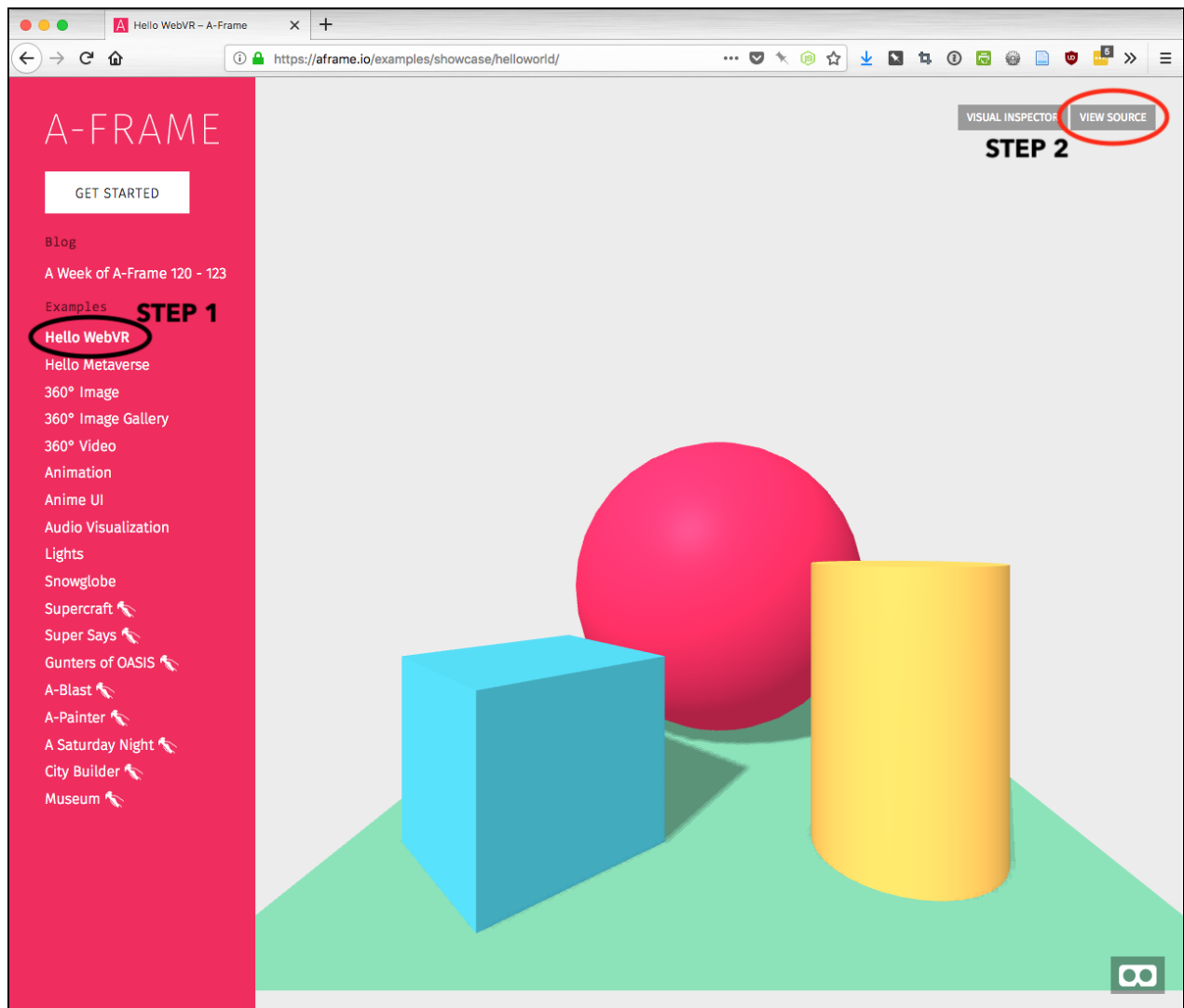# USING AR.JS with A-Frame
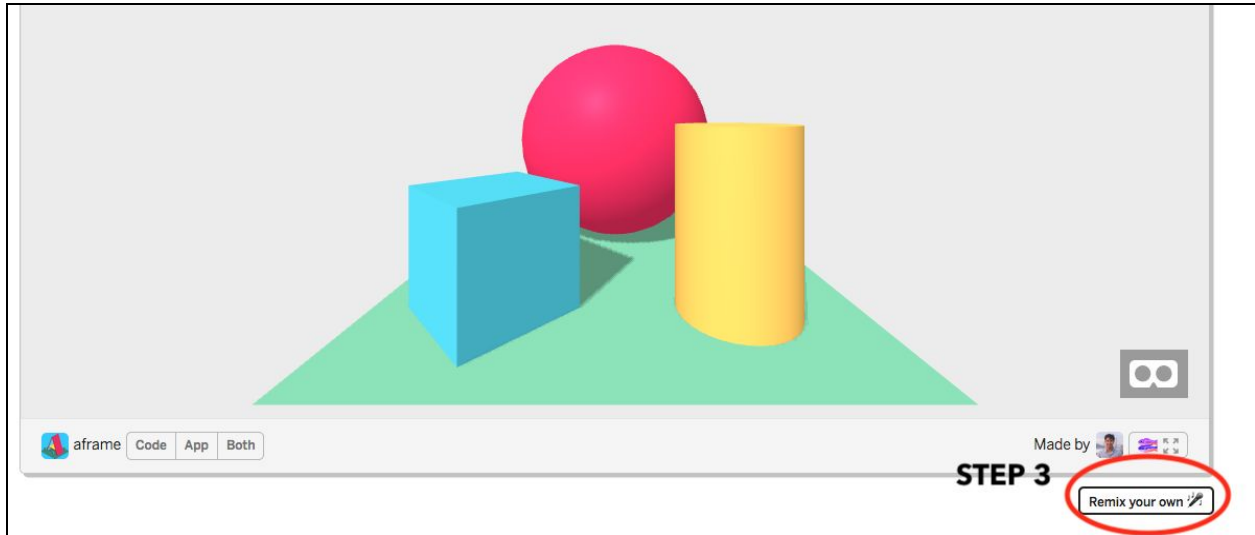
This program is a wrapper that goes on top of A-Frame to integrate augmented reality.
Creating Augmented Reality with AR.js and A-Frame: https://aframe.io/blog/arjs/

Starting Off

Go to https://aframe.io
Click on "Hello webVR" in the sidebar, then the "View Source" button in the upper-right:

Click on "Remix your own." This will bring you to glitch.com, which works in collaboration with A-Frame. SignIn/Create an account on glitch.com so you can start to edit the code! (Glitch allows you to create accounts with Facebook, Gmail…)

This should take you to a page that reads "A-Frame Project." On the side of the webpage there are several tabs that list as "assets, env…" click the last tab that reads as **index.html** this is the most important tab, and will be **where we input our code**.
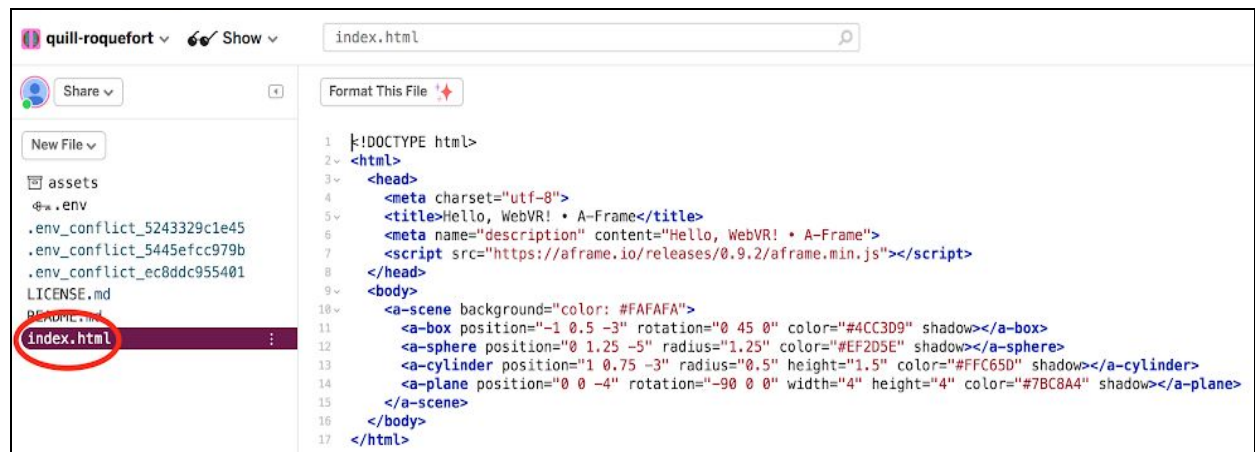
The code from the following instructions must be copied into your project in the order that is specified, if confused refer to the images (which are an approximation of what the code should look like).

Keep in mind that with code, all "beginnings" have "endings." When typing in code, something like `<body>` will require you to close the code with `</body>`. This signifies that whatever effect the code has created is being sectioned off. Consider it to be a series of containers within containers. Or when something starts with a quotation mark there must always be an ending quotation mark, for example: `"hiro"` or `src=""` You will understand the further you go.

Creating the Base of the Code

You may highlight all of the code currently in your index.html tab, and delete it (so that you are left with an empty page). Our instructions will be starting from scratch. For further reference on using A–Frame with AR.js, go to (https://aframe.io/blog/arjs/#show-don%E2% 80%99t-tell). First, we must do basic setup and include the latest A-Frame build and AR.js (which will make our A-Frame project augmented reality enabled). Copy the text below into the index.html page on the first few lines.

```
<!DOCTYPE html>
<html>

<script src="https://aframe.io/releases/0.6.0/aframe.min.js"></script>
<script
src="https://jeromeetienne.github.io/AR.js/aframe/build/aframe-ar.js"></script>
</html>
```

Under that, we will define the body. Within the `<body></body>` tags, create a scene using `<a-scene></a-scene>` tags. Adding this scene and embedding AR.js signifies in the code, that we would like to use AR.js to create an augmented reality scene.

```
<script
src="https://jeromeetienne.github.io/AR.js/aframe/build/aframe-ar.js"></script>
<body style="margin : 0px; overflow: hidden;">
  <a-scene embedded arjs>
      </a-scene>
</body>
</html>
```

We will now add the marker camera. The marker is essentially an image that will trigger the 3D object to appear in your AR scene.   The marker camera will allow the AR object to move according to the marker's position. We will be using the Hiro preset marker in this project. This code should be placed in between the `<a-scene></a-scene>` tags.

```
<a-scene embedded arjs>
    <a-marker-camera preset= "hiro"></a-marker-camera>

</a-scene>
```

Note If you would like to create your own marker, follow the instructions on this blog post: (https://aframe.io/blog/arjs/#customize-your-marker)

Below is the marker we will be using:

Next, we will add a box to our code to act as our AR object. Copy the following code in between the `<a-scene></a-scene>` tags above the `<a-marker-camera></a-marker-camera>` tags.

```
<a-scene embedded arjs>
    <a-box position="0 0.5 0" color="#4CC3D9"></a-box>
  <a-marker-camera preset= "hiro"></a-marker-camera>
```

Your code should look something like this:

```
1
2   <!DOCTYPE html>
3   <html>
4
5   <script src="https://aframe.io/releases/0.6.0/aframe.min.js"></script>
6   <script src="https://jeromeetienne.github.io/AR.js/aframe/build/aframe-ar.js"></script>
7
8   <body style="margin : 0px; overflow: hidden;">
9     <a-scene embedded arjs>
10       <a-box position="0 0.5 0" color="#4CC3D9"></a-box>
11       <a-marker-camera preset= "hiro"></a-marker-camera>
12     </a-scene>
13   </body>
14
15   </html>
```

