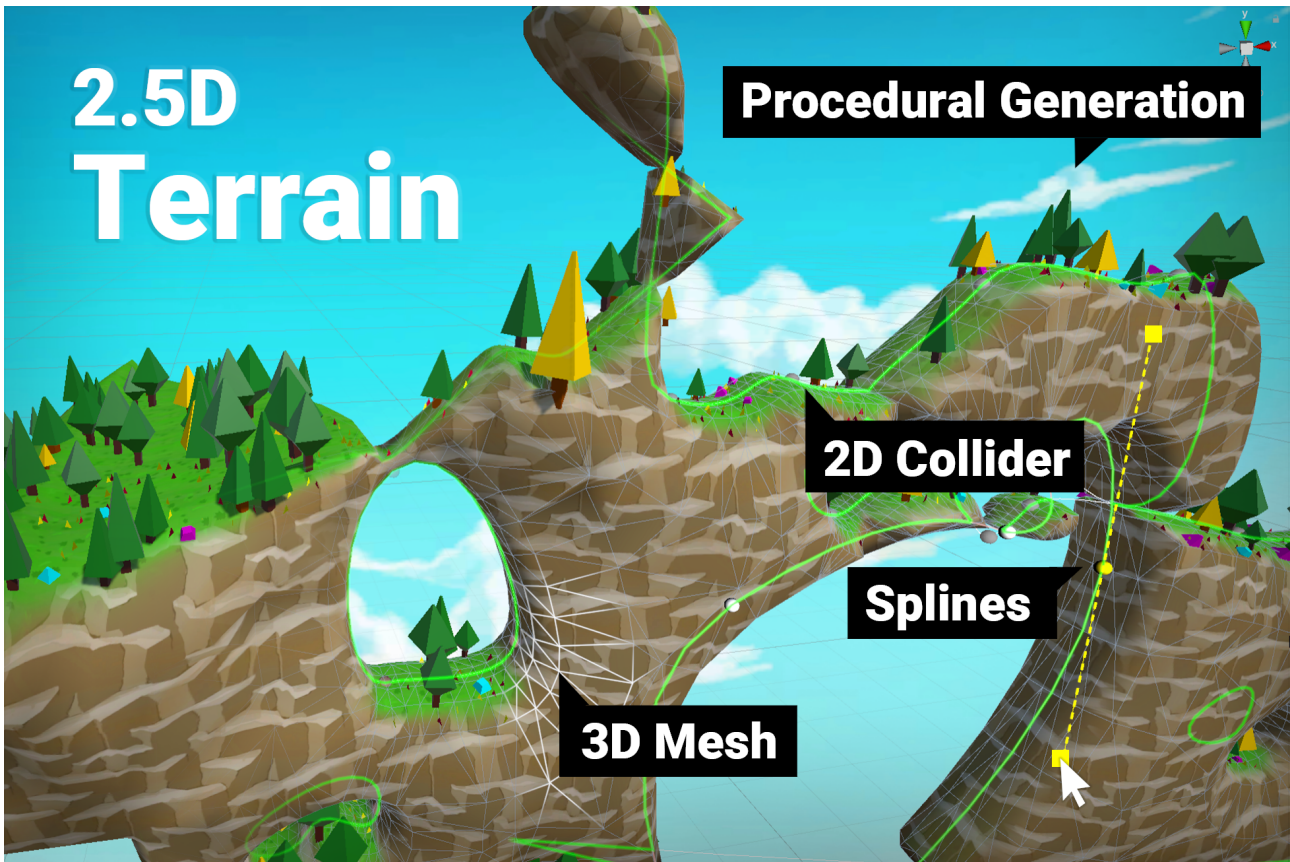


Manual



Support

If you have any questions then please don't hesitate to ask.

Write to office@kamgam.com or visit the [Unity Forum thread](#).

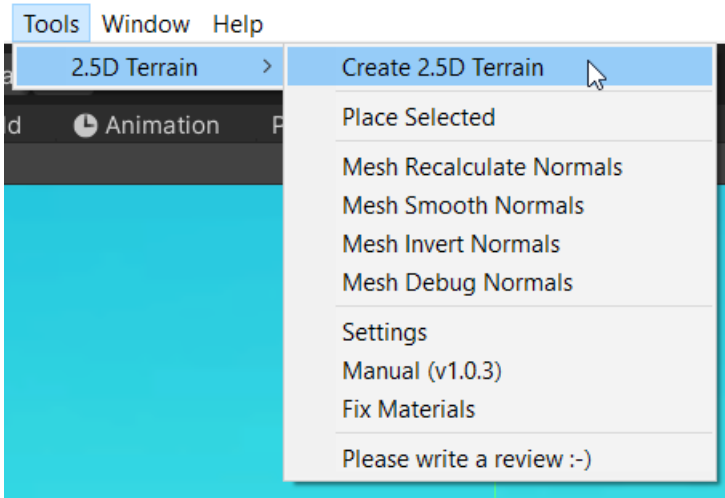
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1. Creating a new 2.5D Terrain.

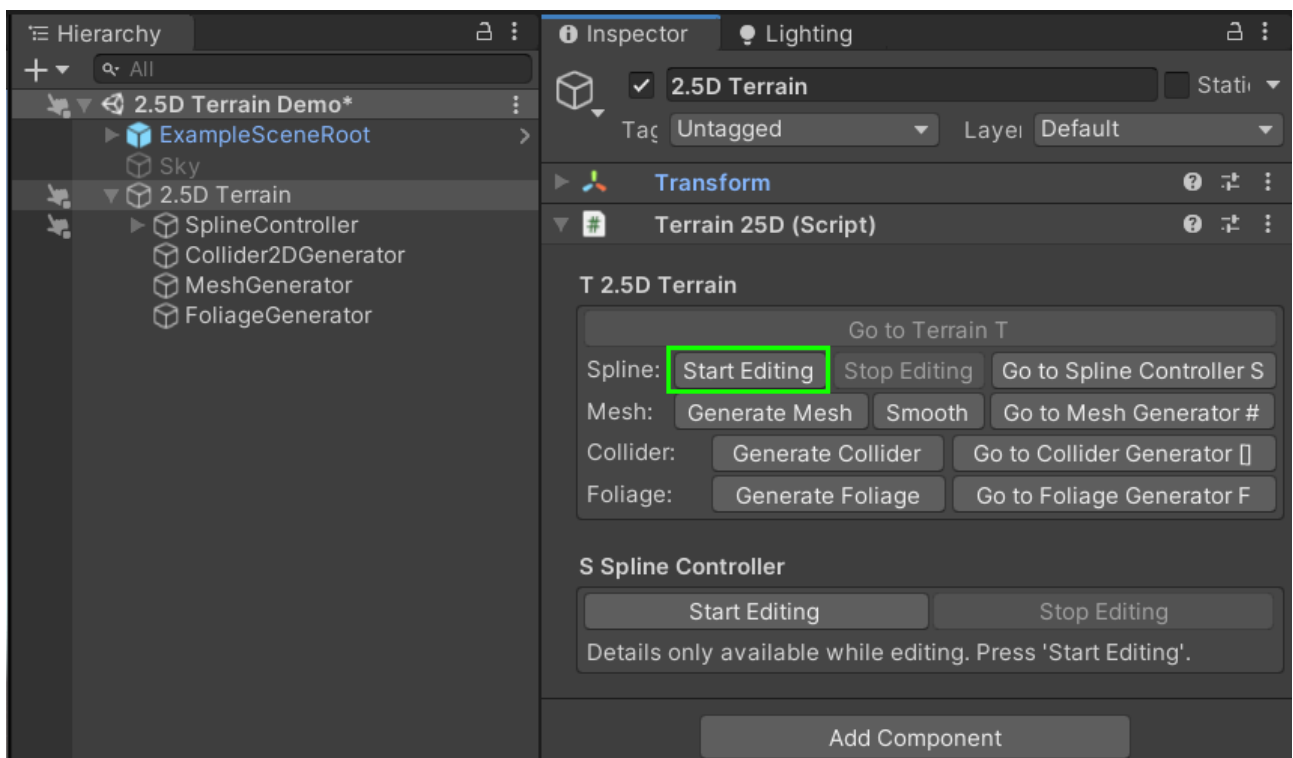
To make a new Terrain use **Tools > 2.5D Terrain > Create 2.5D Terrain**.



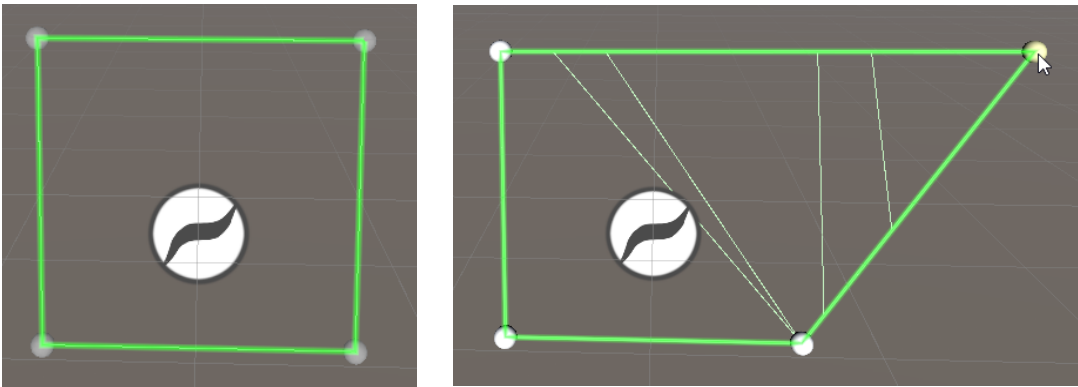
Now you may be disappointed as you don't see much (yet). Just a tiny symbol (the terrain icon).



However, a whole bunch of objects have been added to your hierarchy. Press the **Start Editing** button to start editing the shape.



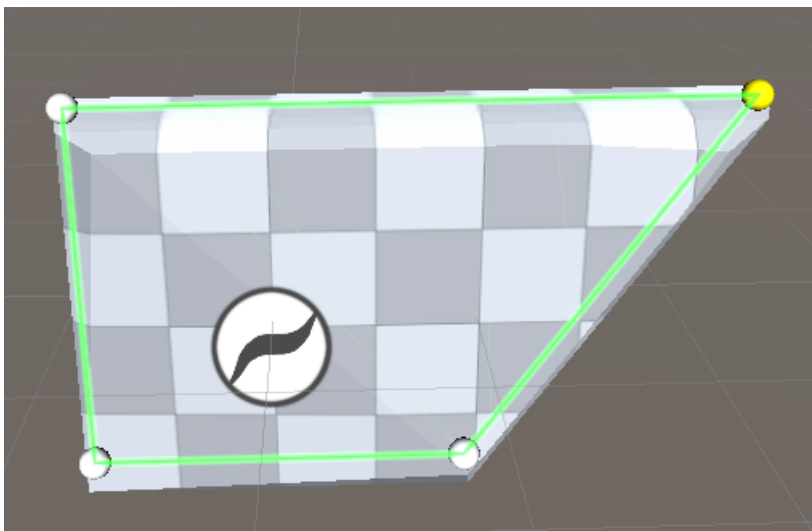
Let's keep it simple. **Click on one of the corners** (it will turn white) and then drag it to the side.



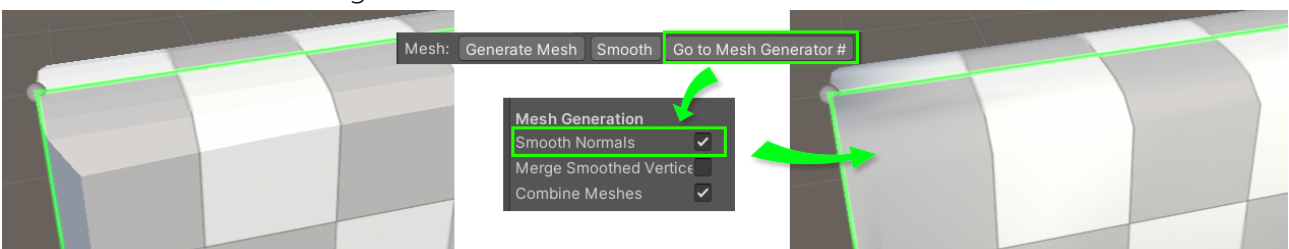
Now click the **Generate Mesh** button.



Ét voila, now you have generated your very first 2.5D terrain.



The mesh still has hard edges. You can make it smooth in the „Mesh Generator“

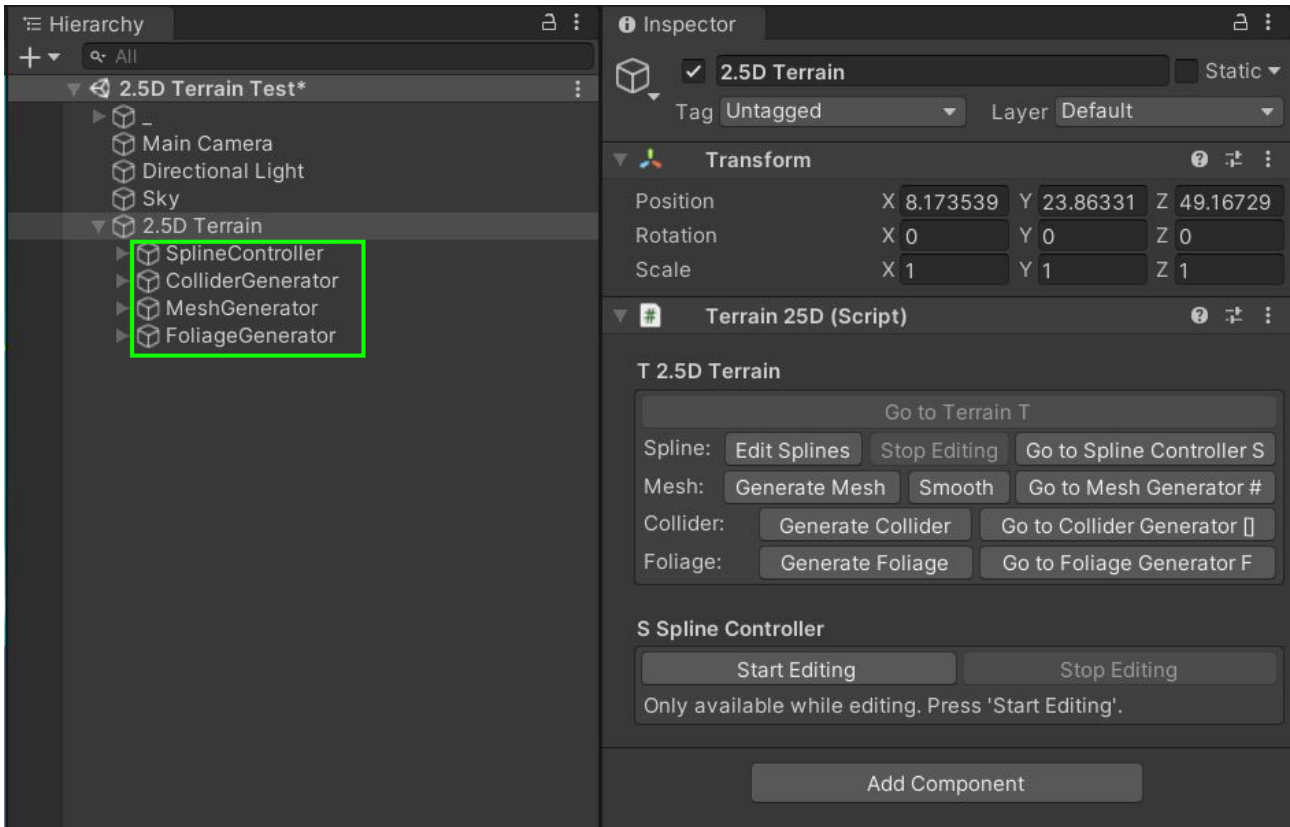


You will find a more detailed step-by-step guide further below.

2. Overview

The „Overview“ and its following sections are meant to be read from top to bottom. If you skip a part then you may have trouble understanding what comes below. Please read it all.

Each 2.5D Terrain object contains four parts as child objects:



Spline Controller

This is the base for all other parts. It is used to create and modify the curves.

Collider Generator

This creates a PolygonCollider2D from the shape output of the Spline Controller.

Mesh Generator

This creates a 3D mesh from the shape output of the Spline Controller.

Foliage Generator

This spawns Prefabs all over the generated mesh from the Mesh Generator.

Each of these children contains its own generated results. The Collider Generator contains the created PolygonCollider2D, the Mesh Generator the generate meshes,

The Terrain2.5D object itself is mostly an empty shell. It does not do much except showing some utility buttons in the inspector.

You can remove the Collider Generator, the Mesh Generator or the Foliage Generator at any time. If a child is removed the tool will simply skip it. For example: No Collider Generator means no PolygonCollider2D will be generated.

Here are the dependencies:

Collider Generator < requires < Spline Controller

Mesh Generator < requires < Spline Controller

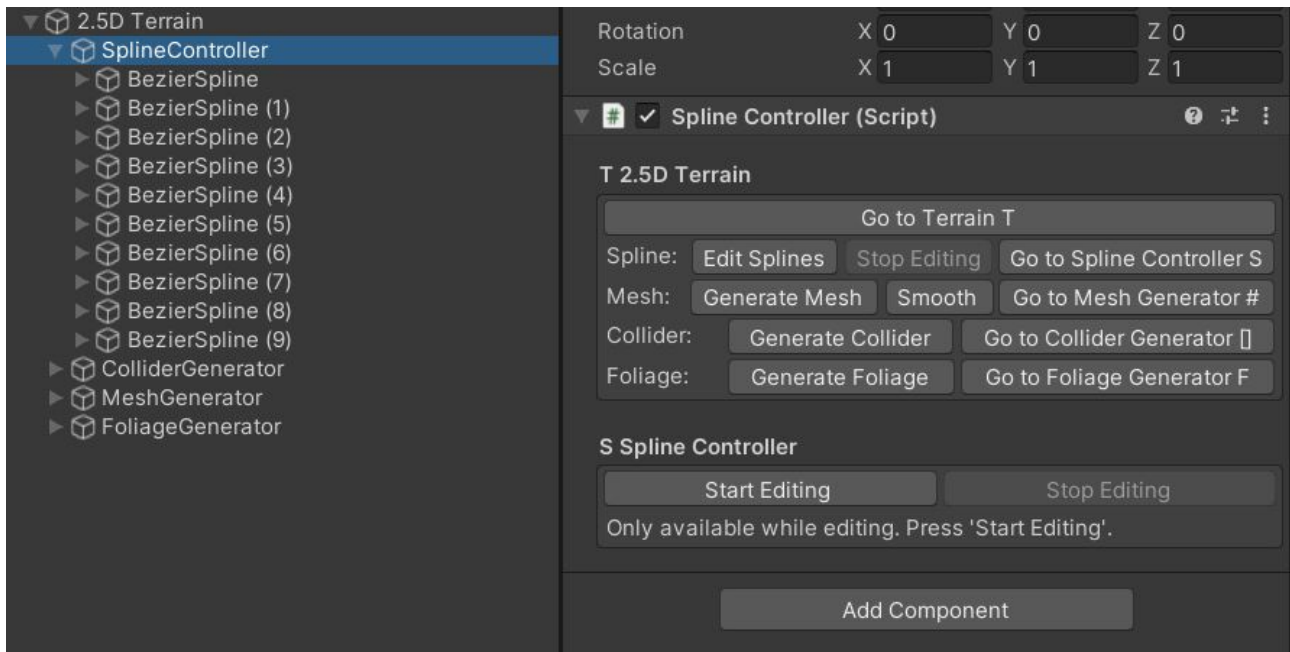
Foliage Generator < requires < Mesh Generator < requires < Spline Controller

3. Spline Controller

The Spline Controller contains one or more Bezier Spline curves.

