Introduction to Unity

Step 5: Shaping outdoor level

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Table of contents

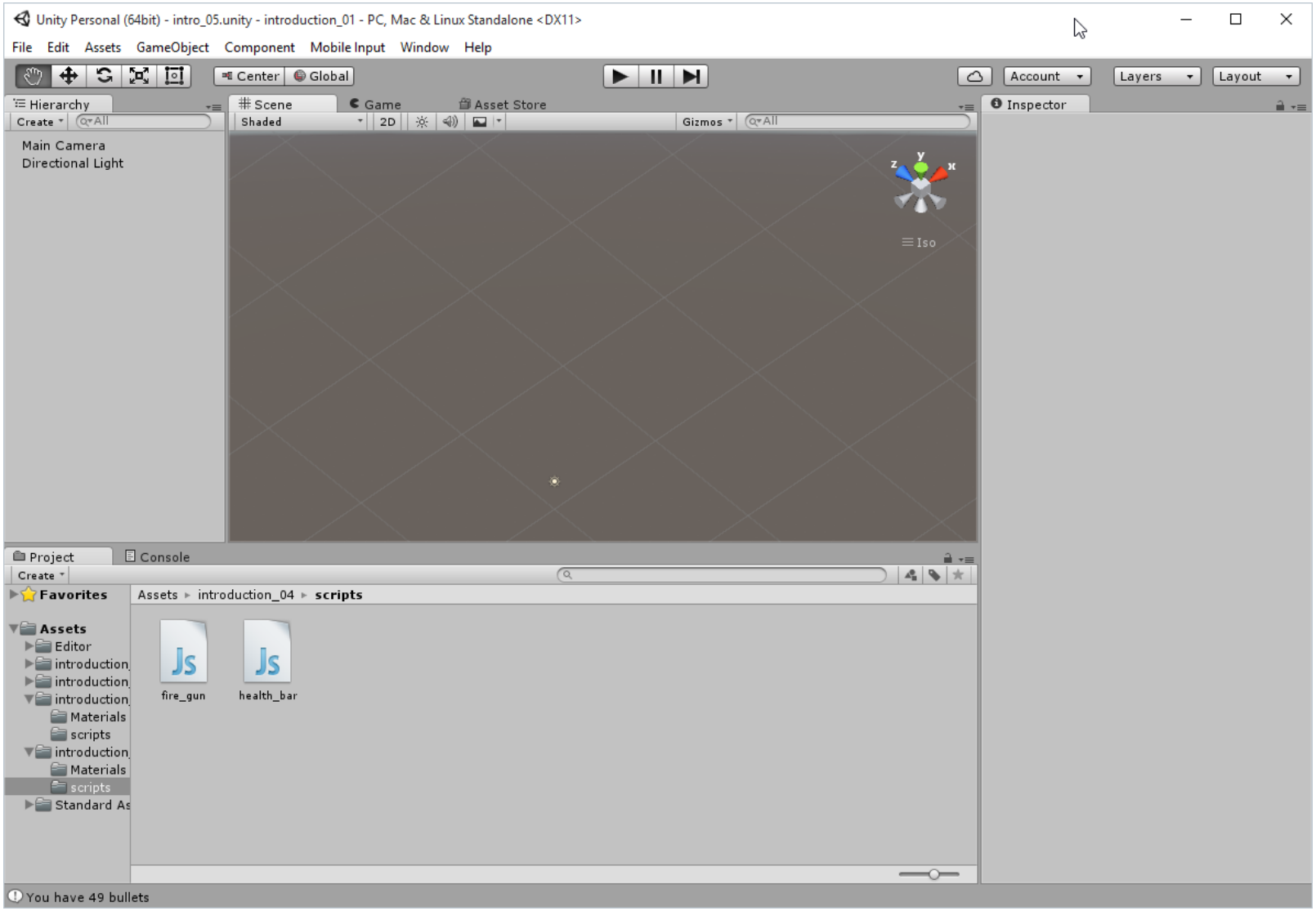
1. Close the previous project (scene `intro_04`) if it is opened.
2. Create new scene with **File | New Scene** and save it as `intro_05` selecting **File | Save Scene As**.

Create terrain

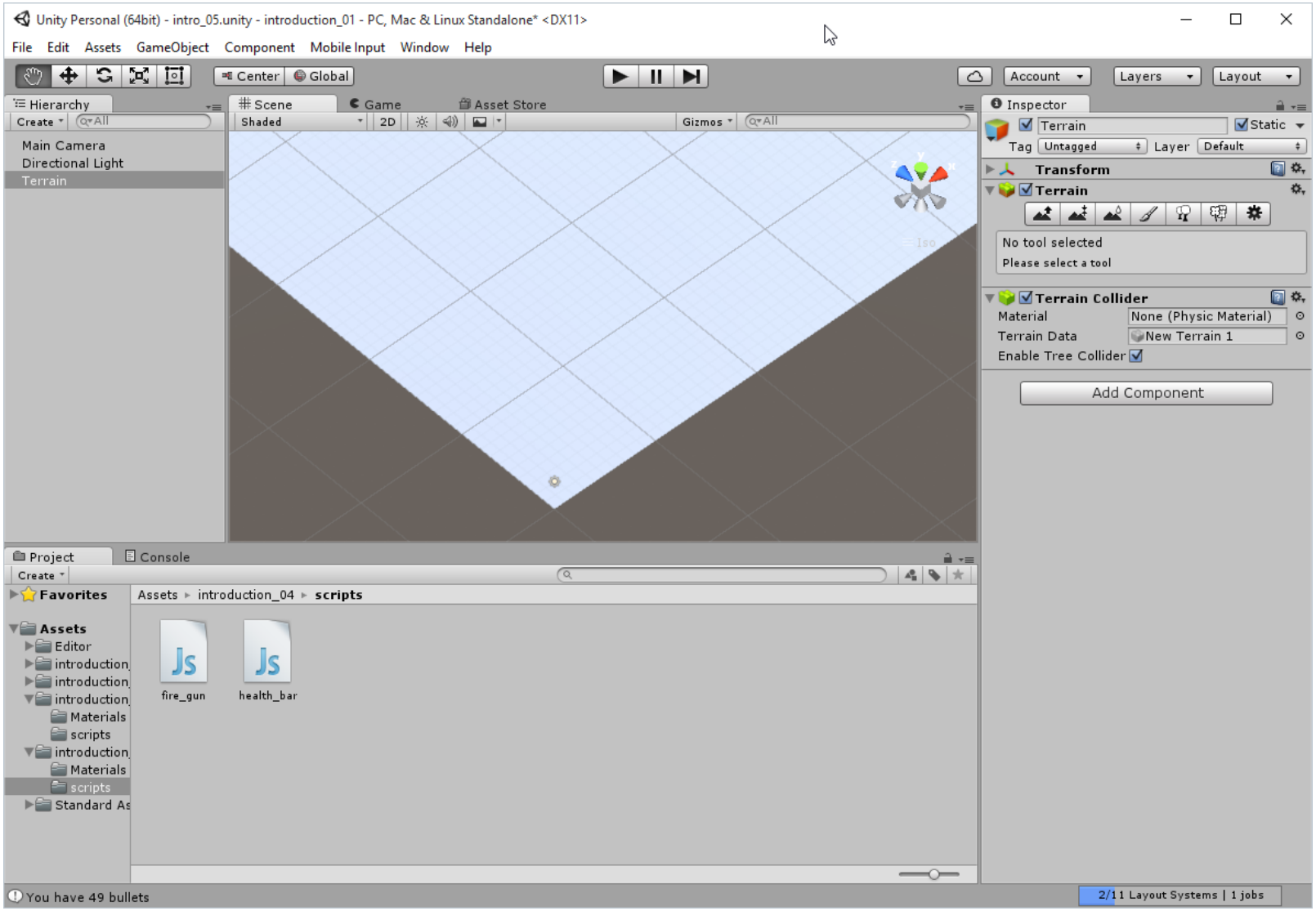
Add terrain object to the scene

1. Select **GameObject** | **3D Object** | **Terrain**. This will spawn a terrain asset in the **Hierarchy** view and place it in the **Scene**.

Add terrain object to the scene



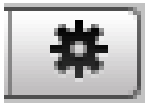
Add terrain object to the scene

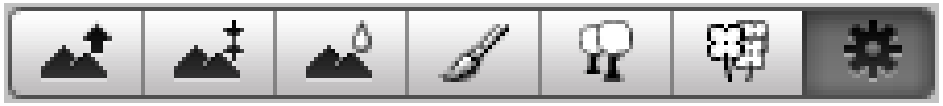


Create terrain

Add terrain object to the scene

1. In the Inspector view, locate and click the **Terrain Settings** button

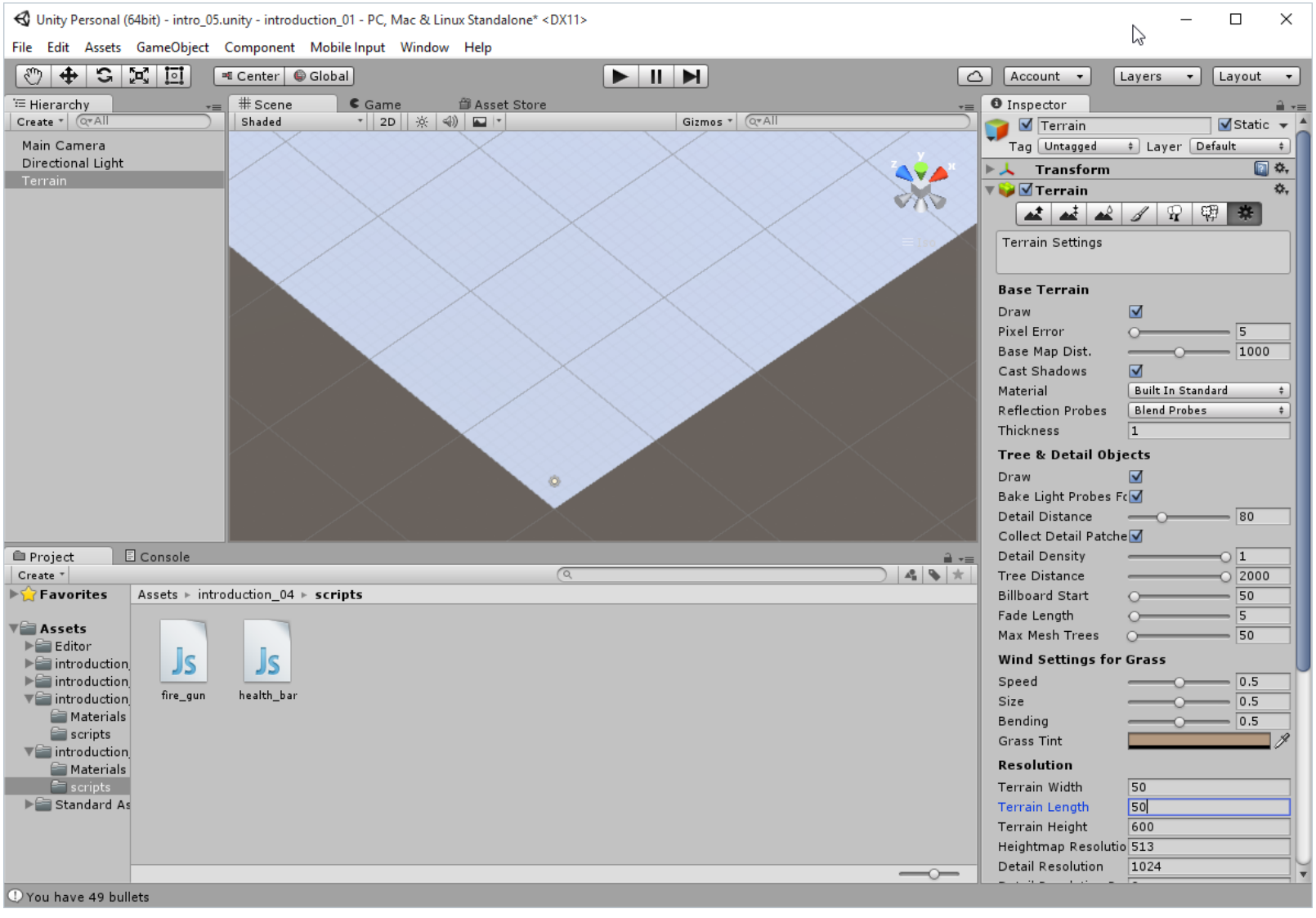




2. Locate the **Resolution** settings.
3. Currently, the terrain width and length are set to big avlues (500 in my case). Set these values both to smaller values, say 50.

Create terrain

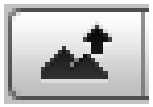
Add terrain object to the scene



Create terrain

Unity Terrain Sculpting Tools

Unity gives us multiple tools for hand sculpting terrain. We can see these tools in the **Inspector** view under the component **Terrain (Script)**. These tools all work under the same premise: we use a brush with a given size and opacity to „paint" terrain.

