Post Processing Stack

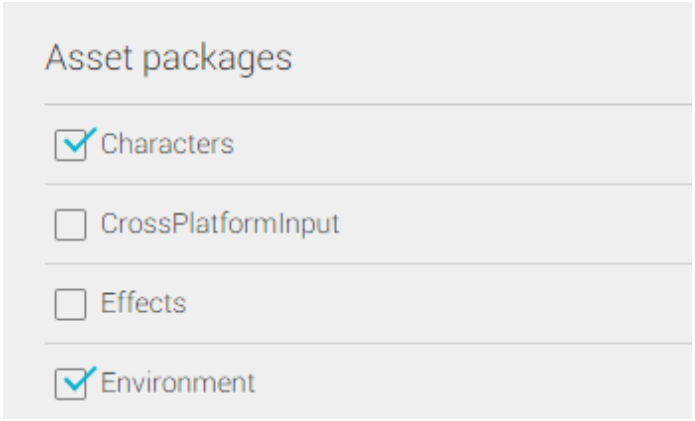
Lab 2a

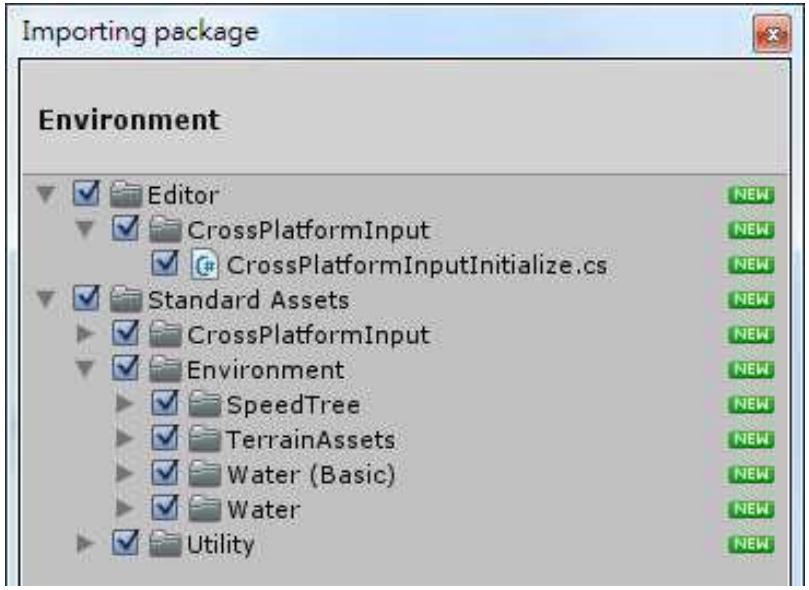
Topics

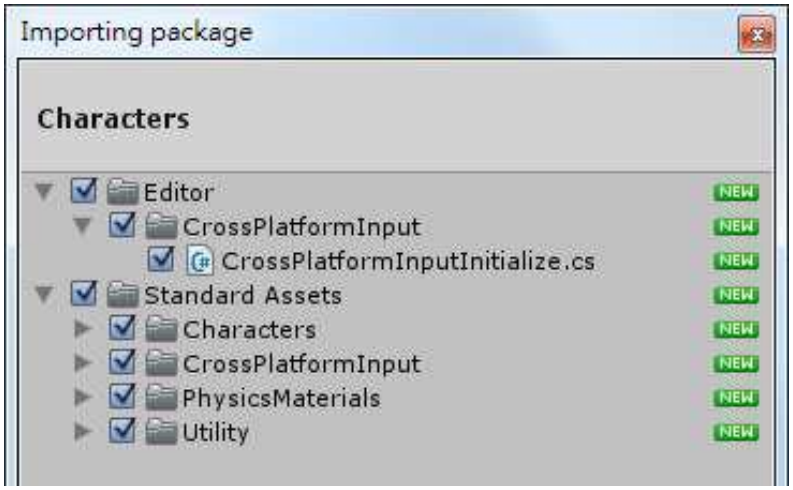
- Post-processing stack
- Depth of Field
- Color Grading
- Tonemapping
- Ambient Occlusion

Terrain Project

- Create a new project including the following standard assets package
  - Characters
  - Environment

