

Daydreaming about Cardboards

Virtual Reality in Android



- 🔑: headless CMS: contentful.com 🎉
- 🐦: [@MarioBodemann](https://twitter.com/MarioBodemann) 🎉
- 📄: bit.ly/mbvrberlin 🎉
 - Please interrupt!

- [CMS](#): headless CMS: contentful.com
- [Twitter](#): @MarioBodemann
- [Link](#): bit.ly/mbvrberlin
 - Please interrupt!

Daydreaming about Cardboards

Virtual Reality in Android

Agenda



Cardboard

Google Cardboard

- easy to produce
- available from different companies
- in different styles/interactions
- You just need a phone™



How do I write a Unity App?



- clone Googles github for unity
<https://github.com/googlevr/gvr-unity-sdk> repository
- install and open Unity
 - [Mac](#) / [Windows](#): <https://store.unity.com/>
 - [Forum](#): <http://forum.unity3d.com/threads/unity-on-linux-release-notes-and-known-issues.350256/>



Cardboard

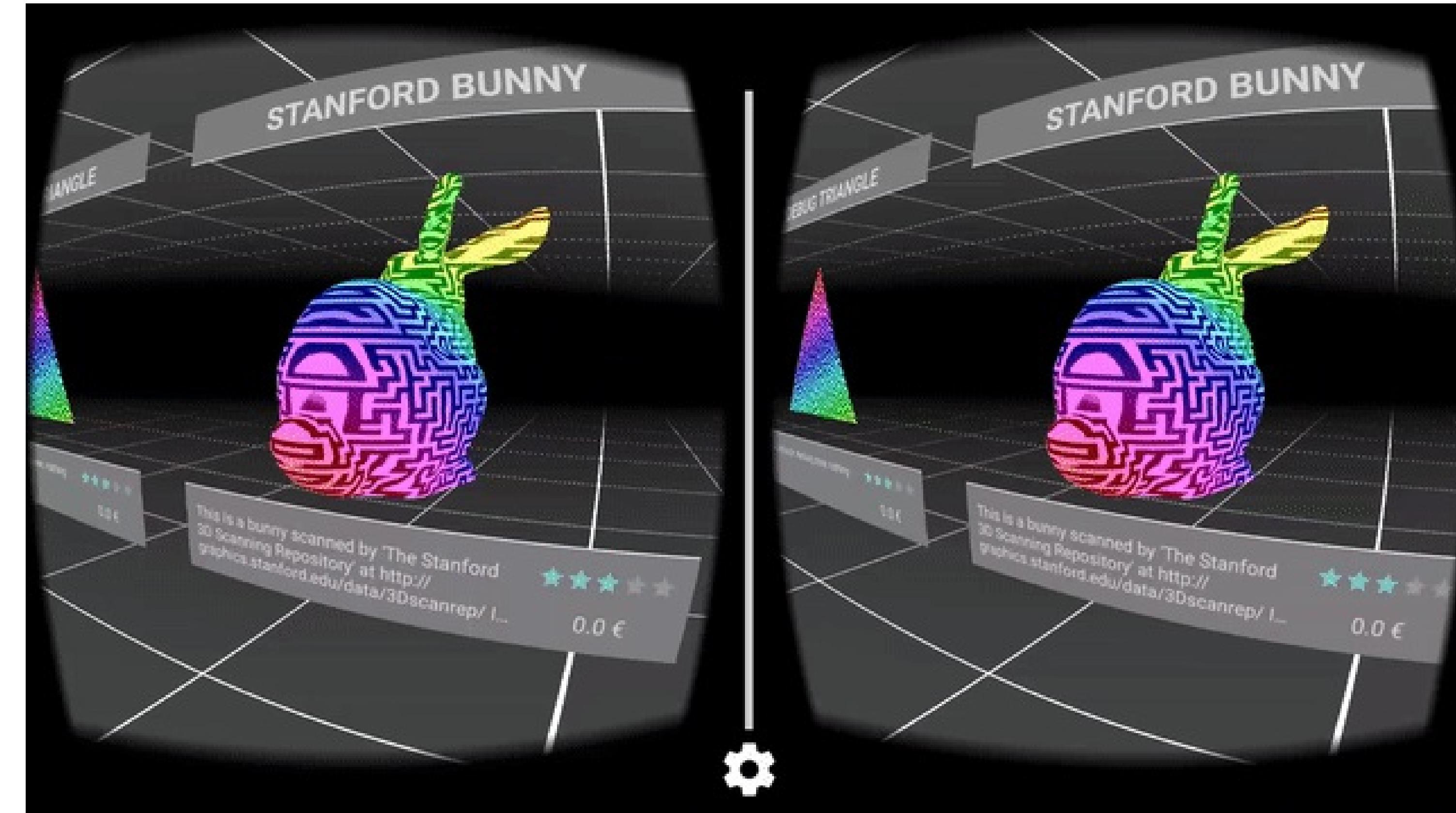
Google Cardboard

- easy to produce
- available from different companies
- in different styles/interactions
- You just need a phone™



How does Cardboard work?

- use 3D data and movement to draw two images
 - one for the left and right eye
- contains Lenses to move things away
- brain combines image to 3D scene



How do you program for it?

Googles SDK are available for

- Android (OpenGL)
- IOS (Objective C)
- Unity Engine (C# /JS) x ( , G,  , )

What do those SDKs provide?

- lens distortion correction
- spatial audio
- head tracking
- 3D calibration
- side-by-side rendering

What else do they provide?

- stereo geometry configuration
- user input event handling
- see developer.google.com/vr/android/ 

How do I write a Unity App?



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- install and open Unity

-  / https://store.unity.com/

-  : <http://forum.unity3d.com/threads/unity-on-linux-release-notes-and-known-issues.350256/>

Home



Projects

Getting started



NEW



OPEN



MY ACCOUNT

Create a project

New project

Home X

Projects Getting started [+ NEW](#) [OPEN](#) [MY ACCOUNT](#)

Project name*
 3D 2D [Add Asset Package](#)

Location*
 [ON](#) Enable Unity Analytics [?](#)

Organization*

[Cancel](#) [Create project](#)

File Edit Assets GameObject Component Help Window



Hierarchy

Create Untitled
Main Camera
Directional Light



Scene Game Asset Store

Shaded 2D 3D Audio

Gizmos

Cloud Account Layers Layout

Inspector Services

Go to Dashboard

Cardboard Sample

SERVICES

Unity provides you a suite of integrated services for creating games, increasing productivity and managing your audience.

SERVICES MEMBERS AGE DESIGNATION SETTINGS

Collaborate

Create together seamlessly

OFF

In-App Purchasing

Simplify cross-platform IAP

OFF

Ads

Monetize your games

OFF

Multiplayer

Easily implement multiplayer

ON

Analytics

Discover player insights

ON

Performance Reporting

Discover app errors

OFF

Cloud Build

Build games faster

OFF

Project Console

Create

Favorites

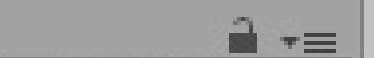
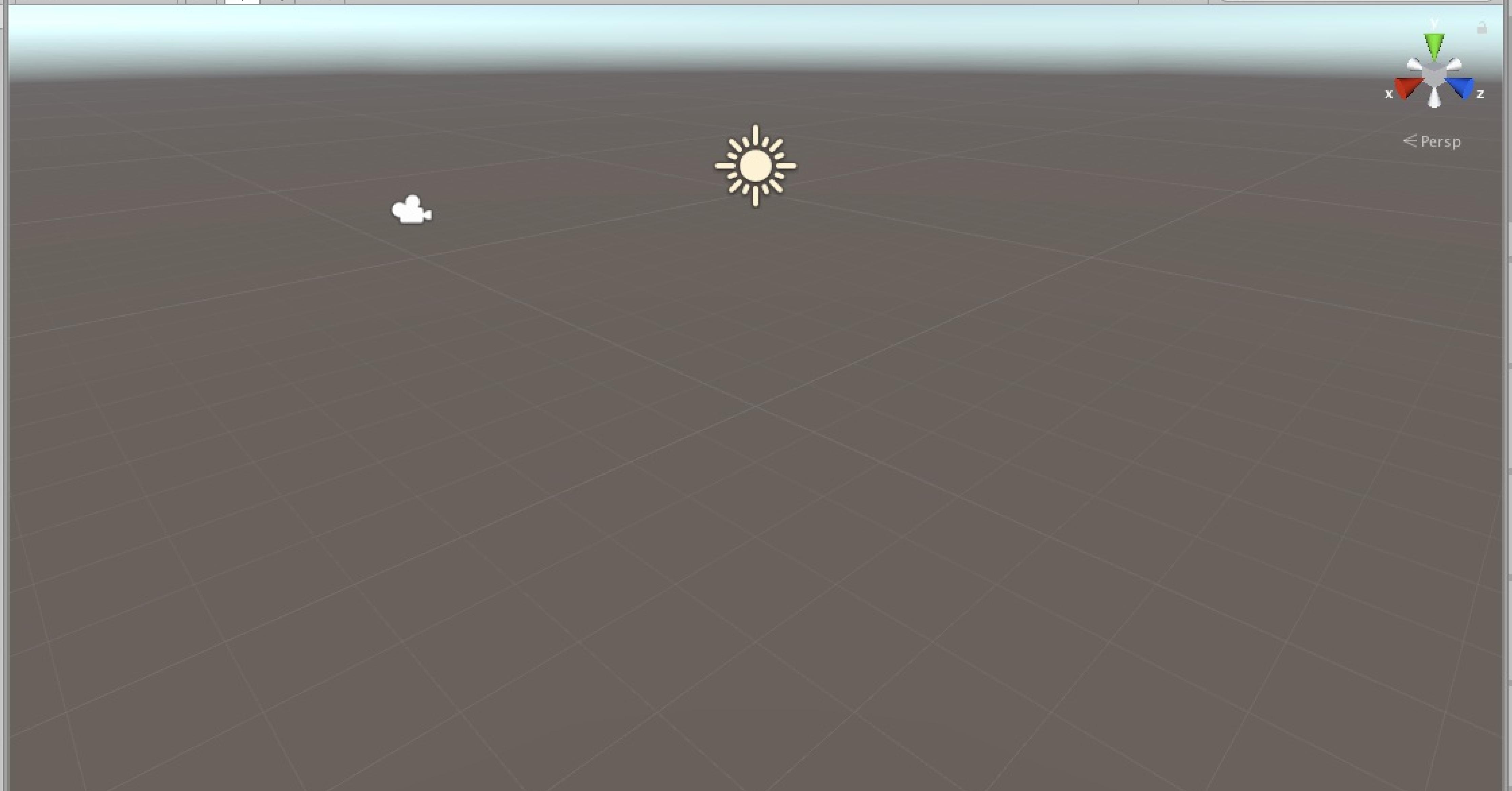
- All Materials
- All Models
- All Prefabs
- All Scripts

Assets

This folder is empty

Assets

Shaded | 2D | ☼ | ⌛ | 🔍 | Gizmos | Qt All



This folder is empty

Cardbo SERVICES

Unity provides you
increasing productivit

SERVICES

Collaborate
Create together se

In-App Purchases
Simplify cross-plat

Ads
Monetize your game

Multiplayer
Easily implement m

Analytics
Discover player ins

Performance
Discover app errors

Cloud Bu

File Edit Assets GameObject Component Help Window

Create Empty Shift+Ctrl+N
Create Empty Child Shift+Alt+N
3D Object
2D Object
Light
Audio
UI
Particle System
Camera
Center On Children
Make Parent
Clear Parent
Apply Changes To Prefab
Break Prefab Instance
Set as first sibling
Set as last sibling
Move To View Ctrl+Alt+F
Align With View Shift+Ctrl+F
Align View to Selected
Toggle Active State Shift+Alt+A

GameObject menu open, showing options for creating 3D objects like Cube, Sphere, Capsule, Cylinder, Plane, Quad, Ragdoll..., Terrain, Tree, Wind Zone, and 3D Text. The "Plane" option is selected.

Game View: A 3D scene with a sun icon and a small white cloud icon. A 3D grid is visible in the background. A camera and directional light are present in the Hierarchy panel.

Asset Store: A tab labeled "Game" is active, showing a search bar and filters for "Game", "Asset Store", and "Gizmos".

Inspector: Shows the "Cardboard Sample" project. It includes sections for SERVICES, MEMBERS, AGE DESIGNATION, and SETTINGS. Services listed include Collaborate (OFF), In-App Purchasing (OFF), Ads (OFF), Multiplayer (ON), Analytics (ON), Performance Reporting (OFF), and Cloud Build (OFF).

Project View: Shows a "Favorites" section with links to All Materials, All Models, All Prefabs, and All Scripts. An "Assets" folder is also present.

Console: A tab labeled "Console" is shown.



