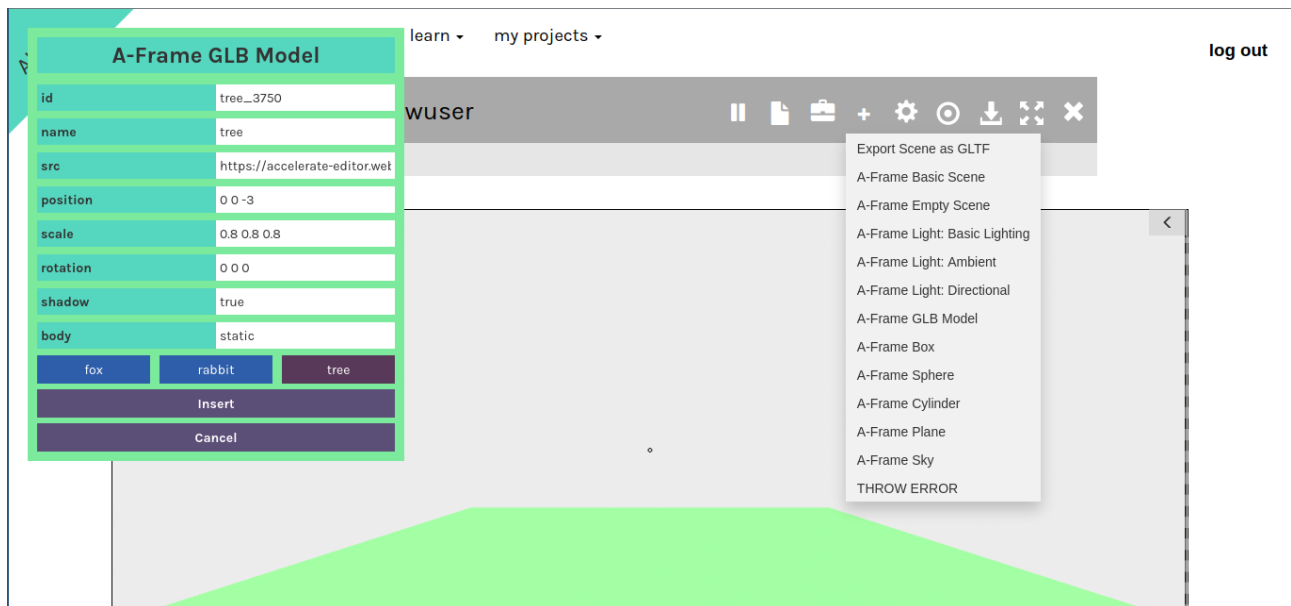


## 3D Models

In this guide we will learn how to include more complex 3D models into our scene. This means we can start making more more complex scenes with 3D models you have found online or perhaps created yourself using some 3D modelling software like [Blender](#). This is actually very easy but there are a few simple things you need to know for things to go smoothly.

### 1. Adding Your First 3D Model

The Accelerate Editor actually has three 3D models built into the snippet editor which you can get into a scene straight away. Start by [making a new document](#) and from the snippet dropdown menu select **A-Frame GLB Model**. In the snippet editor you'll see a choice of three models, a **fox**, a **rabbit** and a **tree**.

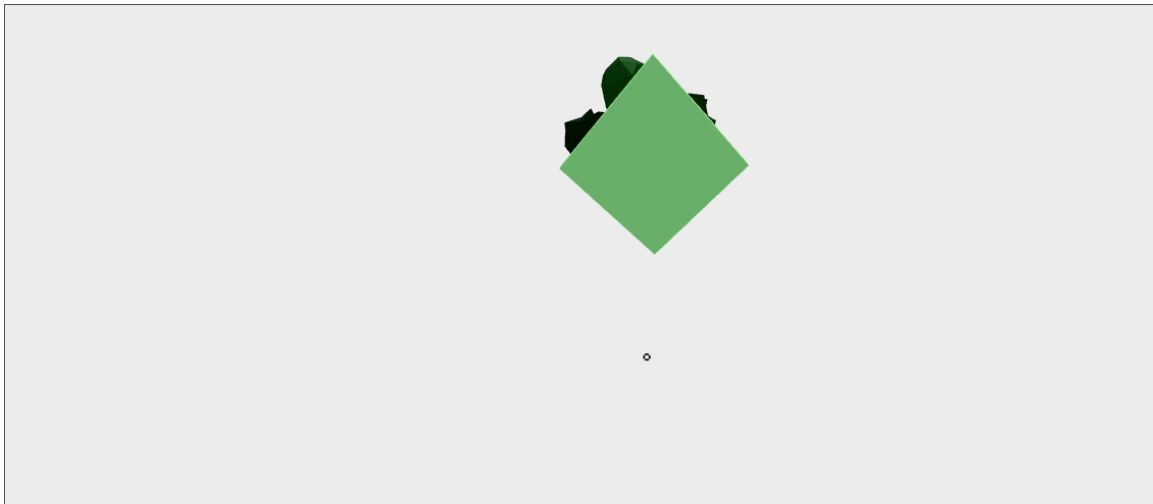


Let's add a tree to our scene by selecting **tree**, but before pressing **Insert** take a quick mental note of the values in **position** and **scale** in the snippet editor. When you're ready press **Insert** and you should see a big tree appear in the scene!

