

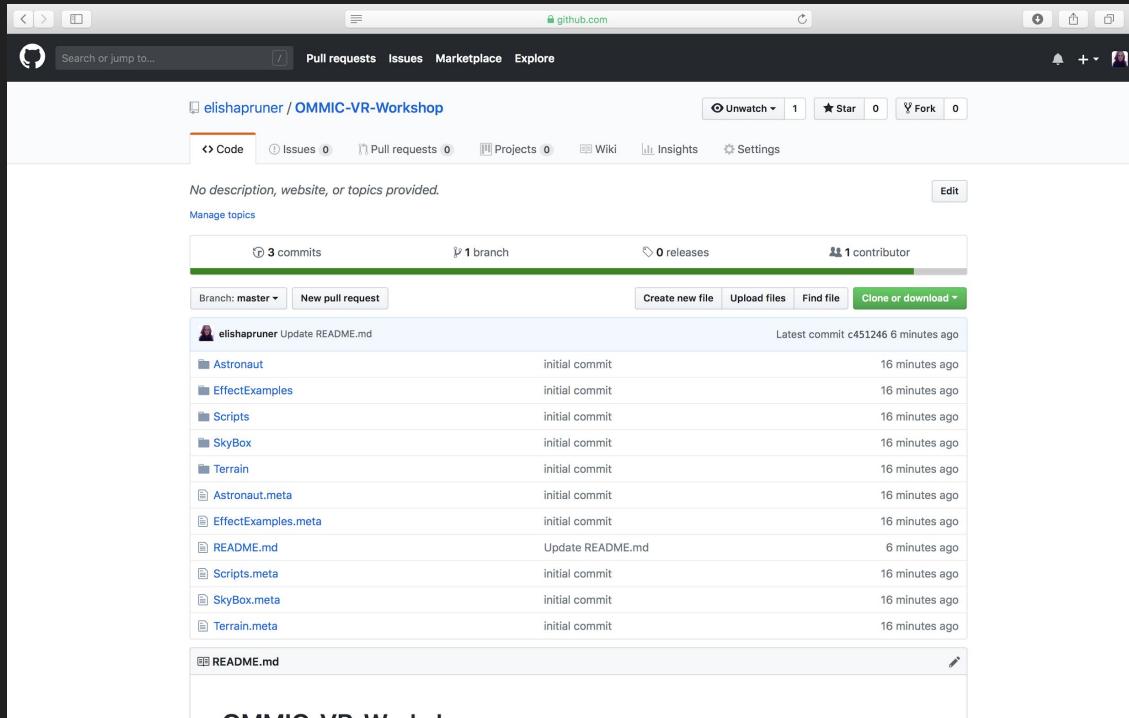
Virtual Reality Workshop

Elisha Pruner
Software Developer for VR

Download the Github Repo

github.com/elishapruner/OMMIC-VR-Workshop

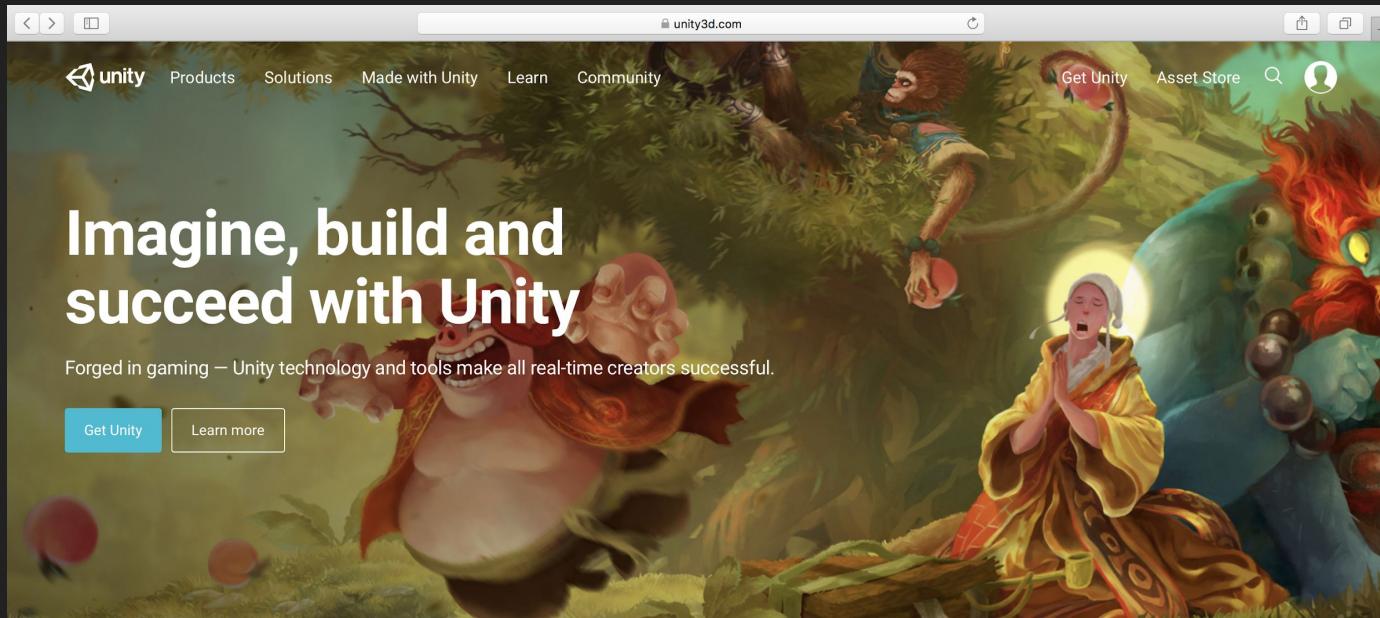
- Click on ‘Clone or Download’ and choose ‘Download ZIP’



MakerSpace
Wifi

W2uOttawa!

Unity3D.com



The screenshot shows the Unity3D.com homepage. At the top, there's a navigation bar with links for "Products", "Solutions", "Made with Unity", "Learn", and "Community". On the right side of the bar are links for "Get Unity", "Asset Store", a search icon, and a user profile icon. The main banner features a colorful illustration of a jungle scene with a monkey hanging from a vine and a monk in traditional robes. The text "Imagine, build and succeed with Unity" is prominently displayed in the center of the banner. Below the banner, a subtext reads "Forged in gaming – Unity technology and tools make all real-time creators successful." There are two buttons at the bottom of the banner: a blue "Get Unity" button and a white "Learn more" button. Below the banner, the page is divided into several sections. One section on the left shows a laptop screen displaying the Unity interface with the text "Introducing new Unity Pro benefits". Another section on the right shows a game environment with floating 3D assets and the text "Grow your game with Unity".

unity3d.com

Products Solutions Made with Unity Learn Community

Get Unity Asset Store

Imagine, build and succeed with Unity

Forged in gaming – Unity technology and tools make all real-time creators successful.

Get Unity Learn more

Introducing new Unity Pro benefits

Grow your game with Unity

Download Unity Personal

The screenshot shows a web browser window for store.unity.com. The main heading "Download Unity Personal" is displayed prominently in large white text against a green background. Below it, a sub-headline reads "Let's get you started! Download Unity and start creating today." A dark banner at the bottom of the page contains promotional text about Unity Plus benefits, with a "Learn more" link. The central area features a checkbox for accepting terms, followed by a detailed list of criteria for using Unity Personal. At the bottom, there are two blue call-to-action buttons: "Download Installer for Mac OS X" and "Download Unity Hub". A note at the very bottom indicates that Windows users should choose the Windows option.

store.unity.com

Download Unity Personal

Let's get you started! Download Unity and start creating today.

Are you a hobbyist aspiring to boost your skills and create faster with Unity? Get 12 months of Unity Game Dev Courses included free and get direct access to Unity experts through monthly Expert Live Sessions and our on demand Unity Success Advisor chat portal. Click to see all the other time-saving benefits with Unity Plus. [Learn more.](#)

Accept terms

By clicking, I confirm that I am eligible to use Unity Personal per the [Terms of Service](#), as I or my company meet the following criteria:

- Do not make more than \$100k in annual gross revenues, regardless of whether Unity Personal is being used for commercial purposes, or for an internal project or prototyping.
- Have not raised funds in excess of \$100K.
- Not currently using Unity Plus or Pro.

If you are not eligible to use Unity Personal, please [click here](#) to learn more about Unity Plus and Unity Pro.