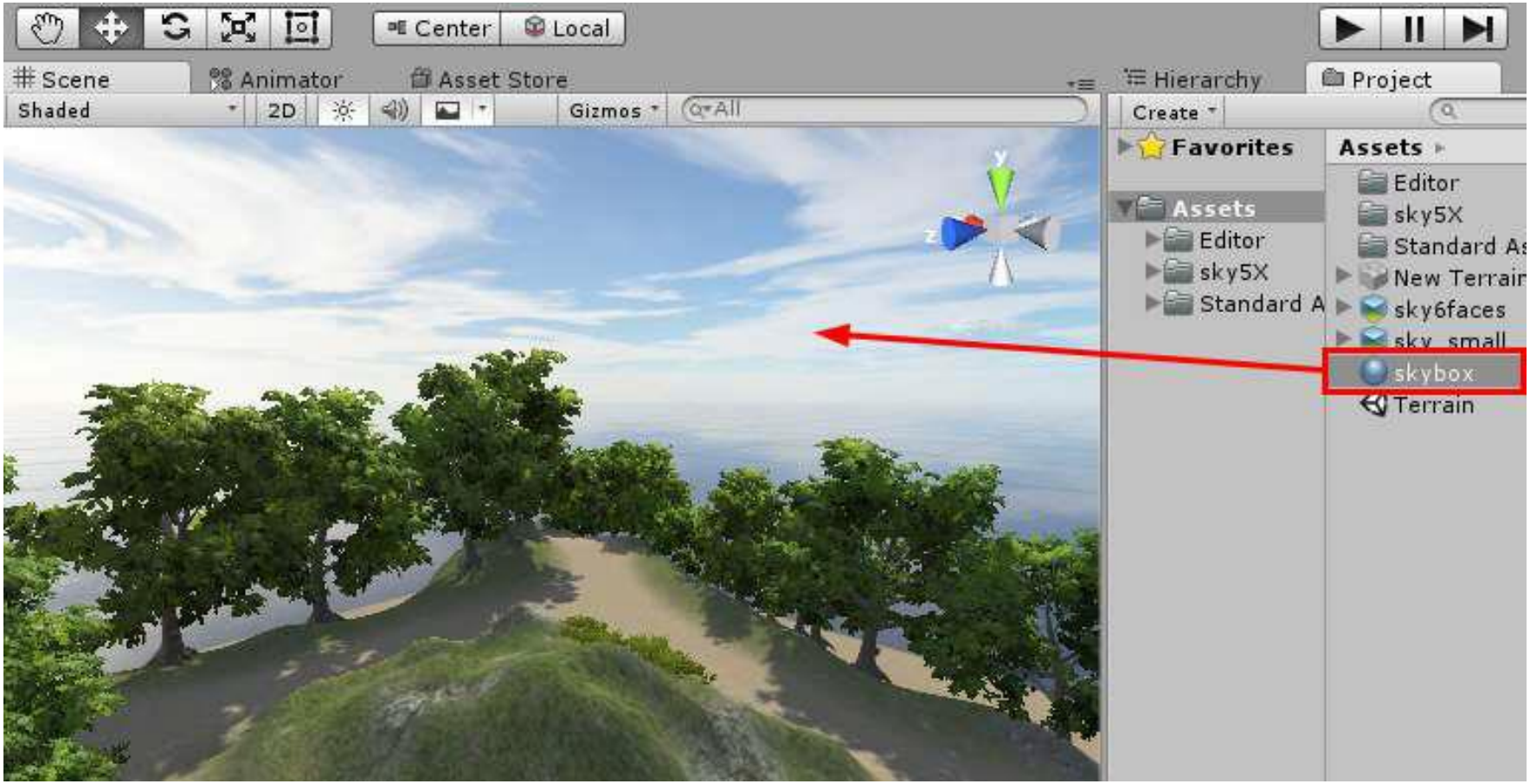






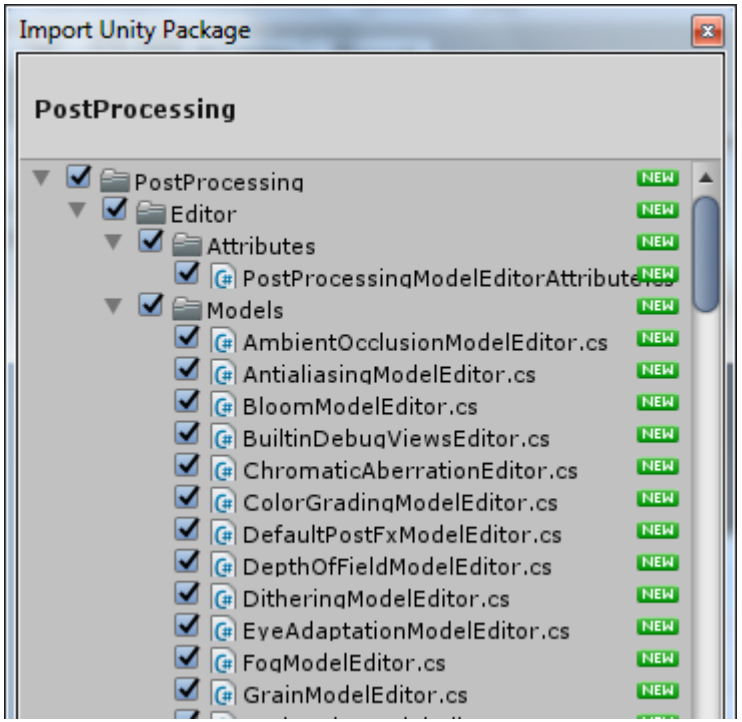
Terrain Project

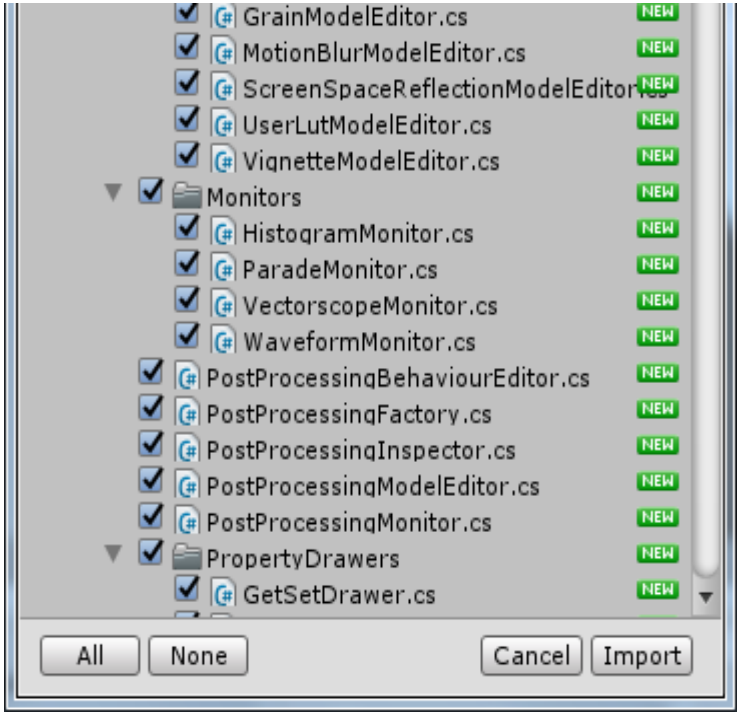
- Create a new terrain with the following :



Post-processing stack

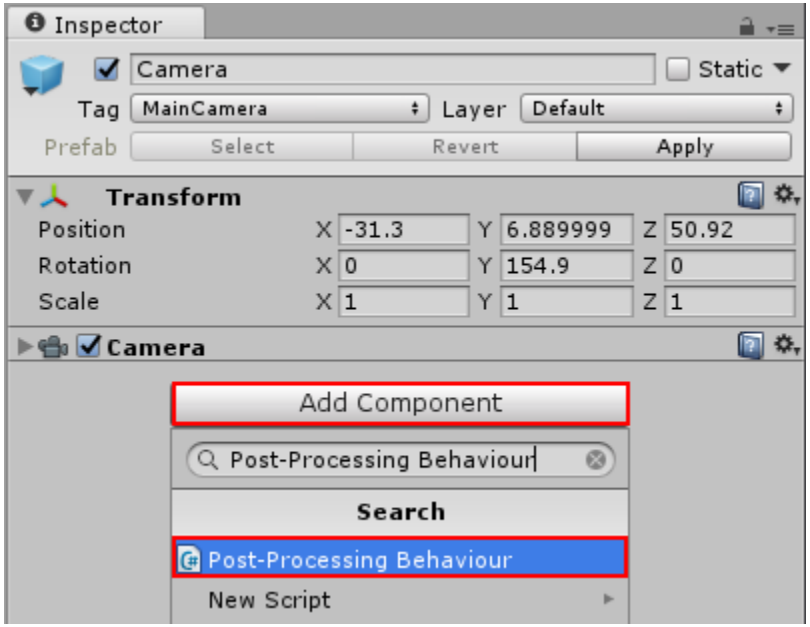
- Import package “PostProcessing”
  - Assets >> Import Package >>Custom Package





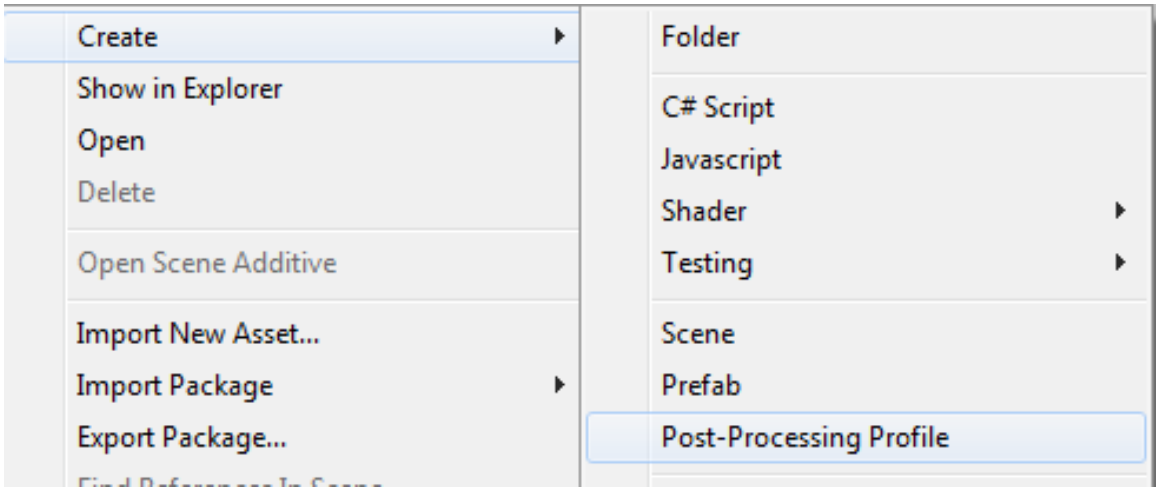
Post-processing stack

- Drag the *PostProcessingBehaviour.cs* script from the project window to the camera.
- Use the menu **Component** > **Effects** > **Post Processing Behaviour**.
- Use the **Add Component** button in the Inspector.



Post-processing stack

- Right-click in your project window and select **Create** > **Post-Processing Profile**.