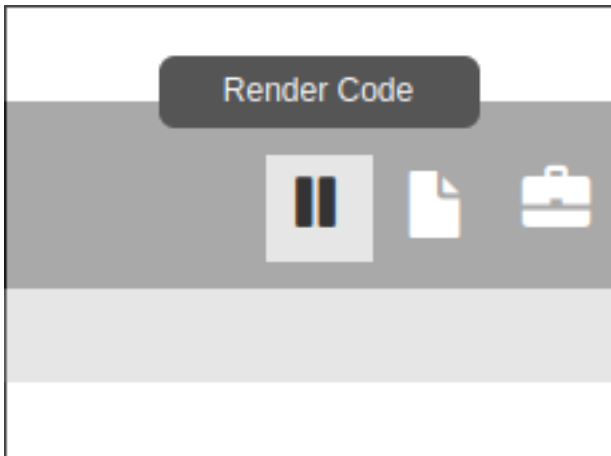


Feel free to take a moment to [enter VR](#) and have a walk around our lovely tree.

You might encounter something quite quickly when you walk around in VR... You can fall off the edge of the world quite easily...



Our floorspace is quite small after all. To reset the world just press **ESC** on your keyboard to exit VR. Then press the **Play / Pause** button in the toolbar. The first click will **pause** the running scene, and then the second click will **play** it again refreshing the scene putting you back where you started.



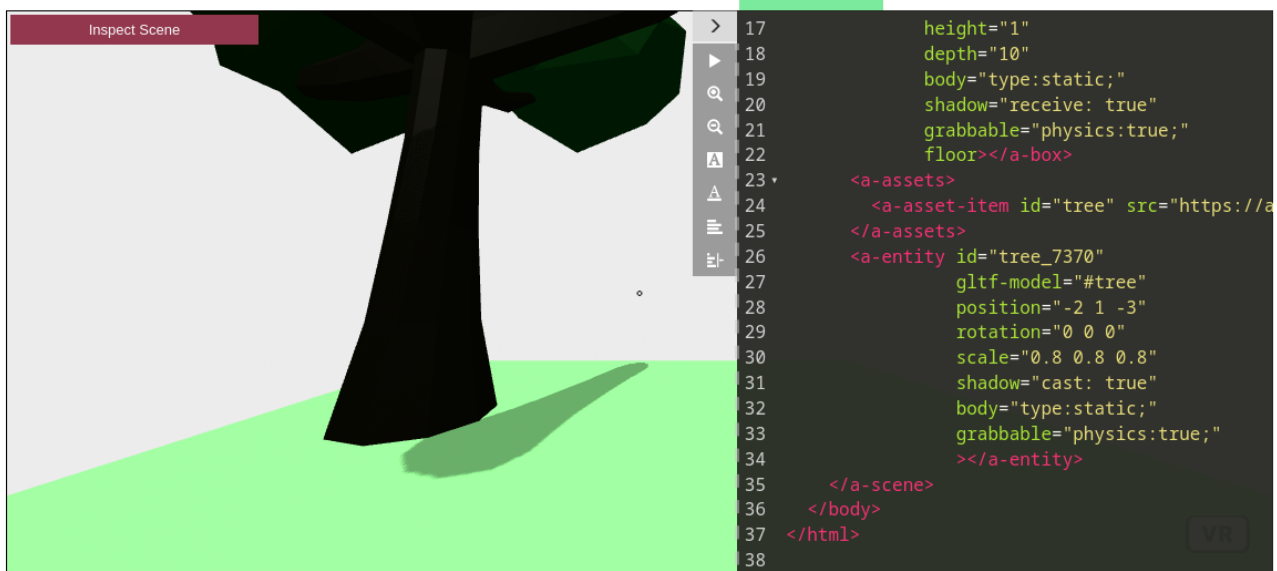
## 2. Virtual World Coordinates

Let's take a moment to think about the tree's position in 3D space. It's position is **0 0 -3** - these are **XYZ** coordinates in space. Everything in space can be positioned using **XYZ** coordinates and you'll soon get used to thinking in this way. All you need to know, is that when you load a **new scene** is:

- **X** is left-to-right, positive to the right.
- **Y** is up-and-down, positive going up.
- **Z** is back-to-front, **negative** going away from you.

So if the tree's position is **0 0 -3**, it has not moved in the **X** and **Y** axes, but has been **moved away from you**, in the **Z** axis, by **3 units**. The unit of measurement is not very important or relevant, but 1 unit can be thought of 1 metre in real world terms.