[Download Installer for Mac OS X](#) [Download Unity Hub](#)

Looking to download the installer for Windows?
[Choose Windows](#)

Install Unity 2018 (do not install any other packages)

Download And Install Unity

Unity component selection

Install	Component	Download Size	Installed Size
<input checked="" type="checkbox"/>	Unity 2018.2.13f1	991 MB	2.40 GB
<input type="checkbox"/>	Visual Studio for Mac	820 MB	2.30 GB
<input type="checkbox"/>	Documentation	334 MB	821 MB
<input type="checkbox"/>	Android Build Support (*)	366 MB	1.26 GB
<input type="checkbox"/>	iOS Build Support (*)	1.37 GB	3.28 GB
<input type="checkbox"/>	tvOS Build Support (*)	495 MB	1.25 GB
<input type="checkbox"/>	Linux Build Support (*)	199 MB	591 MB
<input type="checkbox"/>	Mac Build Support (IL2C...)	42.5 MB	144 MB
<input type="checkbox"/>	Vuforia Augmented Realit...	65.9 MB	125 MB
<input type="checkbox"/>	WebGL Build Support (*)	278 MB	788 MB
<input type="checkbox"/>	Windows Build Support (...)	363 MB	1.27 GB

(*) Indicates that the component requires Unity to be installed

Space Required: 3.4 GB Space remaining: 44.02 GB

Unity Editor

Go Back Continue



The Visual Effects Possibilities with Unity



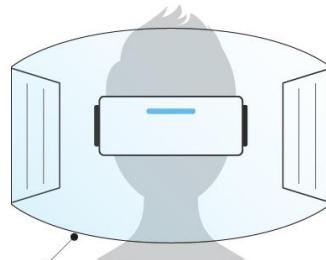
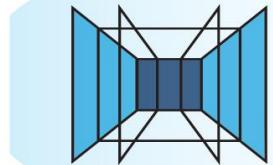
<https://youtu.be/vZqEGjVnXug>

Virtual Reality in the Workplace

VR - AR- Mixed Reality

VIRTUAL REALITY (VR)

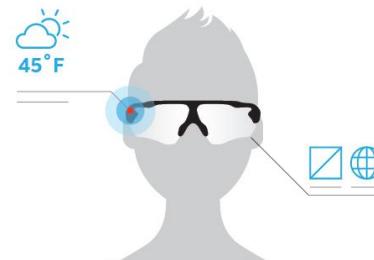
Completely digital environment



Fully enclosed, synthetic experience with no sense of the real world.

AUGMENTED REALITY (AR)

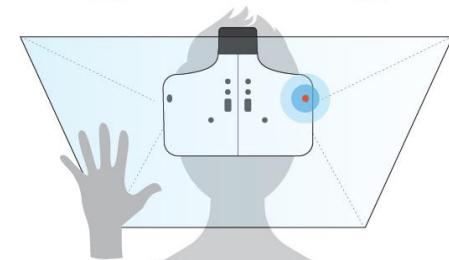
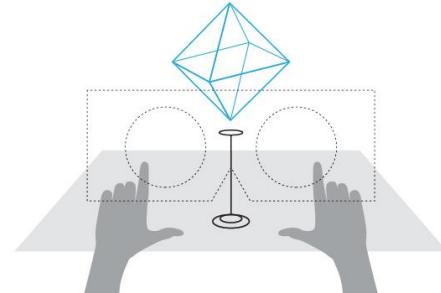
Real world with digital information overlay



Real world remains central to the experience, enhanced by virtual details.

MERGED REALITY (MR)

Real and the virtual are intertwined



Interaction with and manipulation of both the physical and virtual environment.