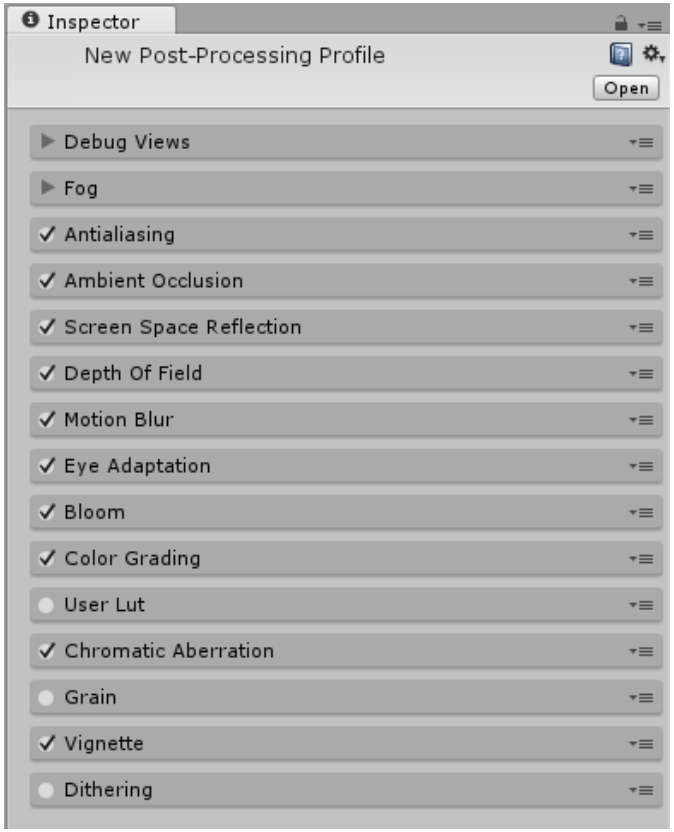
- Use the menu **Assets** > **Create** > **Post-Processing Profile**.
- This will create a new asset in your project.

Post-processing stack

- Post-Processing Profiles are project assets and can be shared easily between scenes / cameras, as well as between different projects or on the Asset Store. This makes creating presets easier (ie. high quality preset for desktop or lower settings for mobile).

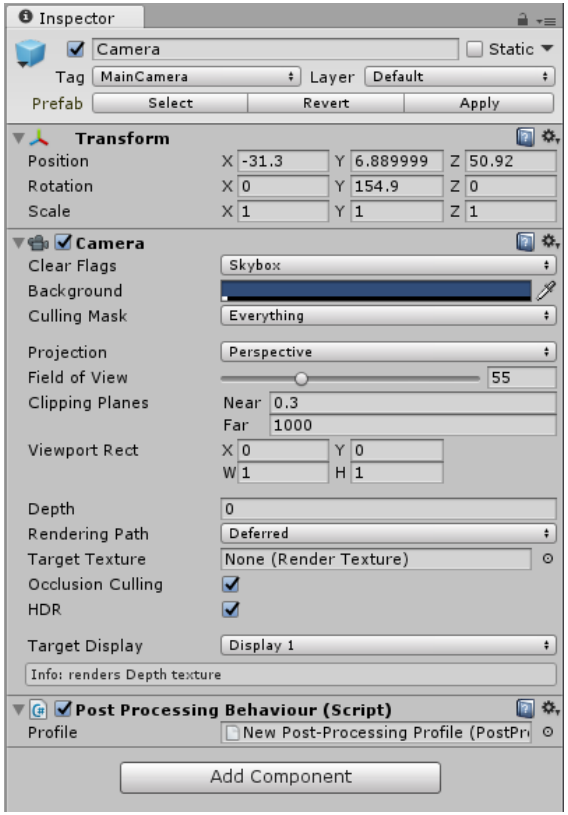
Post-processing stack

- Selecting a profile will show the inspector window for editing the profile settings.



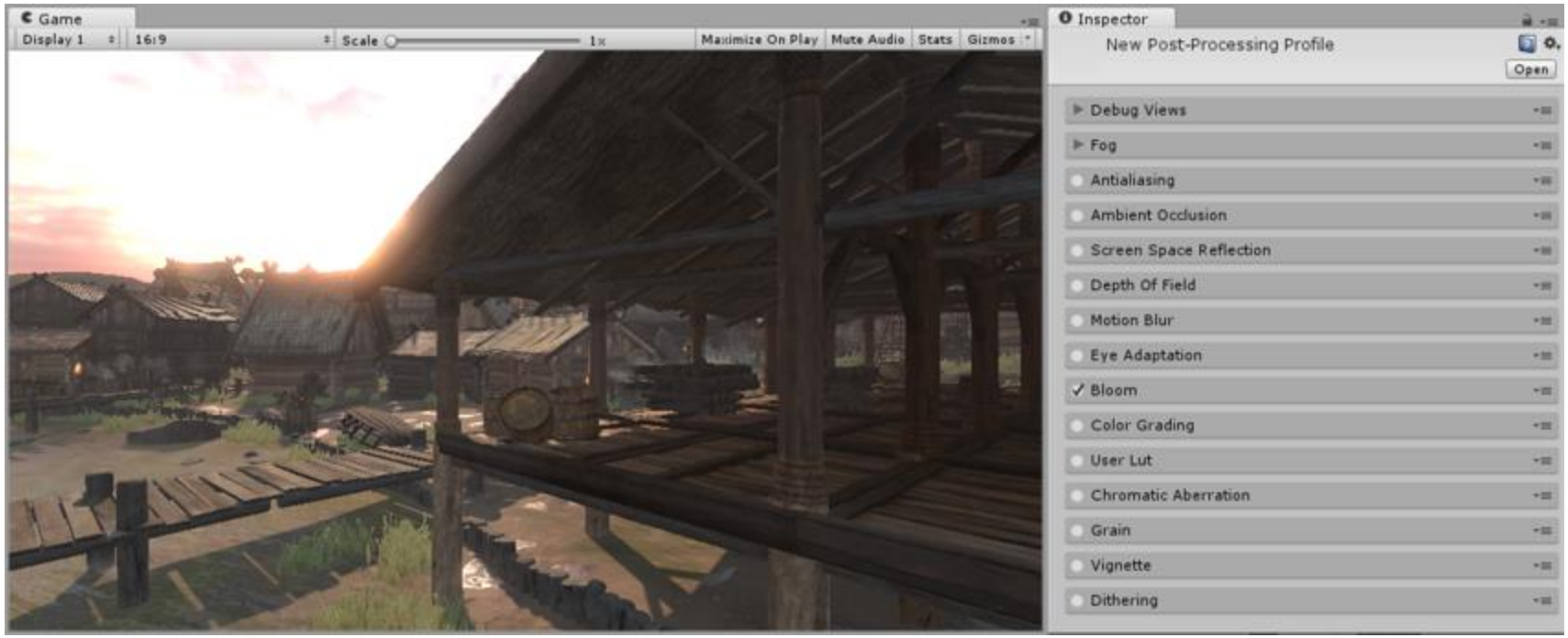
Post-processing stack

- Drag the profile from the project panel to the component or use the object selector in the inspector.



Post-processing stack

- With the profile selected, you can use the checkbox on each effect in the inspector to enable or disable individual effects.



Post-processing stack

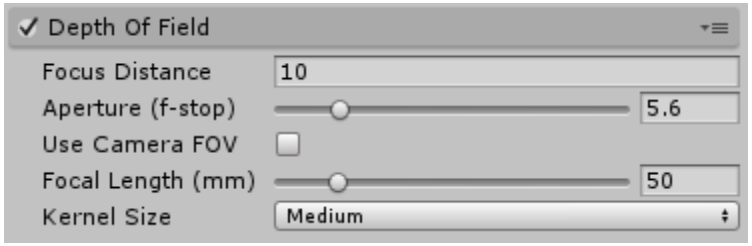
- Post-processing stack provide the following features:
  - Fog, Antialiasing, Ambient Occulusion
  - Screen Space Reflection, Depth of Field
  - Motion Blur, Eye Adaption, Bloom
  - Color Grading, User Cut, Chromatic Aberration
  - Grain, Vignette, Dithering

Depth of Field

- Depth of Field is a common post-processing effect that simulates the focus properties of a camera lens.