- Create Empty Shift+Ctrl+N
- Create Empty Child Shift+Alt+N
- 3D Object**
- 2D Object
- Light
- Audio
- UI
- Particle System
- Camera
- Center On Children
- Make Parent
- Clear Parent
- Cube
- Sphere
- Capsule
- Cylinder
- Plane**
- Quad
- Ragdoll...
- Terrain
- Tree
- Wind Zone

File Edit Assets GameObject Component Help Window



Hierarchy

Create Untitled*

Main Camera
Directional Light
Plane



Scene Game Asset Store

Gizmos

All

Shaded

2D

Lights

Sounds

Materials

Textures

Prefabs

Scriptable Objects

Components

Transforms

Instances

Groups

Links

Links</p

File Edit Assets GameObject Component Help Window



Center Local



Cloud Account Layers Layout

Hierarchy

Create (Q) All

Untitled*

Main Camera

Directional Light

Plane

Scene

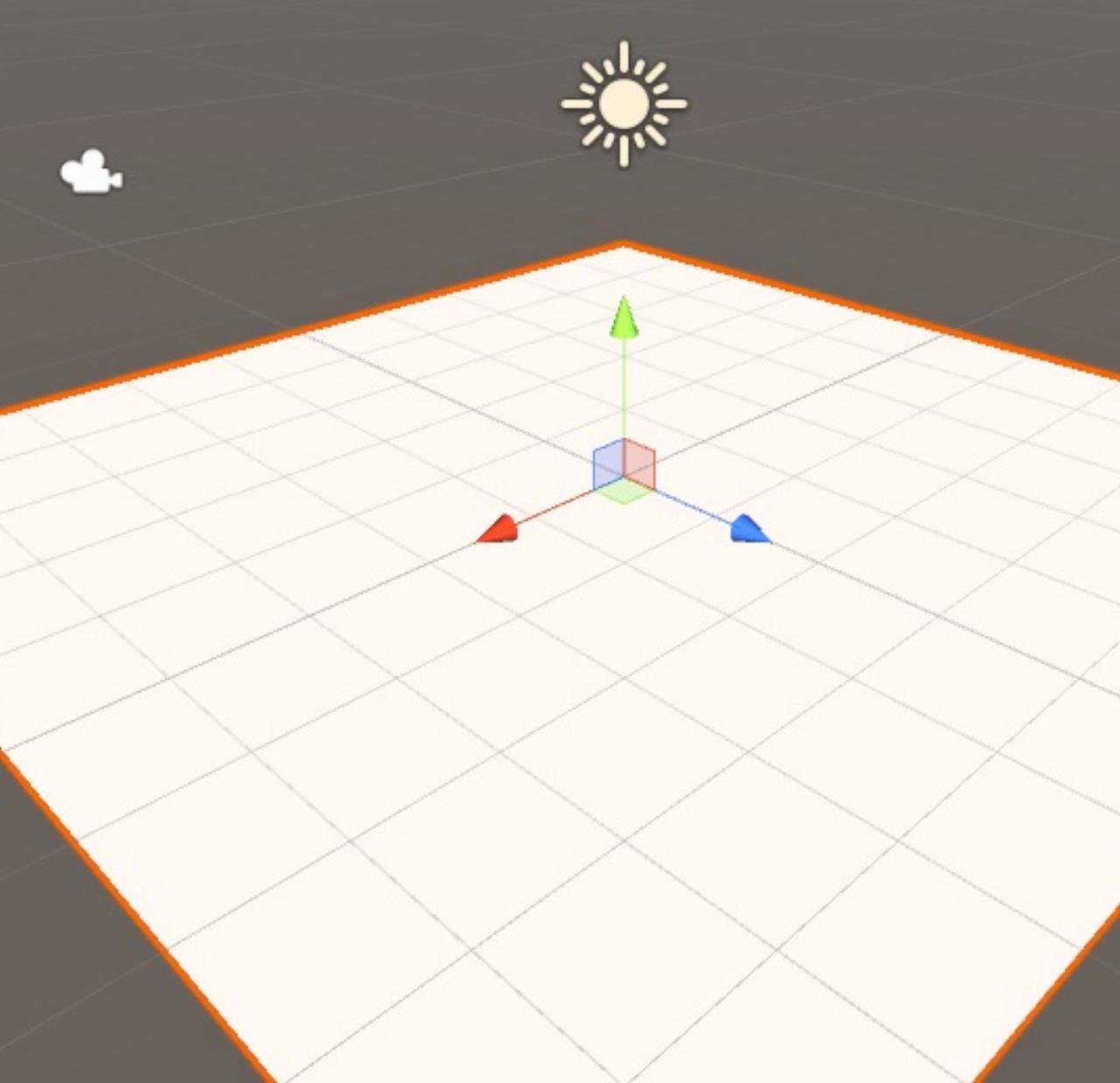
Game

Asset Store

Shaded 2D (Q) All

Gizmos (Q) All

Persp



Inspector Services

Plane

Tag Untagged

Layer Default

Transform

Position X 0 Y 0 Z 0

Rotation X 0 Y 0 Z 0

Scale X 1 Y 1 Z 1

Plane (Mesh Filter)

Mesh Plane

Mesh Collider

Convex

Inflate Mesh

Skin Width 0.01

Is Trigger

Material None (Physic Material)

Mesh Plane

Mesh Renderer

Cast Shadows On

Receive Shadows

Motion Vectors Per Object Motion

Materials

Light Probes Blend Probes

Reflection Probes Blend Probes

Anchor Override None (Transform)

Default-Material

Shader Standard

Add Component

Project Console

Create

Favorites

All Materials

All Models

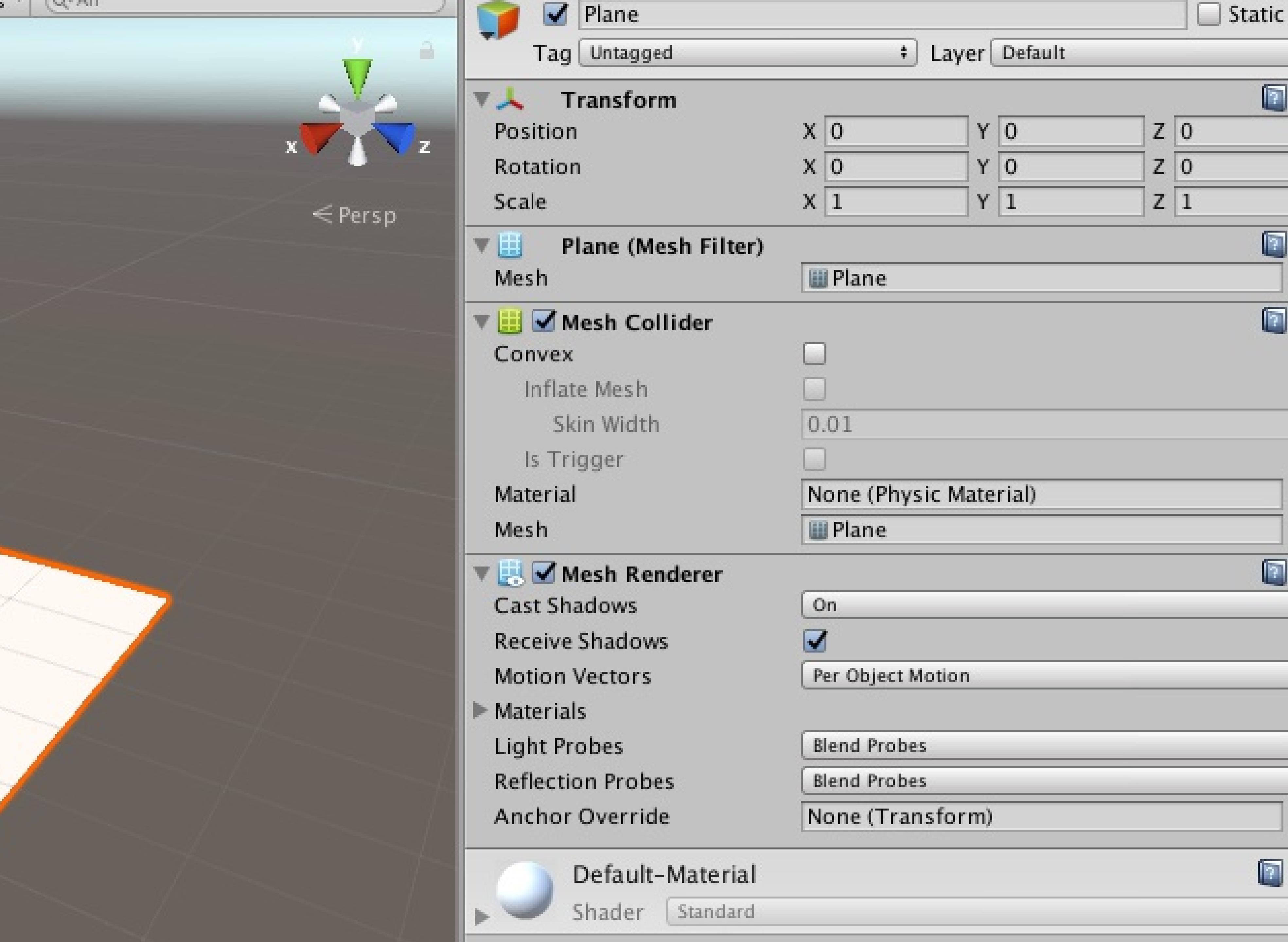
All Prefabs

All Scripts

Assets

Assets

This folder is empty



File Edit Assets GameObject Component Help Window



Center Local



Cloud Account Layers Layout

Hierarchy

Create

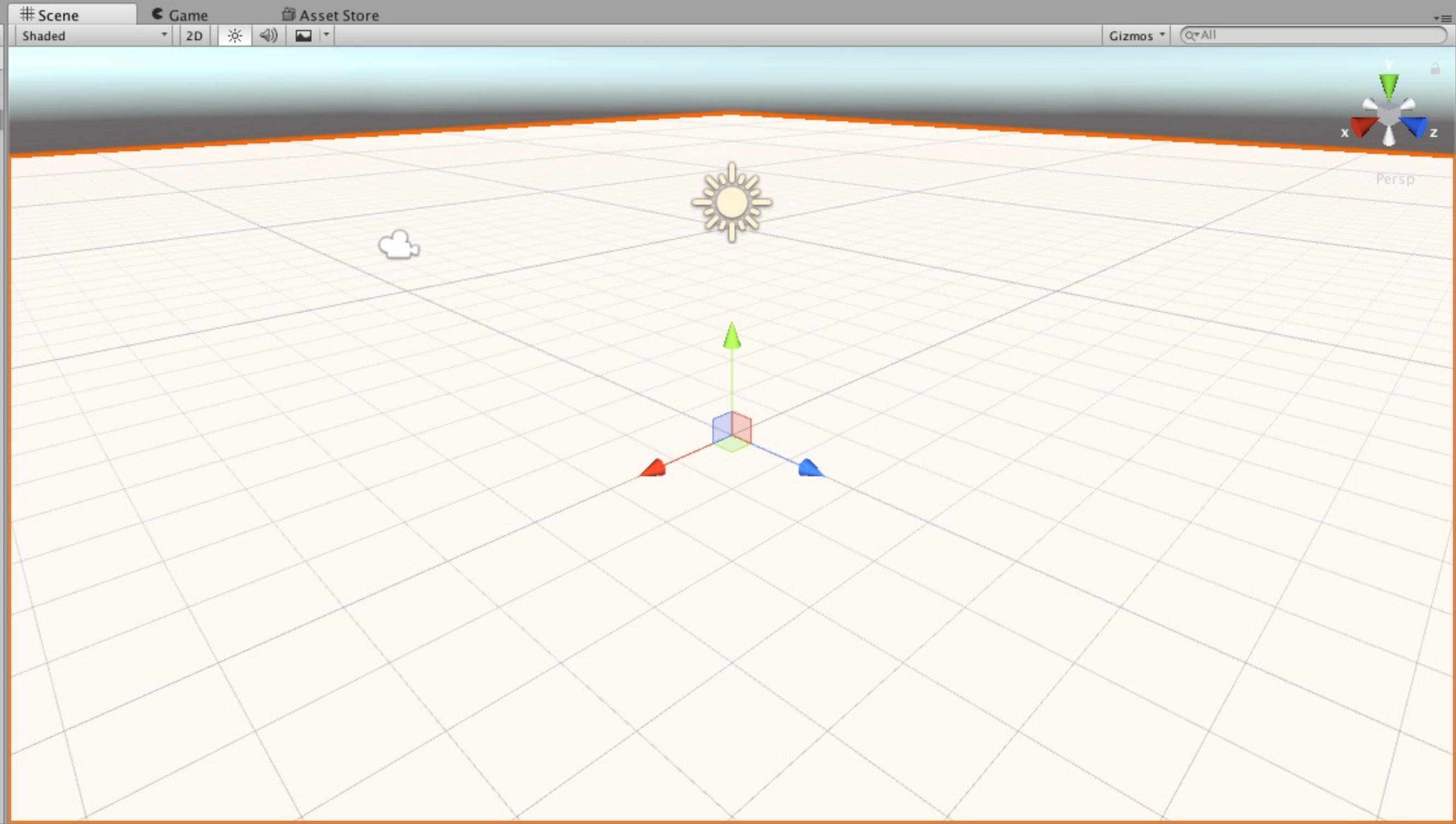
Q All

Untitled*

Main Camera

Directional Light

Plane



Inspector Services

Plane

Tag Untagged Layer Default

Transform

Position	X 0	Y 0	Z 0
Rotation	X 0	Y 0	Z 0
Scale	X 10	Y 1	Z 10

Plane (Mesh Filter)

Mesh

Mesh Collider

Convex

Inflate Mesh

Skin Width 0.01

Is Trigger

Material None (Physic Material)

Mesh Plane

Mesh Renderer

Cast Shadows On

Receive Shadows Per Object Motion

Motion Vectors

Materials

Light Probes Blend Probes

Reflection Probes Blend Probes

Anchor Override None (Transform)

Default-Material

Shader Standard

Add Component

Project Console

Create

Favorites

All Materials

All Models

All Prefabs

All Scripts

Assets

Assets

This folder is empty

File Edit Assets **GameObject** Component Help Window

Create Empty Shift+Ctrl+N
Create Empty Child Shift+Alt+N
3D Object ►
Cube
Sphere
Capsule
Cylinder
Plane
2D Object
Light
Audio
UI
Particle System
Camera
Center On Children
Make Parent
Clear Parent
Apply Changes To Prefab
Break Prefab Instance
Set as first sibling
Set as last sibling
Move To View Ctrl+Alt+F
Align With View Shift+Ctrl+F
Align View to Selected
Toggle Active State Shift+Alt+A

Game Asset Store Gizmos Q>All Persp

Inspector Services

Plane Tag Untagged Layer Default

Transform Position X 0 Y 0 Z 0
Rotation X 0 Y 0 Z 0
Scale X 10 Y 1 Z 10

Plane (Mesh Filter) Mesh Plane

Mesh Collider Convex Inflat Mesh Skin Width 0.01 Is Trigger Material None (Physic Material) Mesh Plane

Mesh Renderer Cast Shadows On Receive Shadows Motion Vectors Per Object Motion Materials Light Probes Blend Probes Reflection Probes Blend Probes Anchor Override None (Transform)

