Unity 3D Basics

Agenda

- Unity 3D Concepts and Vocabulary
- Interface
- Terrains
- Lights
- Textures
- Cameras
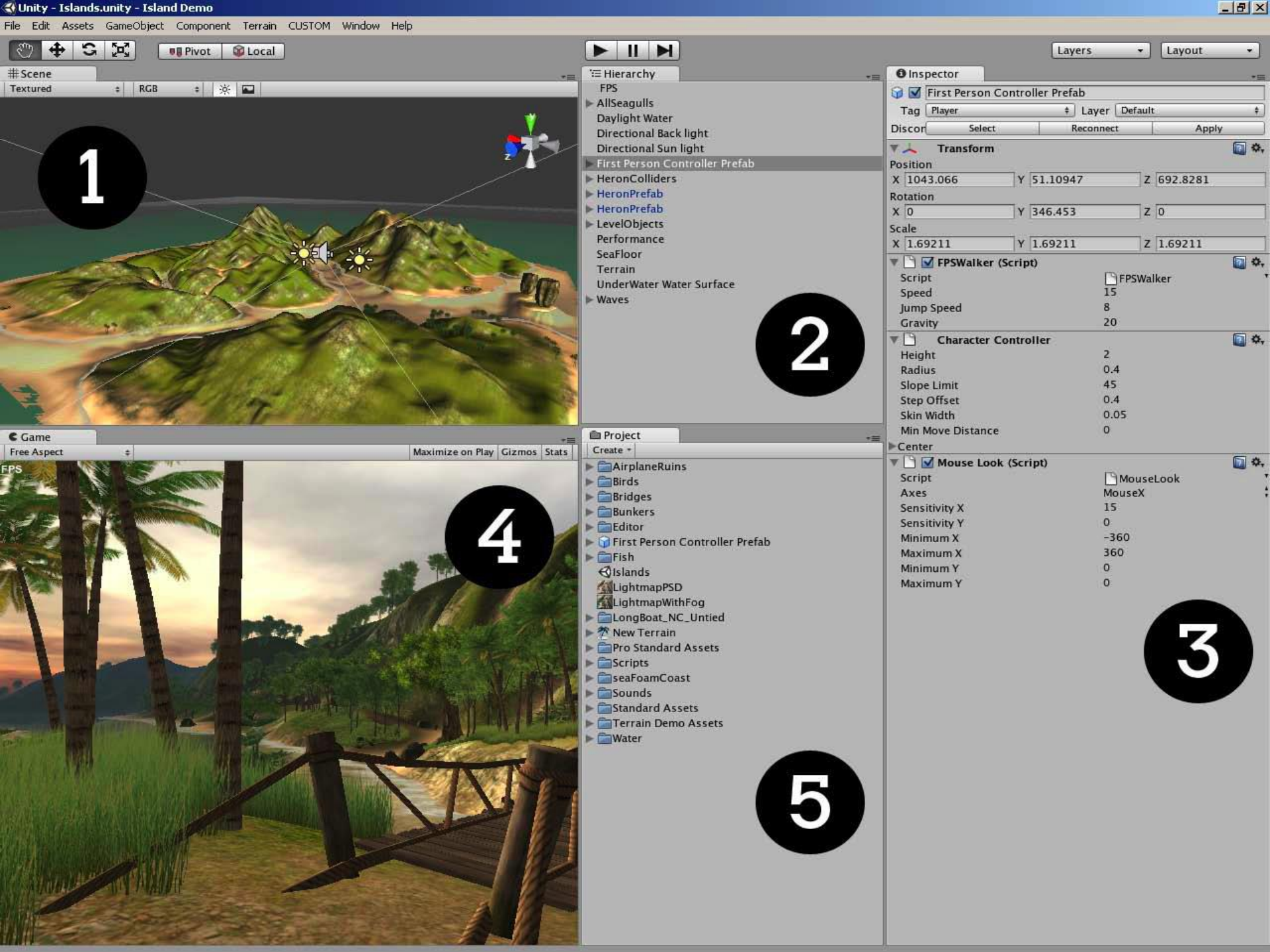- Physics
- Effects
- Skyboxes
- Audio

Unity 3D Concepts

- **Assets** - building blocks of all Unity projects - graphics (textures), models, sound files. The files you use to create the scenario are stored in a folder called Assets

- **Scenes** - scenes are individual levels, areas of game content. Scenes can be loaded on demand.