In the upper left hand corner, there is a "Show" drop down arrow, click it and press "In a New Window." This will open you completed AR scene in a new window. Hold the trigger image "Hiro" on the previous page, to the camera of you device, and view your AR cube!
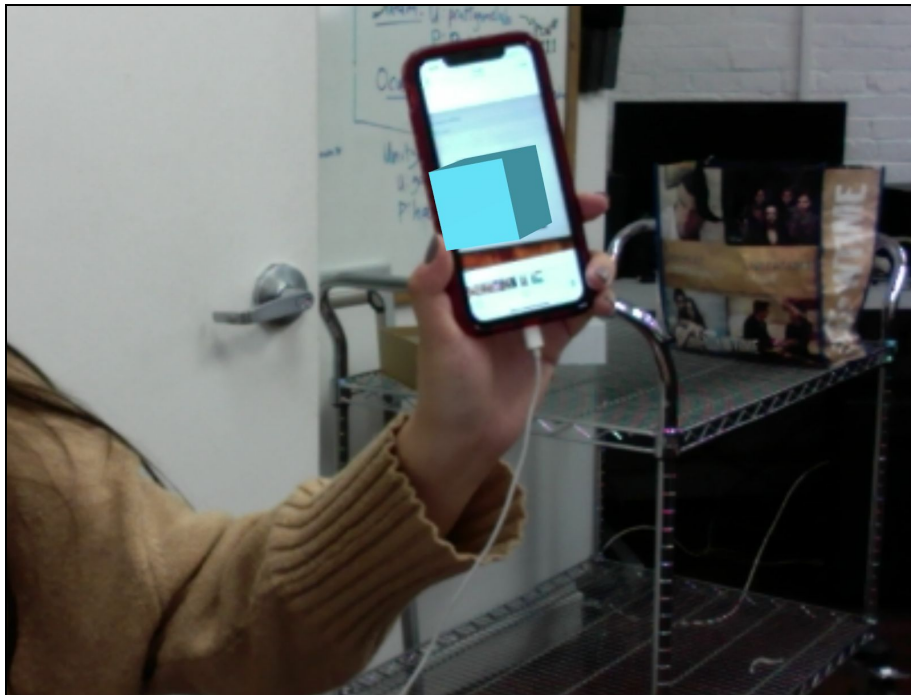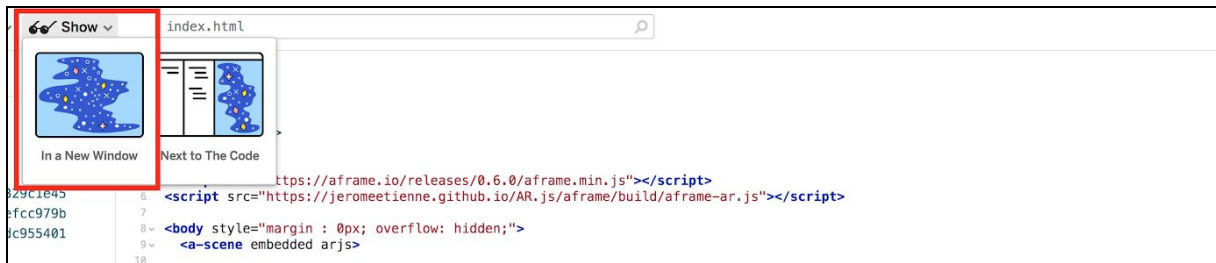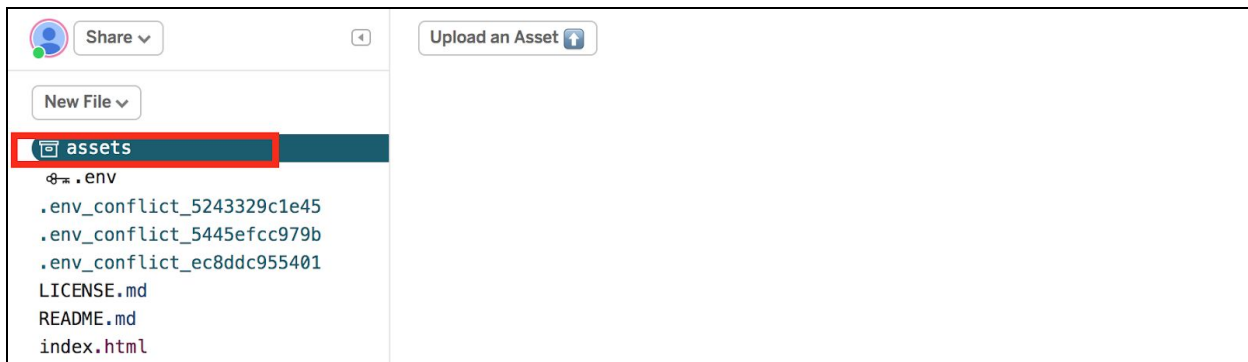

Downloading Object (OBJ) Models

Now that we have a basic example of creating an AR scene, next we will try inserting 3D models into our project. First **find the following code below in your own index html page, highlight, and delete it**. Because we know the basic setup of an AR scene, we are going to insert a new 3D model into our code, and no longer need the example box.

```
<a-box position="0 0.5 0" color="#4CC3D9"></a-box>
```

First we have to import a 3D model into our project. Go to (poly.google.com) to find a 3D model to download, we chose an x-wing (https://poly.google.com/view/100p3RNw-5Q). Below the image of the 3D model, there is a download drop down button. Download the OBJ file.
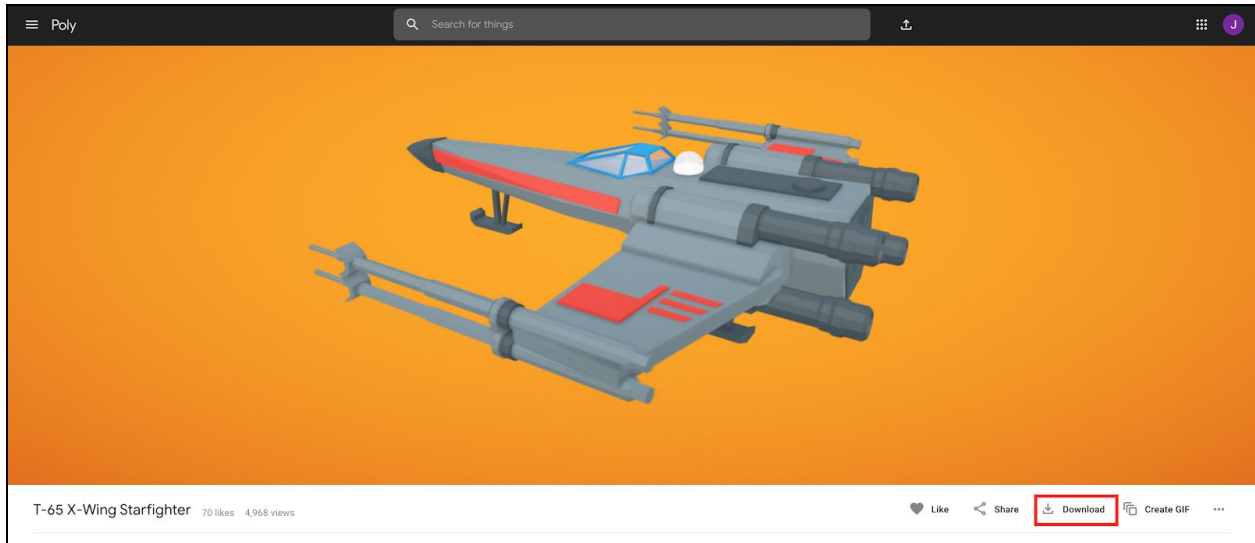
Once downloaded, open the zip file by double clicking it. A folder will pop up with an OBJ file and an MTL file. The OBJ file is the actual object model. The MTL file is the texture/color that covers the object. Once you see your OBJ and MTL files, return to your glitch project page. In the same sidebar where your index.html tab is located, there is an **assets** tab. Click on the tab.



On this page, drag and drop your OBJ and MTL files onto the page. They should automatically load and appear like this:
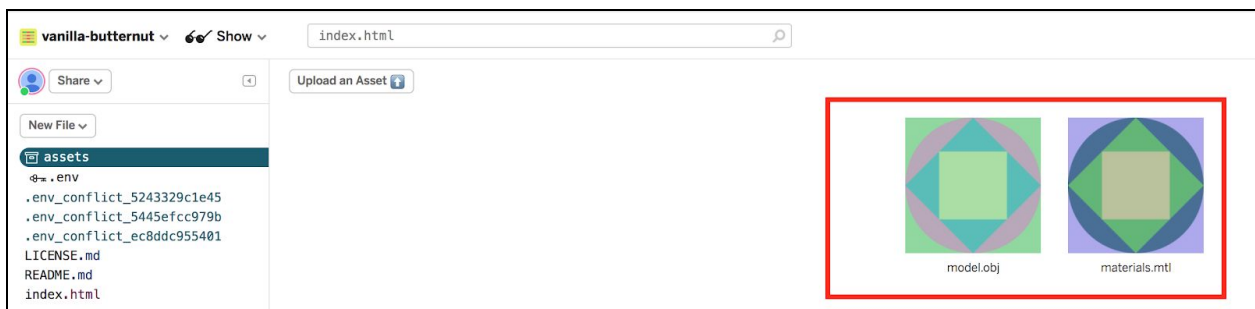
**Adding Object (OBJ) Models**

Now that we have our assets loaded onto glitch. We can start to type in the code that will bring our 3D model into AR. Go back to your index.html tab and copy the text below, in between the `<a-scene></a-scene>` tags.

```
<a-scene embedded arjs>
<a-assets>
    <a-asset-item id="obj" src="url"></a-asset-item>
    <a-asset-item id="mtl" src="url"></a-asset-item>
  </a-assets>

  <a-entity obj-model="obj: #obj; mtl: #mtl"></a-entity>
  <a-marker-camera preset= "hiro"></a-marker-camera>
</a-scene>
```

Now go back to your assets tab. Click on your OBJ file, and a smaller window will pop up on the web page with a url. Copy the url, go back to the index.html page. To put your OBJ file in AR, paste your url into the quotations of the first `<asset-item>`.

```
<a-scene embedded arjs>
<a-assets>
    <a-asset-item id="obj"
src="https://cdn.glitch.com/0671aa85-d115-4cf0-aa78-9b1305c15710%2Fmodel.obj?v=
1571160407881"></a-asset-item>
    <a-asset-item id="mtl" src="url"></a-asset-item>
  </a-assets>

  <a-entity obj-model="obj: #obj; mtl: #mtl"></a-entity>
 <a-marker-camera preset= "hiro"></a-marker-camera>
</a-scene>
```

Now do the same for your MTL file. Go back to your assets tab. Click on your MTL file, and a smaller window will pop up on the web page with a url. Copy the url, go back to the index.html page. Paste your url into the quotations like below. This will allow your MTL file to appear on your 3D model

```
<a-scene embedded arjs>
<a-assets>
    <a-asset-item id="obj"
src="https://cdn.glitch.com/0671aa85-d115-4cf0-aa78-9b1305c15710%2Fmodel.obj?v=
1571160407881"></a-asset-item>
    <a-asset-item id="mtl"
src="https://cdn.glitch.com/0671aa85-d115-4cf0-aa78-9b1305c15710%2Fmaterials.mt
l?v=1571160523644"></a-asset-item>
  </a-assets>

  <a-entity obj-model="obj: #obj; mtl: #mtl"></a-entity>
 <a-marker-camera preset= "hiro"></a-marker-camera>
</a-scene>
```