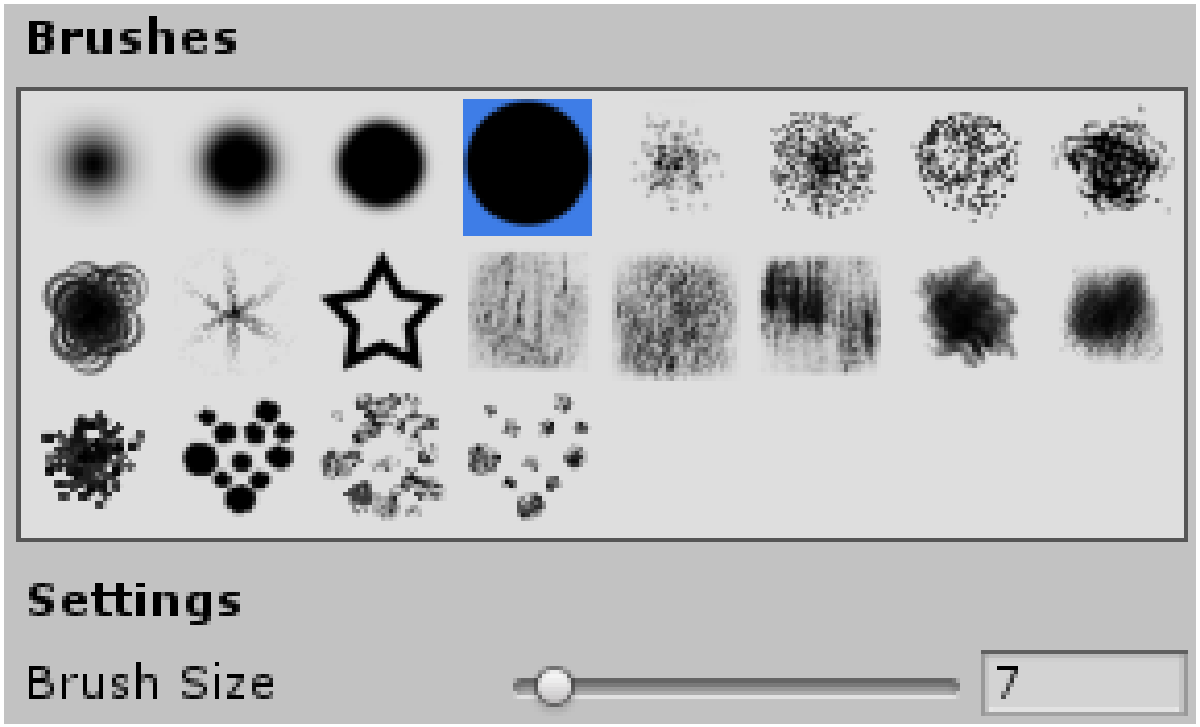
1.  raise / lower tool
2. paint height tool
3. smooth height tool

Create terrain

Sculpting with Raise/Lower tool

The **Raise/Lower** tool, just as it sounds, enables us to raise or lower the terrain wherever we paint.

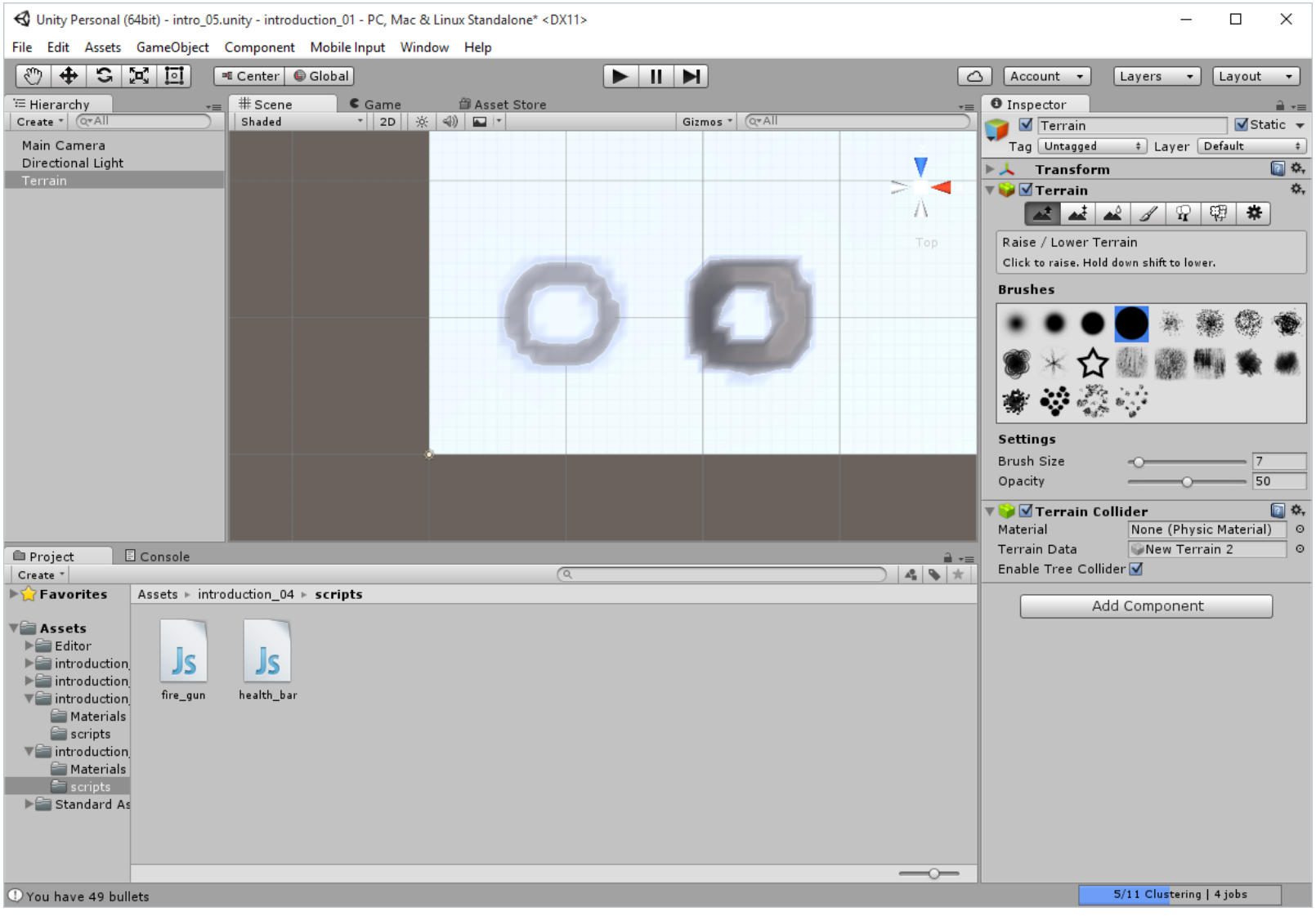
1. Select a simple circle brush and set its size to 7. Brushes determine the size and shape of the sculpting effect.



2. Choose a brush size and opacity. The opacity determines how strong the sculpting effect is.
3. Click and drag over the terrain in the **Scene** view to raise the terrain. Holding **Shift** when you click and drag will instead lower the terrain.

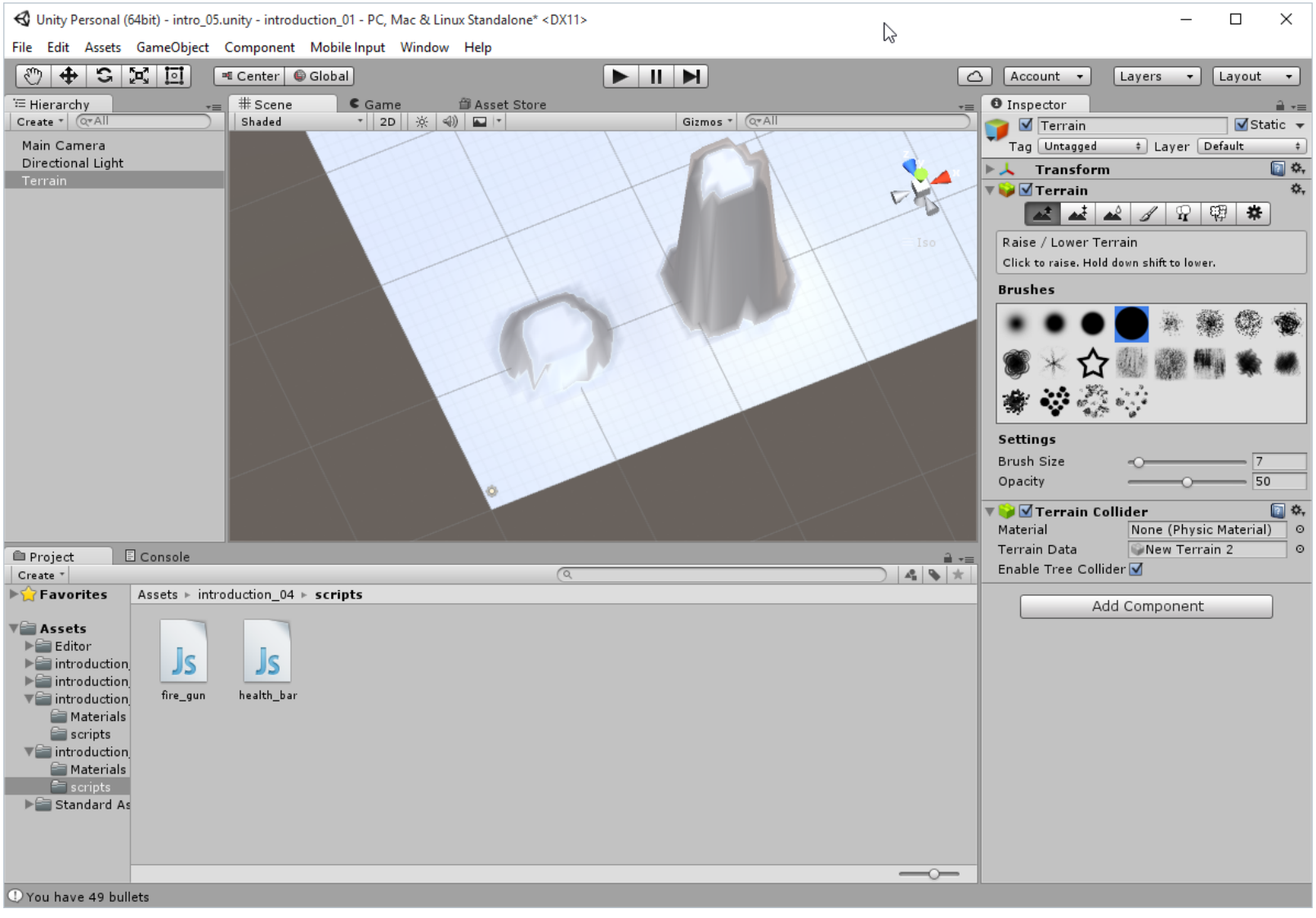
Create terrain

Sculpting with Raise/Lower tool



Create terrain

Sculpting with Raise/Lower tool

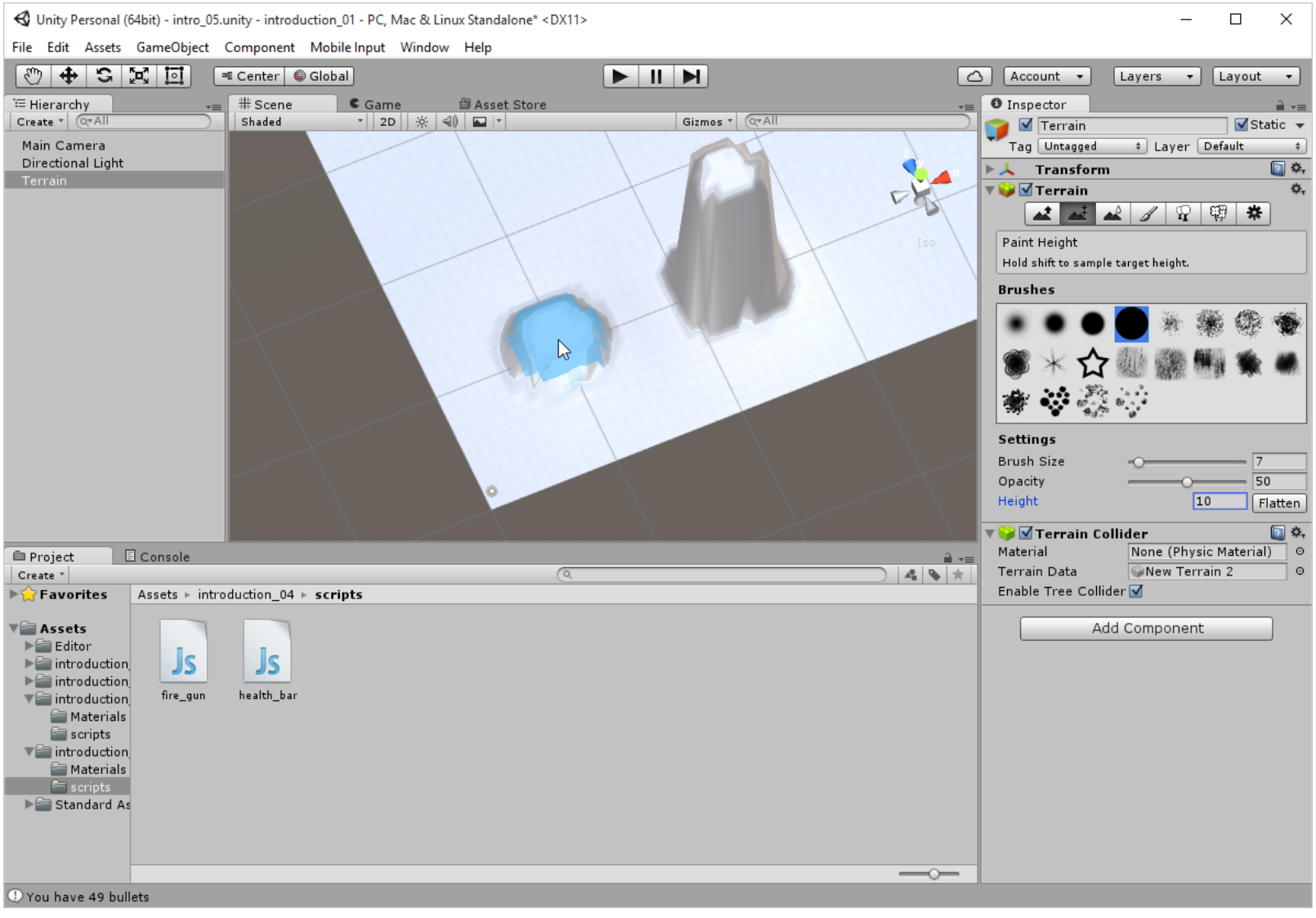


The **Paint Height** tool works almost exactly as the **Raise/Lower** tool except that it paints a terrain to a specified height. If the specified height is higher than the current terrain, painting raises the terrain. If the specified height is lower than the current terrain, however, the terrain is lowered.

