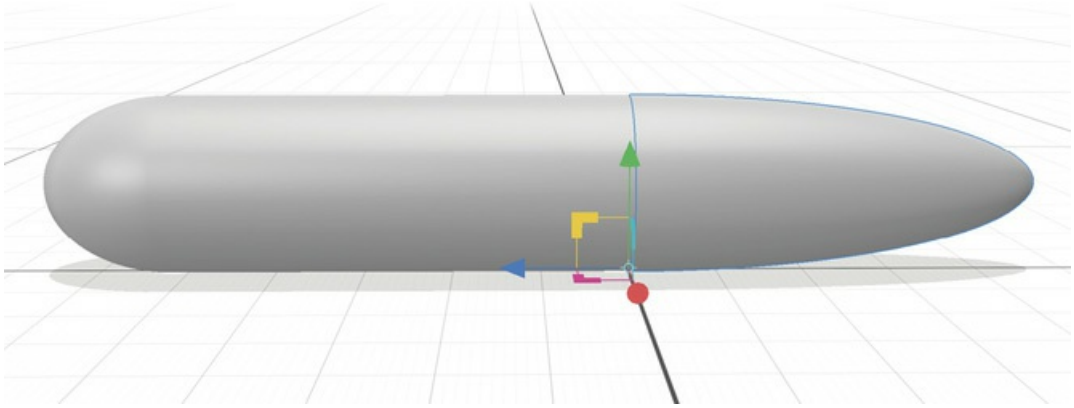
    To make it easier to align all the pieces that will compose the body of the submarine, it is easiest to leave each object in place at the "zero" location on the canvas as long as possible. That way, objects will often align with each other by default. So instead of moving the models, move the camera if you need to see the objects at a different angle.

11. Select the Orbit tool (keyboard shortcut: 1) and move the camera so that you are looking at the cylinder from the side.
12. Select the Sphere model with the Select and Move tool (keyboard shortcut: V), hold down the Option key (Mac) or Alt key (Windows), and drag the blue arrow to the left to duplicate the sphere and add it to the left end of the cylinder.

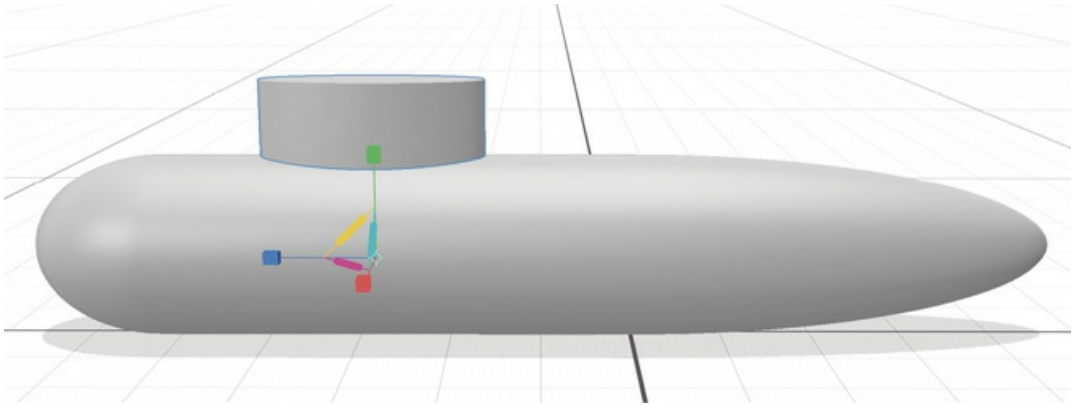


The sphere on the left will be the front of the submarine, and the cylinder the body. Now let's taper the front and back end of the submarine a bit.

13. To taper the front (left) sphere, enter **1.4** for the Z Scale in the Properties panel.
14. Select the sphere on the back (right) of the submarine, and enter **4.6** for the Z Scale in the Properties panel.



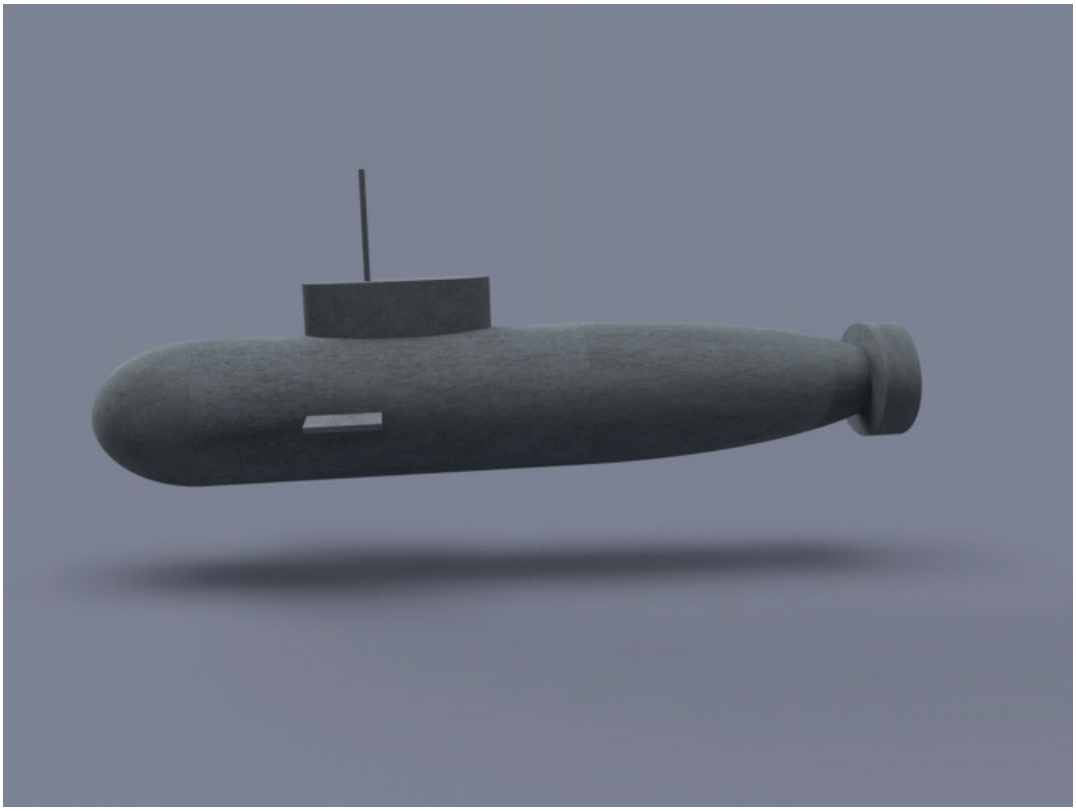
15. Click the Cylinder model in the Content panel to place another cylinder in the scene.
16. Use the Select and Scale tool (keyboard shortcut: S) and Select and Move tool (keyboard shortcut: V) to size and move the cylinder into place to create the conning tower on the top of the submarine.



17. Select the Orbit tool (keyboard shortcut: 1) and move the camera to examine the submarine from different angles.

If you've done everything correctly and constrained your scaling and movement of objects along the proper axes, the submarine should appear symmetric.

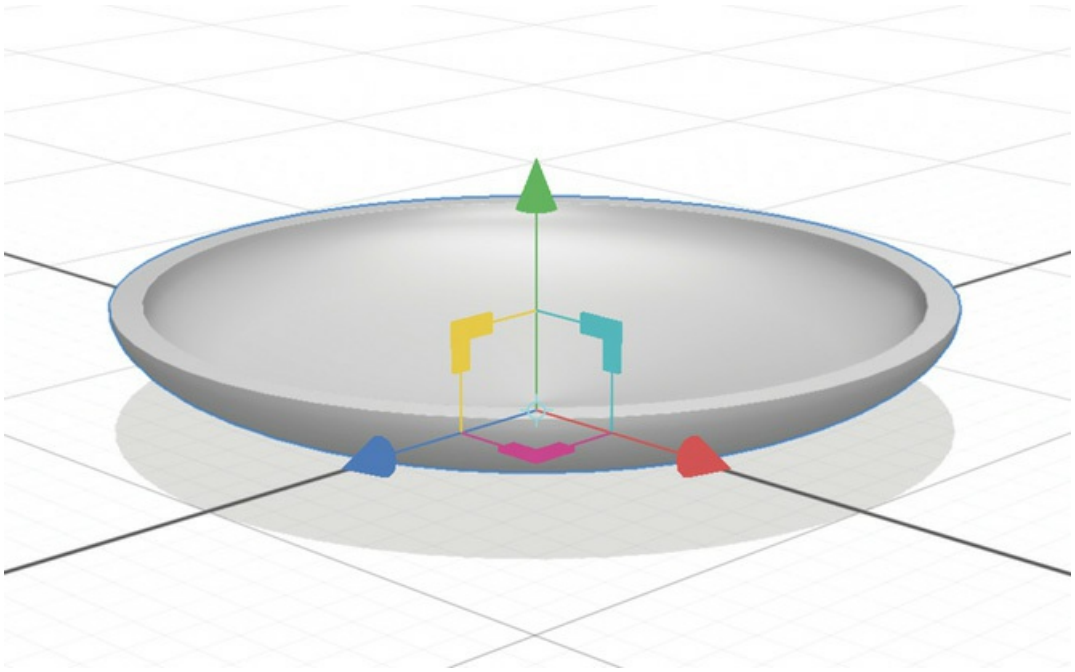
I'll leave it to you to add additional detail to the submarine. Refer to Lesson_12_02_end.dn for hints.



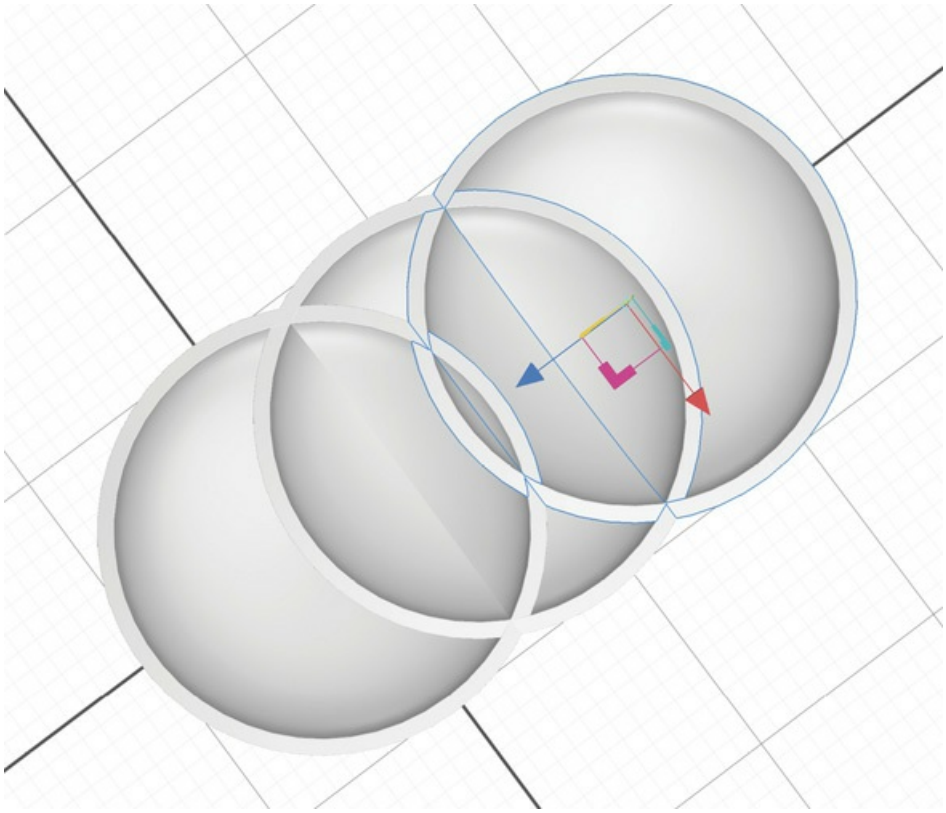
Create a 3D design

Next, you'll use multiple overlapping copies of a simple geometric shape to create an interesting 3D design.

1. Choose File > New to create a new document.
2. Click the Add and Import Content icon at the top of the Tools panel, and choose Starter Assets.
3. Type **hollow** into the Search field at the top of the Content panel.
4. Click the Hollow Sphere model to place the model in the scene.
5. Enter **.3** for the Y Scale in the Properties panel to flatten the sphere.

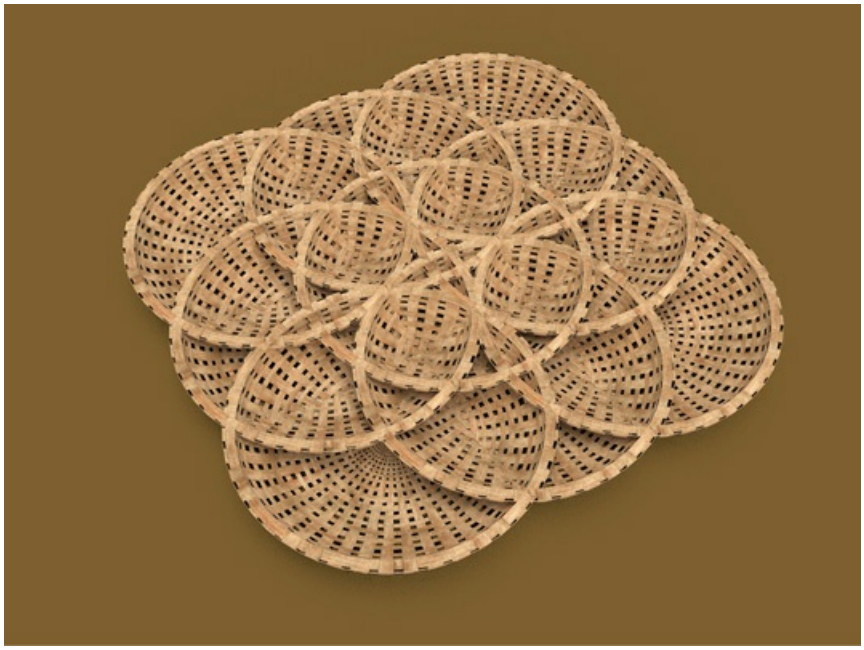


6. Select the Orbit tool (keyboard shortcut: 1) and move the camera so you are viewing the sphere from above.
7. Select the Select and Move tool (keyboard shortcut: V).
8. Hold down the Option key (Mac) or Alt key (Windows), and drag the blue arrow to the right to create a duplicate sphere to the right of the original sphere. Leave the spheres so that they are partially overlapping.
9. Select the second sphere, hold down the Option/Alt key again, and drag the blue arrow to the right to create a third overlapping instance of the sphere.