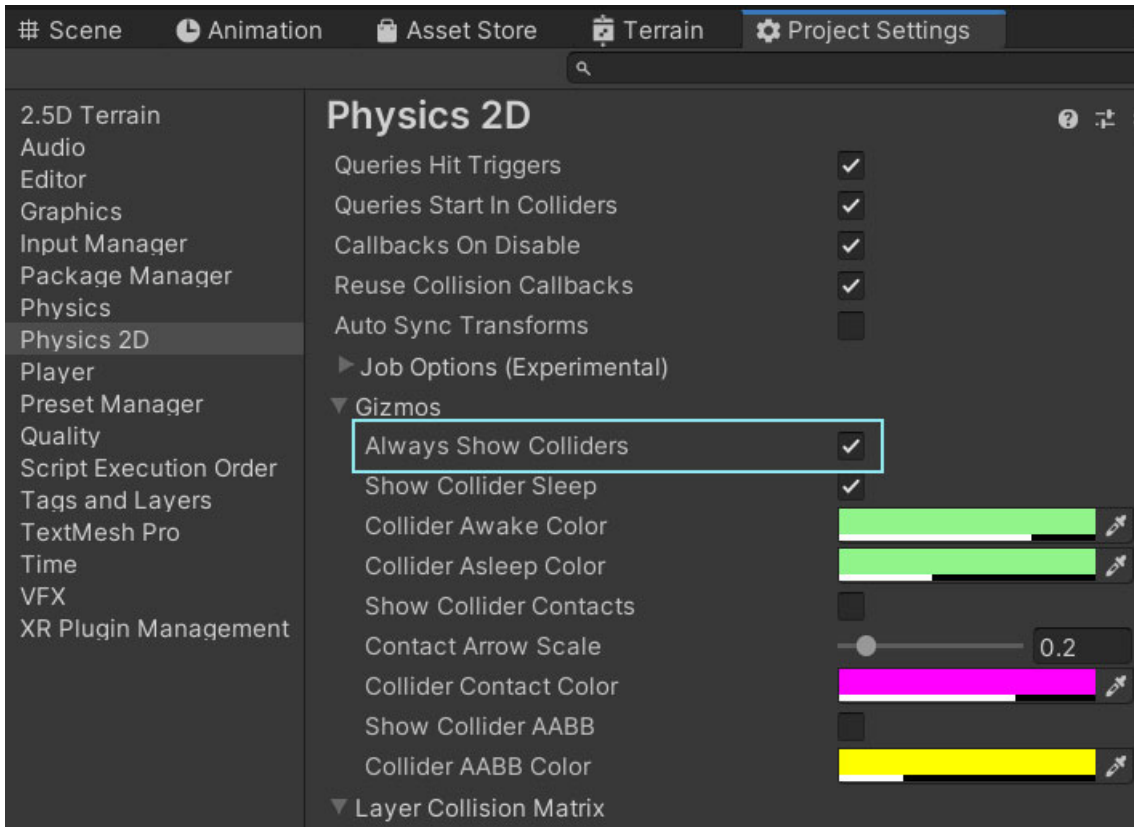
Both the Collider Generator and the Mesh Generator depend on the Spline Controllers output.

Do not delete it.

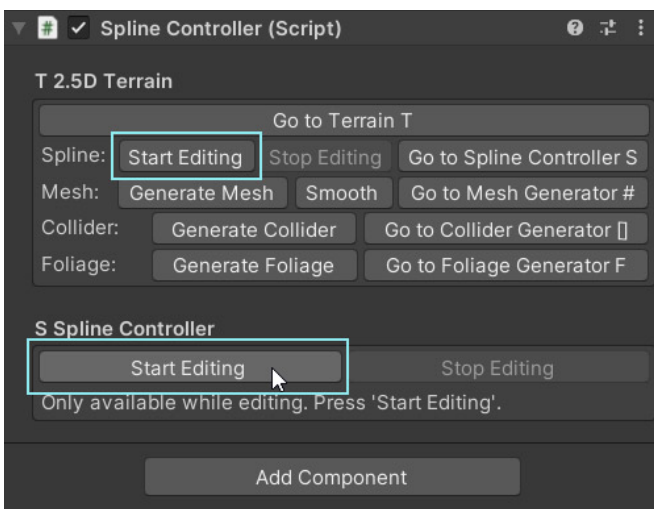


Step-by-Step Guide to the Spline Controller

If you haven't already it might be a good idea to enable the display of the 2D colliders. You can do this under **Edit > Project Settings > Physics 2D > Gizmos > Always Show Colliders**.

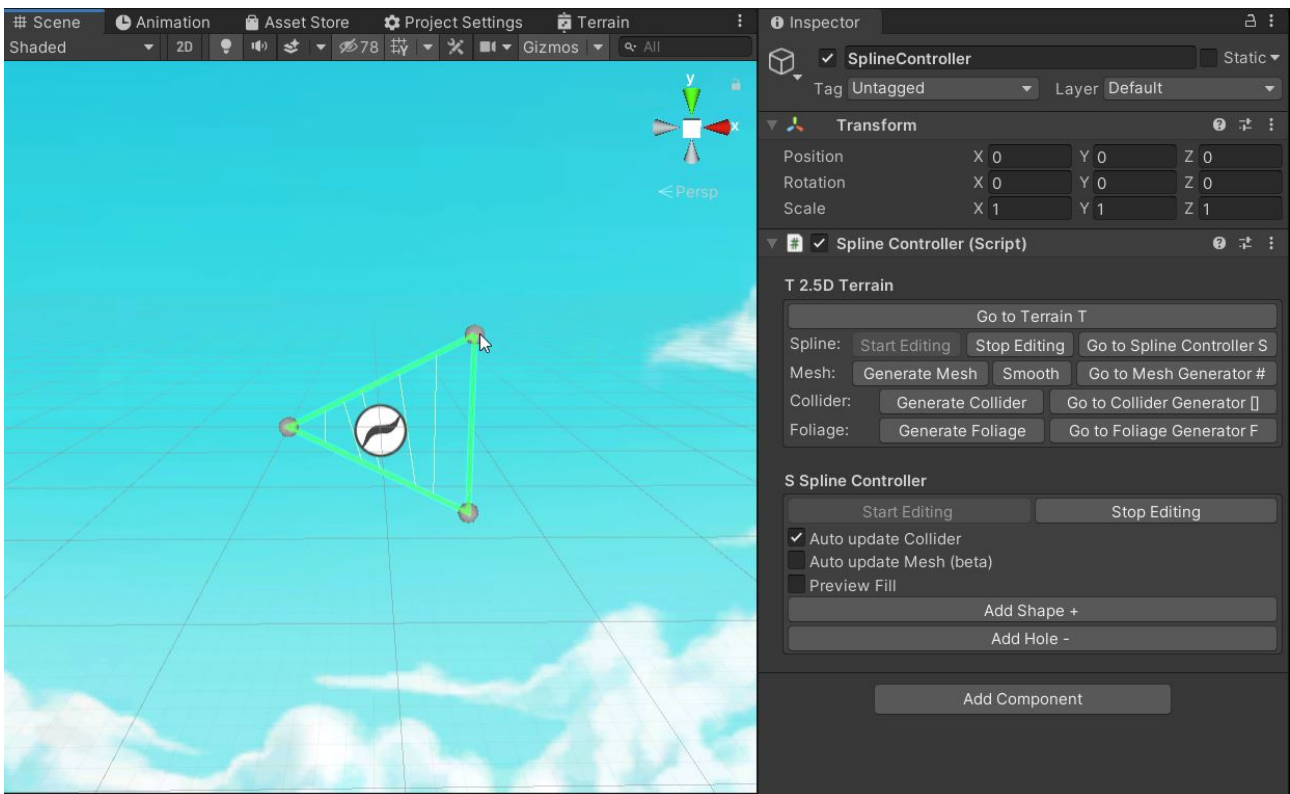


To avoid accidental changes to your curves the Spline EditMode is disabled by default. To start editing curves press the **"Start Editing"** button either on the Spline Controller or the Terrain 2.5D. Both buttons do the same.



Once you are done with editing your curves press "Stop Editing".

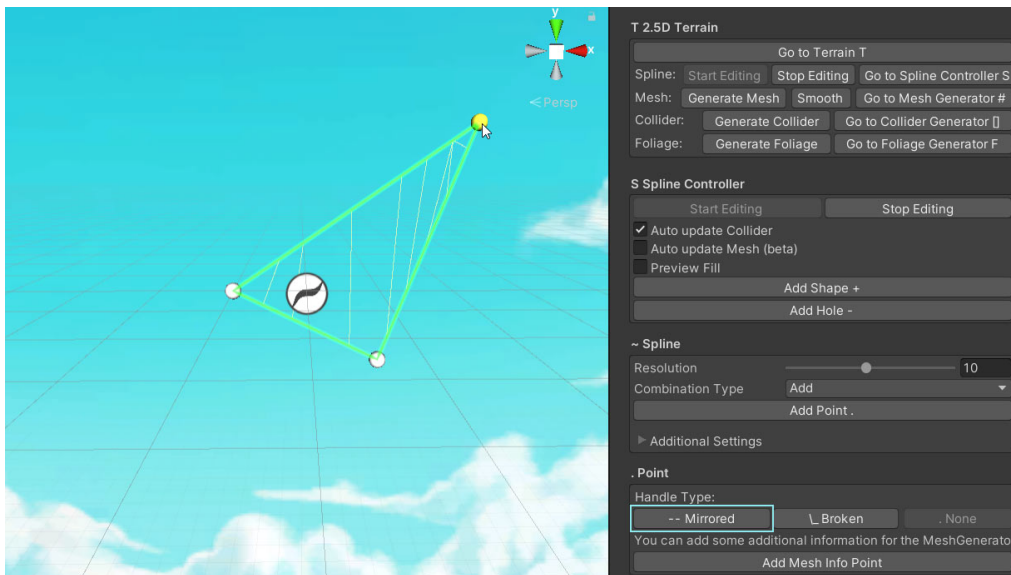
Once you are in edit mode you will notice that the curves are now visible in the scene view. By default each curve has a few points. Click on one of the grey control points to start editing the curve.



In the inspector you can see some options for the Spline Controller. If you hover your mouse over an option a tooltip will appear with a (hopefully helpful) description.

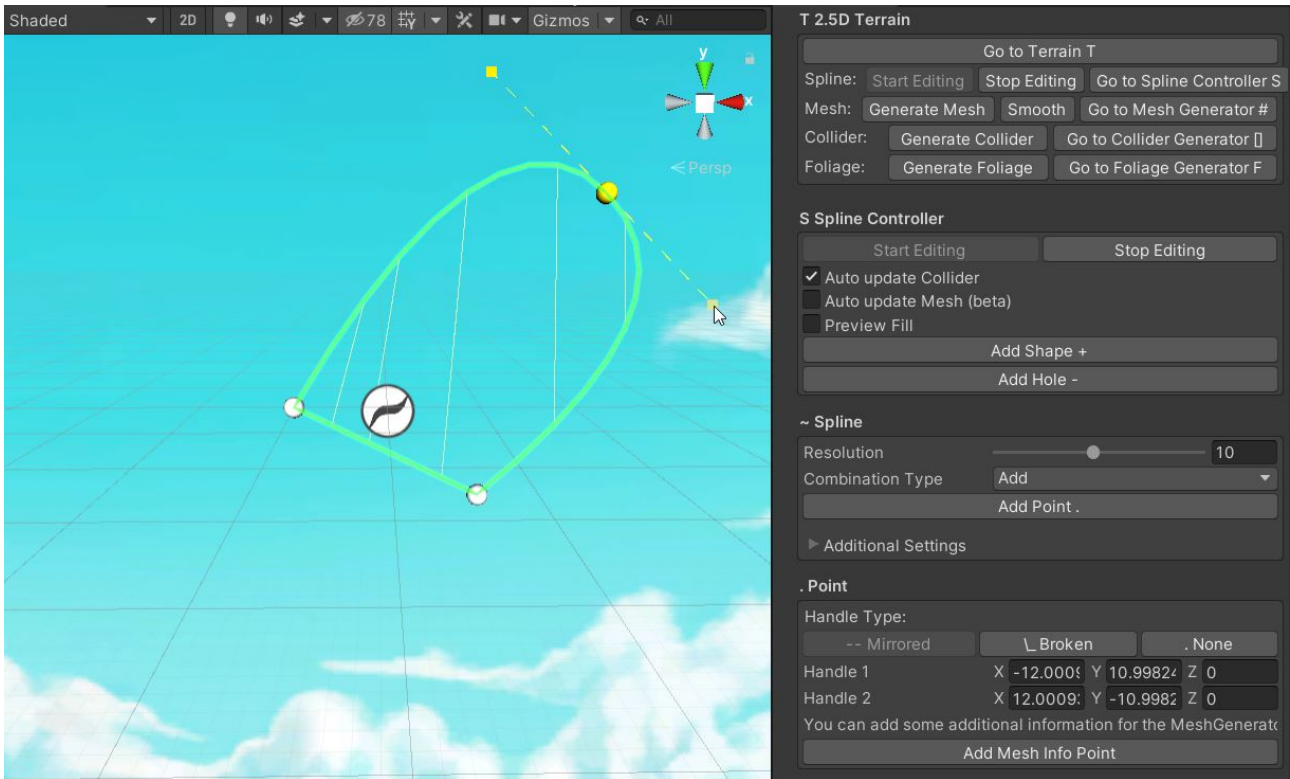
Should you need more info about one of the options in the inspector then please post your question in the [Unity Forum](#). This way others can also learn from the discussion.

The points on the currently selected curve will turn white, indicating you are now editing it. The currently selected control point(s) are marked with yellow color in the scene view. You can drag them around to change the position.



In the inspector you can see some options for the currently selected control point. Try changing the handle type to "mirrored" for example.

There are three handle types for each point "Mirrored", "Broken" or "None". None is the default which means no handles will be shown.

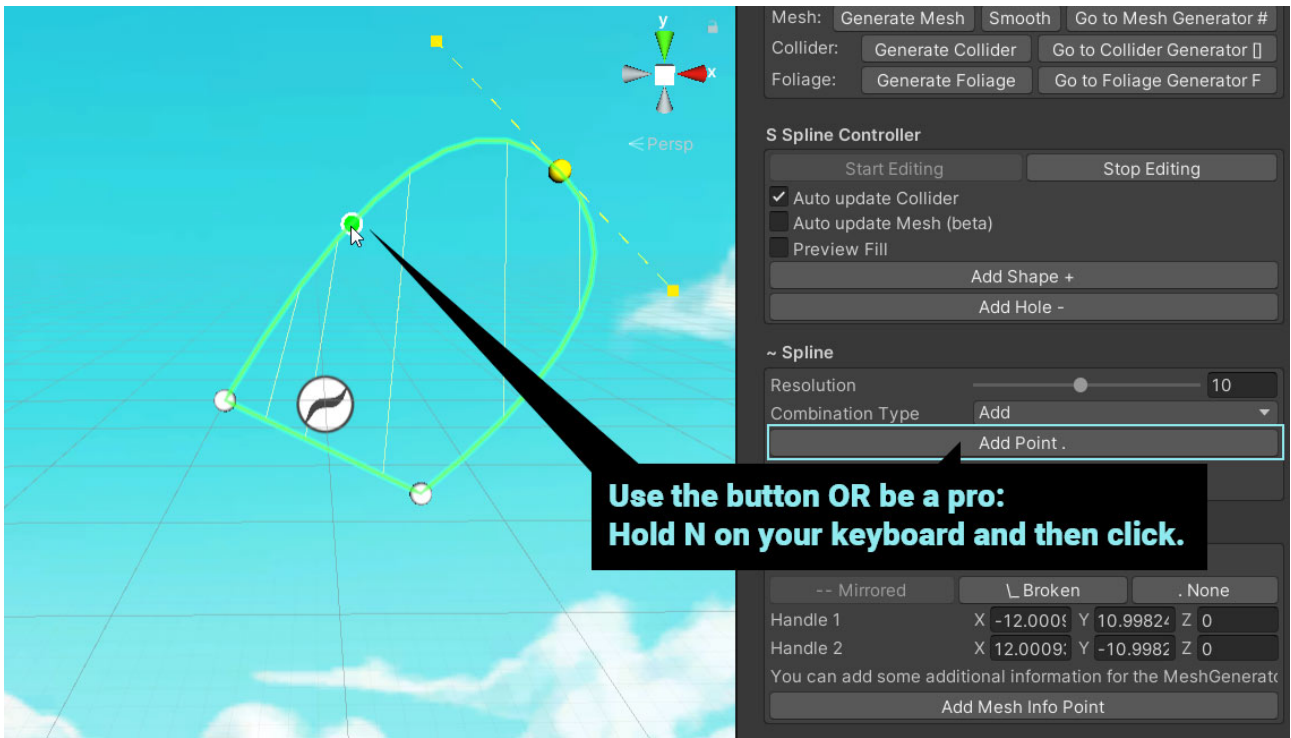


Now that you have mastered the handles let's add a new point to the curve.

You can do that by using the "Add Point" button. But honestly, that sucks.