1. Set **Height** to 10 and click several times on lower peak. It should rise to a certain height but no higher.
2. Click several times on higher peak. It should decrease to a certain heigh but no lower.

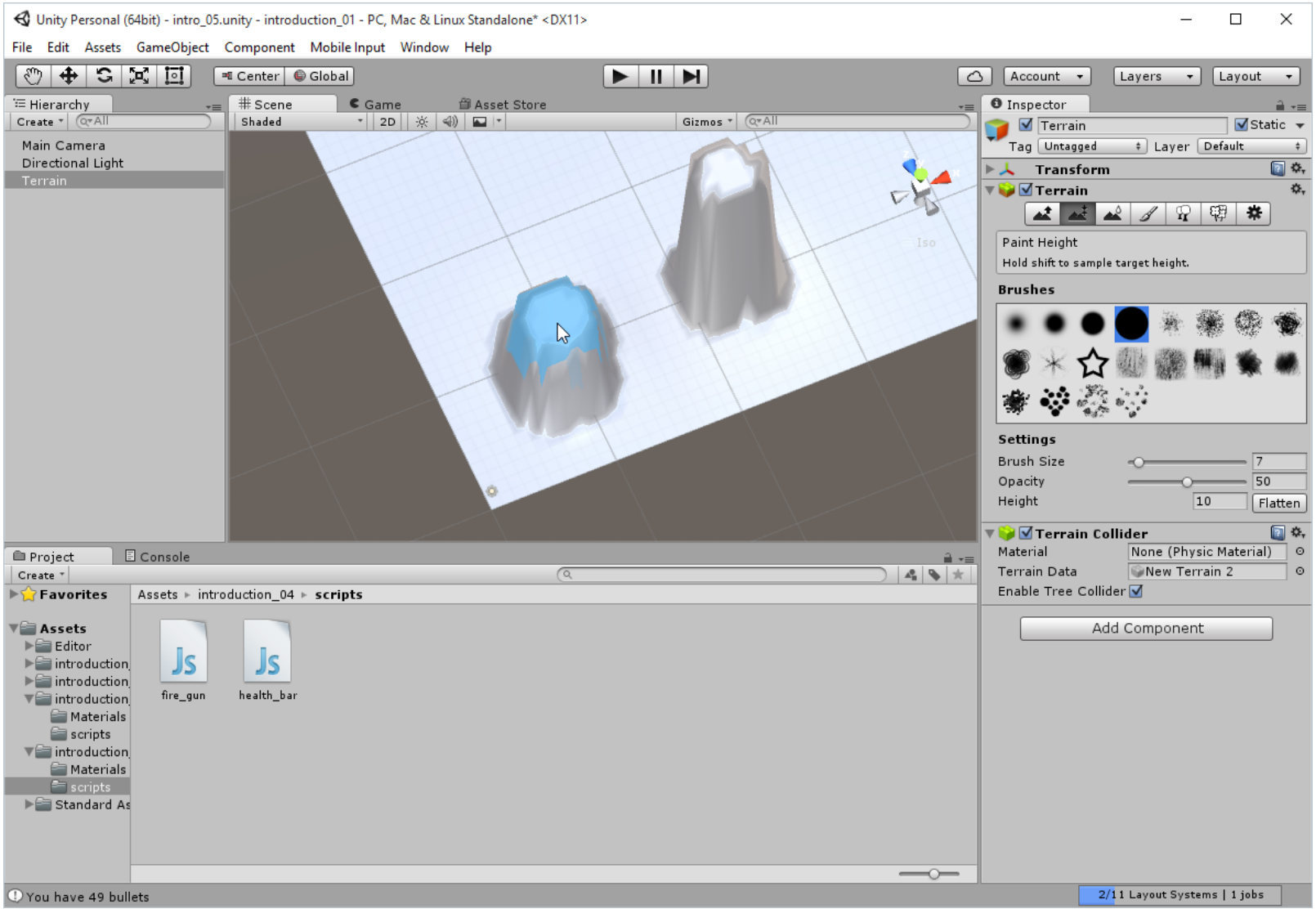
Create terrain

Sculpting with Paint Height tool



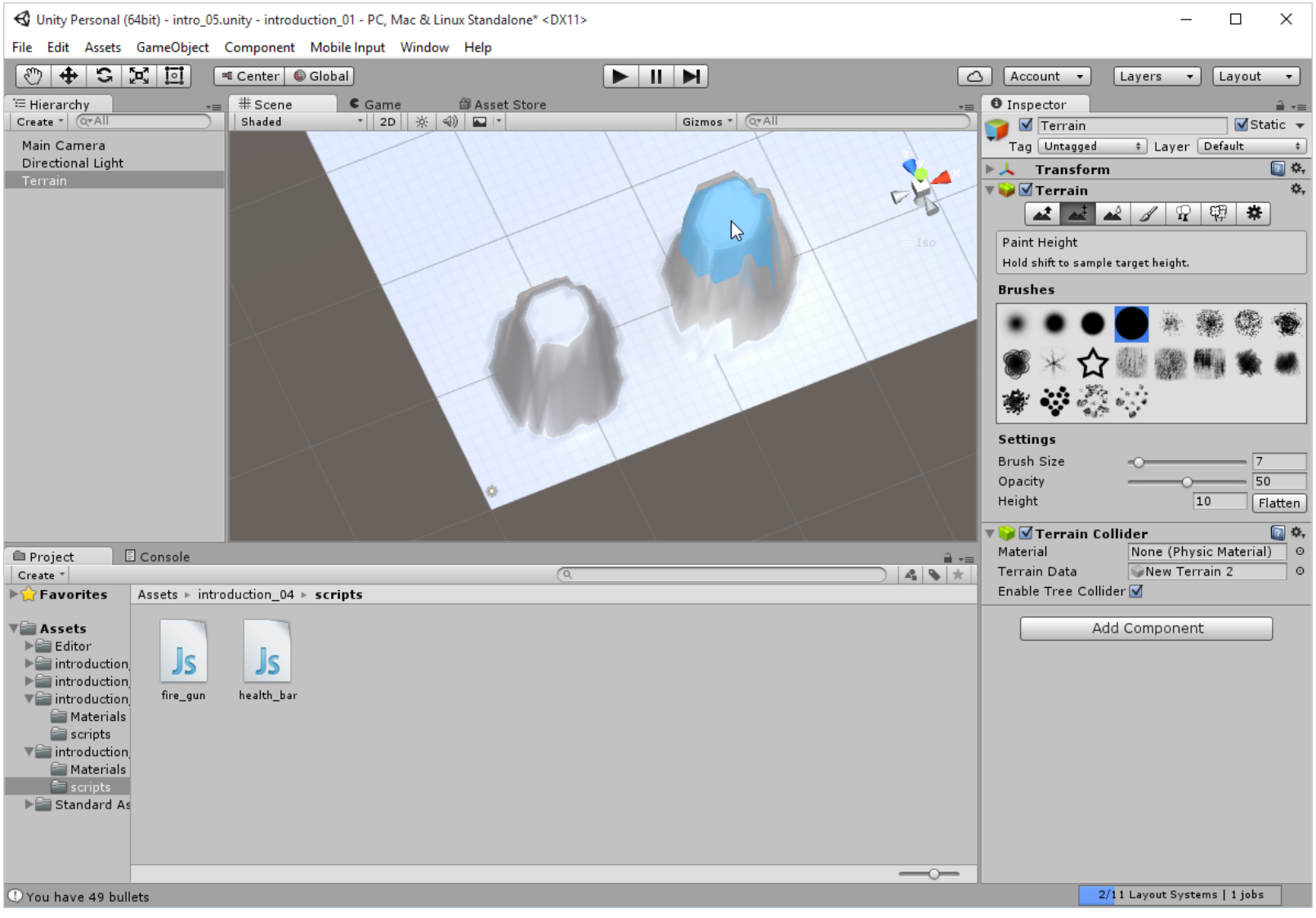
Create terrain

Sculpting with Paint Height tool



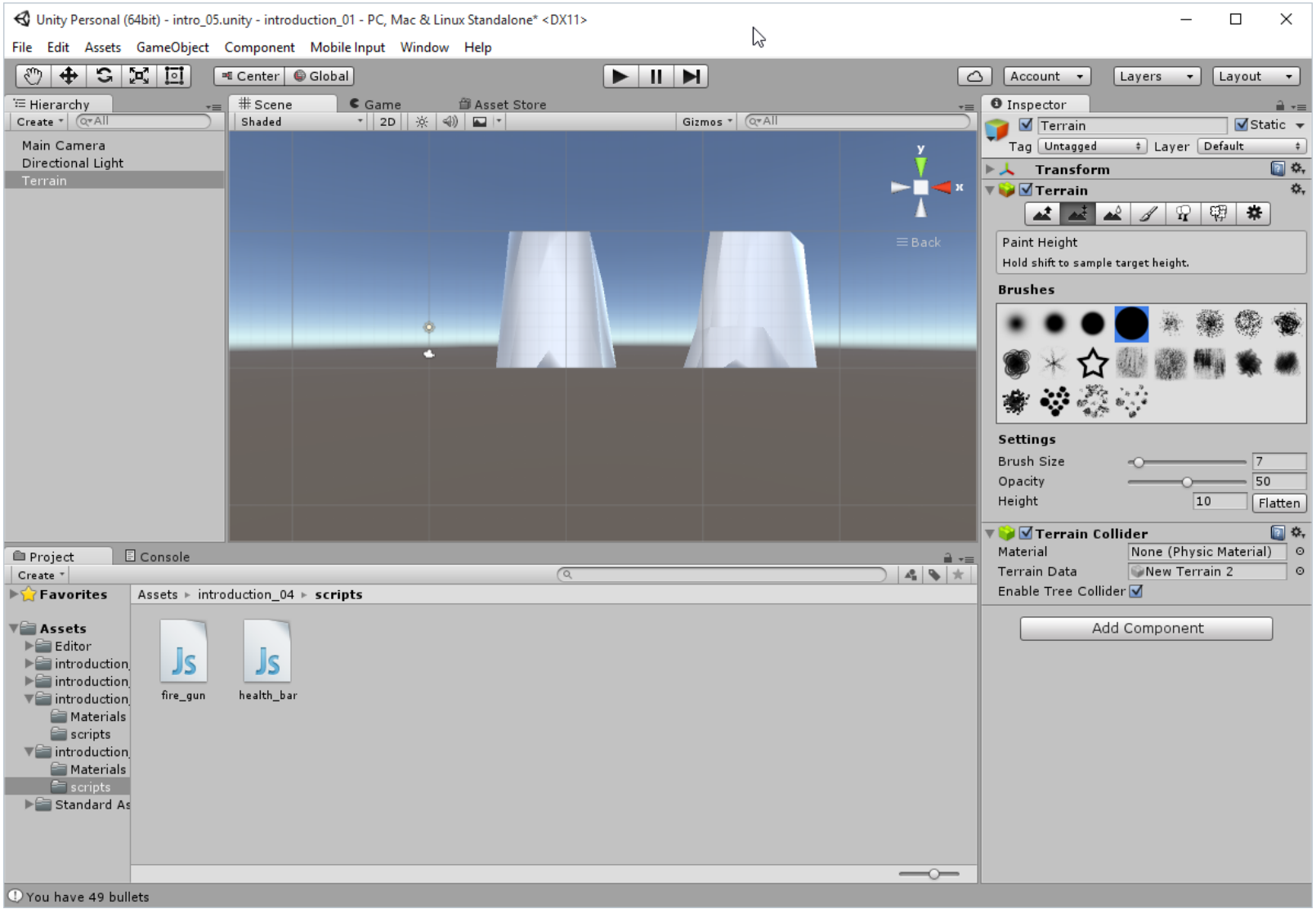
Create terrain

Sculpting with Paint Height tool



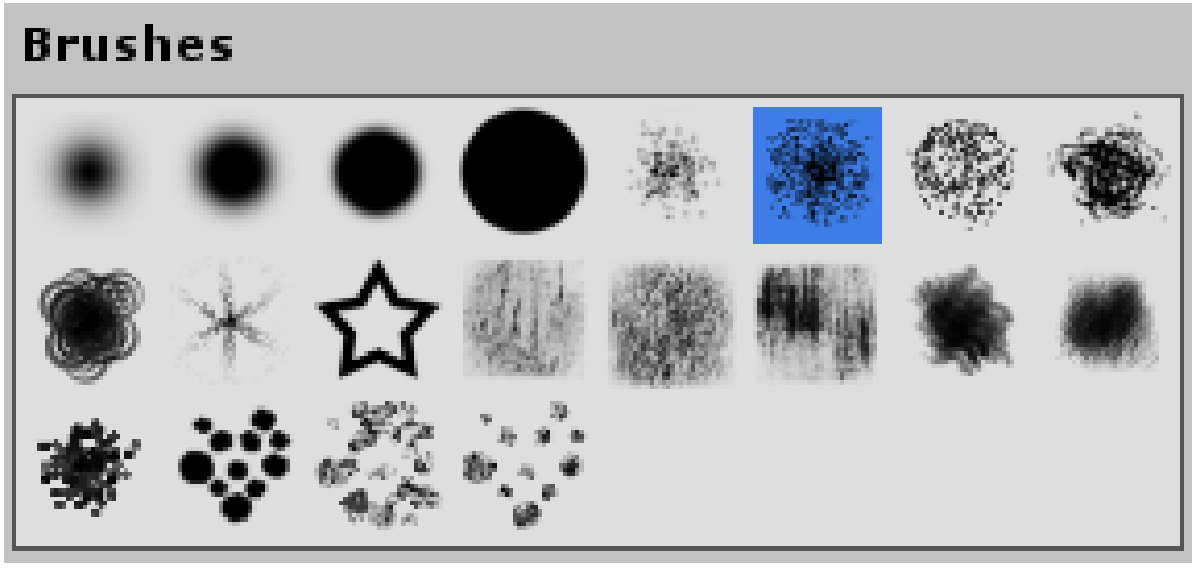
Create terrain

Sculpting with Paint Height tool



The **Smooth Height** tool doesn't alter the terrain in highly noticeable ways. Instead, it removes a lot of the jagged lines that appear when sculpting terrain. Think of this tool as a polisher.

