

A key component of creating an interesting, interactive experience in Enduvo includes various assets that help amplify the concepts you cover in your lesson. Assets allow the learner to engage with your content and increase the likelihood they will retain the information you share. Assets include 3D models, pictures, diagrams, infographics, and videos that support your lesson's narration. This document provides an overview of creating with 2D & 3D Assets.

CREATING WITH 2D ASSETS:

Considerations for using images

- Enduvo supports JPEG, PNG, and PDF image formats and recommends converting your documents into one of these formats before importing them into Enduvo
- Consider diagrams, pictures, research references, schematics
- Always select the highest resolution image option available
- When using highly detailed images, convert to PNG or PDF format

Considerations for using videos

- Enduvo supports the MP4 video format and recommends converting any video to this format before importing the video into Enduvo
- Use GIF-style, short, looping videos
- Keep the length under 10-15 seconds
- Focus on the moment most central to learning objective

Helpful questions to ask before importing your 2D assets

- Is the file type supported?
- Are the videos shorter than 10-15 seconds in length?
- Do the videos show only the most essential moment?
- Are the images the highest resolution possible?
- Am I missing any assets?

CREATING WITH 3D ASSETS:

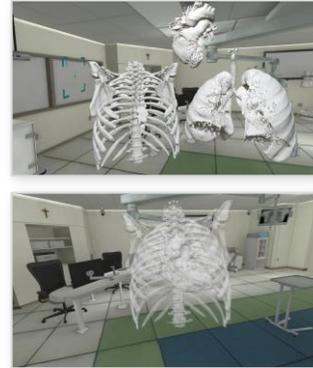
With Enduvo, you can choose from over 50 different 3D model types. This section overviews the following:

- Segment versus model mode
- Our 3D model checklist
- Where to find 3D models
- Software you can use to create and modify 3D models
- 3D model formats Enduvo supports
- Helpful hints for using models in Enduvo

Segment mode vs. model mode

Providing a method for people to engage and interact with assets within learning experiences is one of the ways Enduvo boosts retention and learner confidence. Enduvo offers two ways to interact with models. Depending on your topic you may want to use one or both methods in your lessons. The two modes of interaction include:

1. Segment mode enables you to:
 - Interact with individual segments or components, in 3D model
 - Assemble and disassemble models in Enduvo
2. Model mode enables you to:
 - Interact with the whole model (e.g., use the cut plane to see the layers with the model)
 - Resize, rotate and hide/show model components



Recommended Model Sources

We provide some websites below where you can find 3D models. We recommend verifying copyright and permissions for use before importing any externally sourced model into Enduvo.

Source	Website
3D Export	https://3dexport.com/
CGTrader	https://www.cgtrader.com/
Free3D	https://free3d.com/
NIH 3D Print Exchange	https://3dprint.nih.gov/
Sketchfab	https://sketchfab.com/store/3dmodels/
Turbosquid	https://www.turbosquid.com/

Popular modeling software

The following applications are great sources for modifying models that you acquire and/or for creating your own custom models. Many of these applications also have models you can use in Enduvo.

Tool	Comments	Website
Blender	Open-source desktop 3D model software with advanced modeling features; use version 2.79	https://download.blender.org/release/Blender2.79/
Meshlab	Open-source desktop 3D model software with advanced modeling features	http://www.meshlab.net/

Popular modeling software continued:

Tool	Comments	Website
Sketchup	Subscription-based software including 3D modeling software and access to 3D model warehouse (database of models)	https://www.sketchup.com
Google Blocks	Basic 3D modeling tool in VR; requires VR headset	Site: https://arvr.google.com/blocks/ Enduvo guide: https://enduvo.zendesk.com/hc/en-us/articles/360042587333 Creating Enduvo Content In Google Blocks
Google Tilt Brush	Advanced 3D modeling tool in VR; requires VR headset	Site: https://www.tiltbrush.com/ Enduvo guide: https://enduvo.zendesk.com/hc/en-us/articles/360042586833 Creating Enduvo Content In Google Tilt Brush
Oculus Medium	Advanced 3D modeling tool in VR; requires VR headset	Site: https://www.oculus.com/medium/ Enduvo guide: https://enduvo.zendesk.com/hc/en-us/articles/360042098694 Creating Enduvo Content In Oculus Medium
FreeCAD	Free; allows users to perform basic editing and file conversion for CAD model file types (e.g., step, stl, etc.)	https://www.freecadweb.org/