Play around with this in the code editor to help clarify. Open the code editor and try changing the values in the tree's position (you will need to scroll down to find the tree, and [remember you can auto-format](#) the code to neaten things up). If you set the tree's position to position="-2 1 -3" you'll notice the tree move to the left (negative X) and up a little (positive Y)... it floats!



If you're happy with the tree's new location, keep it there! For this demo I will reset the tree's position to position="0 0 -3".

### 3. Adding More 3D Models

Open the **A-Frame GLB Model** snippet editor again, and this time choose the **fox**. Again, take a quick note of the fox's **position** and **scale** in the snippet editor. The tree had been scaled *down* a bit (0.8 0.8 0.8), and the fox has been scaled *up* (3 3 3) - more on this later. The fox's position is 0 1 -3 which is very similar to the tree's position, let's change the **X** value to move the fox to the **left** a bit - I'll change it to -2 1 -3 *in the snippet editor*, and then press insert.

## A-Frame GLB Model

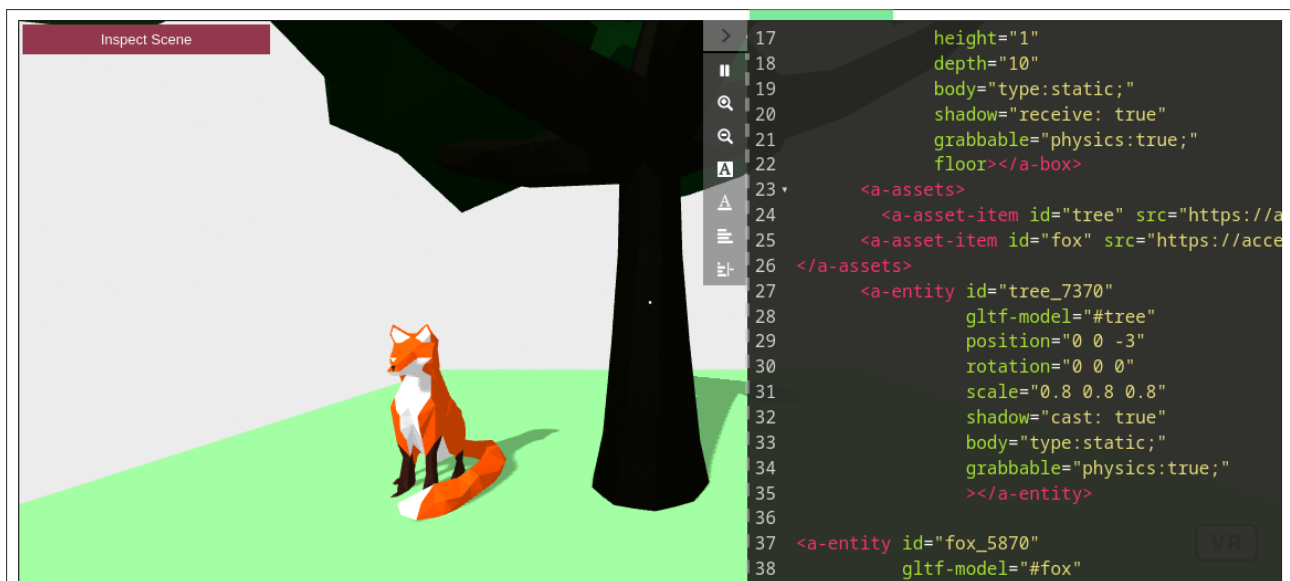
id	fox_5870
name	fox
src	https://accelerate-editor.wek
position	-2 1 -3
scale	3 3 3
rotation	0 0 0
shadow	true
body	static