10. Drag around the three spheres to select all three.
11. Hold down the Option/Alt key and drag the red arrow down to create three more overlapping spheres.

Experiment with creating duplicates and overlapping spheres in interesting ways, creating new patterns as desired.



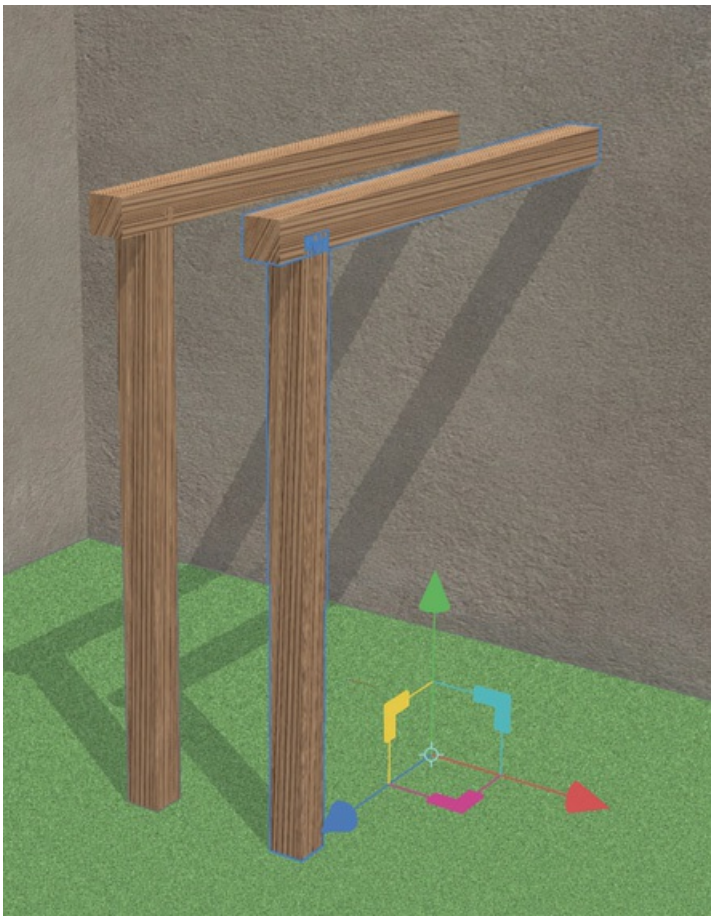
Using step and repeat creatively

Unfortunately, there is no “step and repeat” command in Dimension. Nor is there any way to repeat the last transformation, as there is in Adobe Illustrator. But with some effort, you can still do precise step and repeat in Dimension.

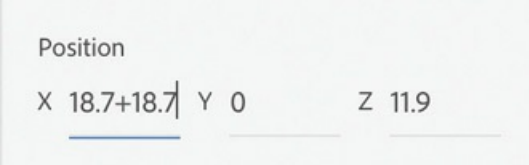
1. Choose File > Open.
2. Select the file named Lesson_12_04_begin.dn, which is in the Lessons > Lesson12 folder that you copied onto your hard disk, and then click Open.

   The scene I’ve started for you consists of two “walls” and a “floor,” created with the Plane model, as well as the beginnings of a wood garden arbor. I created the garden arbor by stretching two cubes non-proportionally. You’ll use step and repeat to create a finished arbor design.
3. Select the Select and Move tool (keyboard shortcut: V).
4. Click Arbor Unit in the Scene panel to select the vertical and horizontal pieces of wood that make up the arbor.

   In the Properties panel, note that the Arbor unit is positioned at an X position of 0.
5. Hold down the Option/Alt key, and drag the red arrow to the right to create a duplicate of the arbor unit.



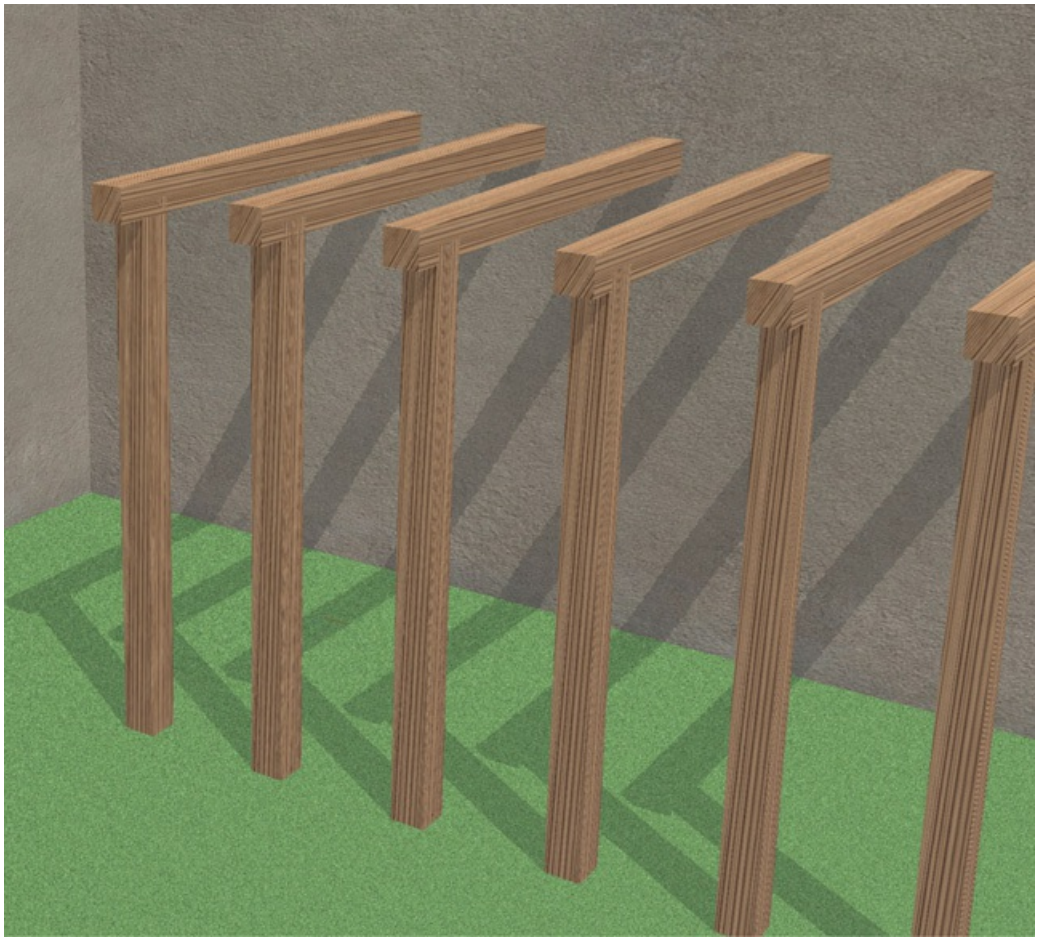
6. Make a note of the X position of the duplicated arbor unit in the Properties panel.
7. Choose Edit > Duplicate to create a duplicate of the second arbor unit. The duplicate won't be visible in the scene because it is directly on top of the second arbor unit.
8. In the Properties panel, click after the X Position value, press + (the plus sign), and then enter the X position you made note of in step 6. Press Enter/Return when you are finished.



9. With the third arbor unit selected, choose Edit > Duplicate again.
10. In the Properties panel, click after the X Position value, type + (the plus sign), and then enter the X position you made note of in step 6. Press Enter/Return when you are finished.

Repeat this process as many times as necessary.

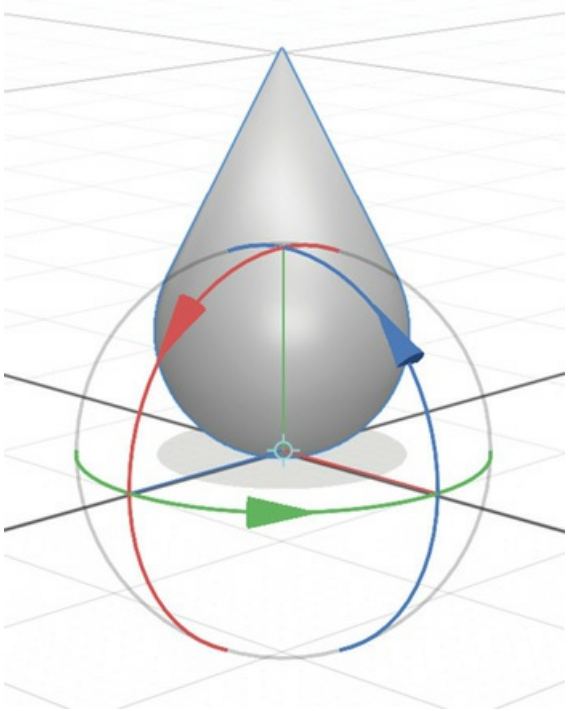
Using this method, you are able to step and repeat the object precisely, ensuring that the objects are equally spaced.



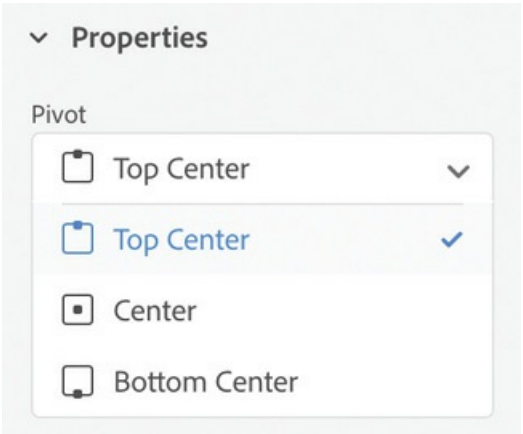
Rotational step and repeat

The ability to choose a pivot point of Top Center, Center, or Bottom Center in the Properties panel is useful for stepping and repeating the rotation of objects.

1. Choose File > New to create a new document.
2. Click the Add and Import Content icon at the top of the Tools panel, and choose Starter Assets.
3. Type **drop** into the Search field at the top of the Content panel.
4. Click the Drop model to place the model in the scene.
5. Select the Dolly tool (keyboard shortcut: 3) and drag down on the canvas so there is more room above the Drop model.
6. Select the Select and Rotate tool (keyboard shortcut: R).