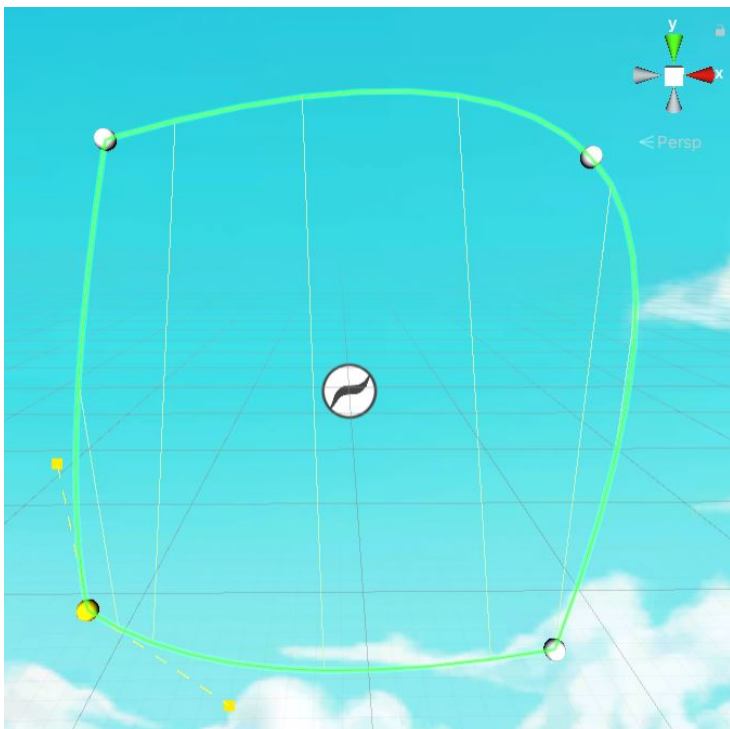
The better way is to press and hold 'N' on your keyboard and then move your mouse over the curve. You will see a green dot moving along. If you click it then a new point will be added right there.

You can change the key at any time in the settings.



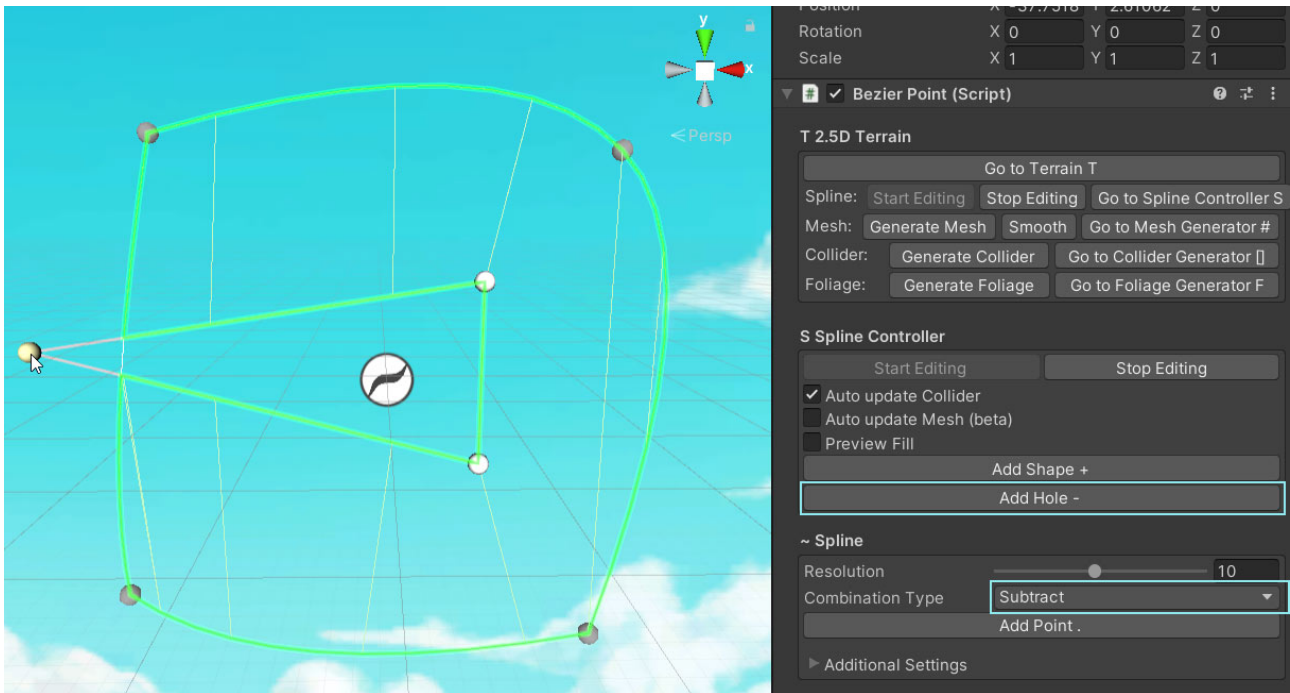
You may have noticed that the collider got updated along with the curve automatically. That's because the 'Auto Update Collider' checkbox is ticked by default.

Play around with the handle types and try to make a square-ish shape. Like this:

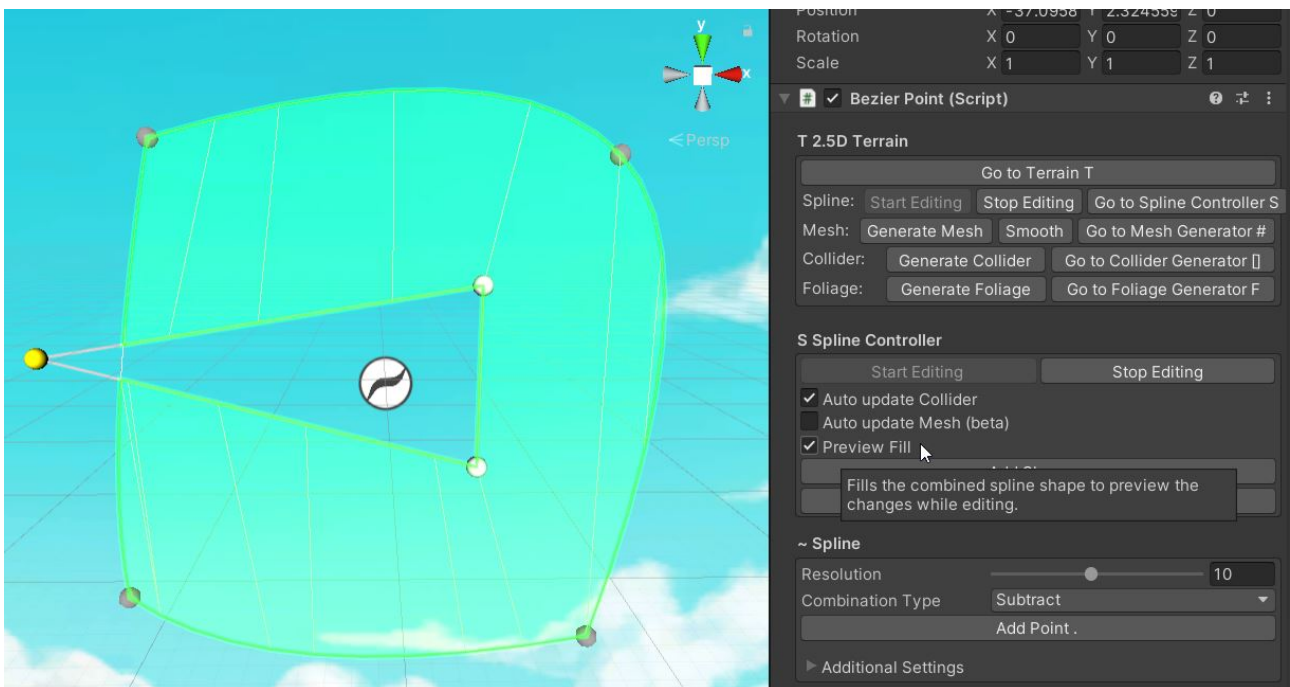


So far we have only used one curve. Let's add another. And to make it more fun, let's make it a hole. Press the "Add Hole" button to add a 'subtractive' shape.

If you drag the left point out of the surrounding curve you will see that the big green border suddenly opens up. The green border is a preview of the final result once all your curved shapes are combined. The Mesh Generator and the Collider Generator will create their results based on this green outline.

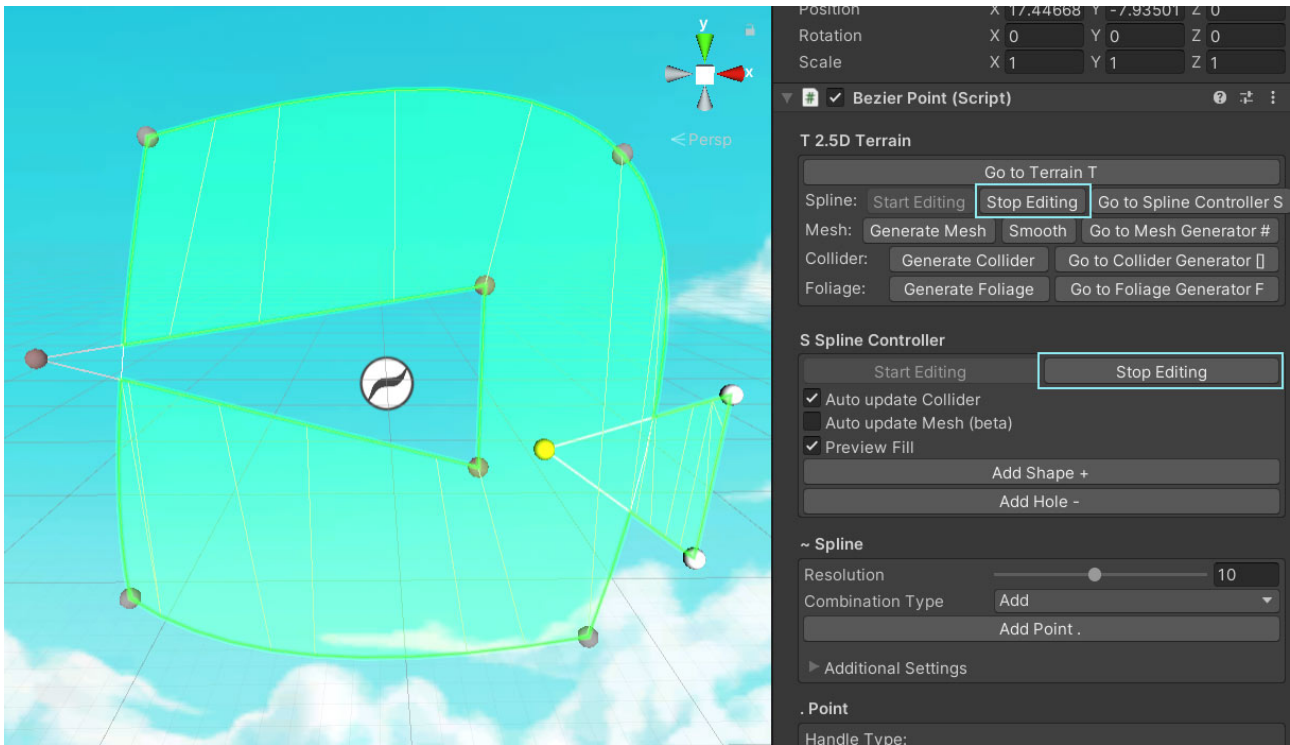


To make it even more visible you can enable the 'Preview Fill' option of the Spline Controller. Though I'd recommend not using it all the time as it costs a bit of performance.



Once you are done. Stop editing the splines.

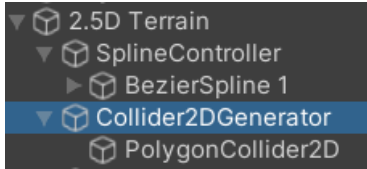
It's not strictly necessary to stop editing a spline before continuing working on other parts but I'd recommend it for performance reasons. The Editor is just a bit slower with all these splines being calculated and drawn all the time.



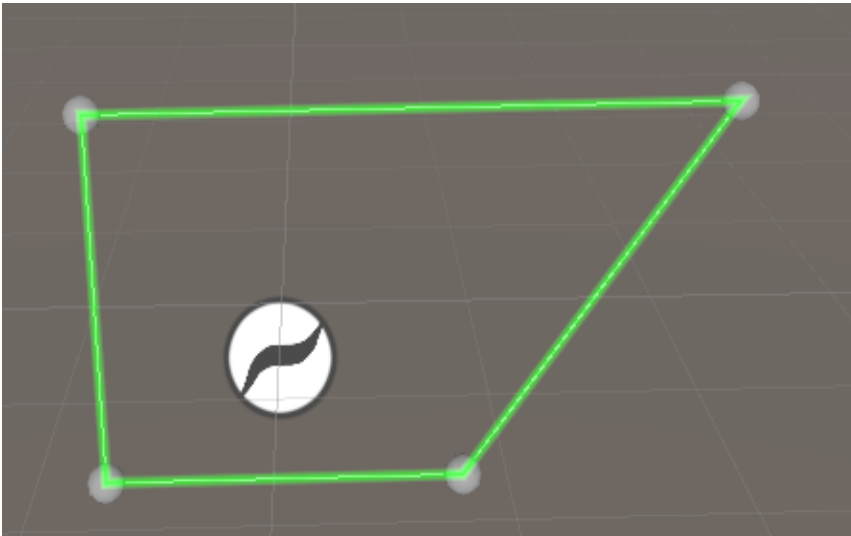
Now you are ready for the „Collider Generator“ and „Mesh Generator“.

4. Collider Generator

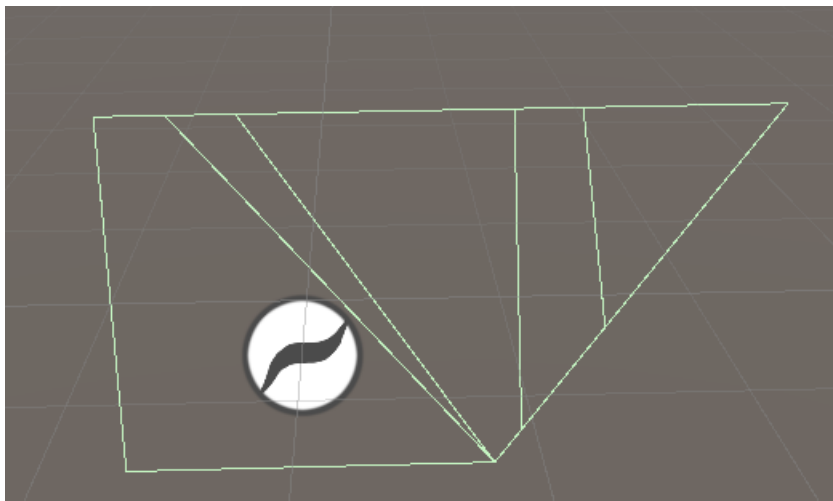
The Collider Generator takes the output of the Spline Controller and generates a PolygonCollider2D from it. That's it.



It turns this:



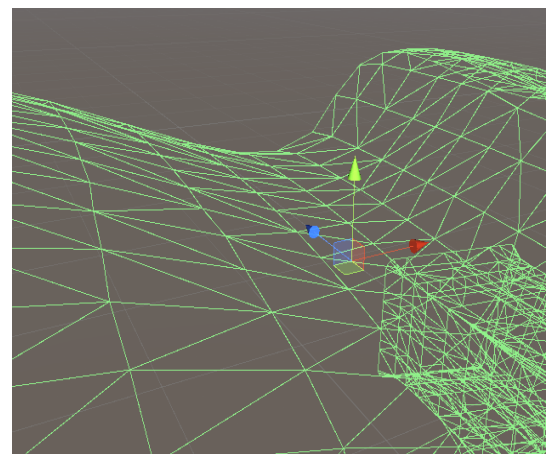
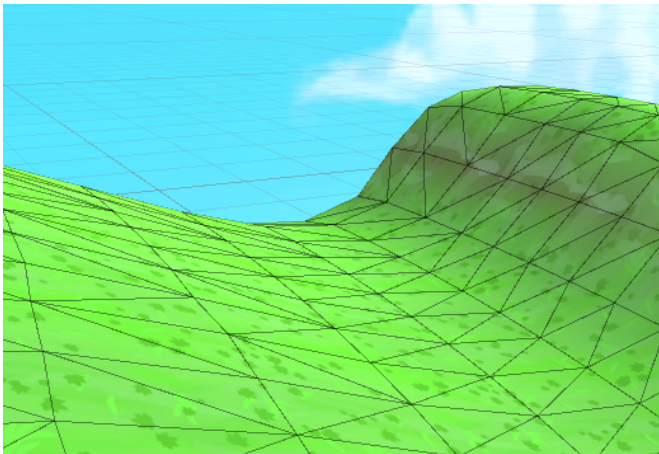
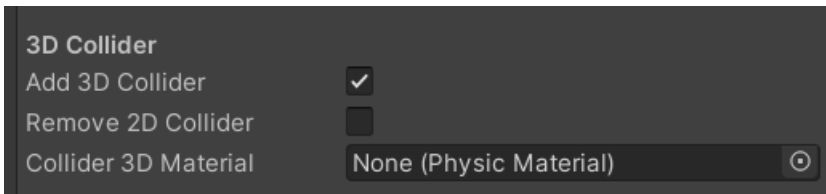
into this:



How to generate a 3D Mesh Collider

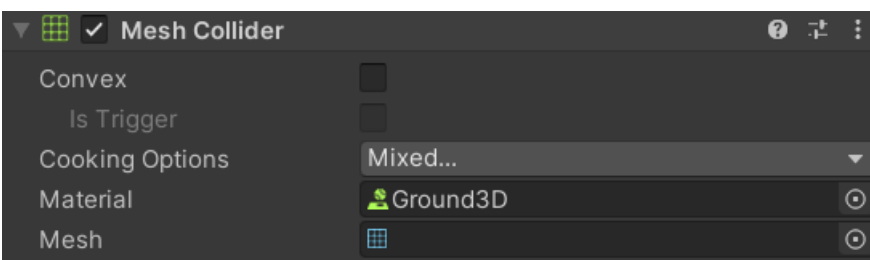
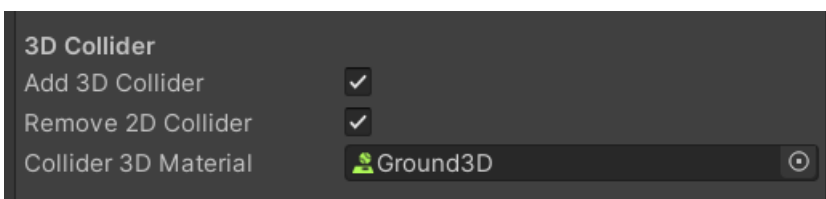
Since we need a 3D mesh BEFORE we can create a 3D Mesh collider we have to wait for the MeshGenerator to generate one for us. That's why the 3D collider options are part of the Mesh Generator, not the Collider Generator.

If you enable the „Add 3D Collider“ option on the Mesh Generator (scroll way down) then you will get a 3D collider based on the 3D mesh.



If you only want a 3D collider then you should also enable the „Remove 2D Collider“ option. This will delete the 2D physics collider after mesh generation.

