



Audio, Sound Effects, and Lighting

Today's Agenda



We're going to be going to be continuing with Chapter 21: Audio, Chapter 16:

Particle Effects

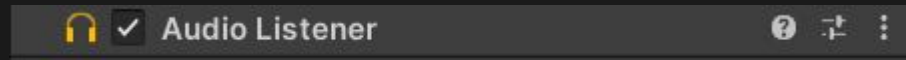
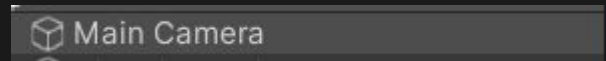
- How to add audio to our game
- What is 2D vs 3D audio
- How to use sound Mixers to control different audio in the game
- How to use Particle Effects to enhance the game

Audio Listener



Audio Listener is a component that is attached to the camera whenever it's created.

It is the component that will listen to the Audio Sources and play them in the speaker based on how distant it is from that source.



Audio



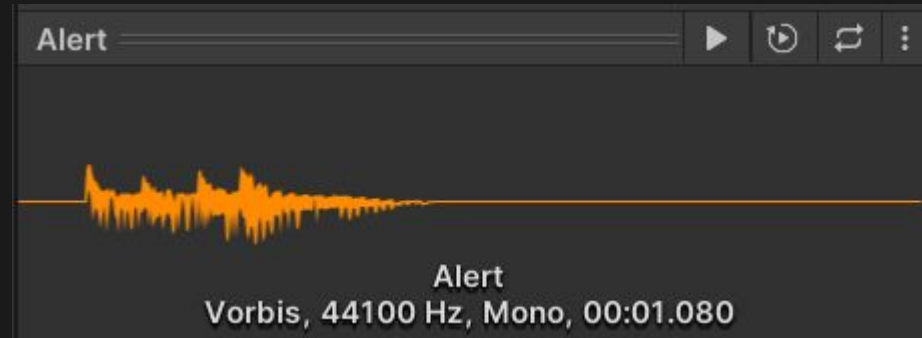
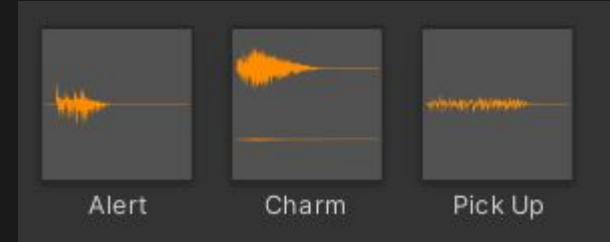
<https://freesound.org/>

What are some audio you can use in your game

You can use Music, Sound Effect to give player feedback and Voice Acting.

All of these will be shown to you as their Waveforms that show the amplitude of sound.

You can test out all of the sounds inside of the Inspector in the preview on the bottom.



Credit



Crediting is very important when working on a game. Imagine you put together your project and some nabs it shows it off and never credits you.

We haven't talked about it yet but now you will have tons of effects and you need to keep track of the information but the same idea applies to any art, mesh, animation, font or anything else you haven't made on your own. Credit people's work.

It's good keep an notepad, or a script full of comments that saves the name of the piece you used and who it was from and what website you found it form.

```
From FreeSound.com
Music
"PianoKeys_Meral.wav" by Meral

SFX
"Charm by Scrampunk
'"Alert" Video Game Sound by EVRetro
"Retro Bonus Pickup SFX" by suntemple|
```

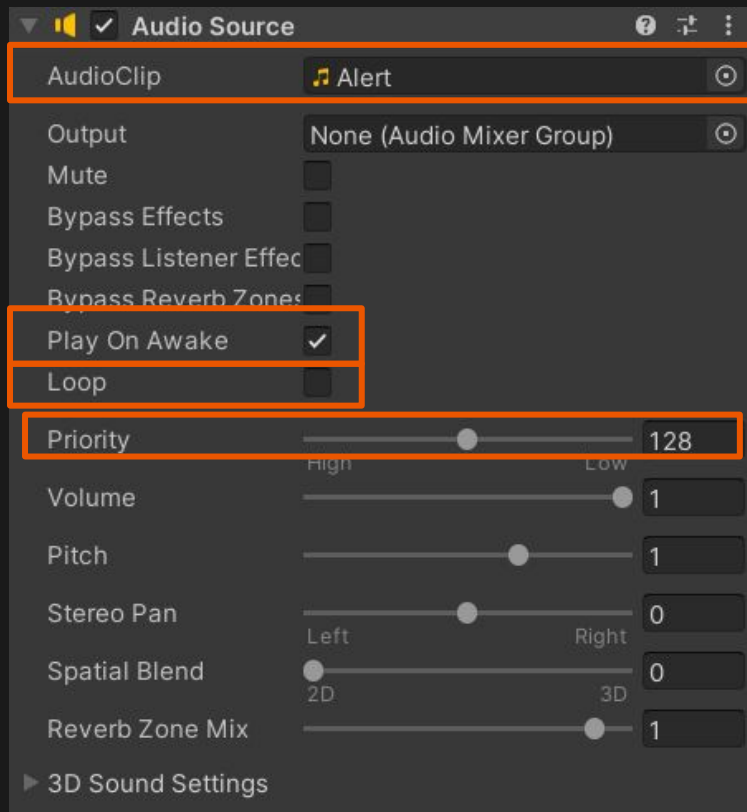
Audio Source

The AudioClip sets what Audio you want to use in this component.

Play On Awake means that whenever the audio source is turned on, we will use that to our advantage in animations but for the most part you will want to turn it off otherwise all the sound effect will play at the same time when you start the game.

Loop will make the audio source restart playing from start when it ends, very useful for implementing music.

Priority tells us which audio should be played more clearly when several are playing at once, if you have both music and sfx what should be louder. Lower the number to more clear it will sound over sfx playing at the same time.