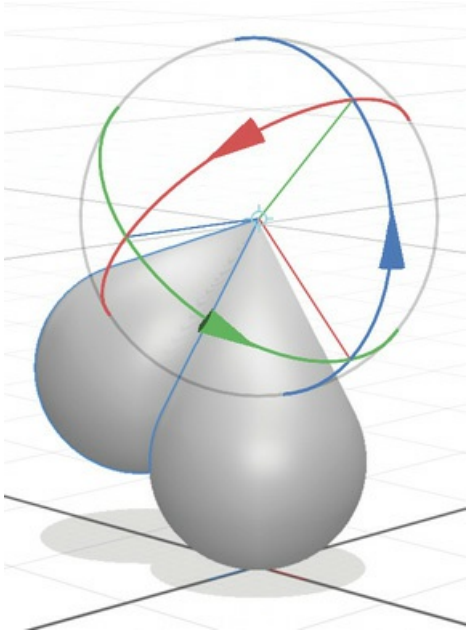


7. In the Properties panel, choose Top Center for the Pivot property.

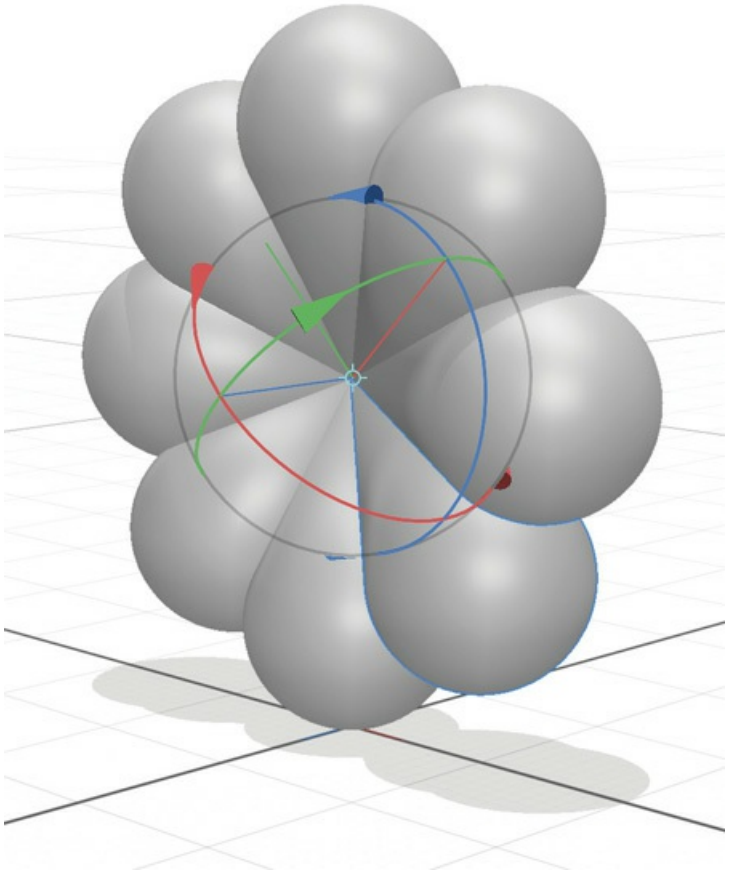


8. Hold down Option+Shift (Mac) or Alt+Shift (Windows).

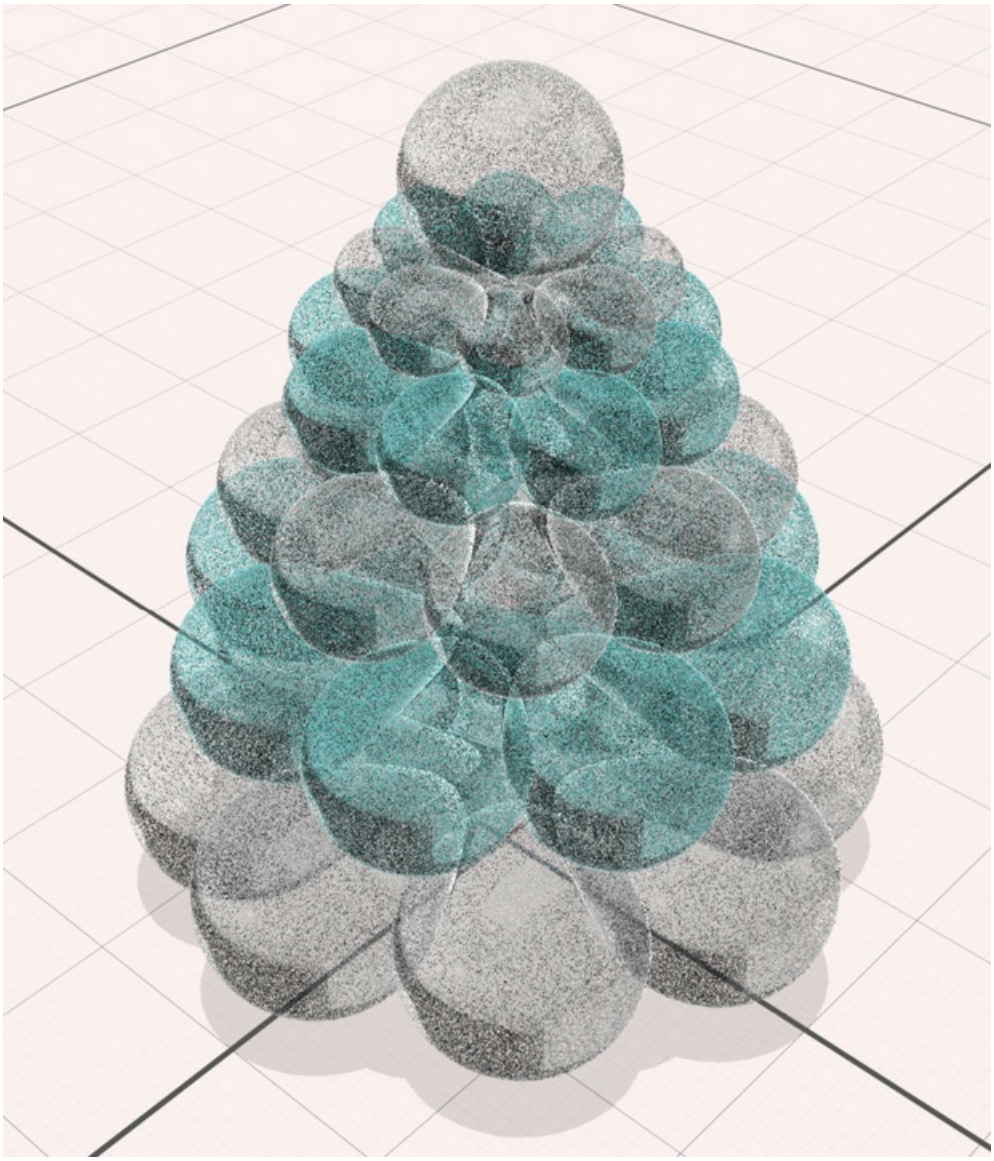
9. Drag the blue arrow clockwise until the Z Rotation value in the Properties panel displays –45°. (Holding down the Option/Alt key duplicates the object as you rotate it, and holding down the Shift key constrains the rotation to 15° increments.)



10. Repeat steps 8 and 9 six more times, rotating the new duplicate –45° each time.



Extra credit: Rotate the collection of drops 90°, and then stack and scale duplicates of the drops to create artwork like that shown here.



Rotational step and repeat workaround

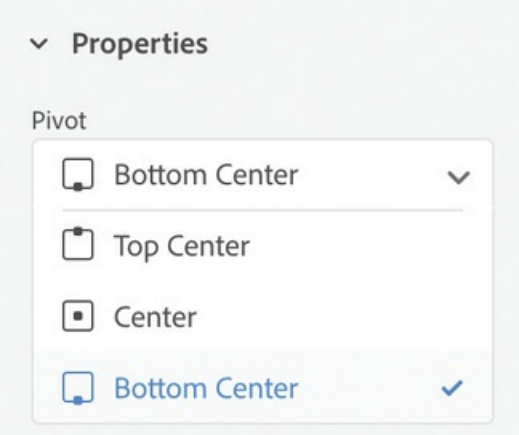
Dimension doesn’t offer any way to rotate a model around a point that isn’t on the model itself. Sure, you can choose a pivot point of Top Center, Center, or Bottom Center in the Properties panel, but those three options refer to points on the model itself. What can you do if you need to rotate an object around another point in space? Here’s a sneaky trick that will get the job done.

1. Choose File > Open.
2. Select the file named Lesson_12_06_begin.dn, which is in the Lessons > Lesson12 folder that you copied onto your hard disk, and then click Open.

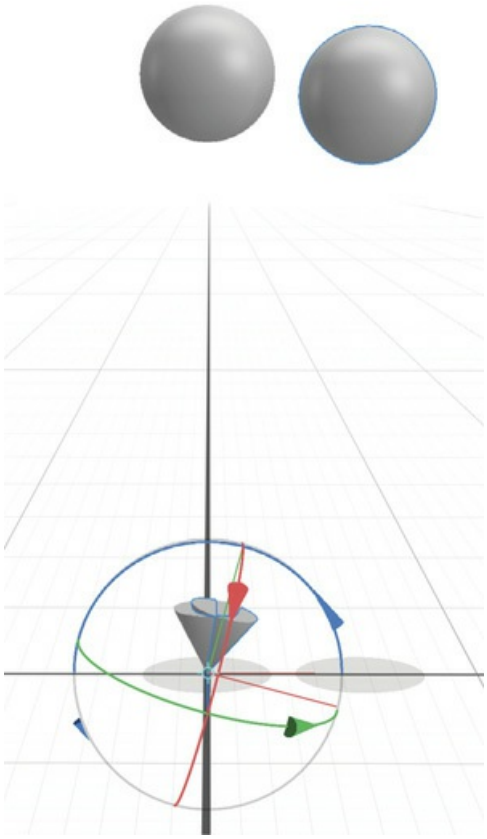
   The scene I’ve started for you consists of a sphere to be rotated, as well as a cone that I’ve

placed at the point around which we will rotate the sphere.

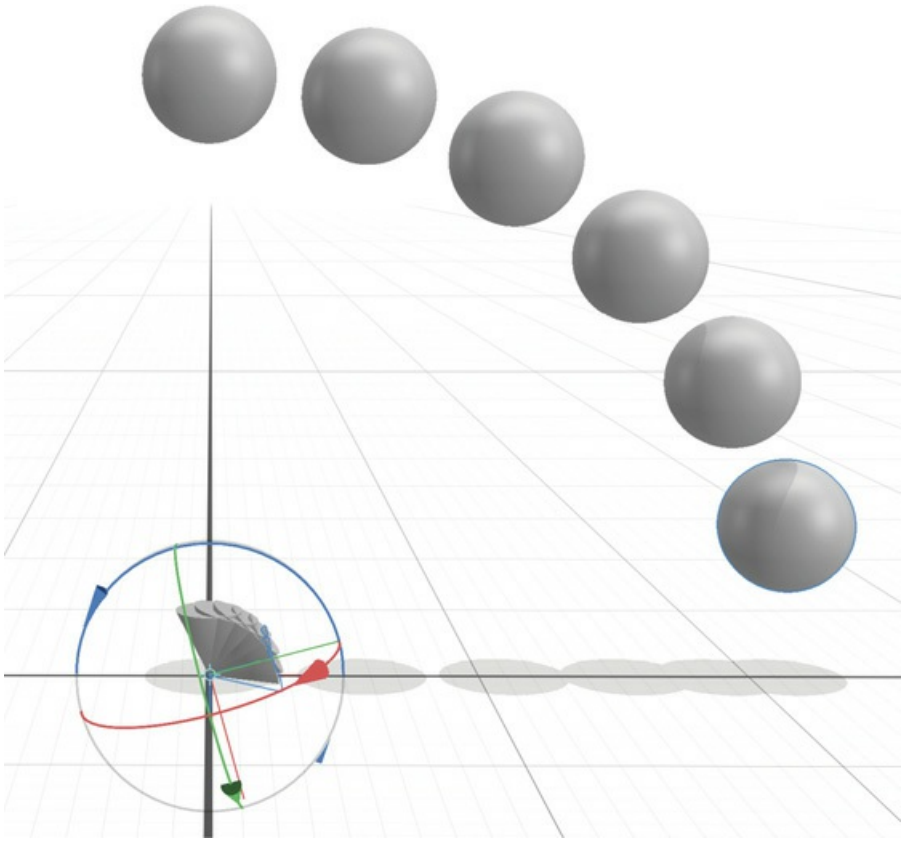
3. Select the Select and Rotate tool (keyboard shortcut: R).
4. Click the Sphere model on the canvas, and then hold down the Shift key and click the Cone model to select both models.
5. Choose Object > Group to group the two objects together.
6. Choose Bottom Center for the Pivot property in the Properties panel.



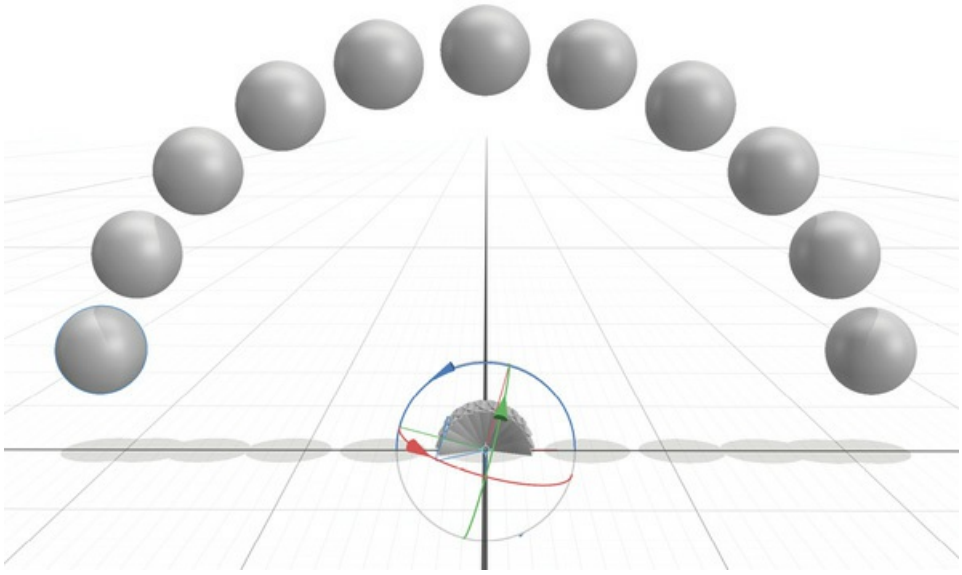
7. Hold down Option+Shift (Mac) or Alt+Shift (Windows), and drag the blue arrow clockwise until the Z Rotation value in the Properties panel displays –15°. (Holding down the Option/Alt key duplicates the object as you rotate it, and holding down the Shift key constrains the rotation to 15° increments.)



8. Repeat step 7 four more times.

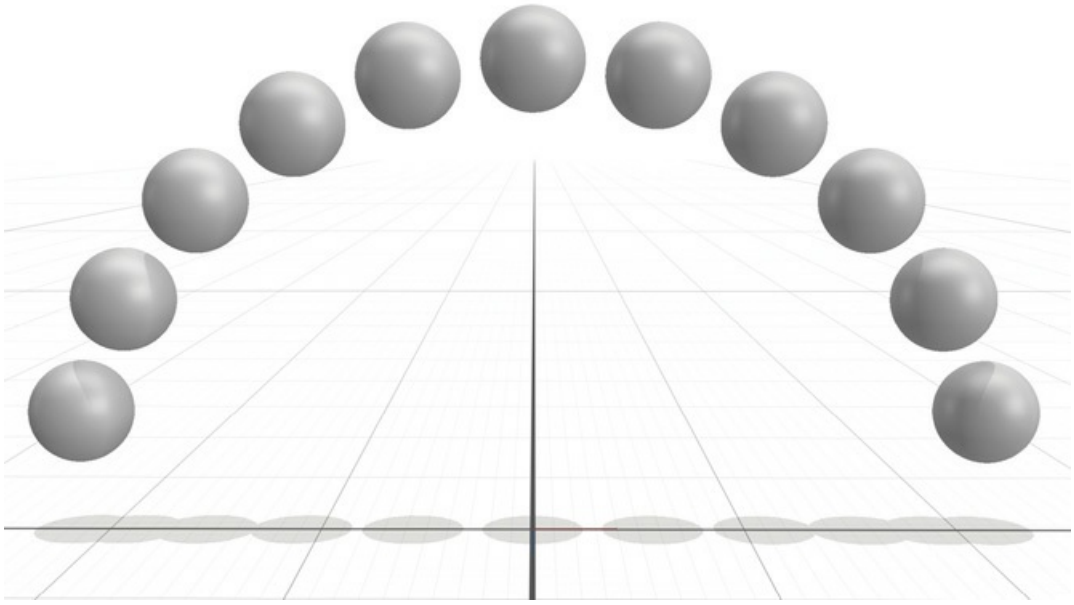


9. To rotate the other way, select the original sphere and cone group again.
10. Hold down Option+Shift (Mac) or Alt+Shift (Windows), and drag the blue arrow counterclockwise until the Z Rotation value in the Properties panel displays 15°.
11. Repeat step 10 four more times.