Depth of Field

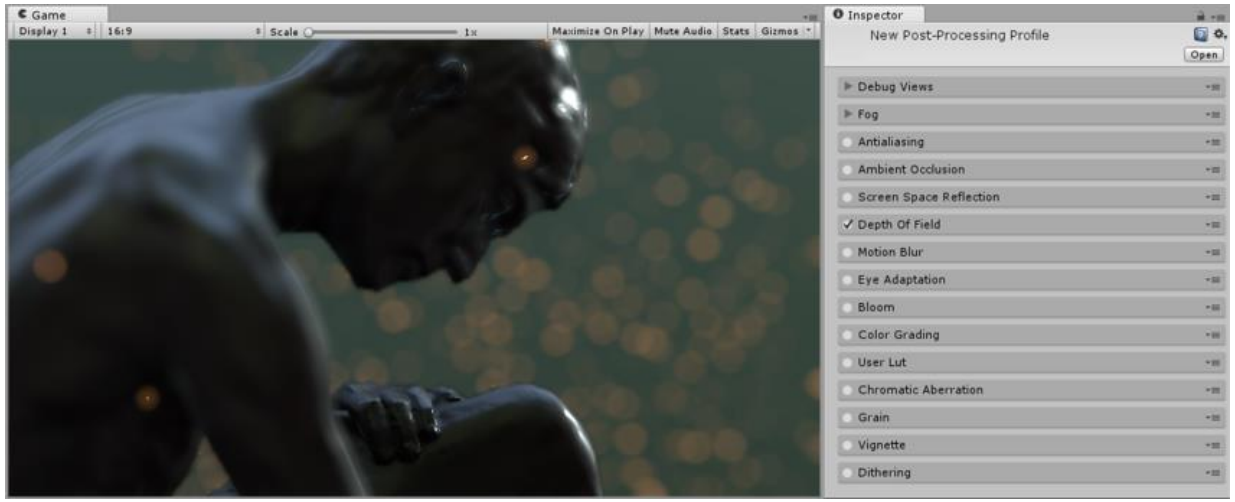
- Setting of Depth of Field :

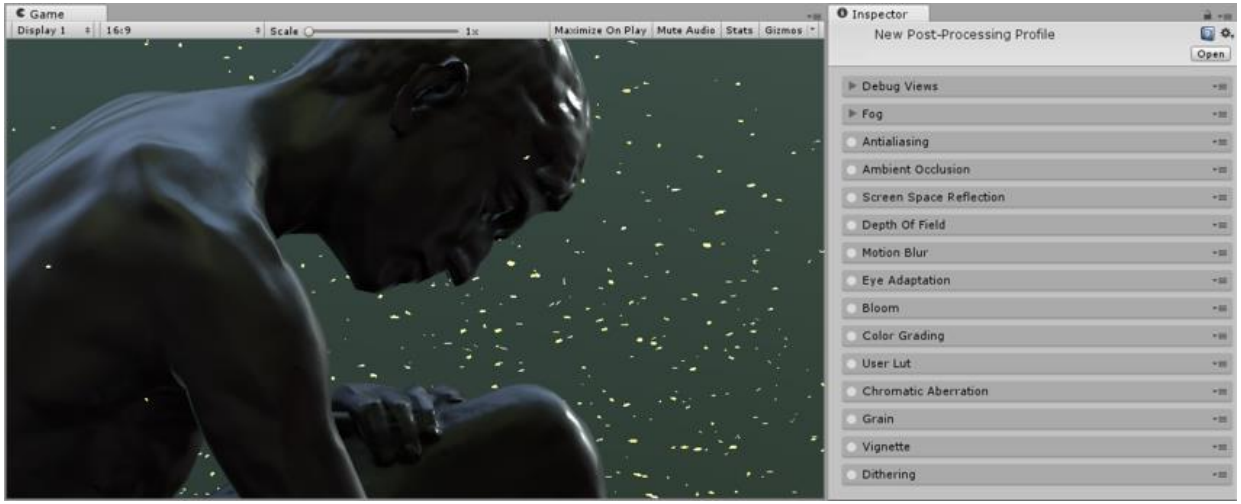


Property:	Function:
Focus Distance	Distance to the point of focus.
Aperture	Ratio of the aperture (known as f-stop or f-number). The smaller the value is, the shallower the depth of field is.
Focal Length	Distance between the lens and the film. The larger the value is, the shallower the depth of field is.
Use Camera FOV	Calculate the focal length automatically from the field-of-view value set on the camera.
Kernel Size	Convolution kernel size of the bokeh filter, which determines the maximum radius of bokeh. It also affects the performance (the larger the kernel is, the longer the GPU time is required).

Depth of Field

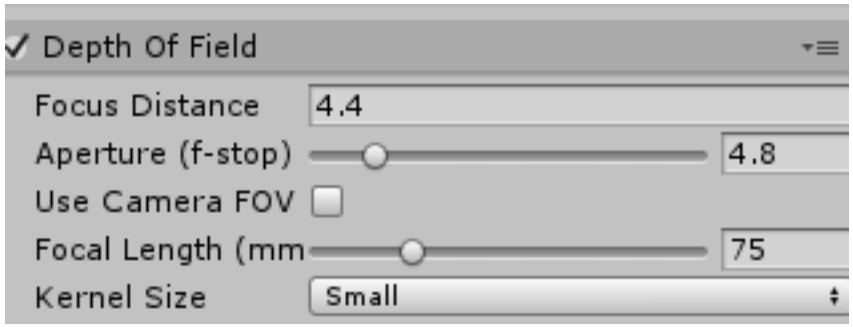
Example of Depth of Field effect :





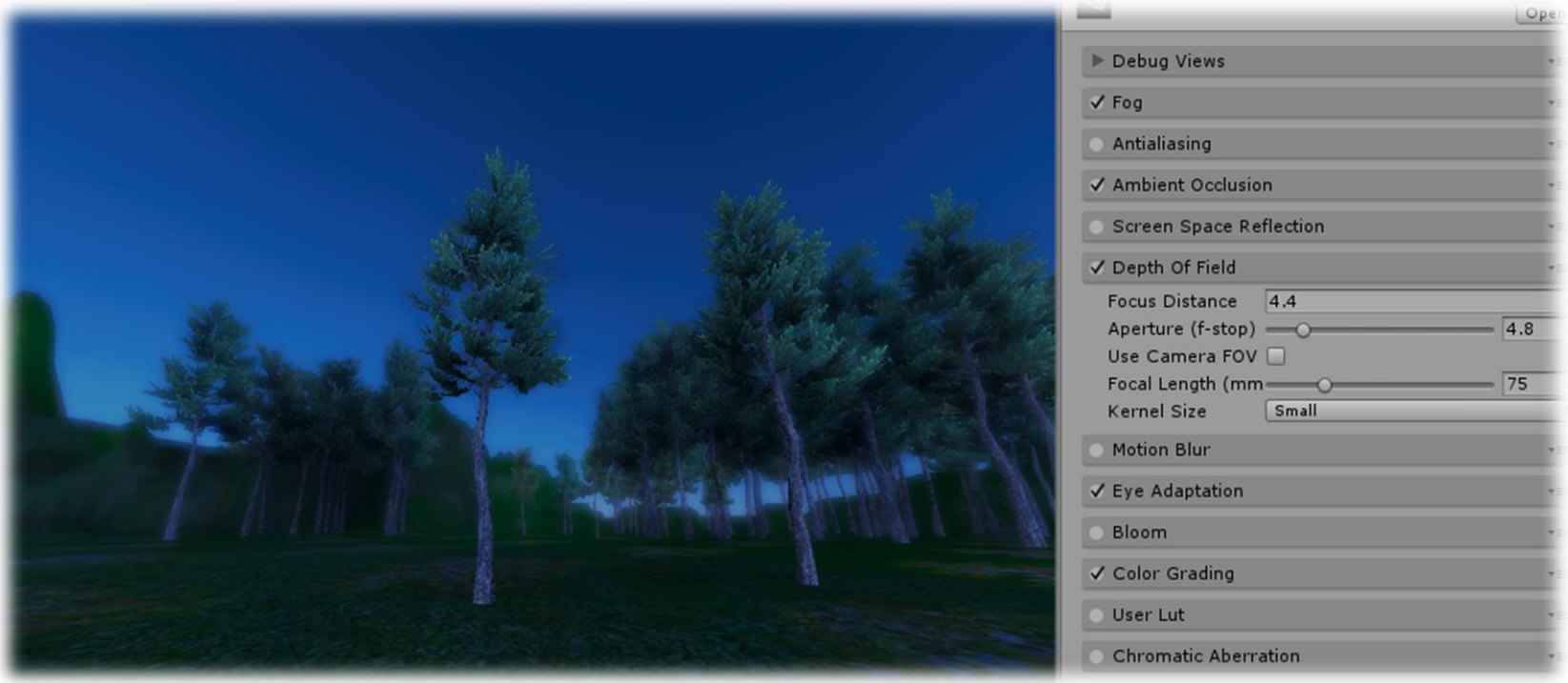
Depth of Field

- Setup parameters
  - Focus Length
    - **4.4**
  - Aperture (f-stop)
    - **4.8**
  - Focal Length
    - **75**
  - Use Camera FOV
    - **No**
  - Kernel Size
    - **Small**



Depth of Field

- This will produce the following screen.