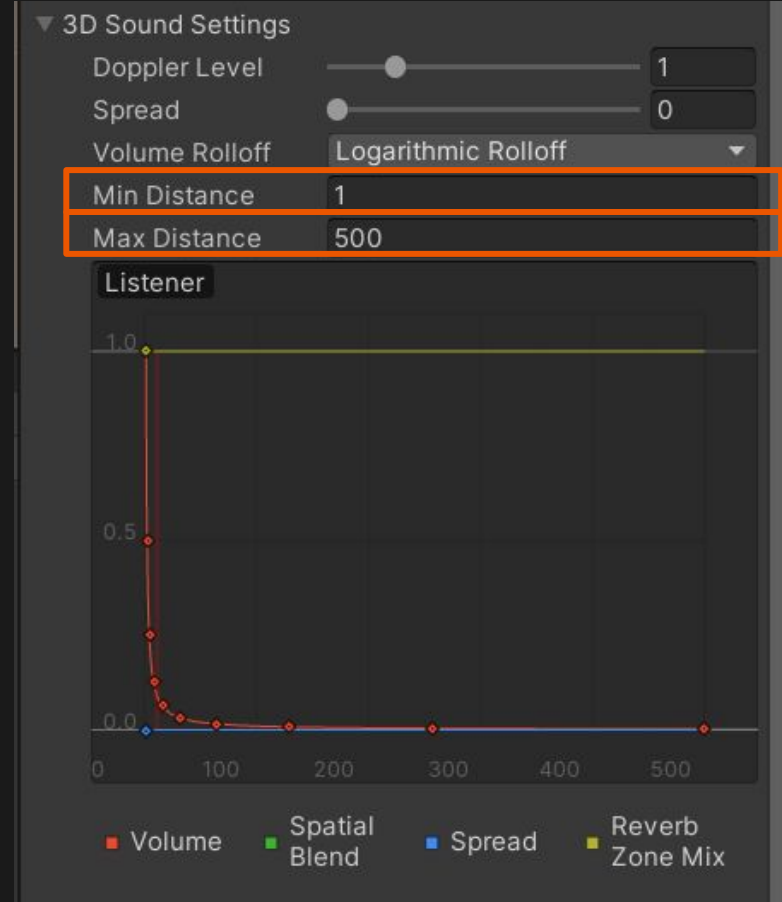
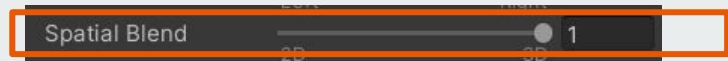
3D Audio



Spatial Blend in the regular settings allows you to control how the sound will be perceived. When it's set to 2D that means you will hear it the same regardless of meanwhile 3D will care about how far or close you are to the object.

You can control these when you open up the 3D Sound Setting.

Main thing we care about is the Min Distance and Max distance, you want to make them small so that the player has to be near the object to hear it play.



Audio Mixer



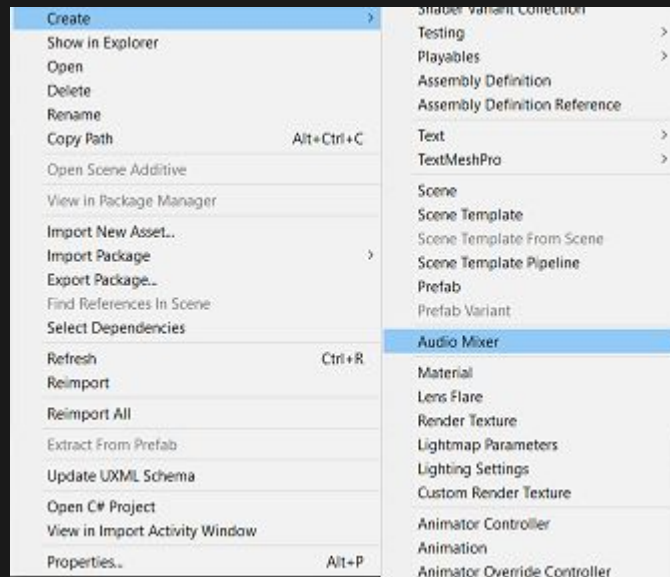
We will now create an Audio Mixer.

Audio Mixers are a way for us to be able to control all of the sound effects and music in the scene with one slider.

To create an Audio Mixer add a Game Asset in your project view and add Audio Mixer.

Output

None (Audio Mixer Group)



Mixer

Audio Mixers

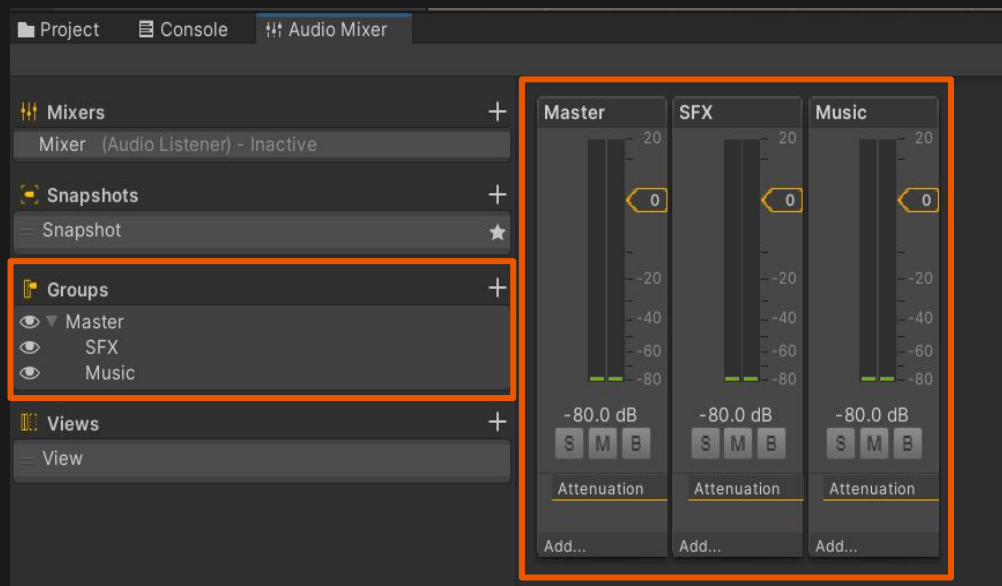
Once we created the Mixer you can double click on it and it will open the Audio Mixer View.

Here we can create and manage the different Mixers using the Mixer Tab.

Create Snapshots, which have preset values for all of your groups.

Create Groups so you can contain different SFX together or separated. Groups can also be nested such like here Master is Parent of SFX and Music.

And View allow you to see only specific groupings.



Groups

On the Right Hand Side you see our three groups. The main part of them is the sound slider that controls how loud audio sources connect to that group can be.