- **Game Objects** - assets used in the scene become GameObjects (script name) All GameObjects have at least one component - the Transform component.

- **Components** - come in various forms. Attach components to and object to add parts of the game engine to the the component e.g a physics component, or a script component

Unity 3D Concepts

- **Scripts** - components used to add, extend or modify behavior of game objects. Unity uses a Behavior class to facilitate the use of custom behaviours.

- **Prefabs** - prefabricated game objects with stored associated components and configuration. Prefabs allow functional game objects to be reused in scenes (spawned) or imported into other projects as external assets. 'The First Person Controller' is an example of a Prefab

Unity - Islands.unity - Island Demo

File Edit Assets GameObject Component Terrain CUSTOM Window Help

Pivot Local Layers Layout

Scene
Textured RGB

1

Game
Free Aspect Maximize on Play Gizmos Stats
FPS

4

Hierarchy
FPS
AllSeagulls
Daylight Water
Directional Back light
Directional Sun light
First Person Controller Prefab
HeronColliders
HeronPrefab
HeronPrefab
LevelObjects
Performance
SeaFloor
Terrain
UnderWater Water Surface
Waves

2

Project
Create
AirplaneRuins
Birds
Bridges
Bunkers
Editor
First Person Controller Prefab
Fish
Islands
LightmapPSD
LightmapWithFog
LongBoat_NC_Untied
New Terrain
Pro Standard Assets
Scripts
seaFoamCoast
Sounds
Standard Assets
Terrain Demo Assets
Water

5

Inspector
First Person Controller Prefab
Tag Player Layer Default
Discor Select Reconnect Apply

Transform
Position
X 1043.066 Y 51.10947 Z 692.8281
Rotation
X 0 Y 346.453 Z 0
Scale
X 1.69211 Y 1.69211 Z 1.69211

FPSWalker (Script)
Script FPSWalker
Speed 15
Jump Speed 8
Gravity 20

Character Controller
Height 2
Radius 0.4
Slope Limit 45
Step Offset 0.4
Skin Width 0.05
Min Move Distance 0
Center

Mouse Look (Script)
Script MouseLook
Axes MouseX
Sensitivity X 15
Sensitivity Y 0
Minimum X -360
Maximum X 360
Minimum Y 0
Maximum Y 0

3

Interface

- **Scene** [1]—where the game is constructed

- **Hierarchy** [2]—a list of GameObjects in the scene

- **Inspector** [3]—settings for currently selected asset/object

- **Game** [4]—the preview window, active only in play mode

- **Project** [5]—a list of your project's assets, acts as a library

Unity 3D Terrain Editor

- Create terrain by selecting brush type, brush size and opacity and then sculpting topology
- Set maximum height and smooth corners
- Textures loaded to paint texture onto terrain
- First texture acts as background to subsequent
- Paint on trees and other smaller items e.g grass.