Your code should look like this (url will vary person to person):

```
<!DOCTYPE html>
<html>

<script src="https://aframe.io/releases/0.6.0/aframe.min.js"></script>
<script
src="https://jeromeetienne.github.io/AR.js/aframe/build/aframe-ar.js"></script>

<body style="margin : 0px; overflow: hidden;">
  <a-scene embedded arjs>

  <a-assets>
    <a-asset-item id="obj"
src="https://cdn.glitch.com/0671aa85-d115-4cf0-aa78-9b1305c15710%2Fmodel.obj?v=
1571160407881"></a-asset-item>
    <a-asset-item id="mtl"
src="https://cdn.glitch.com/0671aa85-d115-4cf0-aa78-9b1305c15710%2Fmaterials.mt
l?v=1571160523644"></a-asset-item>
  </a-assets>

  <a-entity obj-model="obj: #obj; mtl: #mtl"></a-entity>

    <a-marker-camera preset= "hiro"></a-marker-camera>
  </a-scene>
</body>

</html>
```

In the upper left hand corner, click the "Show" drop down arrow, click it and select "In a New Window." This will open your completed AR scene. Hold the trigger image ("Hiro" on the previous page) to the camera of your device, and view your augmented reality scene.
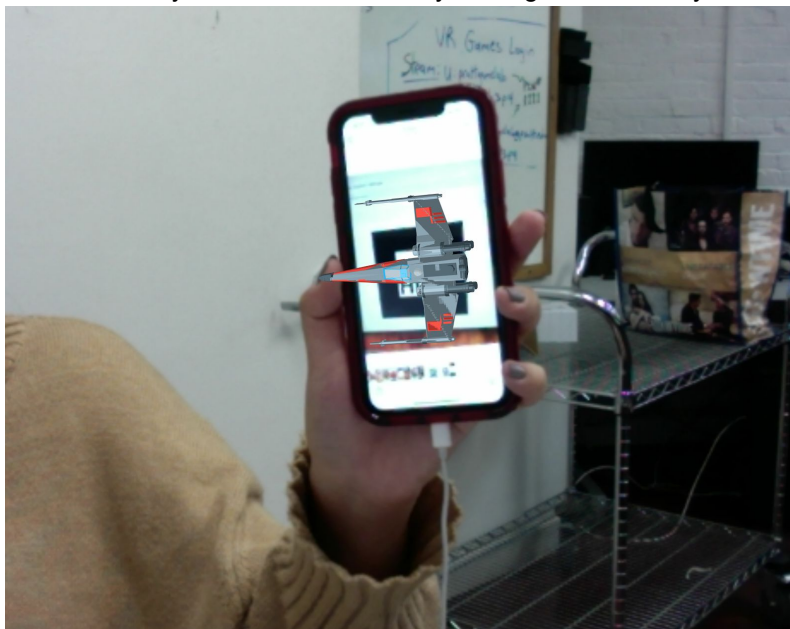
You can also use this code on your phone. Just go to your project page on your mobile device and press the "Show" drop down arrow, click it and press "In a New Window." This will open your completed AR scene in a new window. Hold the trigger image up to the camera of your iPhone or Android to view your AR scene on your phone.

For IOS, users should use Safari, as Google Chrome does not support the code. Android users may use Google Chrome.
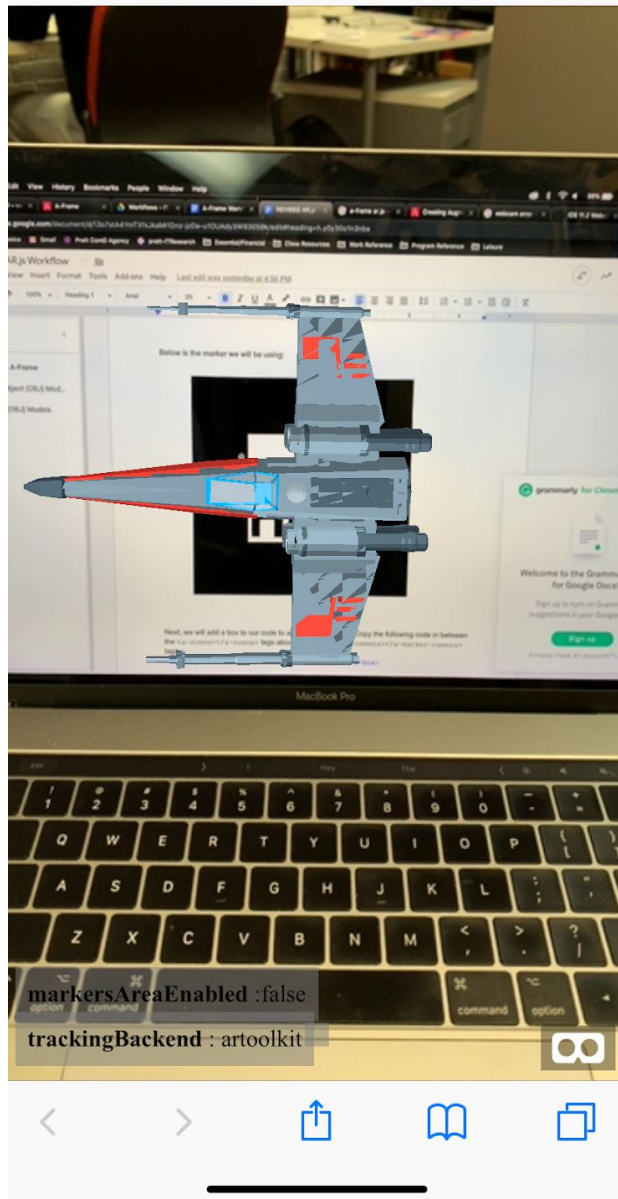
OTHER AR WORKFLOWS YOU CAN TRY

TORCH AR APP

GETTING TO KNOW AR

TORCH AR is an IOS app that helps users build interactive and augmented reality experiences via their mobile device. Augmented reality is an interactive experience of a real-world environment where the assets that reside in the real world are enhanced by computer-generated information. Luckily for the average Joe, **TORCH AR is an app that doesn't require coding skills to be able to create AR scenes. https://www.torch.app/**

STARTING OFF

1. **Login/Create an account** (You can manually do this or sign in through Google)
   a. The app will ask for permission to use the rear camera on phone
2. When the app loads and you are logged into the first page, a new project to work in will automatically be opened and set up for you. You will essentially see the view from your camera, with the apps buttons at the sides of your screen
   a. First, the app will ask you to scan a well lit surface with your device, via minimally positioning the camera
   b. The app will then allow you to tap anywhere on the screen to set the anchor for your augmented reality object
   c. From here you are left to create your scene

FUNCTIONS

1. The circular button with the bell icon on the upper left-hand corner of your screen is your notification button. You can click it to view your **Message Center**, which includes conversation you have within the app, and messages/updates from the app developers
2. The long button on the top center of your phone is your **Main Scene**. Clicking this button gives you to option to name your AR scene, add details/a description about it, view anchor options, add tracked images, add interactions, add scenes, and copy scenes
3. The circular button on the upper-right corner of your screen is your **Account Settings**. Here you can view projects, templates, your profile settings, and seek support
4. There are five remaining buttons to the bottom left of your phone.
   a. The top button is your **Project Settings** for the current project your are in. Here you can reset your world anchor, give attribution credits, and get a viewable link to your project
   b. The second button with the triangle icon is your **Play Button**. Here you can play, reset, and record your augmented reality scene
   c. The third button with the three dot icon is your **Quick Action** button.
   d. The fourth button with the arrow icon is your go **Back/Undo** button.
   e. The fifth button with the cube icon is your **Assets Button**. Search, browse, and download assets from here to use in your projects
      i. Your assets are the objects that you insert into your scene. They are what is "augmenting" the reality.

ii. After loading these assets to the app, you can simply **drag and drop from your assets box into your scene** (and onto your anchor), change their position, and move them around as you like

ADDING ASSETS TO YOUR SCENE

1. **Click your Assets Button.** You assets box will pop up, where you will be able to search for different 3D models.
2. TORCH AR has several different options to choose from, whether you may browse your phone's own files to use, or export a model from your drop box or sketchfab, or search for an asset or search from their preloaded models in the 'Poly' folder.
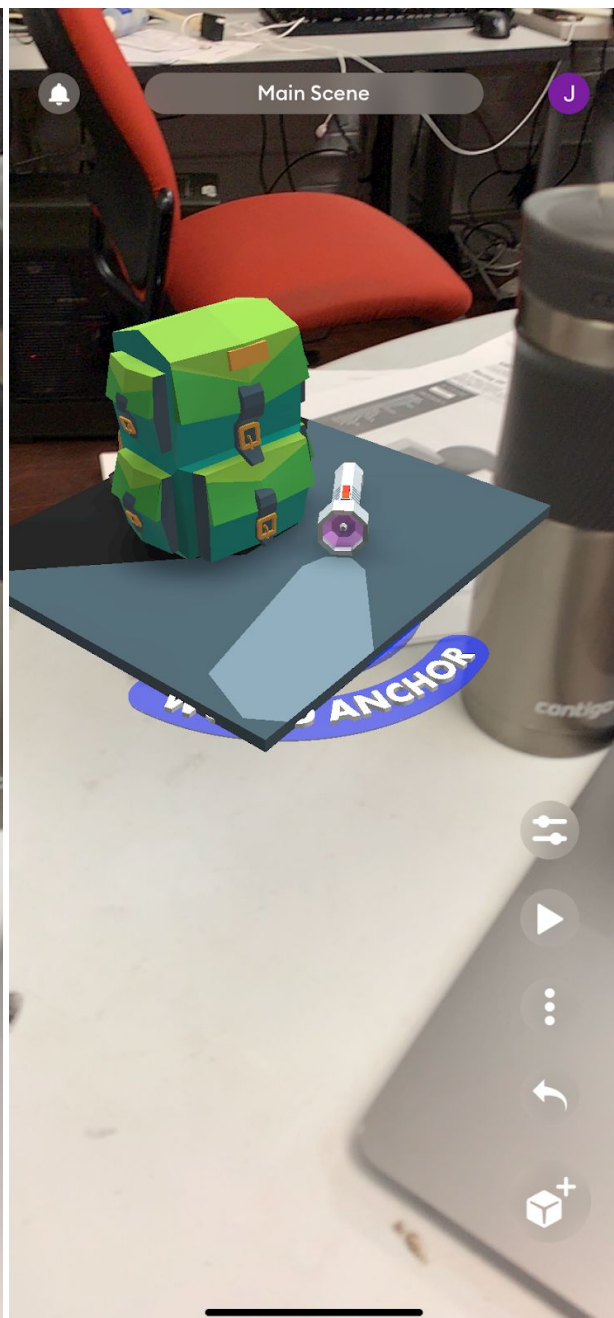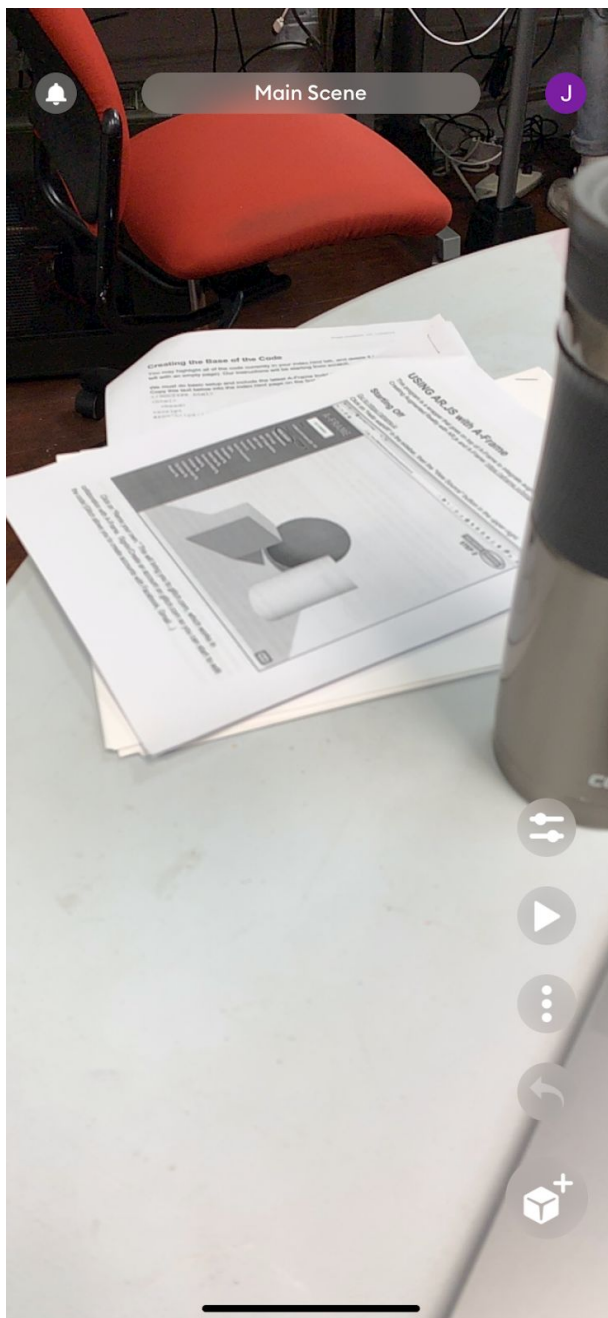
ARTSTEPS

"Make Your Own Virtual Exhibitions"

1.) **Download** the app **Artsteps** on **IOS** and/or **Google Play**
note: if you want to use the VR feature of this app, please have the Google Cardboard app downloaded beforehand

2.) If you do not have an account, **please set up an account online**, OR **login using Facebook** or your **Google** account:

3.) Once you're logged in, you may begin to explore, and create digital exhibitions!