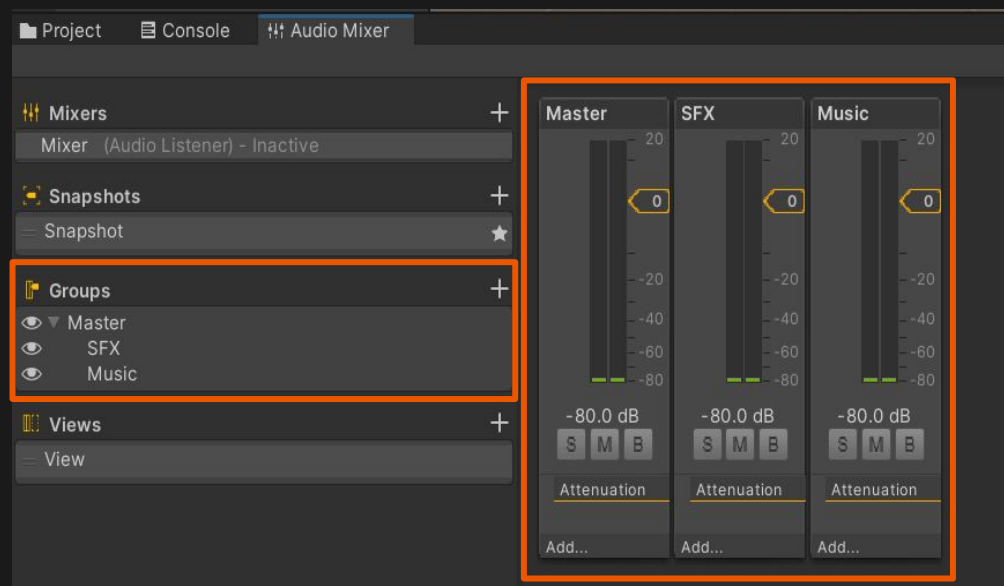
Next you have the three button that allow you to

S - SoloGroup, only play that group when selected

M - Mute

B - ByPass/ Ignores effects

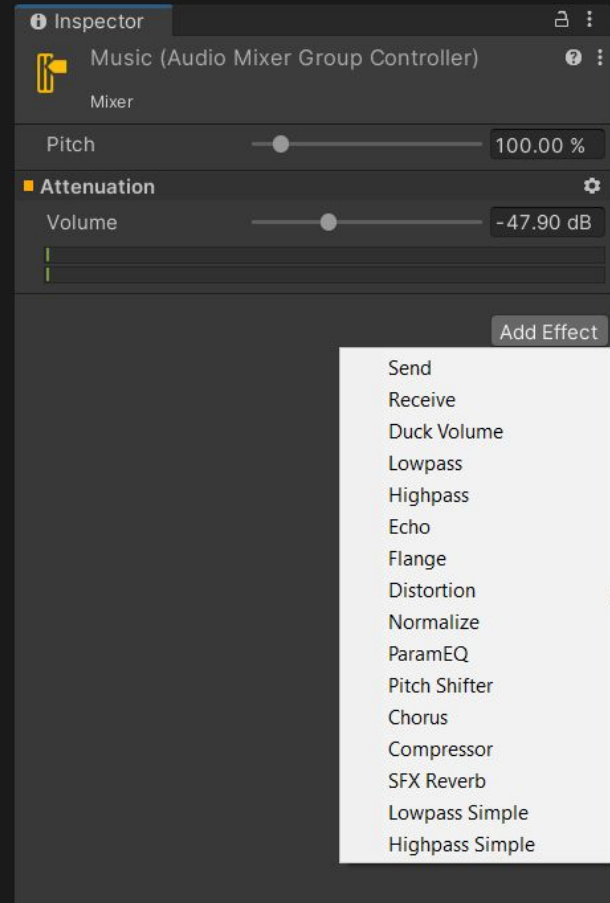
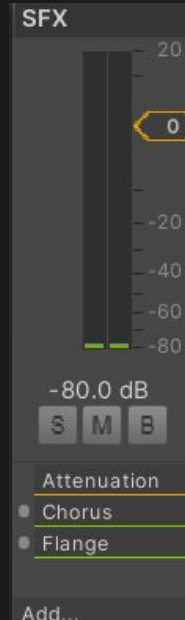
Below the buttons you see the Effects placed on the group currently there are none but once we add them it will list them,



Effects

Audio Effects allow us to apply the action to all of the Audio Sources that are connected to the group.


They can absolute change the sound from what it was to something completely new.



Audio In Script

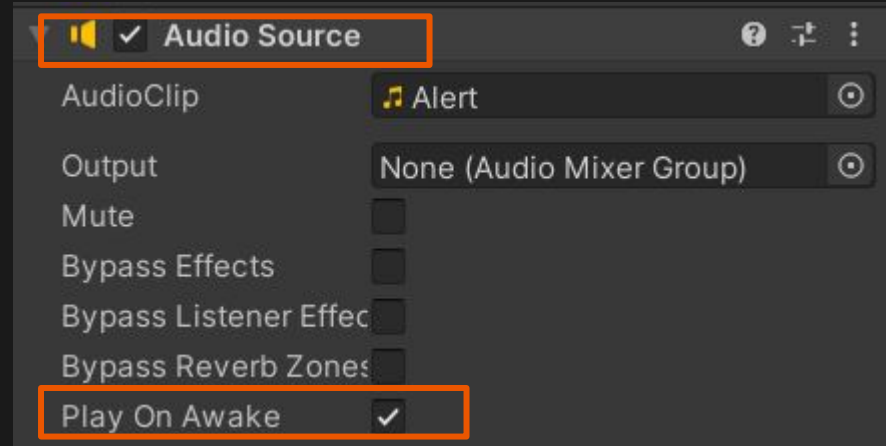


Making an audio play using script
is as simple as import and
calling the Play() function

```
AudioSource audioSource;  
  
// Start is called before the first frame update  
 Unity Message | 0 references  
void Start()  
{  
    audioSource = GetComponent<AudioSource>();  
    audioSource.Play();  
}
```

Audio In Animation

As mentioned before if we set the Play On Awake to be on and keep the audio source off, we can use the animation tool to make the sound effect play.



