Guide for 3D modelers and riggers – UE 5.1 specifics

WORKFLOW FOR IMPORTING 3D MODELS TO UE 5.1

In order to ensure a successful import of a rigged, animated, textured, and UE-compatible model you need to follow these steps.

1. It is important to make sure your model is ***correctly rigged and animated*** in your 3D software before exporting it as an FBX file. Ensure that all joints and bones are properly connected to the model and that the animation plays correctly.
2. When exporting the model as an FBX file, make sure to ***include animations in the export settings***. You may also want to adjust other settings, such as ***frame rate and smoothing groups***, to ensure smooth playback in Unreal Engine 5.1.
3. ***Testing your model and animations*** in Unreal Engine 5.1 before importing your final, fully textured version. This will allow you to catch any potential issues early on and make necessary adjustments.
4. It is important to keep in mind that Unreal Engine 5.1 has specific ***requirements for file names and folder structures***. Make sure to follow these requirements when importing your model and associated files to avoid any importing or linking issues.

Exporting and importing 3D models to UE 5.1

Following is the explanation of specific needs and issues when importing an FBX model made in **Blender, Maya, or 3dsmax** into Unreal Engine 5.1 and converting to Nanite without shading issues.

Firstly, it's important to note that ***not all 3D models will be compatible with Unreal Engine 5.1*** and Nanite, so it's important to ***make sure the model meets the engine's requirements*** before attempting to import.

Here are a few specific requirements to keep in mind:

1. The model must be in ***FBX format***. This is the default format for most 3D modeling software, but if you're working with a different file type, you'll need to convert it to FBX before importing.
2. The model ***should not have any overlapping UVs***. Nanite relies on the UVs to accurately display textures on the mesh, so overlapping UVs can cause shading issues.

3. The model ***should not have any non-manifold geometry***. Non-manifold geometry refers to any parts of the mesh that do not have a consistent orientation (such as the intersection of two planes). This can cause shading issues as well.
4. The model ***should have proper smoothing groups***. If the model has sharp edges that are meant to be smooth, you'll need to specify these areas as smoothing groups in your 3D modeling software before exporting.

Once you have a model that meets these requirements, you can import it into Unreal Engine 5.1 and convert it to Nanite.

Here are a few things to keep in mind during the conversion process:

1. ***Nanite automatically applies tessellation*** to your mesh to improve its level of detail. However, this can cause shading artifacts (such as z-fighting) on certain parts of the mesh. To avoid this, you can disable tessellation for certain parts of the mesh using the "Nanite Settings" panel.
2. ***Nanite uses a different shading model*** than traditional game engines, so you may need to adjust your materials to make them look correct in Unreal. For example, the roughness values you use in your material will have a different effect in Nanite than in a traditional game engine.
3. Nanite can handle ***millions of triangles on screen at once, but this can be taxing on your hardware***. You may need to optimize your scene by using LODs or reducing the number of meshes on screen at once to maintain a smooth framerate.

