Exploring 3D Scene Basics

Help your customers understand a complex item by displaying it virtually in a 3D environment.

In this course, we will explore the 3D Creator which includes a scene designer and a rules editor.

Using the tools and commands available in the Scene designer, we will create a mesh, move it, and rotate it in 3D space.

Creating a 3D Scene

To create a 3D Scene, open the list of Scenes in the Administrative interface, and click the add button.

Give the scene a name and specify how it will be used: either standalone with no relationship to other logic, or with another tool, like a configurator.

Click OK, and the Creator window will appear.

The Creator interface has 3 components which are always visible:

A Menu bar of creator commands across the top…

A Rules tab of logic and 2D decorations for the scene…

And a Scene tab for the 3D space of the scene itself.

The Creator Menu bar shows the name of the scene. Double-click it to edit.

There are also commands to save any edits to the scene, and to run the scene to test it.

Running the scene makes it appear in a new window, either standalone or within another tool, like a configurator.

Other commands help create code to embed this scene into a web page, see any errors in the scene, or search for any scene component by name.

You can leave this scene and go back to the list of all scenes, as well as adjust the basic scene settings made when first creating the scene.

By default, the Scene tab is visible, so the rest of the screen is filled with the Scene Editor.

If you want to see the Rules Editor, click the Rules tab.

To begin a scene design, stay on the Scene tab. First create objects in the 3D Scene Editor, and then add logic or other features in the Rules Editor.

Scene Tab Overview

Before creating objects in the 3D scene, let's look at the main tools inside the scene.

Filling the page is a viewport, looking into the 3D space of the scene.

To help visualize the 3D space, three colored axes for the X, Y, and Z dimensions are shown.

A grid is drawn between the X and Z axes to provide a flat plane for your work.

Use your mouse to navigate in this 3D space:

Click and drag to change the direction you're looking. It's like turning your head without walking around.

Control-Drag to change your position in that 3D Space. It's like walking around without turning your head.

Use the Scroll Wheel to zoom in and out.

Along the left side of the viewport is the explorer: a hierarchical, drill-down tree of the scene and all the categories of objects it can contain.

In the explorer you can create objects, change their relationships to each other, and delete them.

Here, in this empty scene, the explorer only lists the scene itself and some categories of other objects we can create inside it.

The Toolbar across the top show icons for the commands currently available, given what is selected in the Explorer.

The Properties Pane on the right gives detailed information about the item or items currently selected in the explorer. Here you can see and change all the specific properties of items, add connectors or features to items, and otherwise adjust what's selected in the explorer.

Finally, along the bottom of the viewport, are some other helpful resources.

The Materials Tab lists a variety of materials you can paint onto to a mesh, to make that mesh look like metal, plastic, glass, or other real-world materials.

The History Tab shows you all the edits recently made to the scene. These are the changes you can undo or redo by clicking those buttons in the toolbar at the top.

The Imports Tab allows you to create new meshes by importing models from a file on your computer, or from other scenes already created.

Knowledge Check: The Scene Designer

Let's check what you've learned so far. Where can you create objects, change relationships, and delete objects: the Menu Tab, the Explorer, the Properties pane, or the Rules button?

Tap one of the orange boxes to make your choice.

Creating and Moving a Mesh

In the 3D Creator, the objects that can be shown (in the scene tab) and automated (in the rules tab) are called meshes.

Meshes are the main actors on the 3D stage. The other items you see in the explorer -- like materials and lights -- help the meshes look and perform their best.

Let's create a mesh.

In the explorer, click the context menu next to meshes.

Select create primitive to see a list of primitive geometric shapes. Choose create box.

A new entry called box appears in the explorer, and a box mesh appears in the viewport.

Notice where the box appears in the viewport: it's at the origin.

The Origin is a special point in space: it's the center of the scene where the X, Y, and Z axes meet at (0,0,0).

The origin is used as a fixed location to place objects within a scene, or to align scenes with each other.

Each mesh, like our box, also has an origin.

A mesh origin is a point in space that defines the location of the mesh. When we created this box, it was placed so its origin aligned with the scene's origin.

To change the position of a mesh, first select it and you will see it highlighted in the explorer, as well as in the scene.

Click the move button in the Menu bar.

The button changes color, to show you're now moving a mesh.

Notice that three arrows appear at the mesh's origin. This is the move gizmo. Gizmos appear when you have selected an object. They give you ways to manipulate the object, such as moving or rotating it.

Drag any of the three arrows in the move gizmo to move the object in three dimensions.

Dragging the gizmo is one way to change the position. Another way is through the object's properties.

Select the box mesh, and then look at the Properties expander on the right. (If the properties expander isn't open, click it.)

Look for the position section of the properties. As you move the mesh using the gizmo, these position numbers change.

You can also do the reverse: edit the position numbers, and the mesh will move accordingly.

These two techniques let you position the object roughly using the gizmo, or precisely using the position numbers in the properties.

Click the move button again when you're done moving the mesh.

The button color and the gizmo both disappear, showing that move mode is now turned off.

Rotating a Mesh

A mesh can be rotated in the 3D scene, much like how it can be moved.

Select the mesh you want to rotate, and then click the rotate button in the Menu bar. The rotate gizmo appears.

There are two modes (or ways to describe) rotation. Each mode is better suited to different rotation tasks.

See and change the rotation mode for a mesh by looking in the properties expander.

The first rotation mode is called Axis and Angle.

This mode is ideal for complex rotations that aren't aligned with one of the X, Y, or Z axes.

Rotating a mesh in Axis and Angle mode is a twostep process.

First, define the axis it will rotate around, and then define how far it will turn around that axis.

The rotate gizmo looks like a sphere with a ring around it and an arrow going through it.

First, drag the sphere to aim the arrow. This arrow is the rotation axis. The mesh will rotate around this arrow like a wheel around an axle.

Next, drag the ring around the sphere. The farther you drag, the farther the mesh rotates around the axis.

For example, if we want to rotate this steering wheel mesh that's mounted at an angle, we first drag the sphere to align the gizmo's ring with the wheel…

…and then drag the ring itself to turn the steering wheel.

The second rotation mode is called Euler. This mode is perfect for simple rotations around an axis parallel to either the X, Y, or Z axis.

Rotating a mesh in Euler mode is only one step. Simply enter the amount of rotation you want around each of the three axes.

For example, to rotate a wheel of this golf cart, rotate it around the axle, which is parallel to the Z axis.

Or to turn the wheel left or right, rotate it around the X axis.

Knowledge Check: Rotating a Mesh

Here's a knowledge check. You need to rotate this steering wheel along its axis, which is not aligned with an X, Y, or Z axis. Which rotation method is the correct way to turn the steering wheel: Euler or Axis & Angle?

Tap one of the orange boxes to select an option.

Recap

Displaying a complex item virtually in a 3D environment helps your customers understand it better and feel more comfortable buying it.

In this course, we demonstrated the basic skills needed to create realistic visuals.

We learned of the two main parts of the 3D Creator: The Scene Designer and the Rules Editor.

We used the Scene Designer to create a scene and create a primitive shape mesh within it.

We also moved and rotated that mesh in 3D space.

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