Particle Effects System

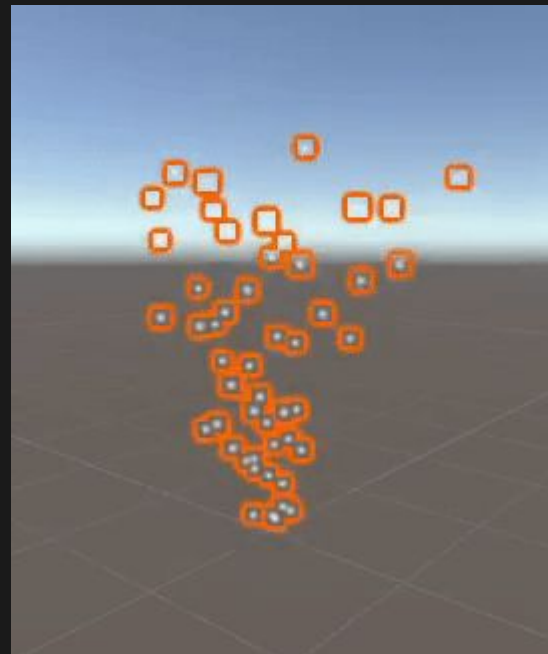


Particle effects are very important as they provide feedback just like sound but rather visually than audio wise.

Whenever you hit something you want there to be some kind of flash, or when you walk a dust cloud get left behind. Particle effects allow you make the illusion that things are touching as if they were in the real world.

To make a particle effect go to Hierarchy and create effect Particle System.

Effects	>	Particle System
Light	>	Particle System Force Field
Audio	>	Trail
Video	>	Line

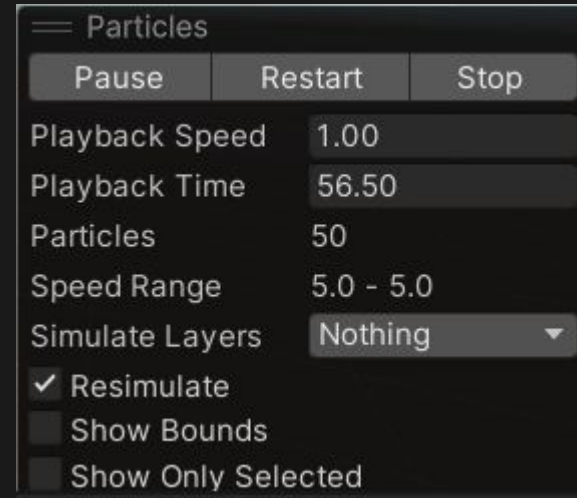


Controller



When you select your particle system you will have the Controller for the particle effect will pop up in you scene view.

This lets you preview how you particle effect will act when played



Component



You will notice that the Particle Effect Component is massive.

It's to allow you to create as detailed effect as possible.

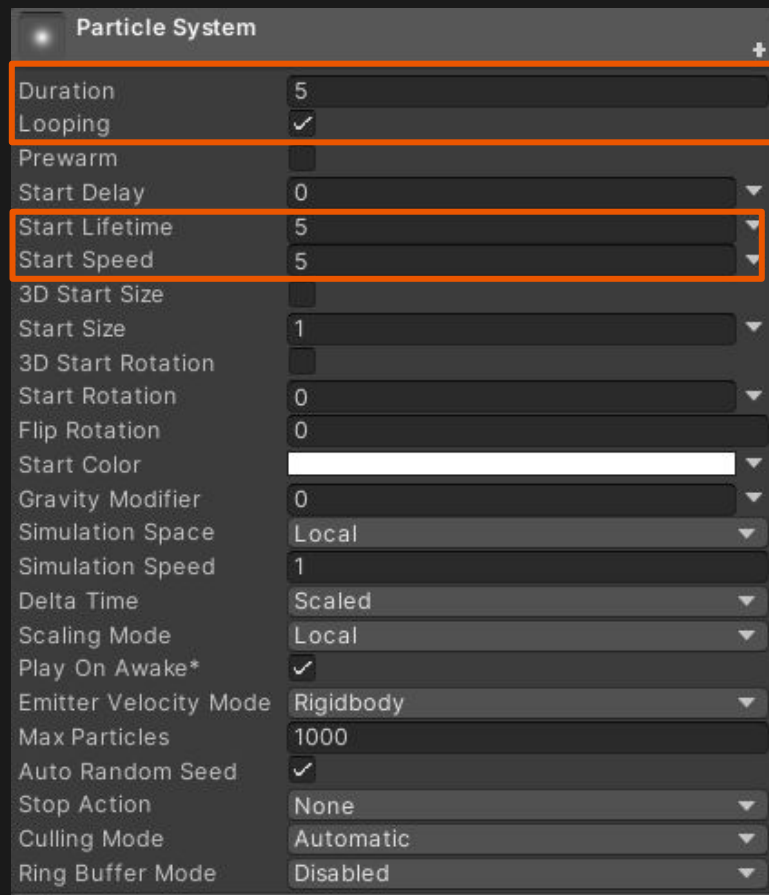
In the general area of the comment we will case about four variables.

Duration, it's how long the whole effect goes on for.

Looping, if you want it to repeat upon completion

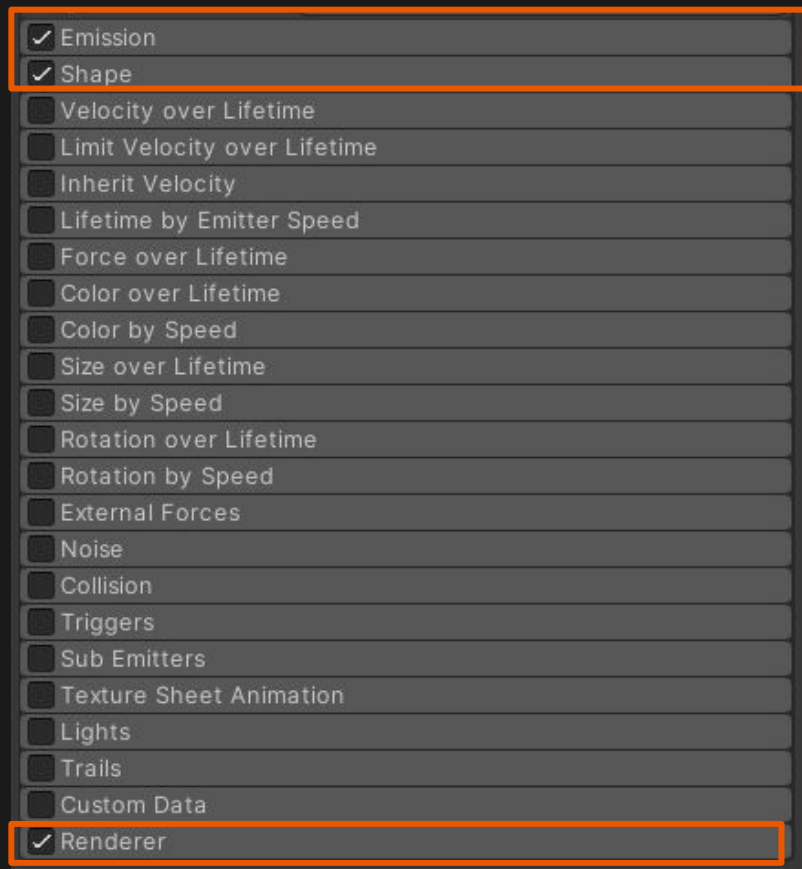
Start LifeTime, how long the individual particles will live for from start

How fast should they be going.