EXPLORING THE GALLERIES

<u>WHAT YOU WILL NEED:</u> your **phone**, the **ArtSteps app**, and a **Google Cardboard VR headset** (**only if you plan to use VR**)

With ArtSteps, you can choose any digital exhibition to view normally through your phone screen, or through VR using Google Cardboard

1.) From here, you can explore exhibitions through 4 main tabs: **"Latest", "Most Viewed", "Top Rated",** and **"Trending"**:
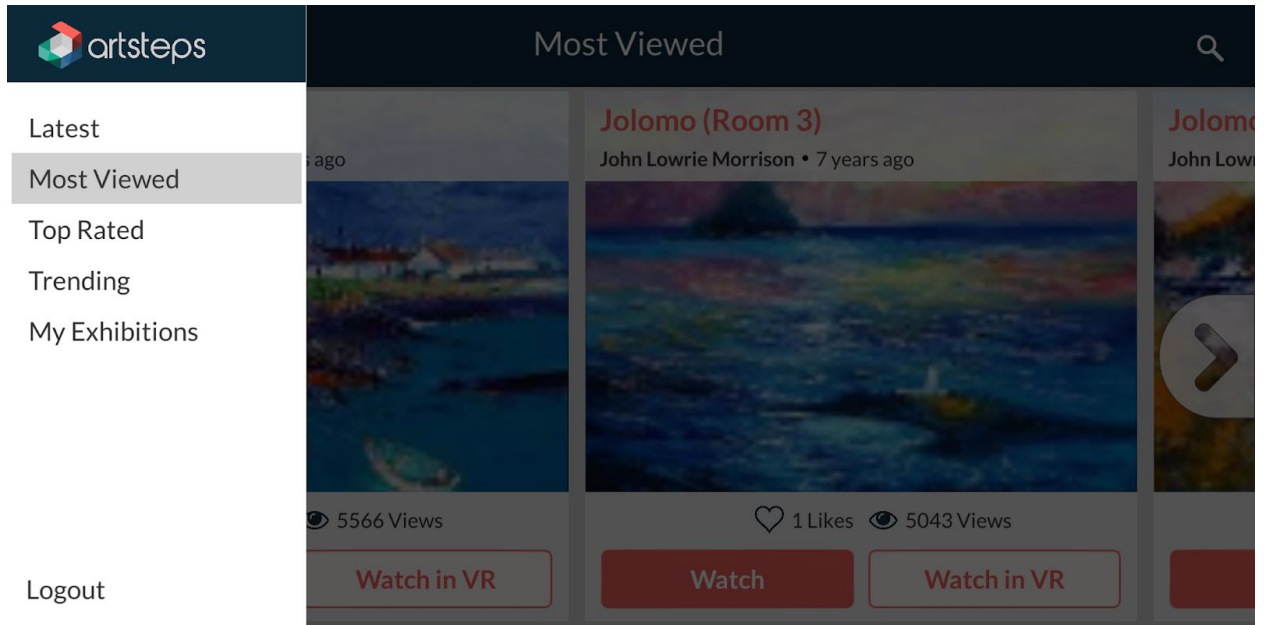

2.) First, pick any gallery that interests you and choose 1 of 2 options- to **"Watch"**, or **"Watch in VR"**:
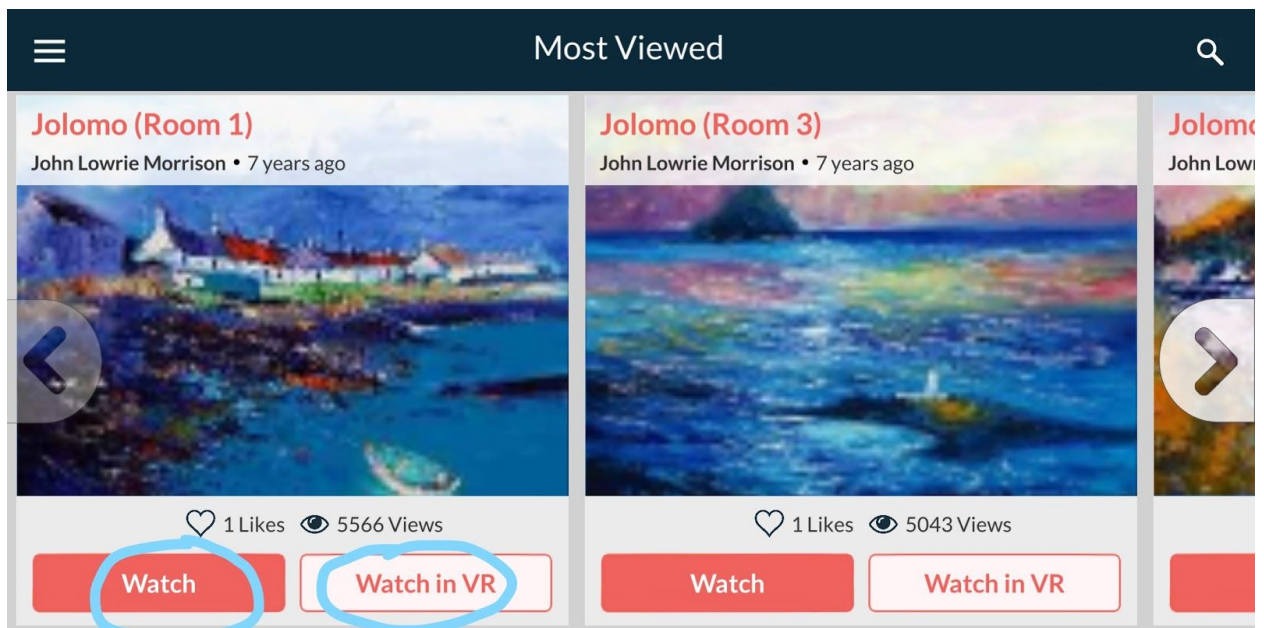

(Whichever way you view the exhibition is up to you, if you choose *"Watch in VR"*, **please have your Google Cardboard ready to use**)