Summer School AR VR

Unity 3D Terrain Editor
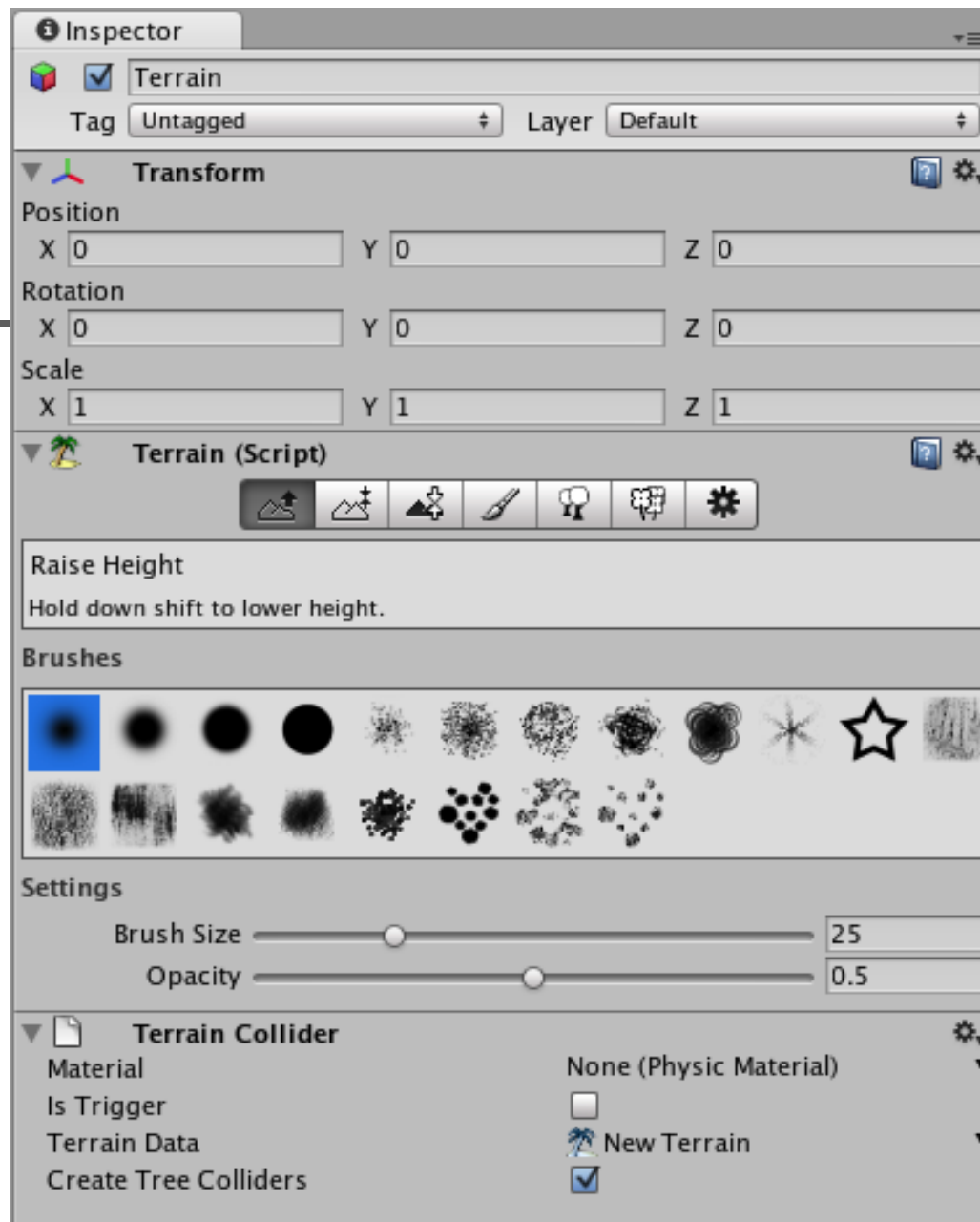