Default-Material Shader Standard Add Component

Project Console

Favorites All Materials All Models All Prefabs All Scripts

Assets This folder is empty

File Edit Assets GameObject Component Help Window



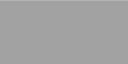
Hierarchy

Untitled*

- Main Camera
- Directional Light
- Plane
- Cube

Scene

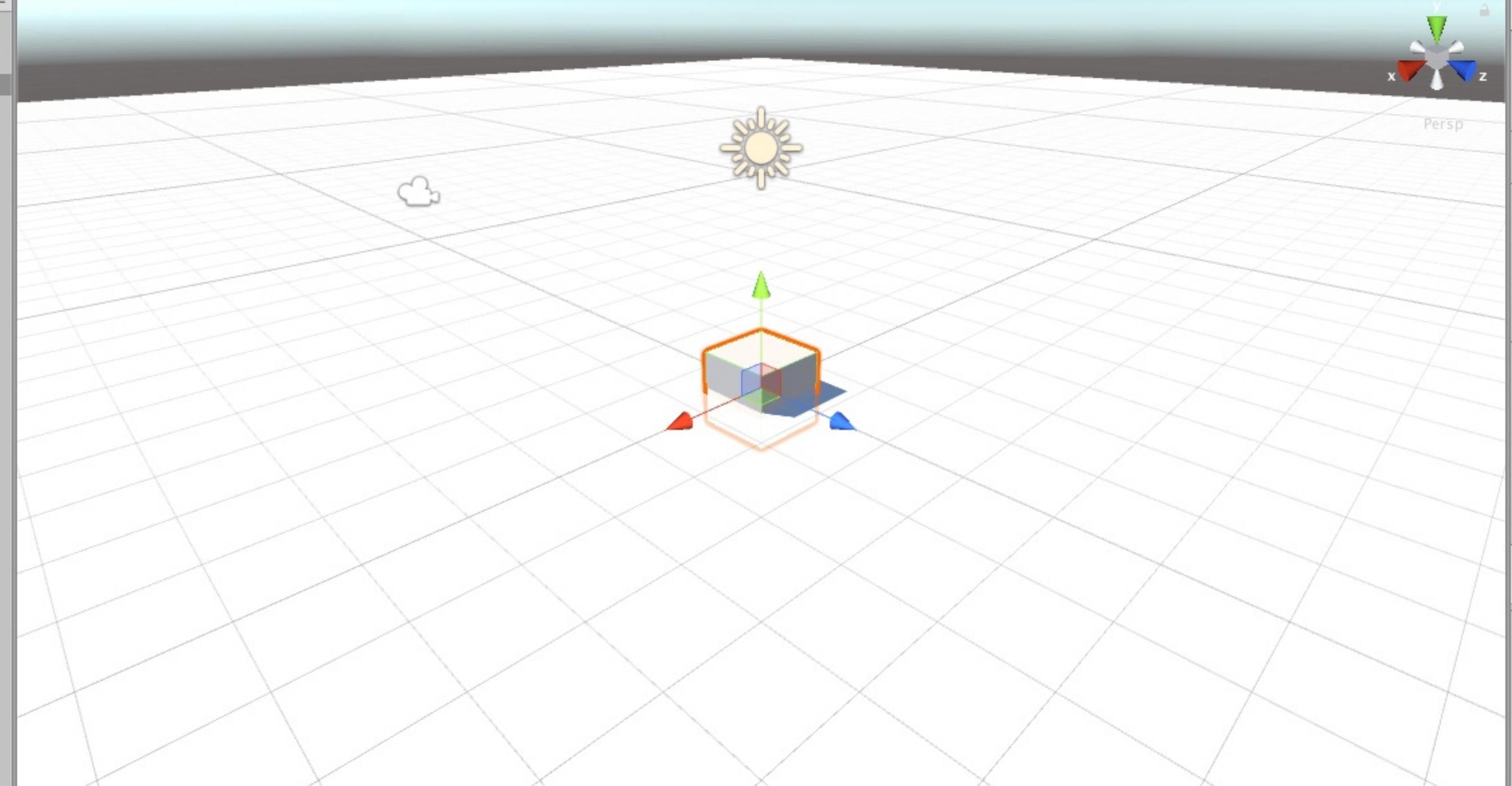
Shaded 2D



Account

Layers

Layout



Inspector

Cube

Tag Untagged

Layer Default

Transform

Position X 0 Y 0 Z 0

Rotation X 0 Y 0 Z 0

Scale X 1 Y 1 Z 1

Cube (Mesh Filter)

Mesh Cube

Box Collider

Edit Collider

Is Trigger

Material None (Physic Material)

Center X 0 Y 0 Z 0

Size X 1 Y 1 Z 1

Mesh Renderer

Cast Shadows On

Receive Shadows

Motion Vectors Per Object Motion

Materials

Light Probes Blend Probes

Reflection Probes Blend Probes

Anchor Override None (Transform)

Default-Material

Shader Standard

Add Component

Project

Create

Favorites

- All Materials
- All Models
- All Prefabs
- All Scripts

Assets

Assets

This folder is empty

Assets

File Edit Assets GameObject Component Help Window



Hierarchy

Untitled*

Main Camera

Directional Light

Plane

Cube

Scene

Shaded 2D

Gizmos

Q>All



Asset Store

Gizmos

Q>All

Services



Inspector

Cube

Tag Untagged

Layer Default

Static

Transform

Position X 1.22 Y 0.88 Z 0.11

Rotation X 0 Y 0 Z 0

Scale X 1 Y 1 Z 1

Cube (Mesh Filter)

Mesh Cube

Box Collider

Is Trigger

Material None (Physic Material)

Center X 0 Y 0 Z 0

Size X 1 Y 1 Z 1

Mesh Renderer

Cast Shadows On

Receive Shadows

Motion Vectors Per Object Motion

Materials

Light Probes Blend Probes

Reflection Probes Blend Probes

Anchor Override None (Transform)

Default-Material

Shader Standard

Add Component

Project

Create

Favorites

All Materials

All Models

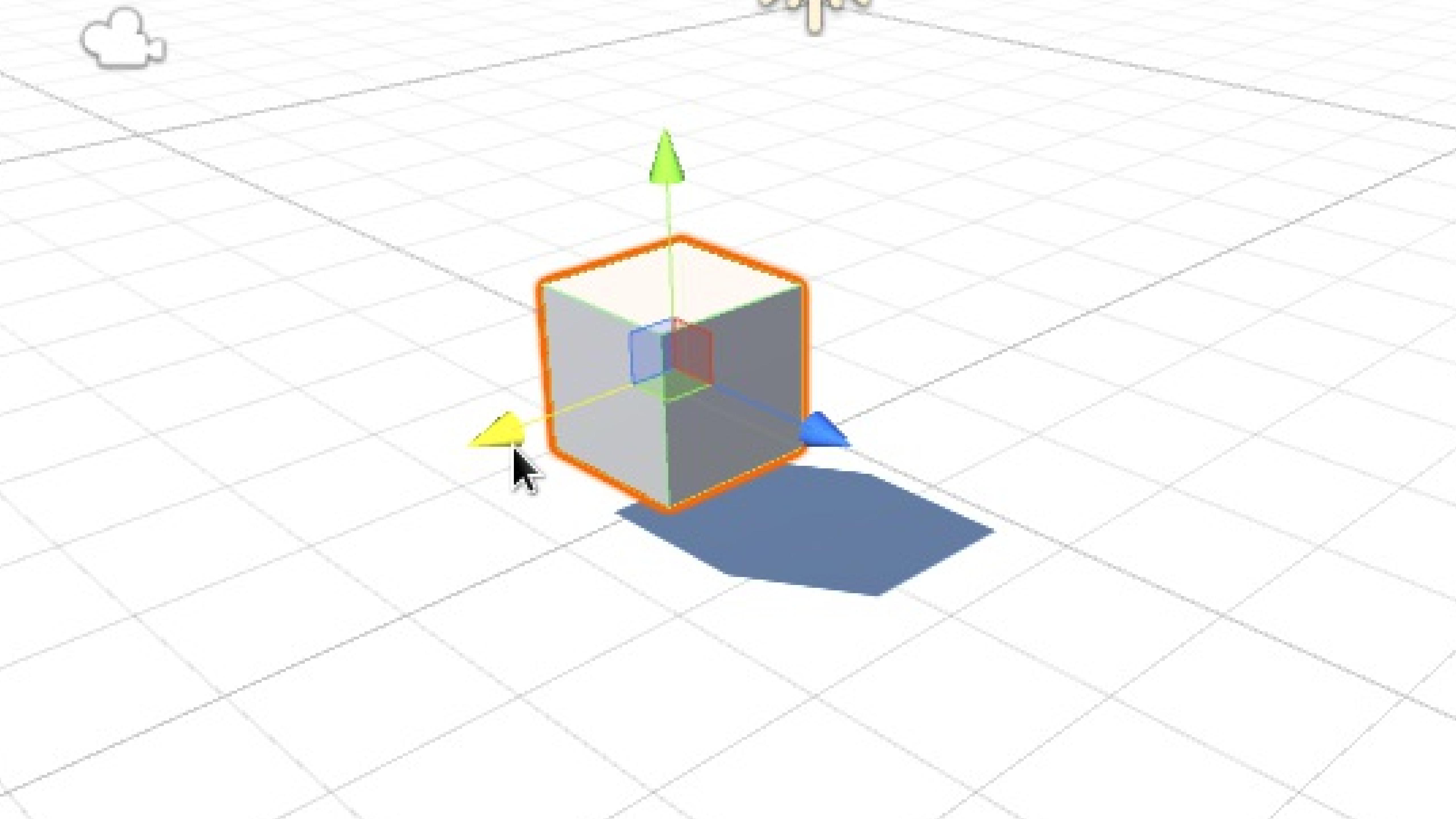
All Prefabs

All Scripts

Assets

This folder is empty

Assets



Let us add some more objects

- Add a sphere, capsule, cylinder.
- Move them arround

File Edit Assets GameObject Component Help Window



Center Local



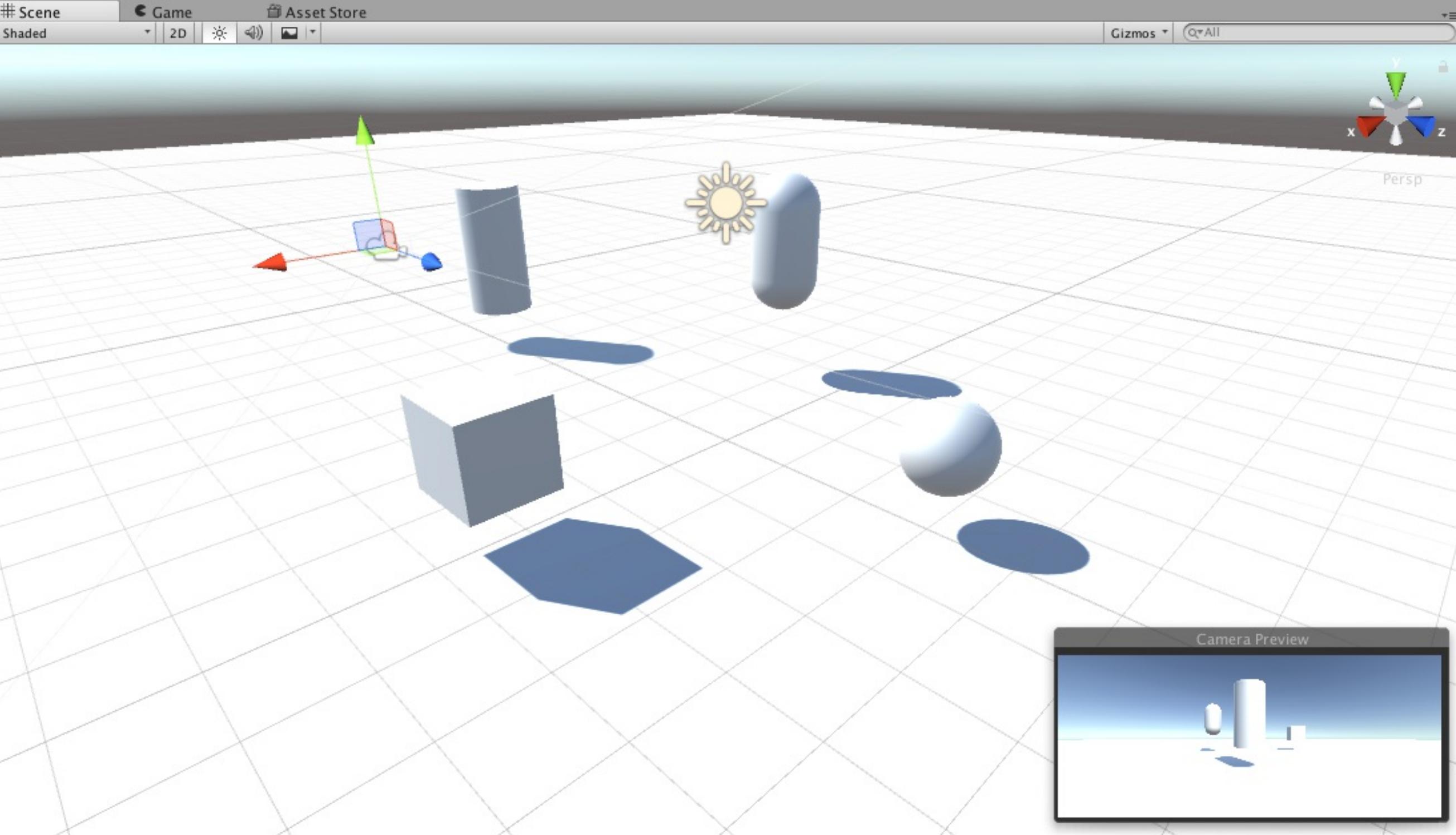
Cloud Account Layers Layout

Hierarchy

Create (Q) All Untitled*

Main Camera

- Directional Light
- Plane
- Cube
- Sphere
- Capsule
- Cylinder



Scene

Game

Asset Store

Project

Create (Q) All

Favorites

- All Materials
- All Models
- All Prefabs
- All Scripts

Assets

This folder is empty

Assets

Inspector Services

Main Camera

Tag MainCamera

Layer Default

Transform

Position X 0 Y 1 Z -10

Rotation X 0 Y 0 Z 0

Scale X 1 Y 1 Z 1

Camera

Clear Flags Skybox

Background Everything

Culling Mask Perspective

Projection Field of View 60

Clipping Planes Near 0.3

Far 1000

Viewport Rect X 0 Y 0 W 1 H 1

Depth -1

Rendering Path Use Player Settings

Target Texture None (Render Texture)