**"WATCH" THROUGH YOUR PHONE**

If you wish to **not use the VR aspect of the app** and to just **browse through a gallery normally through your phone**, then please choose the tab, **"Watch"** under an exhibition that interests you.
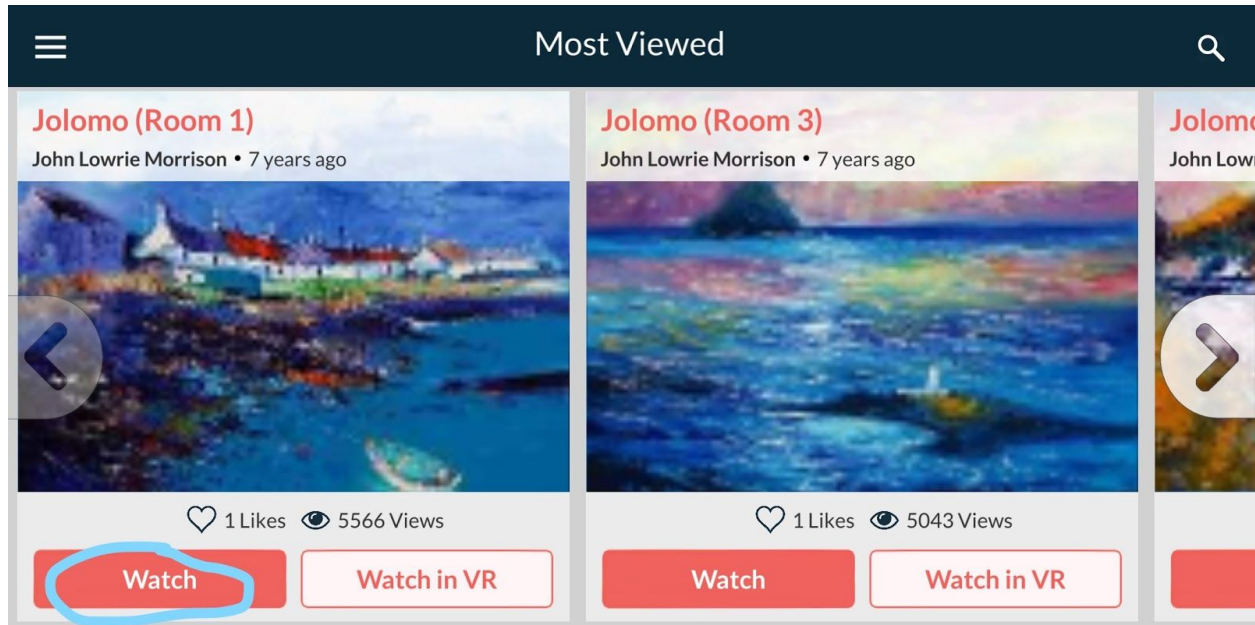
1.) Once the artifacts are done downloading, it then places you to the digital exhibition space like so:
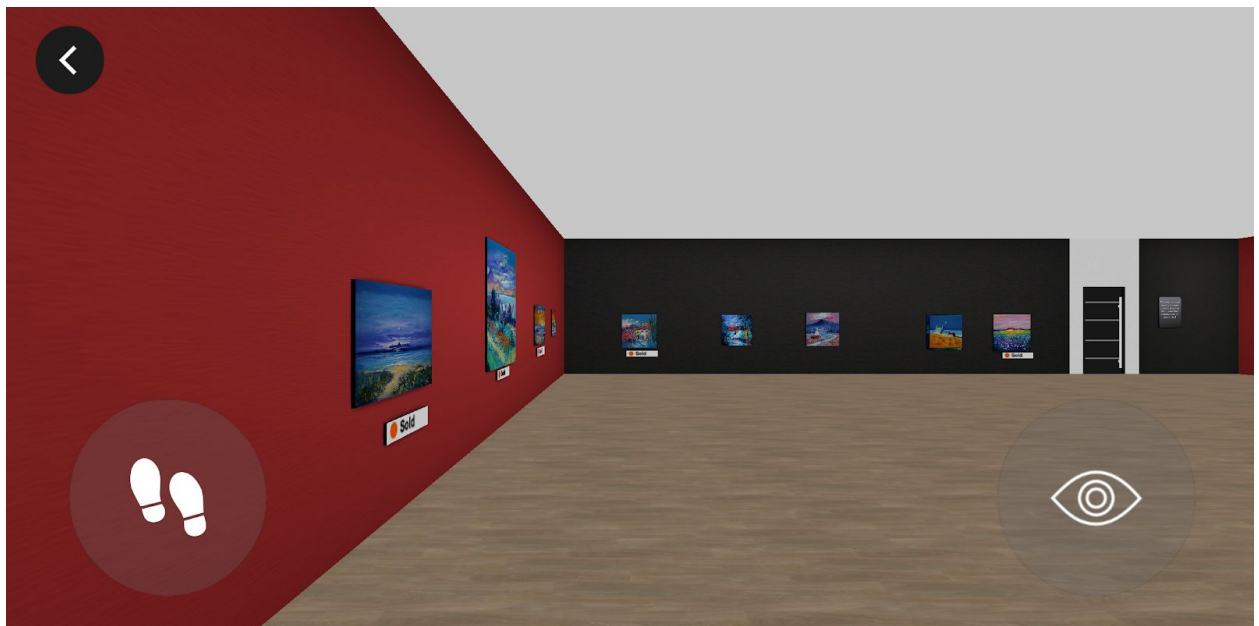
2.) From here, press and drag on the footsteps icon in the lower left hand corner to **walk** around the space. To **look** around the space more, press and drag on the eye icon in the lower right corner:
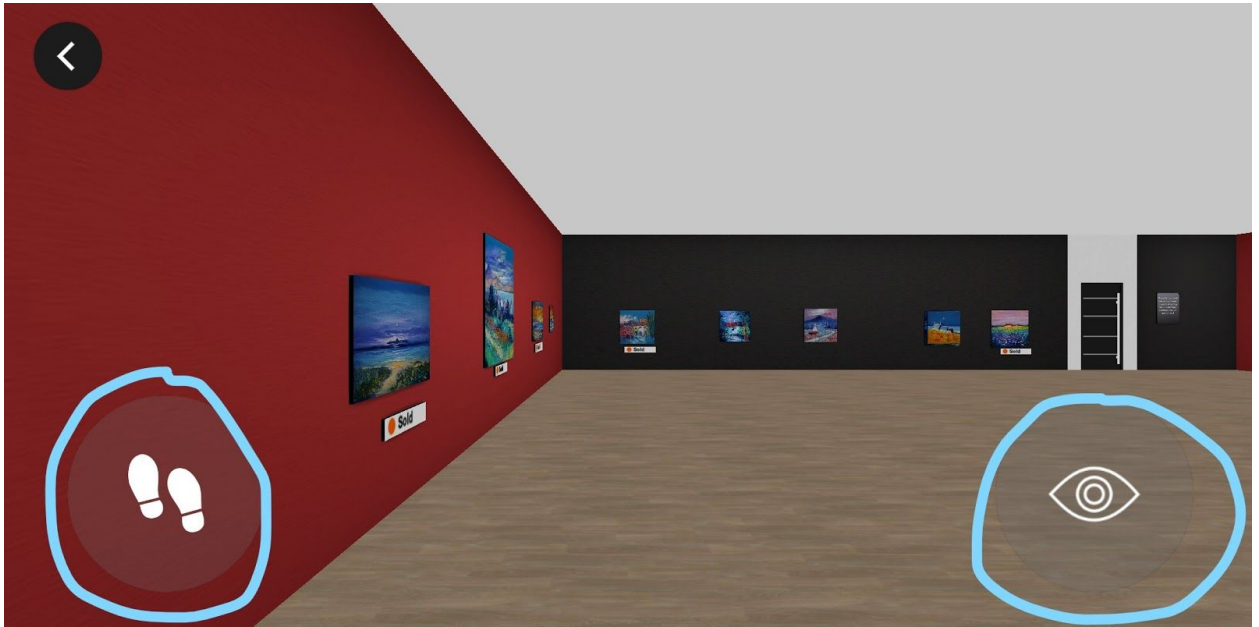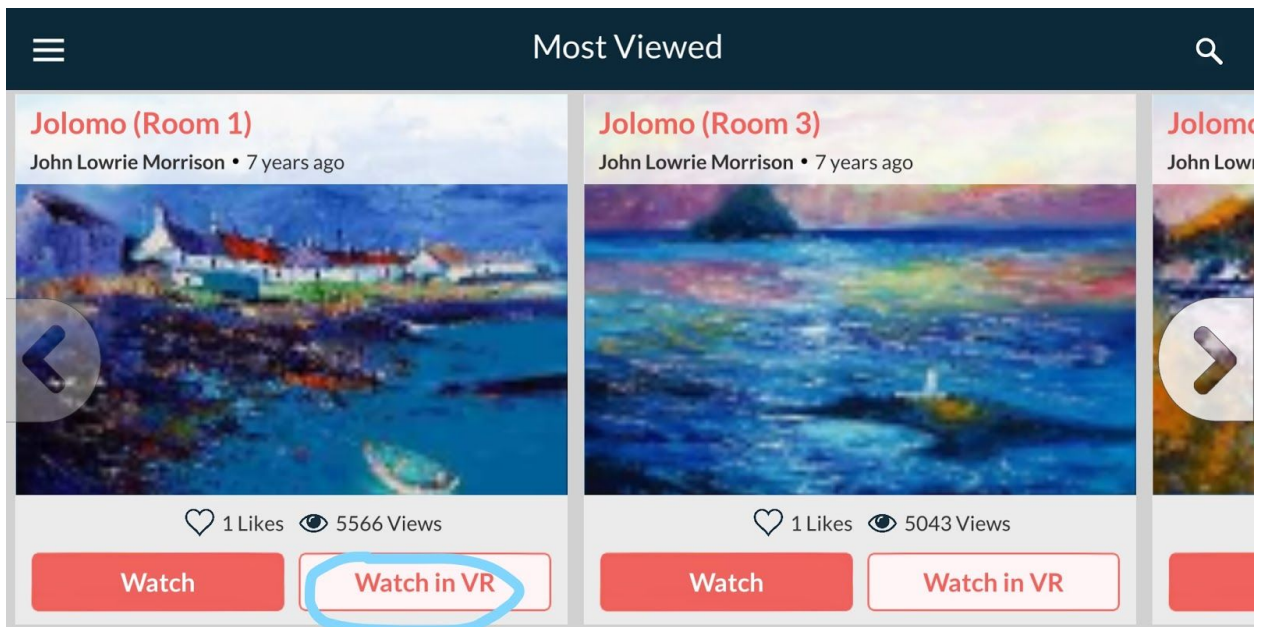

3.) To exit this gallery, please press the black arrow in the top left hand corner

"WATCH IN VR" USING GOOGLE CARDBOARD
**Before starting, please make sure that you have downloaded and are configured with the Google CardBoard app**

1.) To view a gallery in VR, please press the **"Watch in VR"** button on any chosen gallery.

2.) If you are using your phone vertically, it will then ask you to **put on your Google Cardboard headset on,** and to turn your phone horizontally:

*To check the settings, please go to the little gear symbol in the top right corner of the screen**:
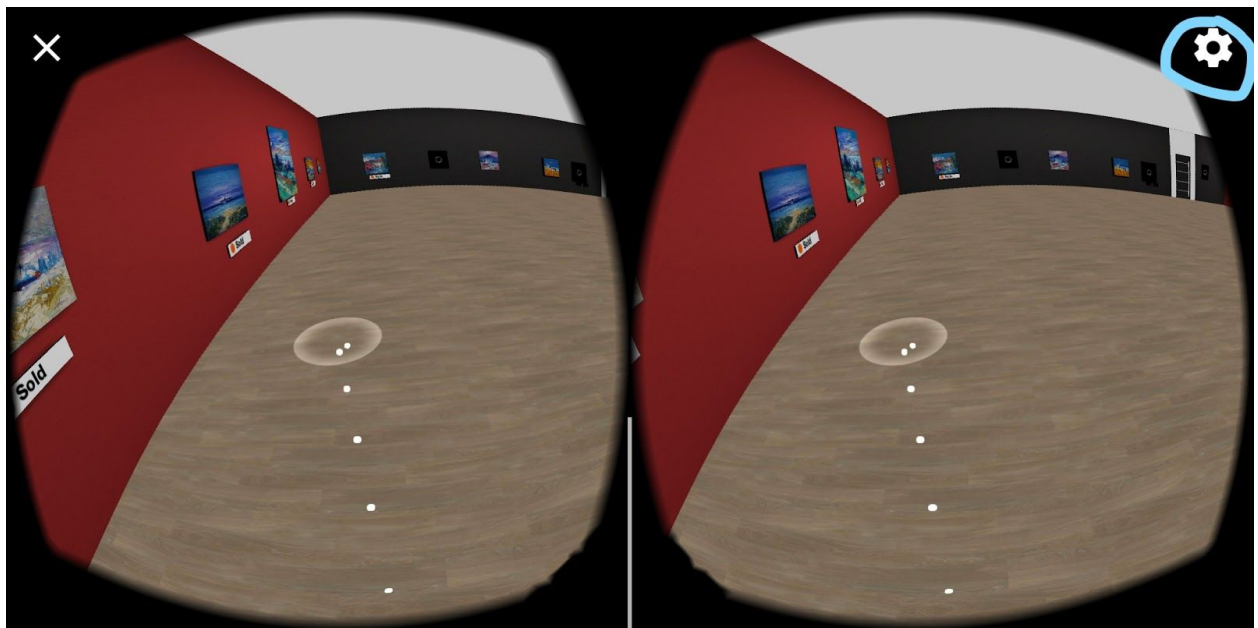

3.) Once your phone is **paired with your Google Cardboard**, you may now explore the gallery in VR.

4.) To exit, please click the little white "X" in the top left corner of the screen.
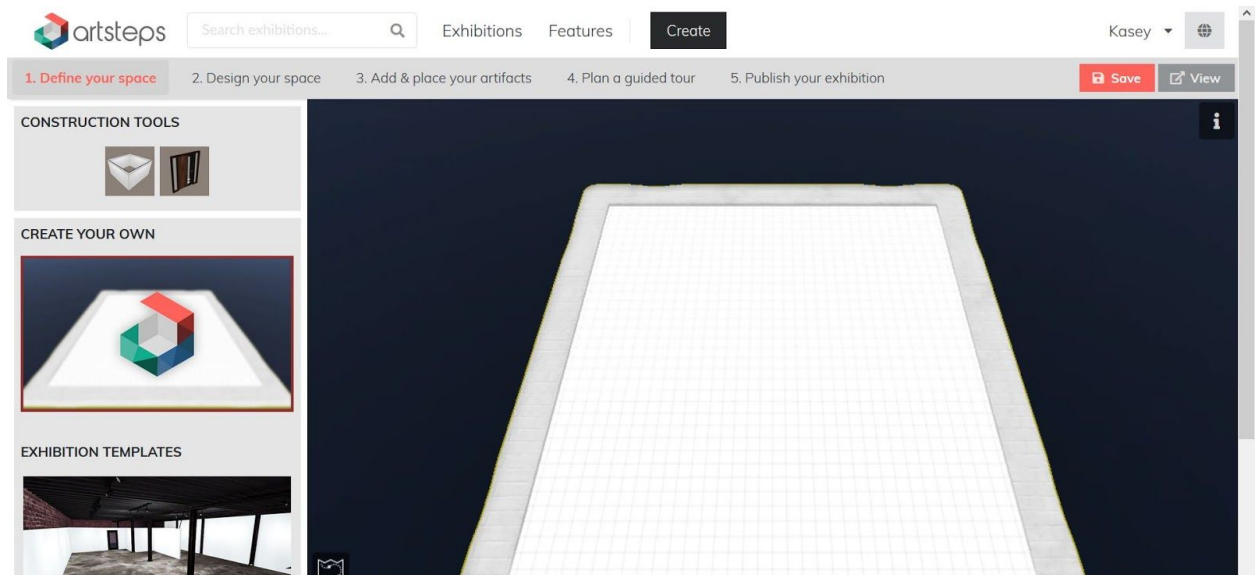
MAKE YOUR OWN EXHIBITION