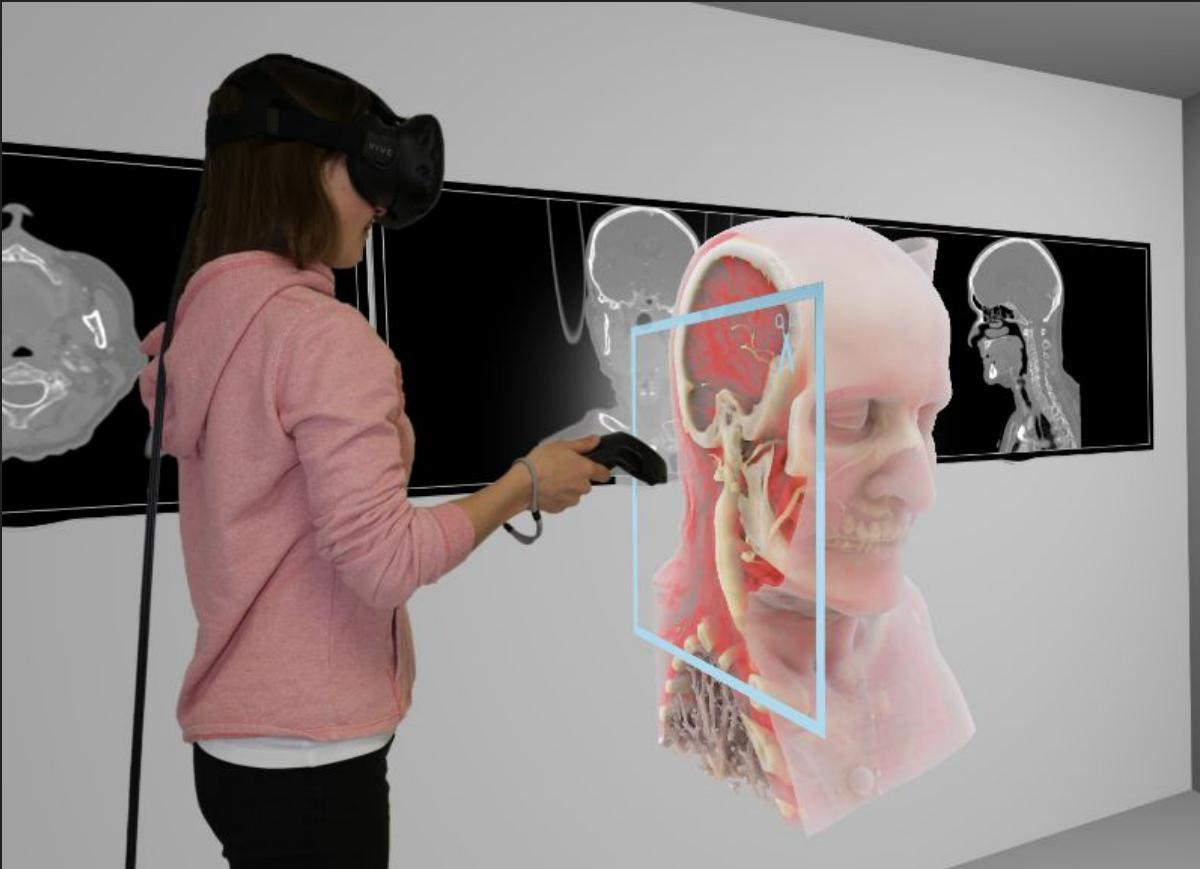
Microsoft Hololens - Mixed Reality



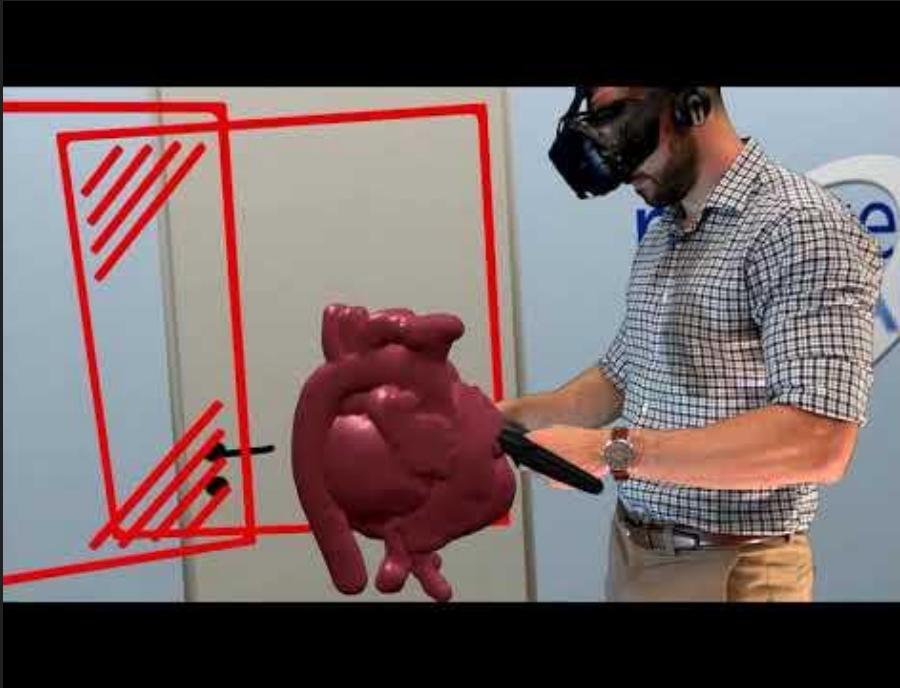
<https://youtu.be/Ke9-EgoAchw>

VR in the Medical Field

VR for Medical Visualization



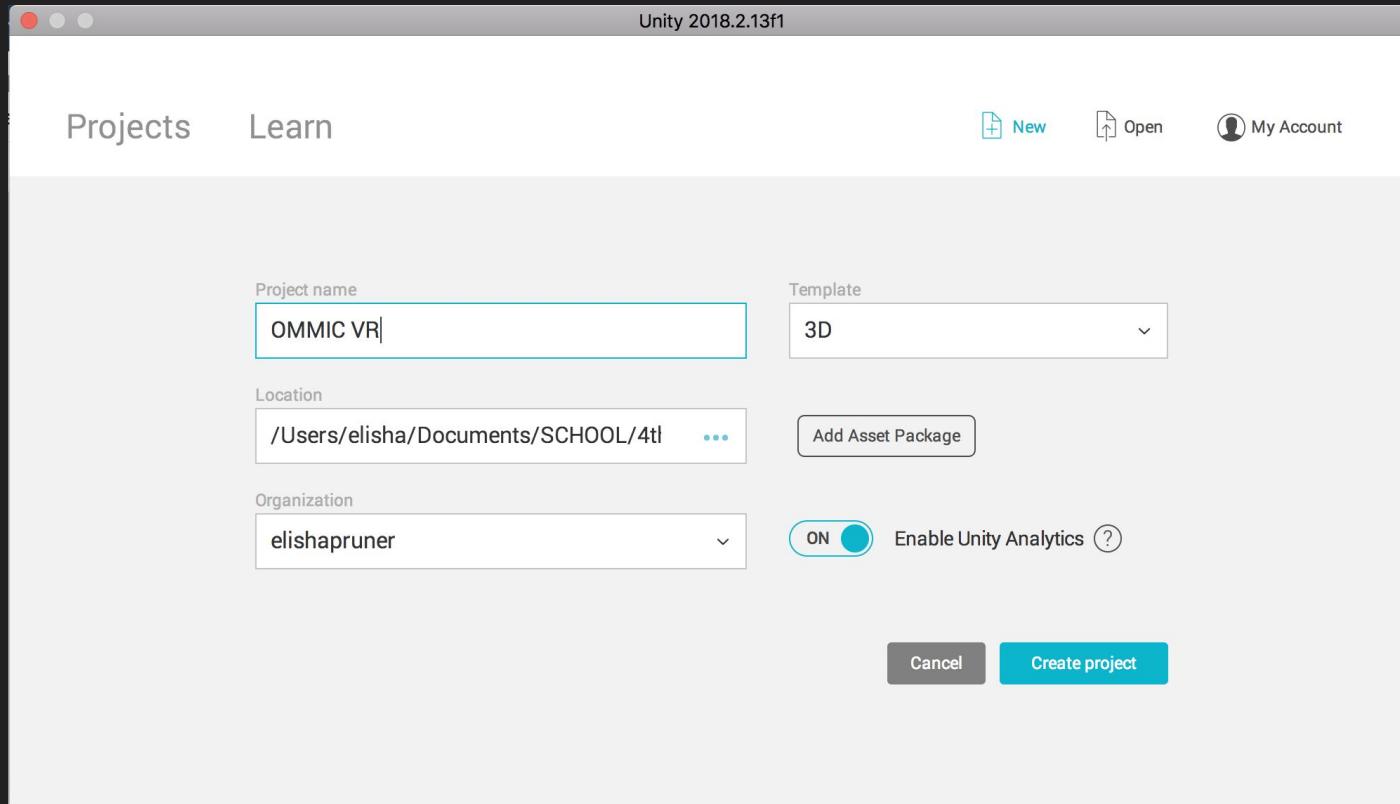
VR Apps at the Ottawa Hospital



<https://youtu.be/1i1nKS18nOo>

Starting a Unity Project

Create a New Project in Unity



Add the Github Assets to the Project

- Drag and drop all of the files from Github into the assets folder of your project



Creating 3D Assets for your Scene

TinkerCAD.com

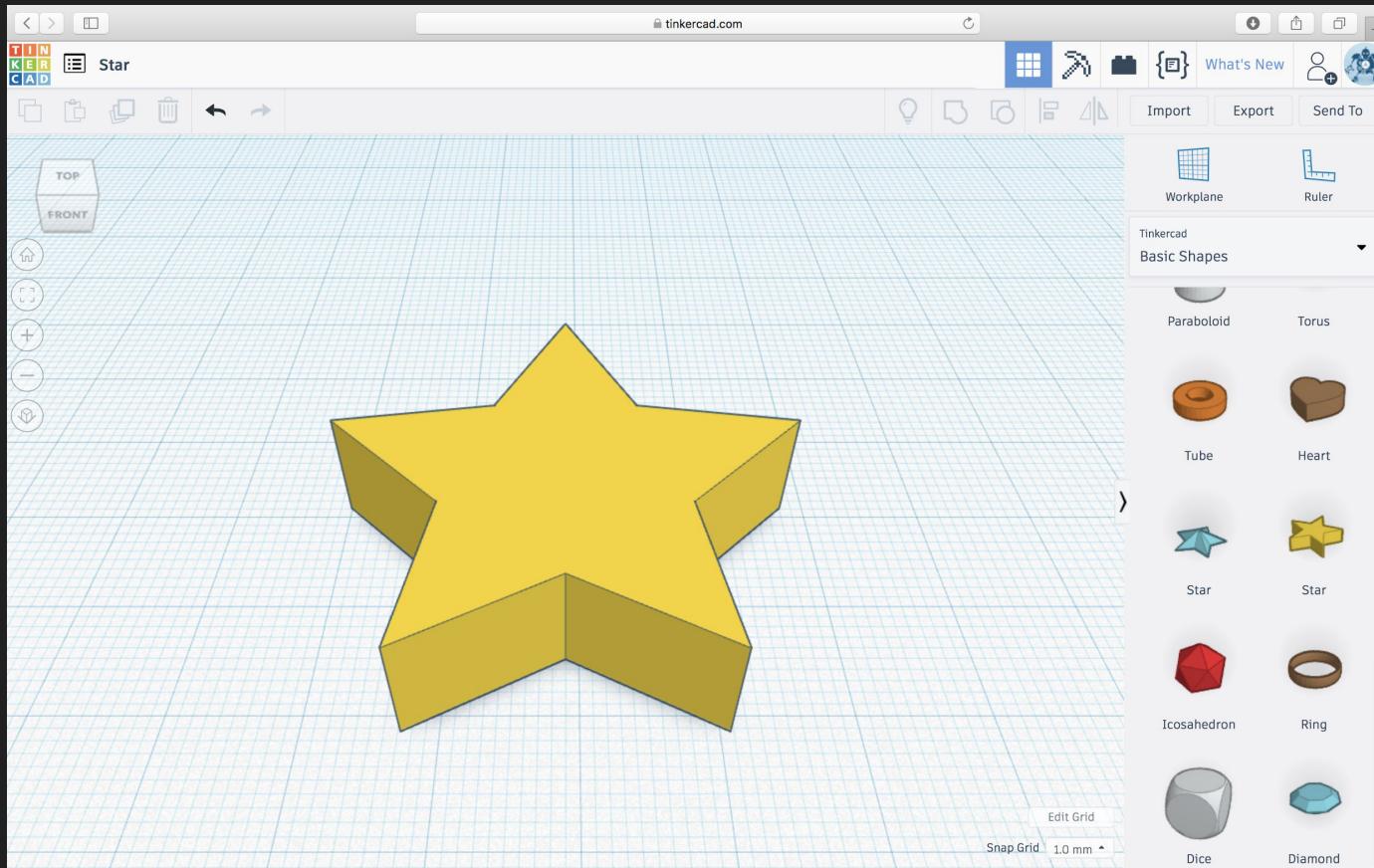
The screenshot shows the TinkerCAD website homepage. At the top, there's a navigation bar with icons for back, forward, and search, followed by the URL 'tinkercad.com'. To the right of the URL are links for 'Gallery', 'Blog', 'Learn', 'Teach', a magnifying glass icon for search, 'Sign in', and a 'JOIN NOW' button.

On the left side of the main area, the Autodesk TinkerCAD logo is displayed. The central focus is a 3D rendering of a scene featuring a green dinosaur-like creature, a potted plant, a yellow sun, several brown buildings, a rainbow, and a blue car. In the foreground, large red 3D text reads 'FLAT IS BORING'.

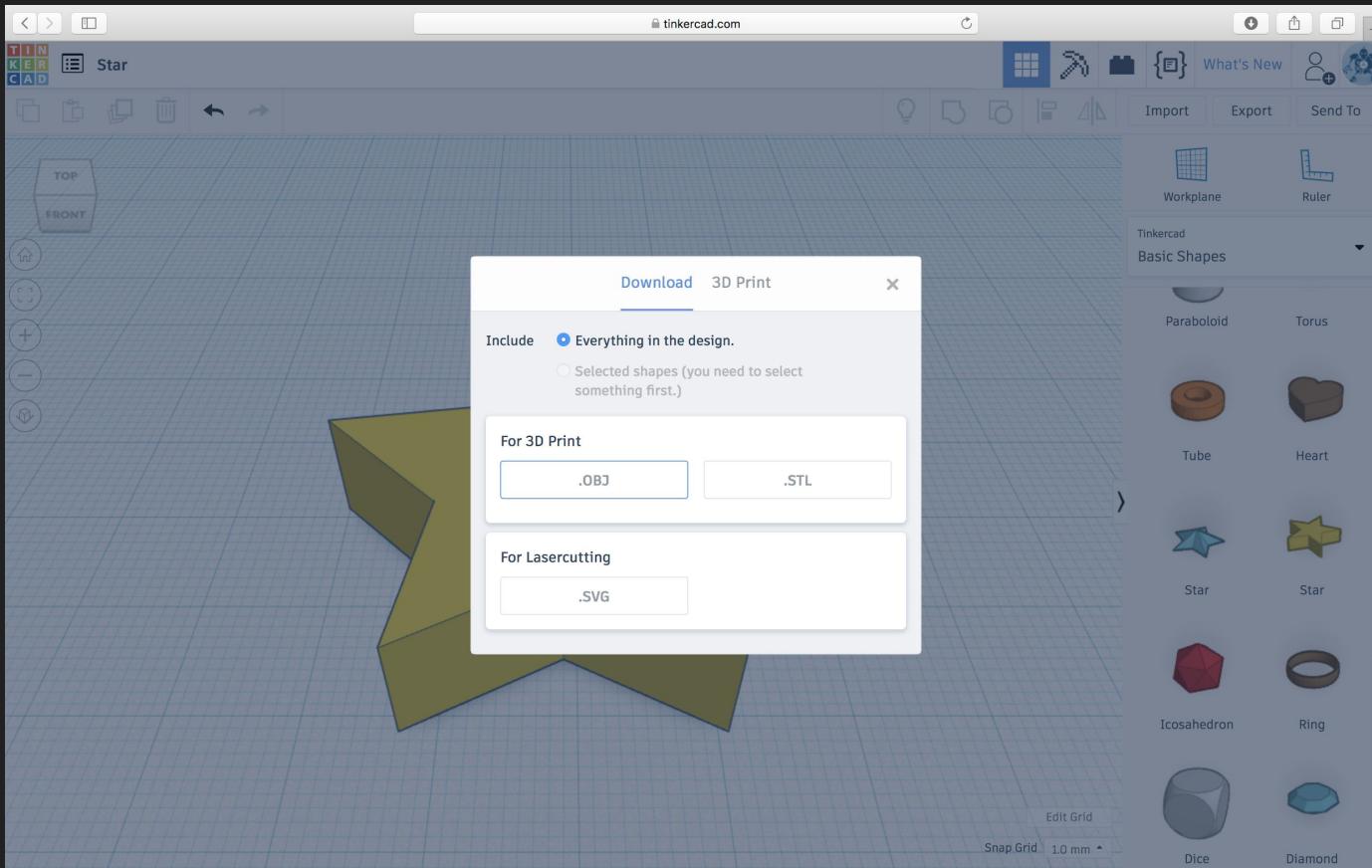
Below the scene, the tagline 'From mind to design in minutes' is centered. A descriptive paragraph follows: 'Tinkercad is a free, easy-to-use app for 3D design, electronics, and coding. It's used by teachers, kids, hobbyists, and designers to imagine, design, and make anything!'