Occlusion Culling Checkmark

HDR Off

Target Display Display 1

GUI Layer

Flare Layer

Audio Listener

Add Component

Occclusion Culling

HDR

Target Display

GUI Layer

Flare Layer

Audio Listener

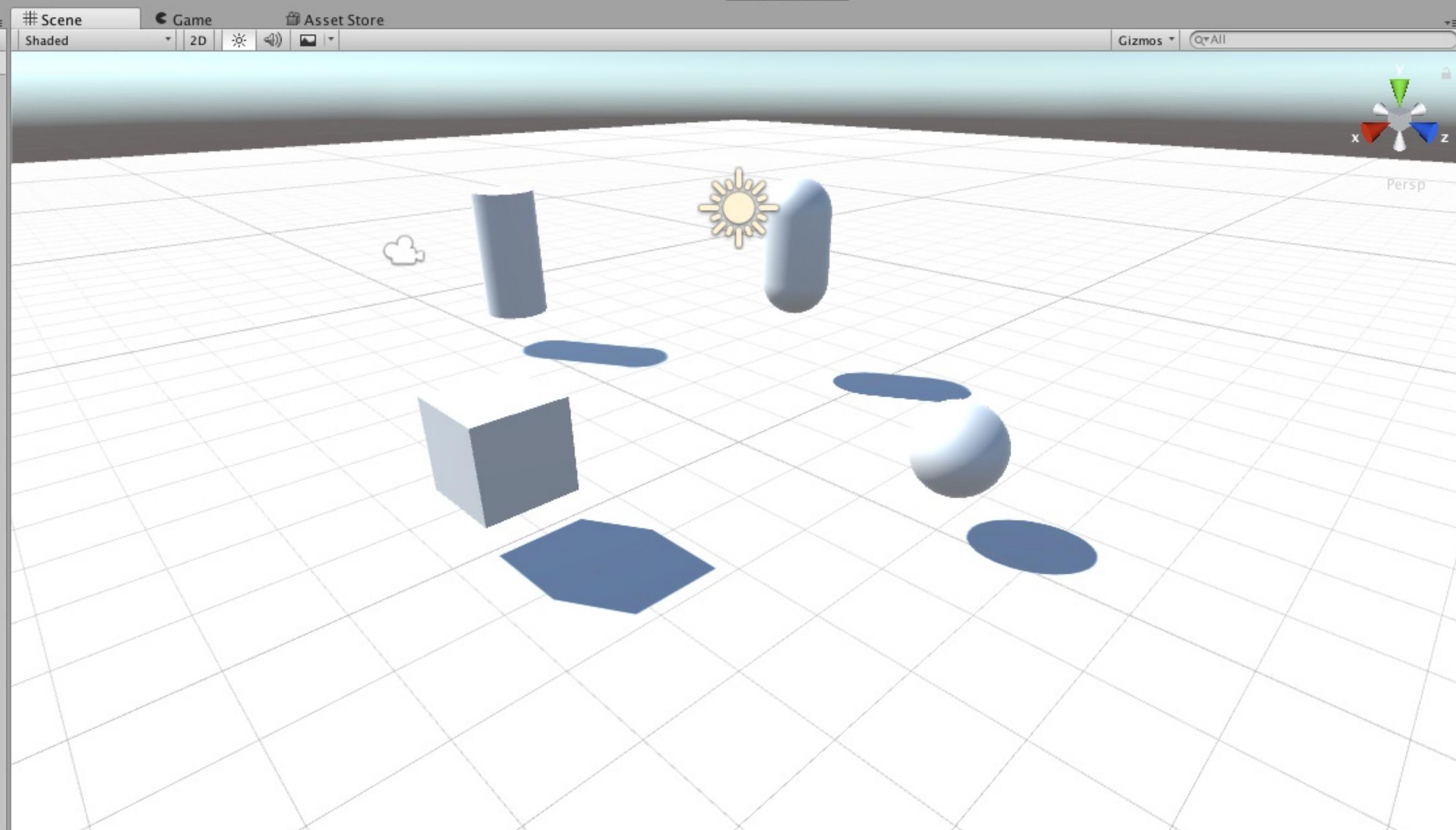


Adding textures

File Edit Assets GameObject Component Help Window


Hierarchy

```
Untitled*
Main Camera
Directional Light
Plane
Cube
Sphere
Capsule
Cylinder
```



Cloud Account Layers Layout

Inspector

Asset Store: RedBeard_Bluestone WallV2.sbsar

Type	ProceduralMaterial
Part of package	
Name	Free Material 5 Pack
Version	1.0
Price	free
Rating	5 of 5
Size	559.74 KB
Asset count	8
Web page	http://u3d.as/r9x
Publisher	Russ Denny

Import package

Open Asset Store

Project

Create

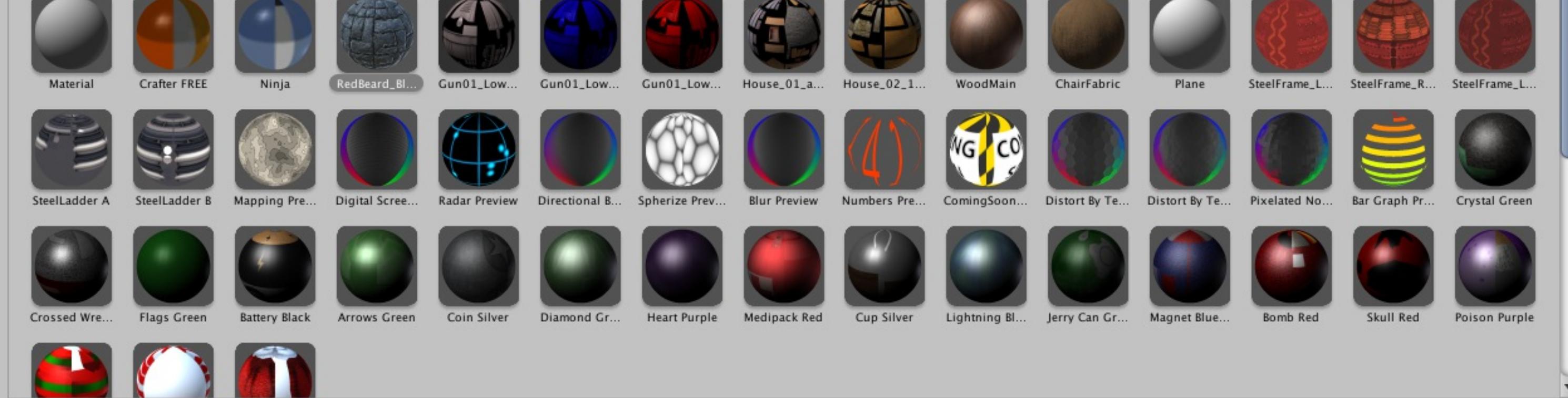
Console
Favorites

- All Materials
- All Models
- All Prefabs
- All Scripts

Assets

Search: Assets Selected folder Asset Store: 999+ / 999+

t:Material

Free Assets

Procedural Properties

Random Seed: Randomize 0
 Randomizer: 1
 Uniform / Random:

Generated Textures


 Project

 Console

Create ▾

▼  Favorites

 All Materials

 All Models

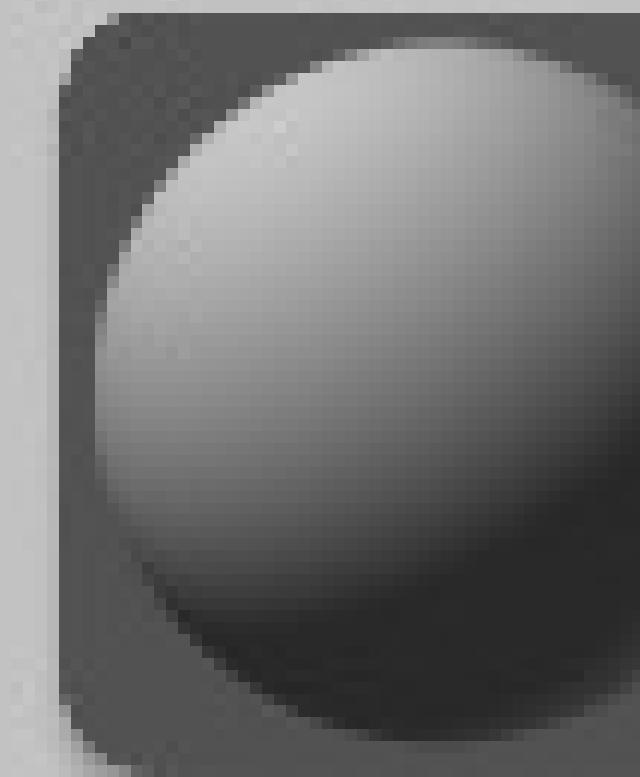
 All Prefabs

 All Scripts

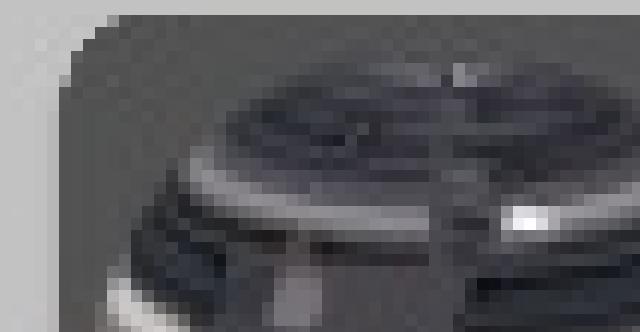
 Assets

Search: A

▼ Free Ass



Material



ected folder

Asset Store: 999+ / 999+





FREE



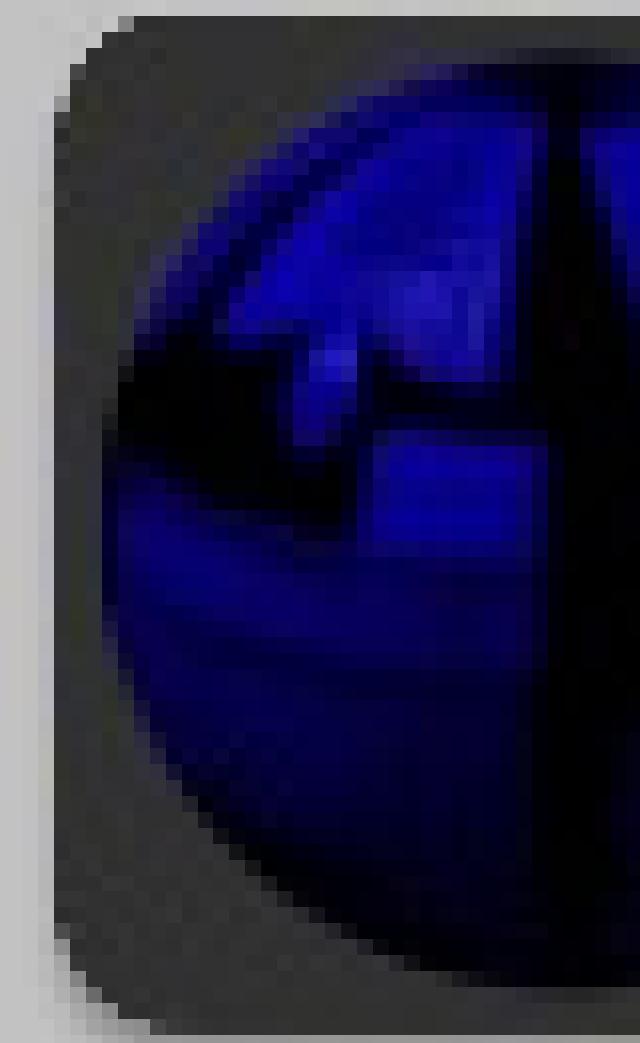
Ninja



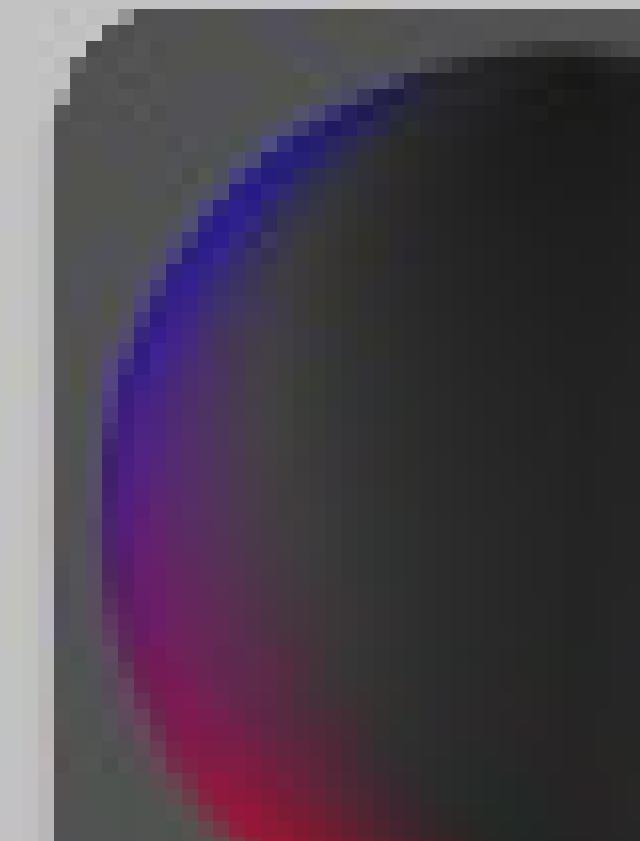
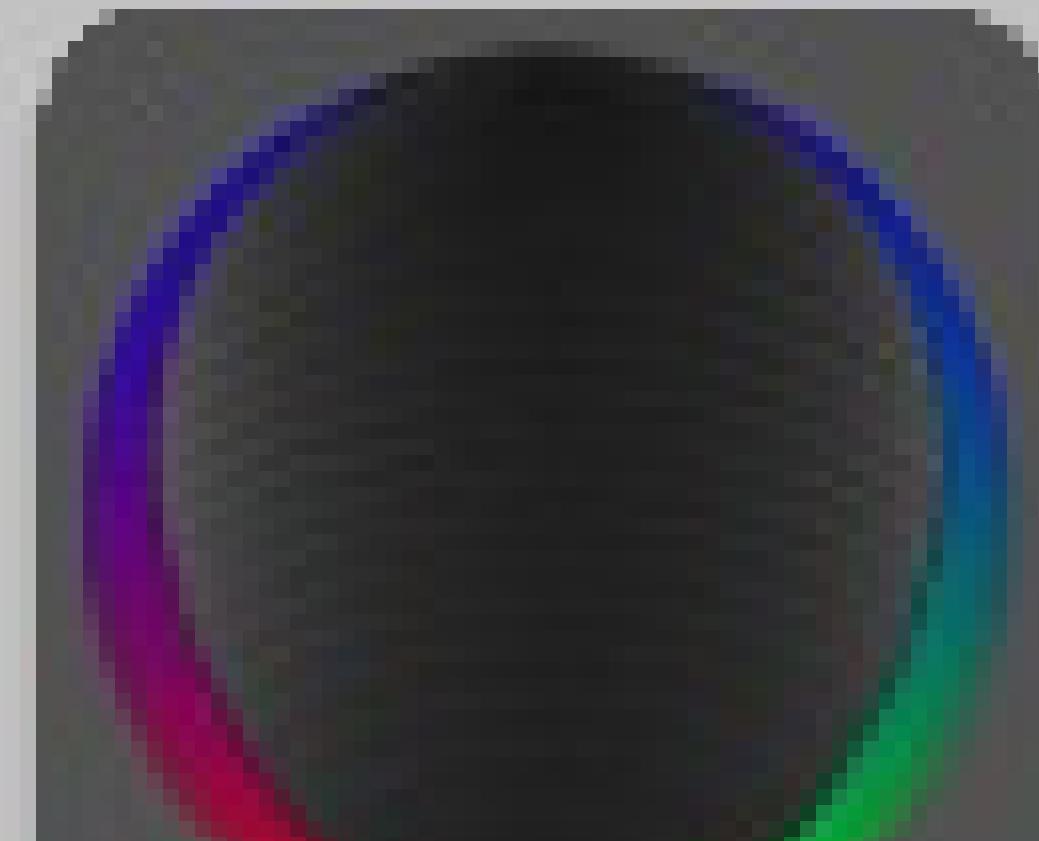
RedBeard_Blo...