12. Choose Edit > Select All to select all the groups.

13. Choose Object > Ungroup to ungroup all the groups at once.
14. Drag around the cones that are overlapping each other at the pivot point to select them, and then click the Trash icon in the Actions panel.



This technique lends itself to creating all kinds of objects encountered in real life, such as gears, wheels, spokes, clock faces, and more.

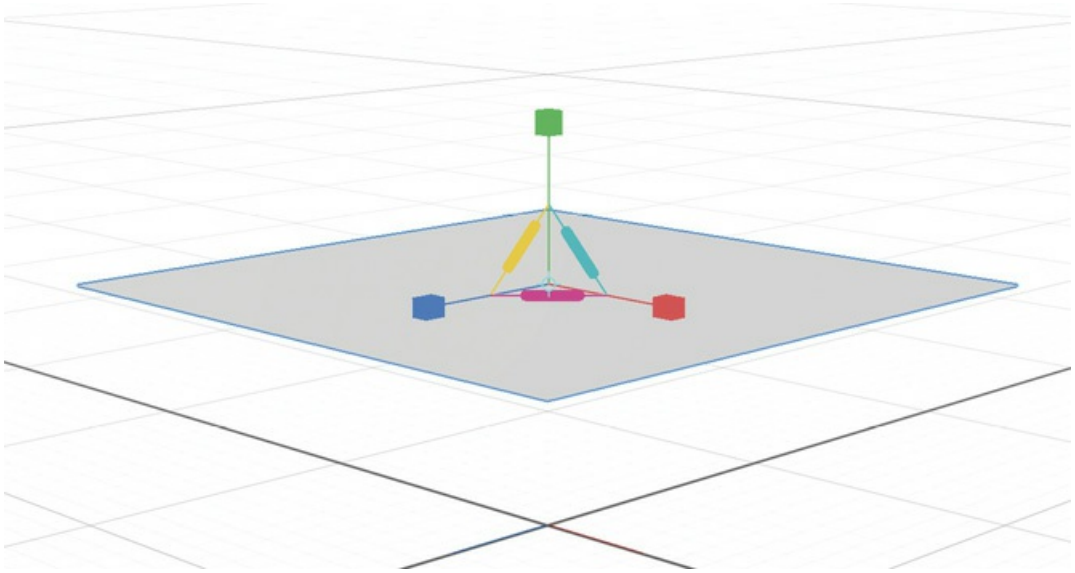
Working with planes

Dimension's starter assets contain two special models: Plane and Disc. These two models behave differently than all the other models in two ways. First, the models have no "thickness," so scaling the models to increase the thickness has no effect. Second, the models have a "good" side and a "bad" side. The bad side is dark, and it reflects light completely differently than the good side does, depending on the material applied.

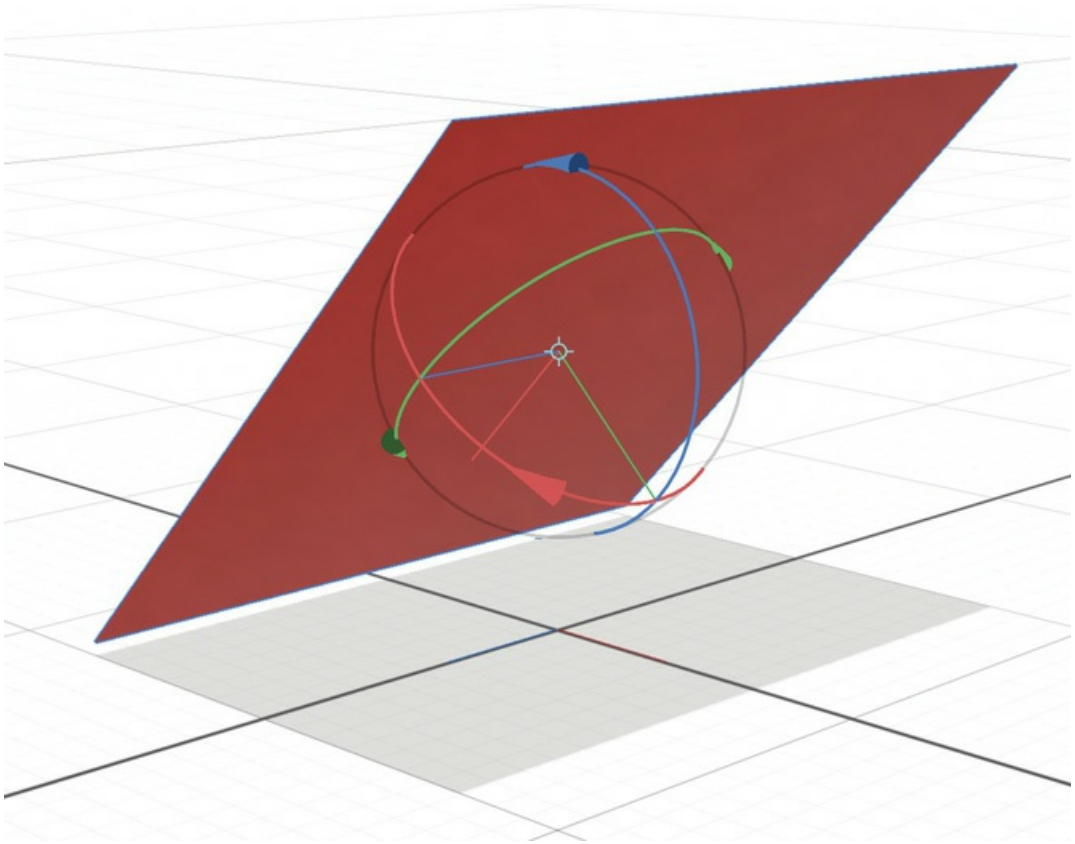
You should use the Plane and Disc models only when you will need to view the model from only one side. And even then, you'll need to pay attention to which side of the model is facing the camera.

1. Choose File > New to create a new document.
2. Click the Add and Import Content icon at the top of the Tools panel, and choose Starter Assets.
3. Locate the Plane model in the Content panel, and click it to place it on the canvas.
4. Select the Select and Move tool (keyboard shortcut: V).
5. Drag the green arrow up a bit to move the Plane model above the ground plane.
6. Select the Select and Scale tool (keyboard shortcut: S).
7. Drag the green cube up to scale the plane in the Y direction. You'll see that no matter how much you scale the plane in the Y direction, it doesn't get any thicker. There is no way to

make the Plane or Disc models thicker in Dimension.



8. Locate the Metal material in the starter assets, and click it to apply the material to the Plane model.
9. In the Properties panel, click the color swatch next to Base Color, and choose a bright red color, then press the Esc key to close the color picker.
10. Select the Select and Rotate tool (keyboard shortcut: R).
11. Drag the blue arrow on the rotation widget clockwise to rotate the plane around the z-axis. Note that one side of the plane is red metallic, and the other side remains dark.

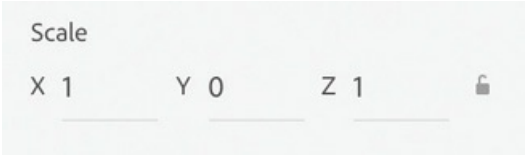


12. Locate the Plastic material in the starter assets, and click it to apply the material to the Plane model.
13. In the Properties panel, click the color swatch next to Base Color, and choose a bright red color, then press the Esc key to close the color picker.
14. Select the Select and Rotate tool (keyboard shortcut: R).
15. Drag the blue arrow on the rotation widget clockwise to rotate the plane around the z-axis. With the Plastic material, you'll see red on both sides, but one side remains considerably darker than the other.

An alternative to planes

A great alternative to the Plane and Disc models is to use the Cylinder and Cube models scaled down in height to create a very thin cylinder or very thin cube. They will look just like the Plane and Disc models but behave in more predictable ways.

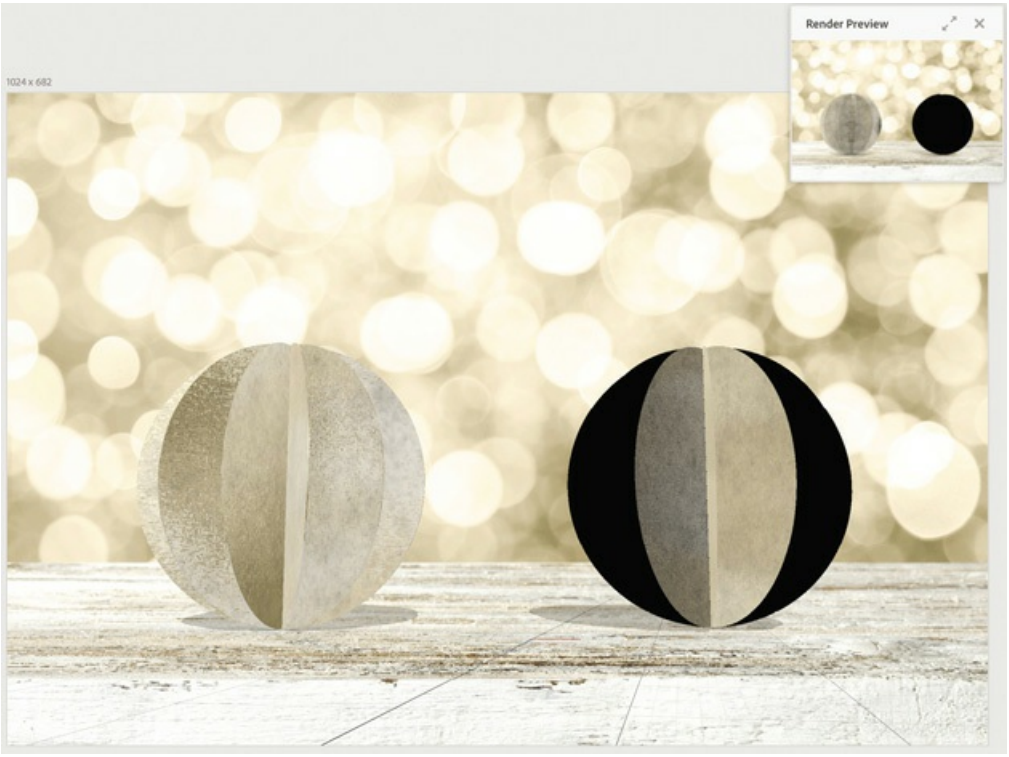
1. Click the Trash icon in the Actions panel to delete the Plane model from the scene.
2. In the Contents panel, click the Cube model to add it to the scene.
3. In the Properties panel, change the Y value for Scale to **0**.



4. Select the Select and Move tool (keyboard shortcut: V).
5. Drag the green arrow up so that the model is above the ground plane.
6. Locate the Metal material in the starter assets, and click it to apply the material to the Cube model.
7. In the Properties panel, click the color swatch next to Base Color, and choose a bright red color, then press the Esc key to close the color picker.
8. Select the Select and Rotate tool (keyboard shortcut: R).
9. Drag the blue arrow on the rotation widget clockwise to rotate the cube around the z-axis. Note that both sides of this model reflect light the same way.
10. Choose File > Open.
11. Select the file named Lesson_12_07_begin.dn, which is in the Lessons > Lesson12 folder that you copied onto your hard disk, and then click Open.

    (When you are warned that opening another document will close your current document, click Don't Save, unless you want to save the file with the Cube model in it.)

12. Click the Render Preview icon to display the Render Preview window.

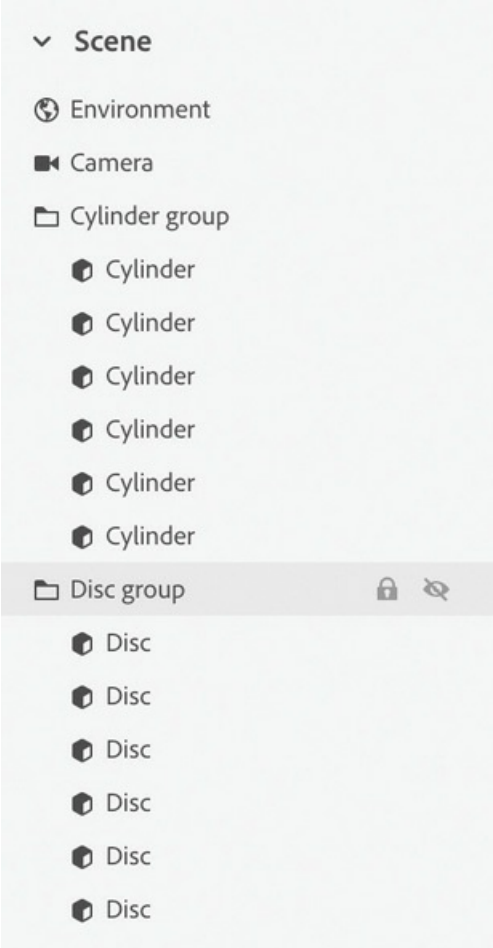


This scene consists of two model groups. In the Scene panel, you'll see a Cylinder group and a Disc group.

13. Click the folder icon next to "Cylinder group," and you'll see that this is a group of six cylinders; this is the object on the left side of the scene.

    The object on the right side of the scene is a group consisting of six discs.

14. Click the folder icon next to "Disc group" to see the six disc models.



Both of these model groups were constructed in a similar manner: by stepping and repeating the rotation of a model. The Damaged Silver material was applied to all the models. But as you can see both on the canvas and in the render preview, the Cylinder model reflects light very differently than the Disc model does.

15. Select the Select and Rotate tool (keyboard shortcut: R).
16. Click the Disc model (the model on the right) to select it.
17. Drag the green arrow on the rotation widget to rotate the Disc model. As you do so, you'll see that the light is reflected in odd, seemingly unpredictable ways. This is because sometimes you are seeing the dark side of a disc, and sometimes you are seeing the light side, depending on how the model is rotated. Shown here is a final high-quality render of the scene so you can see the difference.