Model Types

Enduvo supports over 50 model types; however, we recommend when possible, using .obj and fbx models:

3d	.blend	.ifc	.md5mesh	.ogex	.stl
.3ds	.bvh	.ifczip	.mdc	.pk3	.stp
.3mf	.cob	.irr	.mdl	.ply	.ter
.ac	.csm	.irrmesh	.mesh	.pmx	.uc
.ac3d	.dae	.lwo	.mesh.xml	.prj	.vta
.acc	.dxf	.lws	.mot	.q3o	.x
.amf	.enff	.lxo	.ms3d	.q3s	.x3d
.ase	.fbx	.md2	.ndo	.raw	.x3db
.ask	.glb	.md3	.nff	.scn	.xgl
.assbin	.gltf	.md5anim	.obj	.sib	.xml
.b3d	.hmp	.md5camera	.off	.smd	.z

How to import model textures:

The model import system looks for UV textures defined in the model's material and currently supports diffuse textures. The Import system will look for textures in either:

- Directory defined for the model file
- Directory relative to the model file

You can also use Blender to embed textures in the FBX by assigning a texture to the model's diffuse color ("base color"). However, we recommend you avoid using Blender's node editor; this type of custom setup does not translate in Enduvo. To embed your texture when exporting the FBX:

- Select "Copy" as the Path Model
- Click the icon circled to the right of Path Mode so that it shows file icon above

How to use model layers and transparencies:

Use transparency in Enduvo to show the 'inner workings' of a model. Sample use cases include displaying the lungs below the skin or showing the engine under the hood of a car. Follow the steps to import models with different layers:

- Ensure that your 3D model has distinct layers for each physical trait you plan to show (e.g., one layer for skin and one for lungs)
- Uncheck the "Merge Objects by Material" option in Enduvo
- Consider recoloring layers on Enduvo media import page to highlight key features
- Steps to make layers transparent:
 - In Enduvo, press round trackpad on your controller to open Texture Menu
 - Use sliders to set transparency
 - To hide a layer altogether, uncheck the box next to the layer in question

Posing a model in Blender for use in Enduvo

The procedure below will allow you to import a posed Blender model into Enduvo. This assumes you already have a rig (model with a connected armature) in Blender and know how to edit its pose.

- Pose your armature in Pose Mode
- Select your mesh
- Go to the modifiers tab
- Copy the armature modifier
- Apply the armature modifier at the top of the hierarchy (this will temporarily double the pose transformations)
- Select the entire armature in Pose Mode
- Hit CTRL + A and select 'Apply Pose as Resting Pose'
- Select your mesh
- Go to File > Export > FBX
- Select only the Mesh for export and export your FBX
- Begin creating an Enduvo lesson and import the FBX created above

Showing an object in multiple states

There are 2 options to show multiple object states or stages:

1. Multiple 3D files

- Create a separate 3D model for each state
- When you import your 3D object, select all files
- The trainer can show all stages/states simultaneously by:
 - Arranging all the model stages/states individually around the classroom
 - Turning off a state/stage to show each at a certain time during the lesson

2. Separate objects in one file

- Include each 3D object 'state' as a separate object in the same file
- Give each objects' materials a unique name to control visibility more easily in Enduvo
- Import your single 3D file into Enduvo
- The trainer can then turn on/off the appropriate layers to show each state

Enjoy learning in Enduvo!

Find additional hints and best practices on our [support page](#).
If you have questions, please contact support@enduvo.com.