Making an exhibition for your work is not only great for exposure, but it also plans out a space for your work and creates a professional space for portfolio work

1.) To make your own gallery, please go online to: https://www.artsteps.com/explore
2.) Once you're logged in to your account, click the **"Create"** button at the top of the homepage:
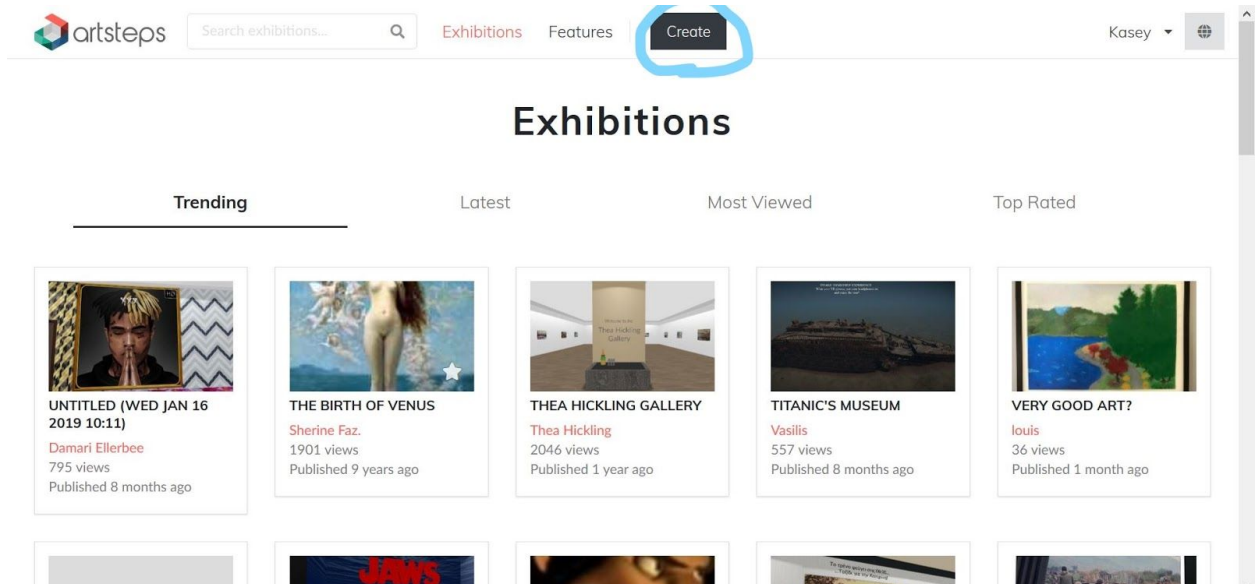
3.) Once you enter the workspace, it will look something like this:

4.) You now can define and create your space for your work to be placed in. On the sidebar, you will notice subcategories for **"Construction Tools", "Create Your Own"**, and **"Exhibition Templates"**
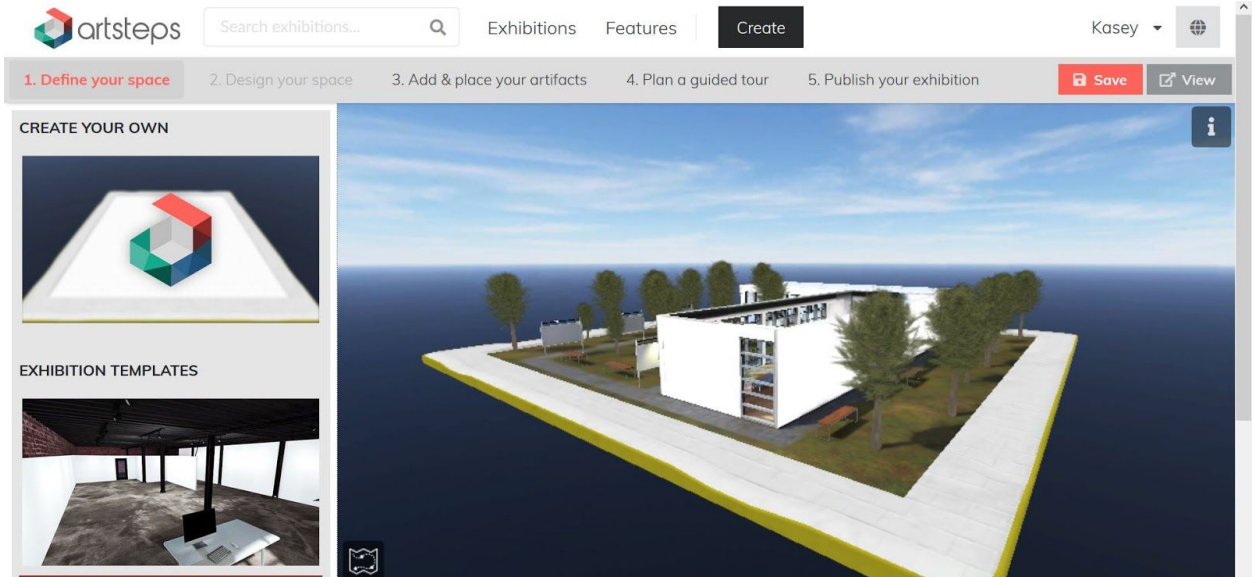
Feel free to explore and download these options further to give your work some space to be in

5.) To view the space in more 360 viewpoints, click and drag the mouse to move around and see the exterior of your space.

6.) You can then begin to place your artworks (or artifacts) within the given space in the next available tab:

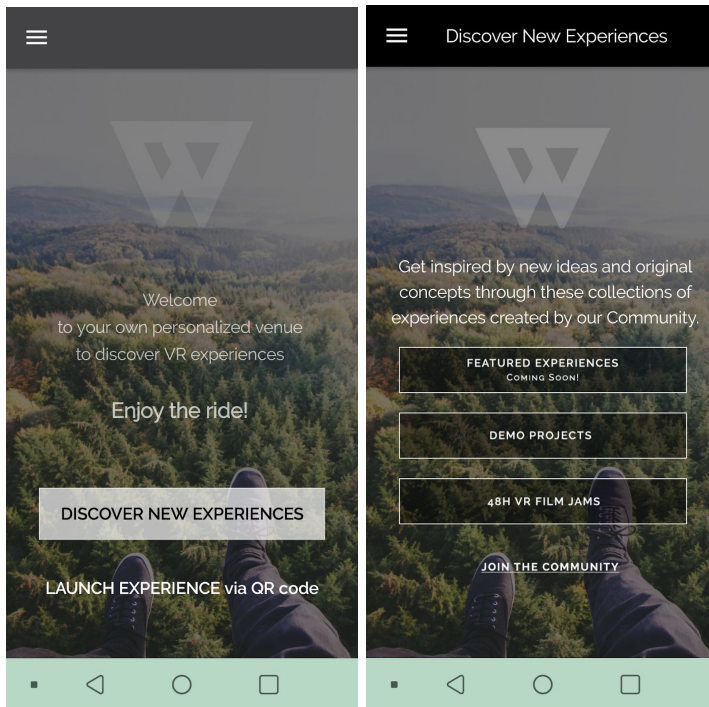   Click **"Add Image"**, **"Add Video"** tab in the left sidebar

7.) Once your done, you can **publish your own exhibition** and **plan a guided tour** if needed!

WONDA VR

GETTING STARTED

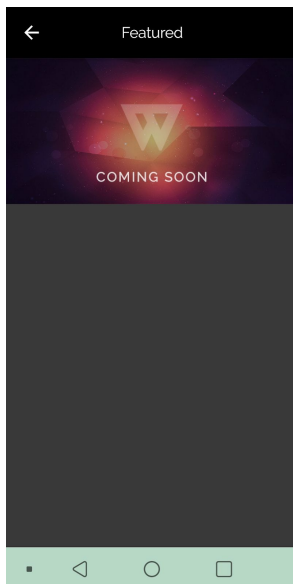1.) Download the **Wonda VR application** on **IOS** and/or **Google Play**

2.) When launching the app, click the **DISCOVER NEW EXPERIENCES** button to get started:

3.) You may then choose to further explore **FEATURED EXPERIENCES, DEMO PROJECTS,** OR **48H VR FILM JAMS**, please click on the tab of your choosing and move on
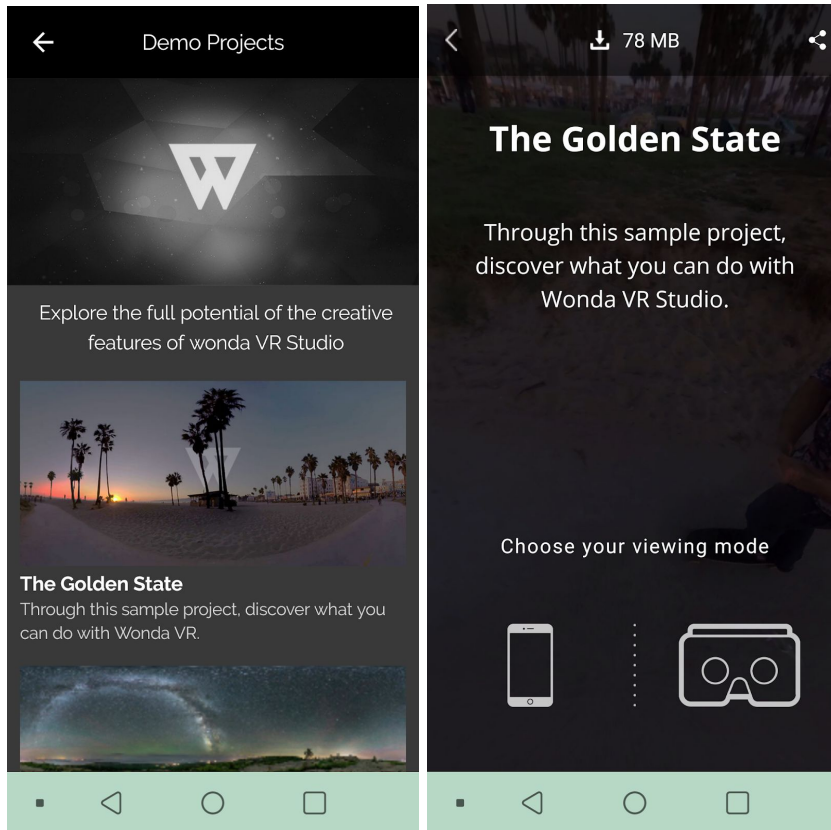
FEATURED EXPERIENCES
This tab is coming soon

DEMO PROJECTS
In this tab, you can explore any demo projects that have been posted by other creators:

1.) Tap any project that interests you, it will then launch the project and give you this screen:

At the bottom, please choose if you would like to view the project normally through your **phone**, or through **VR** and **your Google Cardboard.**

2.) If choosing to view normally, tap on the phone icon at the bottom:

From there, you can now experience this 360 project through your phone

3.) If choosing to view through VR, tap on the Google Cardboard icon at the bottom and experience this project through using your Google Cardboard lens:

48H VR FILM JAMS (WONDA VR JAMS)
In this tab, users can learn how to "write, shoot, edit, and distribute a cinematic VR experience in less than 48 hours"
1.) Scroll through the tabs below and find videos that spark your interest

2.) Once you find a 360 video, tap on it and choose your viewing mode:
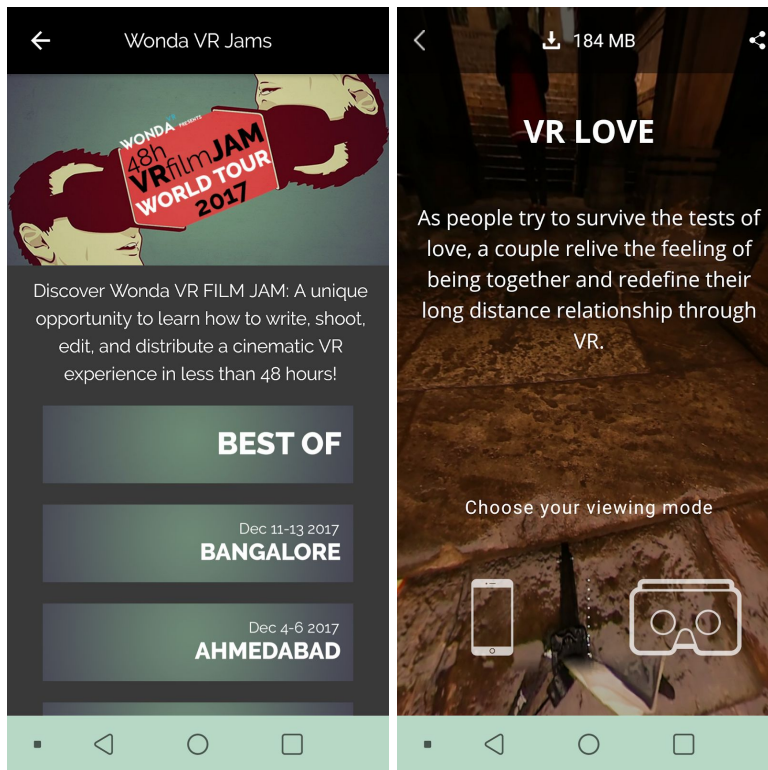
STYLY

STYLY

Styly is a cloud-based service fore creating high-quality VR spaces without needing to code.