Effects

You will notice you have a lot of optional effects that you may want to play around with the main three will will go over are
Emission, Shape and Renderer



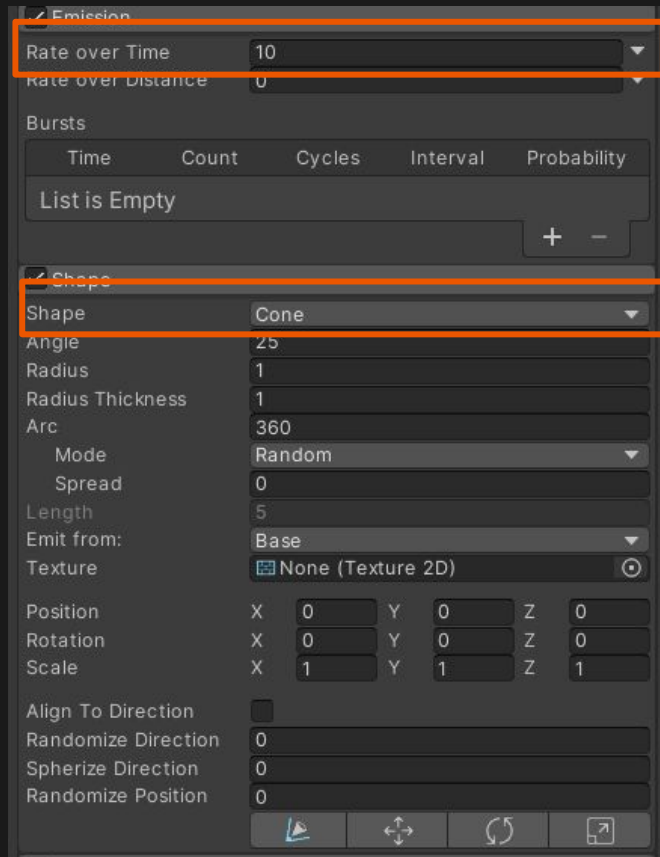
Emission and Shape



Emission control how many particle effects are created over time,

You can also allow it to create a burst of particles at once so they all show up together.

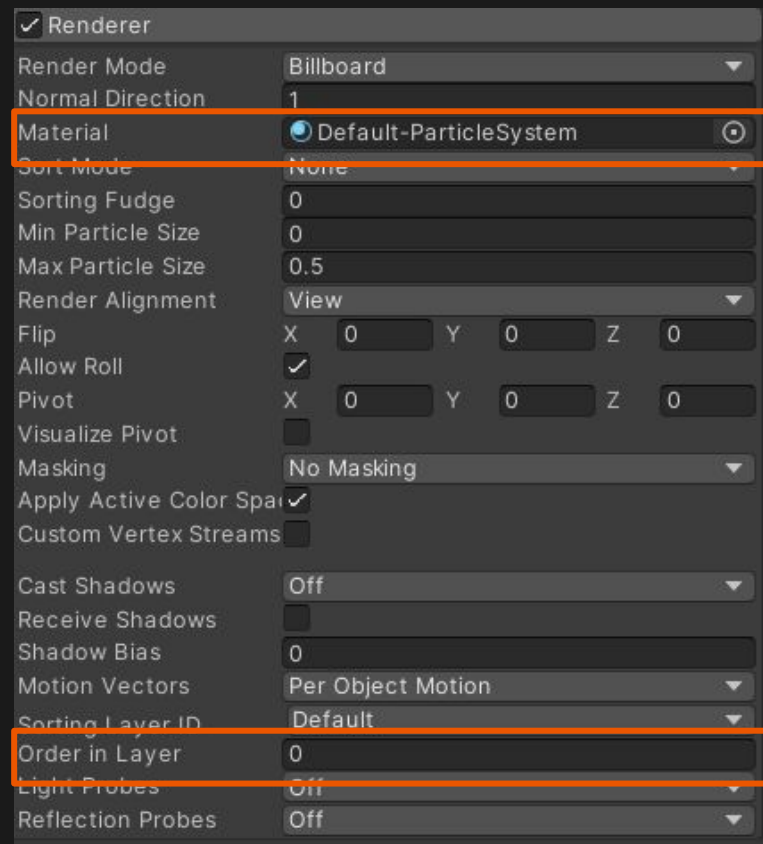
Shape on the other hand controls in what way the particle will be sent out. It starts out with cone but there are tons of ways you can have your particles spawn.



Renderer



Like a Sprite Render the the Render component controls what the particles will look like. We mainly care about two thing Material which is the image or texture that's going to be attached to the particles. And the Order Layer which will controls it's visibility.

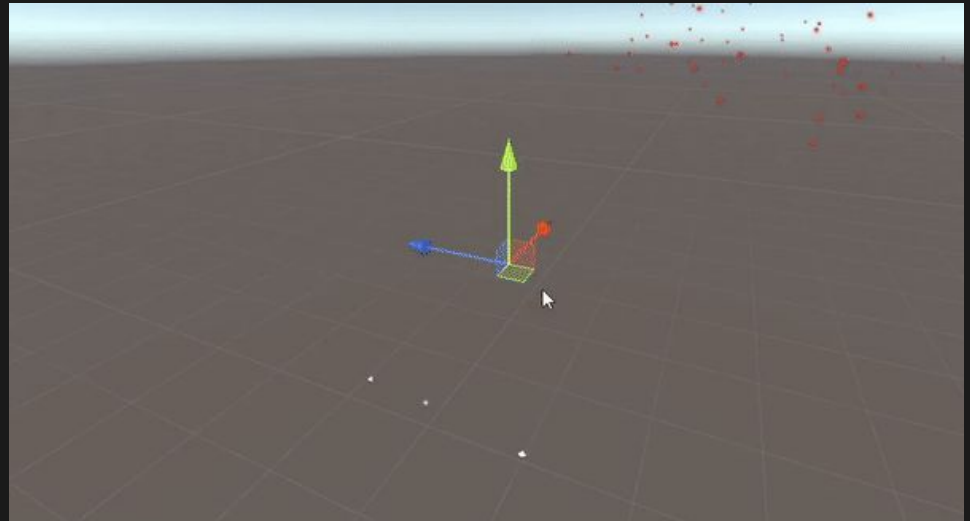


Trail



Effects	>	Particle System
Light	>	Particle System Force Field
Audio	>	Trail
Video	>	Line

Trails are another effect system that can be very useful to you, they can help you show that something is moving very fast, or you can use it to show the players action with the mouse.