fox
rabbit
tree

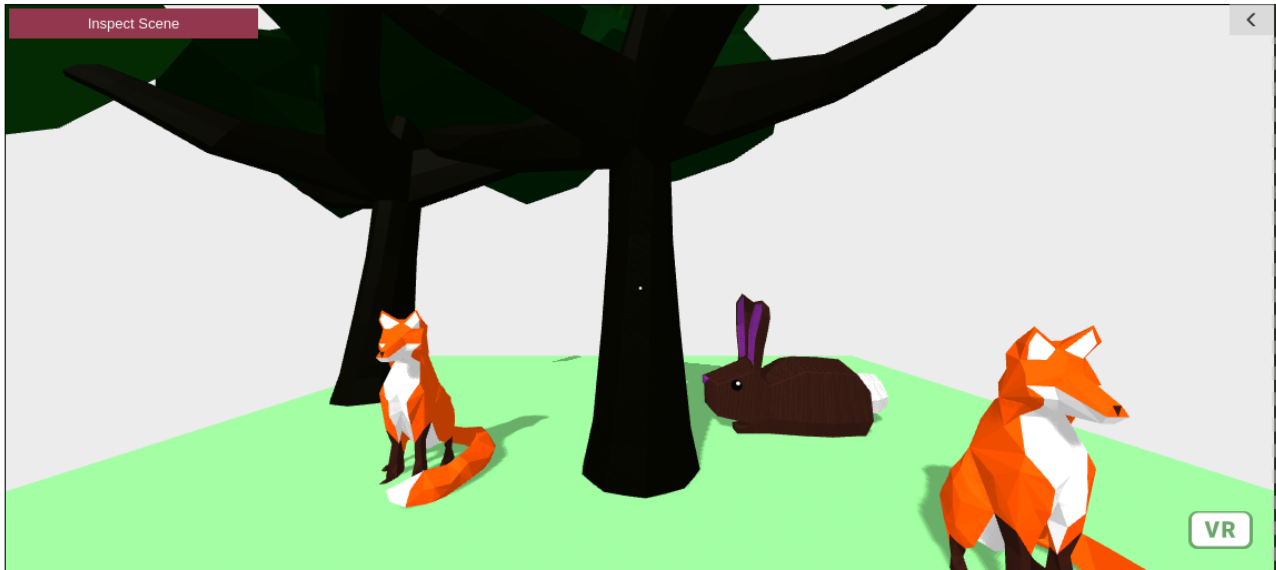
Insert

Cancel

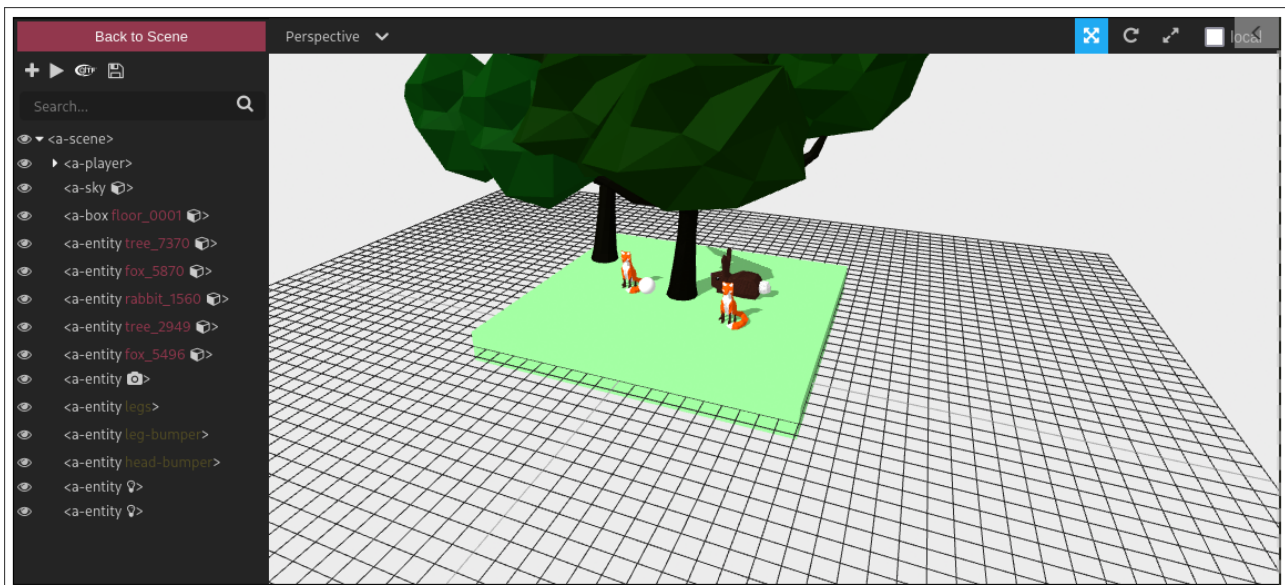
You should see a fox appear in the scene!



Try adding more models using the snippet editor. You will quickly run out of floorspace...



So let's make the floor bigger! There are a couple ways we can do this, for now we will use the **Scene Inspector**. [Hide the code editor](#) and click on **Inspect Scene** in the top left. With the inspector open you can click-and-drag and scroll to move the camera angle and zoom in-and-out respectively. Do this to find a better view of your new world.



