



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

BA COMPUTER GAMES DESIGN

ENVIRONMENT DESIGN

3D Model Cleanup Exercise

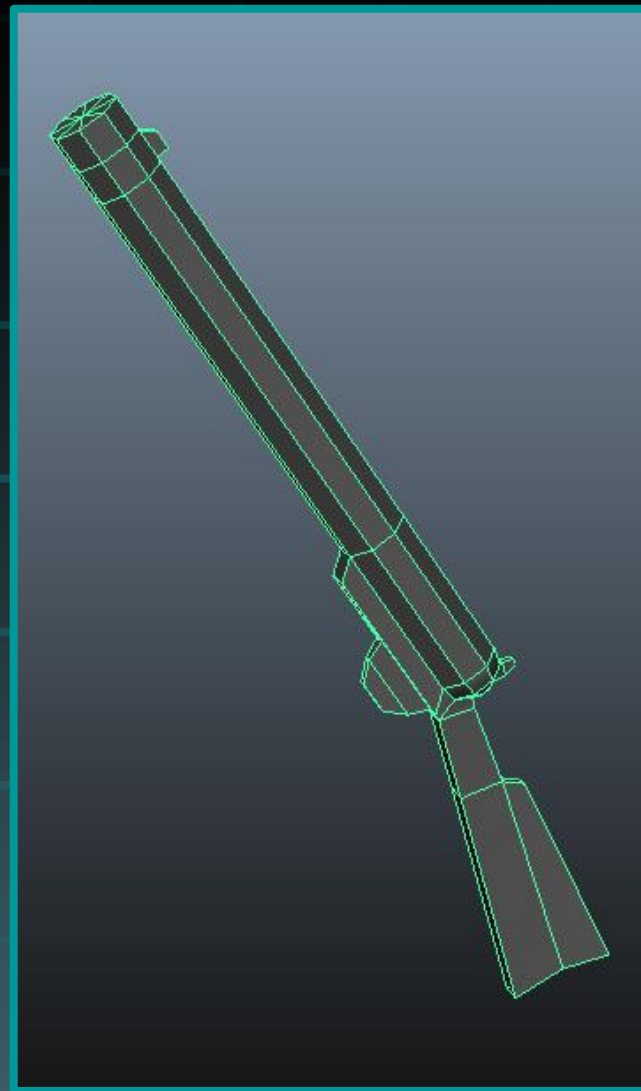


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

3D Model Cleanup Exercise

- **Maya Tools:**
 - Fill Hole Tool
 - Multi-Cut Tool
 - Edge Loop Tool
- **Select Using Constraints**
- **Cleanup Exercise**
- **Exporting Models**





ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Cleanup Exercise

Files to download on Moodle:

ELD_gun_ex_broken.fbx

 Resources

Resources for Environment and Level Design exercises

 Diorama Project Files
10.3MB Archive (ZIP) Uploaded 31/01/18, 16:22

This zip folder contains the Unreal Project (UE4.18) which you will construct your dioramas within, it also contains the diorama measurement base in FBX and MB formats.

 Maya Whitebox reference image

 Maya Simple Gun Model .fbx file - Cleanup Exercise

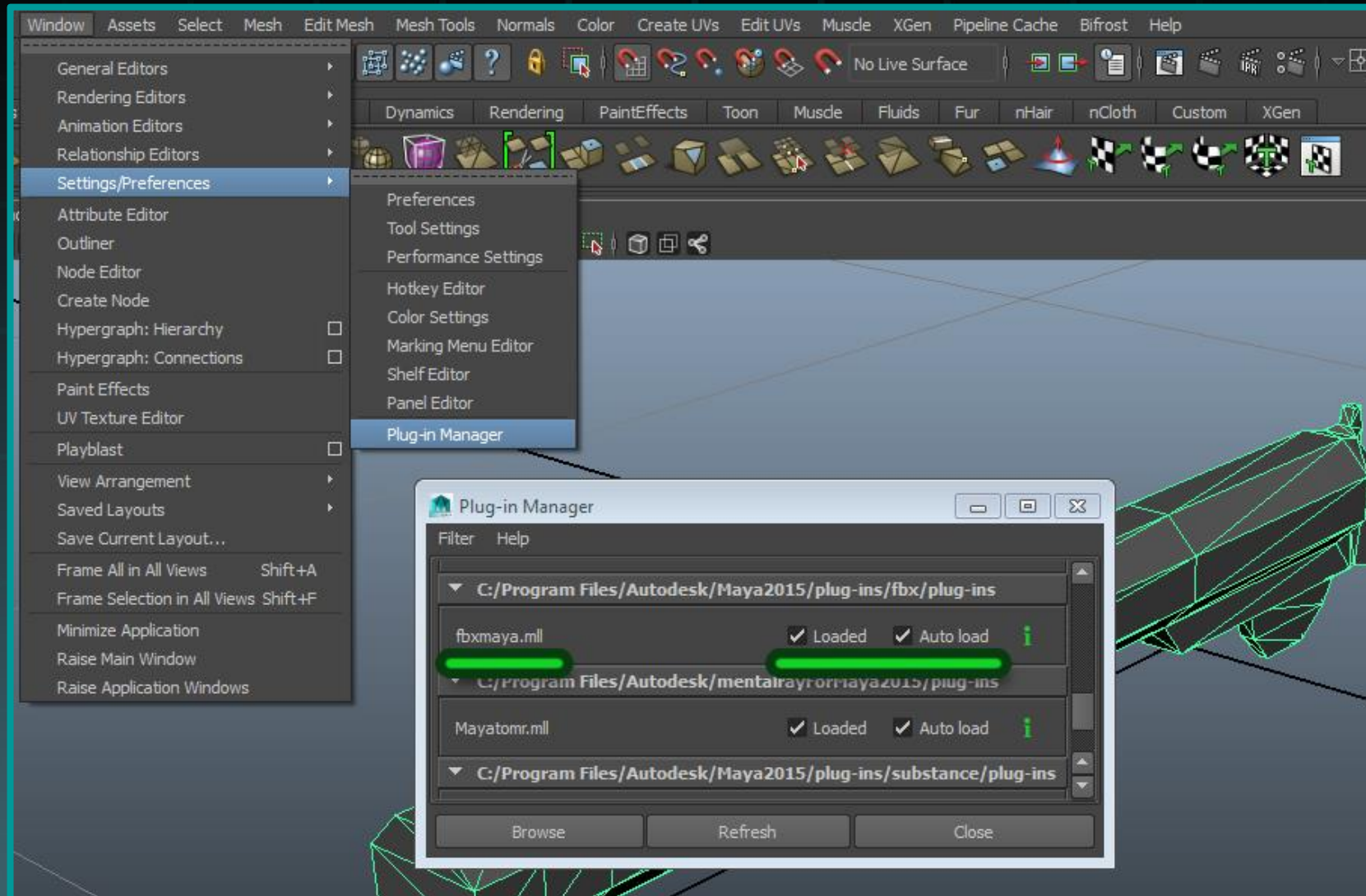




ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Troubleshooting FBX Imports: Plug-In Manager (FBX)