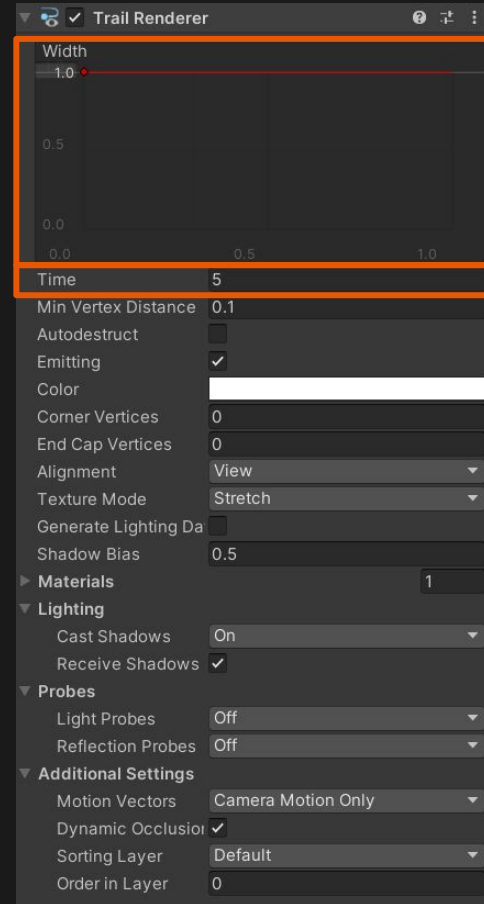


Trail



The trail has this big graph that controls how thick the trail will be, you can make many nodes on it and move it about.

You can control how long it will stay on screen for, what color it is and what it's made of.



Lighting

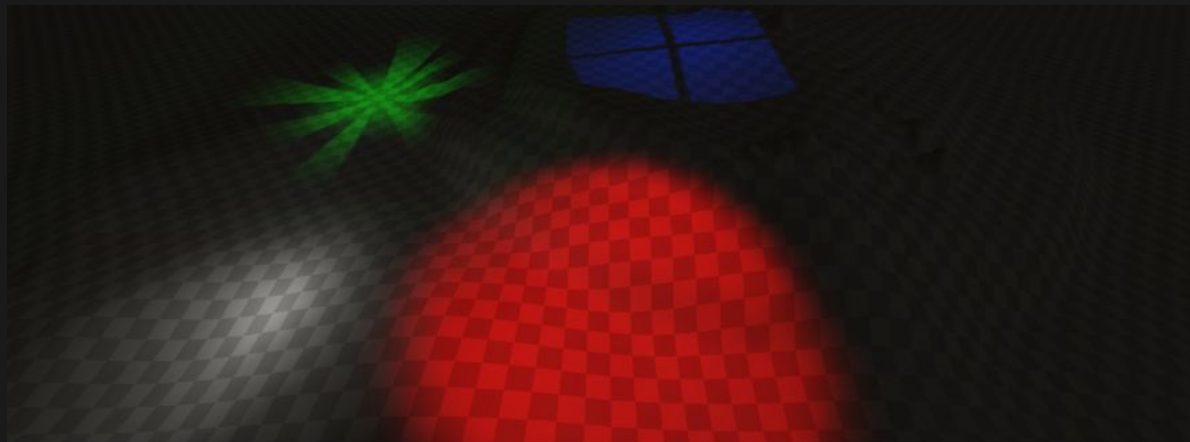


Lighting can affect the games mood and even set the tone for what game you are making.

Making a game with dark lighting is great for setting up a Horror exploration game.

We will look at three lighting sources. Directional, Point and Spotlight.

Light	>	Directional Light
Audio	>	Point Light
Video	>	Spotlight
UI	>	Area Light
UI Toolkit	>	Reflection Probe
Camera	>	Light Probe Group
Visual Scripting	>	



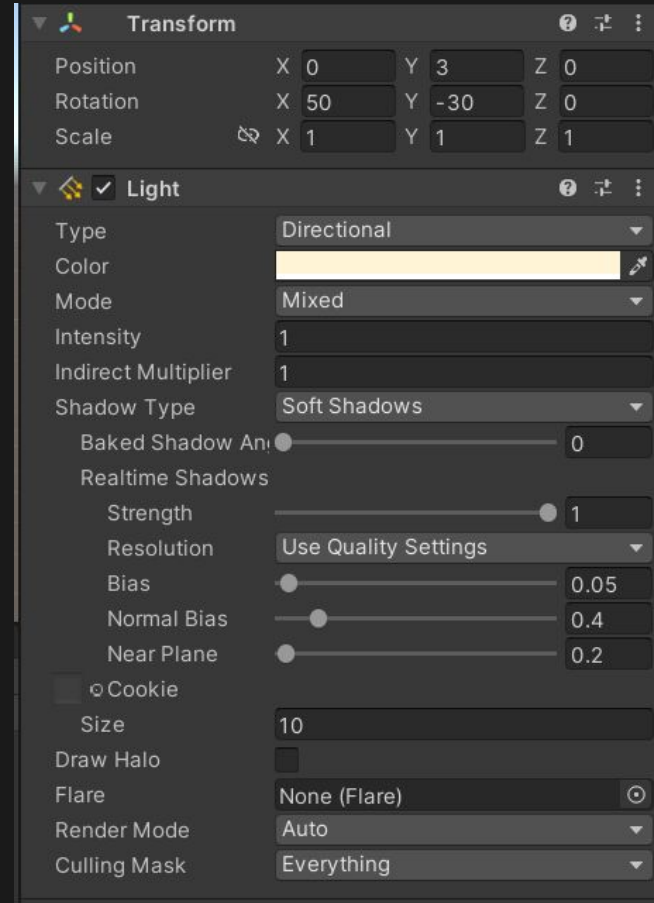
Directional Light



Directional light is created in any 3D game, it the Sun of the scene.