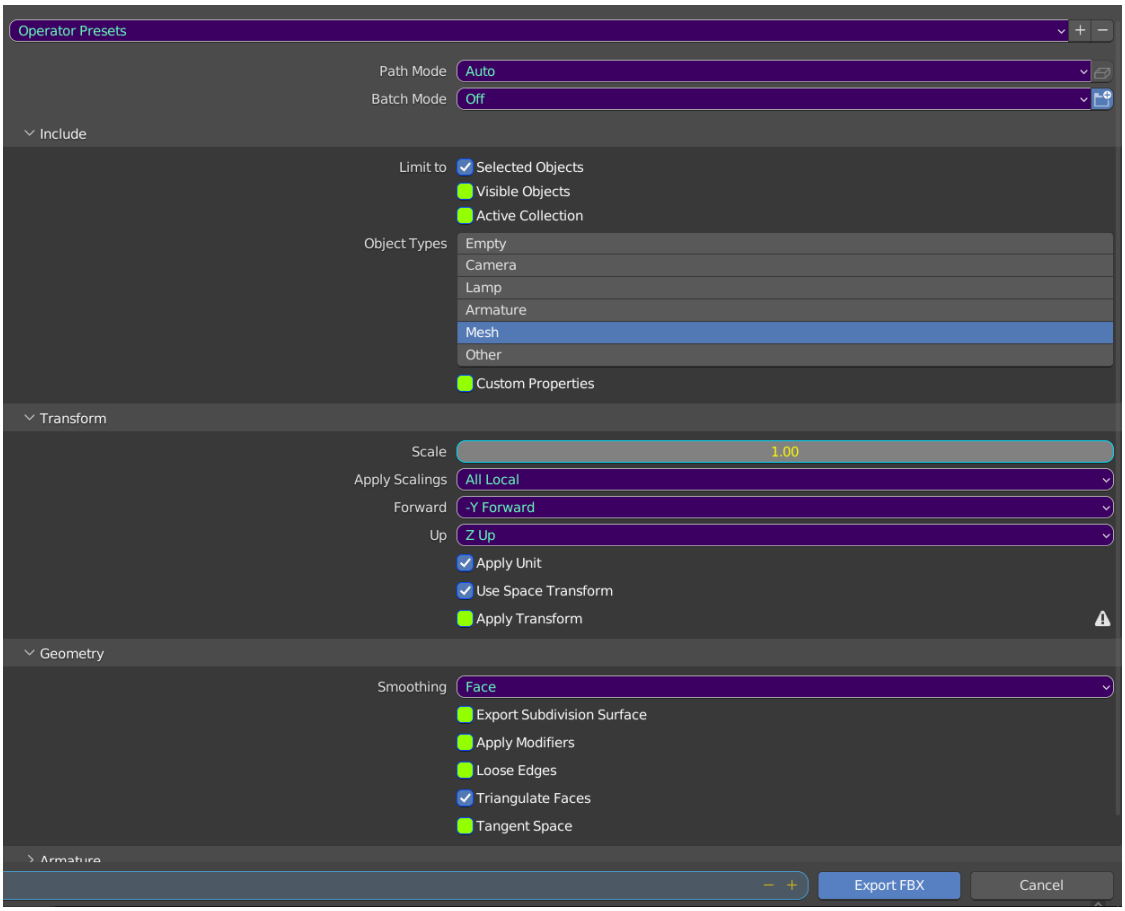
Overall, importing an FBX model into Unreal Engine 5.1 and converting it to Nanite requires a bit of prep work to make sure the model meets the engine's requirements, but the end result is a highly detailed and realistic-looking mesh.

An example: Blender export settings for the harvesters to UE

These export settings apply to any mesh destined for Substance/UE.

Face or Edge smoothing both works, however it seems that ***edge smoothing works better on characters*** and ***face smoothing is better for meshes with large faces***, like the Harvester.

As a safety measure it is recommended to tick triangulate faces regardless of the mesh being triangulated. In UE import, ***set "Normals" to "Import Normals".***



Importing textures and materials to UE 5.1

Blender, Maya, 3dsmax

There are a few special steps you need to take to ensure that the materials and textures are properly imported into Unreal Engine 5.1 and create a ***good material slot structure***.

1. make sure that your textures are ***saved in a compatible file format*** that Unreal Engine 5.1 supports, such as ***PNG or JPEG***. Next, when exporting your FBX model from Blender, Maya, or 3dsmax, make sure that you ***include the materials and textures in the export settings***.

2. when importing the FBX model into Unreal Engine 5.1, you will have the ***option to import materials and texture***s as well. It's important to choose this option and make sure that the ***materials are properly assigned to the model*** as they were in the original 3D software.

3. once you have imported the model and materials, you will need to ***create material slots for each material***. This can be done in the ***Material Editor in Unreal Engine 5.1*** by creating a new material and dragging the textures into the material slots.

It's important to note that the material slot structure will affect the performance of your game, so it's recommended to ***keep the number of material slots to a minimum and reuse textures as much as possible***. Additionally, you may need to ***adjust the material settings***, such as transparency and reflection, to ensure that they look as intended in the game engine.

Substance painter

There are additional steps to take when using Substance Painter in your workflow for importing materials and textures into Unreal Engine 5.1.

When exporting materials from Substance Painter, it's recommended to ***use the following settings***:

- Choose the "Unreal Engine 4 (Packed)" export preset.

- Set the Texture Set Resolution to the desired size for your textures.