A prominent blue button at the bottom center says 'Start Tinkering'.

Creating a Star in TinkerCAD



Export to OBJ File Format



Blender.org

The screenshot shows the Blender.org website's "Animation & Rigging" section. At the top, there is a navigation bar with links for Features, Download, Support, Get Involved, About, Donate, and Store. Below the navigation bar, there is a large image of a 3D animated character with glasses and a yellow shirt, standing next to a wireframe skeleton. To the left of the character, there are several smaller images showing different stages of rigging or animation. To the right of the character, there is a list of features:

- Envelope, skeleton and automatic skinning
- B-spline interpolated bones
- Curve editor and dope sheets
- Custom bone shapes for fast input
- Sound synchronization

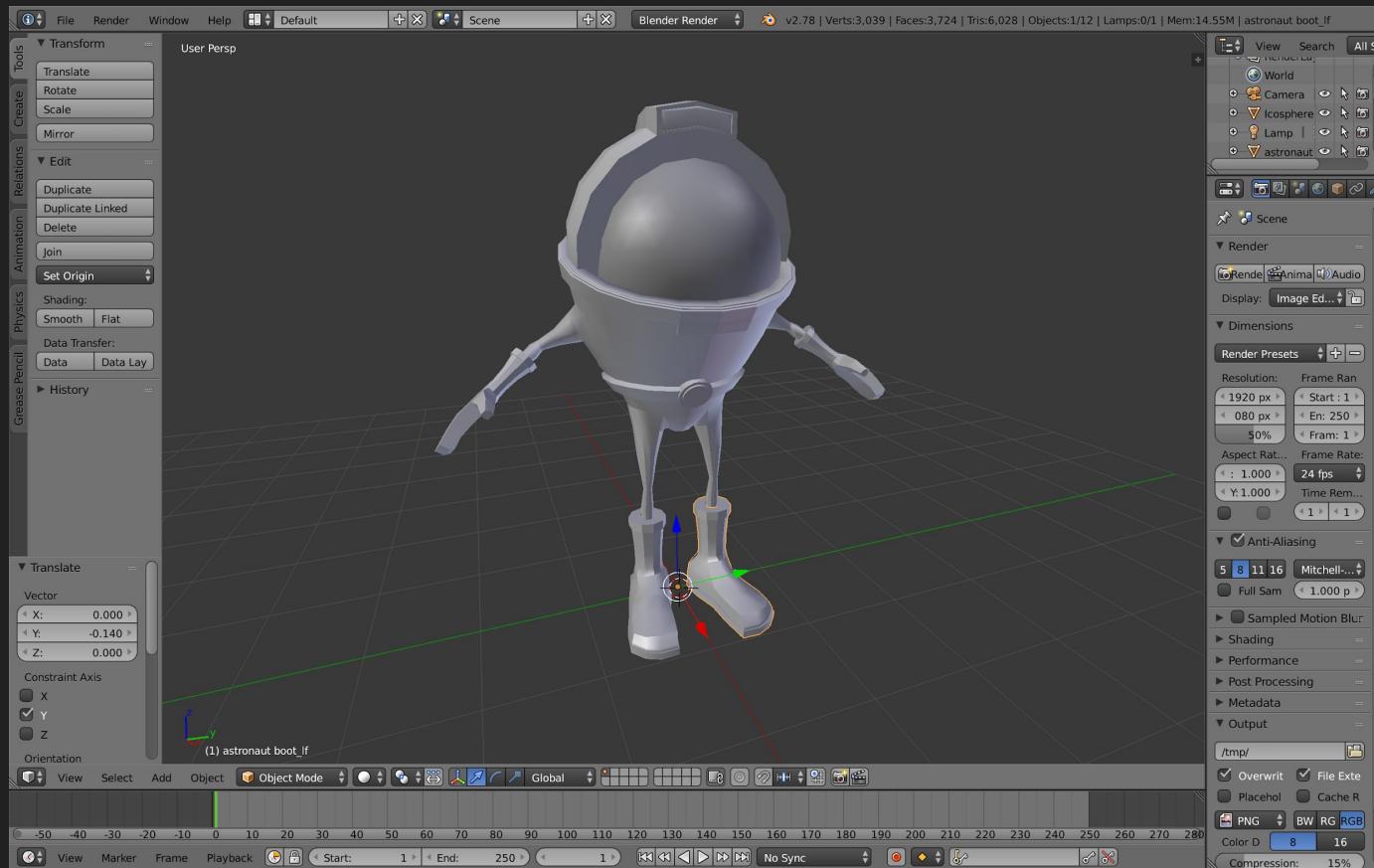
Below this section, there is another section titled "Story Art, drawing 2d in 3d". It includes a paragraph of text and a list of features:

Really! Drawing directly in a 3D viewport makes a lot of sense. It opens unsurpassed workflow freedom for story-boarders and 2D artists.

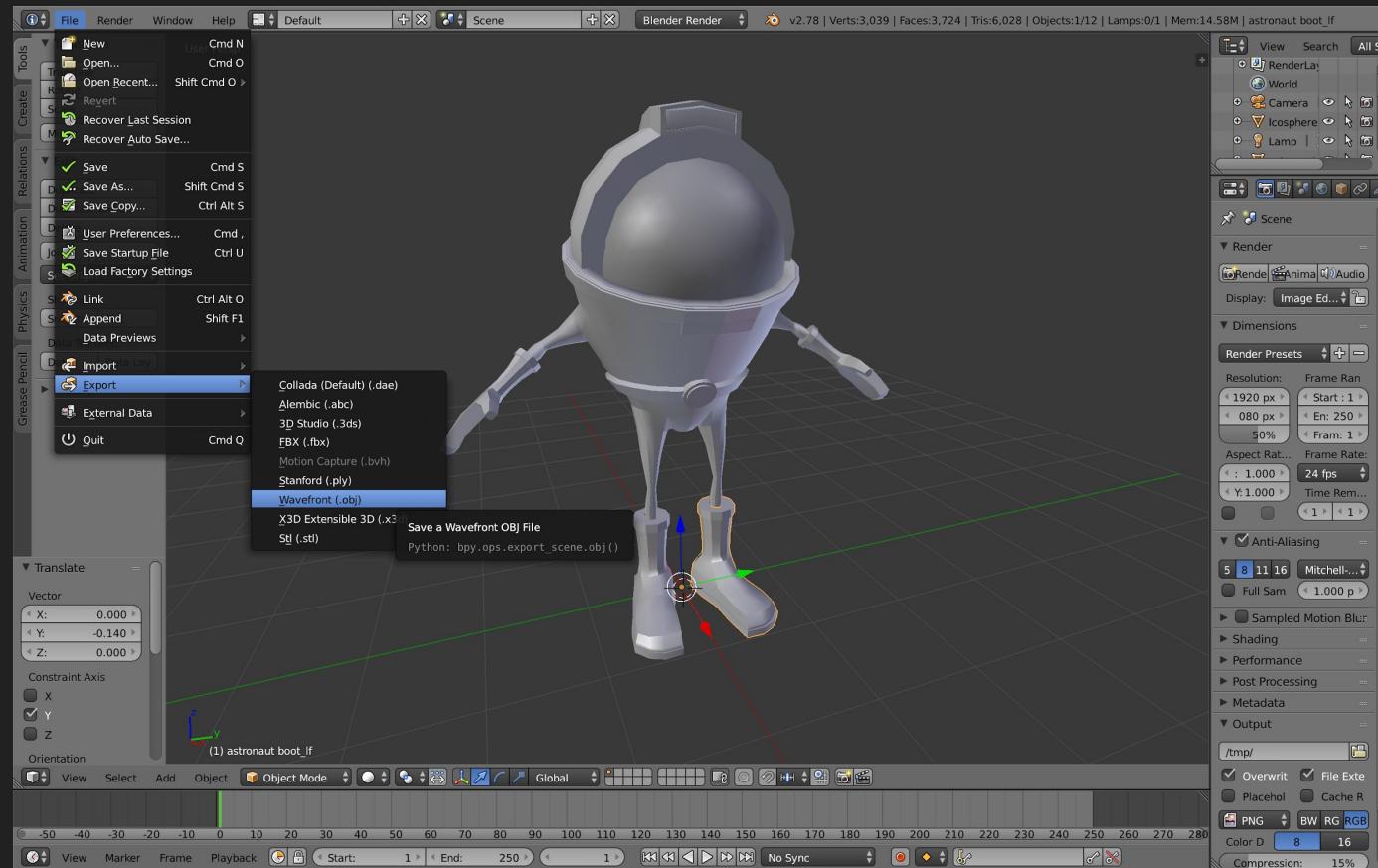
- Combine 2D with 3D right in the viewport
- Full Animation Support with Onion Skinning
- Layers & Colors for Stroke and Fill
- Sculpt brush strokes & Parent to 3D objects

The bottom right corner of the screenshot shows a screenshot of the Blender 3D software interface. The interface features a 3D viewport showing a yellow car and some trees. The interface is filled with various toolbars and panels, including the Outliner, Properties, and Shading panels. The overall theme of the website is dark, with the Blender logo and interface being the primary light sources.