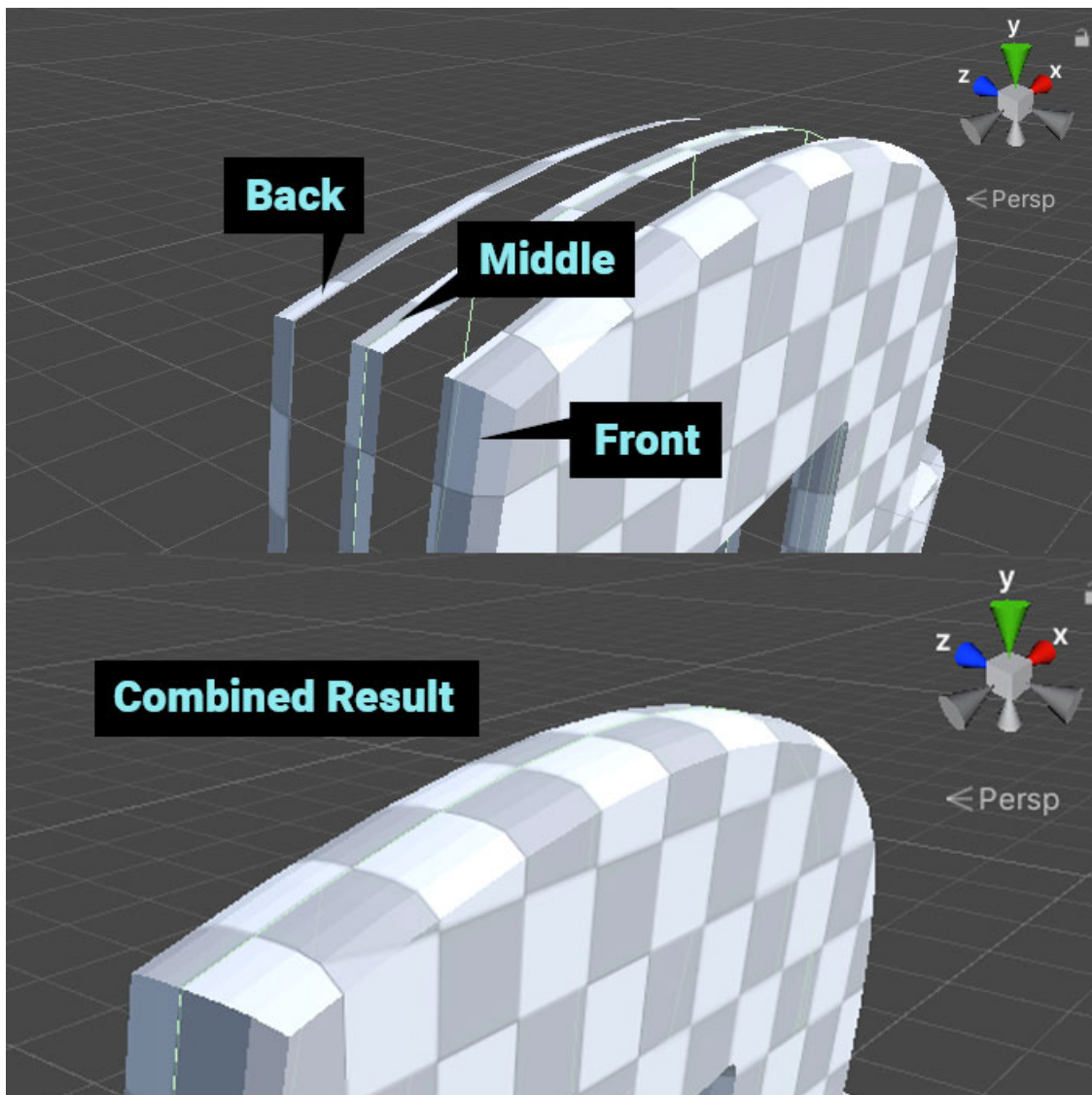
You can also specify a 3D physics material for the collider.



5. Mesh Generator

The Mesh Generator takes the output of the Spline Controller and generates (surprise) a 3D mesh from it. If you are familiar with 3D modelling then it's a bit like extrusion along both directions of the z-axis.

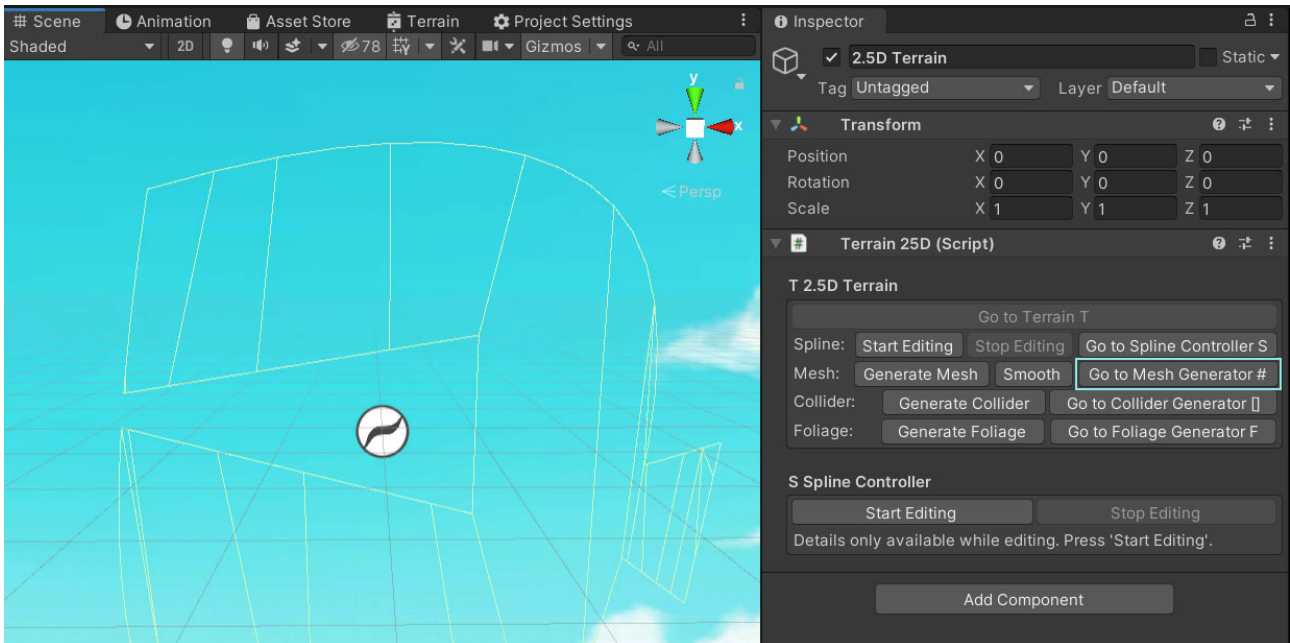
The generated mesh consists of three parts: the Front, the Middle and the Back ordered along the z-axis. These parts are generated and then combined into one mesh (you can also keep them separate if need be).



Step-by-Step Guide to the Mesh Generator

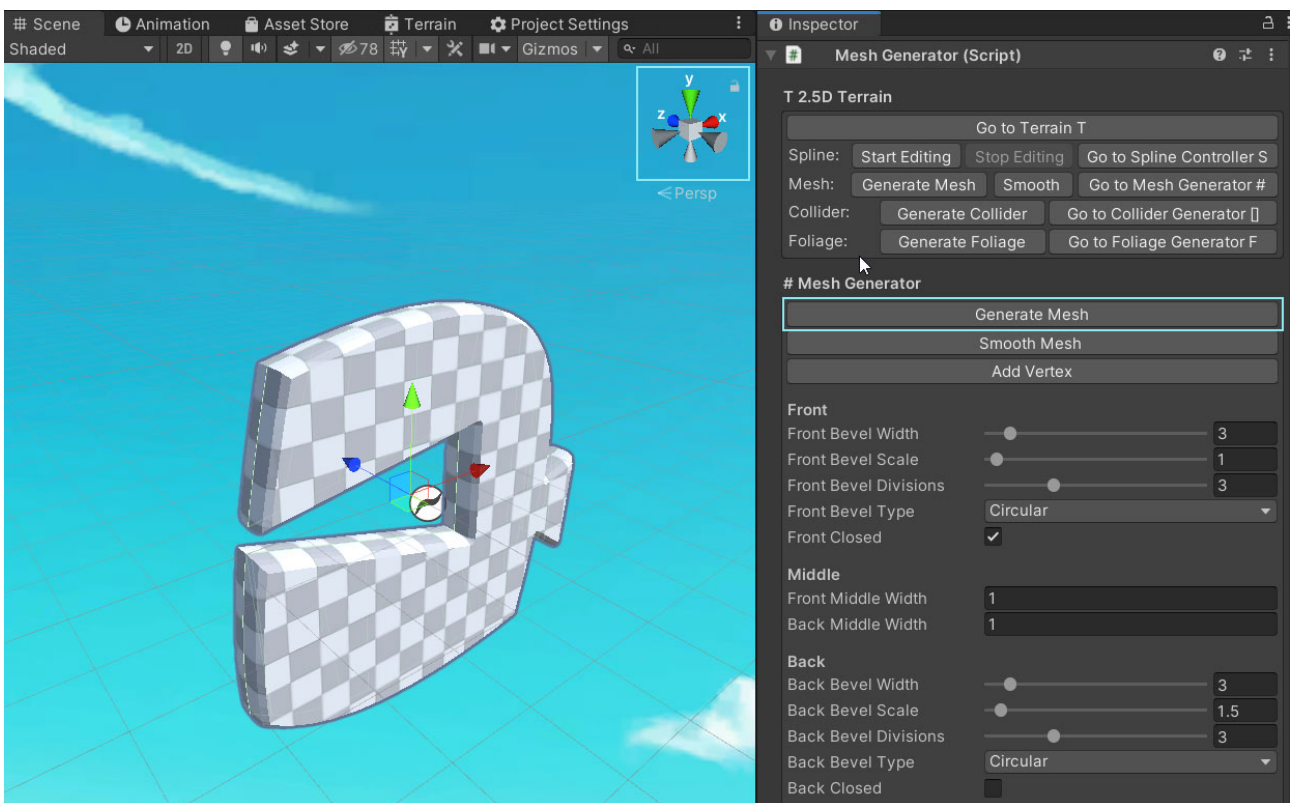
This guide assumes you have completed the 'Spline Controller' guide first.

To open the Mesh Generator select the 2.5D Terrain and hit 'Go to Mesh Generator'.



To generate the mesh press the 'Generate Mesh' button.

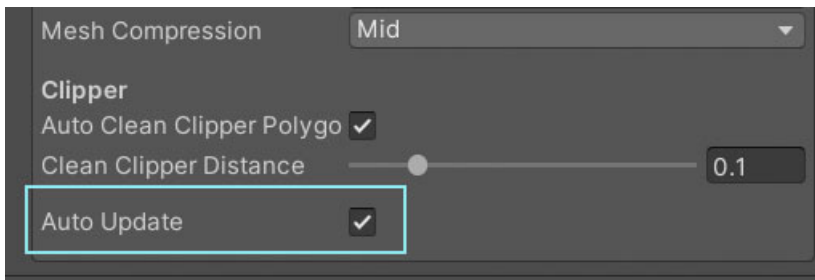
To make it easier to see what each option of the Mesh Generator does I'd recommend to rotate the scene view a bit, like this:



It is best to just play around with the options and see what they do.

To see the changes immediately you can enable the 'Auto Update' option.

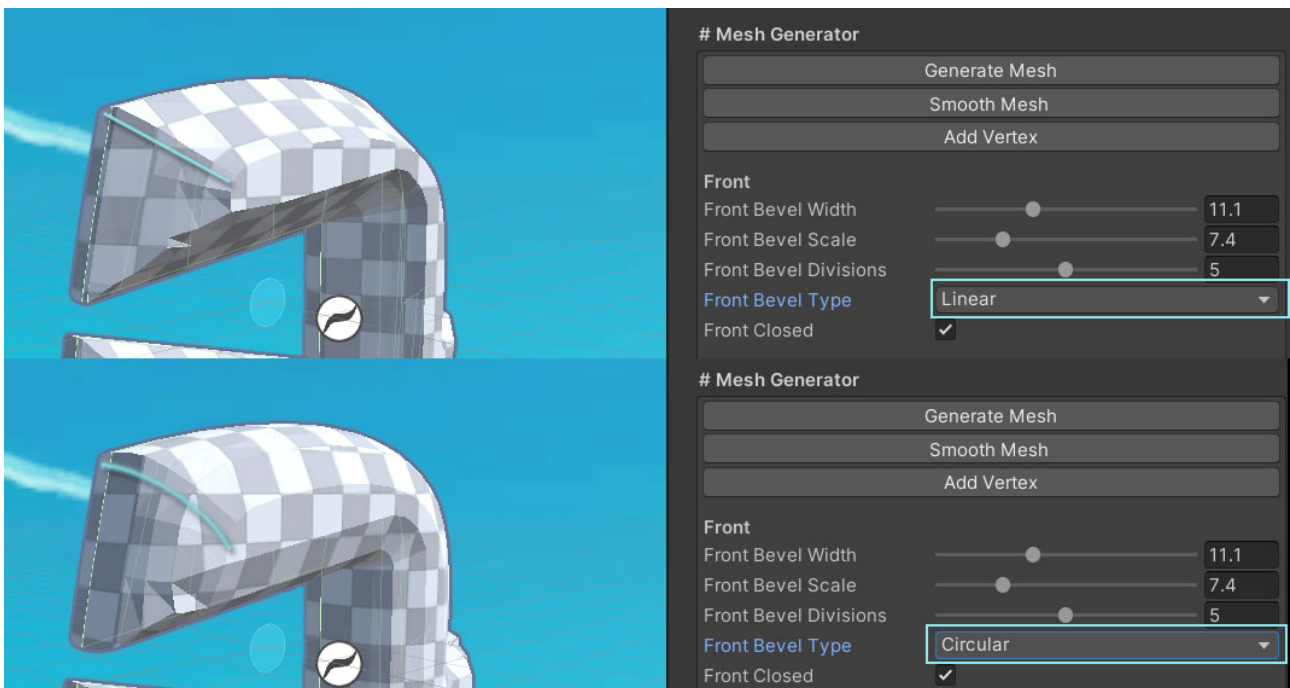
NOTICE that this setting will force the Mesh Generator to ignore the Smoothing and Erosion settings due to performance reasons (it's just too slow with those turned on).



Below you will find more details on some of the more complex options.

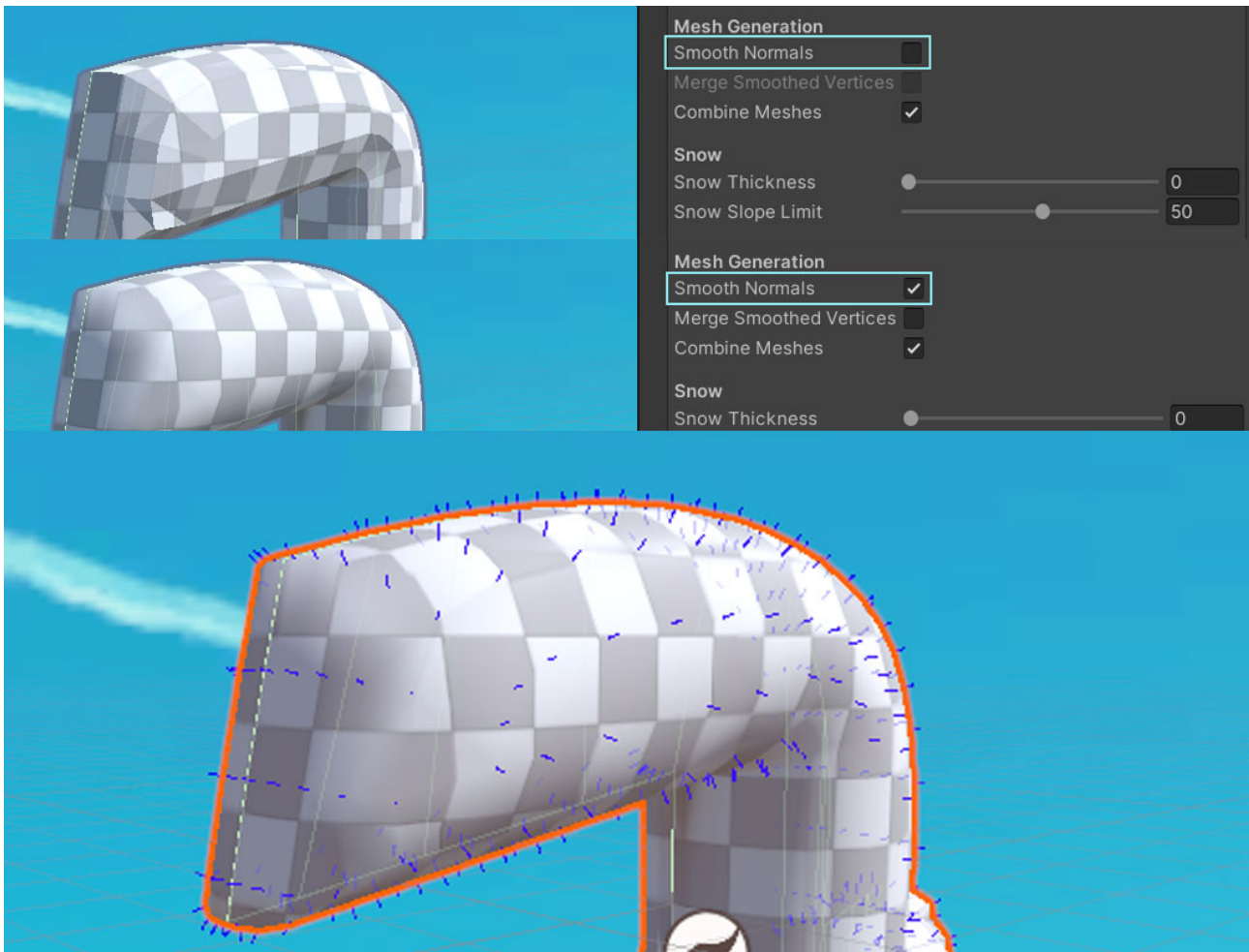
Bevel

The bevel type defines how the edge is shrunk during extrusion. Using the circular bevel in combination with 'Bevel Scale' and 'Bevel Width' can create a nice range of different shapes.