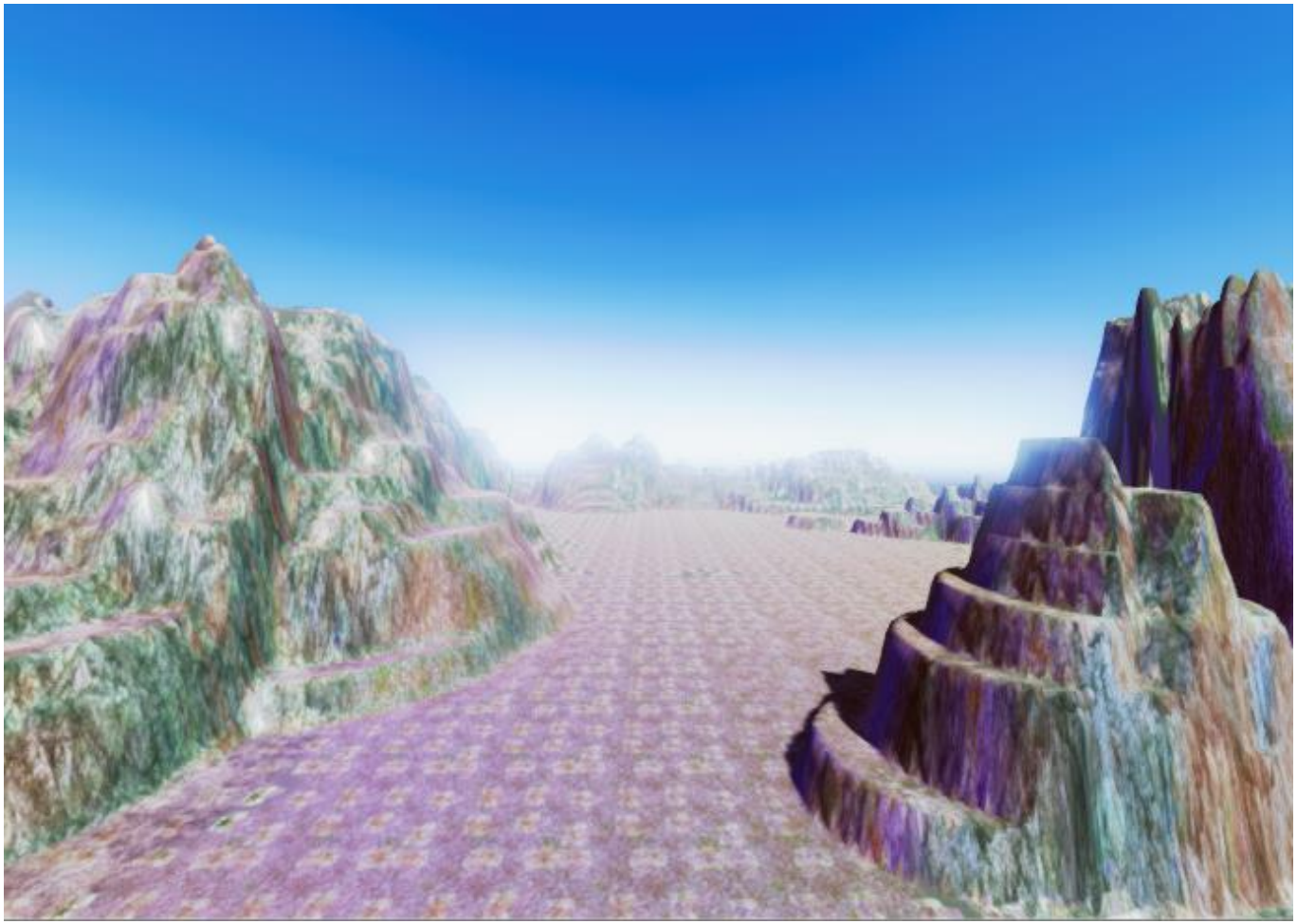


Color Grading

- Color Grading is the process of altering or correcting the color and luminance of the final image. You can think of it like applying filters in software like Instagram.
- The Color Grading tools included in the post-processing stack are fully real-time HDR tools and internal processing is done in the ACES color-spaces.

Color Grading

Example of Color Grading:



Color Grading

- The Color Grading tools supplied in the post-processing stack come in five sections:
  - Tonemapping
  - Basic
  - Channel Mixer
  - Trackballs
  - Grading Curves
- **Requirements**
  - RGBAHalf Texture Format
  - Shader model 3
  - Reference on Graphics Emulation : https://docs.unity3d.com/Manual/GraphicsEmulation.html

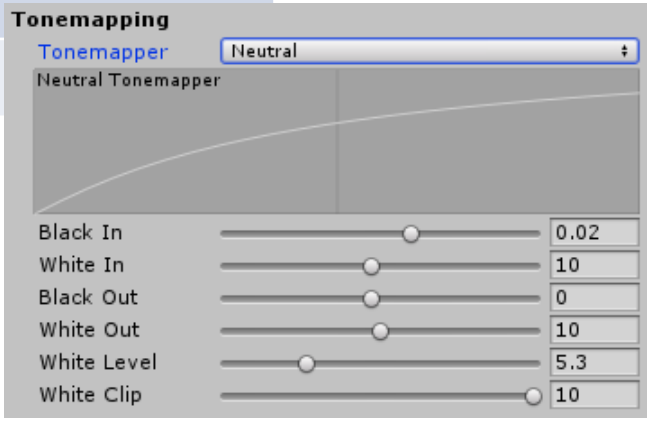
Tonemapping

- Tonemapping is the process of remapping HDR values of an image into a range suitable to be displayed on screen. Tonemapping should always be applied when using an HDR camera, otherwise values color intensities above 1 will be clamped at 1, altering the scenes luminance balance.
  - None (apply no tonemapping)
  - Neutral
  - Filmic (ACES)

Neutral Tonemapper

- Setting of Neutral Tonemapper:

Property:	Function:
Black In	Inner control point for the black point.
White In	Inner control point for the white point.
Black Out	Outer control point for the black point.
White Out	Outer control point for the white point.
White Level	Pre-curve white point adjustment.
White Clip	Post-curve white point adjustment.

