Unity Basics

Learn the basics of Unity, including editor features, scenes, objects, components, materials, and physics.

This document is based on Code Monkey's Unity tutorial on YouTube.

Contents

Downloads

To get started, download the Unity Hub and the Unity Editor from Unity's website.

The Unity Hub is an application for managing your Unity projects and installations. The Unity Hub also provides access to learning and community resources.

The Unity Editor is available to download in multiple versions. These include recent releases on which new features are tested, and long term support (LTS) releases, which are more stable.

This document is updated for Unity Hub 3.0.1 and Unity Editor LTS release 2020.3.28f1.

Creating a new project

You create new projects from the Unity Hub. A number of templates are available to set the starting state of your new project. For this simple project tutorial, you will use the 3D project template.

To create a new 3D project:

1. In the Unity Hub, on the **Projects** tab, select **New project**.
2. From the list of templates, select **3D**.
3. In the **Project name** field, enter a name for your new project.
4. Select **Create project**. Your new Unity project opens in the Unity Editor.

Editor panels

The Unity Editor's default layout contains six panels. You can create custom layouts by resizing and repositioning the panels.

Panel	**Description**
Scene	Shows objects and any other assets in the current scene and allows you to edit the scene.
Game	Shows the current scene from the perspective of its main camera.
Hierarchy	Shows a list of all objects that exist in the project, organized by scene.
Inspector	Shows the properties of the selected object in the current scene.
Project	Shows a list of all files in the current project.
Console	Shows messages generated by the Unity Editor.

Editor toolbar

This section describes six commonly used buttons for navigating scenes and manipulating objects.

Button	**Tooltip**	**Description**
	Hand Tool	Allows you to pan around the scene using left-click.
	Move Tool	Allows you to move an object freely or on directional axes.
	Rotate Tool	Allows you to rotate an object freely or on directional axes.
	Scale Tool	Allows you to resize an object freely or on direction axes.
	Rect Tool	Allows you to resize an object on one axis.
	Move, Rotate or Scale selected objects	Allows you to move, rotate, and resize an object.

Scene camera controls

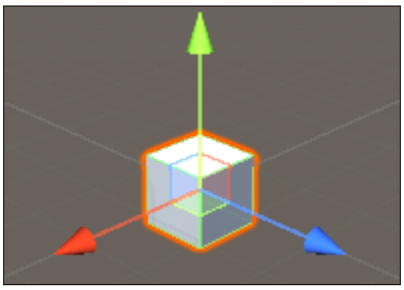
In the **Scene** panel, you can move the camera to get a better look at objects you add to the scene.

Outcome	**Action**
Rotate view from current position	Right-click and hold on scene, drag cursor
Orbit a central point in the scene	Hold **Alt**, left-click and hold on scene, drag cursor
Zoom in or out on scene	Hold **Alt**, right-click and hold on scene, drag cursor
Pan around scene	Select  on toolbar, left-click and hold on scene, drag cursor
Move directionally	Right-click and hold on scene, use **W**, **A**, **S**, **D**, **Q**, and **E** keys
Change movement speed	Right-click and hold on scene, scroll with mouse wheel
Zoom in on an object	Select object in **Hierarchy** pane, hold **Shift**, press **F**

Adding and manipulating objects

To build a new scene, you start by adding objects. After you add an object, you can manipulate its position, rotation, and scale. In this section, you will add a 3D cube object to your project's default scene and then move, rotate, and scale the cube.

You add objects from the **Hierarchy** panel. To add a 3D cube, select  in the **Hierarchy** panel to open the menu, and then select **3D Object** > **Cube**. In the **Scene** panel, a cube appears:



Using the Move, Rotate, and Scale tools on the toolbar, you can manipulate an object in two ways:

- To move, rotate, or scale on the x, y, or z axis, left-click and hold the red, green, or blue axis handle, and then drag your cursor.
- To move, rotate, or scale freely, left-click and hold the shape in the center of the object, and then drag your cursor.