Gun01_Low...



Gun01_Hi...



Cloud Account Layers Layout

Gizmos Q>All

Persp

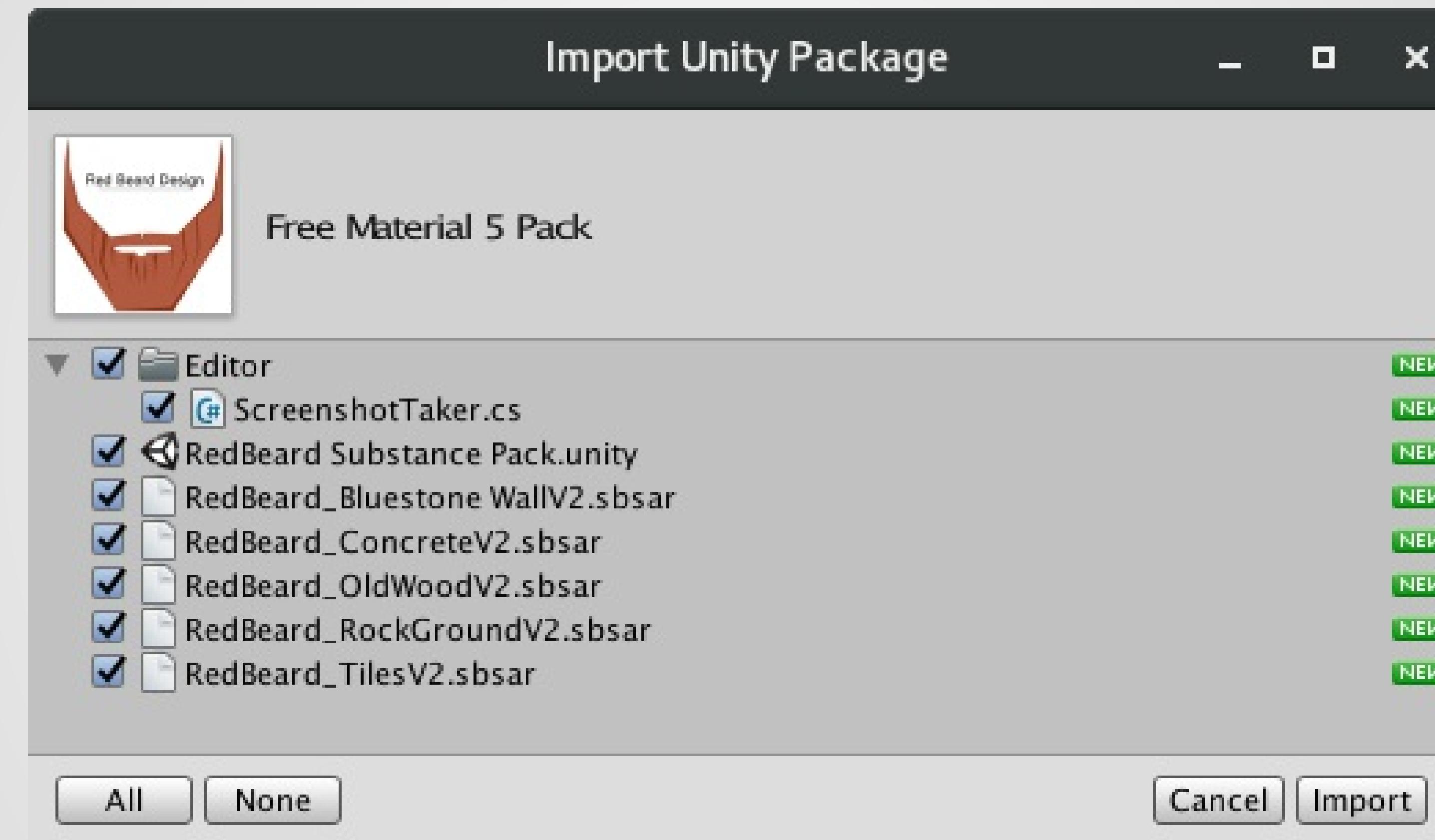
Asset Store: RedBeard_Bluestone WallV2.sbsar

Type ProceduralMaterial

Part of package

Name	Free Material 5 Pack
Version	1.0
Price	free
Rating	5 of 5
Size	559.74 KB
Asset count	8
Web page	http://u3d.as/r9x
Publisher	Russ Denny

Import package Open Asset Store



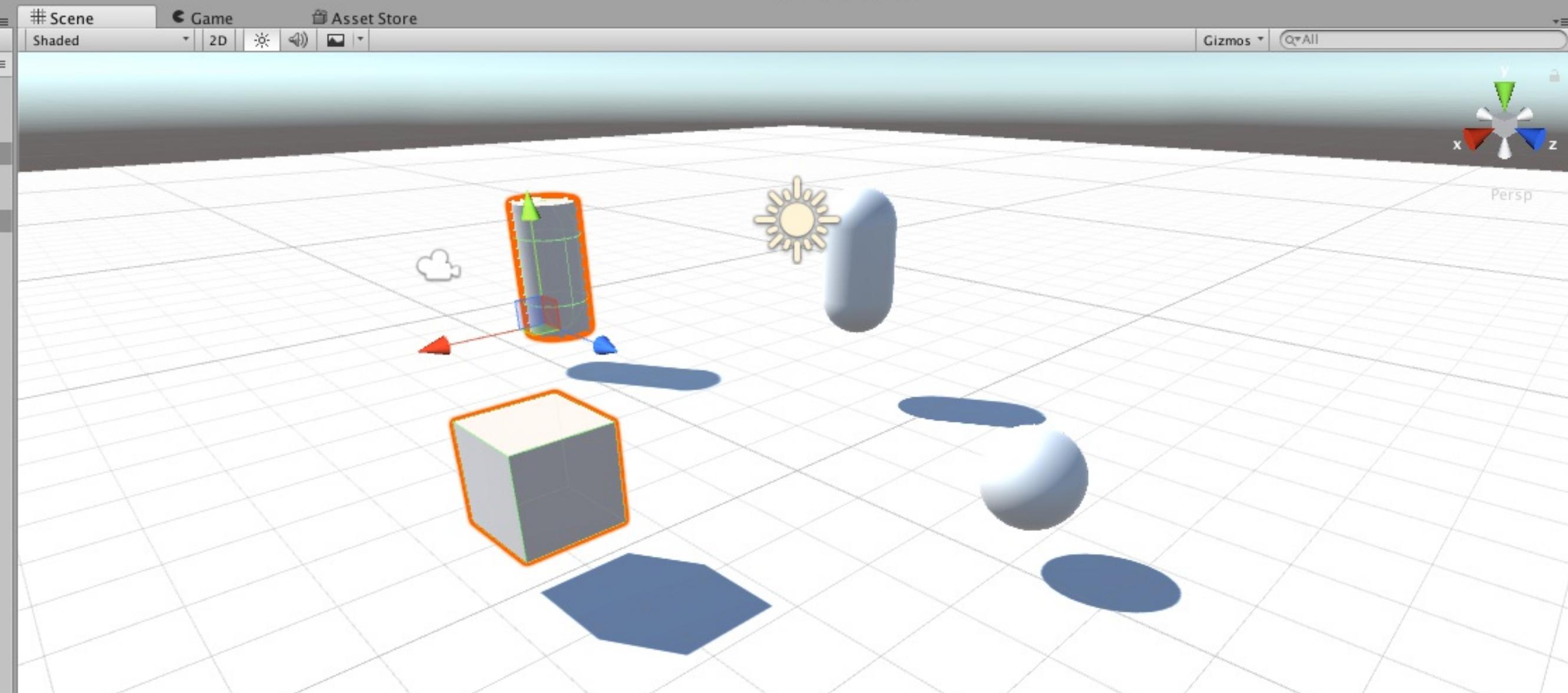
File Edit Assets GameObject Component Help Tools Window



Hierarchy

Untitled*

- Main Camera
- Directional Light
- Plane
- Cube
- Sphere
- Capsule
- Cylinder



Inspector

Transform

Position X: 0 Y: 0 Z: 0

Rotation X: 1 Y: 1 Z: 1

Scale X: 1 Y: 1 Z: 1

Cylinder (Mesh Filter)

Mesh

Mesh Renderer

Cast Shadows On

Receive Shadows

Motion Vectors Per Object Motion

Materials

Size 1

Element 0 Default-Material

Light Probes Blend Probes

Reflection Probes Blend Probes

Anchor Override None (Transform)

Default-Material

Shader Standard

Components that are only on some of the selected objects cannot be multi-edited.

Add Component

Select Mate...

Assets Scene

None

RedBeard_BluestoneWall

RedBeard_Concrete

RedBeard_RockGround

RedBeard_Tiles

RedBeard_WoodWall

FrameDebuggerRenderTargetD

Default-Diffuse

Default-Material

Default-Particle

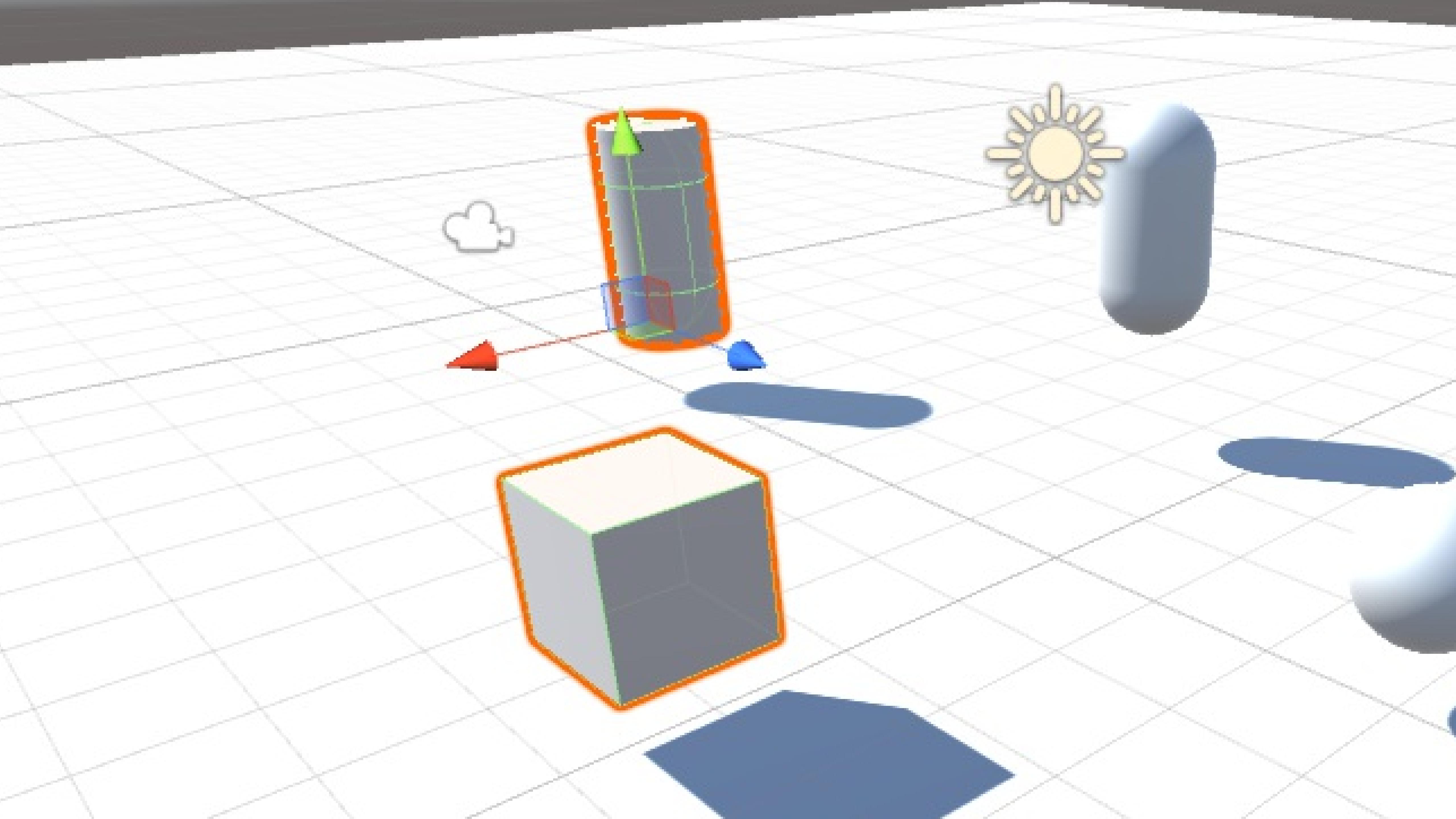
Default-Skybox

Sprites-Default

SpatialMappingOcclusion

SpatialMappingWireframe

Default-Material (Material) Res



Position

X —

Y —

Z —

Rotation

X 0

Y 0

Z 0

Scale

X 1

Y 1

Z 1

▼  Cylinder (Mesh Filter)  