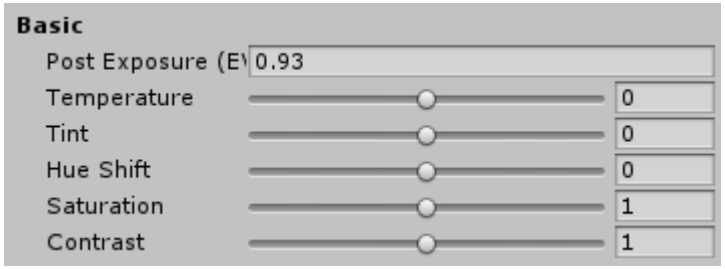


Filmic (ACES) Tonemapper

- The Filmic (ACES) tonemapper uses a close approximation of the reference ACES tonemapper for a more filmic look
- It is more contrasted than Neutral and has an effect on actual color hue & saturation. This tonemapper is the simplest to use as it requires no user input to give a standard filmic look to your scene

Basic Color Grading

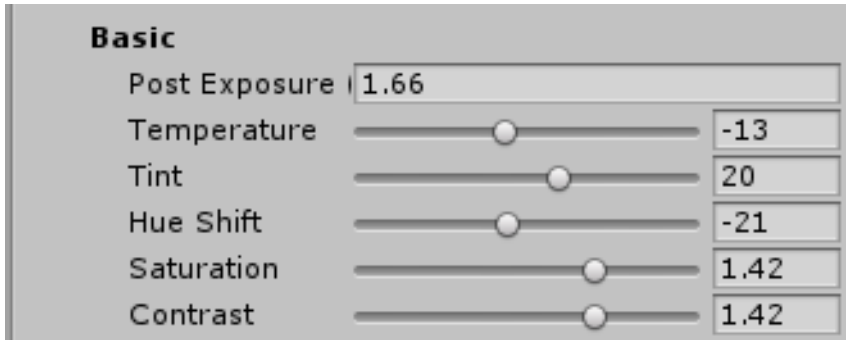
- Setting of Basic Color Grading:



Property:	Function:
Post Exposure	Adjusts the overall exposure of the scene in EV units. This is applied after HDR effect and right before tonemapping so it won't affect previous effects in the chain.
Temperature	Sets the white balance to a custom color temperature.
Tint	Sets the white balance to compensate for a green or magenta tint.
Hue Shift	Shift the hue of all colors.
Saturation	Pushes the intensity of all colors.
Contrast	Expands or shrinks the overall range of tonal values.

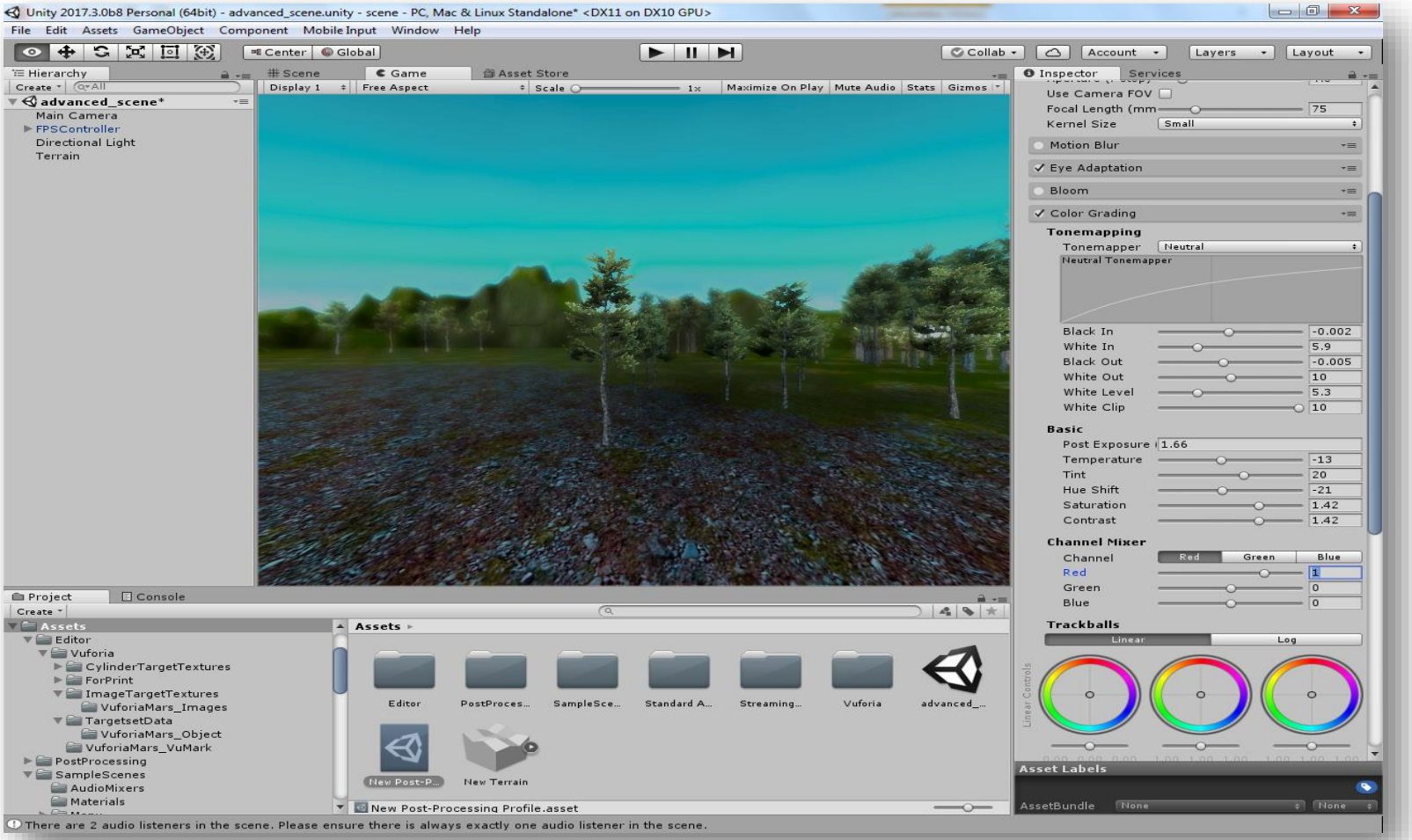
Basic Color Grading

- Setup parameters
  - Post Exposure
    - **1.66**
  - Temperature
    - **-13**
  - Tint
    - **20**
  - Hue Shift
    - **-21**
  - Saturation
    - **1.42**
  - Contrast
    - **1.42**



Color Grading

- This will produce the following screen.



Channel Mixer Color Grading

- Setting of Channel Mixer Color Grading :

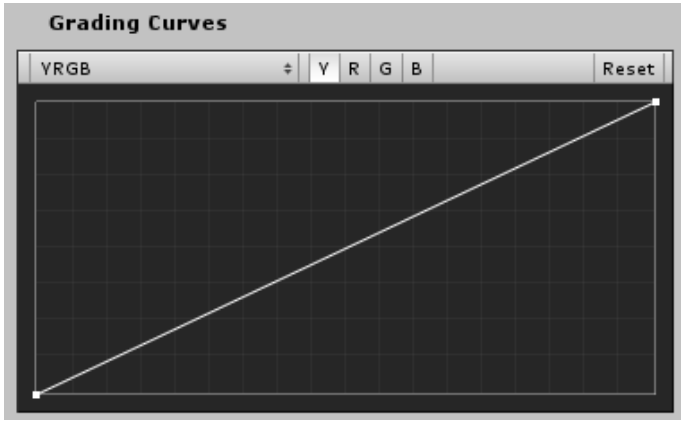
Property:	Function:
Channel	Select the output channel to modify
Red	Modify the influence of the red channel within the overall mix
Green	Modify the influence of the green channel within the overall mix
Blue	Modify the influence of the blue channel within the overall mix

Grading Curves Color Grading

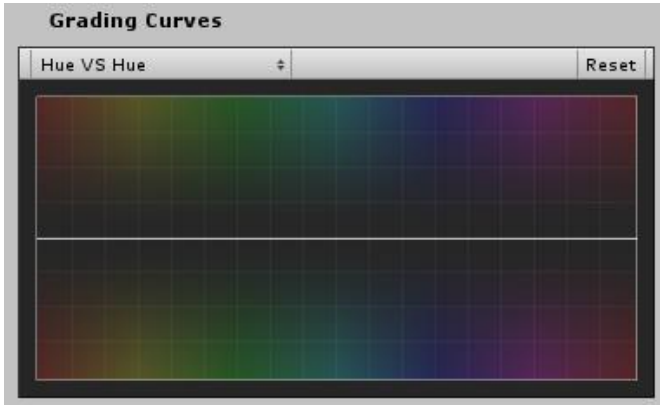
- Grading Curves (also known as versus curves) are an advanced way to adjust specific ranges in hue, saturation or luminosity in your image.
- You can achieve the effects of specific hue replacement, desaturating certain luminosities.
- Five Grading Curve types are supplied in the post-processing stack:
  - YRGB
  - Hue vs Hue
  - Hue vs Sat
  - Sat vs Sat
  - Lum vs Sat