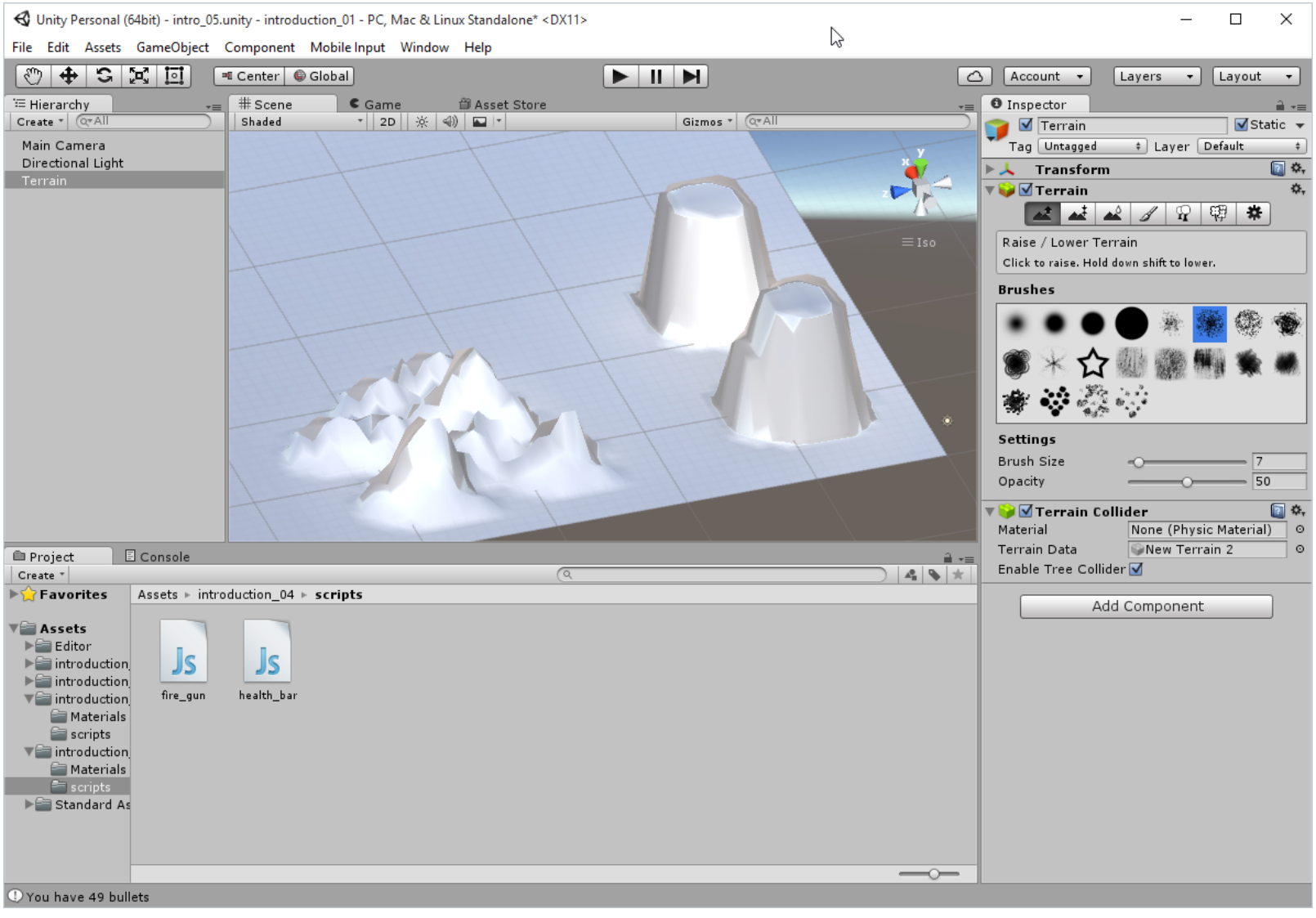
1. Select a frayed brush and set its size to 7.



2. Next change the brush to simple circle and use it with **Smooth Height** tool to smoot the landscape.

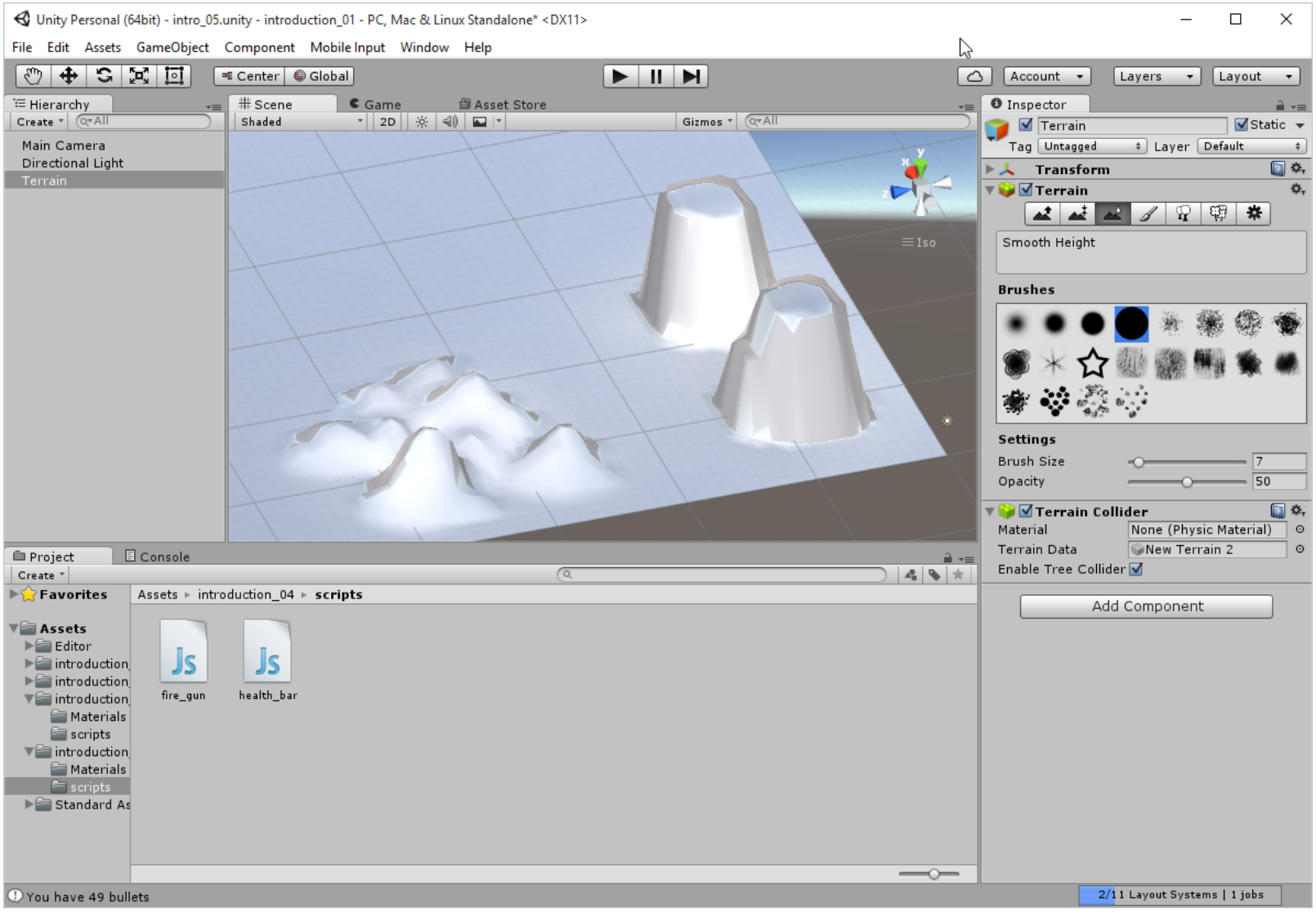
Create terrain

Sculpting with Smooth Height tool



Create terrain

Sculpting with Smooth Height tool



Create terrain

Sculpting: task

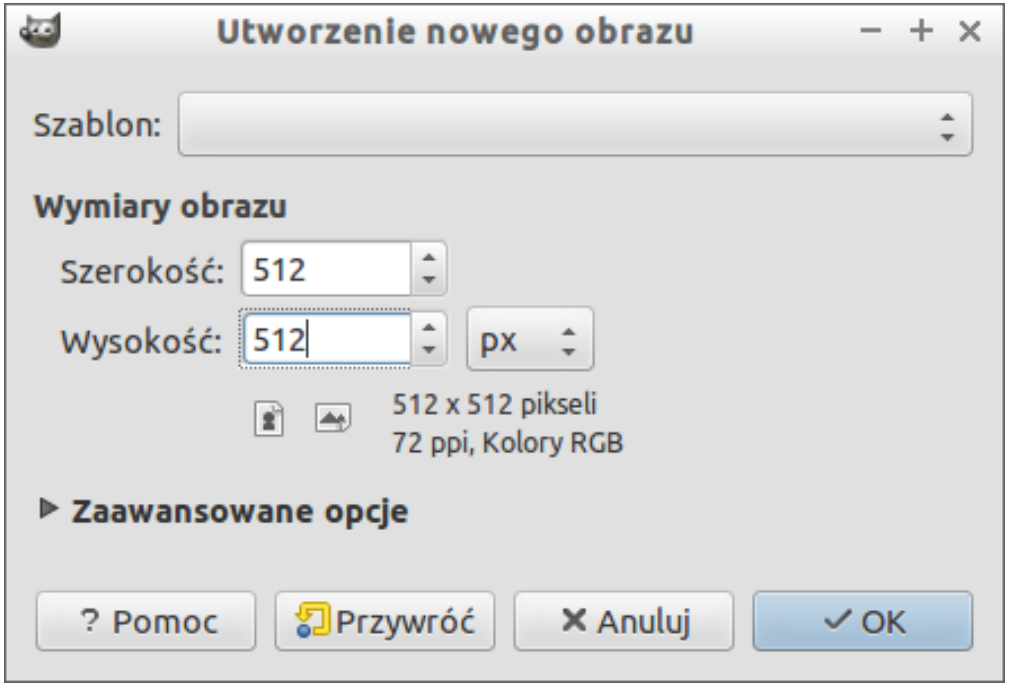
1. Create a new project or scene, add a terrain and save as `task_05_01`. Set the resolution of the terrain to 50 x 50 and give it a height of 50 (or choose other values if you prefer).
2. Flatten the terrain to a height of 25 by clicking the **Paint Height** tool, changing the height to 20, and clicking **Flatten** button.
3. Use the sculpting tools and create your own landscape.

In some sense, heightmaps work in the same way as brushes. The engine interprets the grayscale colors as elevation data and applies it to the terrain. They can be easily created with any application that supports exporting in the `.raw` format.

1. Use **Photoshop** to create grayscale (that is with 256 shades of gray) image of your landscape as it would be seen from the top. The darker shades can be thought of as low points, and the lighter shades are high points.