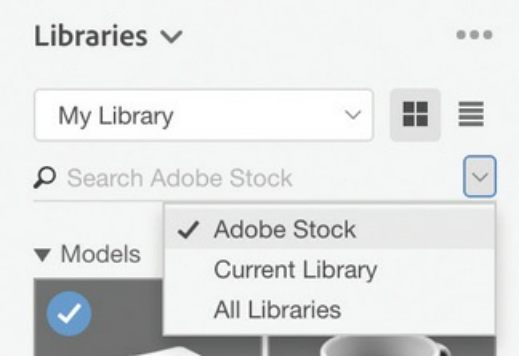
Using parts from models

What if you really need a certain model or a particular 3D shape to construct your scene, but you can’t locate a model to fit your needs? You may be able to locate the shape you need by extracting a model from a larger model group.

Breaking apart multiple objects

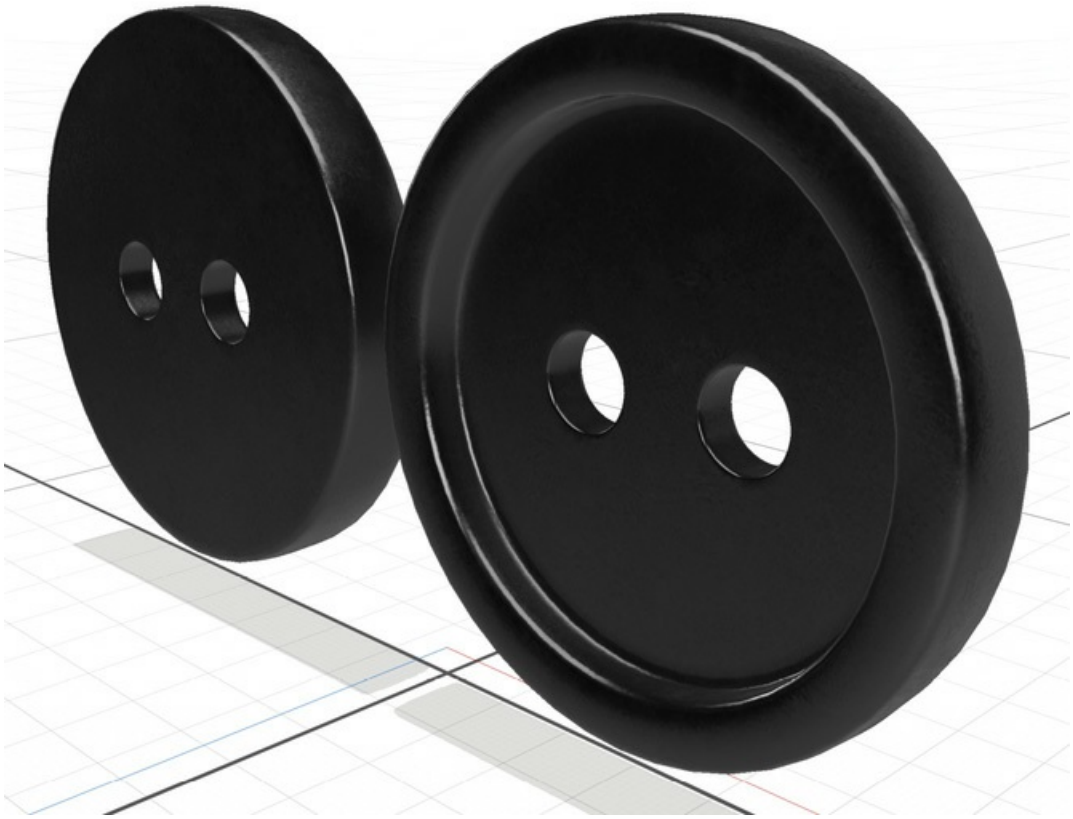
Sometimes you’ll find the perfect model, but it consists of multiple objects and you need only one of the objects in your scene. What can you do in this case? It depends on how the model is constructed.

1. Choose File > New to create a new document.
2. Click the Add and Import Content icon at the top of the Tools panel, and choose CC Libraries.
3. In the Creative Cloud Libraries panel, in the dropdown list to the right of the search field, choose Adobe Stock.

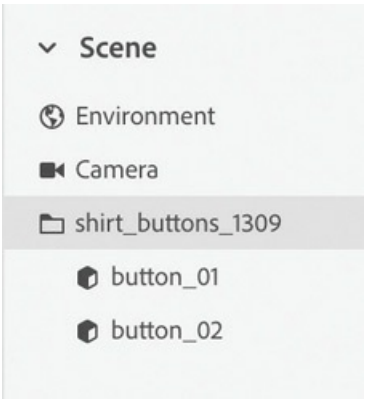


4. Type **218401592** into the search field. A model of two buttons will be displayed.
5. Click the shopping cart icon to save the model to your library. You may be asked if you want to license the free asset. If so, click OK.

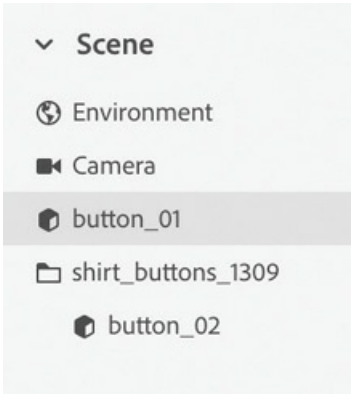
   It may take a few moments for the model to download.
6. When it has finished downloading to your library, click the model to add it to the scene. It will be added to the center of the scene, positioned on the ground plane.
7. Choose Camera > Frame Selection for a larger view of the buttons.



In the Scene panel, you'll see a model group named shirt_buttons_1309, which contains two models: button_01 and button_02.



8. Drag the button_01 model above the shirt_buttons_1309 group to remove it from the group.



9. Click the shirt_buttons_1309 group in the Scene panel, and then click the Trash icon in the Actions panel to delete the group. Now you have a single button to use in your scene.

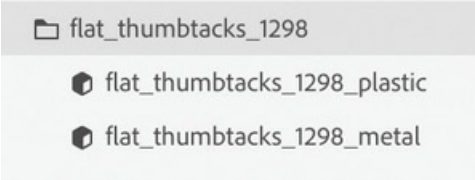
   You were able to delete the extra button in this case because the model consisted of a group of two separate models. But depending on how the model was put together, this won't always be the case.

10. In the Content panel, type **218401720** into the search field. A model of five thumbtacks will be displayed.

11. Click the shopping cart icon to save the model to your library. You may be asked if you want to license the free asset. If so, click OK.

    It may take a few moments for the model to download.

12. When it has finished downloading to your library, click the model to add it to the scene.
13. Choose Camera > Frame Selection so that you can see the thumbtacks on the canvas.
14. Examine the Scene panel. Click the folder icon next to the flat_thumbtacks_1298 model group. You'll see that in this case, the group consists of two models: flat_thumbtacks_1298_plastic and flat_thumbtacks_1298_metal. Unfortunately, the modeler modeled all the plastic parts together and all the metal parts together. So in this case, there is no way to break apart the group and extract a single thumbtack in Dimension.

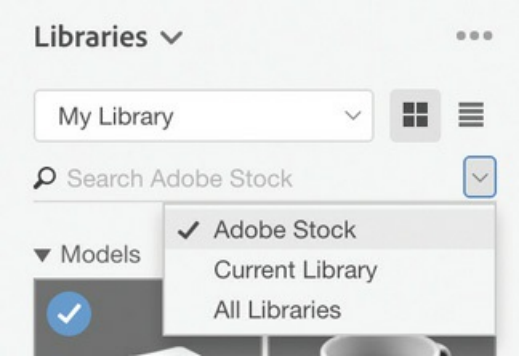


Extract a part from a larger model

Sometimes you may be able to find the part you need for your scene by scavenging a part from another model.

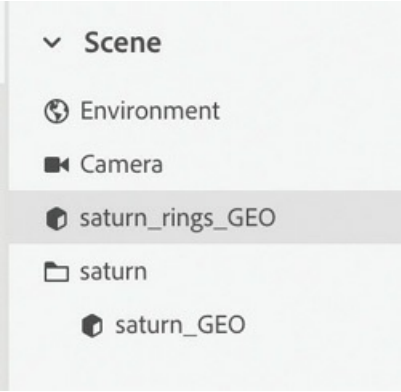
Here's the scenario: You need a couple of objects to add to a scene you're creating. You browse through the models available on Adobe Stock, see the Saturn model, and realize that the shape that makes up Saturn's rings is exactly what you need.

1. Choose File > New to create a new document.
2. Click the Add and Import Content icon at the top of the Tools panel, and choose CC Libraries.
3. In the Creative Cloud Libraries panel, in the dropdown list to the right of the search field, choose Adobe Stock.



4. Type **222488976** into the search field. A model of Saturn will be displayed.
5. Click the shopping cart icon to save the model to your library. You may be asked if you want to license the free asset. If so, click OK.
6. It may take a few moments for the model to download. When it has finished downloading to your library, click the model to add it to the scene.
7. In the Scene panel, you'll see that, thankfully, the rings are a separate model from the sphere.

8. Drag the saturn_rings_GEO model above the Saturn model group to remove it from the group.



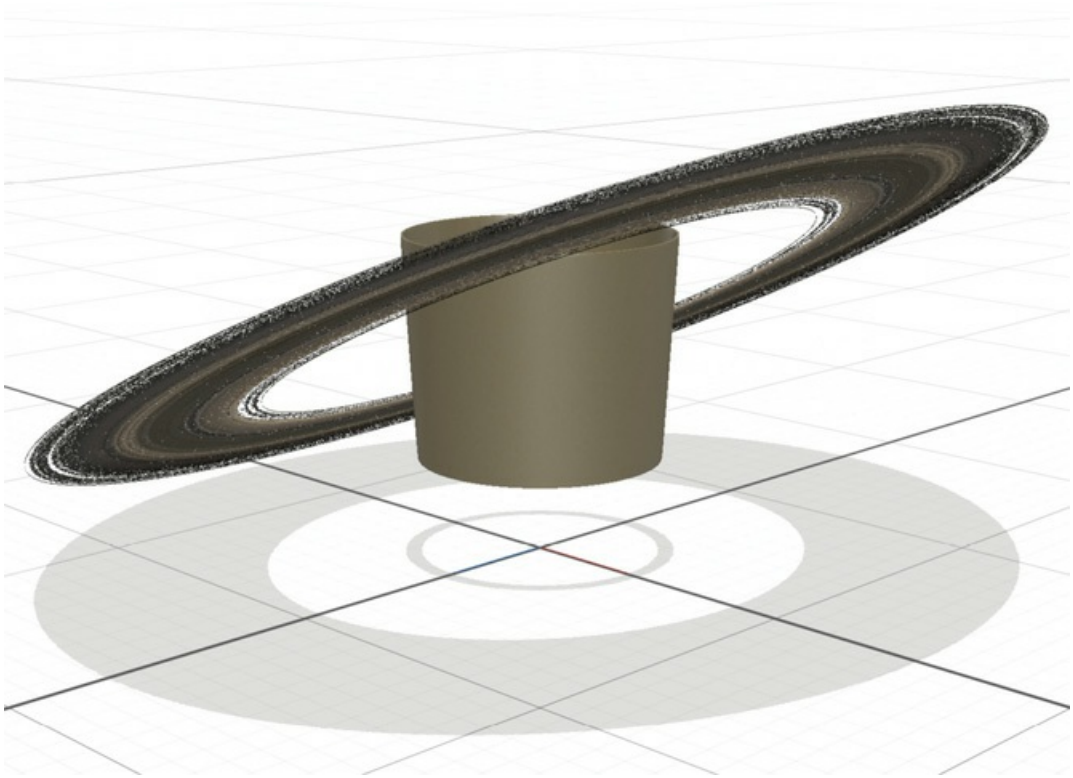
9. Select the Saturn model group, and click the Trash icon in the Actions panel to delete the model group, leaving just the rings.

   You could, of course, change the material applied to the rings and transform them as desired to fit your scene. Let's look at another example.

10. In the Content panel, type **134634095** into the search field. A model of a paper coffee cup will be displayed.
11. Click the shopping cart icon to save the model to your library. You may be asked if you want to license the free asset. If so, click OK.
12. It may take a few moments for the model to download. When it has finished downloading to your library, click the model to add it to the scene.
13. In the Scene panel, you'll see that in this model, the cup, lid, and sleeve have been modeled separately. The sleeve is a simple tapered cylinder shape that could be useful to reuse in your scene. Drag the coffee_withHolder_sleeve model above the coffee_withHolder model group to remove it from the group.

14. Select the coffee_withHolder model group in the Scene panel, and click the Trash icon in the Actions panel to delete the model group.

    Now you are left with two simple shapes that could be grouped with other shapes to build a model.



Borrowing a material from another model

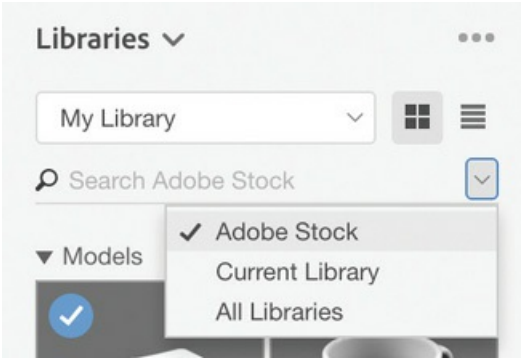
What if you can't find the right material for your model? While you're browsing models on Adobe Stock or from other sources, keep your eyes open for unusual or useful materials applied to the model surfaces. In many cases, depending on how the model is assembled,

the material may be useful for use on other models.

1. Choose File > Open.
2. Select the file named Lesson_12_08_begin.dn, which is in the Lessons > Lesson12 folder that you copied onto your hard disk, and then click Open.

   For these packages, I want a wrinkled gold foil material, like you might find freeze-dried food packaged in. It occurred to me that I've seen foil like that used on spacecraft. A search on Adobe Stock led me to a satellite model that contains some gold foil. Let's see how to apply the gold foil material to the package models in this file.