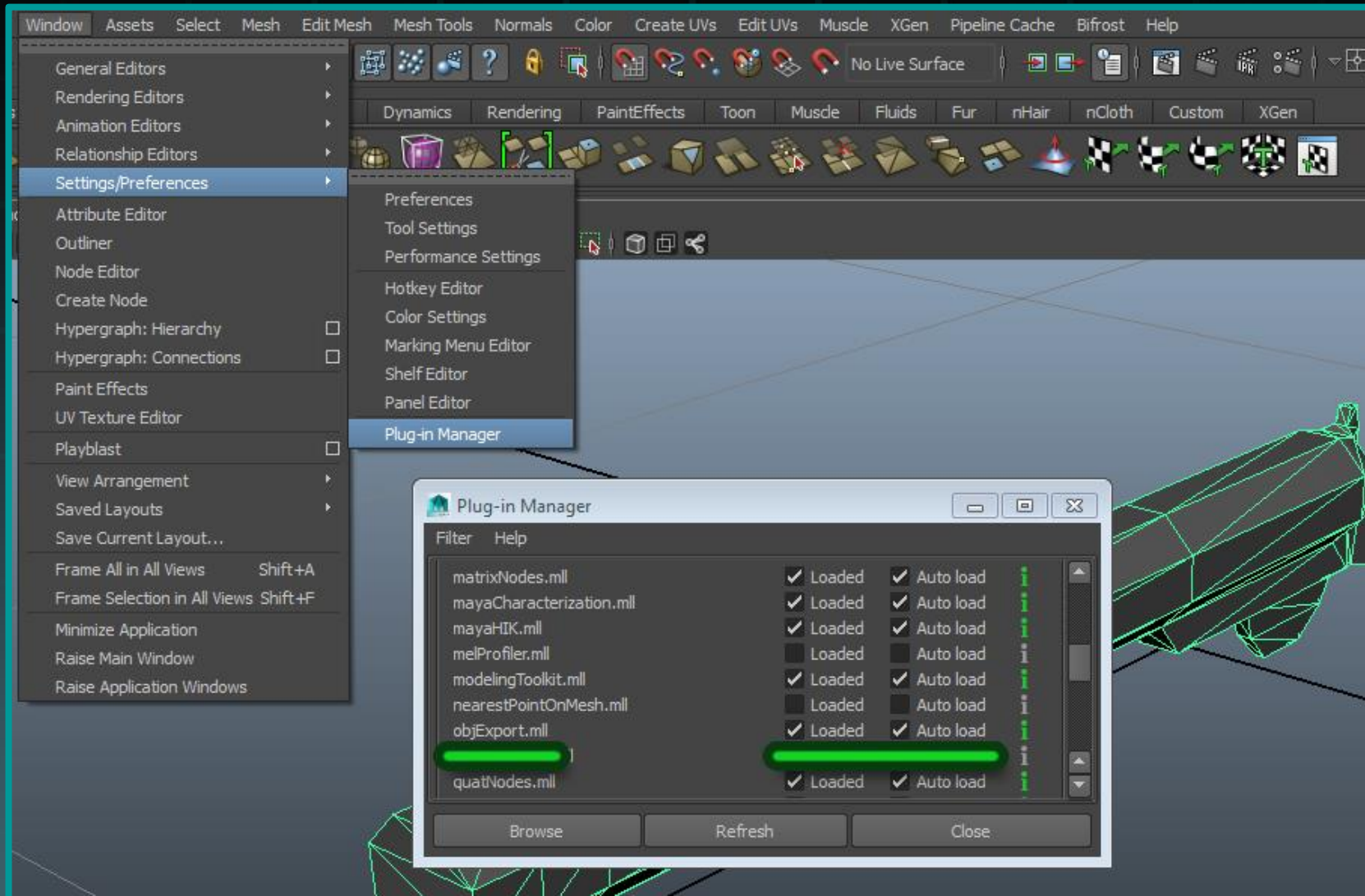




ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Troubleshooting OBJ Imports: Plug-In Manager (OBJ)





ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Maya Tools:

Fill Hole Tool

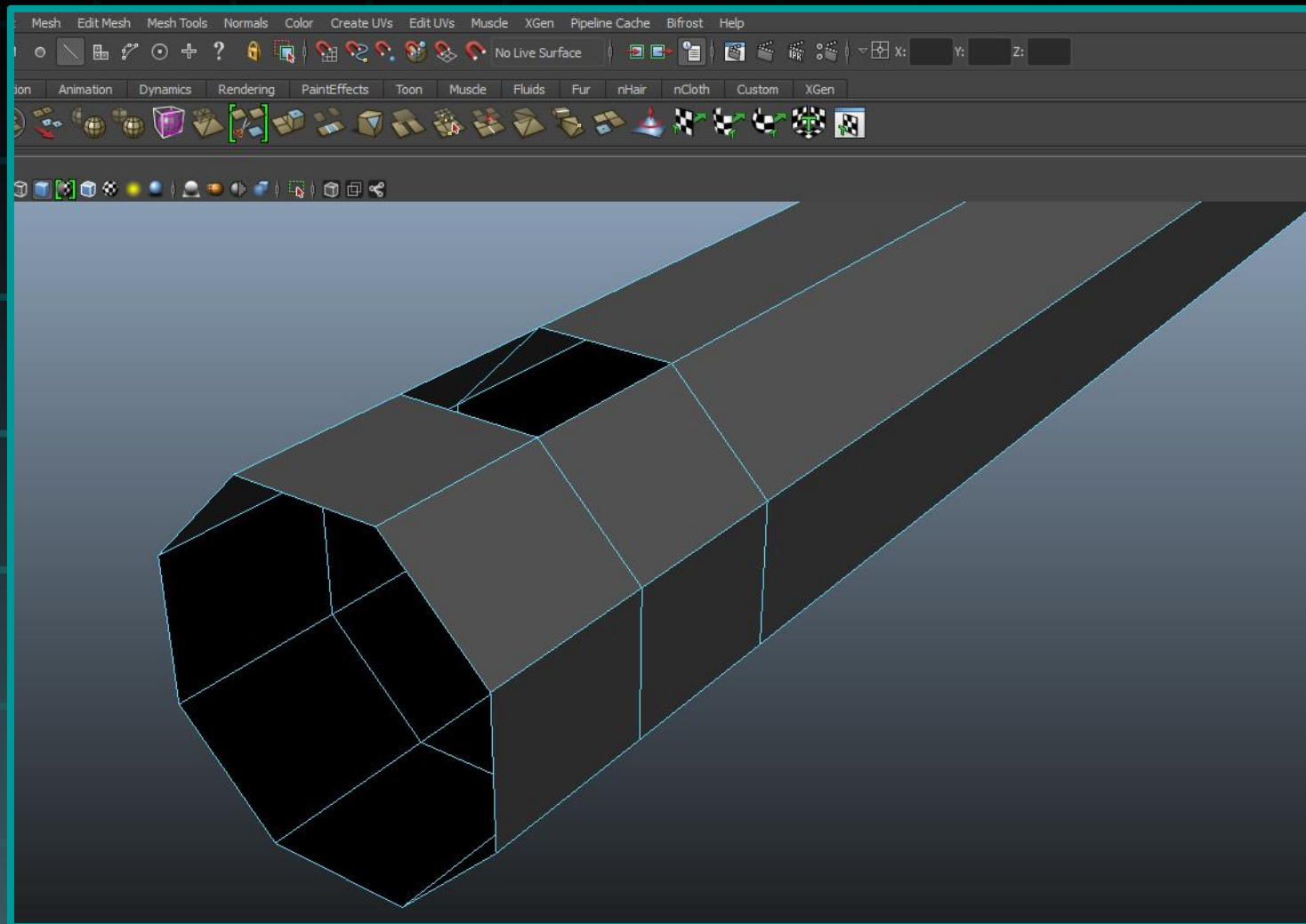


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Fill Hole Tool

The Fill Hole tool creates geometry between existing edges.