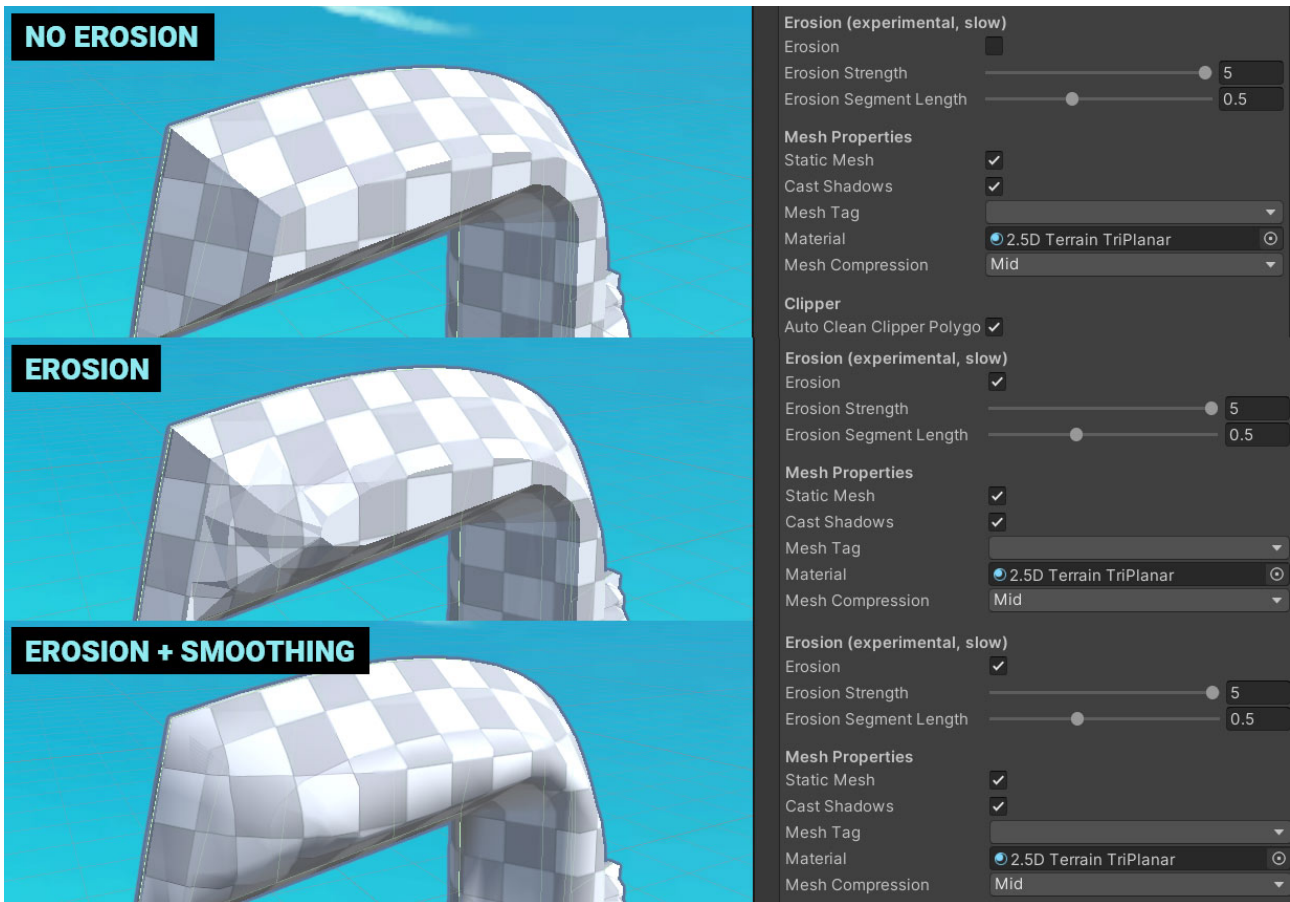
Smoothing

Smoothing will soften the edges by averaging the normals. Very few polygons, but still a smooth look.



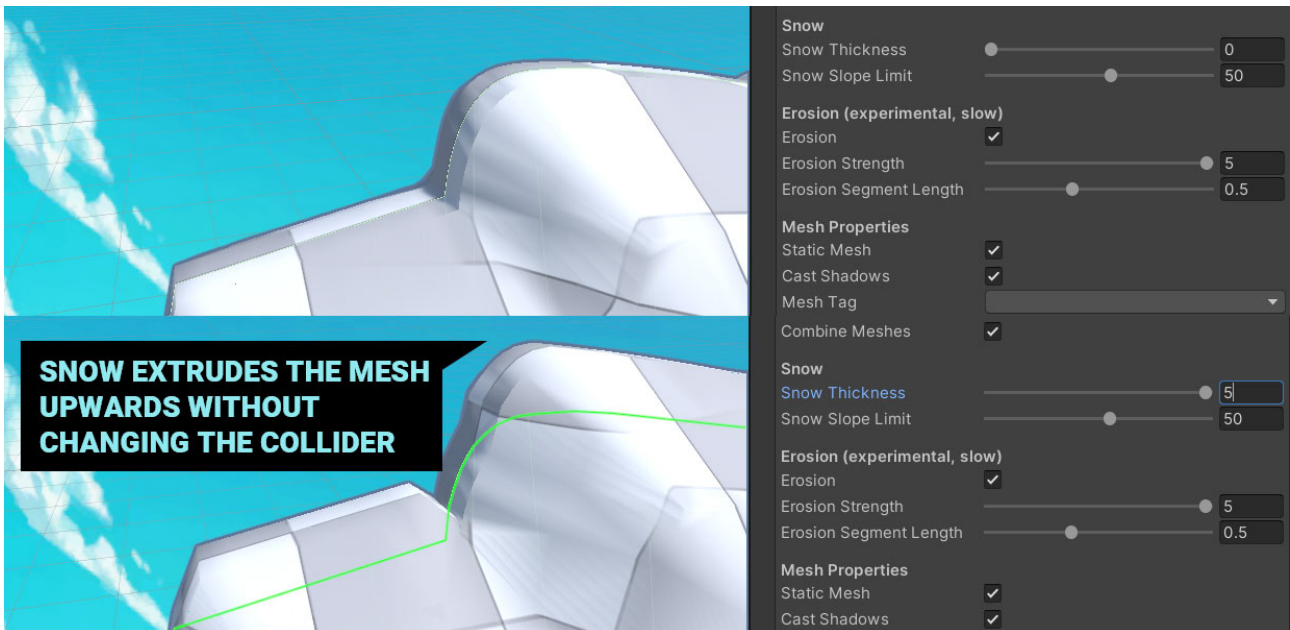
Erosion

Erosion will soften hard edges and makes the mesh look more organic (and chaotic). It's a subtle change. Best used in combination with smoothing.



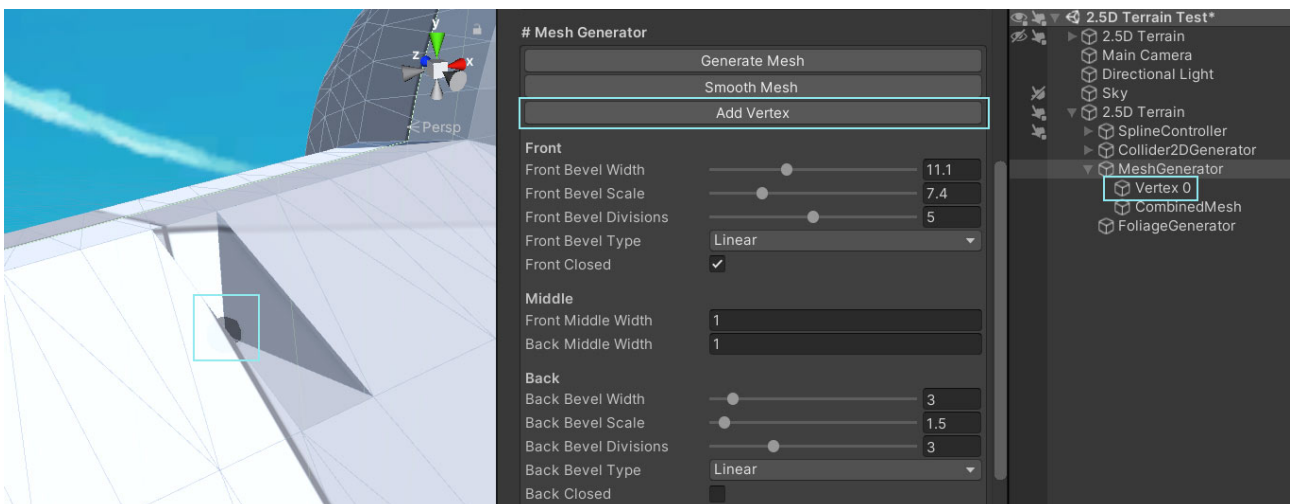
Snow

Snow extrudes the mesh upwards without changing the collider. It also does this only at flat parts of the terrain. Just like real snow.



Custom vertices

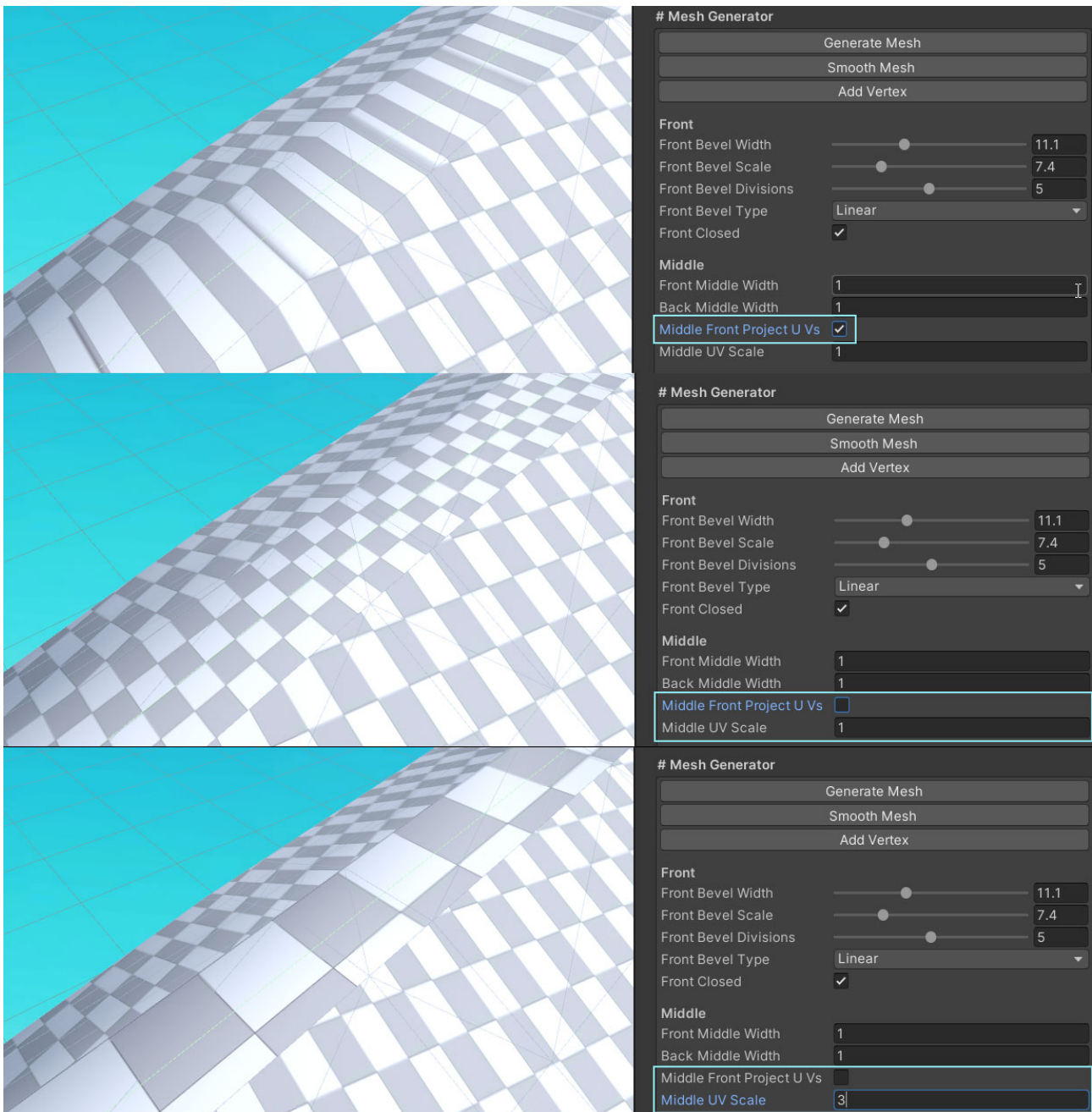
Sometimes you may have the need for one additional vertex just at the right spot. You can add one with 'Add Vertex'. Though it's no replacement for a real modelling tool.



UV layouts

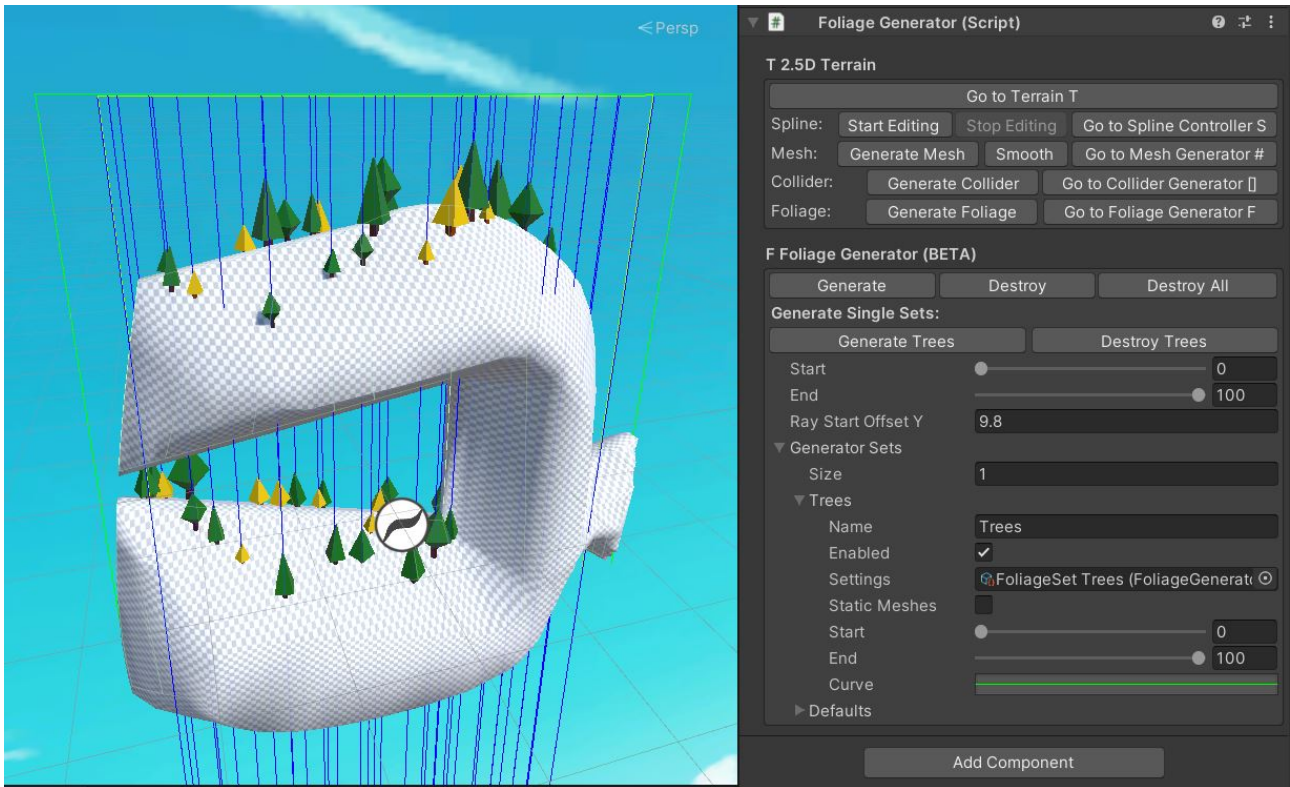
The meshes are meant for using a TriPlanar shader (there is a TriPlanar ShaderGraph shader included).

However, there are some UVs generated for the mesh. The UV layout of the front and back parts is always a simple projection along the z-axis. For the middle part you can choose whether to also use the projection or to generate custom UVs.

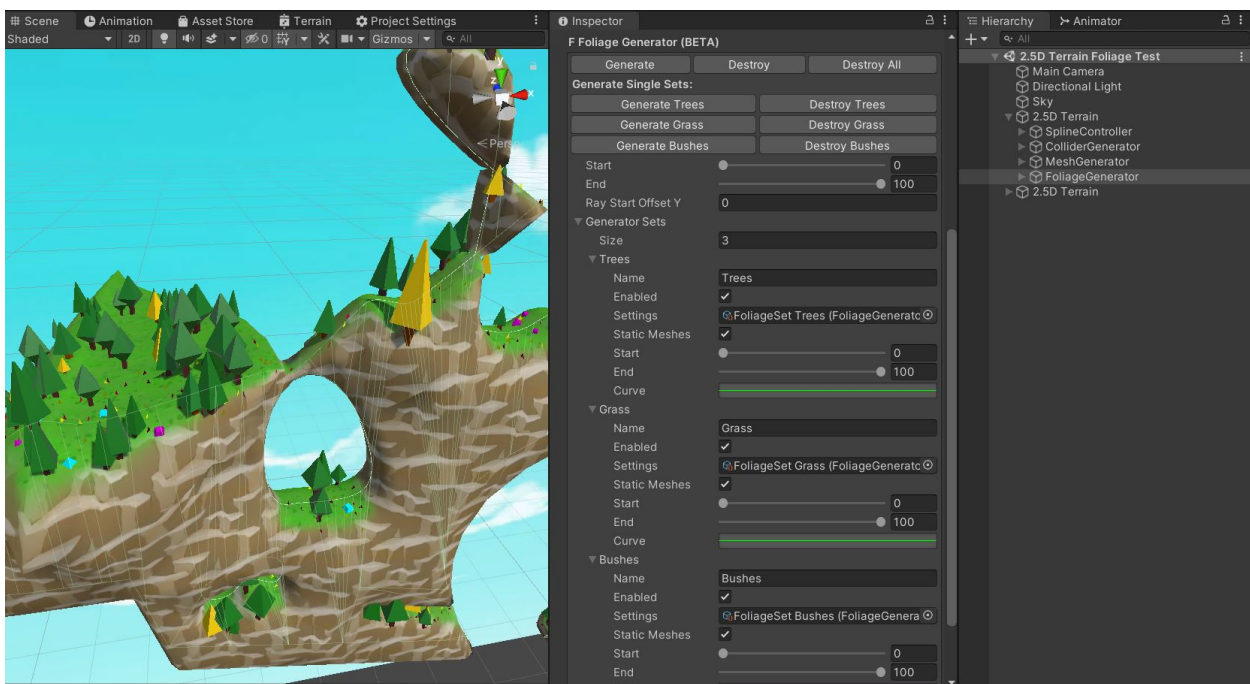


6. Foliage Generator

The Foliage Generator requires a mesh to work. Usually that's the one provided by the Mesh Generator. It does a series of ray casts from top to bottom and wherever a ray hits the mesh it might place an object (instantiate a prefab).