Mesh

—

▼  Mesh Renderer  

Cast Shadows

On

Receive Shadows

Motion Vectors

Per Object Motion

▼ Materials

Size

1

Element 0

 Default-Material 

Light Probes

Blend Probes

Reflection Probes

Blend Probes

Anchor Override

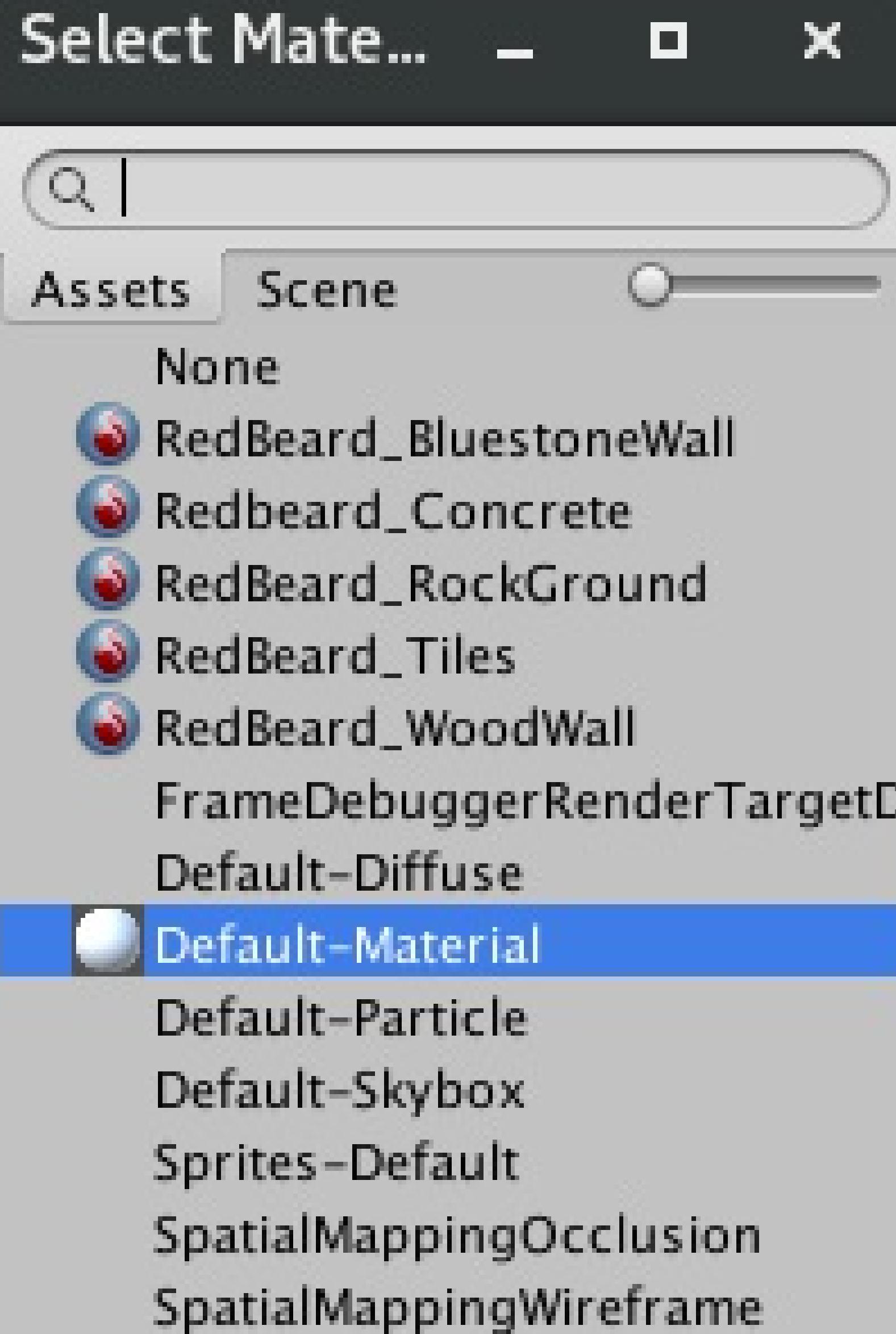
None (Transform) 

Default-Material  

Shader

Standard

Components that are only on some of the selected objects cannot be multi-edited.



File Edit Assets GameObject Component Help Tools Window



Hierarchy

Untitled*

- Main Camera
- Directional Light
- Plane
- Cube
- Sphere
- Capsule
- Cylinder

Scene

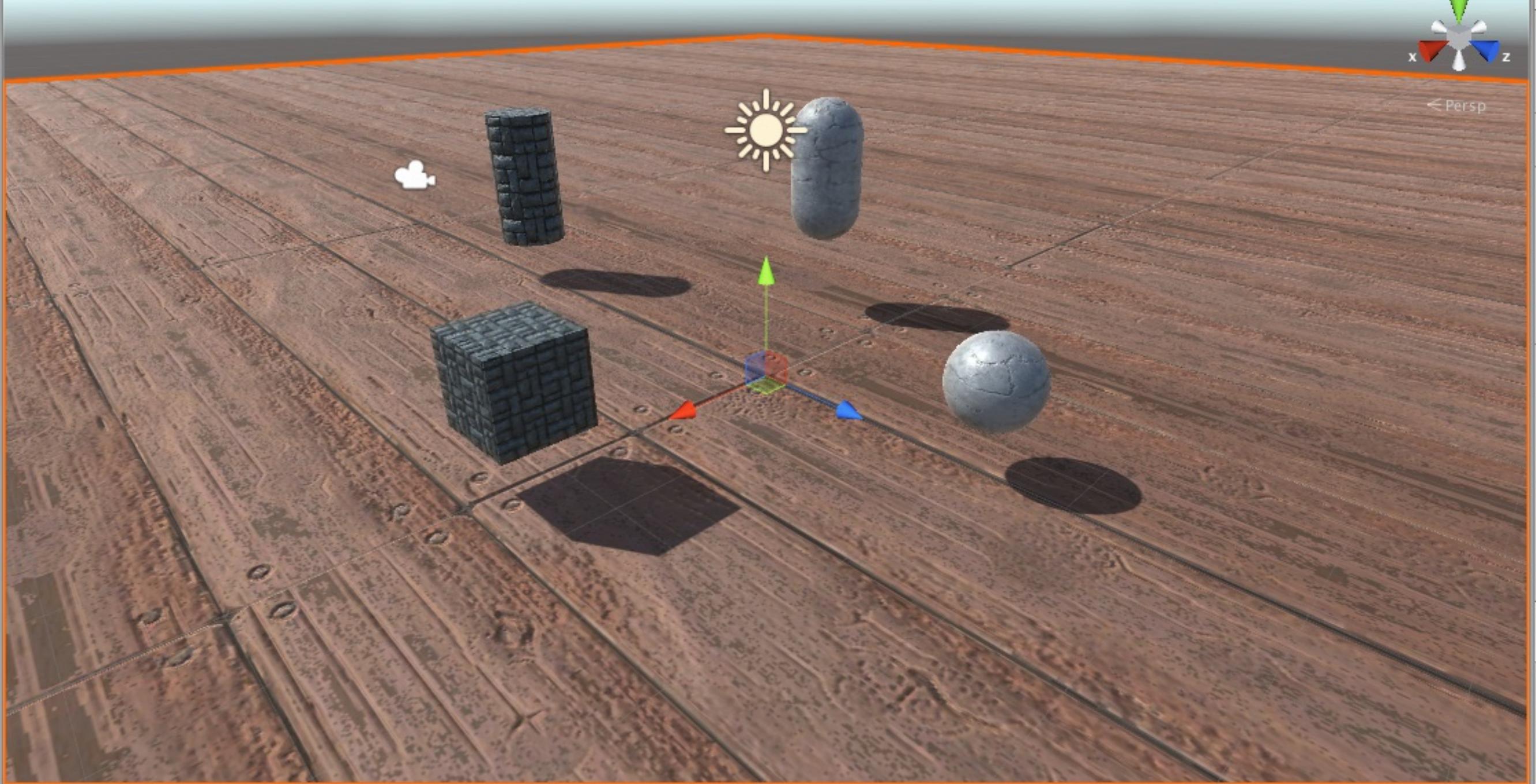
Shaded 2D

Gizmos

Asset Store



Cloud Account Layers Layout



Inspector

Plane

Tag Untagged

Layer Default

Static

Transform

Position X 0 Y 0 Z 0

Rotation X 0 Y 0 Z 0

Scale X 10 Y 1 Z 10

Plane (Mesh Filter)

Mesh Plane

Mesh Collider

Convex

Inflate Mesh

Skin Width 0.01

Is Trigger

Material None (Physic Material)

Mesh Plane

Mesh Renderer

Cast Shadows On

Receive Shadows

Motion Vectors Per Object Motion

Materials

Size 1

Element 0 RedBeard_WoodWall

Light Probes Blend Probes

Reflection Probes Blend Probes

Anchor Override None (Transform)

RedBeard_WoodWall

Shader Standard

Rendering Mode Opaque

Main Maps

Albedo

Metallic

Smoothness

Source

Normal Map

Height Map

Occlusion

Emission

Global Illumination Realtime

Detail Mask

Tiling X 10 Y 10

Offset X 0 Y 0

UV Set UV0

Secondary Maps

Detail Albedo x2

Normal Map

Tiling X 1 Y 1

Offset X 0 Y 0

UV Set UV0

Forward Rendering Options

Specular Highlights

Reflections

Procedural Properties

Generate all outputs

Generate Min Maps

Project

Create

Console

Console

Favorites

All Materials

All Models

All Prefabs

All Scripts

Assets

Editor

Assets

Editor

RedBeard Su...

RedBeard_Bl...

RedBeard_B...

RedBeard_B...

RedBeard_B...

RedBeard_B...

RedBeard_C...

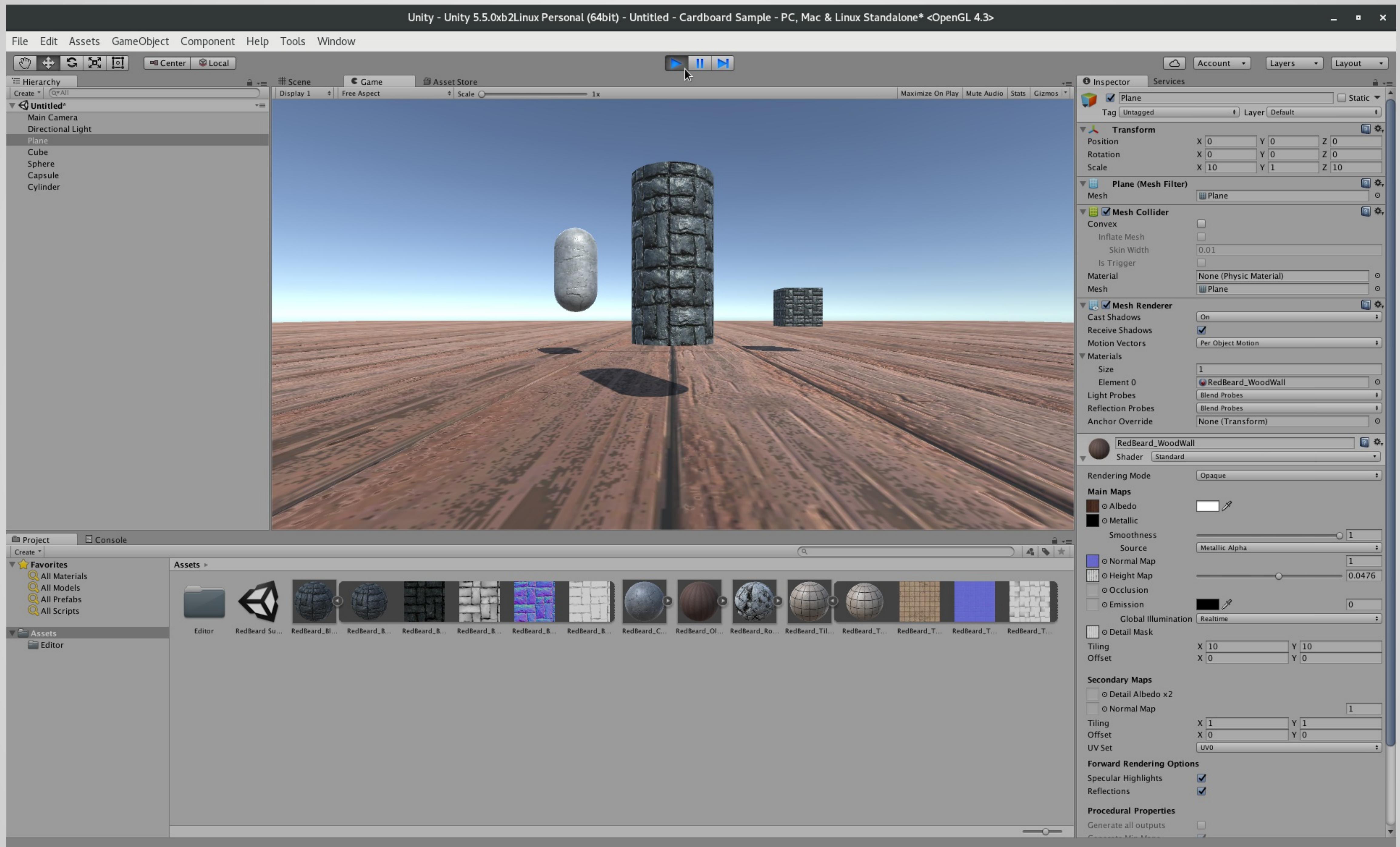
RedBeard_Ol...

RedBeard_Ro...