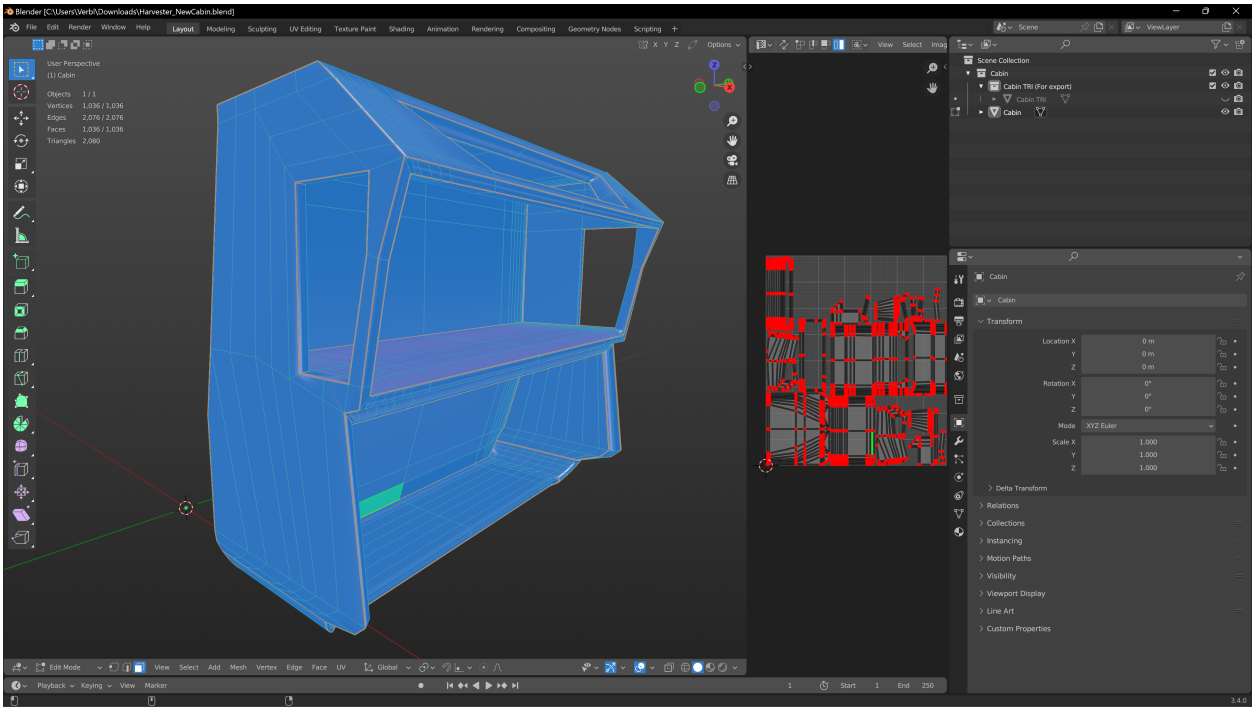
- In the Configuration tab, make sure that the following settings are selected: "Metal Roughness" for the Output Template, "Packed" for the Texture Output Packing, and "Unreal Engine 4/5" for the Texture Settings.

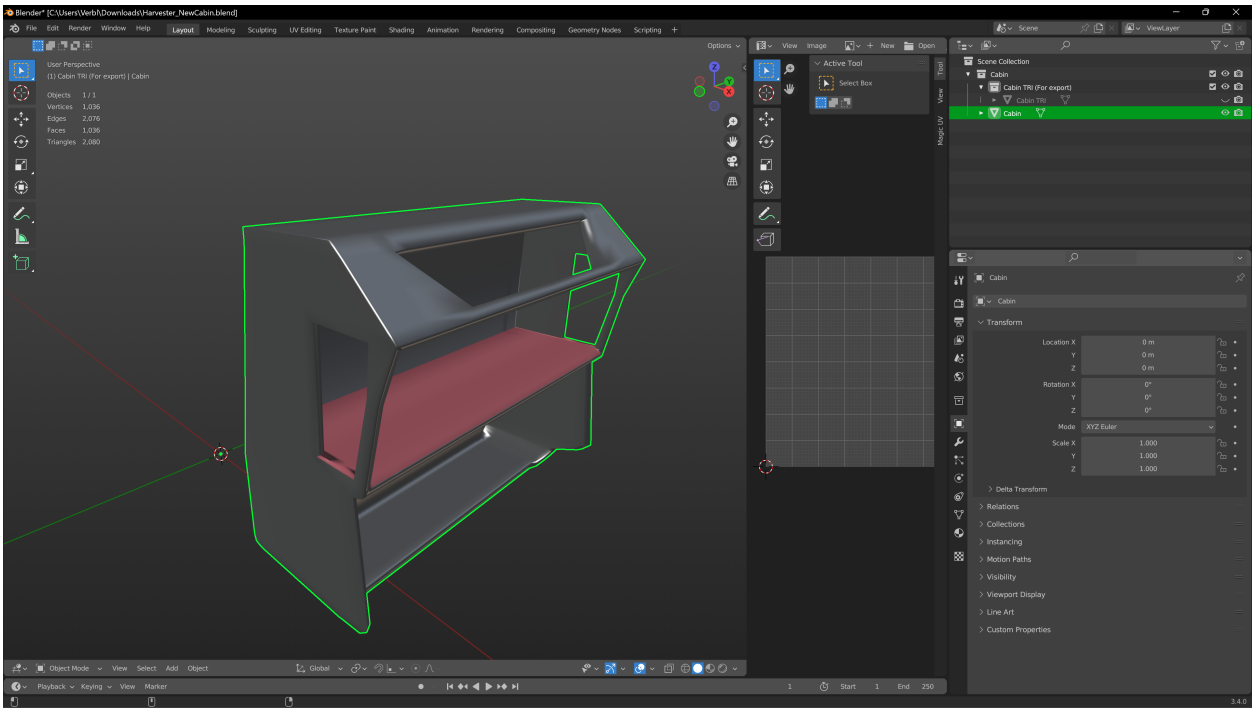
Once you have exported your textures from Substance Painter, you can import them into Unreal Engine 5.1 using the same steps as before, and the material slots will be automatically created for you. However, you may need to adjust some of the material settings to achieve the desired look in the game engine.