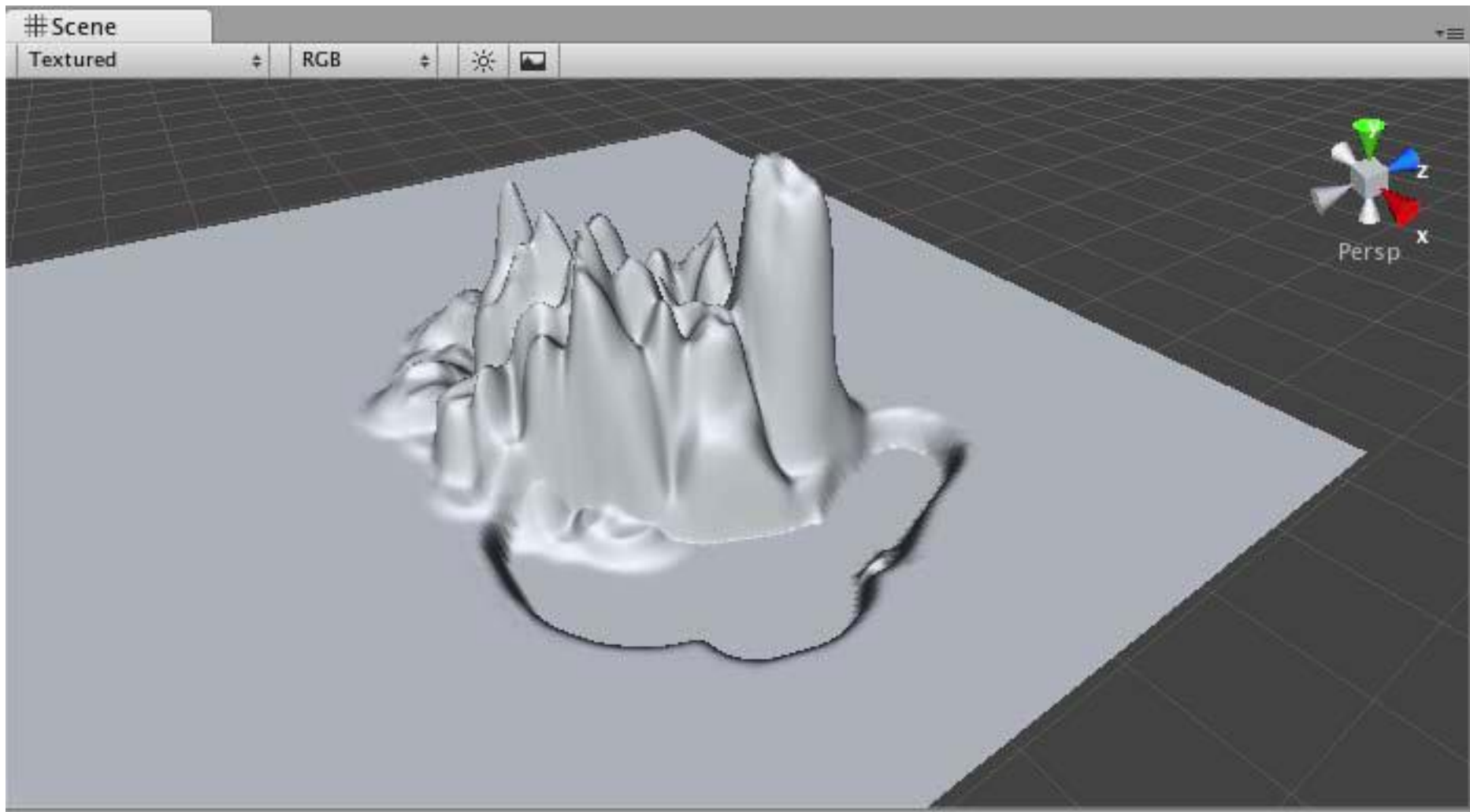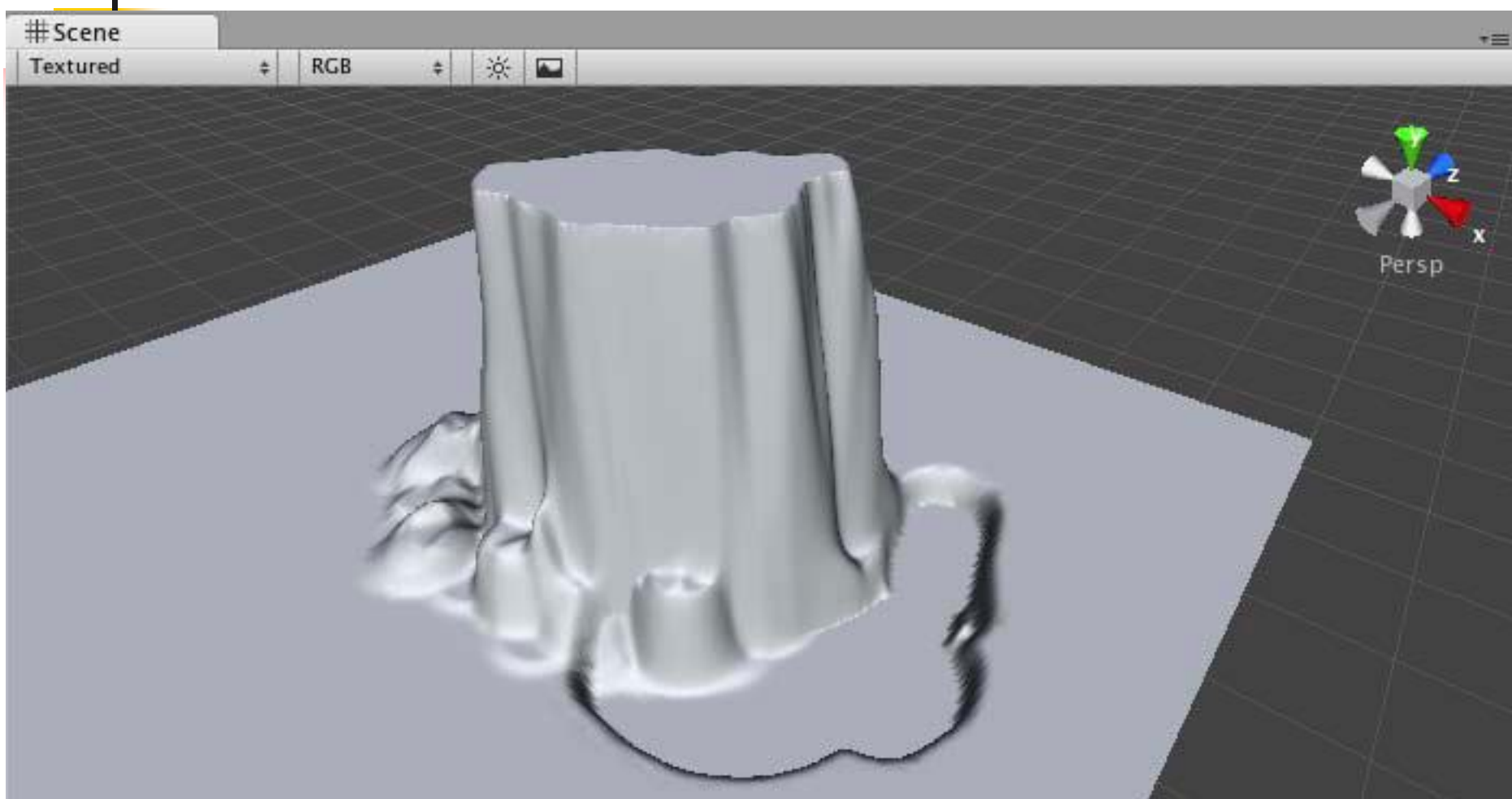
Unity 3D Lights and Cameras