Creating a Character in Blender



Export The 3D Character to OBJ File Format



SolidWorks.com - Export as OBJ

The screenshot shows the official website for SOLIDWORKS, accessible via solidworks.com. The page features a prominent red header bar with the SOLIDWORKS logo and navigation links for "Products & Solutions", "Choosing SOLIDWORKS", "Community", and "More...". A "Try now" button is also visible in the header. Below the header, a large banner image displays a complex mechanical assembly with red highlights on certain parts, illustrating the software's capabilities. The main headline on the banner reads "3D CAD" and describes the software as providing "Intuitive 3D design and product development solutions from SOLIDWORKS let you conceptualize, create, validate, communicate, manage, and transform your innovative ideas into great product designs." At the bottom of the page, there are social media sharing icons for LinkedIn, Facebook, and YouTube, along with links to "SOLIDWORKS 3D CAD", "SOLIDWORKS xDesign", and "SOLIDWORKS Product Design".

[solidworks.com](#)

DASSAULT SYSTEMES

SOLIDWORKS

Products & Solutions ▾ Choosing SOLIDWORKS ▾ Community ▾ More... Try now

SOLIDWORKS > 3D CAD

3D CAD

Intuitive 3D design and product development solutions from SOLIDWORKS let you conceptualize, create, validate, communicate, manage, and transform your innovative ideas into great product designs.

Share

SOLIDWORKS 3D CAD

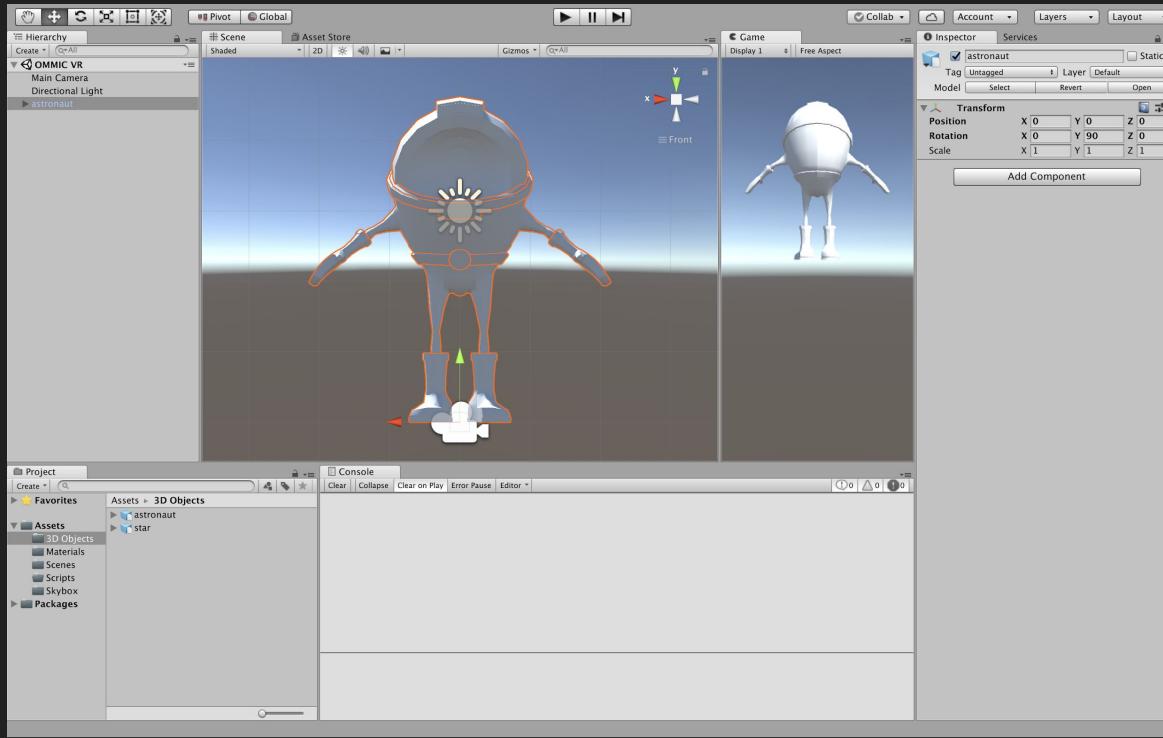
SOLIDWORKS xDesign

SOLIDWORKS Product Design

Adding the Astronaut to the Scene

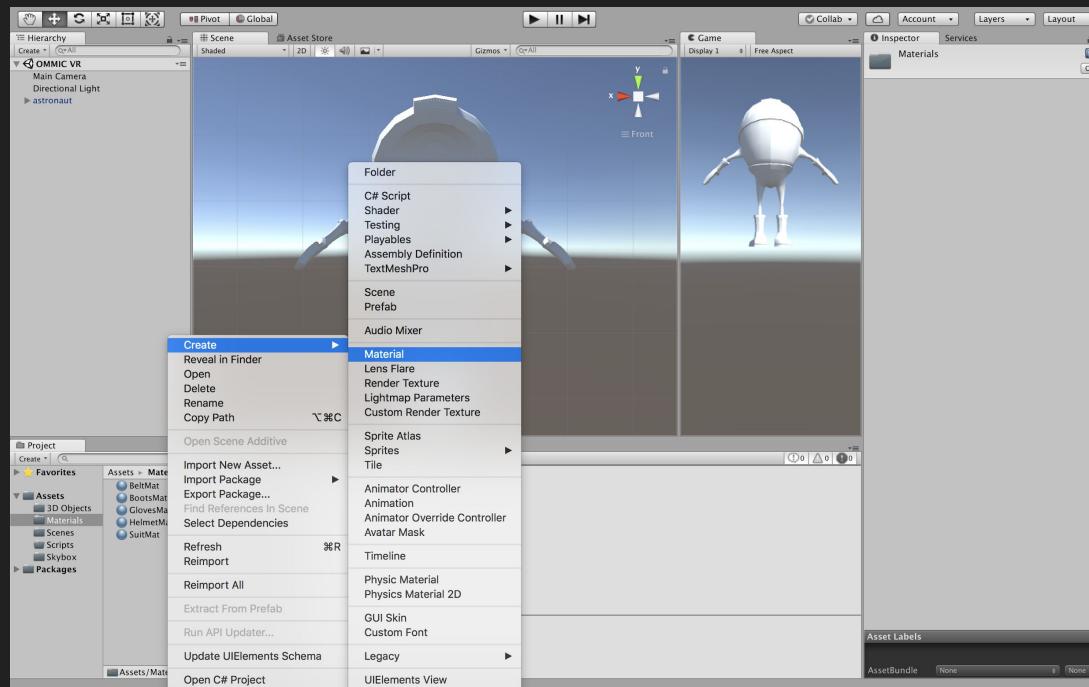
Drag the Astronaut Character into the Scene

- Change the position, rotation, and scale of the character
- Change front, right, left, right, top, bottom viewing angle



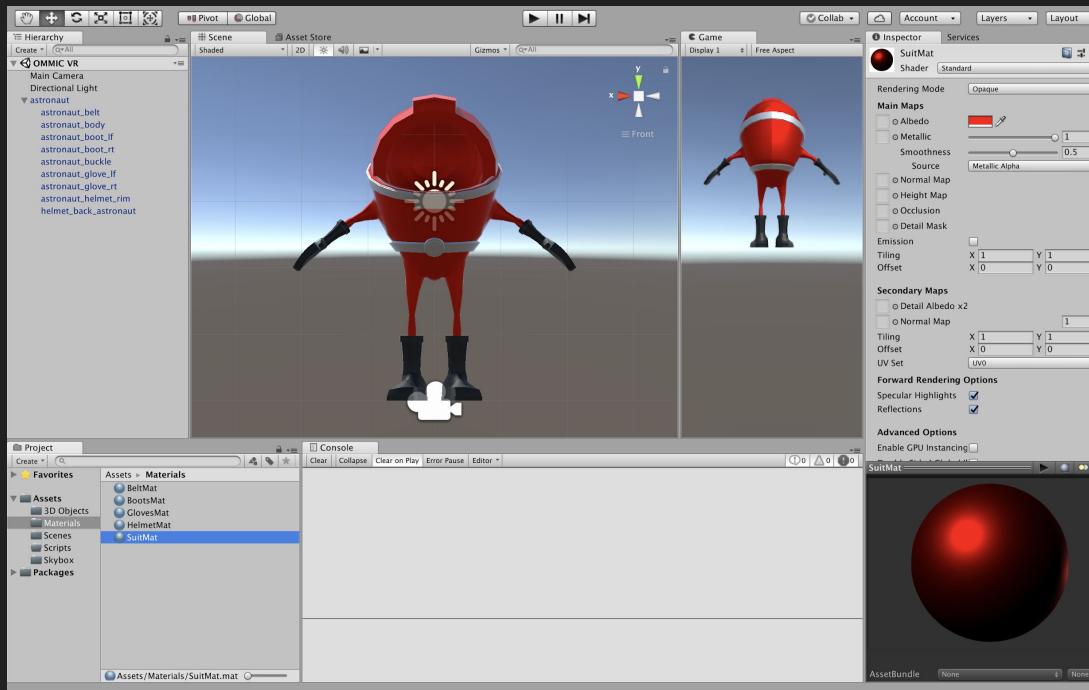
Create New Materials for the Character

- Right click on the ‘Assets’ folder and Create -- Folder
- Name the new folder ‘Materials’
- Go into the Materials folder, then right click and Create -- Material