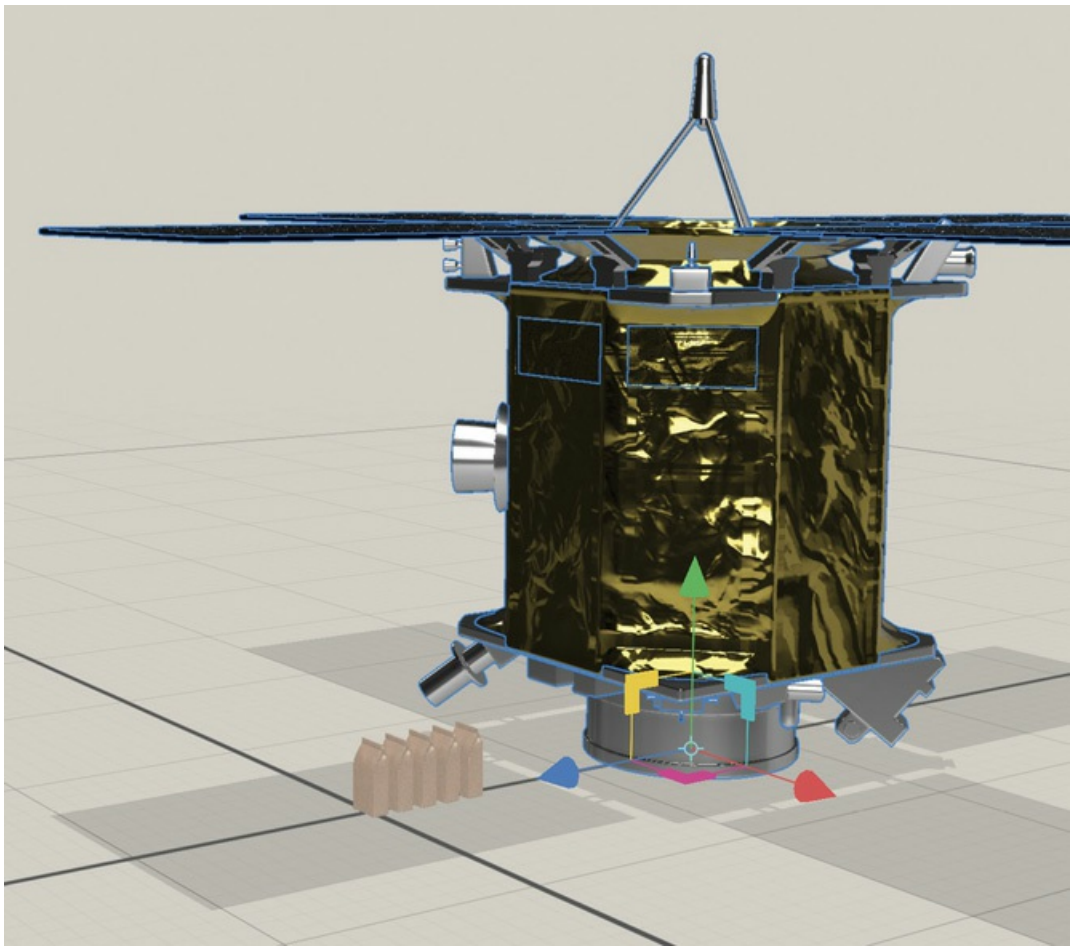
3. Click the Add and Import Content icon at the top of the Tools panel, and choose CC Libraries.
4. In the Creative Cloud Libraries panel, in the dropdown list to the right of the search field, choose Adobe Stock.



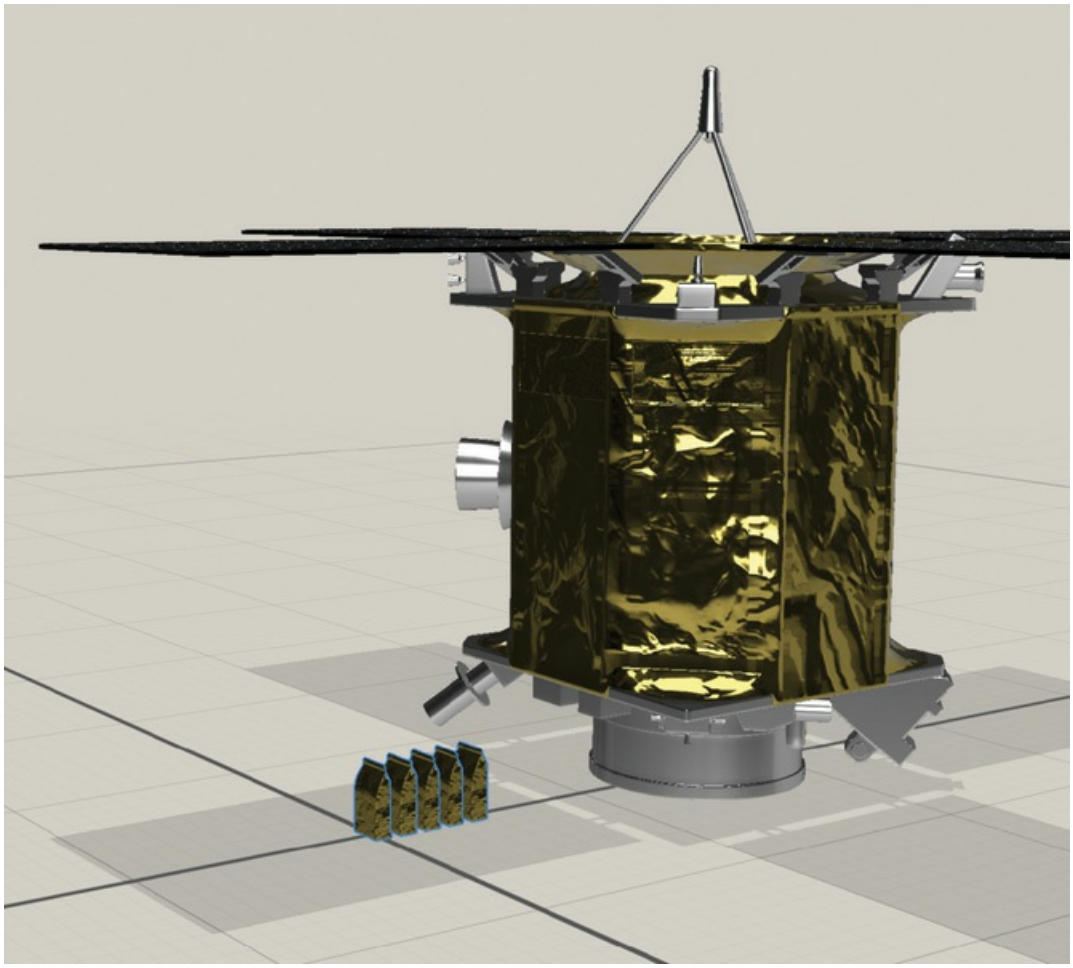
5. Type **222486354** into the search field. A model of a satellite will be displayed.
6. Click the shopping cart icon to save the model to your library. You may be asked if you want to license the free asset. If so, click OK.
7. It may take a few moments for the model to download. When it has finished downloading to your library, click the model to add it to the scene.

   The Satellite model is huge compared to the Bag models, and that's OK.

8. Choose Camera > Frame Selection so that you can see the entire Satellite model.
9. Select the Select and Move tool (keyboard shortcut: V).
10. Drag the blue arrow to the right to move the Satellite model out of the way so you can see both it and the Bag models.



11. Drag a selection boundary around the Bag models to select all five of them.
12. Select the Sampler tool (keyboard shortcut: I).
13. Click somewhere on the gold foil on the Satellite model. This applies the gold foil material to the Bag models.



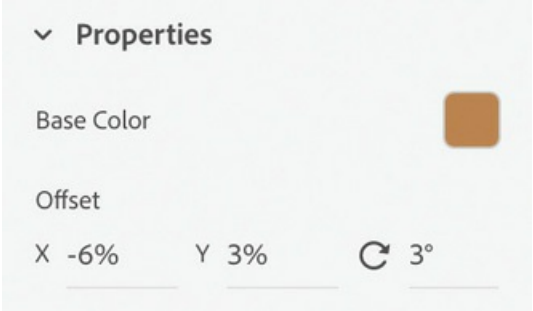
14. In the Scene panel, click the near_satellite model group to select it.
15. Click the Trash icon in the Actions panel to delete the model group.
16. Choose Camera > Frame Selection for a larger view of the Bag models.

Customize the material on each model

The scene doesn't look very realistic because the material was applied in exactly the same way to each model. Let's fix this.

1. Select the Select and Move tool (keyboard shortcut: V).
2. Double-click the second bag from the left to reveal its material.

   You'll see the Break Link to Material icon displayed in the Actions panel, alerting you that the material is linked to one or more other models.
3. Click the icon to break the link.
4. In the Properties panel, adjust the X, Y, and Rotation values for Offset so that the material is positioned differently than it is on the bag to the left.



5. Repeat steps 2–4 for each of the remaining bags. You can also experiment with adjusting the background color of the material on each bag if you like.

Review questions

1 When you use the Edit > Duplicate command, where does the duplicated model appear on the canvas?

2 What is one way to simulate a precise step and repeat effect in Dimension?

3 What are the two unique properties of the Plane and Disc models in the starter assets?

4 After you place a model in a scene, how can you determine whether you can extract individual parts from the model for reuse?

Review answers

1 The Edit > Duplicate command duplicates the selected model and places them at the same X, Y, and Z coordinates as the original model.

2 You can precisely step and repeat a model by duplicating the model, dragging the duplicate to a new location, and then memorizing the XYZ position of the duplicate. Then, by duplicating the object again and performing simple math such as addition or multiplication on the XYZ position values, you can move the second duplicate the same distance as the first duplicate.

3 The Plane and Disc models have no thickness, and the thickness cannot be scaled. Additionally, these models have a “dark” side that reflects light in unpredictable ways.

4 The ability to extract and reuse individual parts of a model is determined by how the modeler assembled the model. If the model is a model group that consists of individual models and sub-models, they can be removed from the group for use individually. If the entire model is a single entity, there is no way to break it apart in Dimension.

13 Post-Processing with Adobe Photoshop CC

Lesson overview

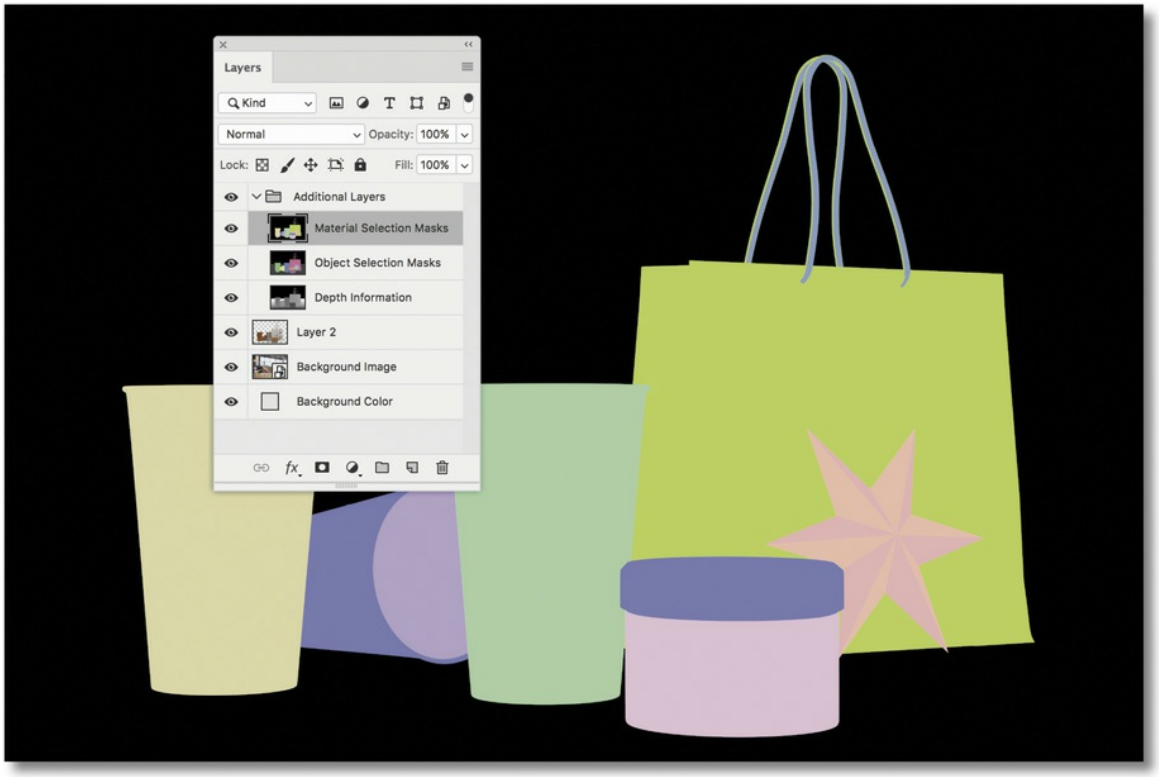
In this lesson, you'll discover why and how you would open in Adobe Photoshop CC a scene that was rendered by Dimension and learn the following:

- What Photoshop layers are created automatically by Dimension's renderer and what you can use them for
- How to easily change the background image in Photoshop
- How to use the masks that are automatically saved into the rendered image to make selections easier
- How to apply simple color correction to a rendered scene in Photoshop

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.

This lesson assumes that you have some basic knowledge of how to use Adobe Photoshop and are familiar with the Photoshop interface, in particular the Layers panel.



When you render a scene to the PSD format, Dimension adds several useful layers to the file that make certain post-processing tasks easier.