Position and Scale don't really matter however the rotation is crucial to it. Which way the light is point determines how much light is being shown.

You can also control the color of the light and how you want the shadows to be rendered.

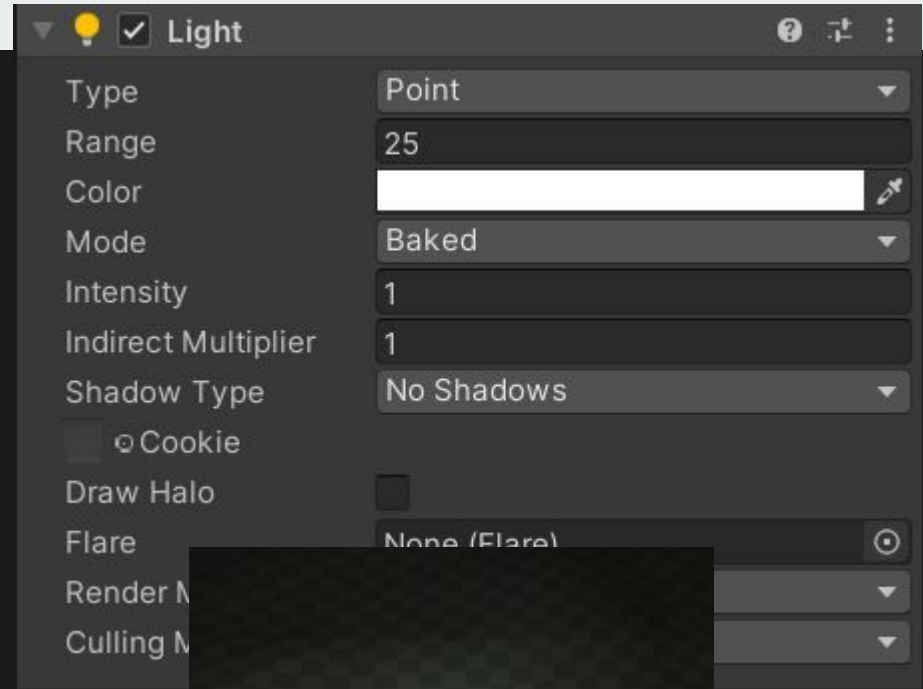


Point Light



Point light are area of effect lights. You give it a sphere that is controlled by the range and it will have a glow tha slow loses power from center to the end of the sphere.

You can also use Intensity to how strong the light coming from the source is.

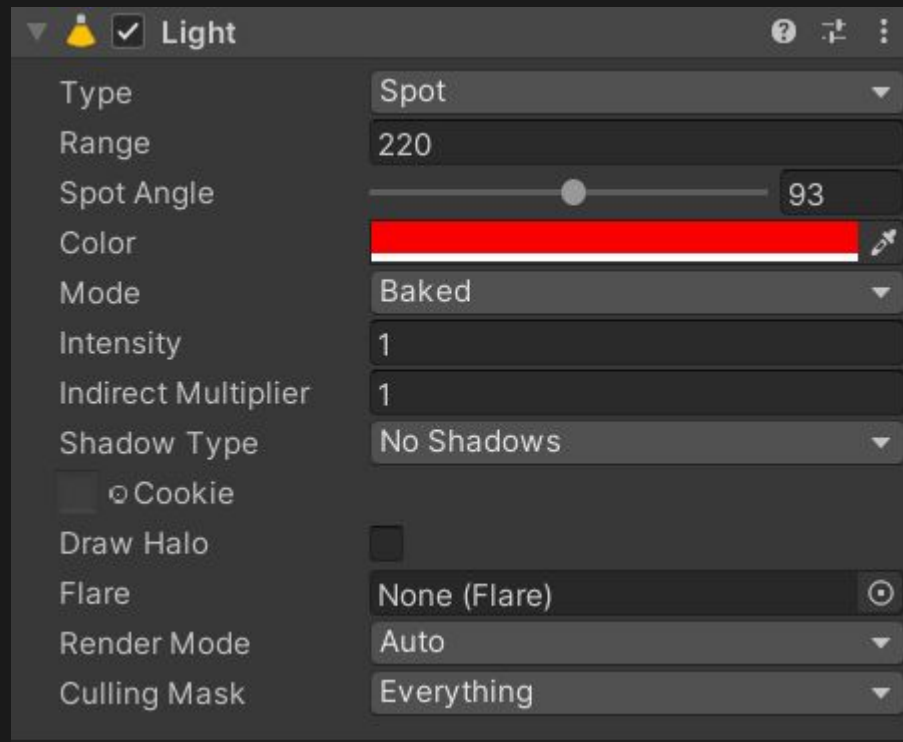


Spot Light



Spotlight is what it sound like a light that shoots in on direction rather than radiates from the center.

You can control the angle of the and the range of the cone that it uses to show the light.



Cookie

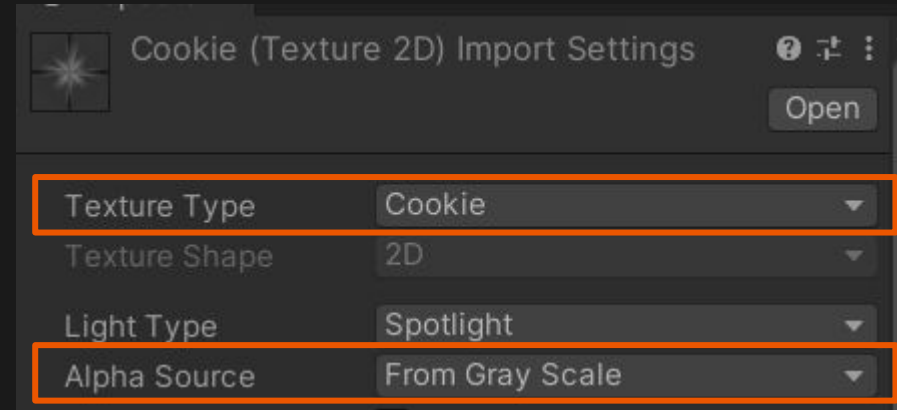


Cookie is a way of taking a image and having the light system display it.

You first want to make sure that the image you are using is black and white.