- Lights
  - Directional
  - Point
  - Spot
  - Lights can be parented to other game objects
- Cameras
  - One default camera
  - First Person Controller includes camera
  - Camera acts as an Audio Listener in the scene
  - Remove default camera to only have one Audio Listener
  - Cameras can be parented to other game objects

Unity 3D Textures

- Materials form the basic starting point for textures
- Textures should be in the following format to enable 'tiling'.
    - Square and the power of two
    - 128 x 128, 256 x 256, 512 x 512, 1024 x 1024
- Shaders control the rendering characteristics of textured surface

Physics and Collision Detection

- Physics component
  - Mass
  - Gravity
  - Velelocity
  - Friction
- Physics component added to game object.
- Collision detection provided for most objects - can be customized with sphere colliders and mesh colliders
- Mesh colliders most computationally expensive
- Also level of detail LOD is handled by game engine

Sky Boxes and Effects

- Skybox - cubemap - six textures placed inside a cube
- Rendered seamlessly to appear as surrounding sky and horizon
- Not an object position a player can visit
- Only visible in the Game View panel
- Water effects created by an animated material applied to a surface

Audio Effects

- Audio requires an Audio Source and an Audio Listener in the scene
- Stereo sound treated as as ambient constant volume and continuously playing in the scene (looped enabled)
- Mono sound treated as spatial - gets louder or softer depending on player's position relative to the audio source position
- Supported formats .wav, .mp3, .aiff, .ogg