Create terrain

Creating the terrain using heightmaps



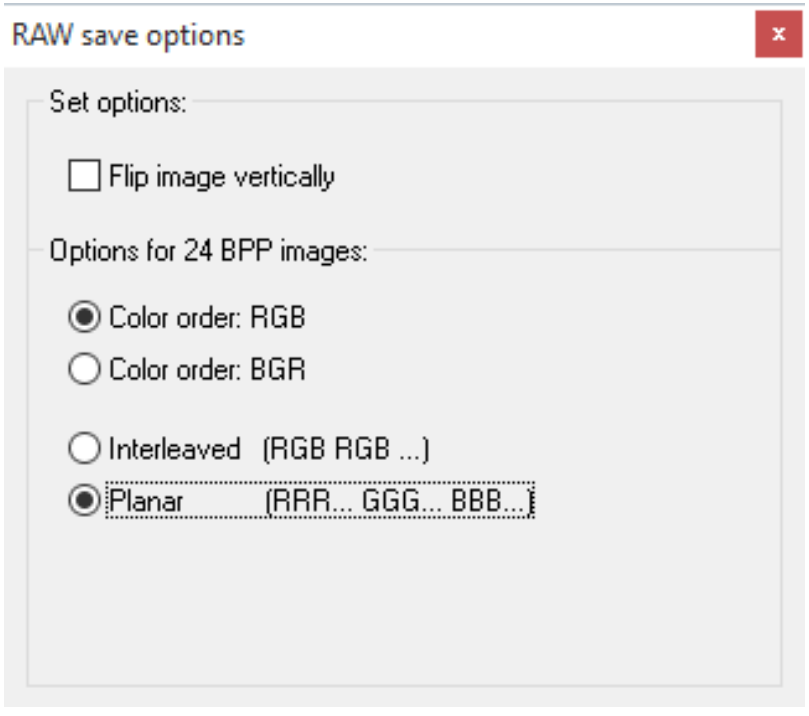
Create terrain

Creating the terrain using heightmaps

I was unable to create heightmaps with software other than Photoshop. Maybe the following link could be used as a good replacement for this

- `http://forum.unity3d.com/threads/png-or-png-to-raw.156450/`
- `http://wiki.unity3d.com/index.php?title=HeightmapFromTexture`

Another solution is to use any graphical software which is able to save file as `.png` Next **IrfanView**[1] with plugin **formats**[2] can be used to export `.png` to `.raw` format with the follwing settings



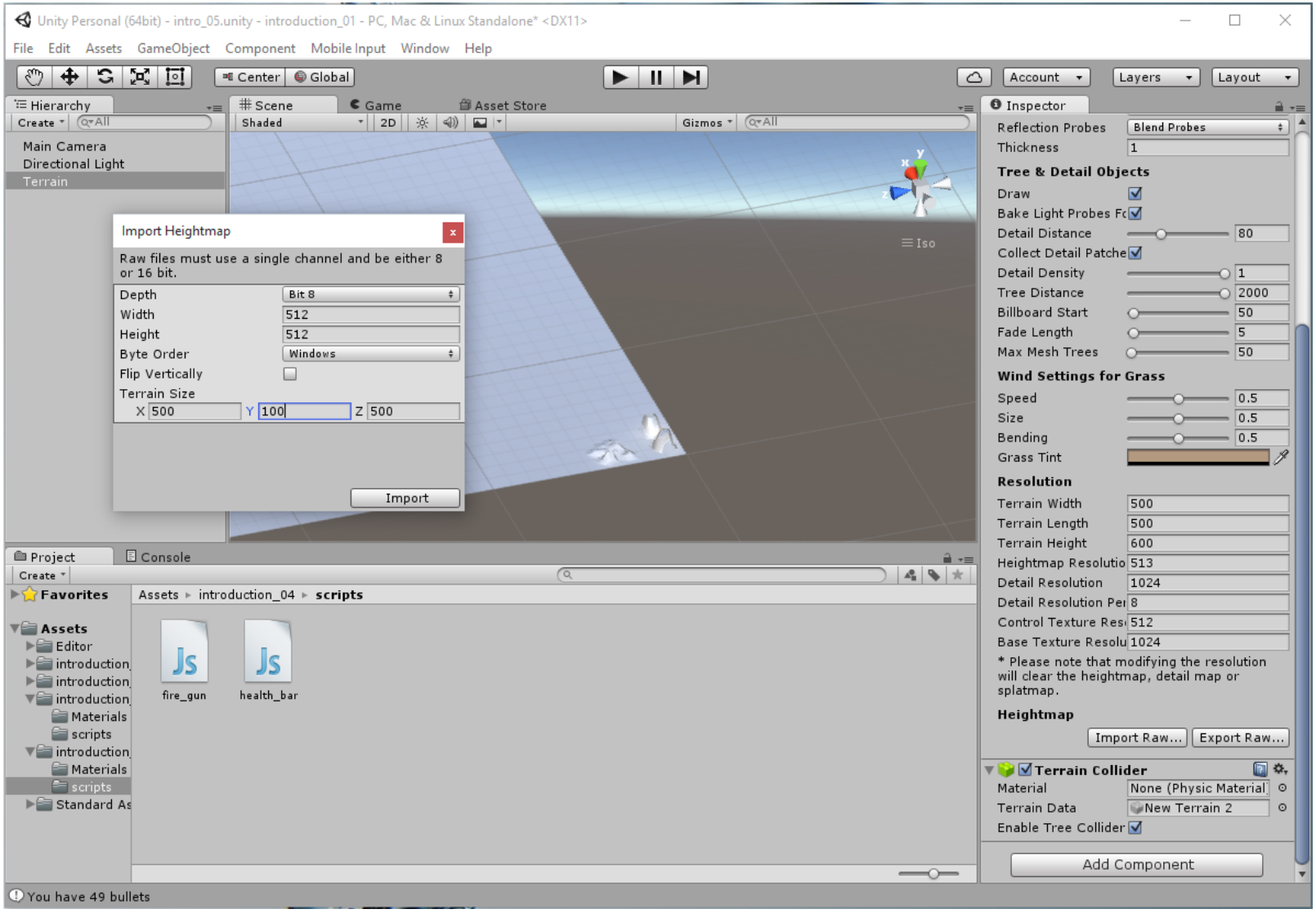
[1] `http://www.irfanview.com/`

[2] Plugin install is quite easy: it is enough to download plugin package (`.exe` file) and run it.

- With your terrain selected in the **Hierarchy** view, click the **Terrain Settings** button. In the **Heightmap** section, click **Import Raw**.
- The **Import Raw Heightmap** dialog will open. Locate your `.raw` file and click **Open**.
- The **Import Heightmap** dialog will open. Set the options as it is shown on next slide. **Width** and **Height** should be set to values corresponding to the dimension of the image you have prepared.
- If it is needed, change the terrain resolution and / or the height value by going back to the **Resolution** section in the **Terrain Settings** in the **Inspector** view.

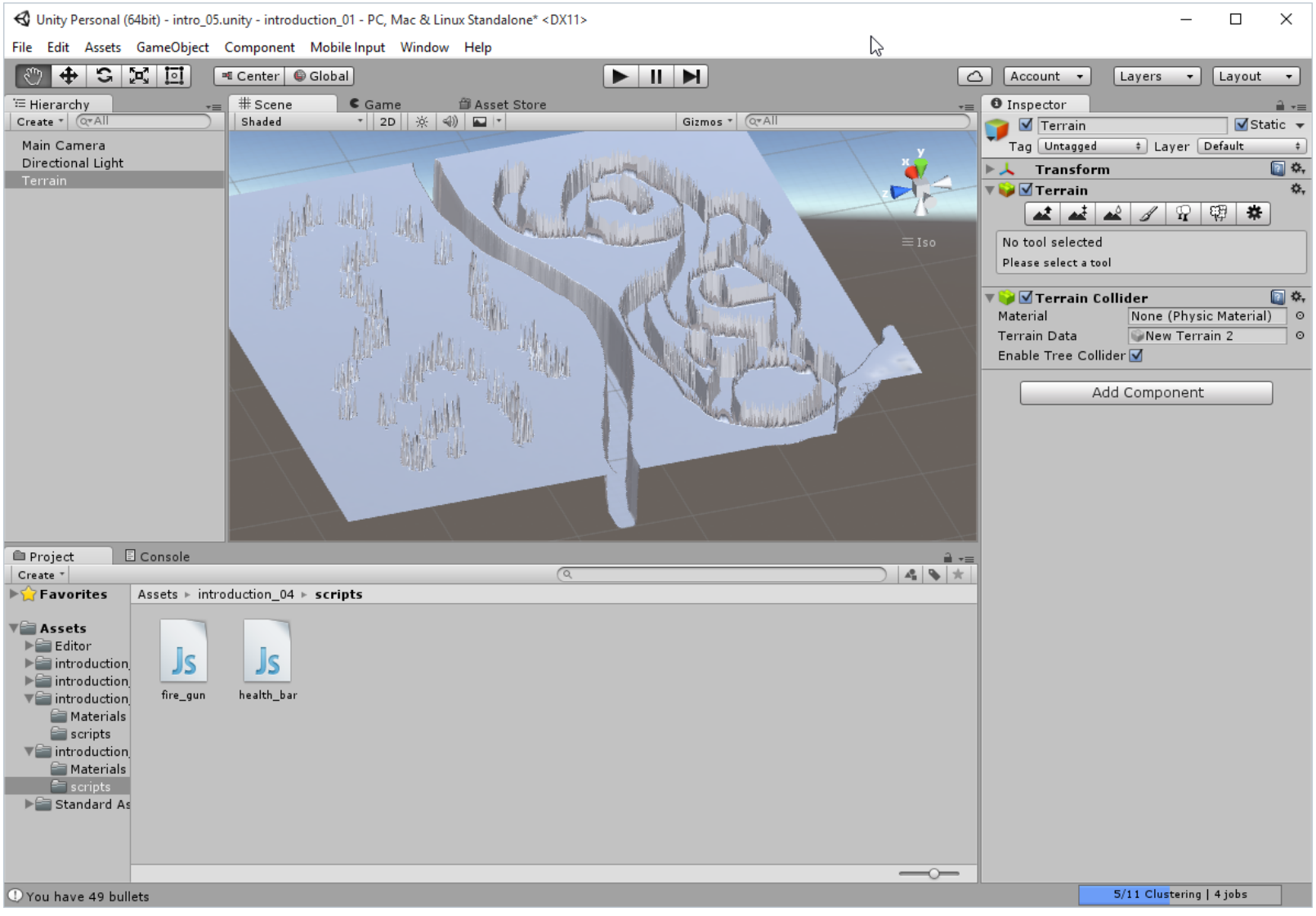
Create terrain

Creating the terrain using heightmaps



Create terrain

Creating the terrain using heightmaps

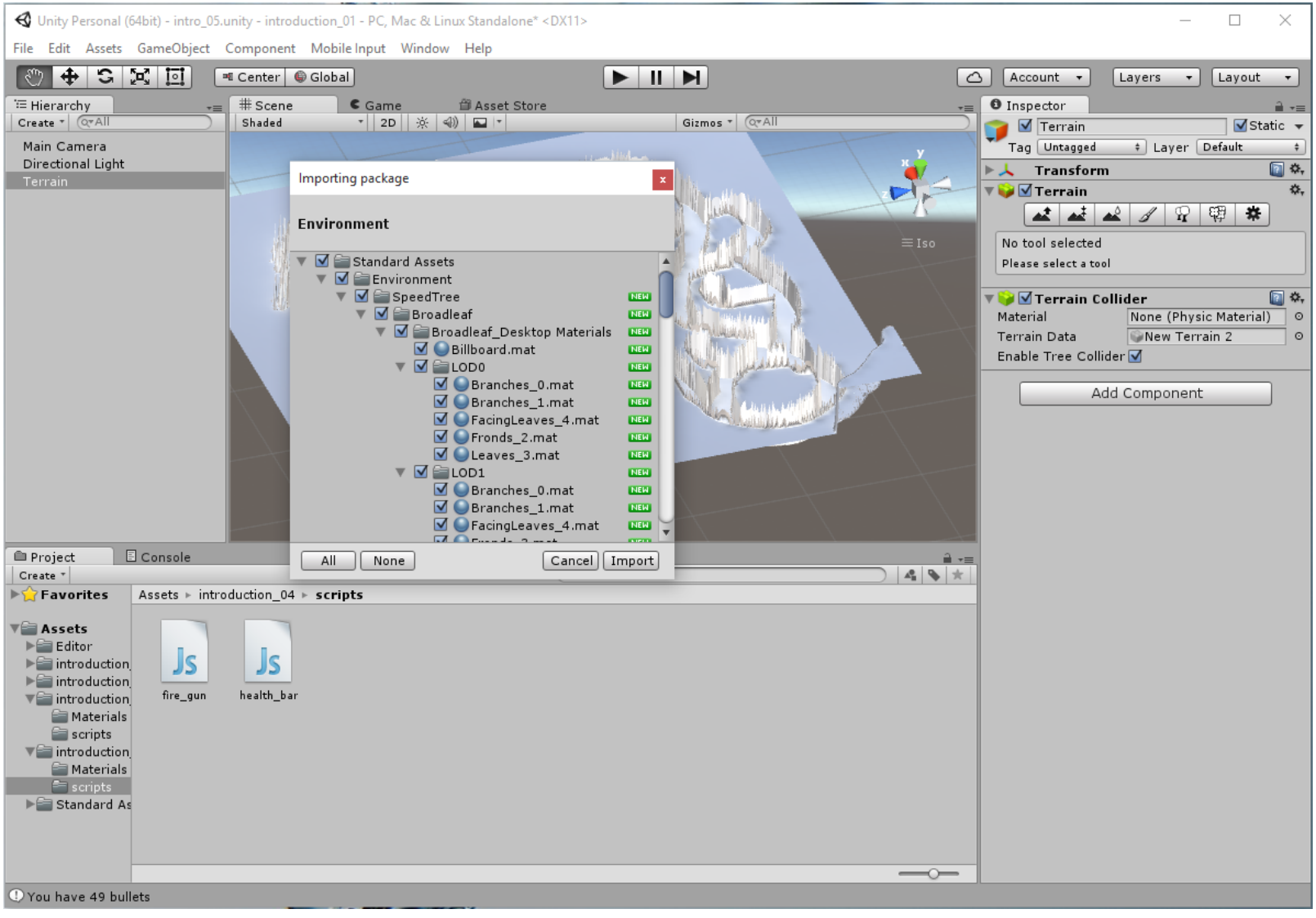


- Go to **Assets | Import Package | Environment**.
- Click on **Import**.

This will import some textures for the terrain and tree models that we will use in the future.