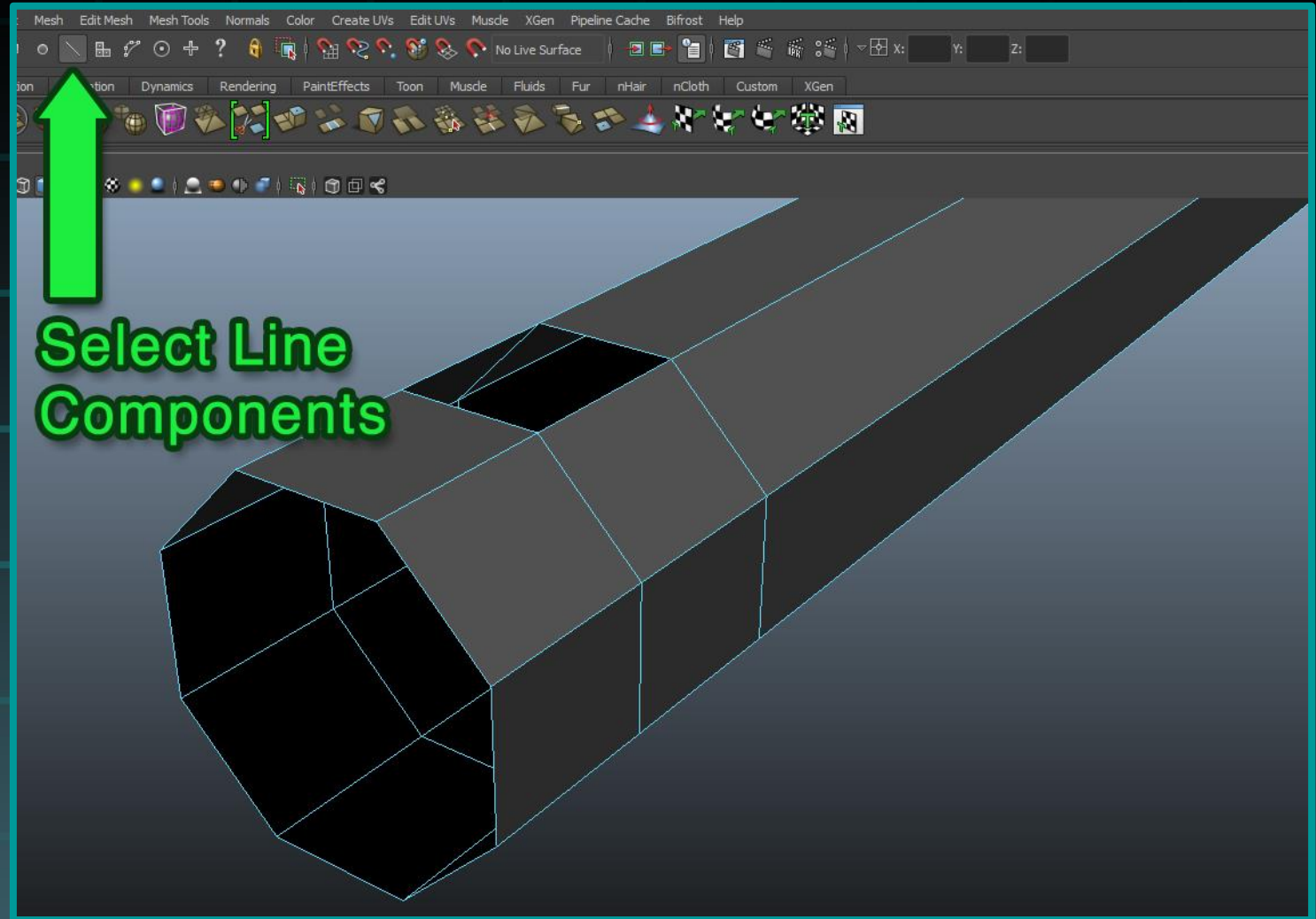


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Fill Hole Tool

Use the **Select Line Components** in **Component Mode** (F8 – blue wireframe) to select the edges of the area that you want to fill.