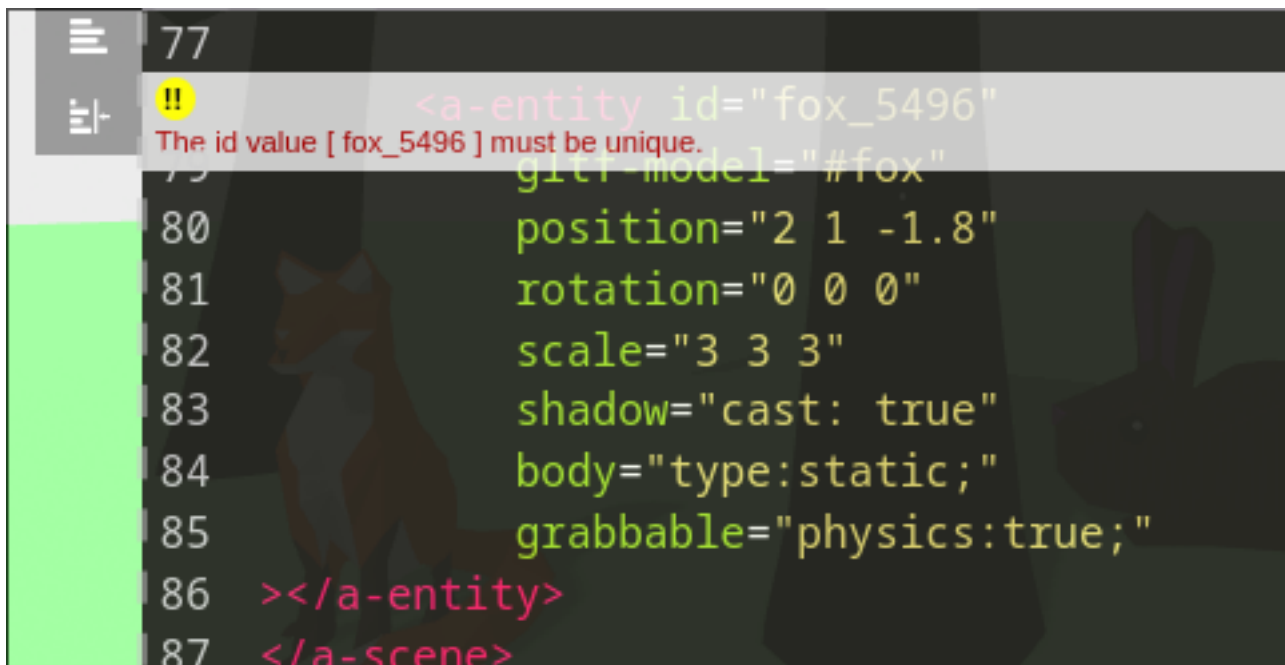
Now click on the floor and you'll see a pane open on the right-hand-side. This is all the information specific to that object. From here you can make lots of adjustments to when an object's position, scale, rotation, colour and much more. First let's adjust the floor's **scale** in **X** and **Z**, by increasing these values the floor will get stretched to fill more space. Click on the values in **position** and increase them to **10**.



We manipulated the **X** and **Z** values as they are the values which control left-to-right and front-to-back lengths. If we increased **Y** the floor would just get **deeper** (top-to-bottom). You'll get used to the **XYZ** coordinates if it doesn't feel intuitive yet.

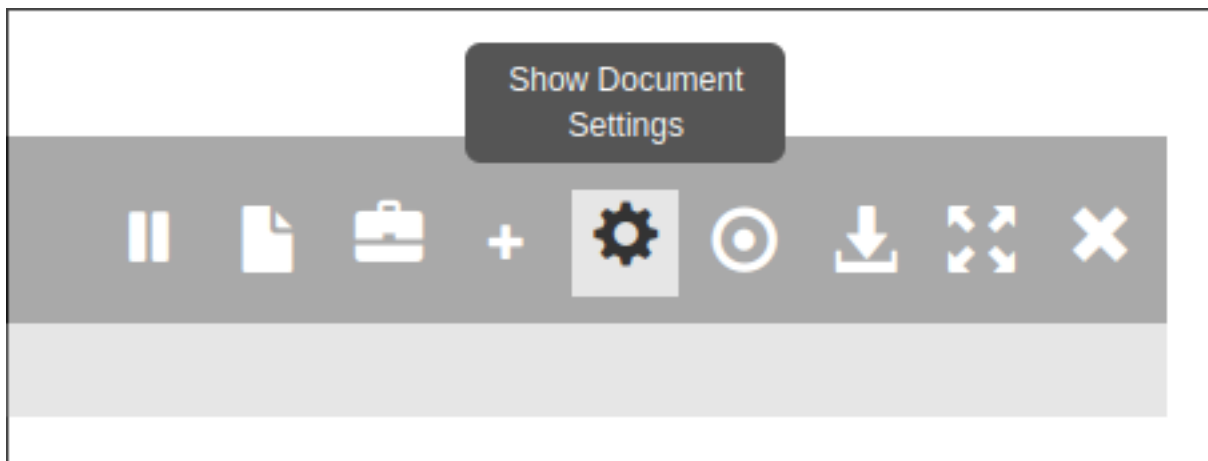
Now click on the save icon in the top left to return to our scene. You'll have a much bigger floor to walk around on and to keep adding 3D models! Try adding some more, but experiment with the position, scale and rotation of the models as you add them through the snippet editor. **Or** you could open the code editor and try copy-pasting chunks of code. If you do this make sure to change the **ID** of each new element - **the scene inspector needs each element in the scene to have a unique ID to work**. The ID can be anything you want, so long as they are unique. The snippet editor assigns a random 4 digit number after the name of the object to form a unique ID.