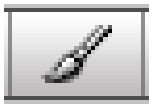
The terrain texture

Importing textures



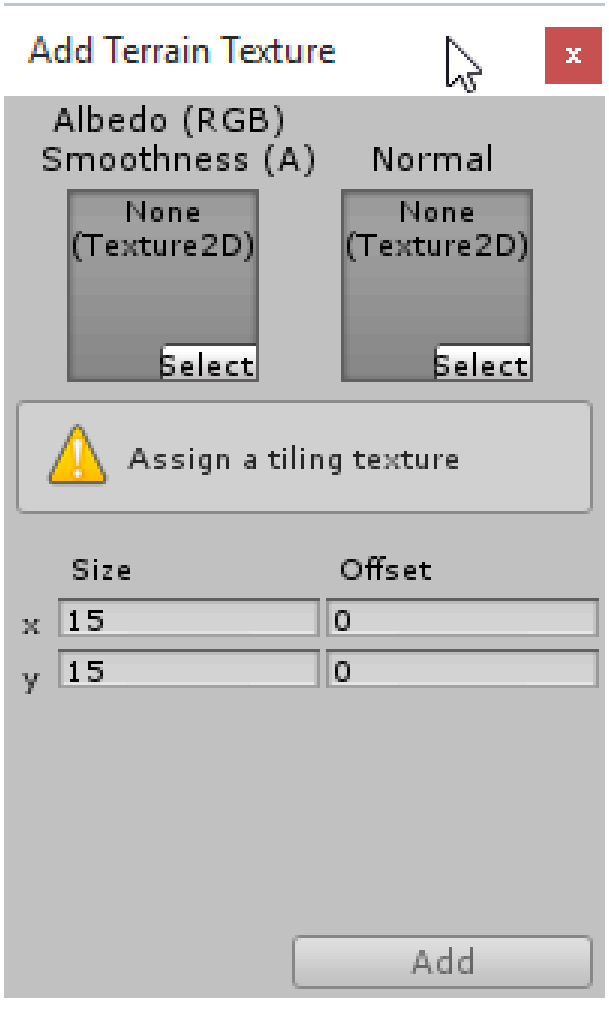
The terrain texturing procedure is very simple and works a lot like the sculpting.

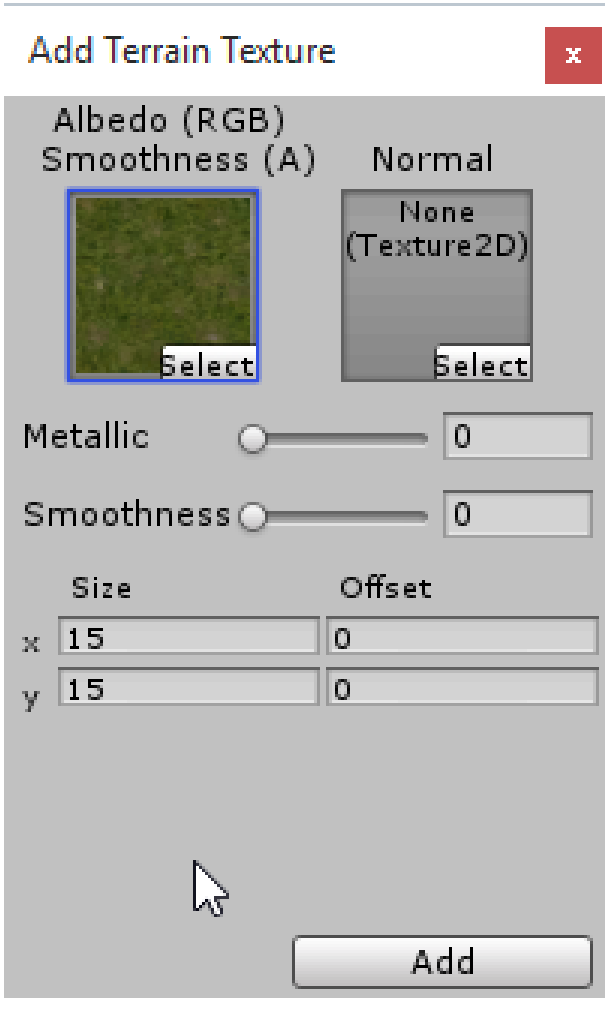
1. The first thing is to swich to **Paint Texture** tool



2. Next we should load a texture.
    1. Click **Edit Textures | Add Texture**.
    2. The **Add Terrain Texture** dialog will appear. Click in the box for **Albedo** parameter and select the **GrassHillAlbedo** texture.
    3. Click **Add**.

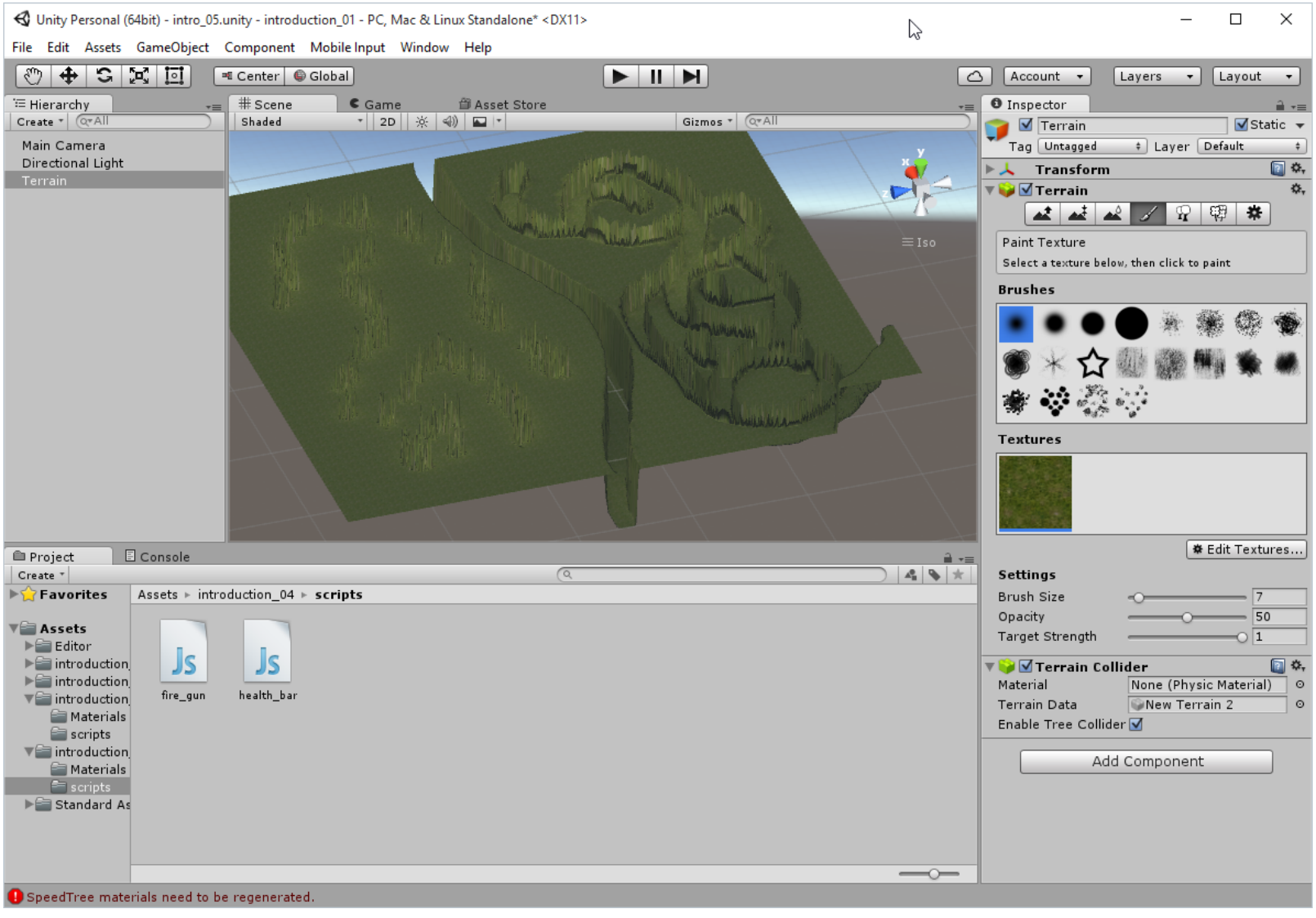
This will import some textures for the terrain and tree models that we will use in the future.


Add Terrain Texture
x
Albedo (RGB)
Smoothness (A)
Normal
None
(Texture2D)
Select
None
(Texture2D)
Select
Assign a tiling texture
Size
Offset
x
15
0
y
15
0
Add


Add Terrain Texture
x
Albedo (RGB)
Smoothness (A)
Normal
Select
None
(Texture2D)
Select
Metallic
0
Smoothness
0
Size
Offset
x
15
0
y
15
0
Add

The terrain texture

Texturing terrain



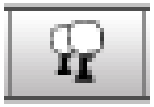
At this point, the entire terrain should be covered in patchy grass. Now, we will actually begin painting and making our terrain look more realistic.

1. Repeat previous steps and add a new texture (different than green grass, for example there should be **GrassRockyAlbedo** texture).
2. Set your brush size to 30, opacity to 20, and target strength to 0.6.
3. Sparingly, paint (click and drag) on the steep parts and crevices of your terrain. This gives the impression that grass isn't growing on the sides of steep grades and in between hills.
4. Continue experimenting with texture painting. Feel free to load different textures and apply them to obtain more realistic game world.

Adding flora to the level

Paint trees

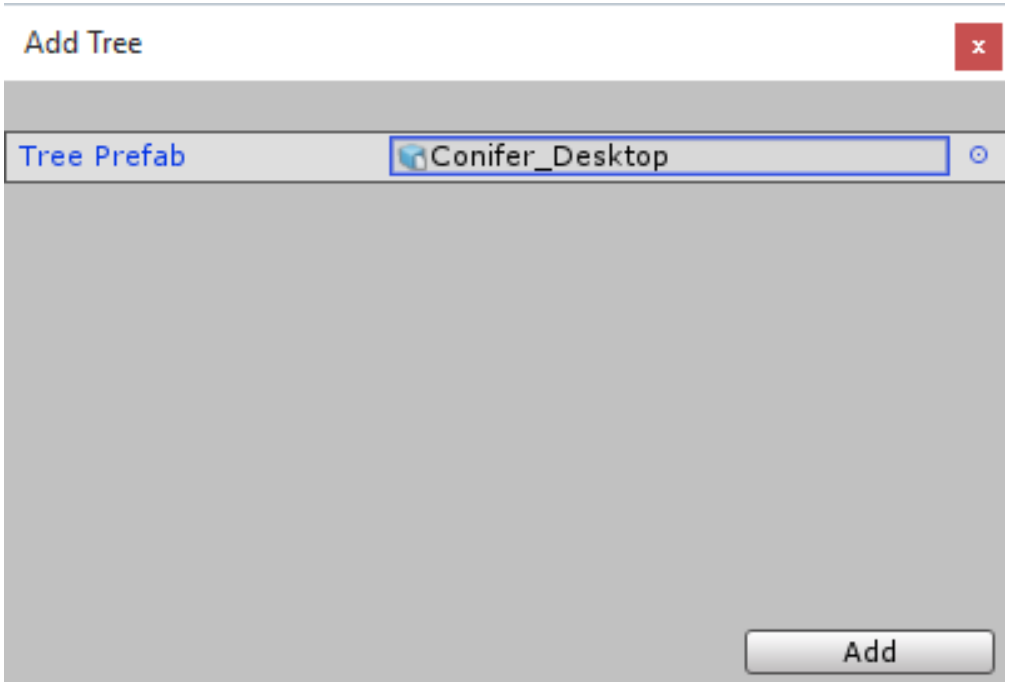
Populating our level with trees and creating forests can be done by using the **Place Trees** tool.



1. Click **Edit Trees** | **Add Tree** to pull up the **Add Tree** dialog.
2. Clicking the circle icon to the right of the **Tree** text box on the **Add Tree** dialog pulls up the **Tree Selector** dialog.
3. Select the **Palm Tree** and click **Add**.
4. Set your brush size to 20, your tree density to 70.
5. Paint trees on the terrain by clicking and dragging over the areas where you want trees. Holding the Shift key while click-dragging removes trees.
6. Continue to experiment with different brush sizes, densities, and other options.