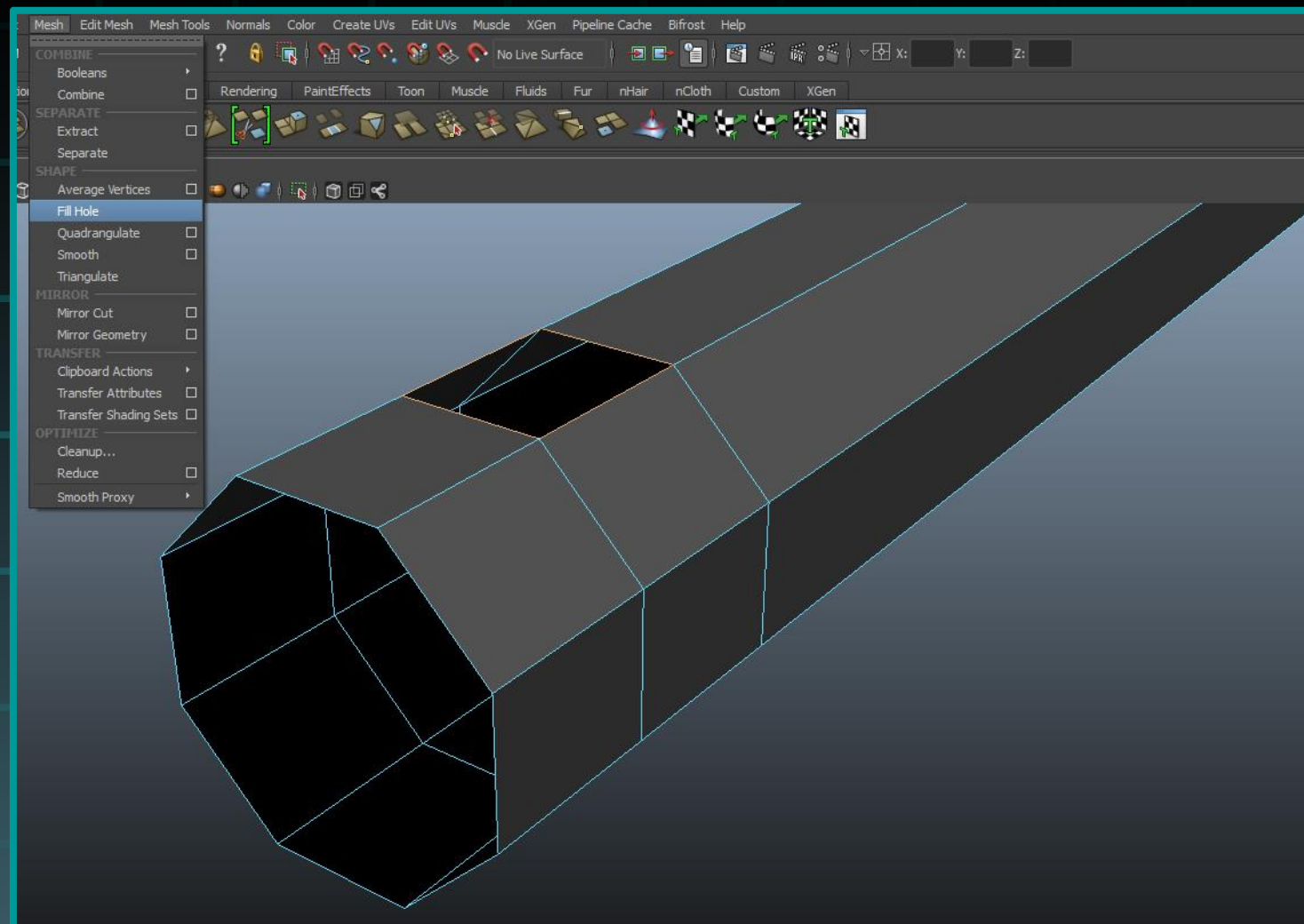


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Fill Hole Tool

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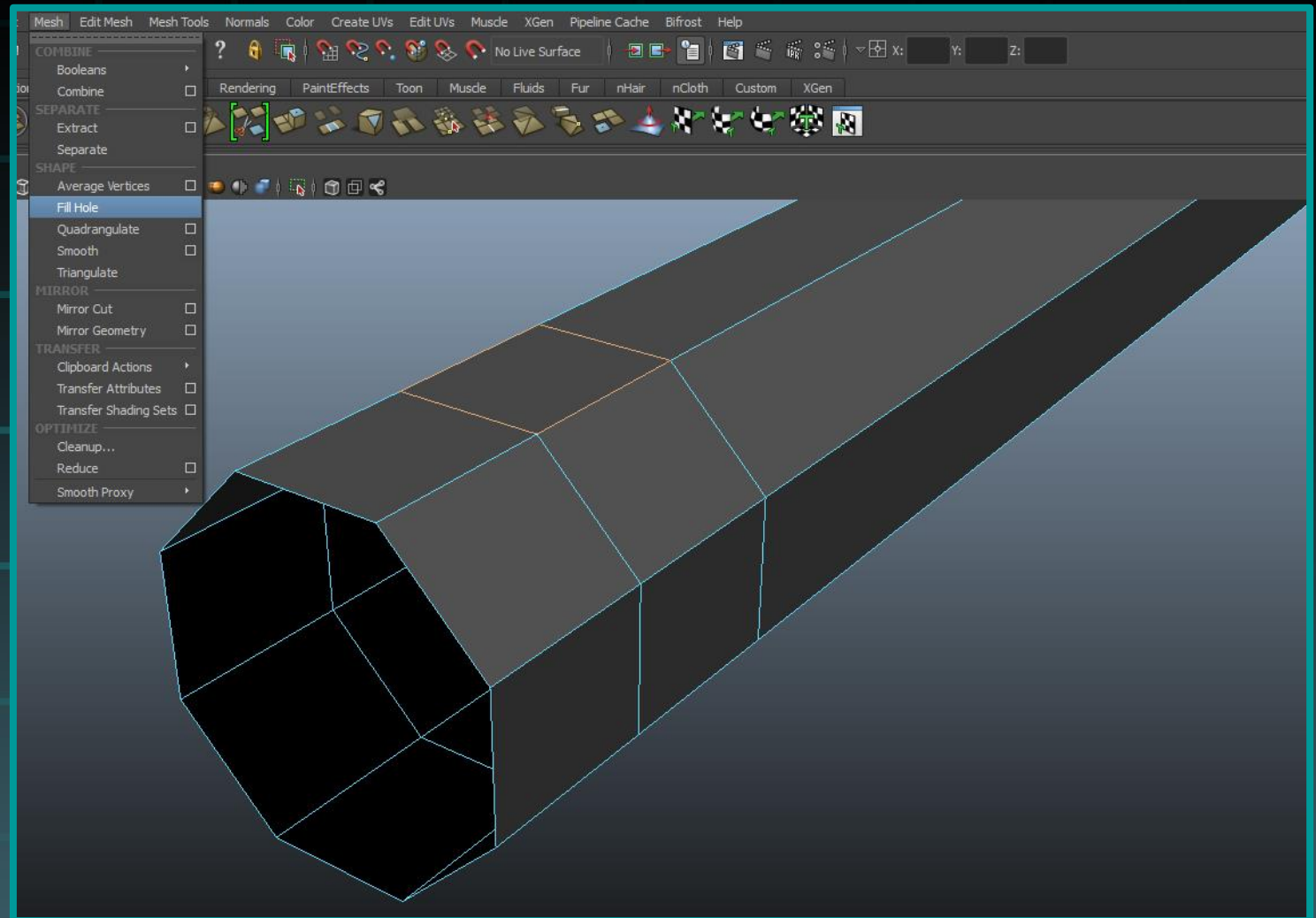
ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Fill Hole Tool

The **Fill Hole** function can be found in the Mesh menu in Maya.