Fortunately the Accelerate Editor will warn you if it encounters a repeated ID:



#### 4. Auto-Rendering

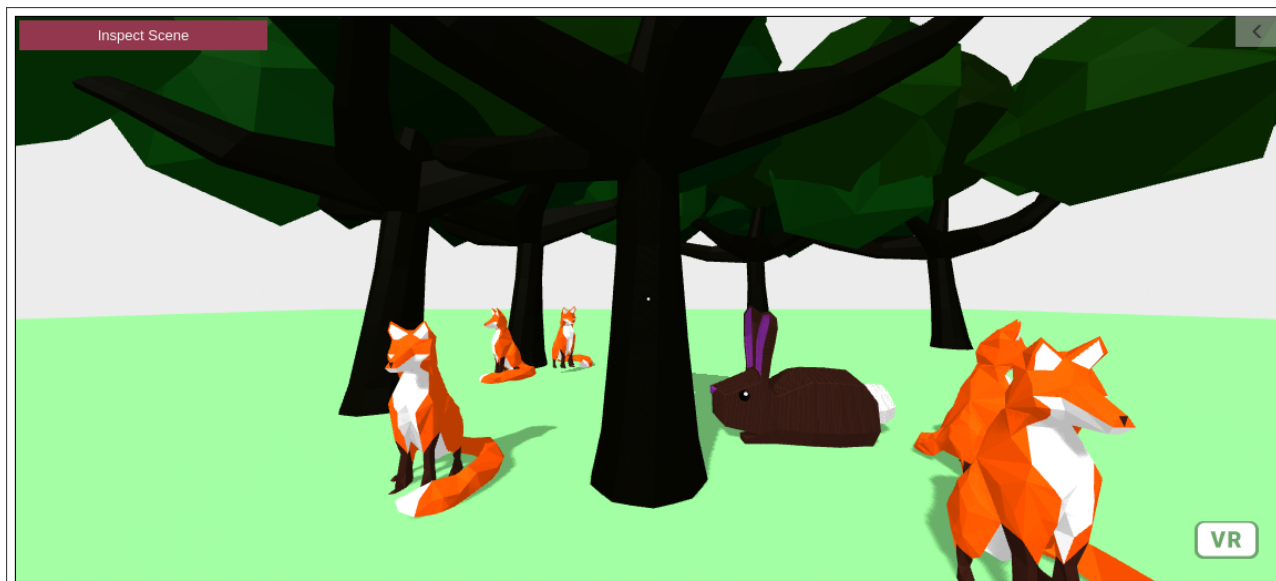
The Accelerate Editor will **auto-render** the document when it detects a change. This is useful when you are experimenting and want to see the changes immediately. But if you want to make a series of changes to the document and *then* refresh the document you can turn off auto-rendering by opening the documents settings via the toolbar:



And then unchecking **Auto Render**.



Now you can add lots of snippets, or copy-paste chunks of code and not have the document try to refresh on each changes. After making changes you can press the **Play / Pause** button at the top to see what you have created! You will need to do this once after turning auto-rendering back on too. A scene slowly but surely comes together!



## 5. Custom 3D Model

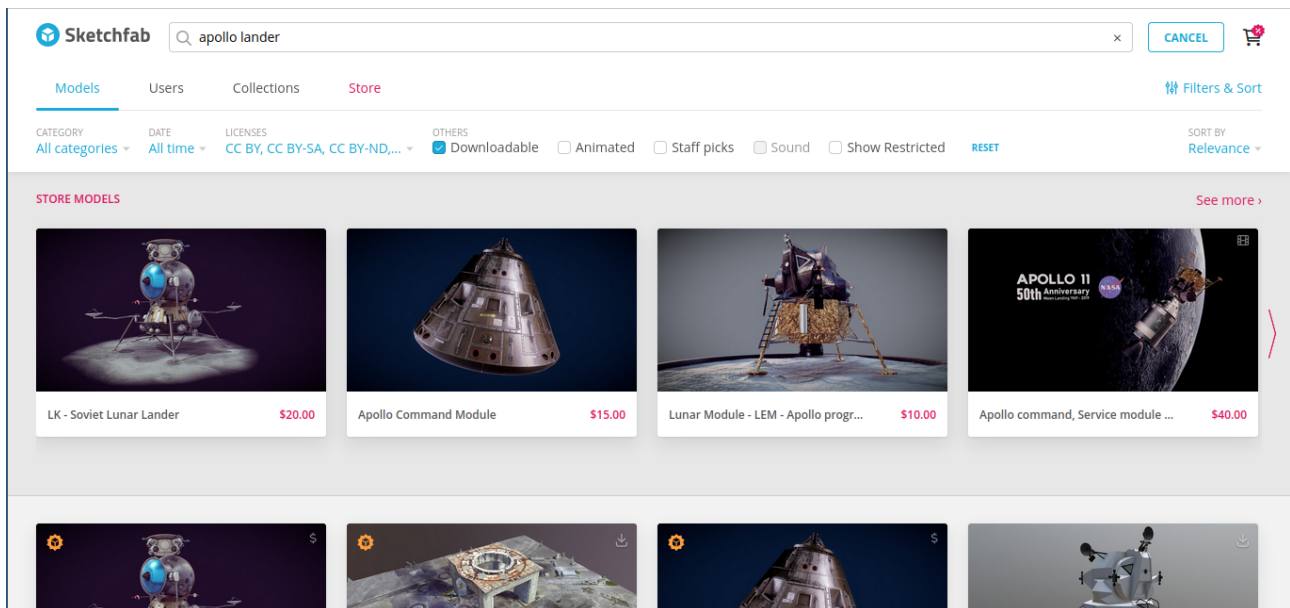
Finally we will talk about loading a custom model. In this example I will show you where you can find and download models online, but the same process will apply if you are making your own 3D models. The most important thing you need to know is that the model needs to be in **.GLB** format. This is a standardised 3D model format which packages up all the information about the model in a format a **web browser** is happy with. Here's some more information from the [SketchFab website](#).