It's also important to note that Substance Painter supports ***multiple texture sets for a single model***. If your model has multiple texture sets, you can ***export them separately and import them into separate material slots*** in Unreal Engine 5.1.

An example: Harvester cabin

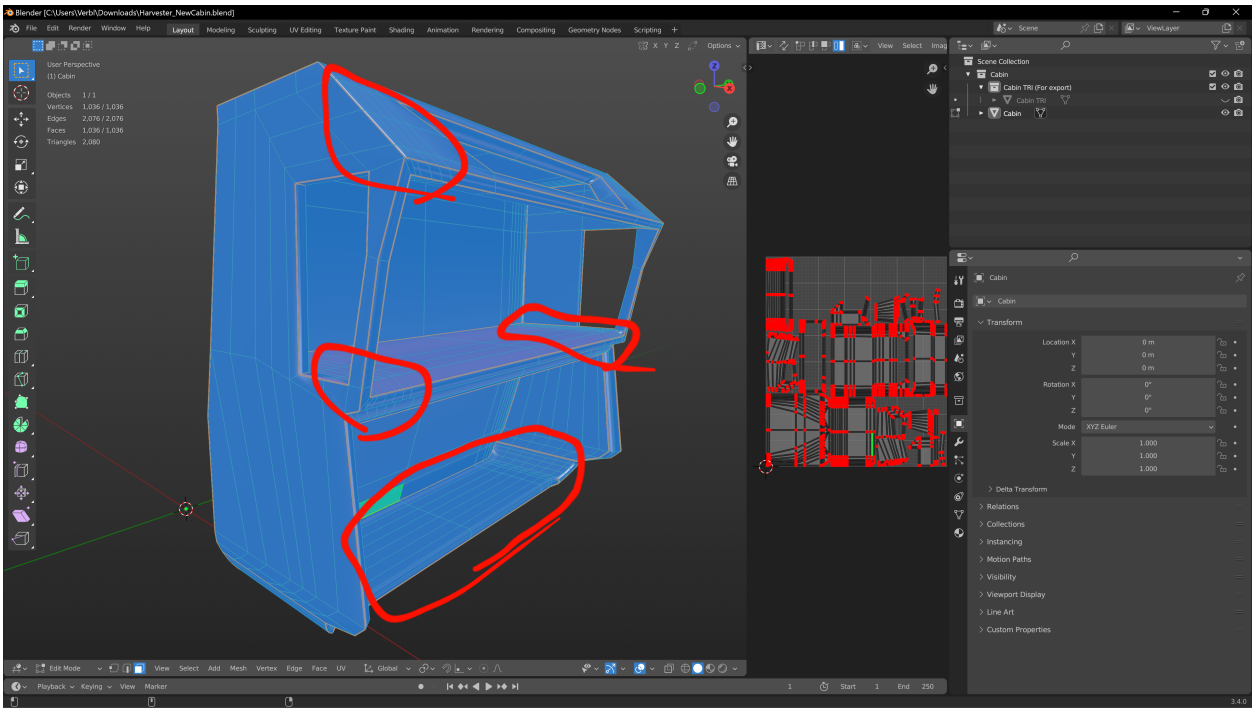
When it comes to topology, this is an example for correct topology. You can find a video attached comparing the harvester cabin before and after.