GETTING STARTED

1. Go to https://styly.cc/
   a. When you click on the Sign up button on the page, you will be taken to another page that asks you to manually create a username, password, and provide your email
2. After creating your account you will be taken to your home page where you will have the option to launch the STYLY Studio.
3. The webspace launches a new project while already in a VR space, and provides instructions on the basic structure and functions within the studio.
   a. The first set of instructions you see will detail to move about the virtual space using either a mouse or a trackpad
   b. Once you are able to comfortably move about the space, follow the dotted line to move onto the next set of instructions
4. Hierarchy Box
   a. Go to the box in the upper left corner of the page, this is your Hierarchy Box

b. In your Hierarchy Box, you can see the scene you are working, create a new scene, add assets, get help, fiddle with your camera, and publish you VR space

5. Adding Assets
    a. There are already a few preloaded assets in the space when you first open the page, but if you would like to download/insert some new ones, go to you Heirarchy box.
    b. Press the icon of the image at the top of the box
    c. Styly provides you with many capabilities to add assets. You may get assets from their pre-made 3D models, my uploading your own images, instagram, pdf, and so on
    d. Styly also allows you to add music, video, and filters

6. Positioning your asset
    a. In the Hierarchy Box, in the upper left corner of the page, there are a series of preloaded assets that also appear in the space.
    b. Click on one of the assets, and change its position. You may do this by clicking on the asset in the Hierarchy box, which will make arrows appear around the object's x, y, and z axis. Use these arrows to move the asset along these planes.
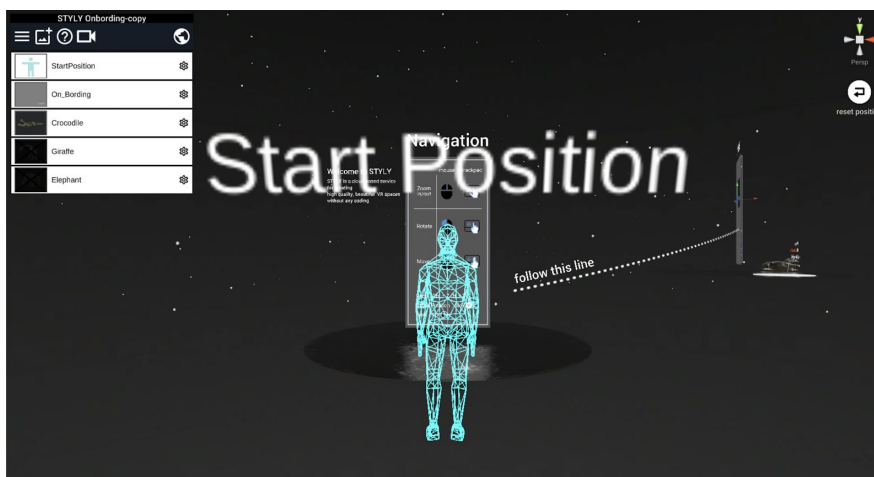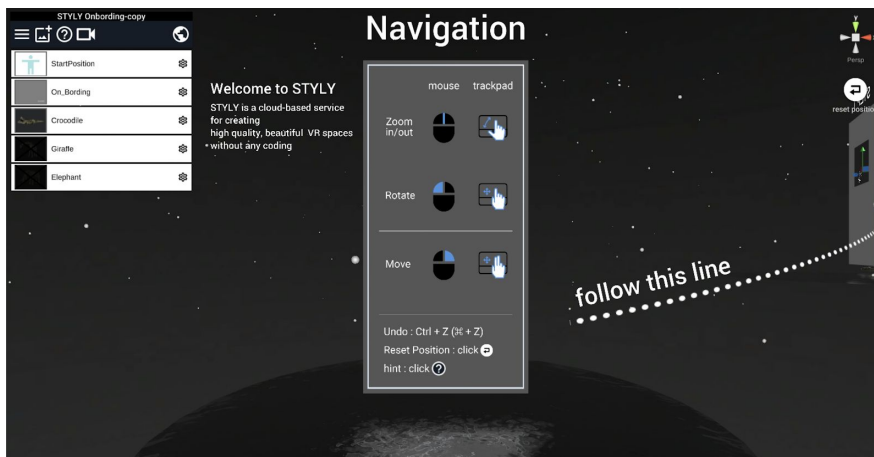

LENS STUDIO

GETTING STARTED:

1. Go to: https://lensstudio.snapchat.com/
2. Click **"Download"** in the upper right hand corner, and select to download for **Mac** or **Pc**:
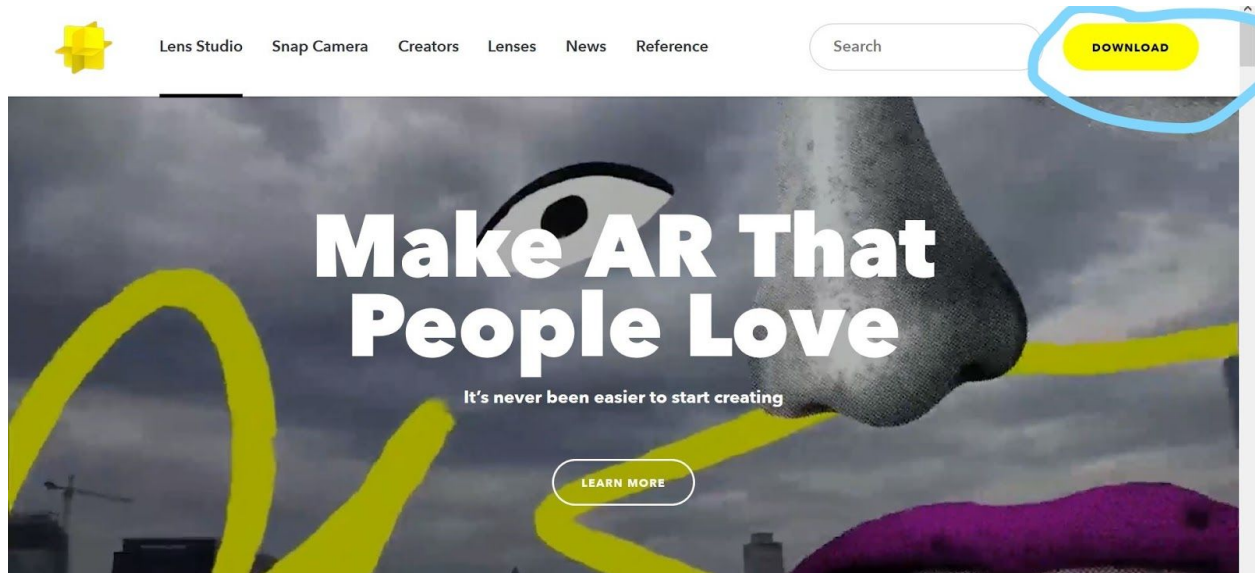
3. After the program is fully installed, you can **begin to create your own AR projects and lens**. You may also sign in to the program using your **Snapchat login**.
4. Clicking the **"Birthday Tutorial"** feature when first starting up the program, it gets you started on a tutorial of how to use the program.
5. Once you click it, it will then give you the screen to start building your AR lens and walk you through a **tutorial**:
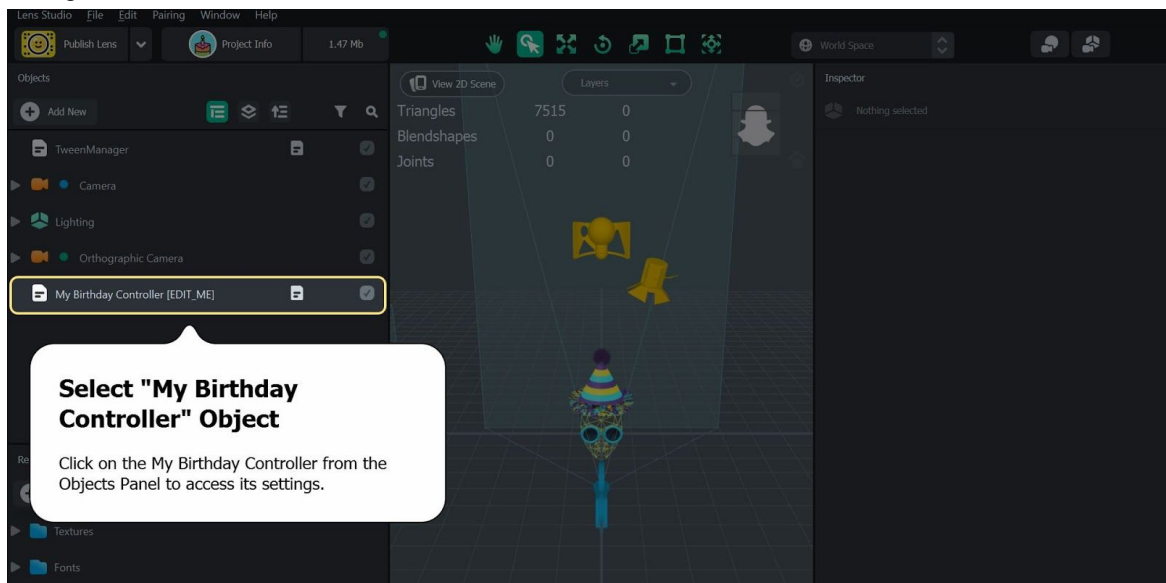
6. As you continue to follow along with the tutorial, make sure that your **webcam is turned on** to **test out the effects and lens that you create**
7. When you are done, in the **top left corner of your file**, there is also a "**publish lens**" option to **export your finished lens:**
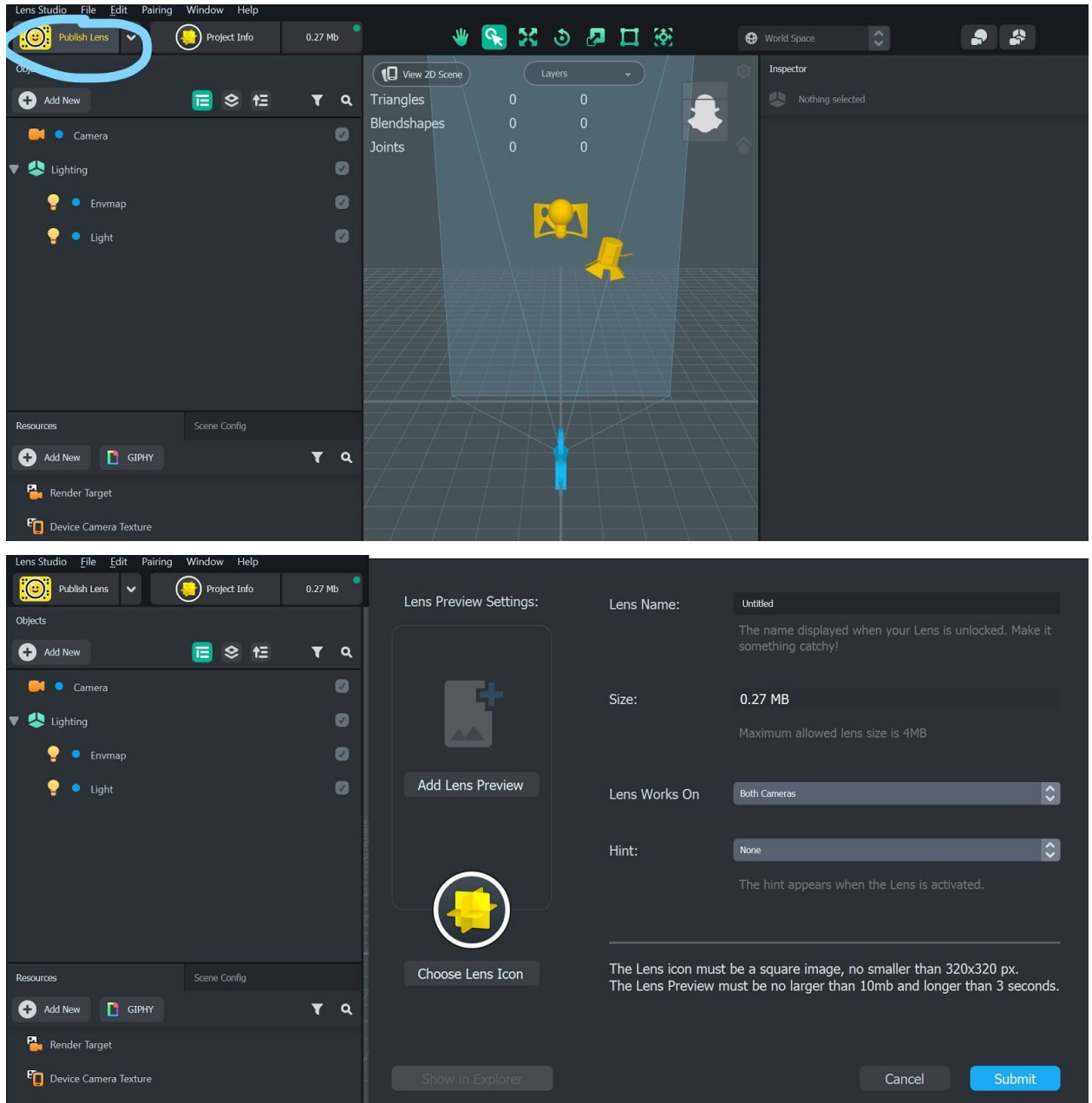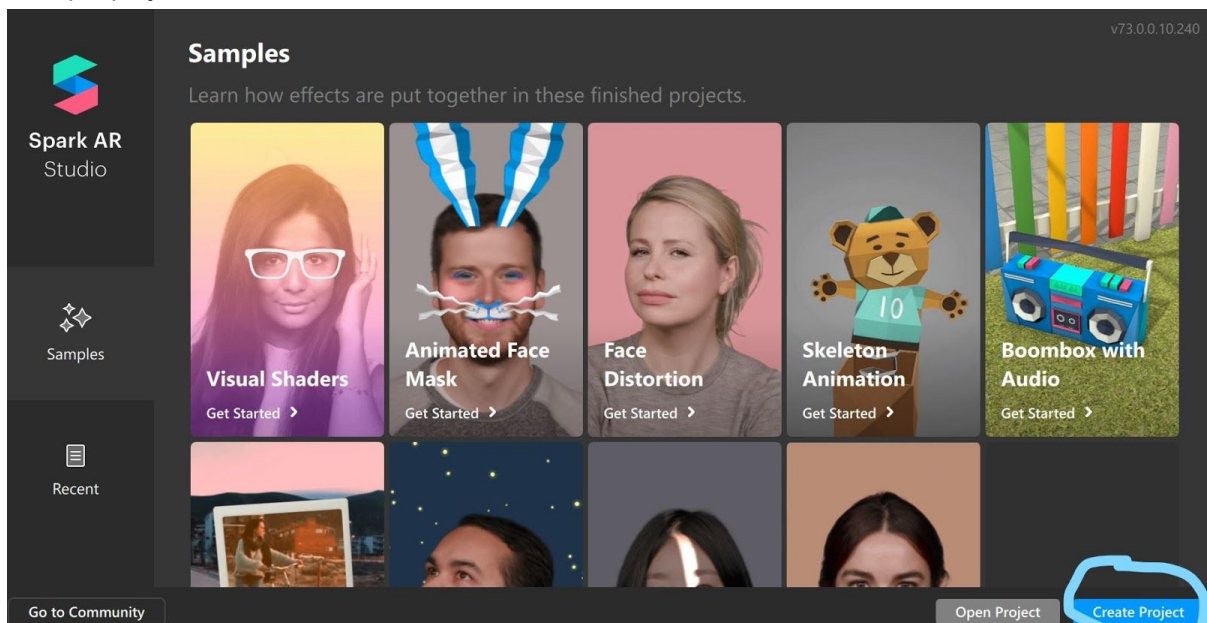
SPARK AR