Grading Curves Color Grading

- **YRGB Curve:**

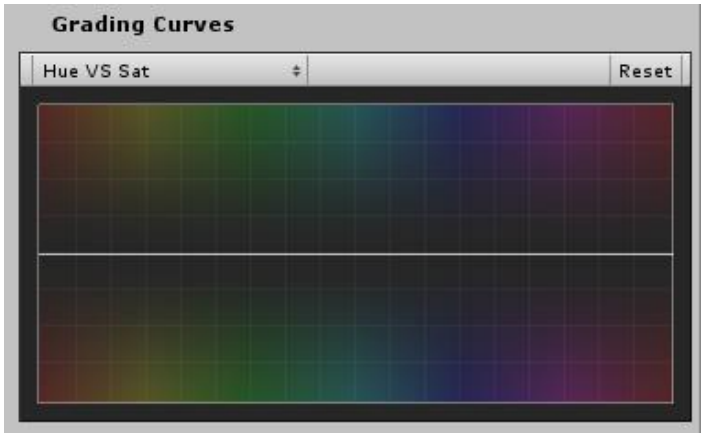


- **Hue vs Hue Curve**

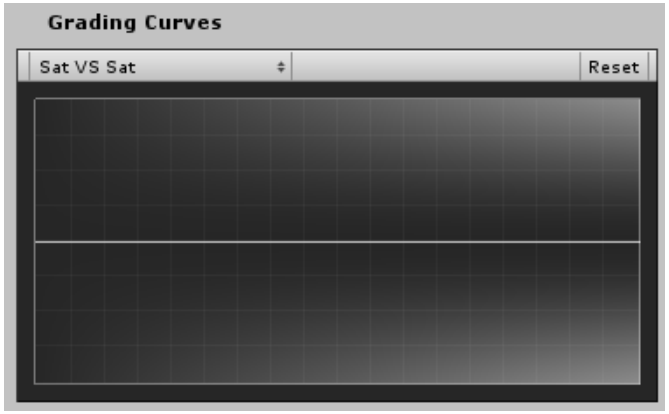


Grading Curves Color Grading

- **Hue vs Sat Curve:**

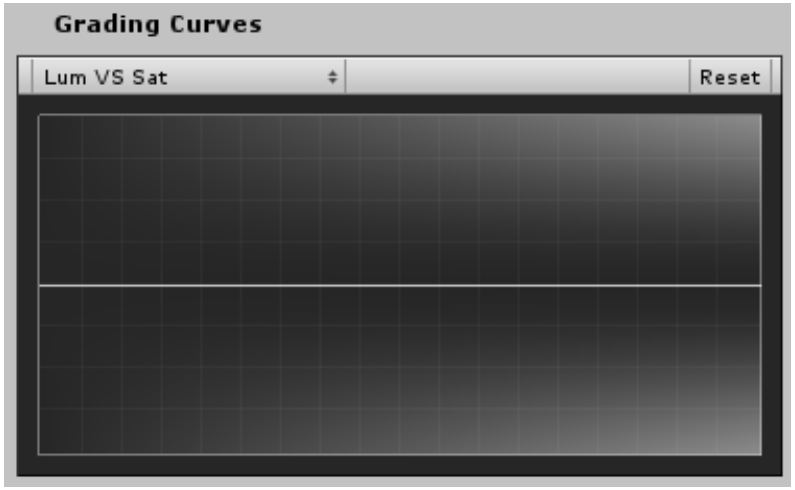


- **Sat vs Sat Curve**



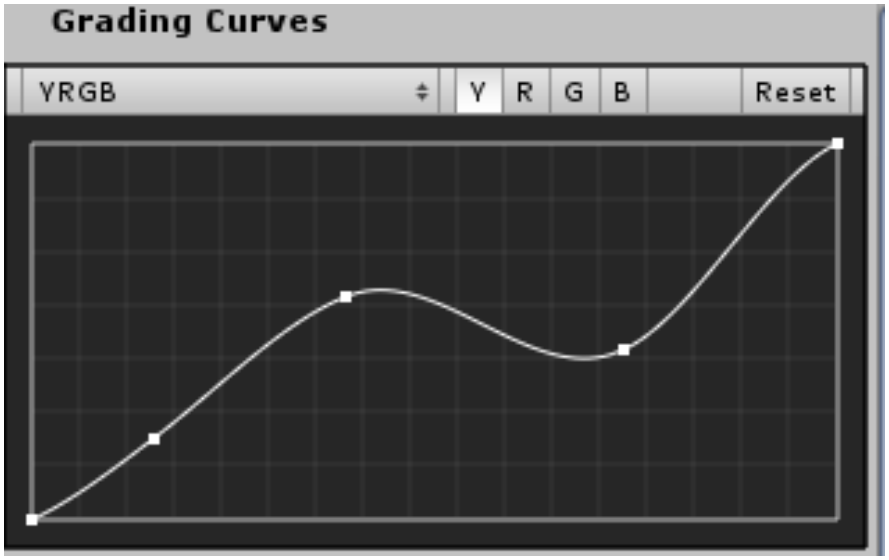
Grading Curves Color Grading

- **Lum vs Sat Curve :**



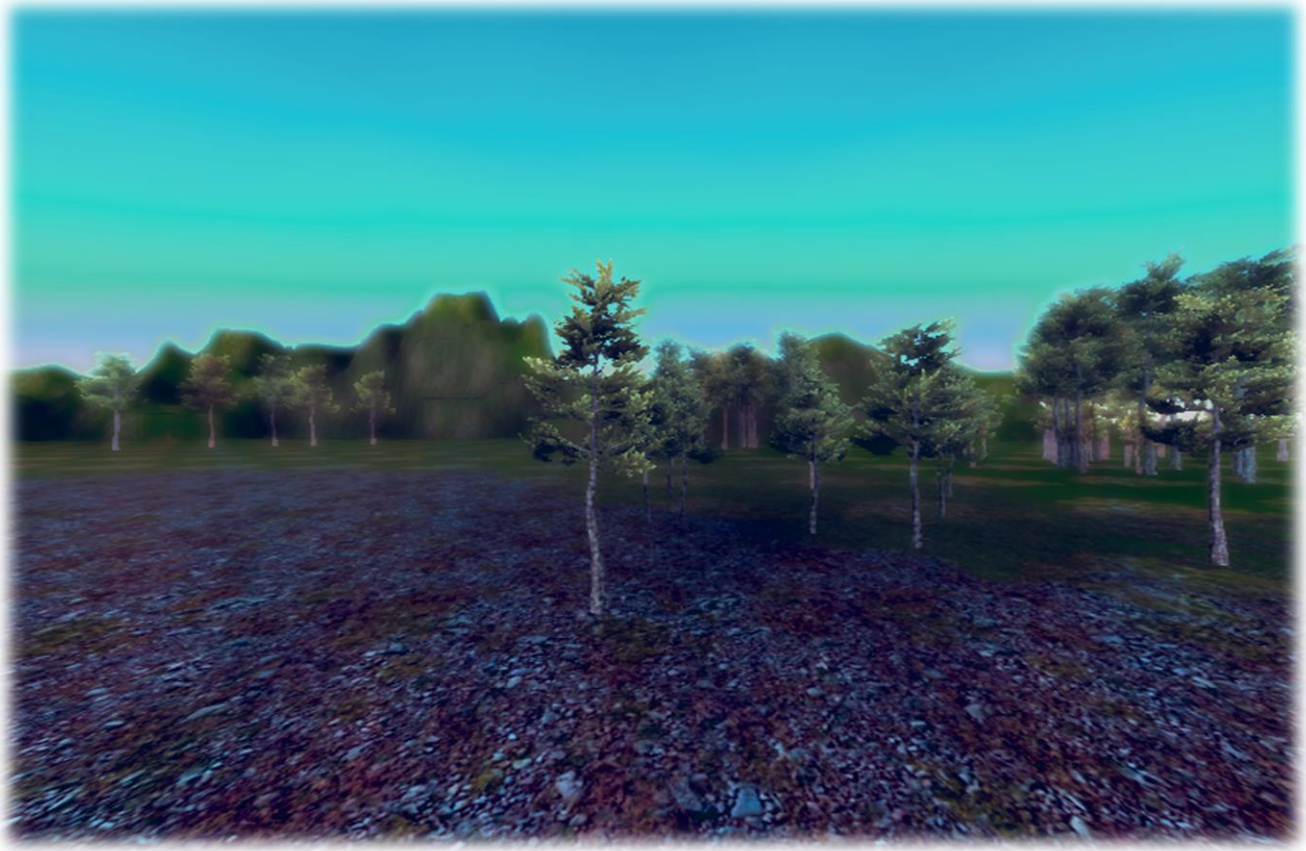
Grading Curves Color Grading

- Setup parameters



Grading Curves Color Grading

- This will produce the following screen.