glTF is a 3D file format maintained by the Khronos Group. It is an all-purpose transmission format, but it has been adopted by Google as the format of choice for Augmented Reality (AR) on Android's Scene Viewer.

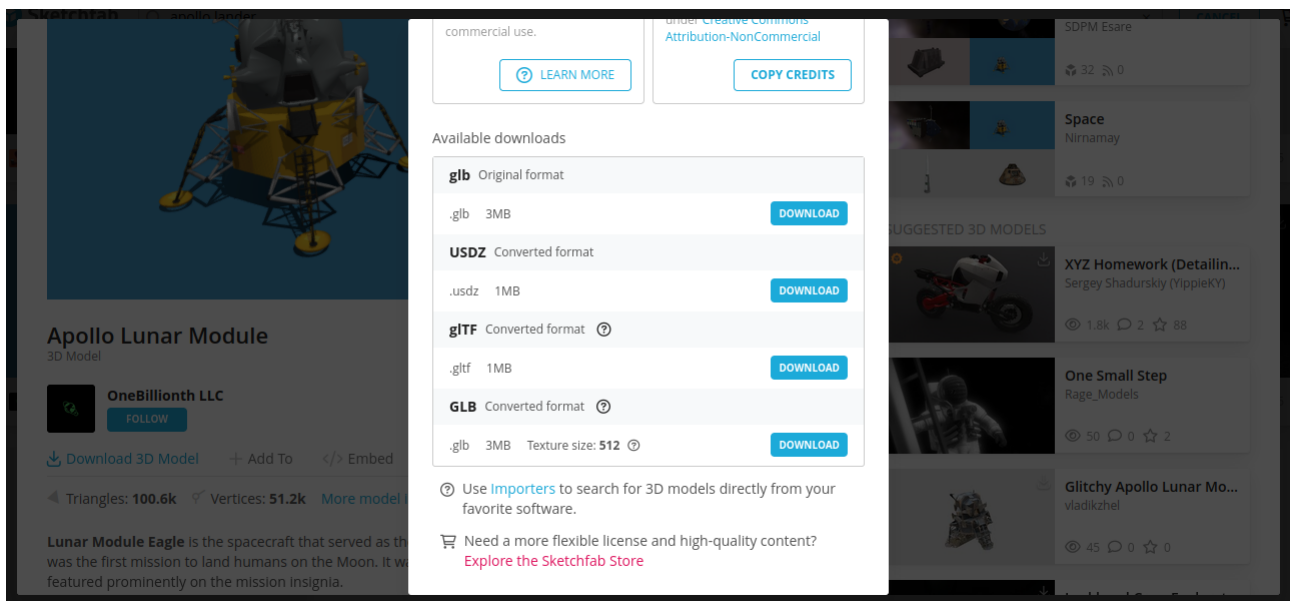


GLB is a binary container format of glTF. It bundles all the textures and mesh data into a single file.

There are a few places you can find models for free online, but [SketchFab](#) is very popular and easy to use. I would recommend making an account so you can save models you like for later. Search for what you want in the top search bar, and a good tip is to check the **Downloadable** option in the filters.

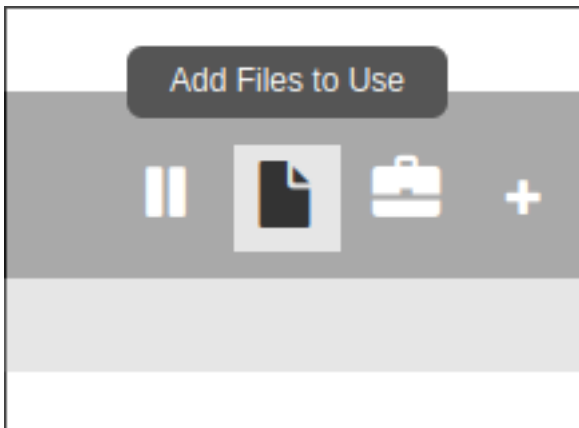


I have chosen [this Apollo Lander model](#). To download click on the **Download 3D Model** link just under the **Follow** button. In the pop-up menu make sure you select the **GLB Converted** option - this will give you a single .glb file which is much more convenient to use.