You can file .blend file of the cabin attached for your reference.

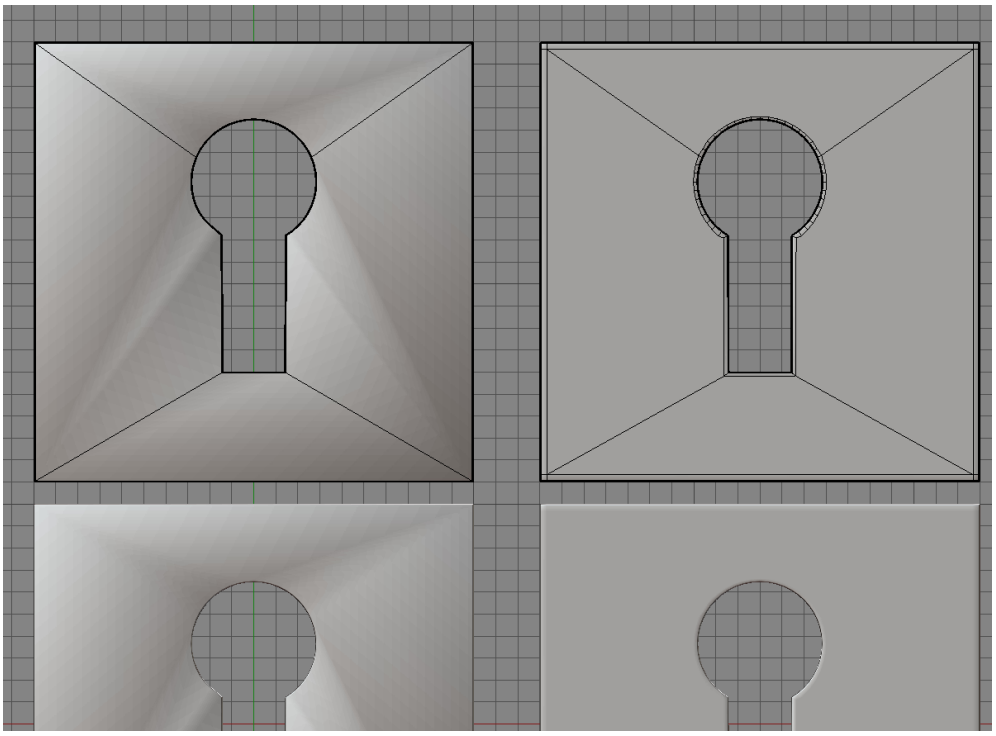
Question: Aren't there a bit of a waste of faces which aren't needed at all? What I mean is circled in red.