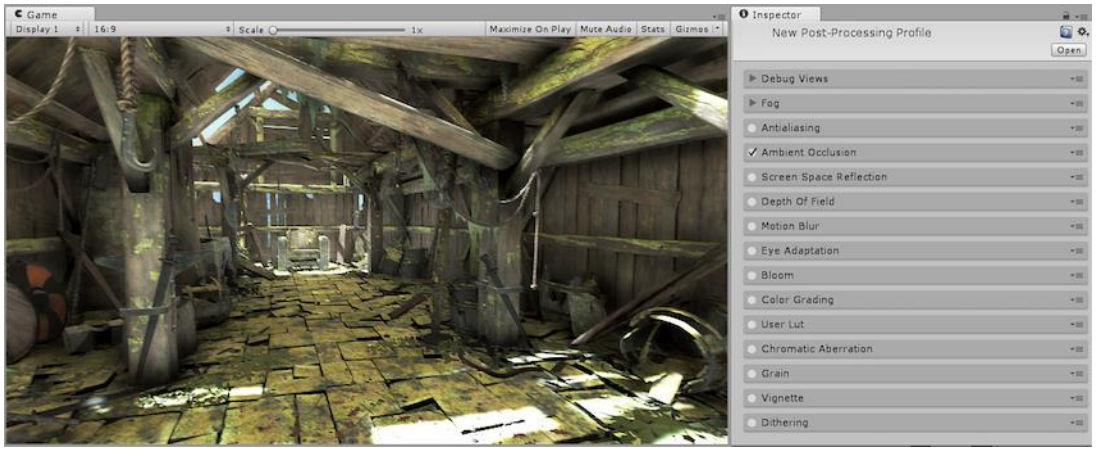
Ambient Occlusion

- The Ambient Occlusion post-processing effect approximates Ambient Occlusion in real time as a full-screen post-processing effect.
- It darkens creases, holes, intersections and surfaces that are close to each other. In real life, such areas tend to block out or occlude ambient light, hence they appear darker.
- **Requirements**
  - Depth & Normals texture
  - Shader model 3

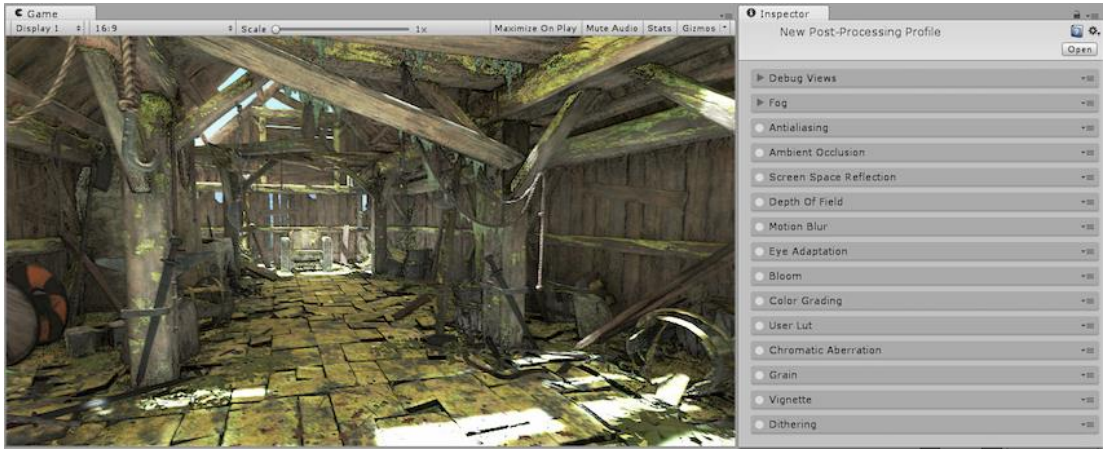
Ambient Occlusion

Example of Ambient Occlusion:

- Scene with Ambient Occlusion.

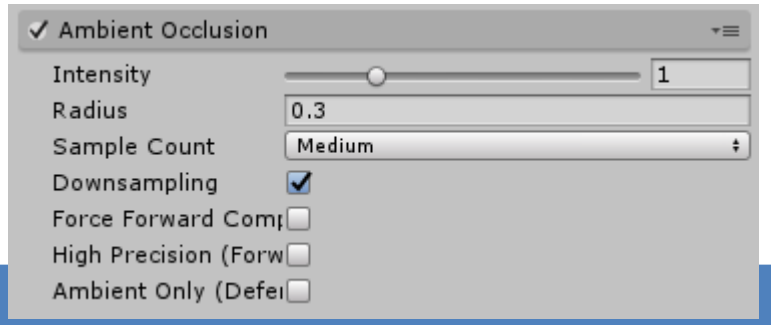


- Scene without Ambient Occlusion



Ambient Occlusion

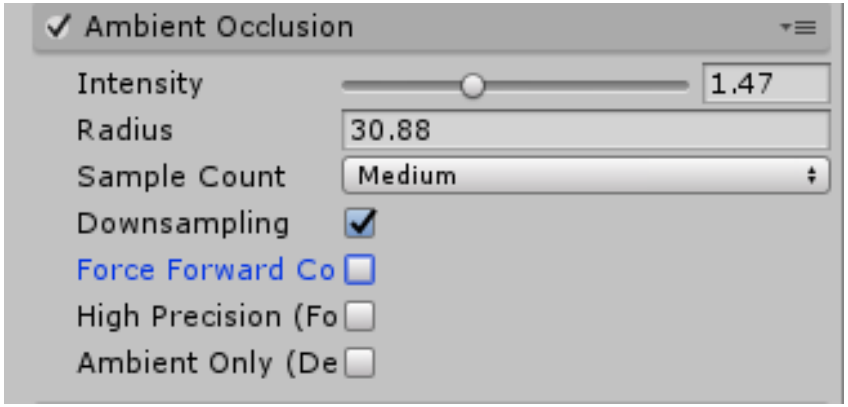
- Setting of Ambient Occlusion:



Property:	Function:
Intensity	Degree of darkness produced by the effect.
Radius	Radius of sample points, which affects extent of darkened areas.
Sample Count	Number of sample points, which affects quality and performance.
Downsampling	Halves the resolution of the effect to increase performance at the cost of visual quality.
Force Forward Compatibility	Forces compatibility with Forward rendered objects when working with the Deferred rendering path.
High Precision (Forward)	Toggles the use of a higher precision depth texture with the forward rendering path (may impact performances). Has no effect with the deferred rendering path.
Ambient Only	Enables the ambient-only mode in that the effect only affects ambient lighting. This mode is only available with the Deferred rendering path and HDR rendering.

Ambient Occlusion

- Setup parameters
  - Intensity
    - **1.47**
  - Raduius
    - **30.88**
  - Sample Count
    - **Medium**
  - Downsampling
    - **Yes**
  - Force Forward Compatibility
    - **null**
  - High Precision (Forward)
    - **null**
  - Ambient Only
    - **null**



Ambient Occlusion

- This will produce the following screen.