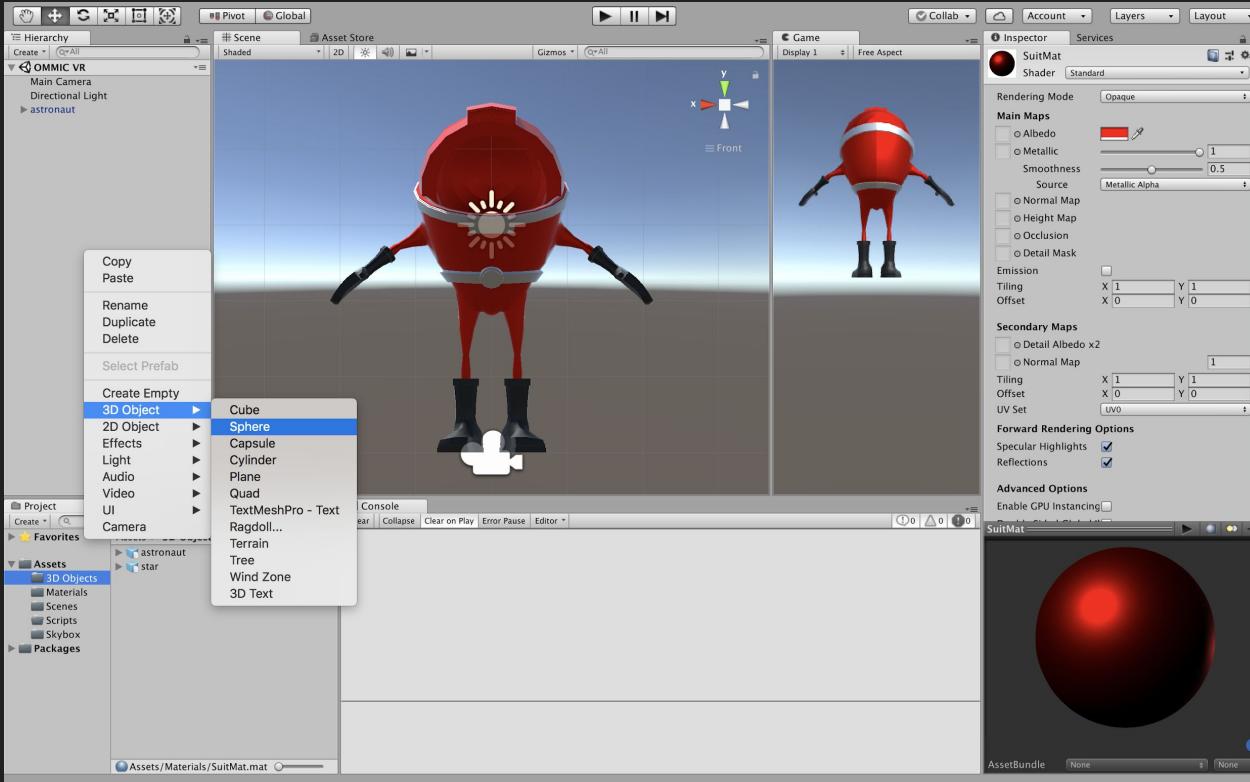
Drag the New Material onto the Character

- Create as many new materials as you want
- Drag and drop the material onto the area that you want to color
- Change the material properties in the Inspector Window



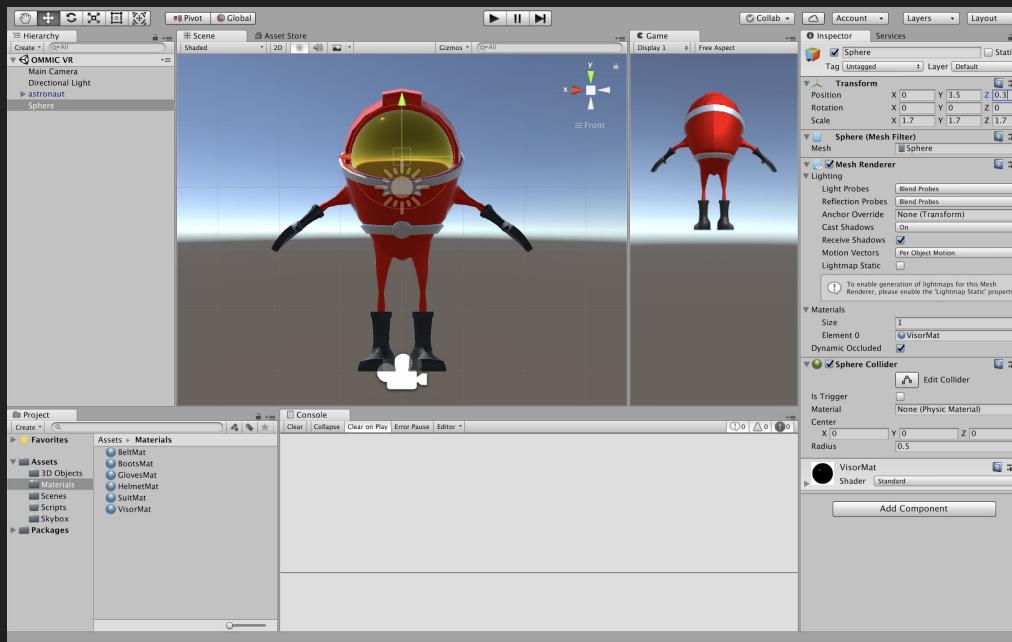
Creating 3D Meshes Inside Unity

- Right click on the ‘Hierarchy’ window and click ‘3D Object’ -- ‘Sphere’



Move and Scale the Sphere

- Move to position $x=0$, $y=3.5$, $z=0.3$ in the Inspector window under ‘Transform’
- Scale to $x=1.7$, $y=1.7$, $z=1.7$ in the Inspector window under ‘Transform’
- Add a material for the sphere
- Drag Sphere over astronaut in the Hierarchy to make it a child of astronaut



Creating a Skybox

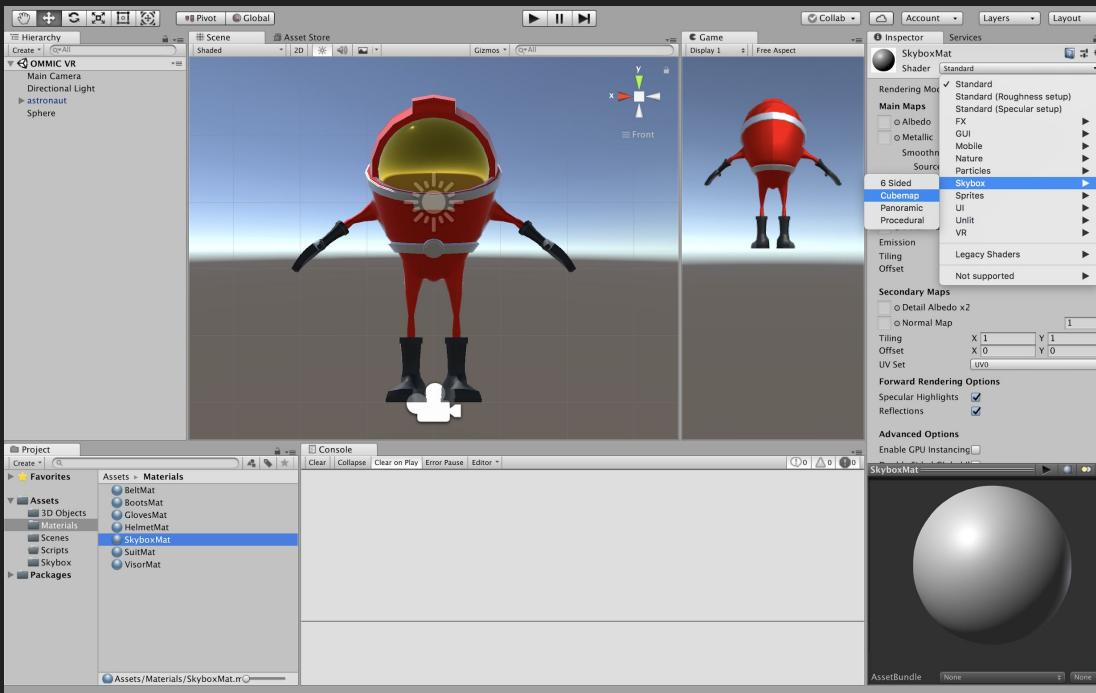
Skybox Backgroud Images

- HDR File Format - High Dynamic Range Image
- HDR images provide the sky color and also light the scene