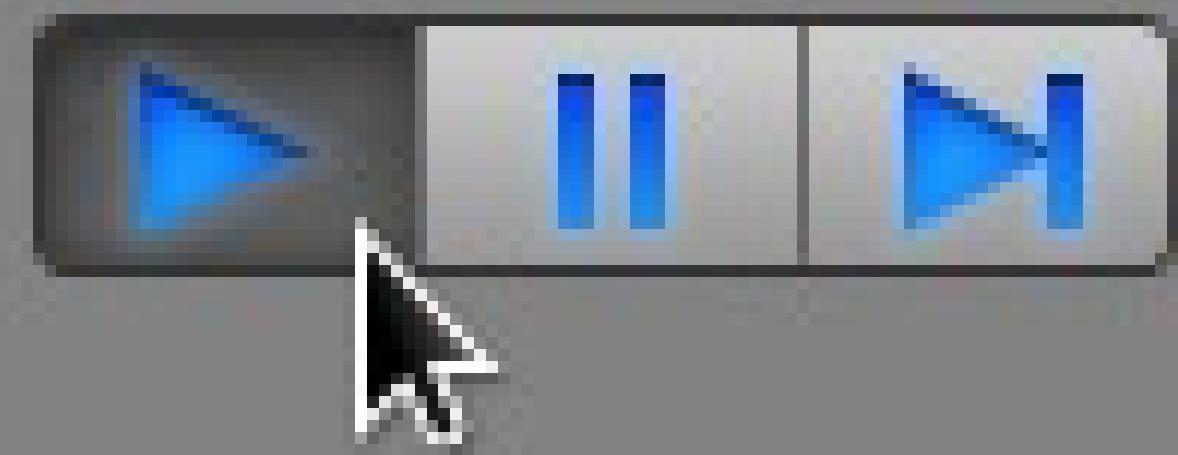
RedBeard_Til...

RedBeard_T...

RedBeard_T...



x Personal (64bit) - Untitled - Cardboard Sample - PC, Mac & Li



→ 1x

File Edit Assets GameObject Component Help Tools Window

Add... Shift+Ctrl+A

Hierarchy The tool handle is placed at the center of the selected object.

Create **Q+All**

Untitled*

- Main Camera
- Directional Light
- Plane
- Cube
- Sphere
- Capsule
- Cylinder

Physics Rigidbody

- Character Controller
- Box Collider
- Sphere Collider
- Capsule Collider
- Mesh Collider
- Wheel Collider
- Terrain Collider
- Cloth
- Hinge Joint
- Fixed Joint
- Spring Joint
- Character Joint
- Configurable Joint
- Constant Force

Asset Store

Gizmos **Gizmos** **Q+All**

Inspector Services

Tag Untagged **Layer** Default

Transform

Position	X	—	Y	—	Z	—
Rotation	X	0	Y	0	Z	0
Scale	X	1	Y	1	Z	1

Cylinder (Mesh Filter)

Mesh

Mesh Renderer

- Cast Shadows
- Receive Shadows
- Motion Vectors

Materials

- Size: 1
- Element 0
- Light Probes: Blend Probes
- Reflection Probes: Blend Probes
- Anchor Override: None (Transform)

Components that are only on some of the selected objects cannot be multi-edited.

Add Component

Project **Console**

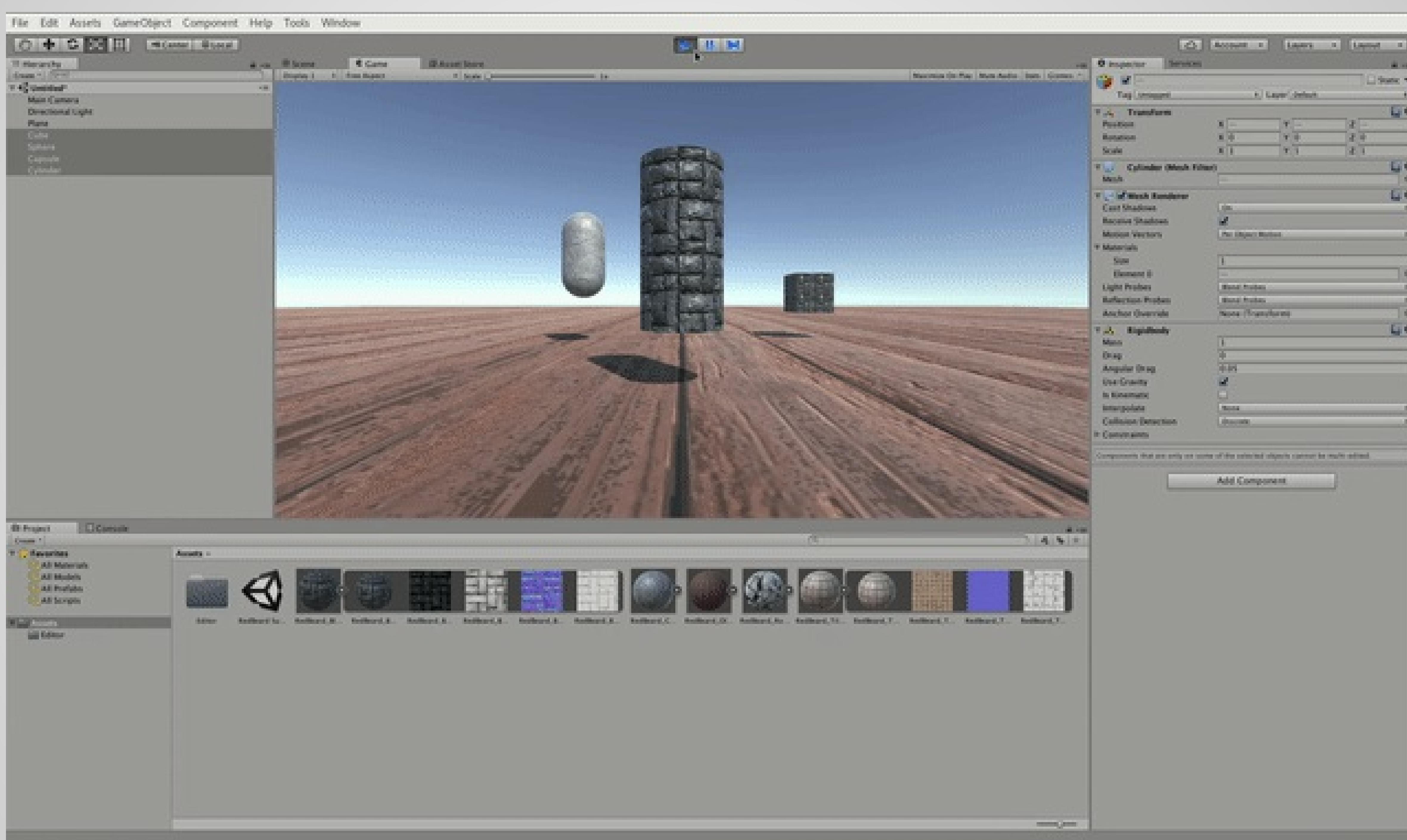
Create

Favorites

- All Materials
- All Models
- All Prefabs
- All Scripts

Assets

Editor RedBeard_Su... RedBeard_B... RedBeard_B... RedBeard_B... RedBeard_B... RedBeard_B... RedBeard_C... RedBeard_Ol... RedBeard_Ro... RedBeard_Til... RedBeard_T... RedBeard_T... RedBeard_T...



File Edit Assets GameObject Component Help Tools Window



Center Local



Cloud Account Layers Layout

Hierarchy

Create (Q) All

Untitled*

Main Camera
Directional Light
Plane
Cube
Sphere
Capsule
Cylinder
Cylinder (1)
Capsule (1)
Sphere (1)
Cube (1)
Capsule (2)
Capsule (3)
Cylinder (2)
Cube (2)
Cube (3)
Sphere (2)
Sphere (3)
Sphere (4)
Sphere (5)
Sphere (6)
Cube (4)
Cube (5)

Scene

Game

Asset Store

Shaded

2D

Lights

Audio

Image

Movie

Material

Texture

Model

Prefab

Script

Shader

Component

Light

Light Pro

Light Pro 2

Light Pro 3

Light Pro 4

Light Pro 5

Light Pro 6

Light Pro 7

Light Pro 8

Light Pro 9

Light Pro 10

Light Pro 11

Light Pro 12

Light Pro 13

Light Pro 14

Light Pro 15

Light Pro 16

Light Pro 17

Light Pro 18

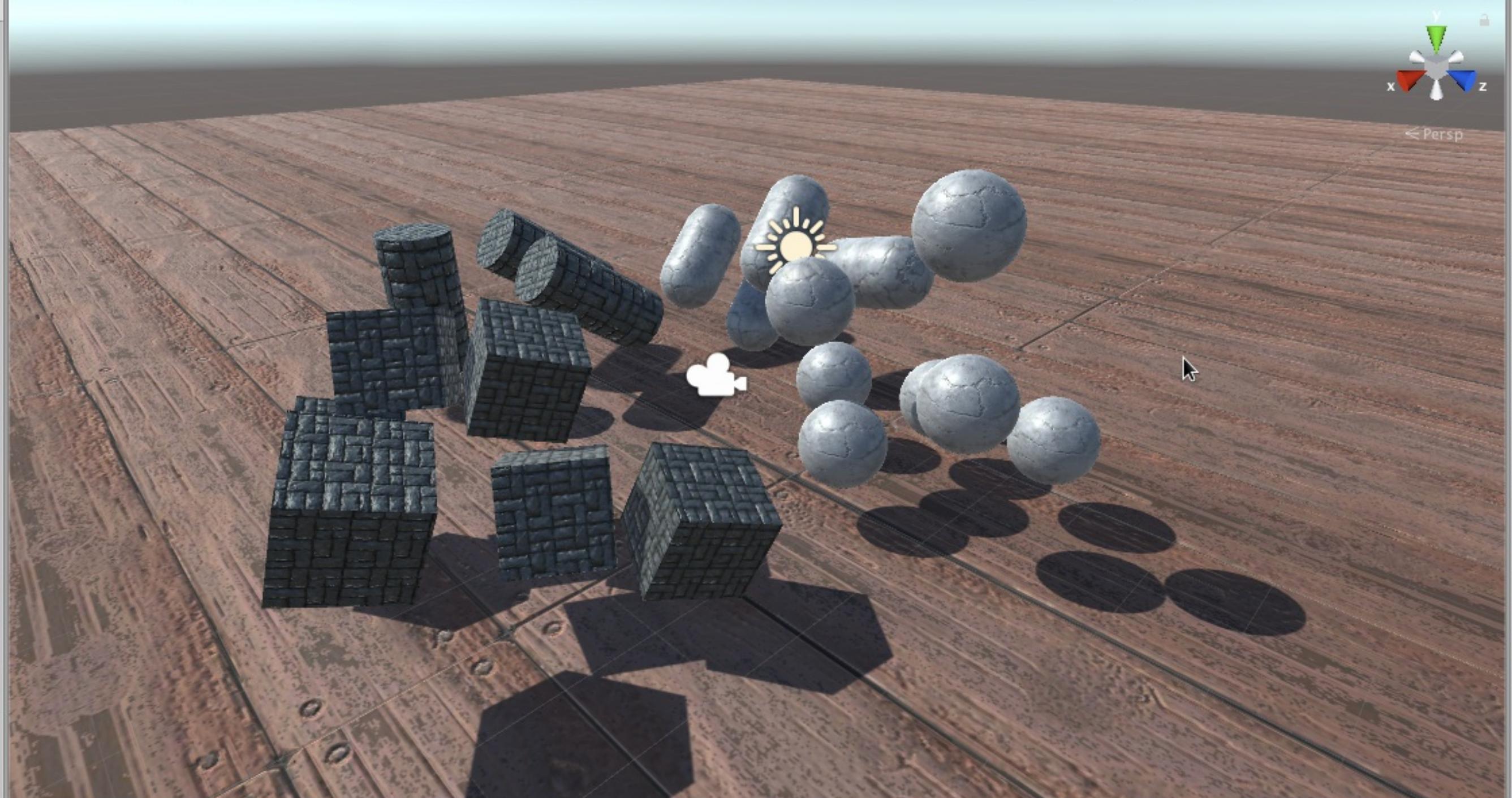
Light Pro 19

Light Pro 20

Gizmos

(Q) All

Inspector Services



Project Console

Create

Favorites

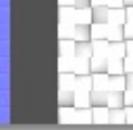
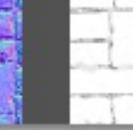
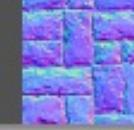
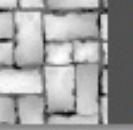
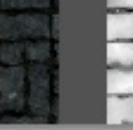
All Materials
All Models
All Prefabs
All Scripts

Assets

>

Editor

RedBeard Su...



Assets

>

Editor

File Edit Assets GameObject Component Help Tools Window



M Hierarchy

Assets

Main Camera

Directional Light

Plane

Cube

Sphere

Capsule

Cylinder

Cube (2)

Capsule (2)

Sphere (2)

Cube (2)

Capsule (2)

Cylinder (2)

Cube (2)

Cube (2)

Sphere (2)

- Import the Unity package by going to Assets > Import Package > Custom Package.

- Apply Camera by going to Assets/GoogleVR/Prefabs and move the GvrViewerMain onto the camera.

- Play Scene. (Mention building it for Android and provide it later on)

What can I do in pure Android only?