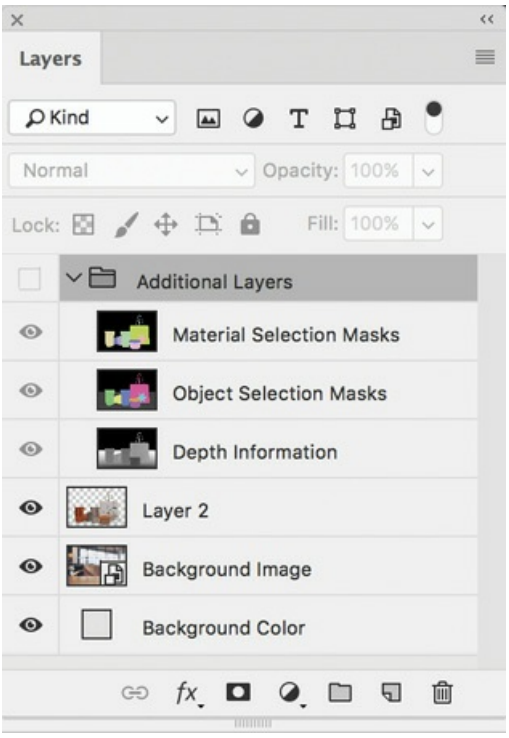
Opening a scene rendered as a PSD file in Photoshop

Dimension is the easiest place to make changes to the lighting, color, background, and composition of your Dimension scenes. But occasionally you might need to edit a scene in Photoshop after it has been rendered. For example, you might want to make a quick tweak to the overall color of the scene without re-rendering the entire scene. Or you might need to work on the image after you've converted it to CMYK for print output in Photoshop. Or you might want to manipulate the image in some way that can be done only in Photoshop.

As you saw in an earlier lesson, Dimension can save the rendered output as a PNG file or as a PSD file. The main difference is that a PNG file is "flat." There are no layers, masks, or other helpful extras saved with a PNG file. However, if you save the rendered scene as a PSD file, Dimension adds extras to the file that make it easier to edit, or "post-process," the scene.

1. Launch Adobe Photoshop.
2. Choose File > Open.
3. Select the file named Lesson_13_begin_high_quality_render.psd, which is in the Lessons > Lesson13 folder that you copied onto your hard disk, and then click the Open button.
4. If your Layers panel isn't visible on the screen, choose Window > Layers.

   Your Layers panel should contain six layers. Let's look at what some of the things these layers could be used for.



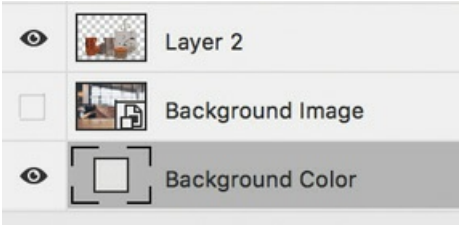
Editing the background

Because the models are all rendered onto a transparent layer separate from the background, it is easy to make changes to the background behind the models.

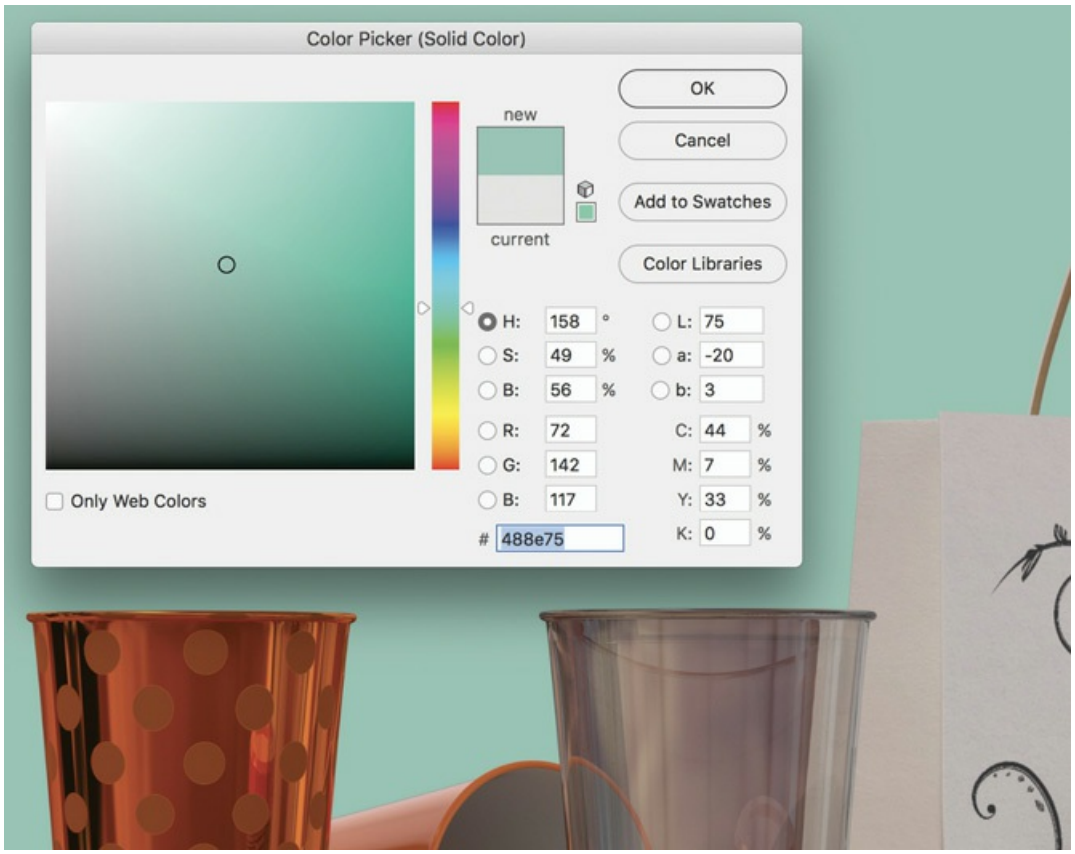
Change the background color

Changing the background color of the background is straightforward. Here's one way to do this in Photoshop.

1. Click the eyeball icon next to the layer named Background Image to hide the background image.
2. Double-click the thumbnail icon on the Background Color layer to access the color picker.



3. Select a new color for the background, and click OK.



The shadows cast by the models on the background are semi-transparent, so they blend realistically with the new colored background. If this image had reflections that were reflecting on the ground plane, those reflections would also be retained and blend realistically with the new background color.

The image in the water glass still shows the background image through the glass. Semi-transparent materials are rendered with the background image in the material, which can make it difficult to edit such scenes in Photoshop.

Change the background image

Since the background image is rendered on its own Photoshop layer, it can easily be swapped out with a different image. However, your scene will not look very realistic unless the new background image has similar perspective and lighting as the original background image.

1. Click the eyeball icon to the left of the Background Color layer to hide that layer.

   Note that the 3D models are all rendered on a single layer called “Layer 2” and that the area around the models on this layer is a light gray checkerboard, indicating that it is transparent. Since the area around the models is transparent, you can just put a new layer with a new background image beneath Layer 2 to replace the background.

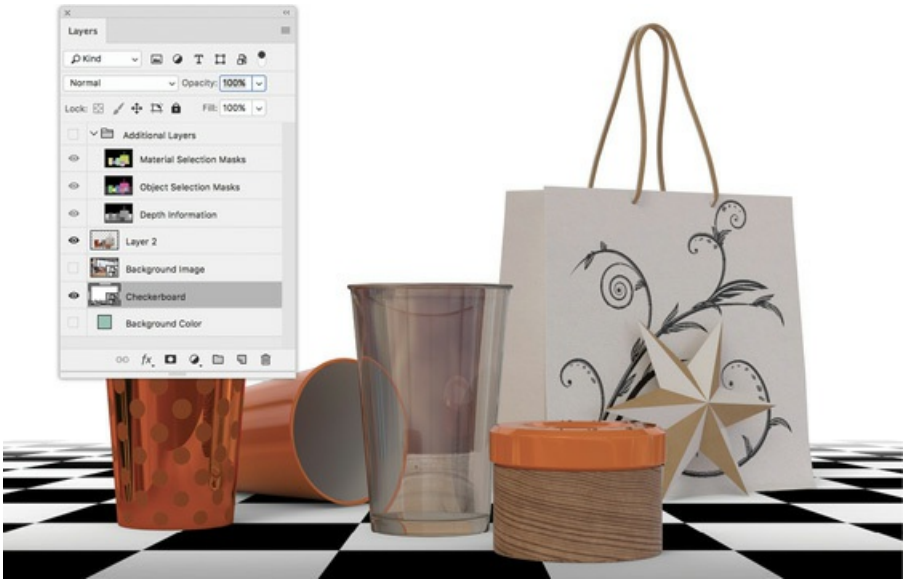
2. Choose File > Place Embedded.
3. Select the file named Checkerboard.jpg, which is in the Lessons > Lesson13 folder that you

copied onto your hard disk, and then click Place.

4. Double-click the image to place it.

   The image is placed on a new layer, named Checkerboard.

5. Drag the new layer beneath the layer named Background Image in the Layers panel.

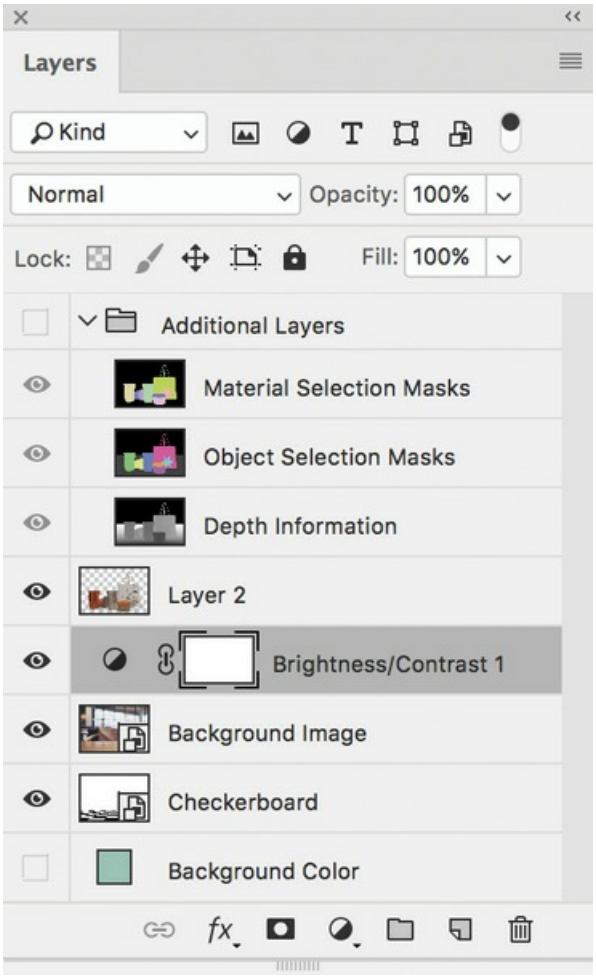


The scene looks pretty good because the new background has a perspective similar to the old background. But the original image still appears when viewed through the glass, and the reflections that appear on the models are created from the original background. This would be very difficult to fix in Photoshop.

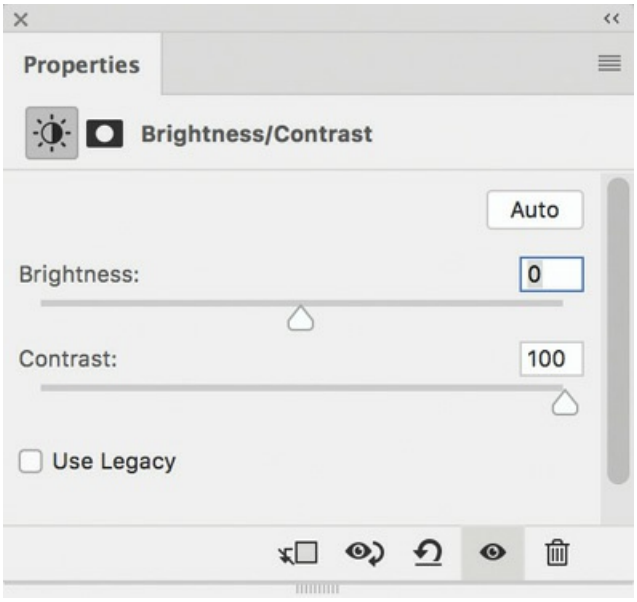
Modify the background image

You've seen that replacing the background image can be problematic because of translucent objects and reflections on the surface of objects. But simple edits to the background image such as color correction, sharpening, and blurring can often be done without destroying the realism of the scene.

1. Click in the eyeball column next to Background Image in the Layers panel to reveal the original background.
2. Click Background Image in the Layers panel to select that layer.
3. Choose Layer > New Adjustment Layer > Brightness/Contrast.
4. Click OK in the New Layer dialog. This creates a new Brightness/Contrast adjustment layer above the Background Image layer.



5. In the Properties panel, drag the Contrast slider all the way to the right to increase the contrast. This increases the contrast only in the Background Image layer, not in the layers above it.

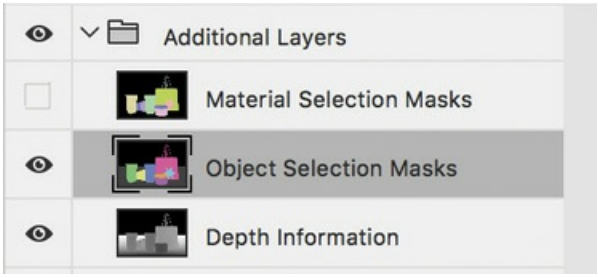


Using masks to make selections

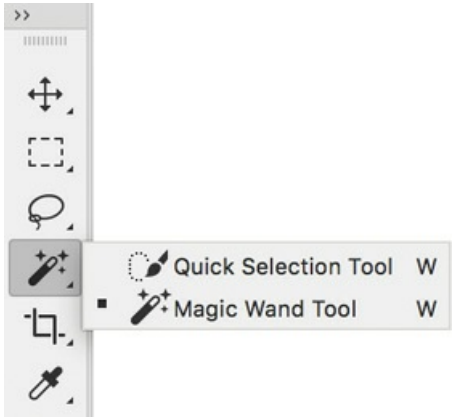
When you render an image in the PSD format, Dimension always creates a layer called Object Selection Masks, in which every 3D model in the scene is filled with a separate solid color on a black background. This layer makes it easy to select the outlines of each model in the rendering.

You'll use this layer to change the color of the spotted glass on the left side of the scene.