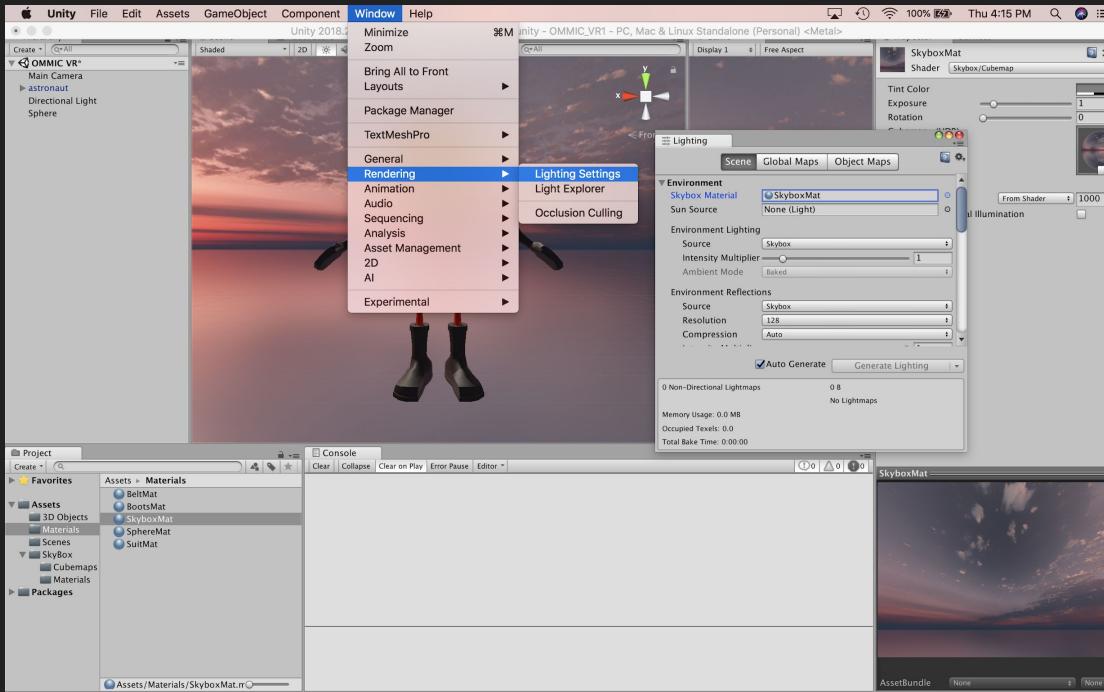
Add a New SkyBox Material

- Go to the Materials folder, right click and add a new material
- Name the material SkyboxMat
- In the Inspector, use the Shader dropdown and click on Skybox -- Cubemap



Adding the Skybox to the Scene

- In the Inspector, press select in Cubemap HDR and select a cubemap
- Then click on Window -- Rendering -- Lighting Settings and choose SkyboxMat as the material



Adding Terrain to the Scene

Drag the Terrain Mesh into the Scene

- In the Inspector change position to x=50, y=-2.2, z=50
- Rotation x=-90, y=0, z=0 and Scale x=100, y=100, z=100



Add the Terrain Material to the Terrain Mesh

- Drag and drop TerrainMat into the scene on the Terrain_Mesh
- TerrainMat uses a color and normal texture to create a realistic material



Moving the Camera using C# Scripts

MoveCamera Script

- Drag the MoveCamera script onto the Camera in the scene

```
1  using System.Collections;
2  using System.Collections.Generic;
3  using UnityEngine;
4
5  public class MoveCamera : MonoBehaviour {
6
7      void Update () {
8          Vector3 posOrigin = new Vector3(0, 2, 0);
9          transform.LookAt(posOrigin);
10
11         int step = 10;
12
13         if (Input.GetKey(KeyCode.RightArrow)) {
14             transform.Translate(Vector3.right * step * Time.deltaTime);
15         }
16         else if (Input.GetKey(KeyCode.LeftArrow)) {
17             transform.Translate(-Vector3.right * step * Time.deltaTime);
18         }
19         else if (Input.GetKey(KeyCode.UpArrow)) {
20             transform.Translate(Vector3.forward * step * Time.deltaTime);
21         }
22         else if (Input.GetKey(KeyCode.DownArrow)) {
23             transform.Translate(-Vector3.forward * step * Time.deltaTime);
24         }
25     }
26
27 }
```

PointShootCamera Script

- Drag the PointShootCamera script onto the Camera in the scene

```
1  using System.Collections;
2  using System.Collections.Generic;
3  using UnityEngine;
4
5  public class PointShootCamera : MonoBehaviour {
6
7      float speed = 10.0f;
8
9      void Update() {
10
11         if (Input.GetAxis("Mouse X") > 0 || Input.GetAxis("Mouse X") < 0) {
12             float mouseX = Input.GetAxisRaw("Mouse X") * Time.deltaTime * speed;
13             float mouseY = Input.GetAxisRaw("Mouse Y") * Time.deltaTime * speed;
14
15             transform.position += new Vector3(mouseX, 0.0f, mouseY);
16         }
17     }
18
19 }
20
```

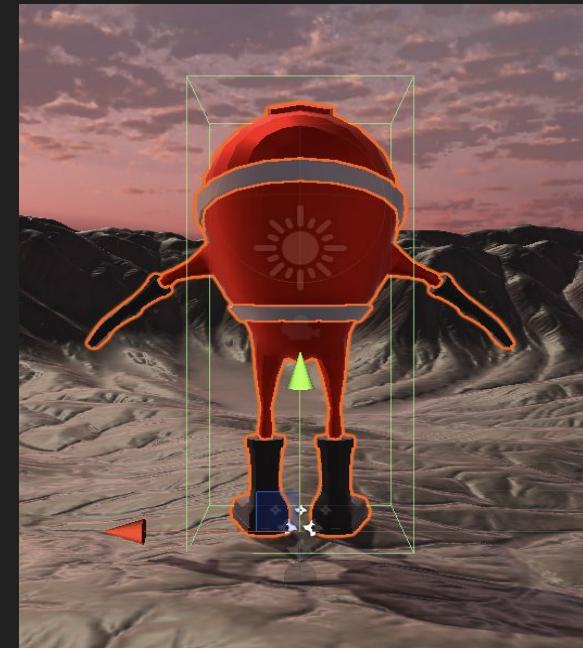
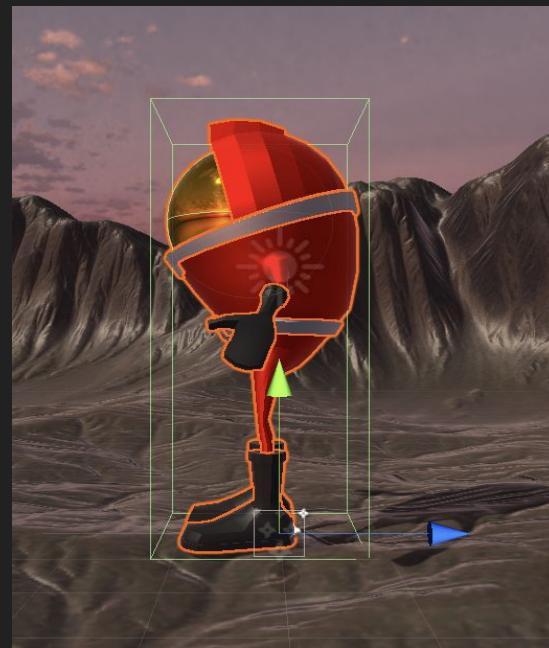
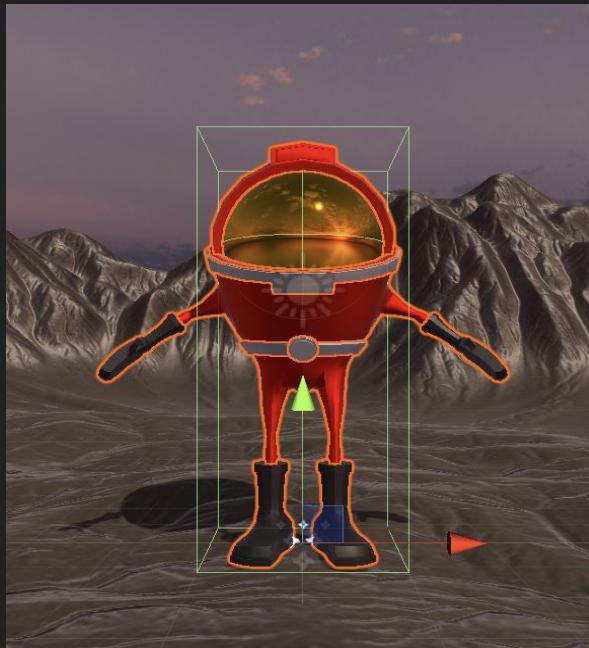
Adding a Collider to the Character

Create a Box Collider Around the Character

- In the Inspector, click on ‘Add Component’ and search for ‘Box Collider’
- Set Center x=-0.2, y=2.3, z=0
- Set Size x=2, y=4.6, z=2



Box Collider from Different Angles



Particle Explosions

Particle Effect Explosions

assetstore.unity.com

unity Asset Store 3D 2D Add-Ons Audio Templates Tools VFX

All Assets ▾ Type here to search assets

Learn Game Development Plus/Pro Impressive New Assets Shop On Old Store

Home > Essentials > Asset Packs > Unity Particle Pack 5.x

UNITY TECHNOLOGIES

Unity Particle Pack 5.x

FREE

★★★★★ 91 user reviews

Add to My Assets

Note: this particle pack is compatible for Unity 5.5. Find the brand new Particle Pack for 2018 [HERE!](#) This pack of sample particle assets can be used in your games and to help you understand how to achieve certain effects using the Unity Particle System component and modules. You'll find Fire, Explosions, Rain and other cool effects, free to download