- Mesh > Fill Hole





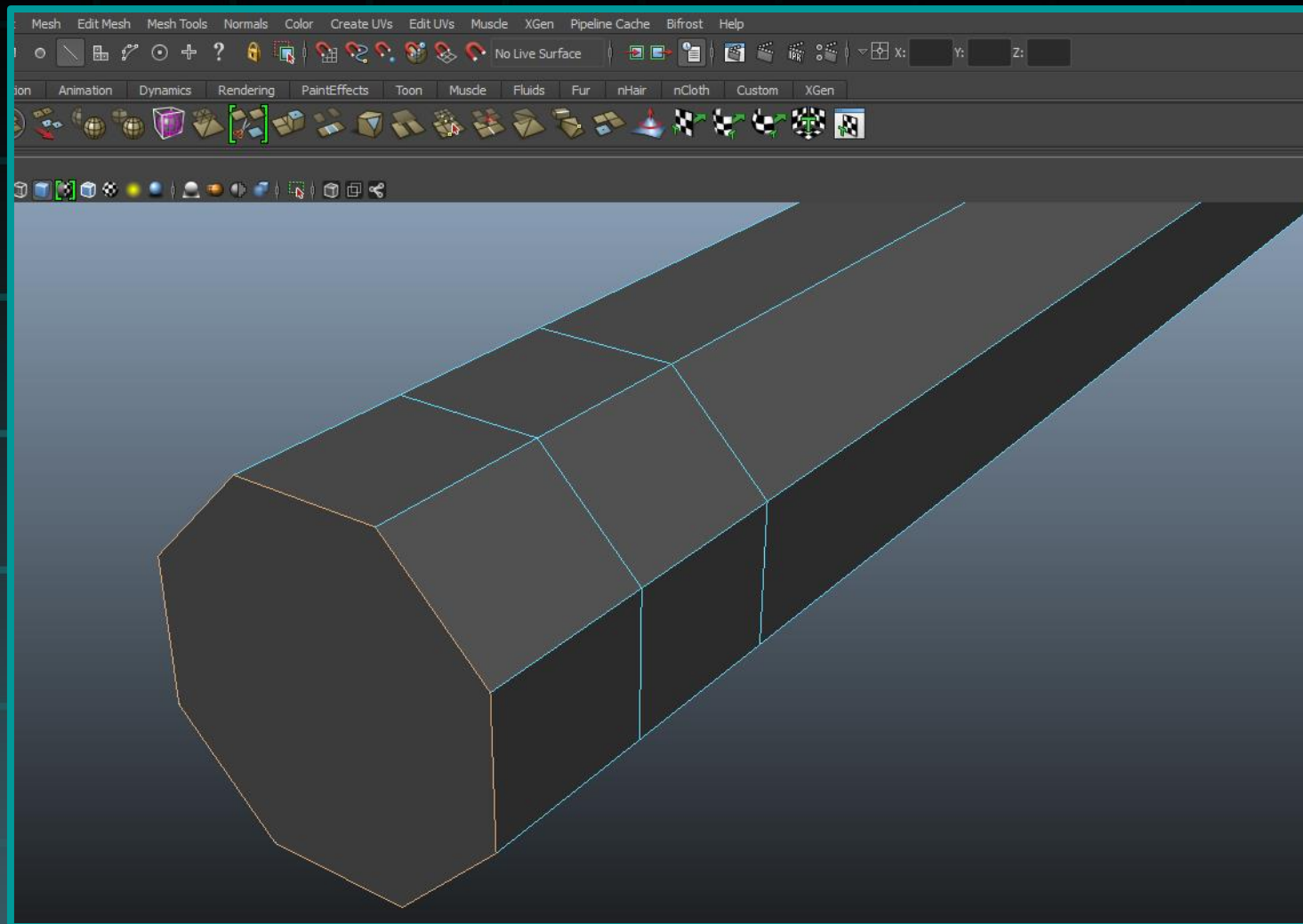
ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Fill Hole Tool

NOTE:

Be mindful that Maya may place geometry in these spaces that would be considered **unsuitable** for engine usage.





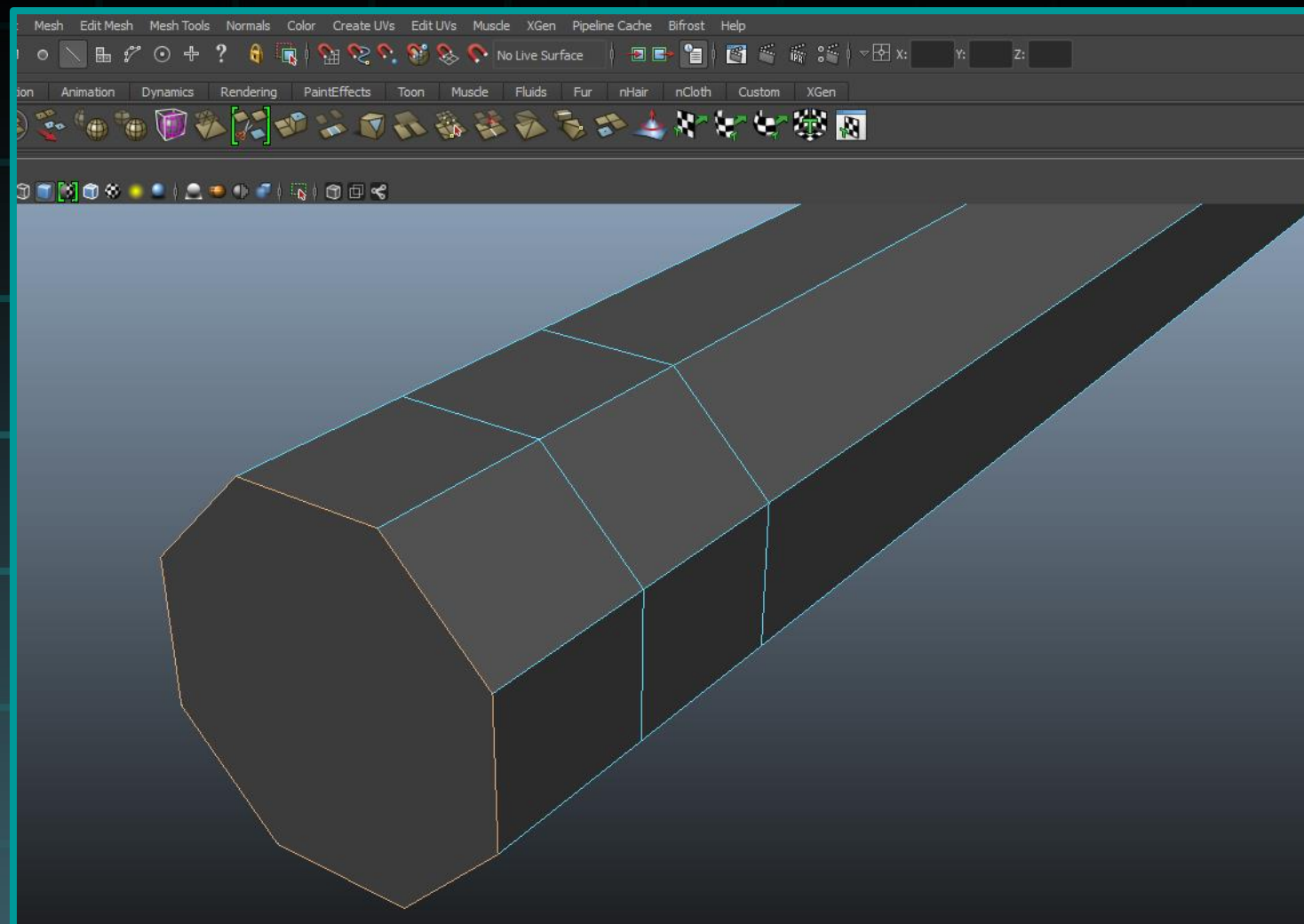
ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Fill Hole Tool

REMEMBER:

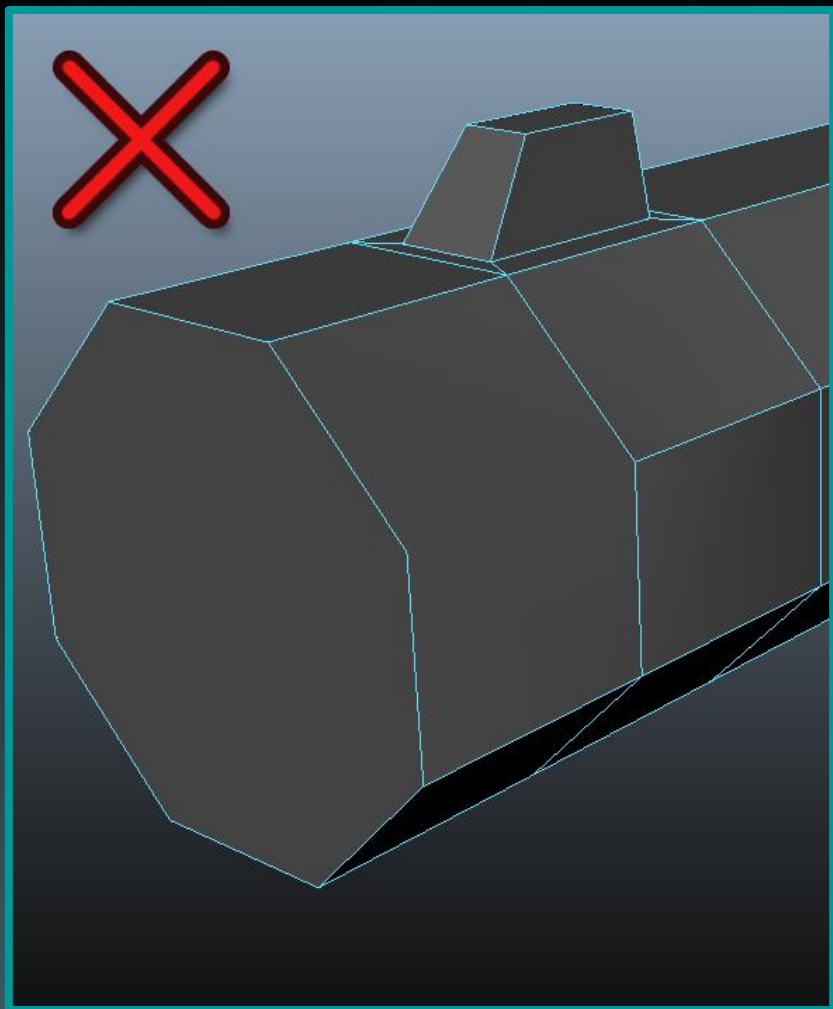
You will **always** have to work with **tris (3-sided)** or **quads (4 sided)**.





ENVIRONMENT DESIGN

3D Model Cleanup Exercise



Nsided / N-Gons:

Faces with more than four sides.

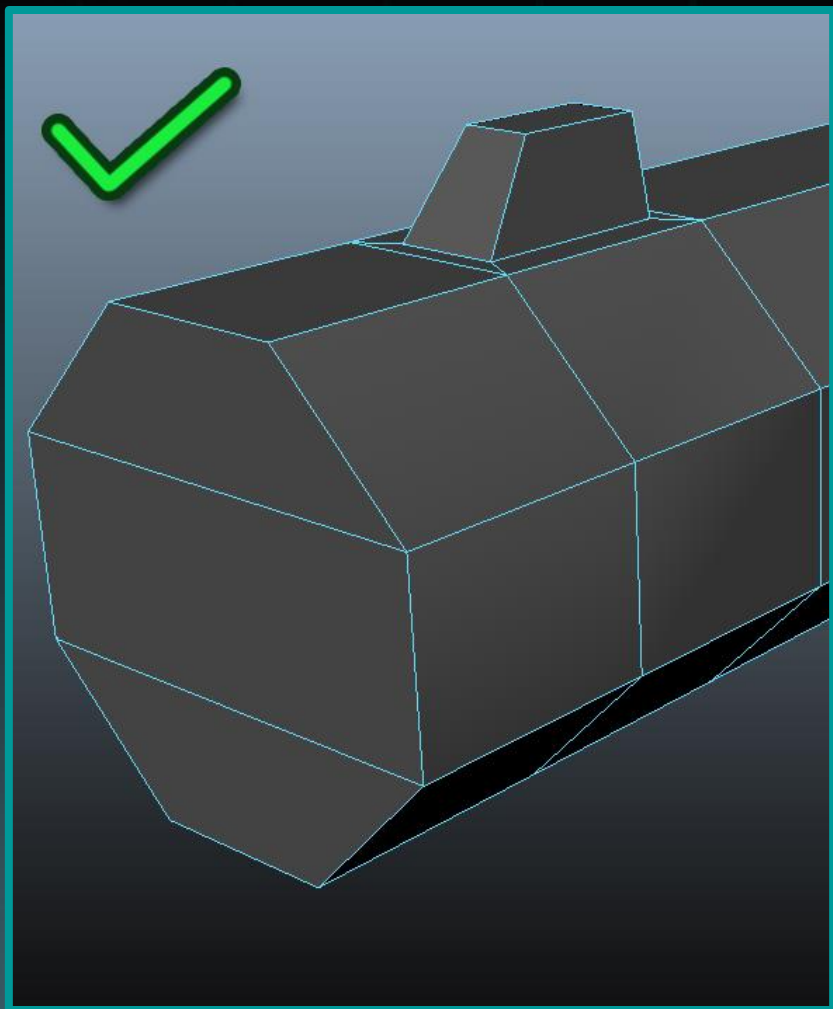
This is **illegal geometry** and models containing any n-gons will not be suitable for anything.

Game Engines will not accept models containing illegal geometry.



ENVIRONMENT DESIGN

3D Model Cleanup Exercise



Nsided / N-Gons:

Faces with more than four sides.

This is **illegal geometry** and models containing any n-gons will not be suitable for anything.

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ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Maya Tools: **Multi-Cut Tool**