- VrPanoramaView/VrVideoView
 - integration of photospheres in view hierarchies
- integration with other (Java) libraries
- sending of Intents easily

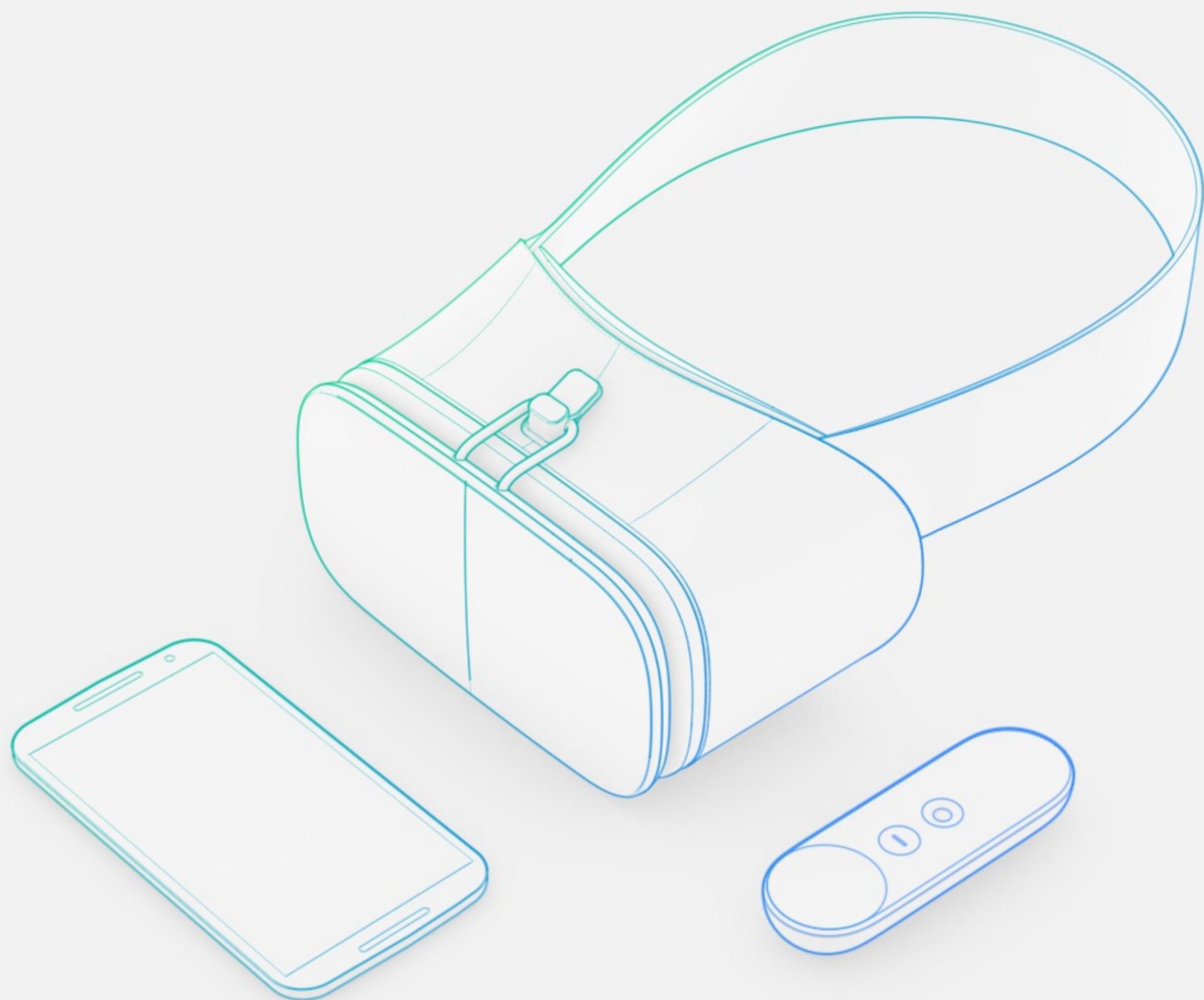
Limitations of Android SDK

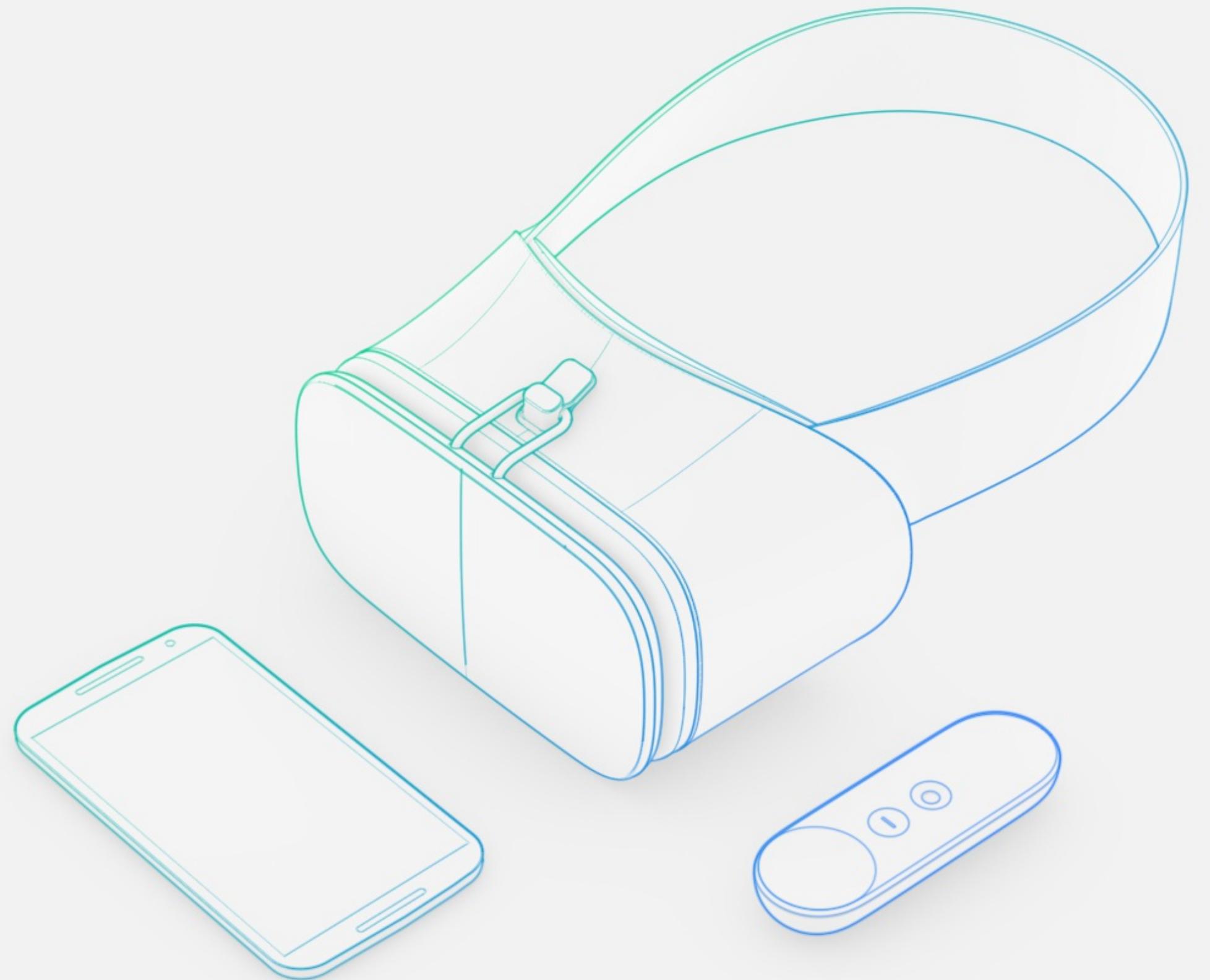
- using 3D models has to be done by
 - either low level OpenGL or
 - 3rd party 3d engine

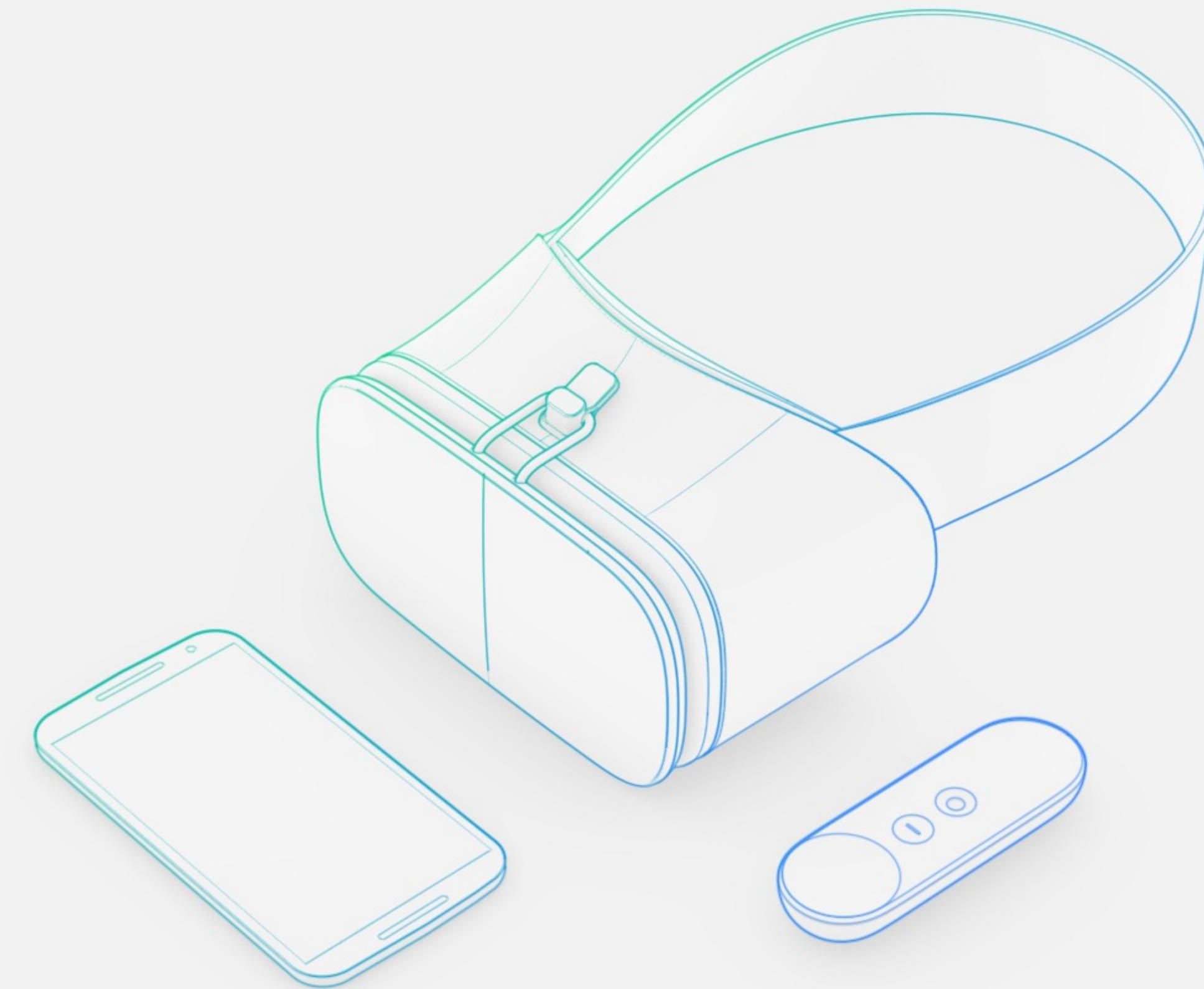
Adding Photospheres to a simple project

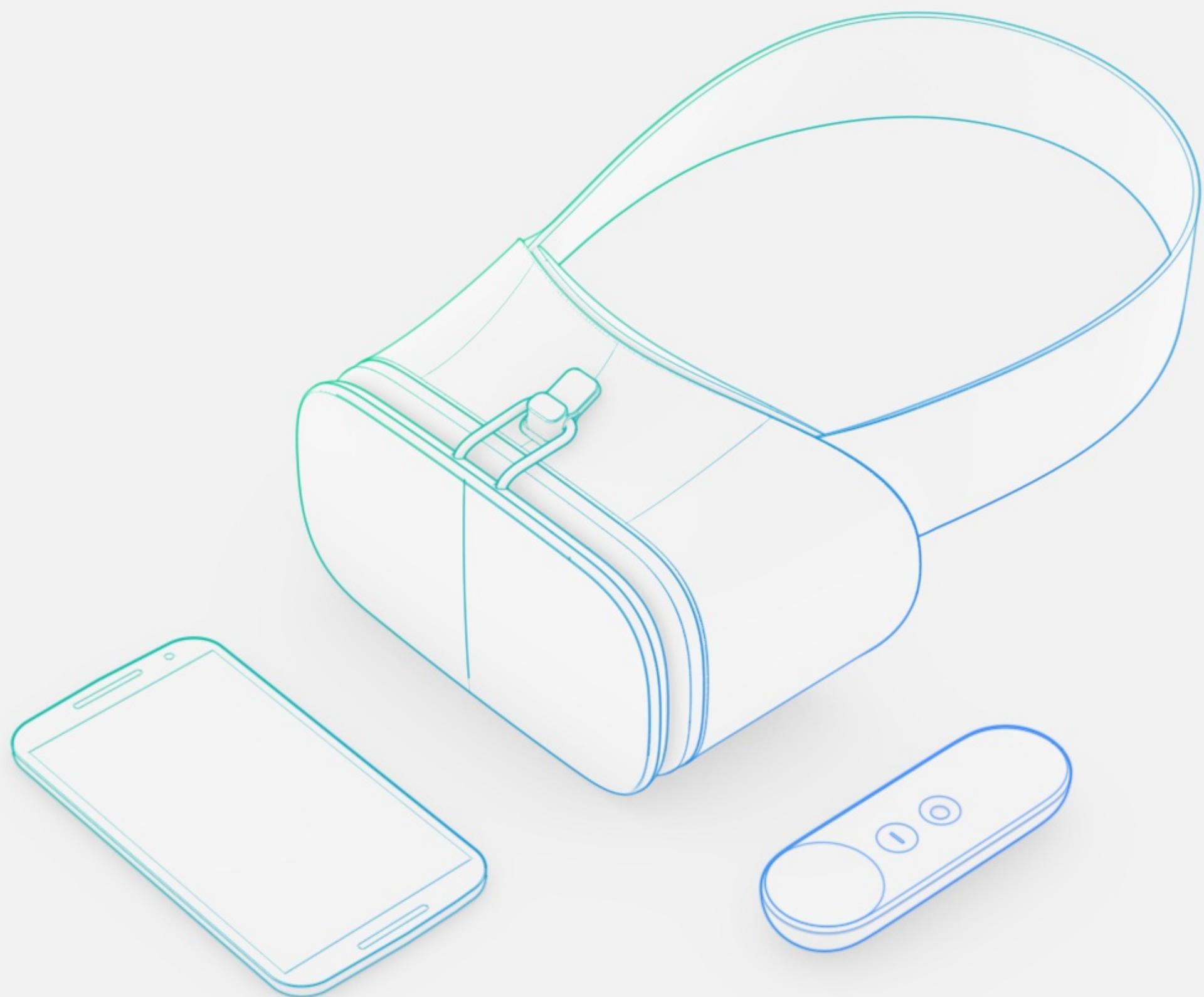


Daydream









New SDK features

- Controlling the controller
 - orientation/acceleration
 - clickpad (x,y, clicked)
 - buttons (App, Vol+/-)
- spatial audio engine

Deprecation & Deletion

- depreciation of v1.0 Cardboards 
- magnets are uncool!
- depreciation of cardboard button infavor of controller
- renaming Cardboard* packages to Gvr*