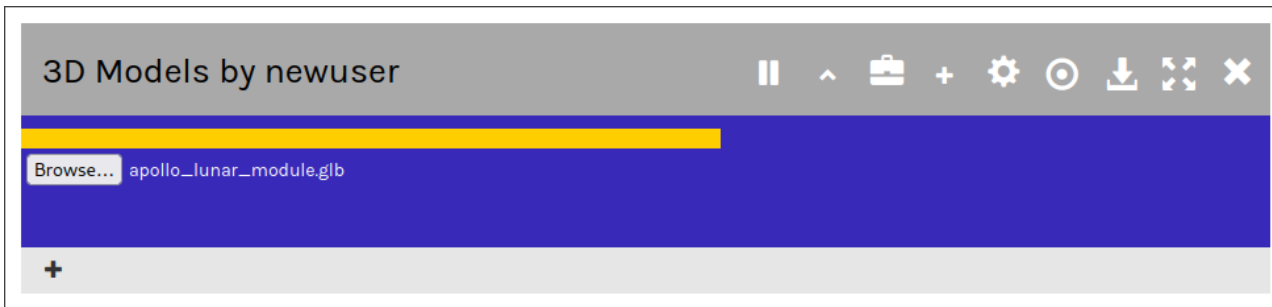


To load this model into our scene we need to upload it into the Accelerate Editor first. To upload files click on **Add Files to Use** in the toolbar.





Then click on **Browse** and find your downloaded .glb file. The file will be uploading.



Once the file has finished uploading will use the snippet editor to add it to our scene. Make sure to make a note of the **exact filename**. Click on the **A-Frame GLB Model** to open the snippet editor. You need to input a **name** and a **src** (source) for the model. The name can be anything you like, this will be used internally for reference, a bit like an ID. The **src** is the **exact filename** of the file you have uploaded. In my case that is `apollo_lunar_module.glb`.

A.

## A-Frame GLB Model

id	glb_6030
name	apollo_lander
src	apollo_lunar_module.glb
position	0 0 0
scale	1 1 1
rotation	0 0 0
shadow	true
body	static

fox

rabbit

tree

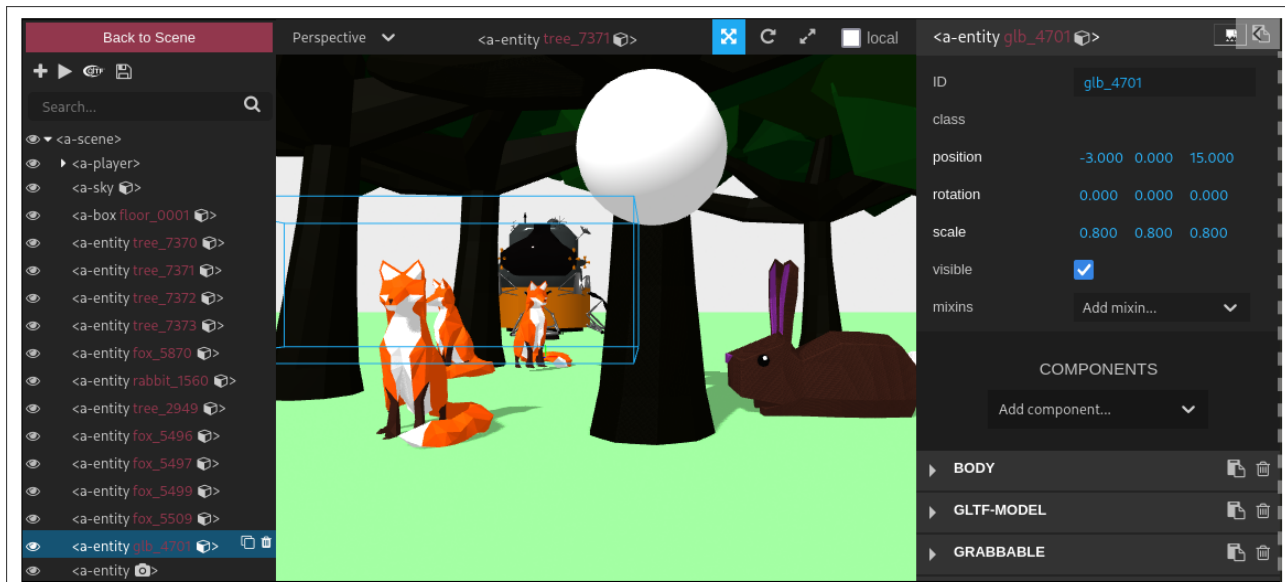
Insert

Cancel

Once you have done this press insert! Quite often the scale and position of a downloaded model does not match up with the scale of our world, so in my case the Apollo Lander is way too big and I end up inside the model!



To fix this let's open the **Scene Inspector** and reduce the scale and change the position of our model.



Now save your changes (save button in the top left) and explore your new scene!



You can see the scene I have created [here](#).

If you want to make your own models just make sure to export the model as a .GLB and the steps will be exactly the same as above!