1. In the Layers panel, click the eyeball column next to Additional Layers to show the layer group.
2. Click the eyeball icon next to Material Selection Masks to hide that layer.
3. Select the Object Selection Masks layer.

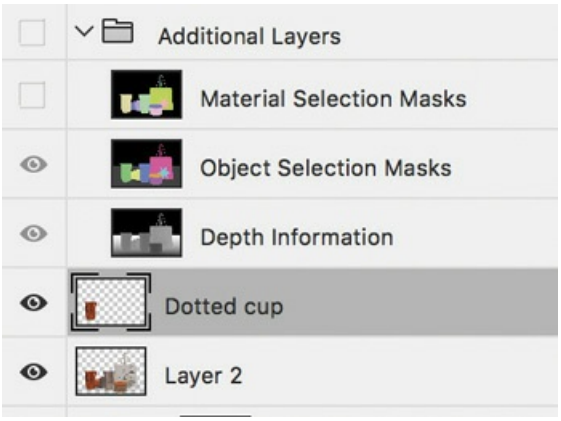


4. Select the Magic Wand tool (underneath the Quick Selection tool in the Tools panel).

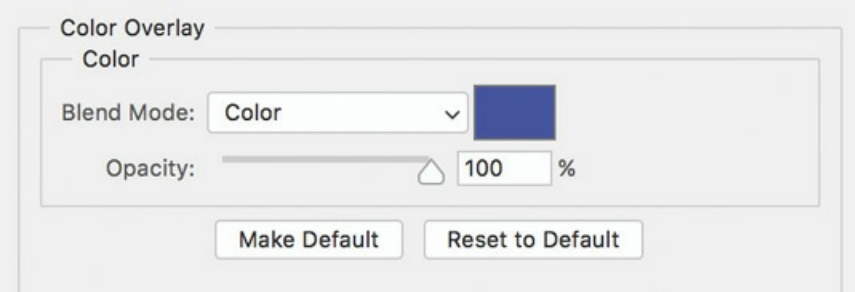


5. In the options bar, make sure that Tolerance is set to 0, that Anti-alias and Contiguous are selected, and that Sample All Layers is deselected.

6. On the Object Selection Masks layer, click the green color, which represents the left-most glass.
7. In the Layers panel, click the eyeball icon next to Additional Layers to hide that layer group.
8. Click Layer 2 in the Layers panel. Now the cup on that layer is precisely selected, based on the selection we made in the Object Selection Masks layer.
9. Select Layer > New > Layer Via Copy.
10. Double-click the layer name and change it to **Dotted cup**.



11. Choose Layer > Layer Style > Color Overlay.
12. Choose Color from the Blend Mode menu.
13. Click the color swatch, choose a blue color for the cup, and click OK.



14. Click OK again to close the Layer Style dialog.

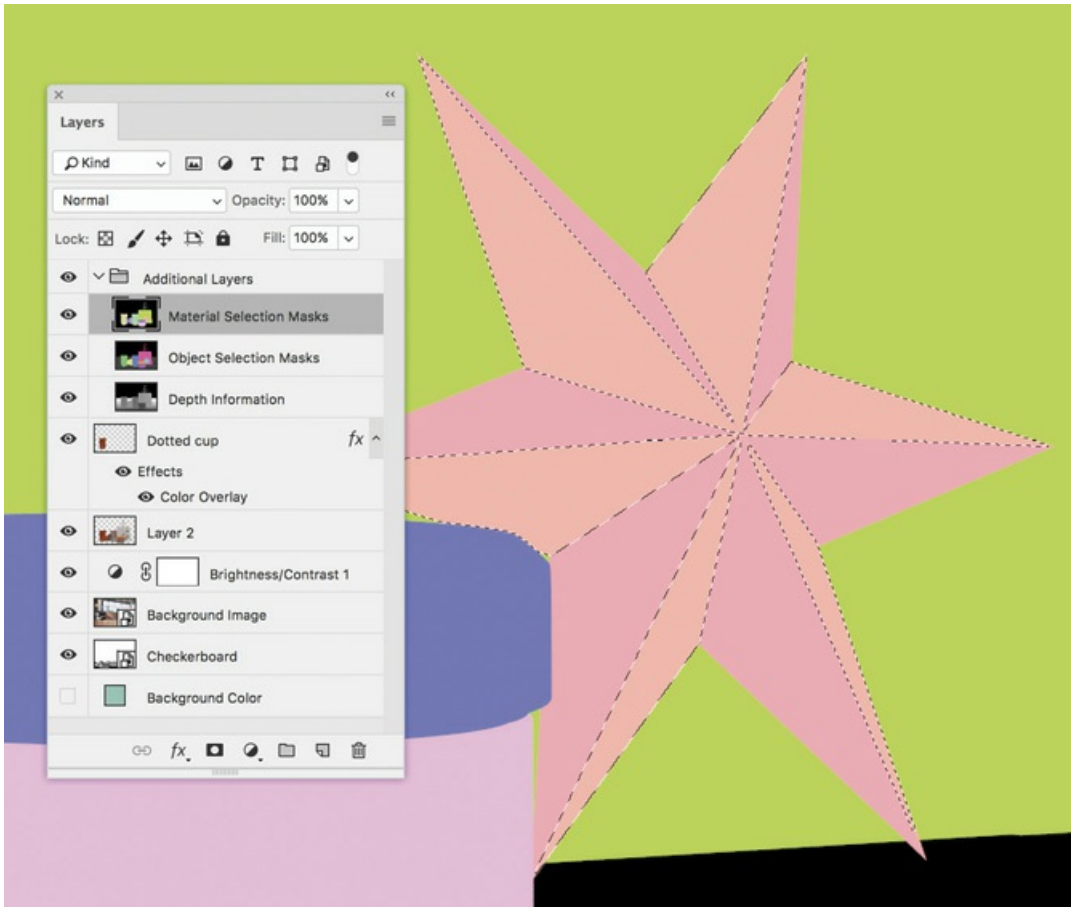
Adjusting materials

Dimension automatically creates a layer named Material Selection Masks in each rendered PSD file. This layer contains individual solid-color shapes that represent each material applied to the surface of a model. You'll use this layer to change the look of one of the materials used for the Star model.

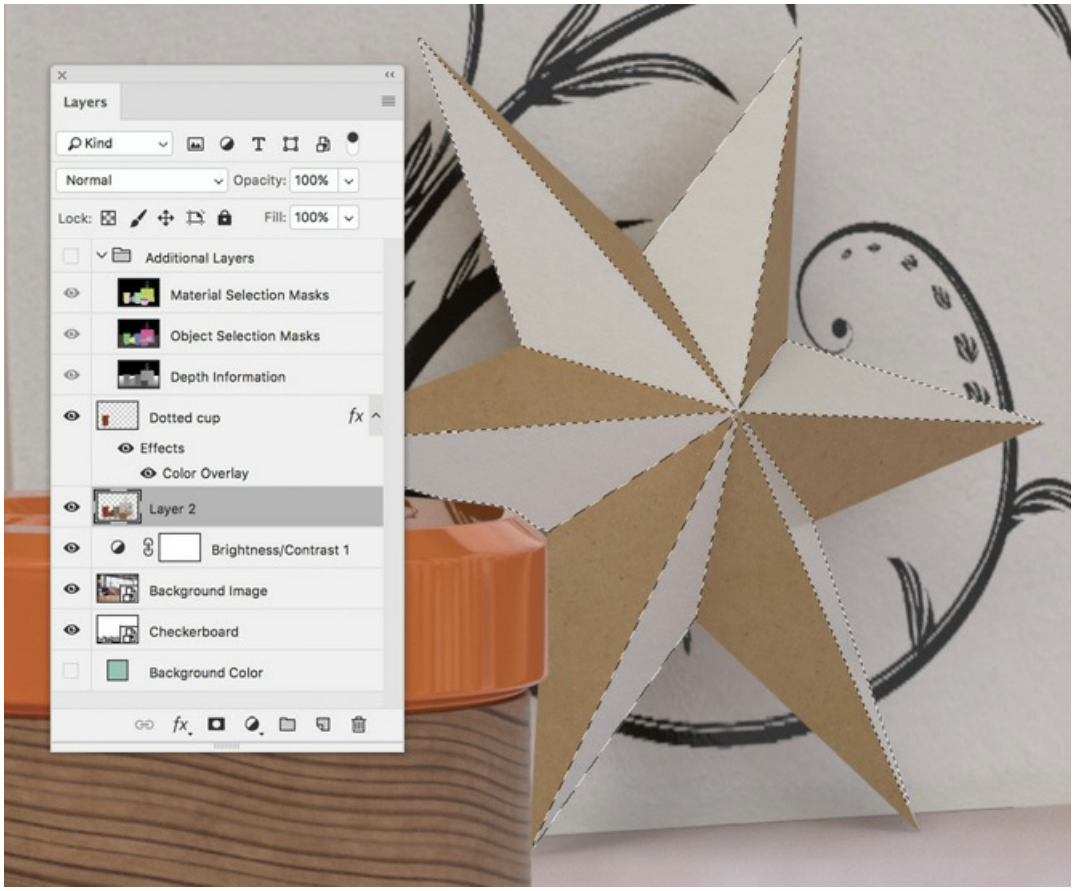
1. Click the eyeball column next to the Additional Layers layer group to show the group.
2. Compare the filled area that represents the star on the Object Selection Masks layer to the filled area that represents the star on the Material Selection Masks layer by using the eyeball column to show and hide the layers.

   You should see that the Object Selection Masks layer displays a single color for the entire Star model. But since two different materials are applied to the different facets of the Star model, the Material Selection Masks layer represents these two materials with two separate colors.
3. In the Layers panel, make sure the Material Selection Masks layer is visible, and click the layer to select it.
4. With the Magic Wand tool, click one of the light-colored facets of the Star model.

5. Hold down the Shift key, and click each of the other light-colored facets of the Star model to add all of them to the selection.



6. Click the eyeball icon next to the Additional Layers layer group to hide the group.
7. Click Layer 2 in the Layers panel to select it.



8. Choose Filter > Pixelate > Pointillize.

Tip

You can use the Depth Information layer as a mask to add depth of field effects or dramatic lighting to the scene. In the Depth Information layer, light-colored areas are farther away from the camera, and darker areas are closer to the camera.

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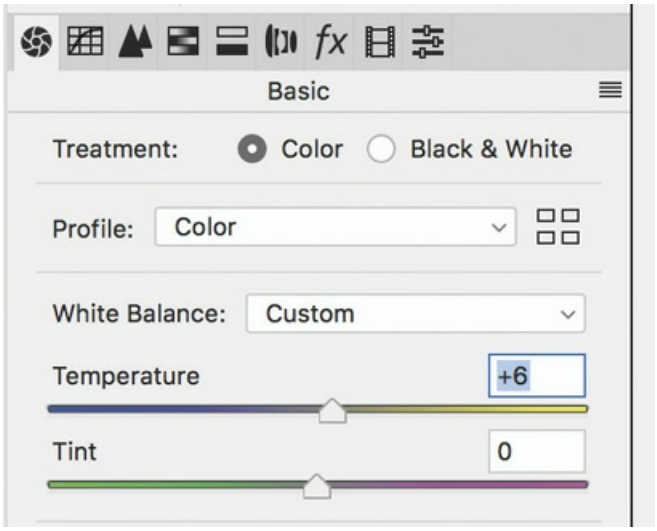
9. Set Cell Size to **3**, and click OK.

Correcting color in the image

I want the overall color of the entire scene, including the background, to be a bit warmer. There are many ways to do this in Photoshop. Here's one way to do it without needing to flatten the layers containing the models and the background.

1. Click Layer 2 in the Layers panel, and then Shift-click the Background Image layer.
2. Choose Layer > New > Group from Layers.
3. Click OK.
4. Choose Filter > Convert for Smart Filters.
5. Choose Filter > Camera Raw Filter.
6. Drag the Temperature slider to the right to warm the image up.



7. Click OK.

You can do a lot to a 2D scene in Photoshop, of course. You are limited only by your imagination, your skill, and your knowledge of Photoshop.

Review questions

1 What is the advantage of saving a render from Dimension in the PSD format instead of in the PNG format?

2 What type of material could make it more difficult to realistically edit a background image in Photoshop?

3 Which layer contains a colored mask for each material applied to the surface of a model?

Review answers

1 The PSD format contains extra layers that make the image easier to edit. A scene rendered as a PNG will be a single-layer flat image.

2 Images that are semi-transparent, such as glass, once rendered, can make it difficult to swap in a new background in Photoshop.

3 The Material Selection Masks layer contains a separate colored mask for each part of a model that has a material applied to it.

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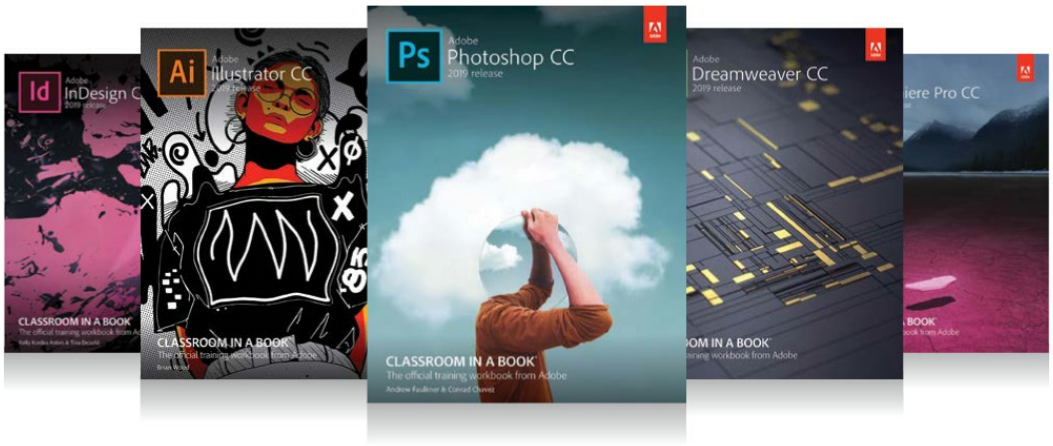

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