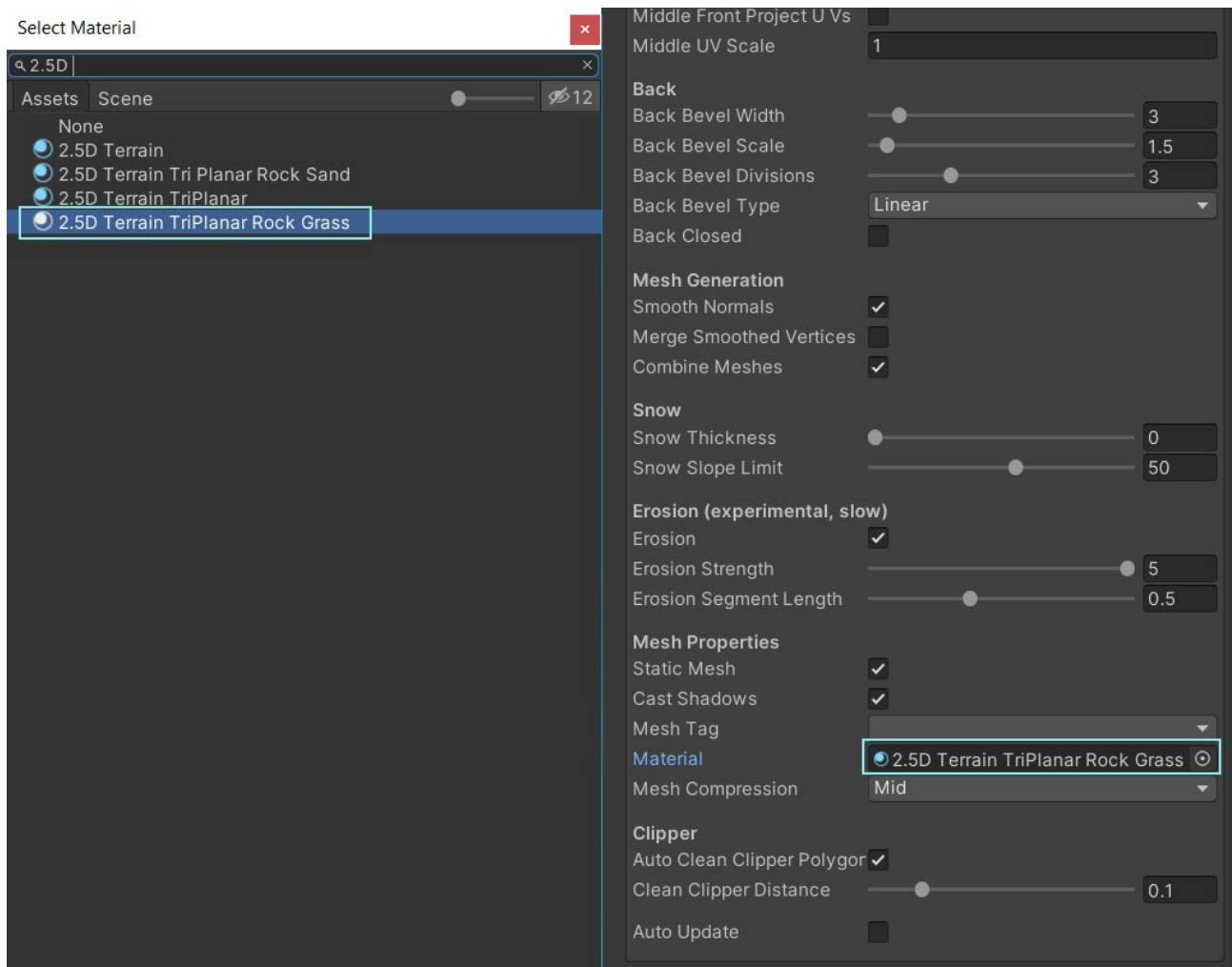
If you want a quick start on the Foliage Generator you can open the "2.5D Terrain Foliage Test" scene located under "Plugins/Terrain25D/Examples/Foliage". It contains a fully configured Foliage Generator with three sets (trees, grass, bushes), prefabs, materials and textures.



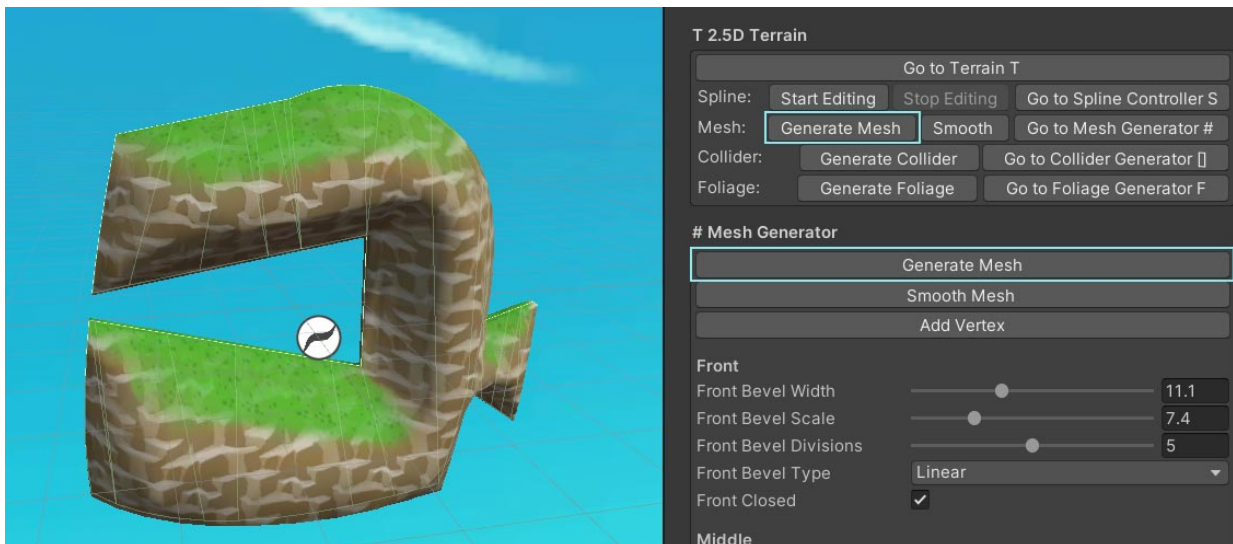
Step-by-Step Guide to the Foliage Generator

This guide assumes you have completed the 'Mesh Controller' guide first.

Before we begin let's quickly change the material of the mesh to something more pleasing. Open the Mesh Generator and select the '2.5D Terrain TriPlanar Rock Grass' Material.

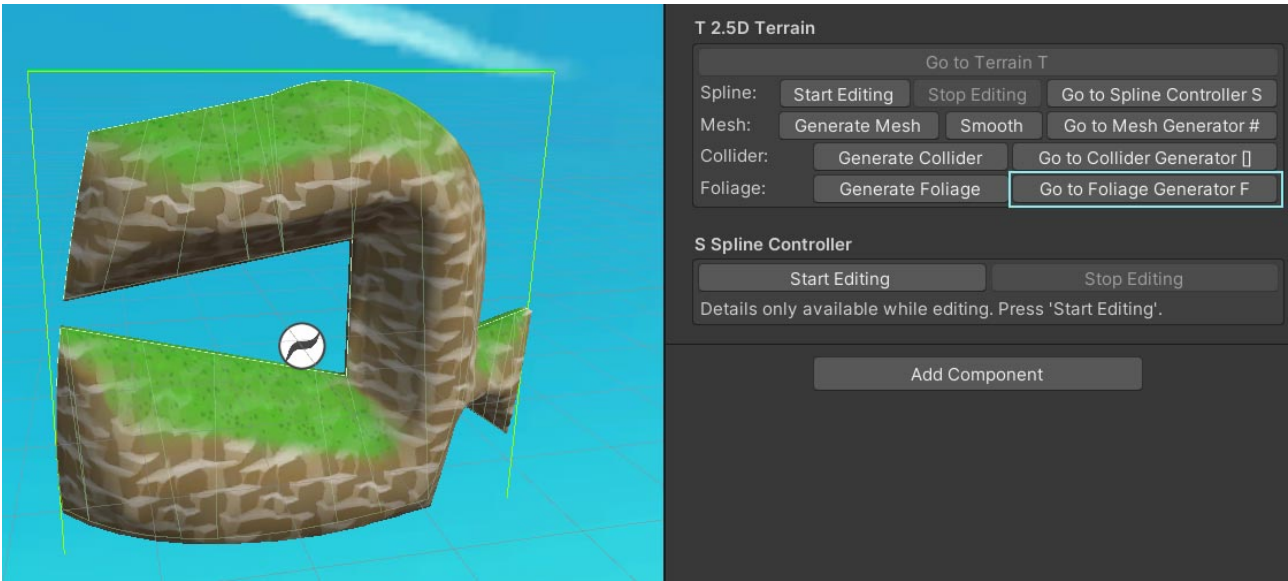


Then generate the mesh again with the new material assigned.



Probably your artists will do a better job with nice textures than me :D

To open the Foliage Generator select the 2.5D Terrain and hit 'Go to Foliage Generator'. 2.5D



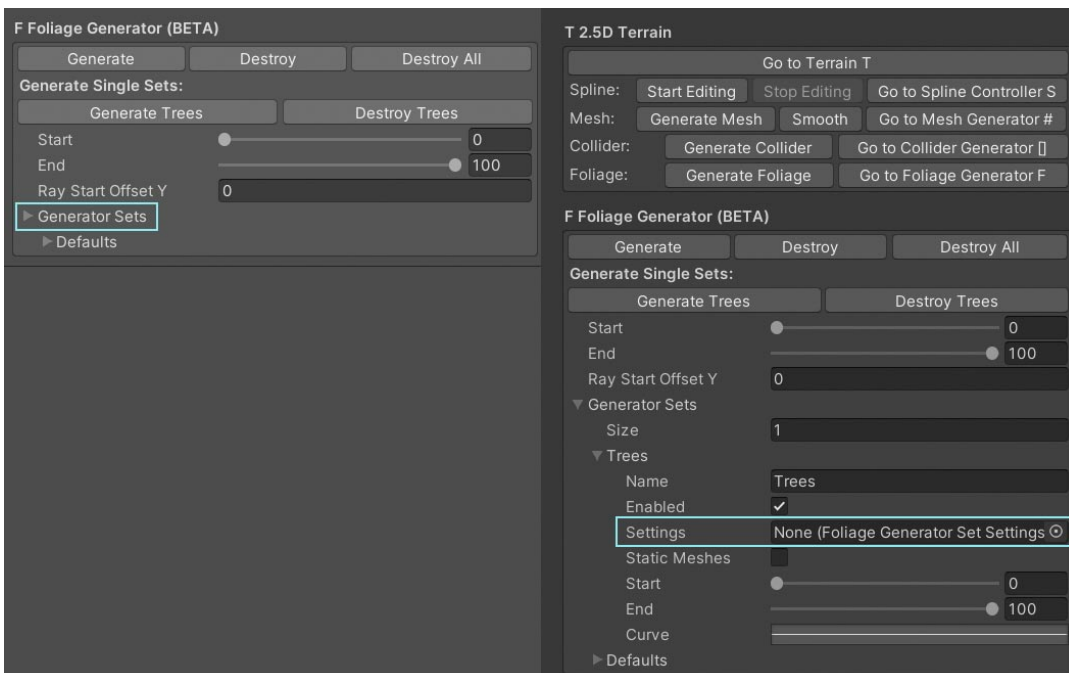
The foliage is generated based on rules. You need to tell it how many objects you want to spawn, where to spawn them, which objects (prefabs) and materials to use,

All these settings are bundled together in a 'Generator Set'. There can be multiple sets used in the Foliage Generator. For example you may have one set for trees and one for bushes and another for grass.

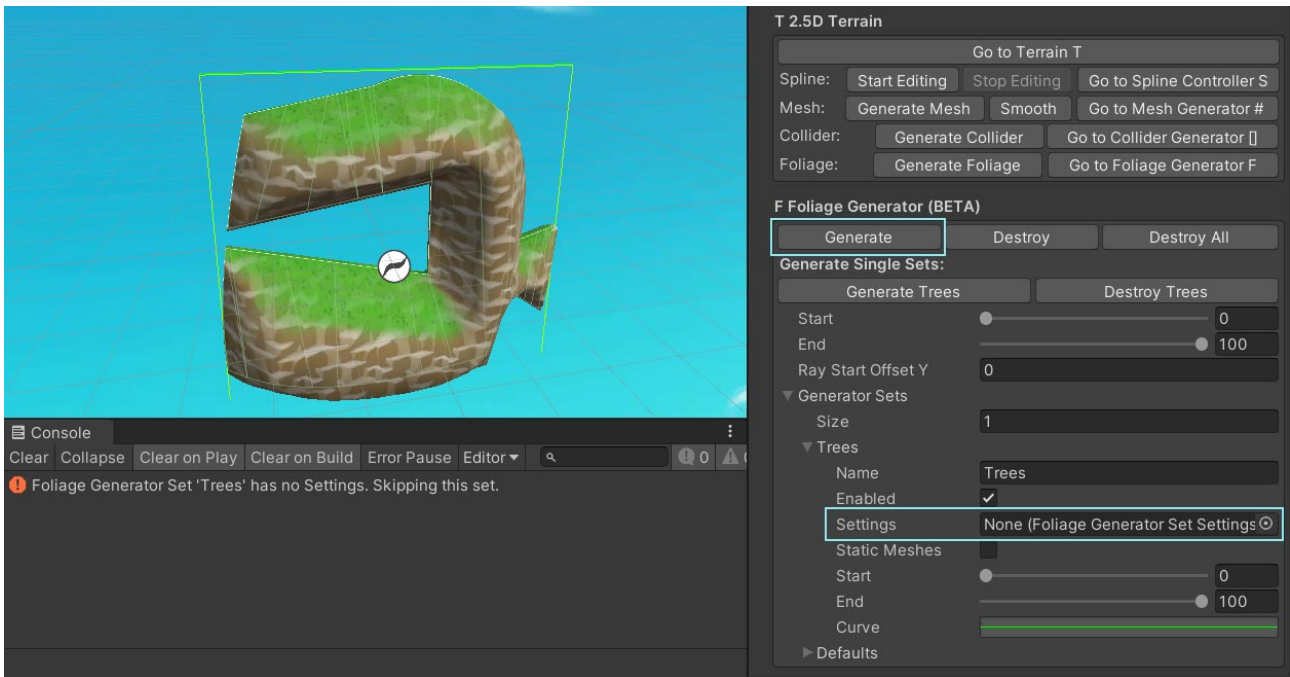
You probably also want to be able to reuse these sets across multiple terrains. That's why most of the settings within a set are store in a file called 'FoliageSet Settings'. Each set has a reference to one settings file.

Here is the dependency graph:

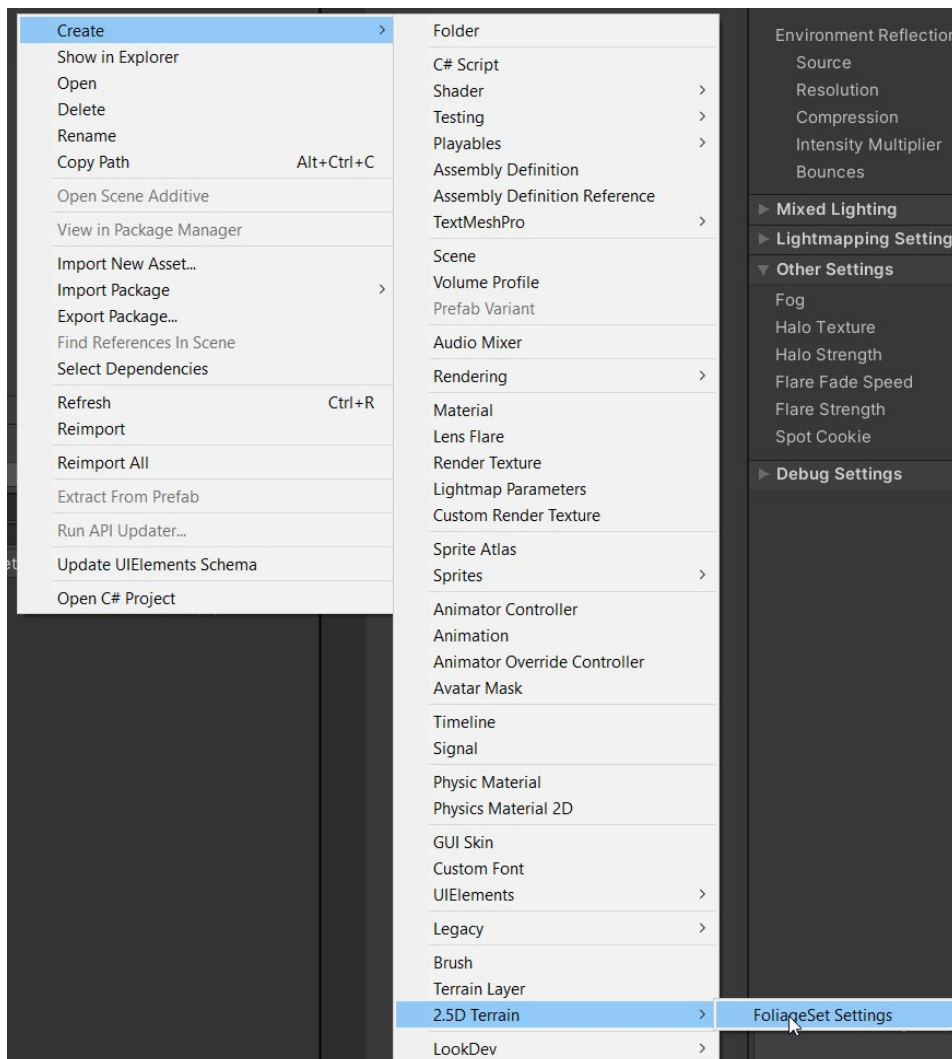
Foliage Generator > requires > Generator Sets > requires > FoliageSet Setting



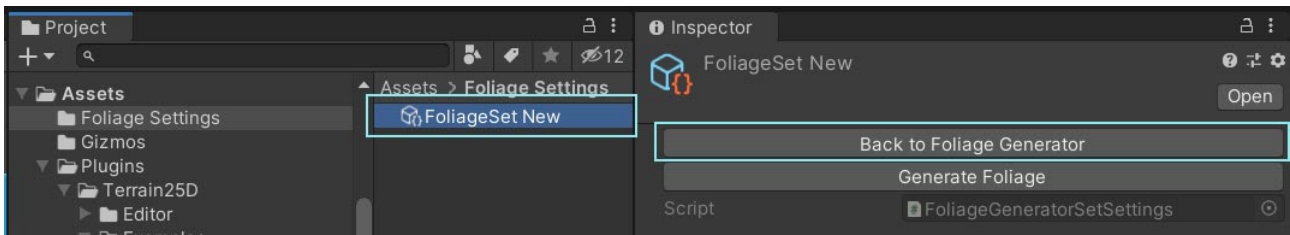
By default a set called 'Trees' is added to the generator. BUT this set does not yet have a setting linked to it. That's why you will get an error if you hit the 'Generate Foliage' button.