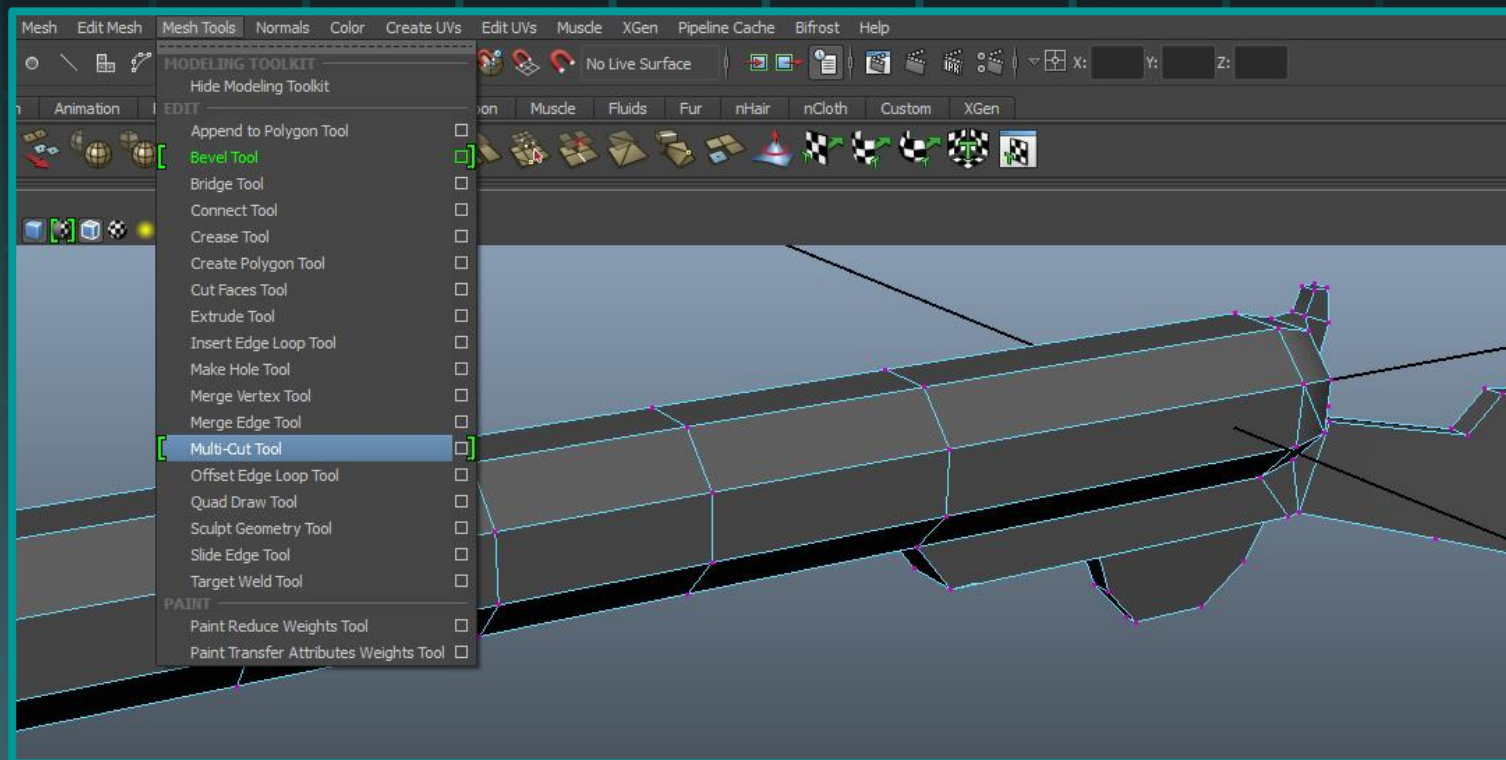


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Multi-Cut Tool

The **Multi-Cut** tool allows you to cut faces on models. This is used when **retopologizing** a model or cleaning up mistakes in geometry.





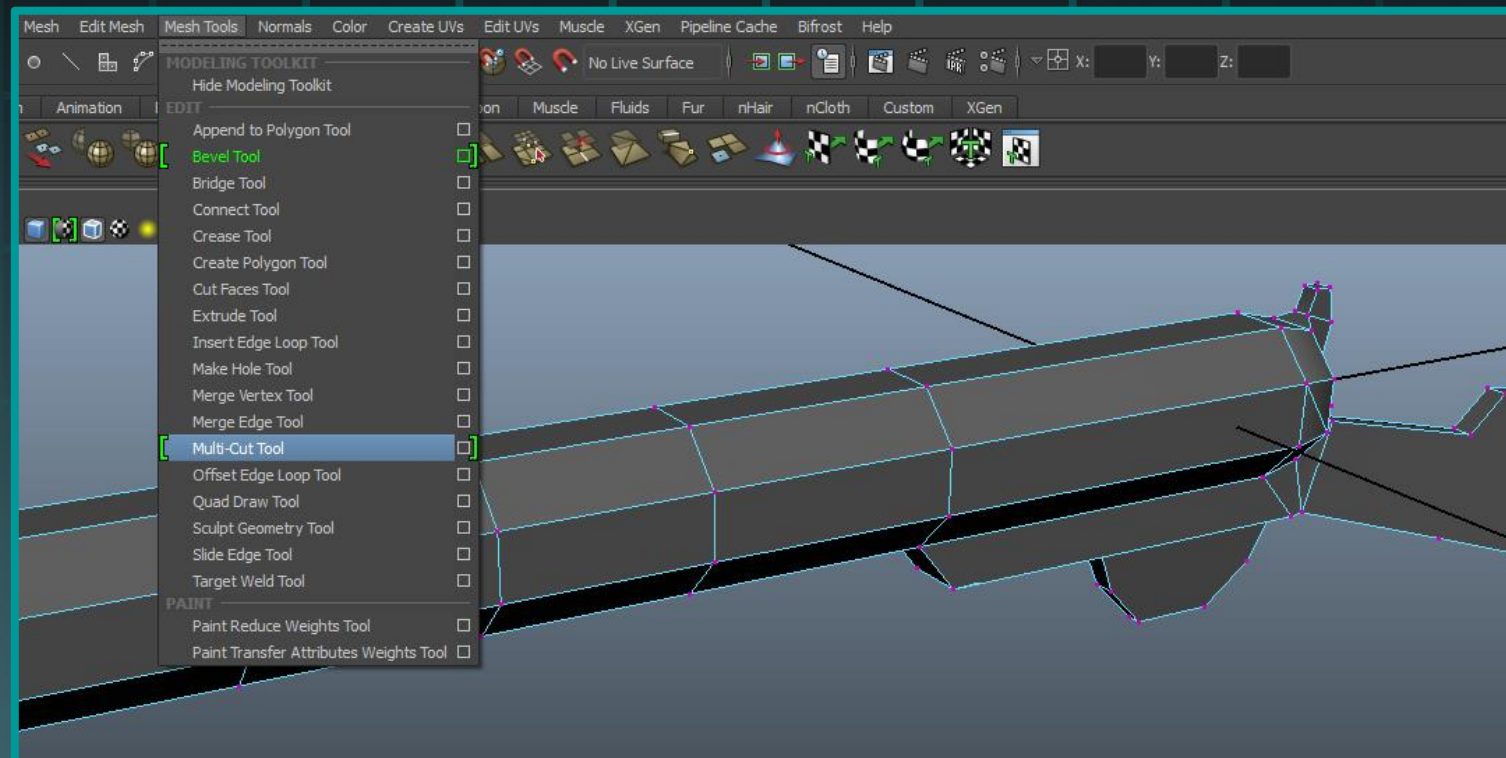
ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Multi-Cut Tool

It can be found in the **Mesh Tools** menu in Maya.

