

## Unity Mesh Creator Overview

The Unity Mesh Creator package creates simple meshes from image textures based on image transparency. It allows the user to easily generate mesh colliders, box colliders, or a bounding box to the mesh, as well as to assign a physics material and texture materials. One may also generate front and back planes as well as an edge mesh for different texturing options.

This document provides an overview of how to use some features of the mesh creator. Please read it like stereo instructions. If you want a friendly tutorial, see here:

<http://games.ucla.edu/resource/unity-mesh-creator/>

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## Use Cases

There are few cases where Unity Mesh Creator comes in handy:

1. 2D platformer games.
2. Quasi-3D games using an extruded look.
3. Distant objects requiring physics in 3D games.

We've also been informed that the mesh triangulation features of Unity Mesh Creator are helpful for reducing some alpha drawing performance problems on mobile devices. We have yet to test this.

## Where to Get Unity Mesh Creator

Unity Mesh Creator is available for download on Github here:

<https://github.com/uclagamelab/MeshCreator>

Just download the zip file for the project and open up the example scene found at Assets/UCLAGameLab/Scenes/UCLA\_Game\_Lab\_Mesh\_Creator.unity

## About Unity Mesh Creator

1. Open source - BSD 2 clause license.
2. Editor scripts, and data component for game objects in scene.
3. No run time support, editor only.
4. Expects a transparent area around opaque or partially opaque pixels.
5. Deals with transparent holes in an unpredictable manner.
6. Islands in images are fine.
7. Pollutes your project hierarchy with a bunch of mesh assets.
8. Best with square images. Rectangular images require the MeshCreatorData scale to be set properly.

## Unity Mesh Creator Workflow

1. Make new scene in Unity. Mesh Creator objects may only be created inside a scene.
2. Save scene before creating a new object.
3. Import textures. Adjust texture size before creating a new object.
4. Use wizard to create new game objects.
5. Update meshes by adjusting inspector elements, and clicking "Update Mesh" button.
6. Changes made to images in the project will not propagate to meshes until "Update Mesh" is used.

## Textures for Unity Mesh Creator

Mesh Creator creates meshes or colliders based upon the alpha channel found in transparent .psd or .png files. Ideally, images are created so that an opaque area is completely surrounded by transparent pixels.

Multiple islands of opaque pixels are supported by the tool. Meshes or colliders made from islands will look as you expect.

Support for transparent holes inside opaque pixels is not so good. Meshes will probably look wrong. Box colliders seem to look okay.

Images are not required to be square, but you will need to change your import settings for the texture to Non Power of 2 -> None.

The best results come from .psd files made using the techniques described here:

<http://unity3d.com/support/documentation/Manual/HOWTO-alphamaps.html>

We've made some additional actions that help streamline the process:

<https://github.com/uclagamelab/AlphaUtilityAdditions>

## Create New Mesh Creator Game Object

1. Open wizard window:
  - a. choose GameObject->Create Mesh Object
2. Select Texture in the box labeled Texture to Create Mesh From
3. Select Mesh Type:
  - a. Flat 2D - make smooth rendering front quad.
  - b. Full 3D - make a 3D mesh.
4. Select Collider Type:
  - a. Boxes - pack the object with box colliders
  - b. Mesh - build a mesh collider
  - c. Bounding Box - make a bounding box around opaque areas
  - d. None - don't make a collider.
5. Enter a name in the text box labeled Game Object Name.
  - a. The name, along with the scene name, will be used for saving created meshes into your project.
6. Click the Create Mesh button.
7. After a few seconds, a new game object should be in your scene and it's mesh saved into your project.

## Modify Mesh Creator Data in the Inspector

The wizard window provides some basic configuration, but using the inspector allow full control over you created object.

Adjustments made in the inspector window will not propagate to your object until you click the Update Mesh button at the bottom of the inspector.

If the MeshCreatorData component is attached to a prefab object, you will be able to view the values for the data, but you will not be able to manipulate them. Update Mesh can only be used when an object is in a scene.

The available MeshCreatorData values are:

1. Mesh Outline Texture - the texture used to create the mesh or colliders from.
2. Pixel Threshold - normally the algorithm searches for 100% opaque pixels, but can be

adjusted by changing the value here.

3. Mesh Type: Flat 2D and Full 3D - same as in the wizard.
4. Collider Type: Boxes, Mesh, Bounding Box, None - same as in the wizard.
5. Mesh id number - unique number for the object used for saving the mesh. Read only.
6. Create full mesh for edge? - select to create a mesh for the side when using Flat 2D
7. Create backside plane? - select to create a quad plane on the back side when using Flat 2D
8. Auto Generate Material? - select to use the material created for you. uncheck to provide your own
9. Use Other Material - select a material for the Mesh Creator to texture your mesh. The mesh shape will still be determined by the Mesh Outline Texture selected.
10. Max Number Boxes - limit the maximum number of boxes when using box colliders.
11. Use Physics Material? - select to have Mesh Creator add a physics material to all colliders generated.
12. Set Collider Triggers? - select to have Mesh Creator set all generated colliders as triggers.
13. Mesh Scale - scale the mesh by this amount. Transform scale will not be affected.
14. Merge Close Vertices - select to simplify edge creation by merging vertices within a the specified distance.
15. Pivot Position - changes the central pivot of the mesh. Can be useful for rotating objects with animation.

## **Useful Tips**

When making very large meshes, use the Mesh Scale values in the Mesh Creator Data inspector rather than the transform scale. I found physics with big mesh colliders to be completely wonky using the built in scale.

Use Pixel Threshold and Merge Close Vertices to smooth out rough edges.

## **Motivation for Mesh Creator**

The original version of Mesh Creator was written for high school level game design class at UCLA DMA Summer Institute. We needed a quick way to prototype games without teaching the kids 3D modeling software. Unity Mesh Creator provided an easy content creation workflow so users could concentrate on making 2D games. We currently use it for rapid game prototyping at the Game Lab at UCLA.