The appearances of the red, green, and blue axis handles and center shapes differ for moving, rotating, and scaling objects. When you use the combined tool for moving, rotating, and scaling an object at once, all three variations of the axis handles and center shapes appear for you to use.

Adding object components

Components are object properties that you use to make an object look and behave a certain way. For example, you use components to add meshes and mesh renderers, materials, and colliders.

You add components to an object using the **Inspector** panel. Each new object you create is assigned a name and has, at minimum, the Transform component, which stores the position, rotation, and scale of the object. Each additional component you add has a set of unique properties you can configure.

In this section, you will create a new object and then add components to turn it into a sphere that rolls off a flat object (a plane).

1. Create an empty object and name it.
    a. In the **Hierarchy** panel, select  and then select **Create Empty**.
    b. Ensure the object is selected. To do so, you can select its name in the **Hierarchy** panel.
    c. In the **Inspector** panel, enter a unique name for the object.

2. Add the mesh filter component to give the object a shape.
    a. In the **Inspector** panel, select **Add Component**.
    b. Select **Mesh** > **Mesh Filter**.
    c. In the **Mesh** field, select  to open the **Select Mesh** window.
    d. Select **Sphere**.
    e. Select  to close the **Select Mesh** window.

    A mesh filter adds a shape but no visual. After the next step, the sphere will be visible.

3. Add the mesh renderer component so that you can see the object's shape and set its material.
    a. In the **Inspector** panel, select **Add Component**.
    b. Select **Mesh** > **Mesh Renderer**. The object becomes visible as a pink sphere.
    c. Expand the **Materials** section so that the field for selecting a material is visible.
    d. On the field in the **Materials** section, select  to open the **Select Material** window.
    e. Select a material. Optionally, you can create your own material and then select it here.
    f. Select  to close the **Select Material** window.

4. Add the Rigidbody physics component so that the object is affected by gravity.
    a. In the **Inspector** panel, select **Add Component**.
    b. Select **Physics** > **Rigidbody**.
    c. Ensure that the **Use Gravity** check box is selected.

5. Position the object in view of the scene's main camera and test its behaviour.
    a. In the **Hierarchy** panel, select **Main Camera**. A preview of the main camera's view appears in the corner of the **Scene** panel.
    b. Ensure that the object is in view of the main camera.
    c. Select the **Game** panel.
    d. Select  to preview the scene. The object is in view of the camera and then falls.
    e. Select  again to reset the object's position.

6. Add a sphere collider component to the object so that it can interact with other objects.
    a. In the **Inspector** panel, select **Add Component**.
    b. Select **Physics** > **Sphere Collider**.

7. Add a flat object (a plane) for the sphere to collide with.
    a. In the **Hierarchy** panel, select  and then select **3D Object** > **Plane**.
    b. Position the plane object below the sphere object and in view of the main camera.
    c. Using the Rotate Tool, tilt the plane object slightly so that the sphere object will roll off.

8. Test the interaction of the two objects.
    a. Select  to preview the scene. The sphere object falls, hits the plane object, rolls off the edge of the plane object, and then continues to fall.
    b. Select  again to reset the sphere object's position.

Creating a material

You can create a custom material and then select it when configuring an object's mesh renderer component in the **Inspector** panel. In this section, you will create a custom material using the default shader. Then, you will customize the albedo property, which controls the material's texture and colour.

To create a basic custom material:

1. In the **Project** panel, select  and then select **Material**. The new material's properties appear in the **Inspector** panel.
2. Ensure the **Shader** field is set to **Standard**. This is the default shader for new materials.
3. Select a texture:
    a. On the left of the **Albedo** label, select  to open the **Select Texture** window.
    b. Select a texture.
    c. Select  to close the **Select Texture** window.

4. Select a colour:
    a. On the right of the **Albedo** label, select the white rectangle to open the **Color** window.
    b. Select a colour.
    c. Select  to close the **Color** window.

    The white rectangle in step 4.a. changes to match the colour you selected.

5. Give the new material a unique name:
    a. In the **Project** panel, locate the material file, right-click it, and then select **Rename**.
    b. Press **Enter** to save your changes.