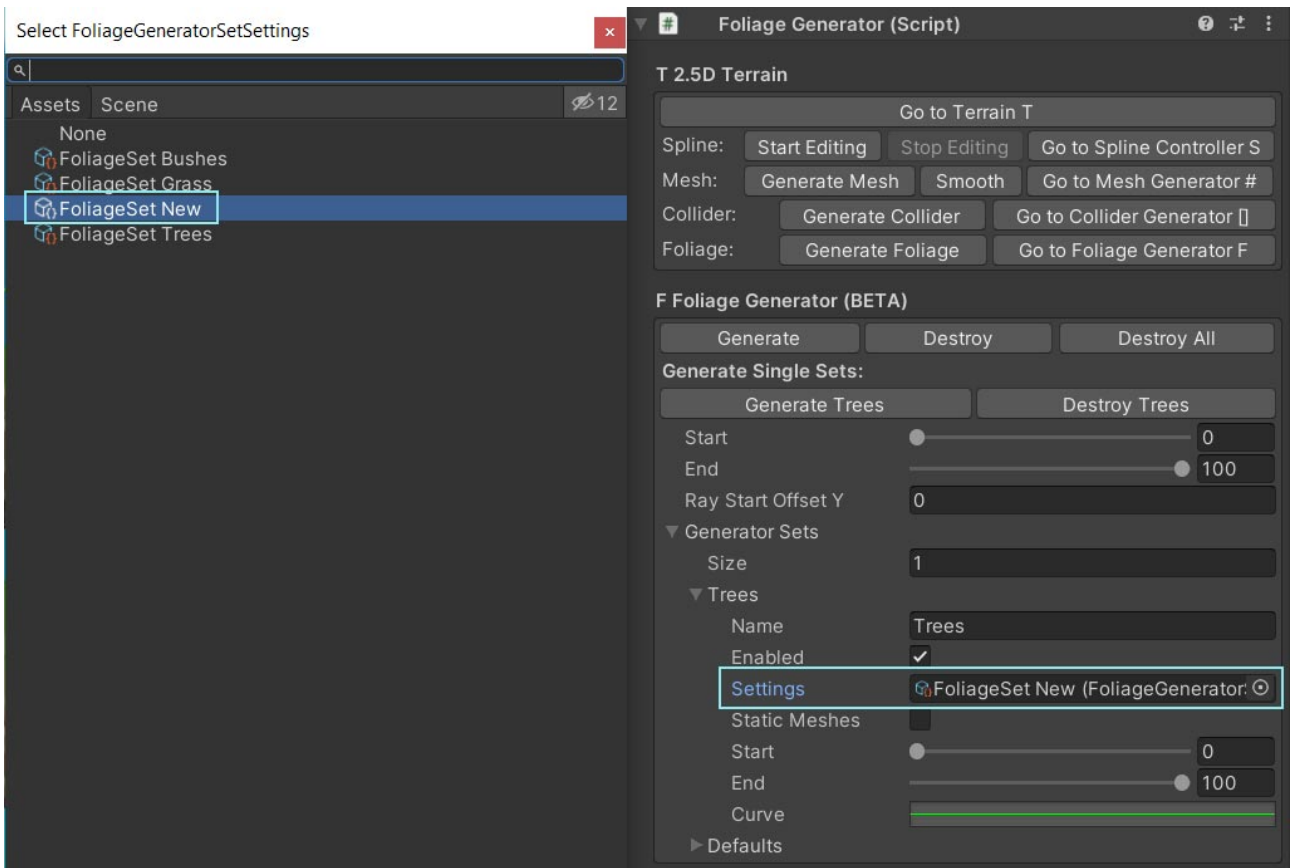
Create a new 'Foliage Set Setting' by going to Assets > Create > 2.5D Terrain > FoliageSet Settings.



Go back to the Foliage Generator.

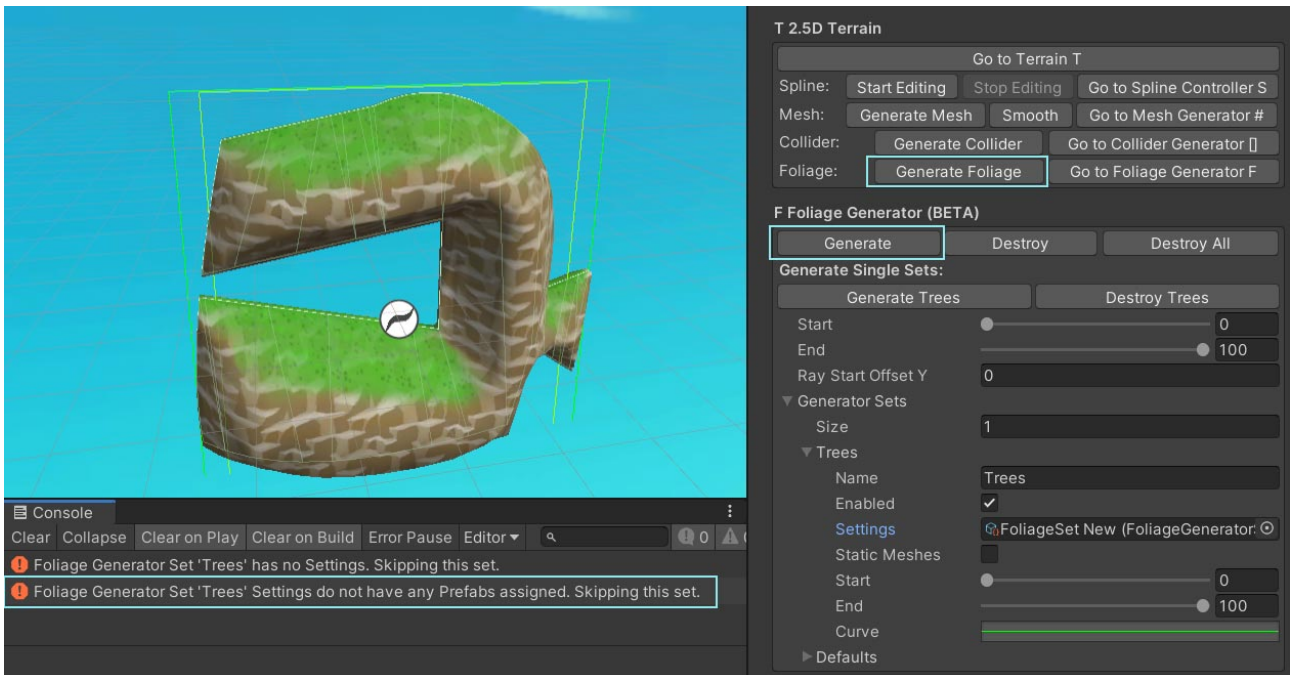


Assign it to the Generator Set in your Foliage Generator.



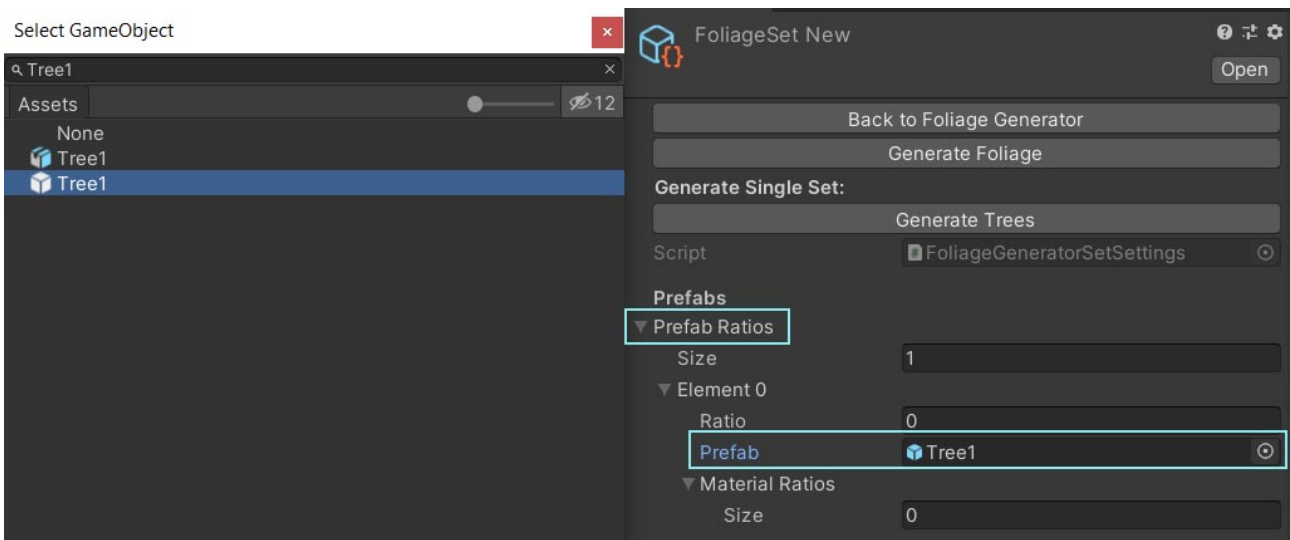
Now if you press 'Generate Foliage' you will get ... another error?

Well, you have created settings for your foliage set BUT you have not yet assigned any Prefabs to it. Therefore the Foliage Generator does not know which objects to spawn and skips the set.

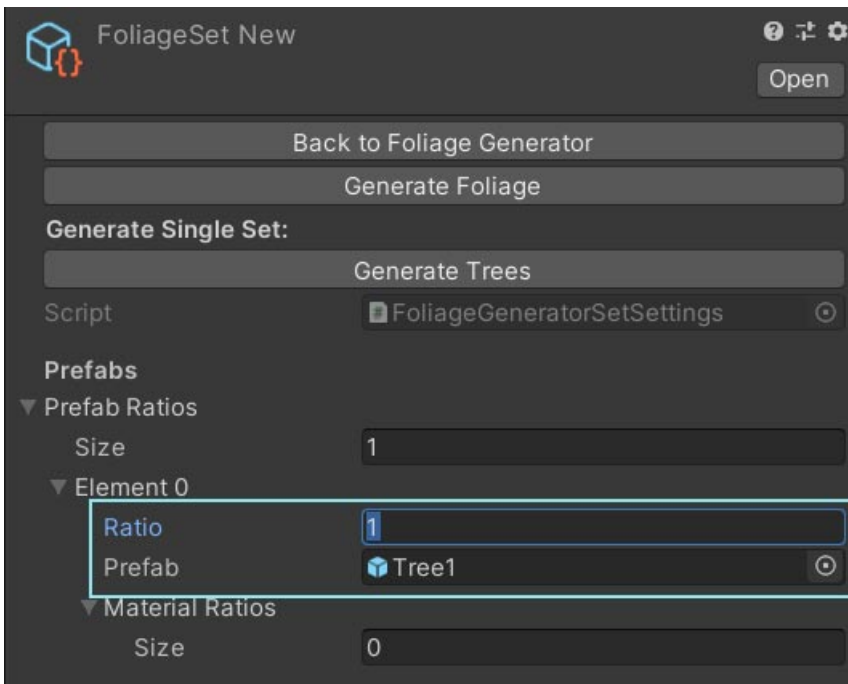


In order to add some Prefabs to the settings you need to open the settings (double click on the setting in the Generator Set).

Add a prefab to the 'Prefab Ratios'. You can use the 'Tree1' from the examples here.



Also, don't forget to specify the ratio. It should be 1 in most cases. The ratio defines how often a prefab is used compared to other prefabs in the list.



You can also specify a Material (and ratios for those) which will be applied to the prefab. Leave it empty for now.

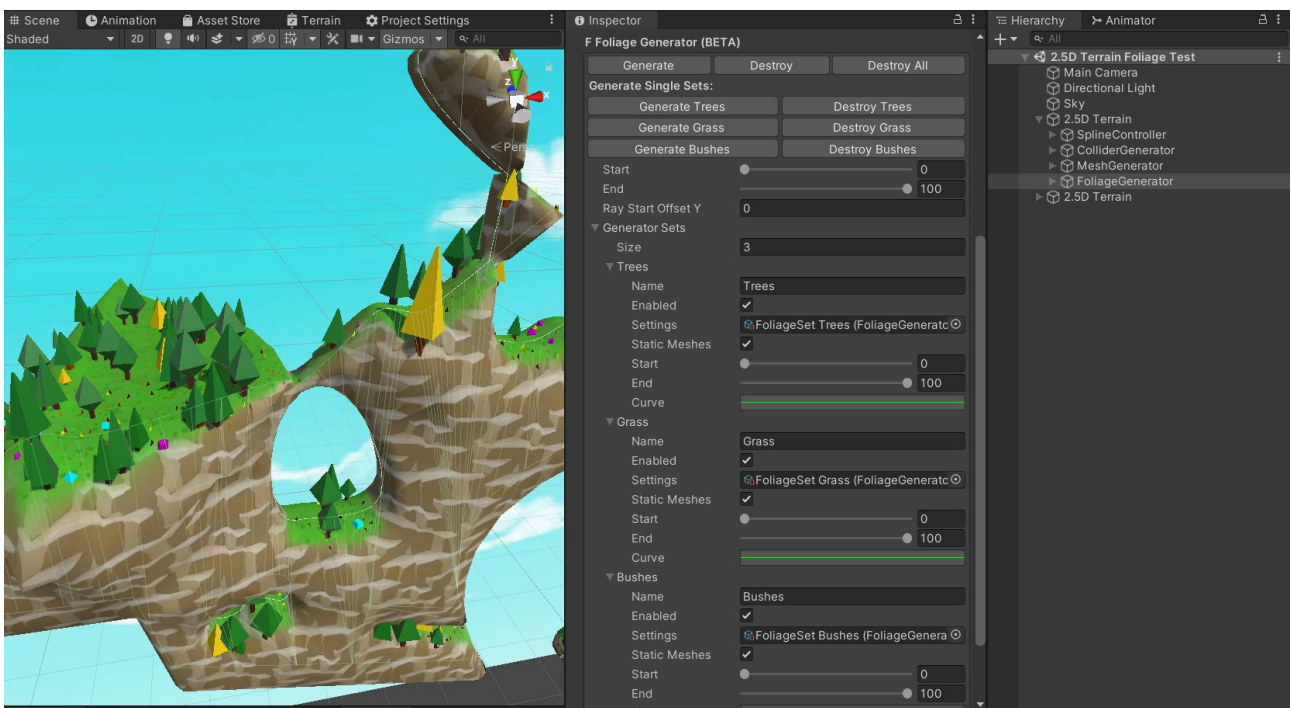
Finally the 'Generate Trees' button works.



Now you can play around with the settings. Remember: each option has a tooltip. Hover over it and read it.



If you want to investigate a more complex setup then you can open the "2.5D Terrain Foliage Test" scene located under "Plugins/Terrain25D/Examples/Foliage". It contains a fully configured Foliage Generator with three sets (trees, grass, bushes), prefabs, materials and textures.



That's it. Phew. Thanks for reading it all.

If you have any questions then please post them in the [Unity Forum](#). This way others can also learn from the discussion.

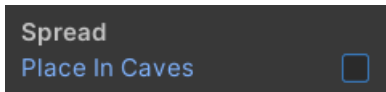
Foliage Spread Parameters

The foliage set parameters are powerful. Yet this also means they take a bit of getting used to.

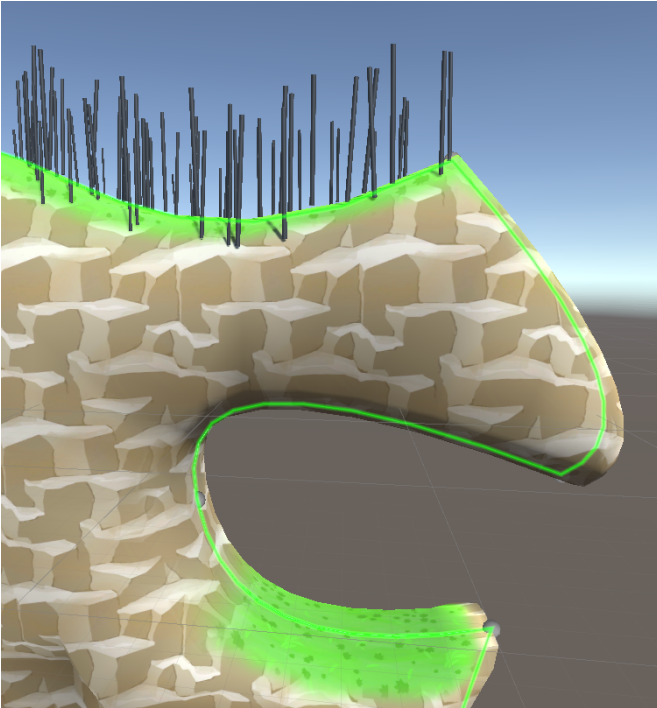
The image shows a dark-themed software interface for configuring foliage spread parameters. The settings are organized into several sections:

- Prefabs**
 - Prefab Ratios**
 - Size: 1
 - Element 0**
 - Ratio: 1
 - Prefab: Pole
 - Material Ratios**
 - Size: 0
- Density**
 - Density Front: 0.9
 - Density Back: 0.9
 - Density Min Distance: 0.1
 - Density Max Distance: 5
- Spread**
 - Place In Caves:
 - Allow Upside Down:
 - Only Upside Down:
 - Margin: 5
 - Place In Middle:
 - Middle Width Overlap Front: 0
 - Middle Width Overlap Back: 0
 - Depth Limit Front: -0.1
 - Depth Limit Back: -0.1
 - Depth Curve: A green horizontal line graph.
- Size, Rotation, ...**
 - Min Scale: 0.5
 - Max Scale: 1
 - Min Scale XYZ: X 1, Y 1, Z 1
 - Max Scale XYZ: X 1, Y 1, Z 1
 - Align Rotation With Terrain:
 - Use Mesh Normals For Alig:
 - Rot X Variance In Deg: 0
 - Rot Y Variance In Deg: 0
 - Rot Z Variance In Deg: 0
 - Ground Intersection: 0.64
 - Slope Limit: 0.34
- Randomness**
 - Randomness: 1

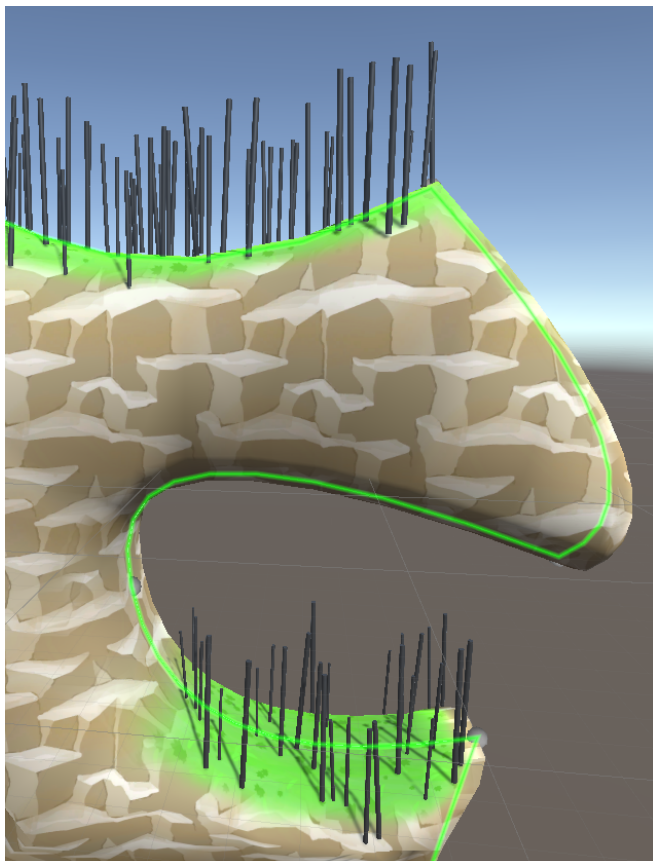
Place In Caves



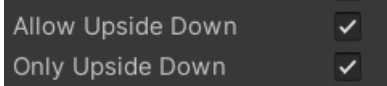
If disabled then no objects will be spawned inside of caves.