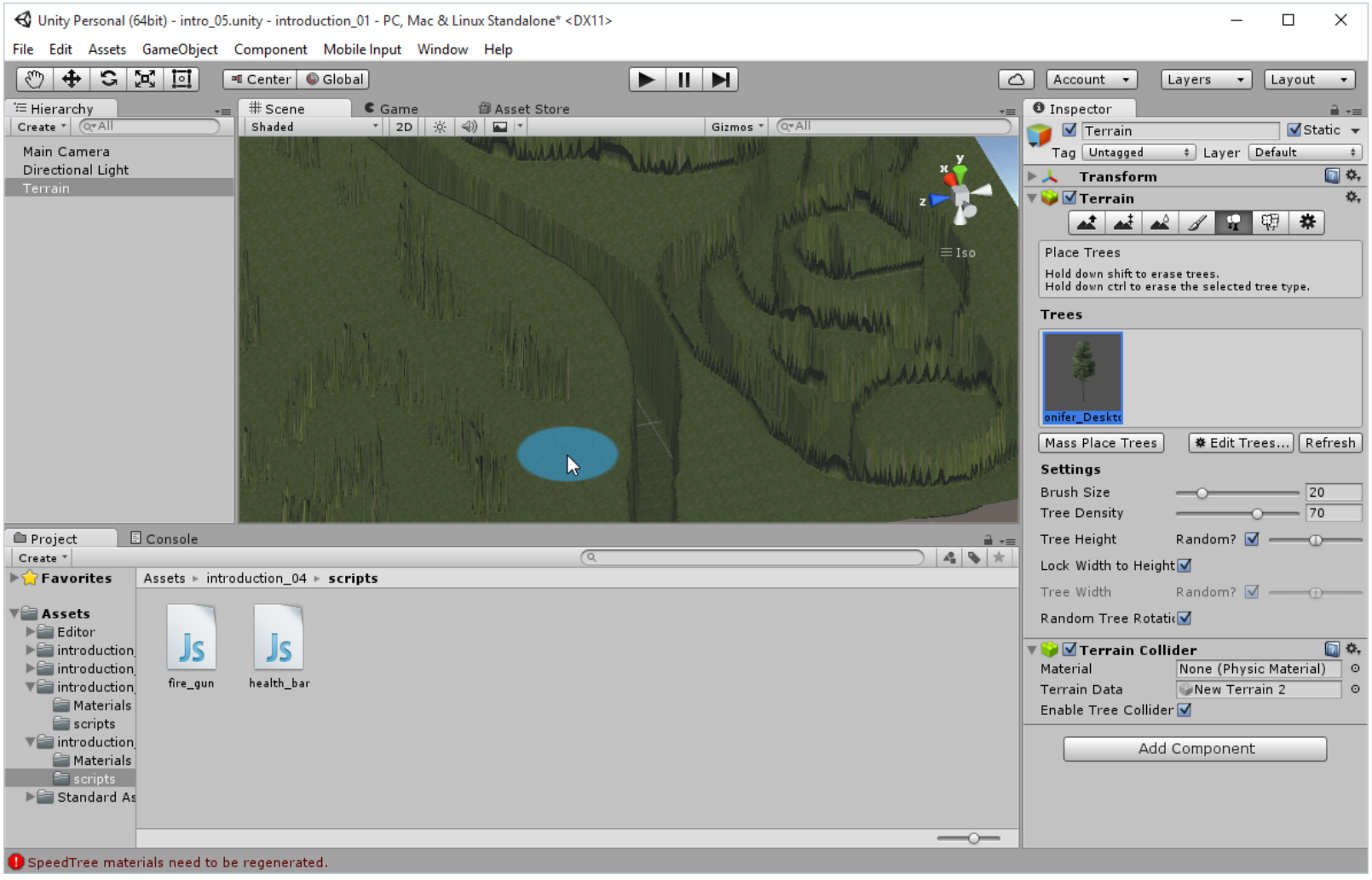
Adding flora to the level

Paint trees



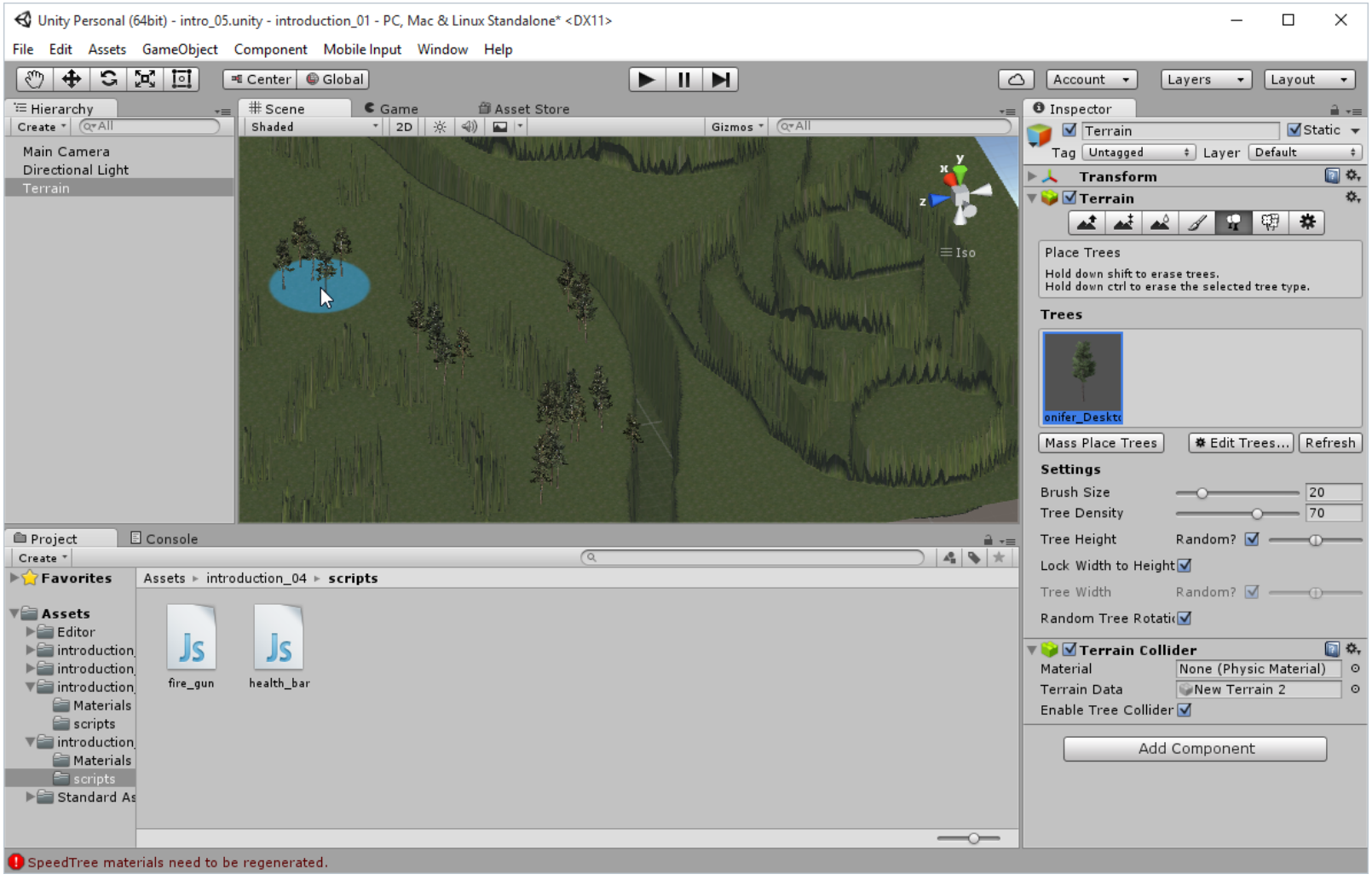
Adding flora to the level

Paint trees

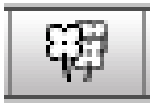


Adding flora to the level

Paint trees



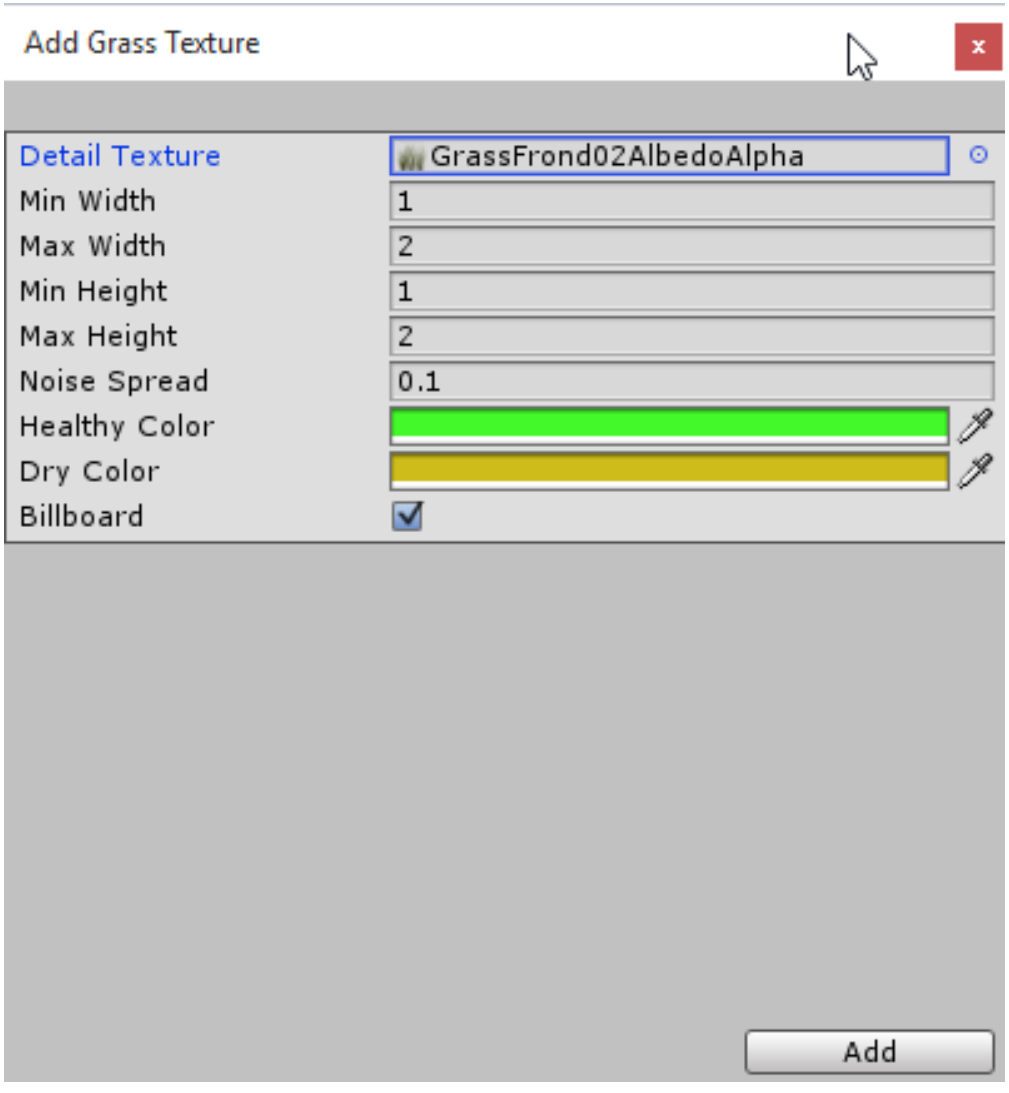
Populating our level with grass can be done by using the **Paint Details** tool.



1. Click **Edit Details** in the **Inspector** view and select **Add Grass Texture**.
2. In the **Add Grass Texture** dialog, click the circle icon next to the **Texture** text box. Select the **GrassFrond01AlbedoAlpha** texture (not the **GrassHillAlbedo** texture, because it is much less „grassy").
3. Set your texture properties to whatever values you want. Pay special attention to the color properties because those establish the range of natural colors for your grass.
4. When done, click **Apply**.
5. After you have your grass loaded, you just need to choose a brush and your brush properties. You are now ready to begin painting grass.