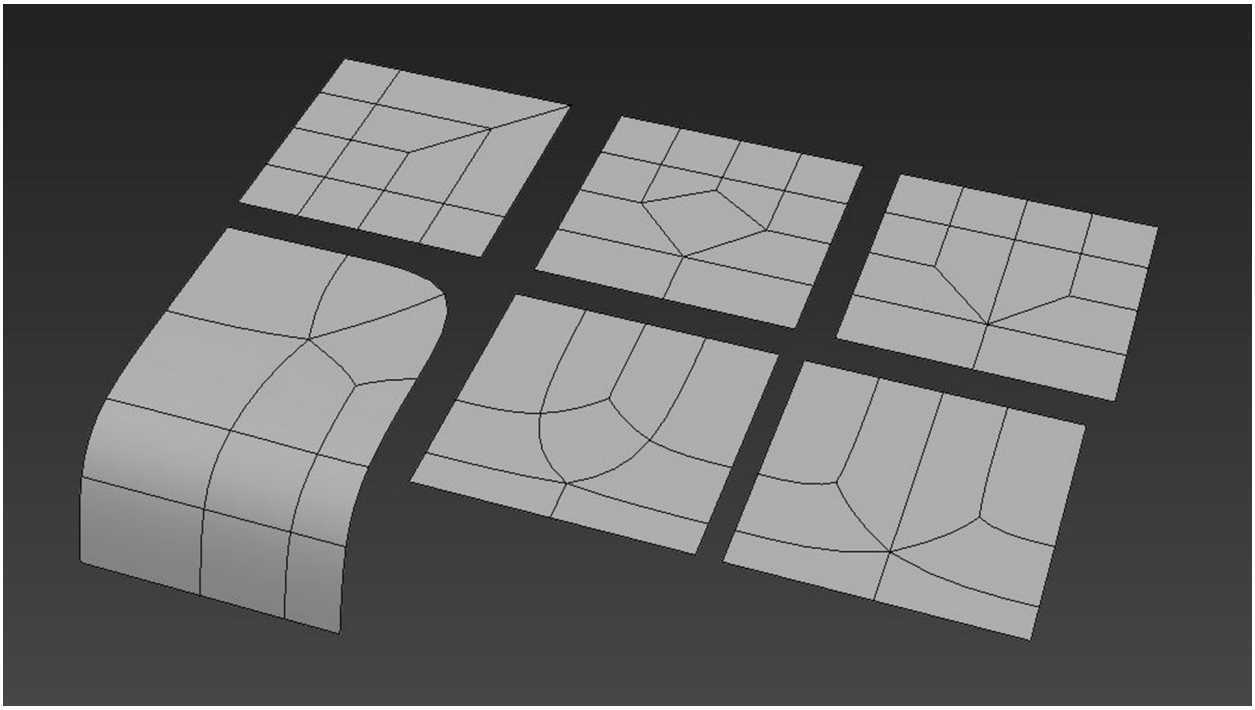


Answer: These faces are support loops, every line on that mesh needs to be there.

Curved sections need extra vertices, those verts need an edge loop each or they are an Ngon. The picture has also Ngons but just imagine it's quads.

Substance hates large faces too, the reason why it looks good in Substance now is the new. Normal painting and everything is perfect only using a 2k map also.





Rigs and animations

To rig a vehicle to Chaos physics in Unreal Engine 5.1, you will need to follow these steps:

1. First, you will need to ***create a skeletal mesh*** for the vehicle. This can be done either by creating custom geometry or using an existing mesh and rigging it to a skeleton.
2. Once you have your skeletal mesh ready, you can start rigging it to Chaos physics. This is done by selecting the mesh and going to the ***Physics Asset Editor***. In the Physics Asset Editor, you can add physical constraints between bones, create collision volumes, and adjust the center of mass and other physical attributes of the mesh.
3. After you have set up the vehicle's physics, you can ***export the mesh using the FBX*** export process previously discussed. Make sure to set the export settings appropriately so that the physics constraints and collision volumes are included in the export.
4. Next, you can ***import the mesh*** into Unreal Engine 5.1 and ***set it up as a dynamic object*** that can interact with the game world. This is done by creating a blueprint for the vehicle and setting up its movement and collision mechanics. You can also add visual effects like exhaust smoke and particle effects.
5. Finally, you can ***test the vehicle*** to make sure it operates as intended and make necessary adjustments to its physics, movement, and visual effects.

The export/import process for ***rigging to Chaos physics is very similar to the process for importing a regular FBX mesh***, but the key difference is the ***use of the Physics Asset Editor*** to set up the physics constraints and collision volumes for the vehicle mesh.

Physics Asset Editor

Following is a step-by-step process for using the Physics Asset Editor in Unreal Engine 5.1 to rig your vehicle to Chaos physics:

1. Open your project in Unreal Engine 5.1 and make sure all ***relevant assets*** (such as your vehicle model and any necessary textures or materials) are ***imported*** into the engine.
2. ***Locate the Physics Asset Editor*** in the engine by opening the Content Browser, right-clicking in an empty space, selecting "Physics" from the contextual menu, and then selecting "Physics Asset".
3. ***Drag your vehicle model into the Physics Asset Editor*** window. This will create a skeletal mesh that you can use to rig your vehicle to Chaos physics.
4. Right-click on the skeletal mesh in the Physics Asset Editor and select "***Add new capsule primitive***". This will create a capsule-shaped collider around your vehicle model. You can use this collider to represent the overall size and shape of your vehicle.
5. ***Continue adding additional colliders*** to your vehicle model as needed, such as boxes or spheres for specific parts of the vehicle. You can do this by right-clicking on the skeletal mesh and selecting "Add new [shape] primitive".

6. Once you've added all necessary colliders, you can begin ***adjusting the physics settings*** for each one. This includes adjusting things like mass, friction, and damping to get the desired physical behavior for each collider.
7. You can also create joints between the colliders, such as hinge joints for doors or ball joints for wheels. To create a joint, right-click on the source collider, select "***Add joint***", and then select the target collider.
8. ***Test your physics settings*** by simulating your vehicle model in the Physics Asset Viewer window. Use the controls in the lower left corner of the window to move and rotate the vehicle and watch how the physics behaves in real-time.

Keep in mind that there are many additional settings, be sure to consult engine's documentation and experiment with different settings until you get the desired results.