Next you will set the texture Type to be Cookie and the Alpha Source to be From Gray Scale so we only care about the black and white values .

After all that apply the changes and you can drag your image into the Cookie slot on the lights.



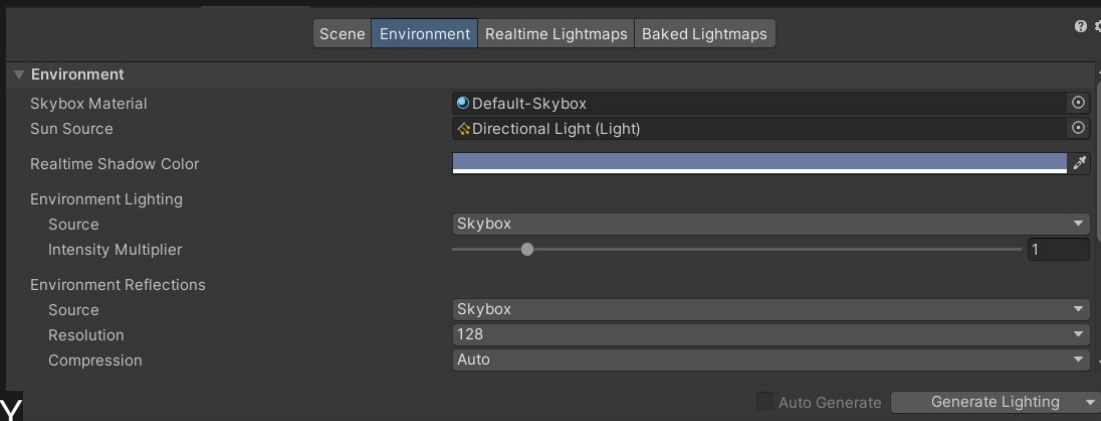
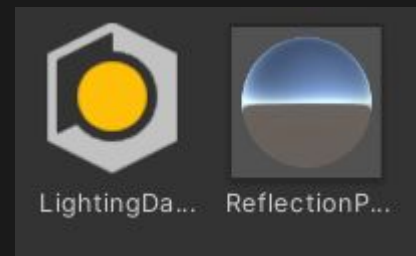
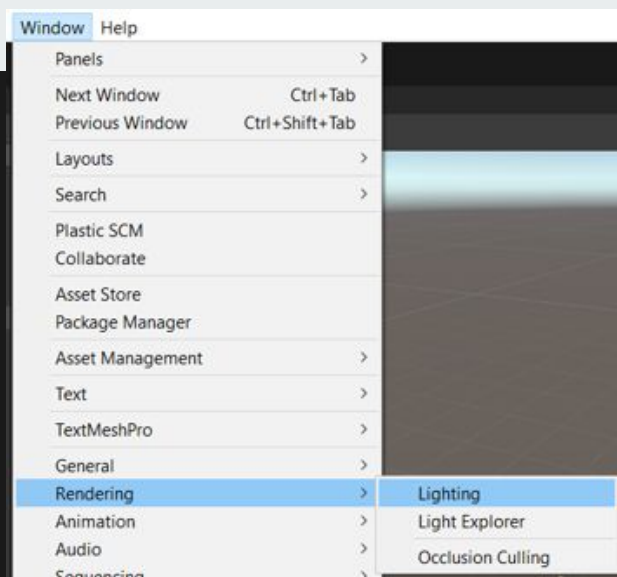
Baked vs Real Time

Currently as you are editing your scene the Lighting is Real Time but the game isn't running so it's not hard for unity to do that.

Once the game operates and all of the game element swork it's much harder to keep up with demanded calculations.

That's why we Bake the lighting into the scene. Meaning once you're happy with the way it looks you can save the setting on all of the object and bake them into the scene.

To do that we will open the Rendering View and go to the Environment and click Generate Lighting which will create two object that will save what the scene will look like.



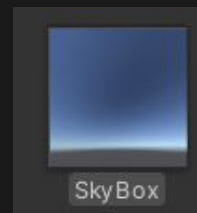
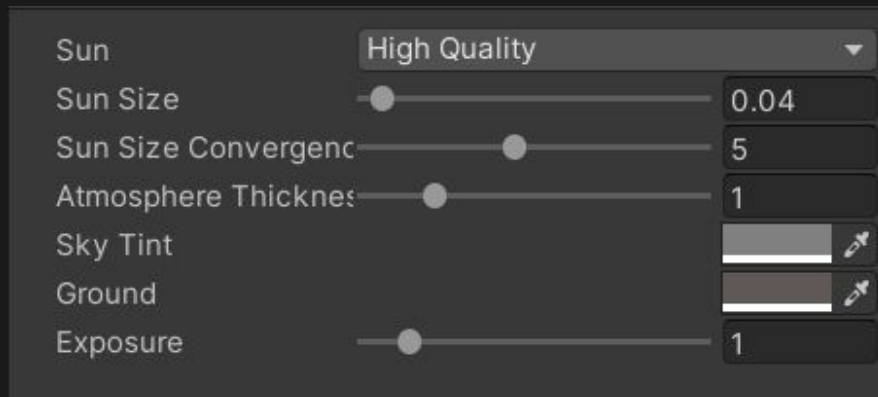
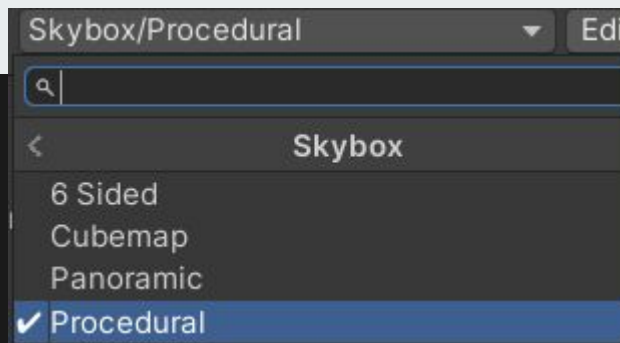
Skybox Procedural



First skybox we will look at is procedural.

To Create a skybox we will create a material and inside the Material Inspector we can change it from Material to Skybox Procedural.

This will allow us to create a gradient sky with a ground.



Skybox CubeMap

Now a different way of creating a sky box is by getting a skyboxed cube image.

Inside the Import Settings you will set the Texture Shape to Cube which will make it look like a material.

Then you can Create a new Skybox Material and set it to Skybox/Cubemap pass in the image and now you will have to vista in your game.