About SPARK AR

Spark AR is a downloadable program that allows users to create intuitive, customizable augmented reality experiences with their flagship creation software. Their Studio features allow users to create interactive AR experience without the need for coding, while their Hub features allow users to be able to publish, manage, and track their performance across Facebook, Instagram, and Messenger.

GETTING STARTED:

1.) Go to: https://sparkar.facebook.com/ar-studio/
2.) Click "**Download**" in the upper right hand corner:
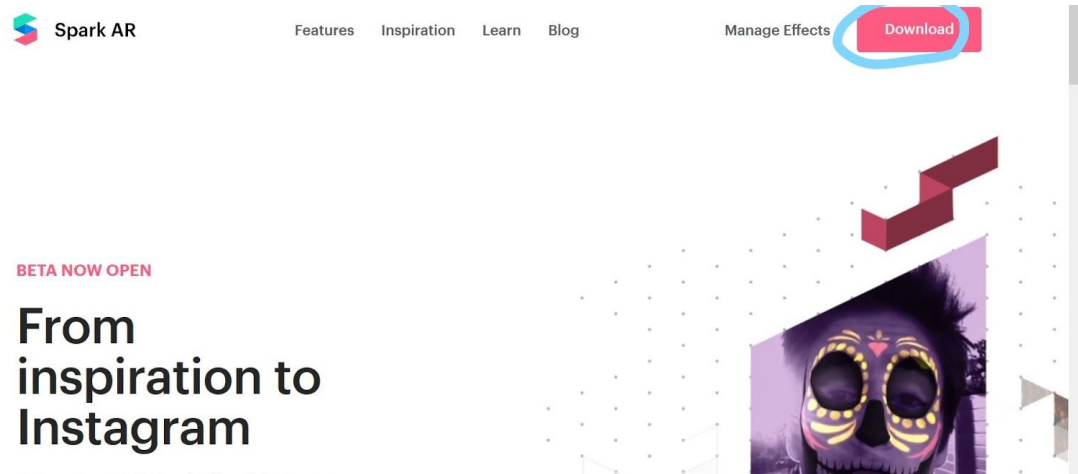
3.) Once the program is downloaded, launch it and **login with your Facebook account.**
4.) From here, you can "**Create a New Project**" in the bottom right hand corner or browse any example projects:

5.) Controls and Structure
    a.) **Viewport** - the area in the center of Spark AR Studio, where you can visualize your effect.
    b.) **Simulator** - which shows how your effect would look on a mobile device.
    c.) **Scene panel** - where you'll control which objects are in your effect.
    d.) **Assets panel** - where you can add and view all the assets you've added to a project.
    e.) **Inspector** - use this to view and edit the properties of elements in your scene.
    f.) **Toolbar and Menu bar** - for quickly accessing all kinds of different features.

g.) **The Layers panel** - where you can add and edit layers.

h.) **Patch Editor and scripting Console** - where you can add more complexity to your effects using visual programming or scripting.

6.) In the below screenshot, in the **left-side bar**, you now have your **workspace**, where you can locate **videos**, **test-runs, pause, and restart**. You also have your current "**scene**" you're working on, as well as "**Assets**", "**Properties**", and "**Transformations**" when dealing with objects created within the workspace:
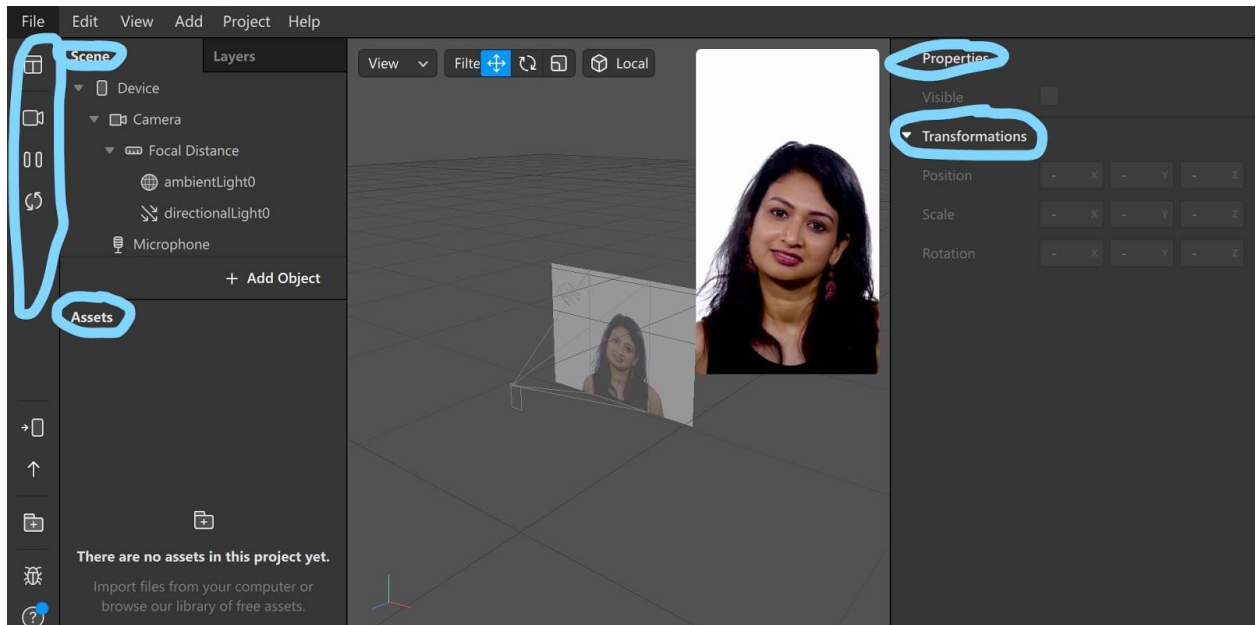
7.) When the Camera is selected in the menu on the left of the screen, blue lines will appear. These lines show where the camera is pointing and which objects are in view of the camera.

a.) When an object is listed underneath the Camera in the Scene panel, it will move with these blue lines - because it's in camera space. You can test this out by clicking and dragging your mouse in the Simulator. When an object isn't listed under the camera, it won't move with these lines, and can be placed in a fixed position in the world.

8.) Click Add Object in the Scene Panel to add an object. You'll see a list of all the different objects included in Spark AR Studio. You can also select 3D Object to import an object from your computer.