Enable this to spawn objects in caves too.

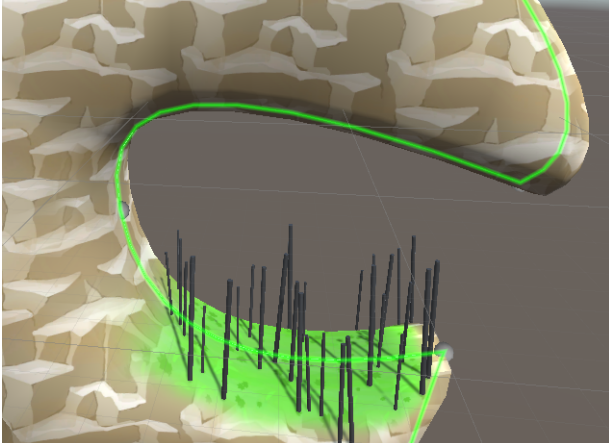


Allow Upside Down

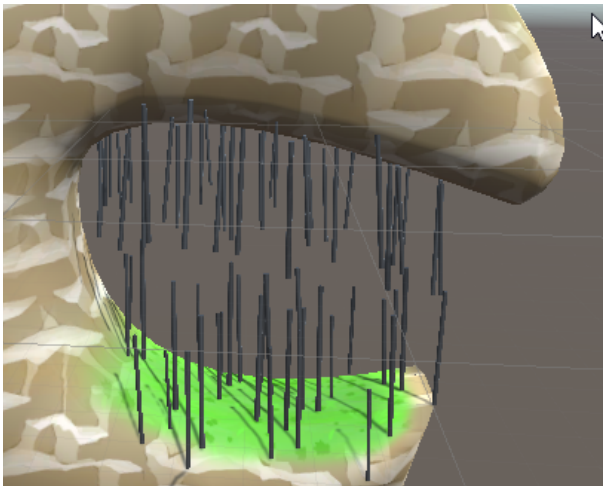


Upside down is useful for generating stalactites hanging down from cave ceilings

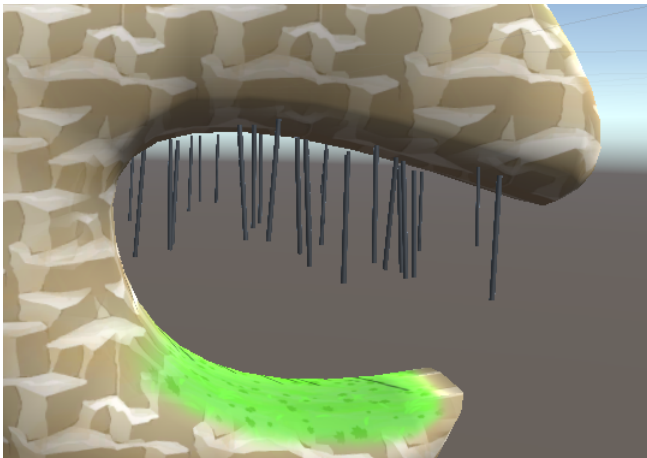
If turned OFF then upside down elements are ignored.



If turned ON then the upside down elements are placed too.



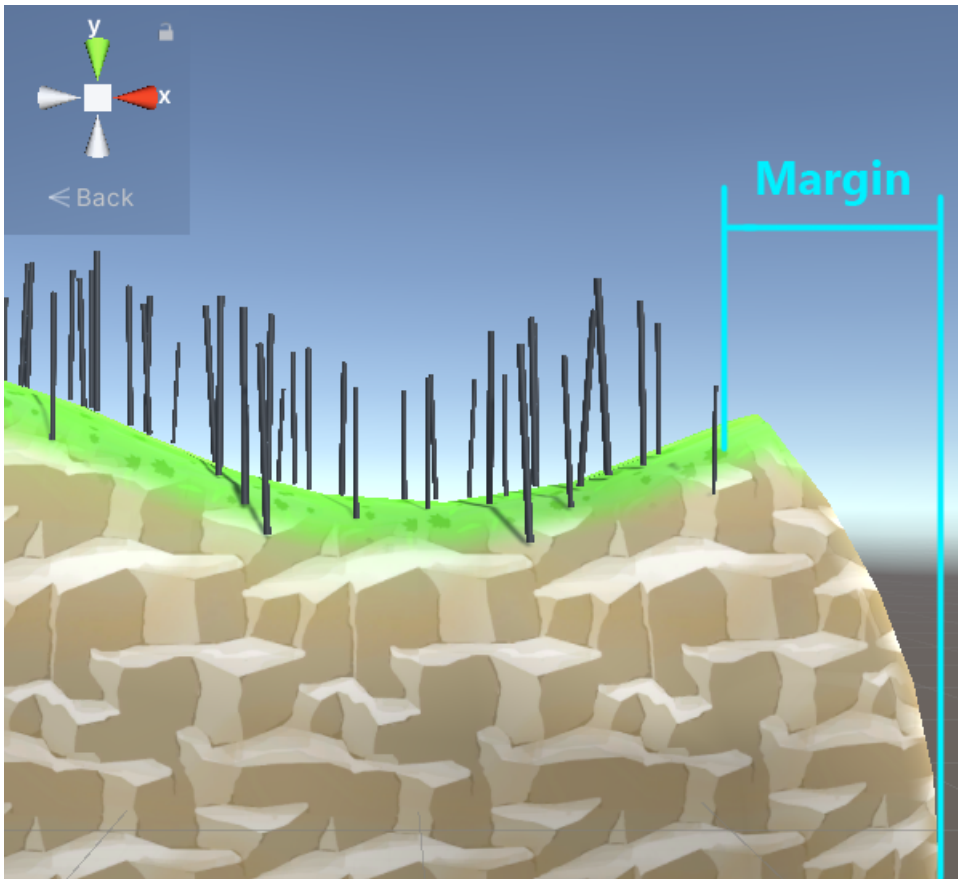
If „Only Upside Down“ is enabled then only the upside down elements are placed.



Margin

Margin

The margin defines how big the area at the start and end of the terrain (along the x-axis will be left empty).

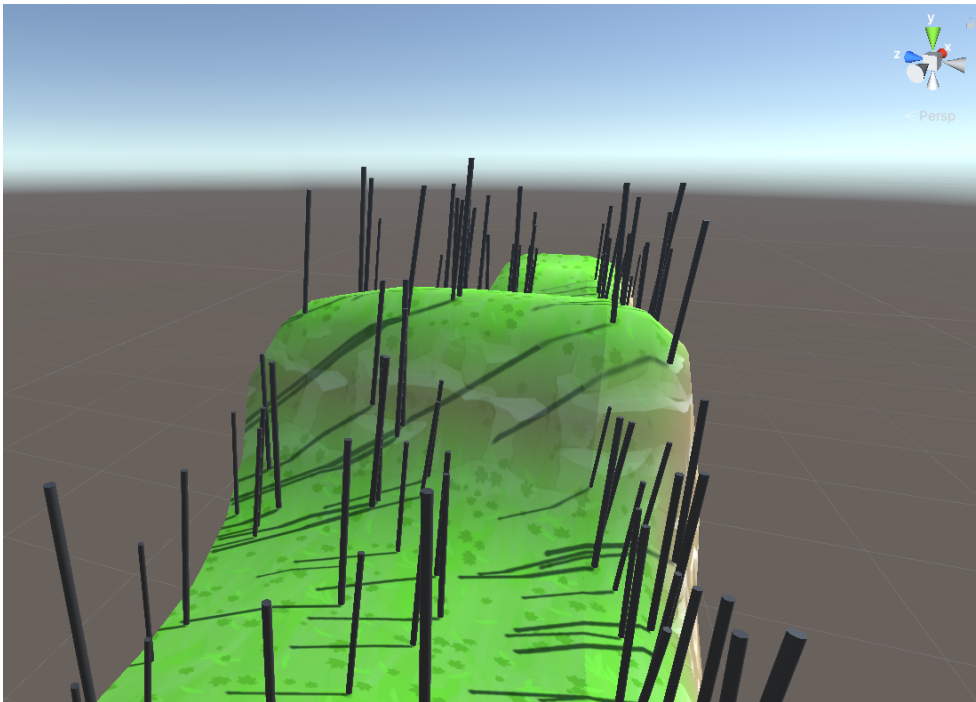


Place In Middle

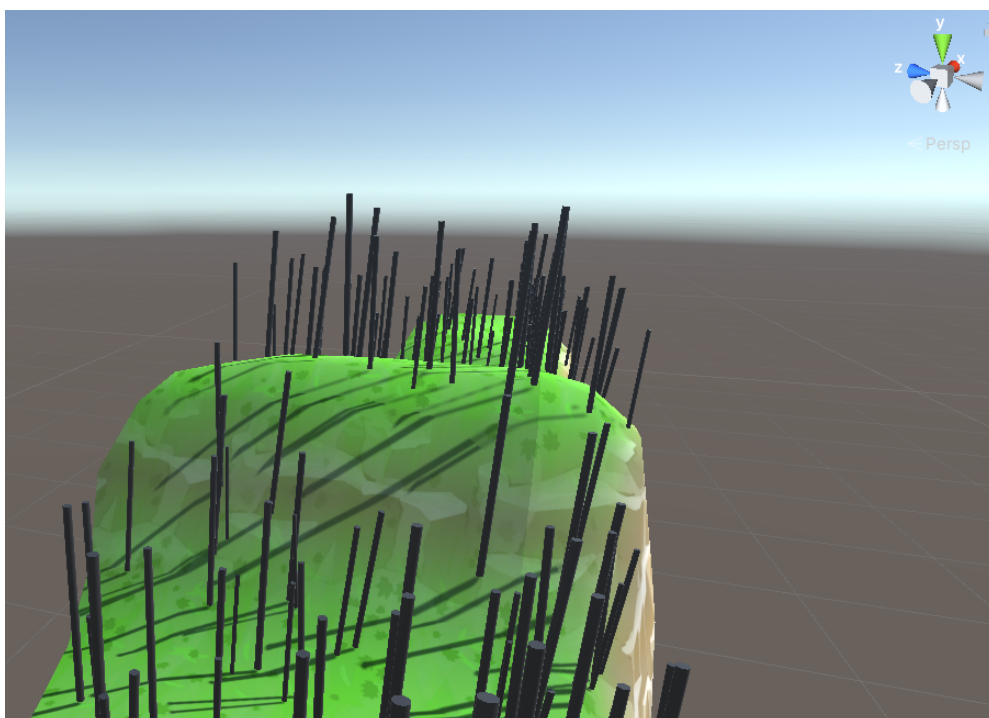
By default the middle is as wide as you have configured it in the MeshGenerator (front + back = total middle width):

Middle	
Front Middle Width	<input type="text" value="1"/>
Back Middle Width	<input type="text" value="1"/>

If you have „Place In Middle“ turned OFF then the middle will be kept empty.



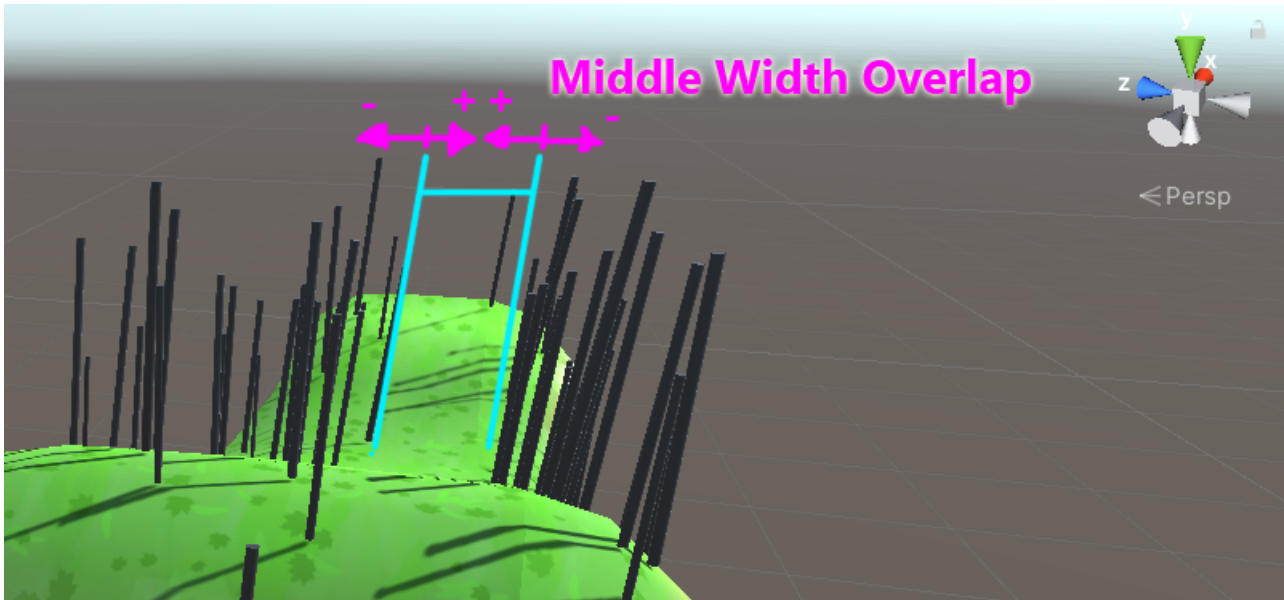
If you have „Place In Middle“ turned ON then the middle will be populated with prefabs.



Middle Width Overlap

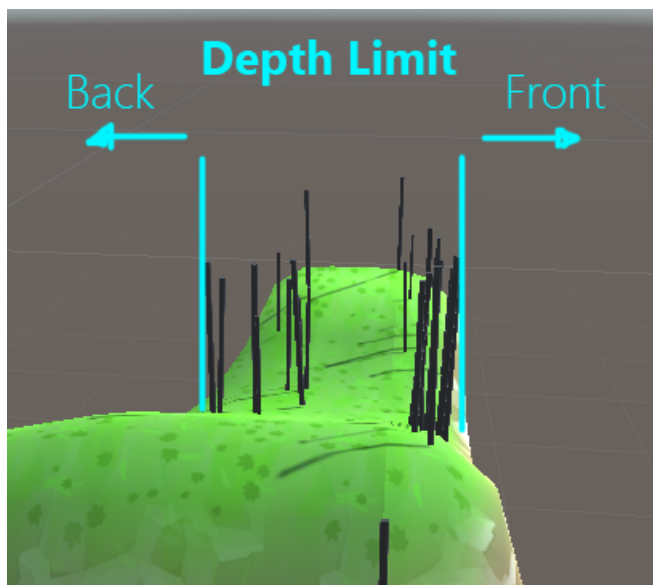
Since the middle area is left empty (unless „Place in Middle“ is enabled) you can specify some overlap to have elements start spawning a little closer to the middle.

NOTICE: Positive overlap goes inwards, negative overlap goes outwards.



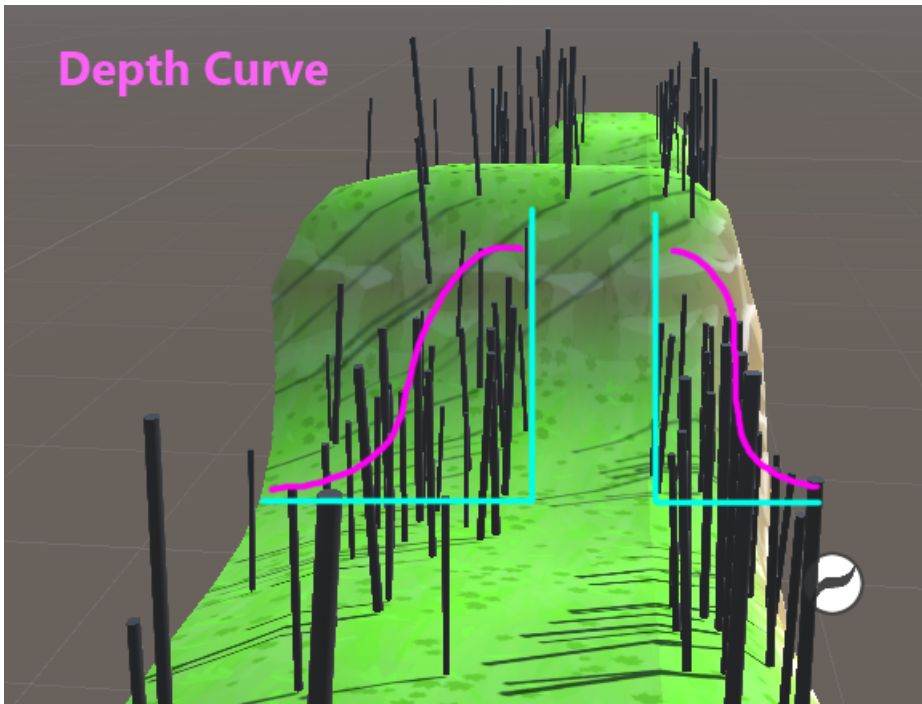
Depth Limit Front/Back

These are the limits (on the z-axis) beyond which no prefabs will be spawned.



Depth Curve

The depth curve allows you to define how many objects are spawned based on the distance from $z=0$ (curve is along the z -axis).



7. Settings

You can find the settings under **Edit > Project Settings ... > 2.5D Terrain** or under **Tools > 2.5D Terrain > Settings**.

You can define some shortcut keys to streamline your work process. All settings have tooltips.