+1

Adding an Explosion to the Scene

- Under Assets, go to ‘Effects Examples’ -- ‘FireExplosionEffects’ -- ‘Prefabs’
- Drag and drop ‘BigExplosionEffect’ into the scene
- Make ‘BigExplosionEffect’ a child of the ‘astronaut’ in the Hierarchy

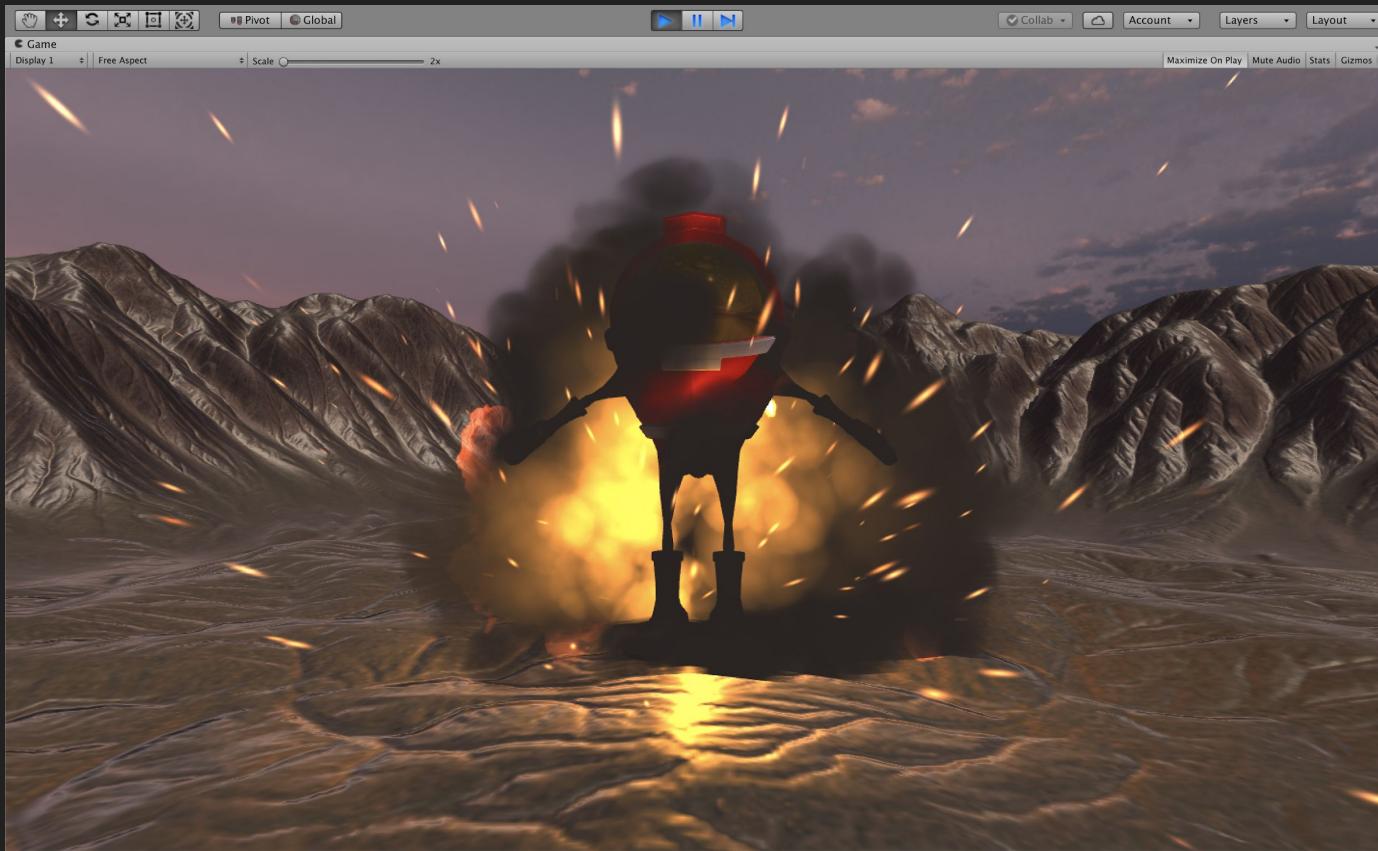


StartExplosion Script

- Drag the StartExplosion script onto the Camera in the scene

```
1  using System.Collections;
2  using System.Collections.Generic;
3  using UnityEngine;
4
5  public class StartExplosion : MonoBehaviour {
6
7      public ParticleSystem explosion;
8      Camera camera;
9
10     void Start() {
11         explosion.Stop();
12         camera = GetComponent<Camera>();
13     }
14
15     void Update () {
16         if (Input.GetMouseButtonDown(0)) {
17             Ray ray = camera.ScreenPointToRay(Input.mousePosition);
18             RaycastHit hit;
19
20             if (Physics.Raycast(ray, out hit)) {
21                 explosion.Play();
22             }
23         }
24         else if (Input.GetMouseButtonUp(0)) {
25             explosion.Stop();
26         }
27     }
28
29 }
```

Explosion on Mouse Click Event



MoveCharacter Script

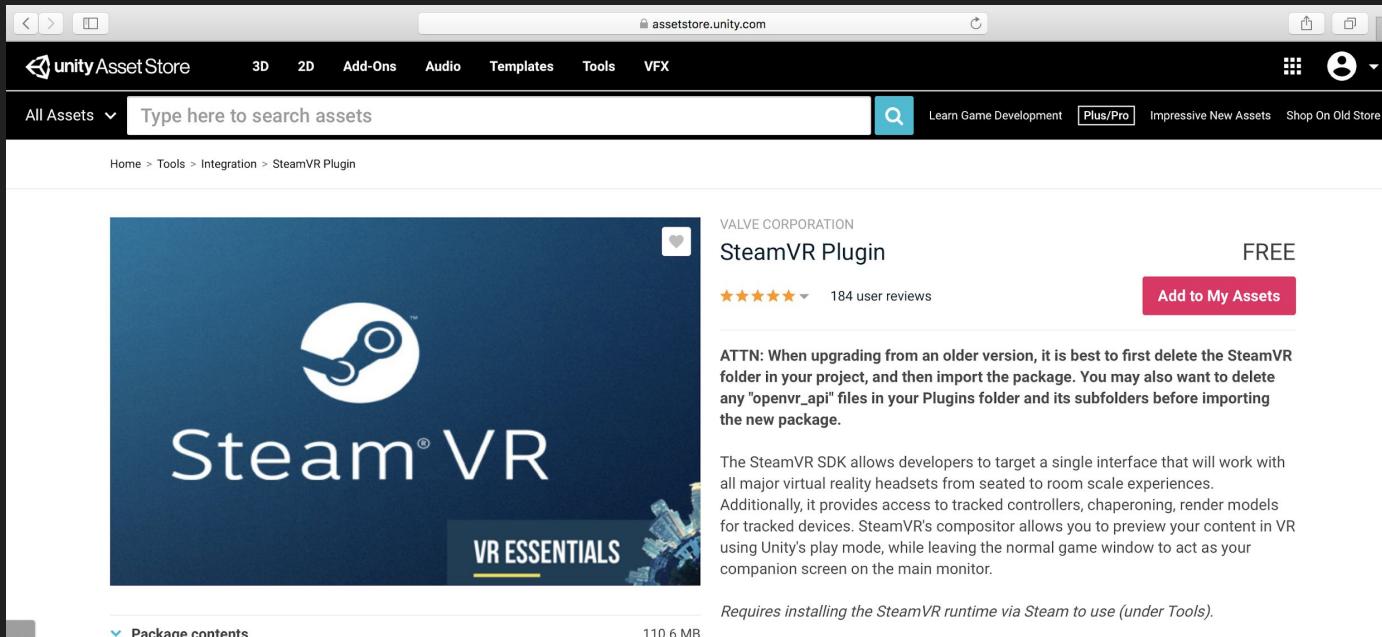
- Drag the MoveCharacter script onto the astronaut in the scene

```
1  using System.Collections;
2  using System.Collections.Generic;
3  using UnityEngine;
4
5  public class MoveCharacter : MonoBehaviour {
6
7      int currTime = 0;
8
9      void Update () {
10
11         currTime += 1;
12
13         if (currTime > 100) {
14             float posX = Random.Range(-5.0f, 5.0f);
15             float posY = 0.0f;
16             float posZ = Random.Range(-5.0f, 5.0f);
17
18             transform.position = new Vector3(posX, posY, posZ);
19             currTime = 0;
20         }
21     }
22
23 }
24
```

Running the Game with the HTC Vive VR Headset

SteamVR Plugin for Unity

- Download SteamVR from the Unity Asset Store, and import it into your project
- Under Assets, go to SteamVR -- Prefabs -- CameraRig and drag the CameraRig into the scene. Delete the old camera from the scene
- And then it just works! The VR headset is now your camera in the scene



Running the Game with
the Google Cardboard

Steps to Run on Google Cardboard



1. Building your Unity game for iOS or Android
 - unity3d.com/learn/tutorials/topics/mobile-touch/building-your-unity-game-ios-device-testing
 - unity3d.com/learn/tutorials/topics/mobile-touch/building-your-unity-game-android-device-testing
 -
2. Quickstart for Google VR in Unity on iOS or Android
 - developers.google.com/vr/develop/unity/get-started-ios
 - developers.google.com/vr/develop/unity/get-started-android

Github Repo

github.com/elishapruner/OMMIC-VR-Workshop