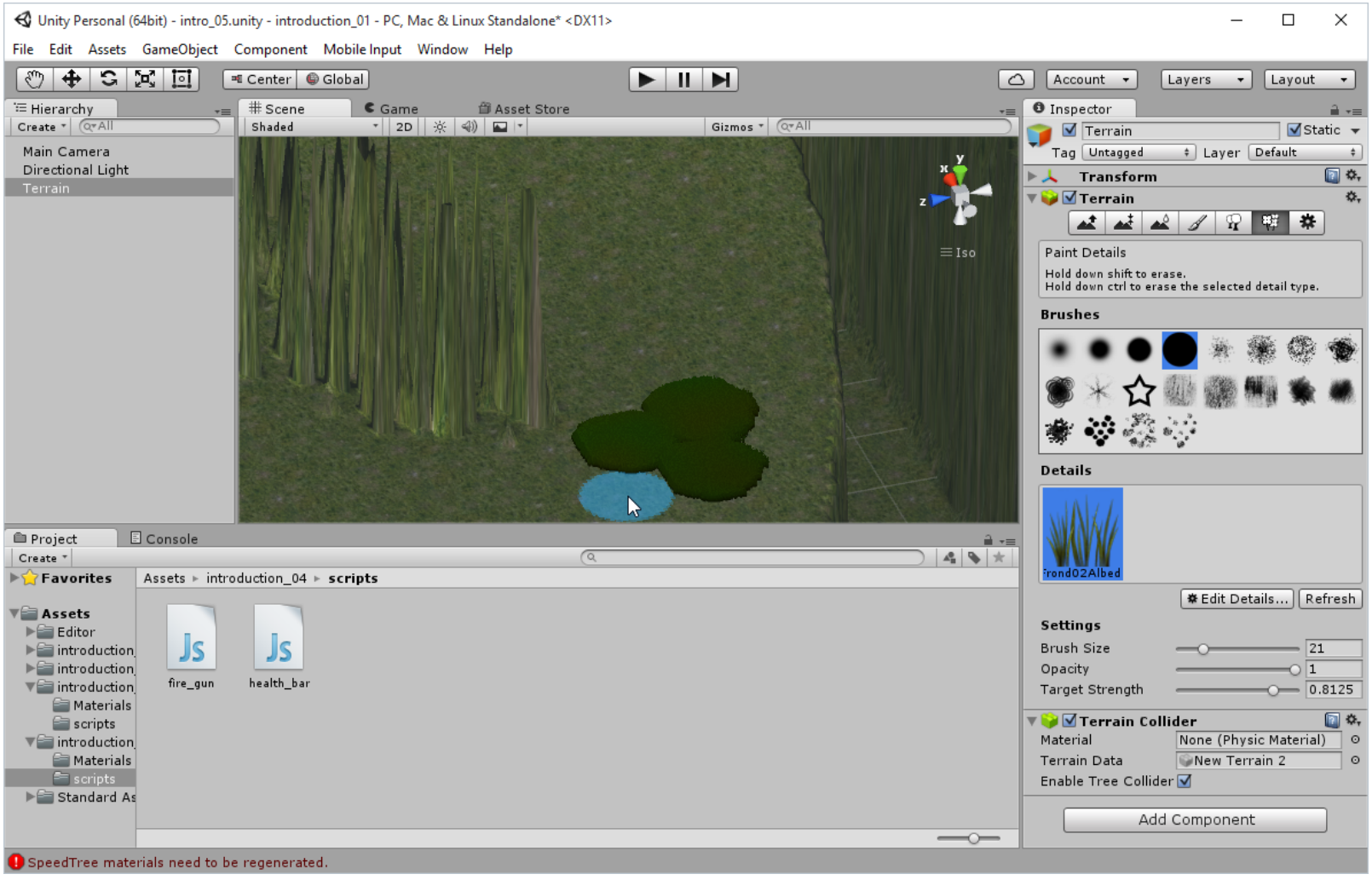
Adding flora to the level

Paint grass



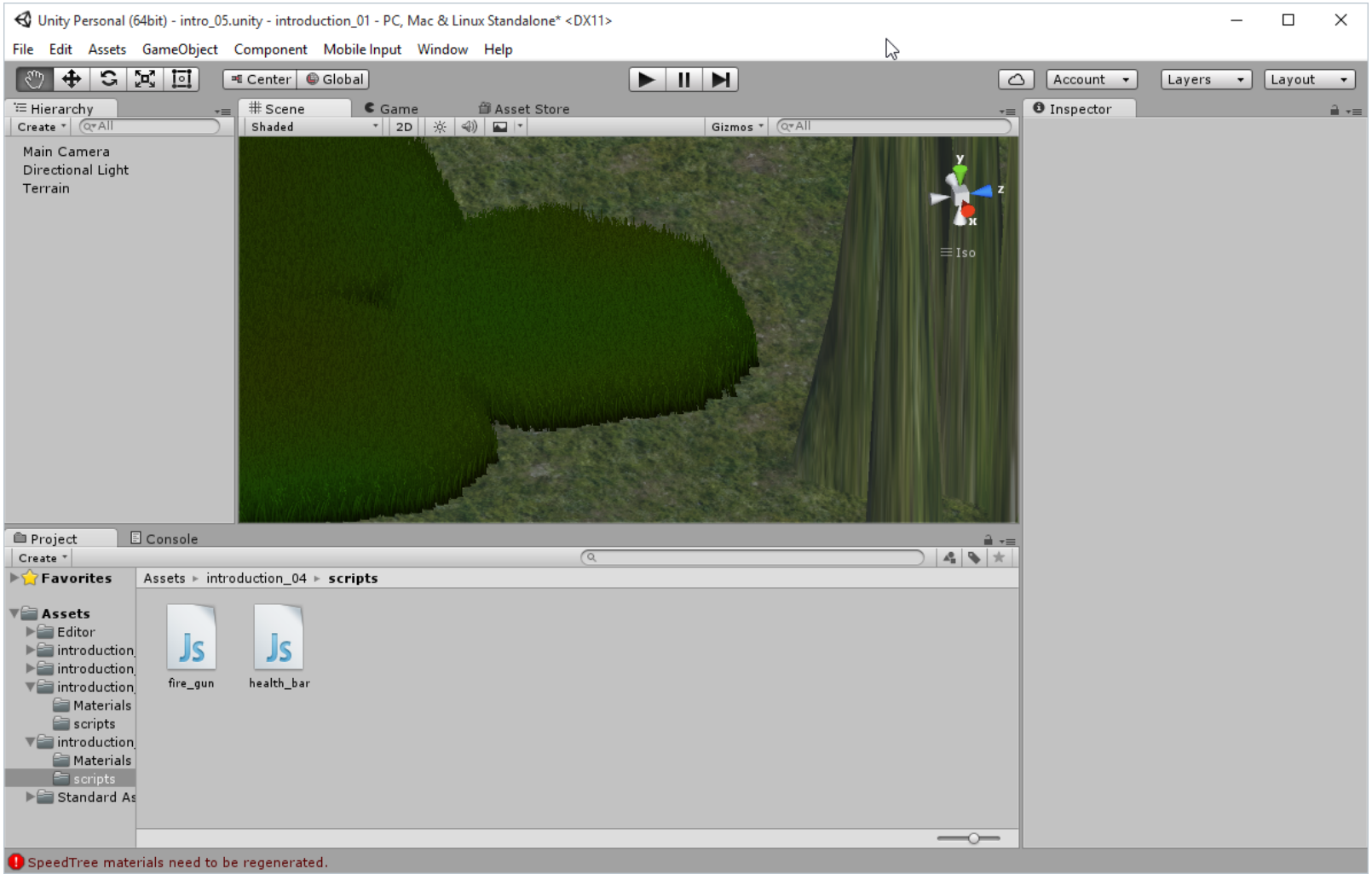
Adding flora to the level

Paint grass



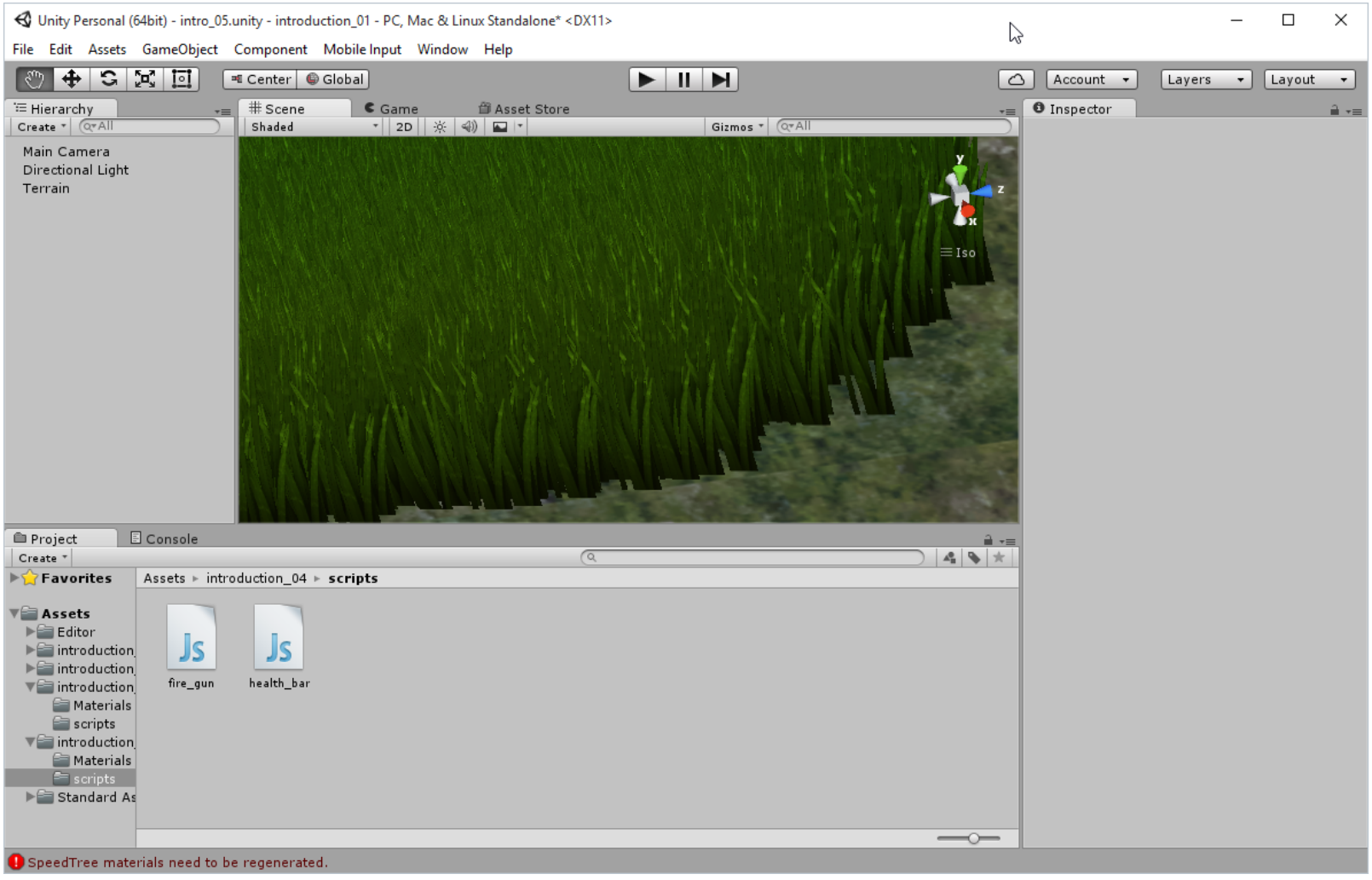
Adding flora to the level

Paint grass



Adding flora to the level

Paint grass



Create terrain with textures, grass etc

Heightmap, sculpting, texturing. . . : task

1. Create a new project or scene and save it as `task_05_02`.
2. Use heightmap, sculpting, texturing etc. to create a game world. Think of this as a previous or next level of our stone game world we made so far.

We can add a skybox to the camera so that whatever the camera sees beyond the game world will be replaced with sky. To add a skybox to the camera, follow these steps:

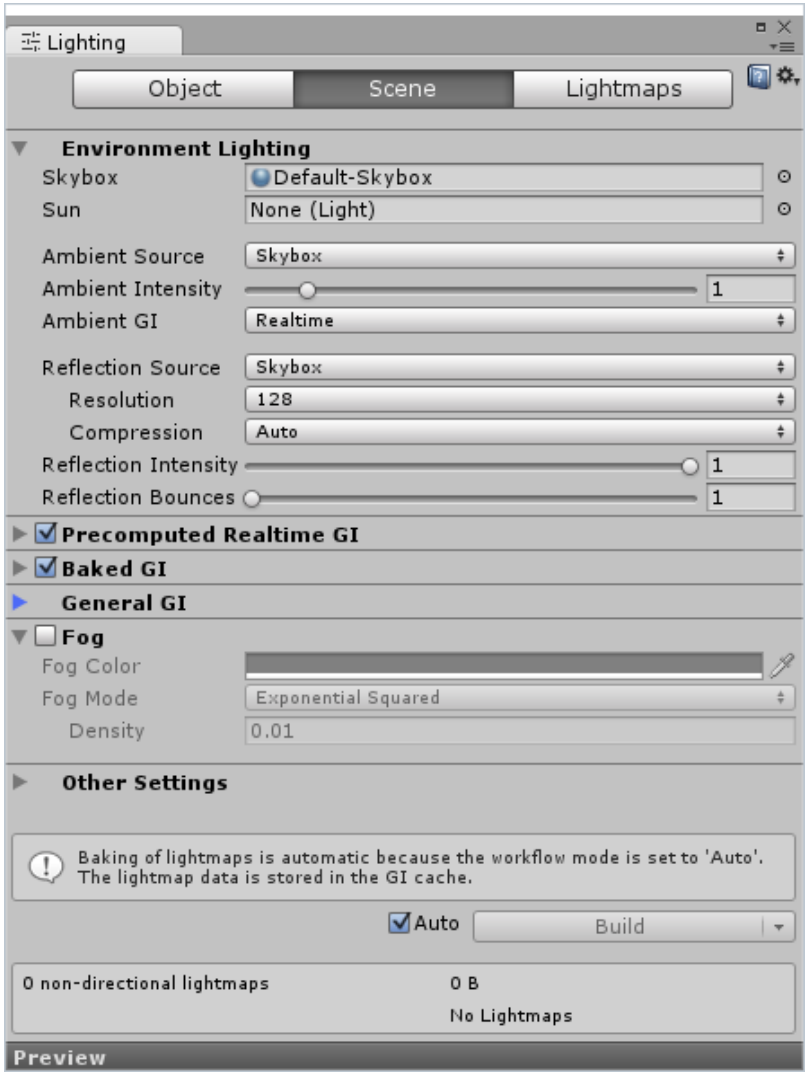
1. Select the **Main Camera** in the **Hierarchy** view.
2. Add a skybox component by clicking **Component** | **Rendering** | **Skybox**.
3. In the **Inspector** view, locate the **Skybox** component and click the circle icon next to the **Custom Skybox** field. In the **Select Material** dialog, select the skybox you prefere.
4. Run your scene to see the skybox applied to the camera.

Note: read this slide but before you try, please see also next 2 slides.

1. Click **Window** | **Lighting** to open the lighting settings for the scene in the **Inspector** view.
2. Select **Scene** tab.
3. Locate the **Skybox** field in the **Envirionment Lighting** section and click the circle icon to the right of it.
4. Choose the skubox you prefere. Notice how the **Scene** view changes to contain the sky.

Environment effects

Skybox: adding a skybox to the scene



- Accessing Render Settings in Unity 5
  https://www.youtube.com/watch?v=zqZT6KOLQxo
- How do I Make a Skybox?
  http://docs.unity3d.com/Manual/HOWTO-UseSkybox.html

1. Click **Window** | **Lighting** to open the lighting settings for the scene in the **Inspector** view.
2. Select **Scene** tab.
3. Locate **Fog** section.
4. Turn on fog by checking the **Fog** check box.
5. Experiment with the different fog densities and colors.

Summary

You should know

- how to sculpte terrain;
- how to use heightmaps to simplyf design process;
- how to texture terrain;
- how to add flora object (like tree or grass).