- Mesh Tools > Multi-Cut Tool



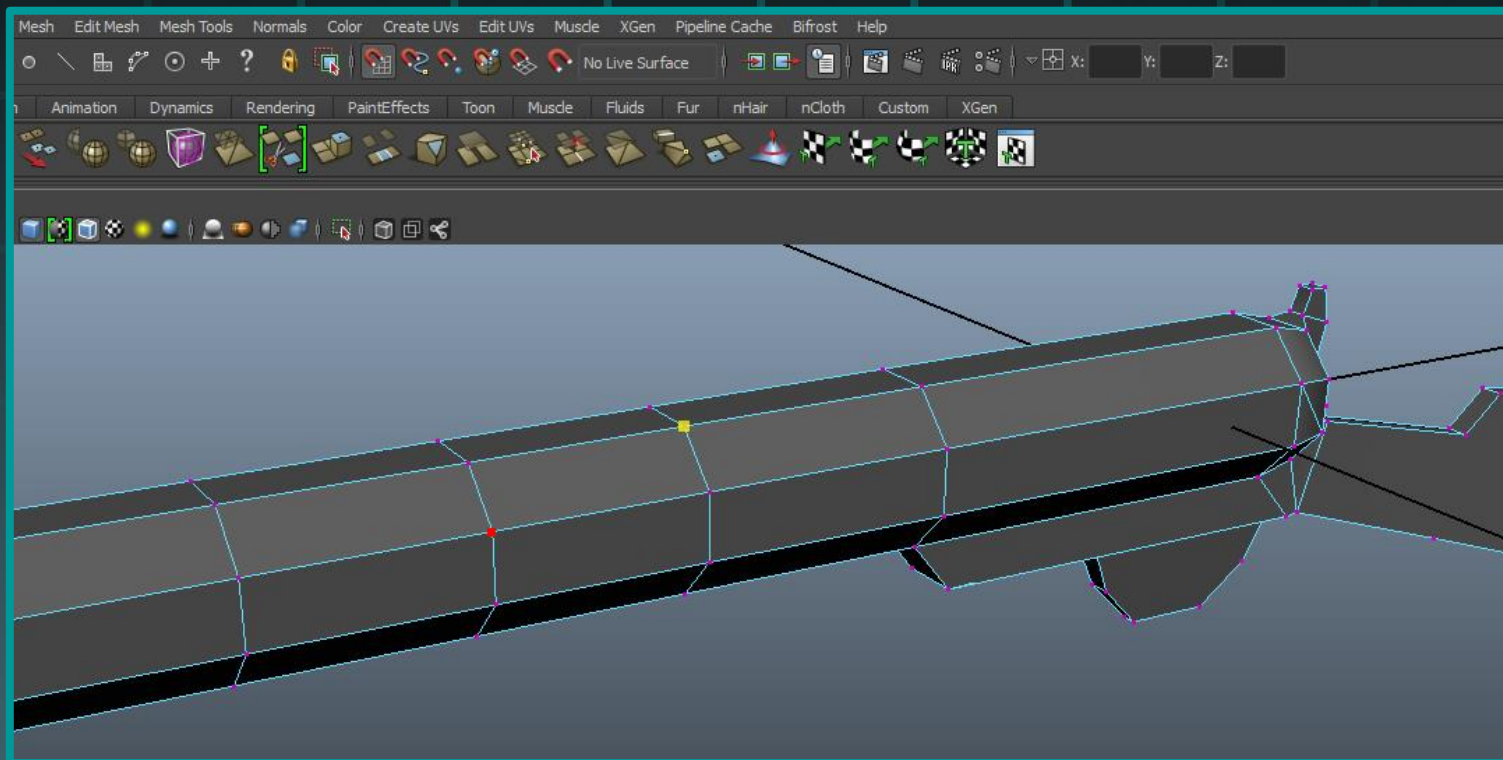


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Multi-Cut Tool

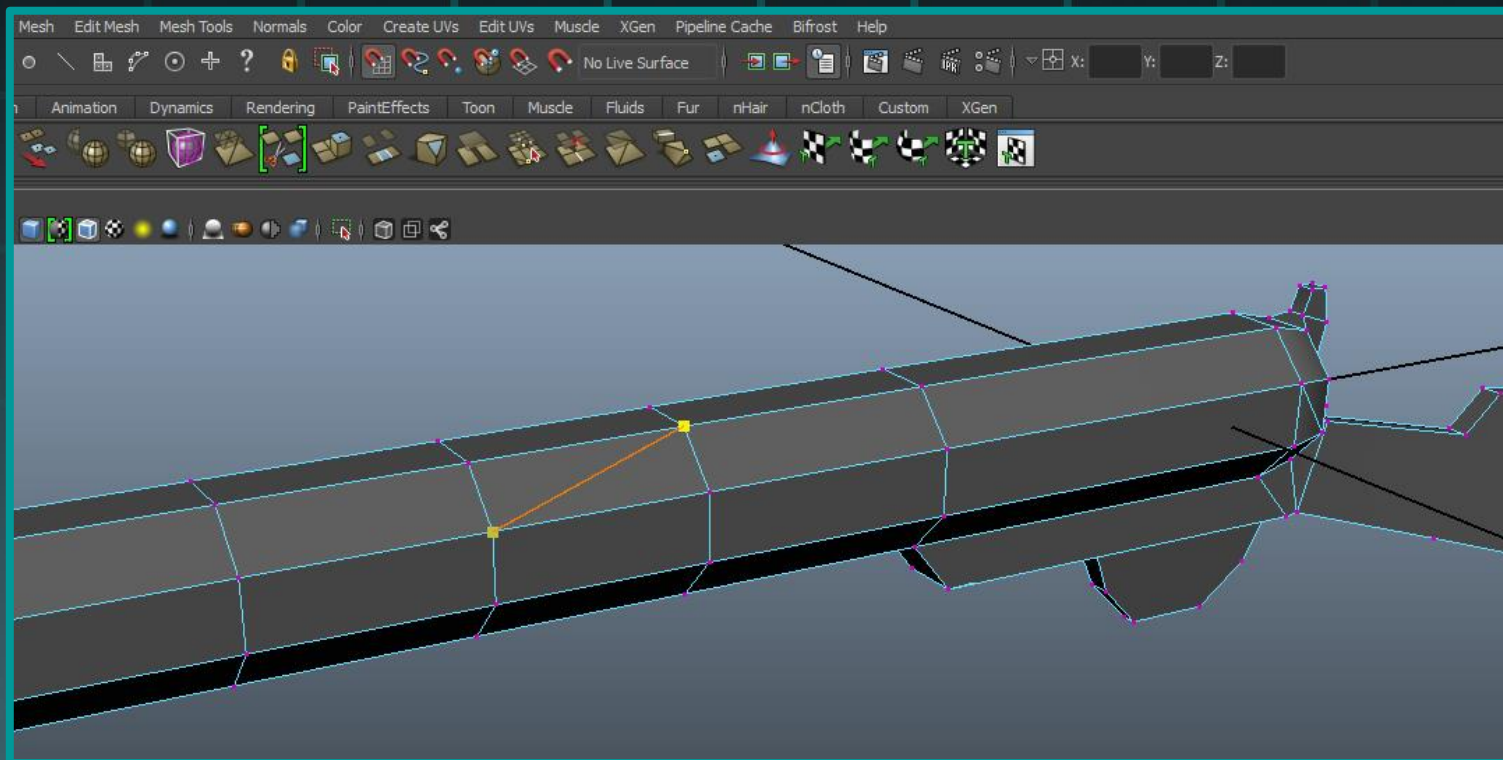
Clicking on **vertices** with the tool selected will allow you to create new edges between them, essentially ‘cutting’ the polygons (represented with an **orange line** between vertices).





Multi-Cut Tool

Clicking on **vertices** with the tool selected will allow you to create new edges between them, essentially 'cutting' the polygons (represented with an **orange line** between vertices).



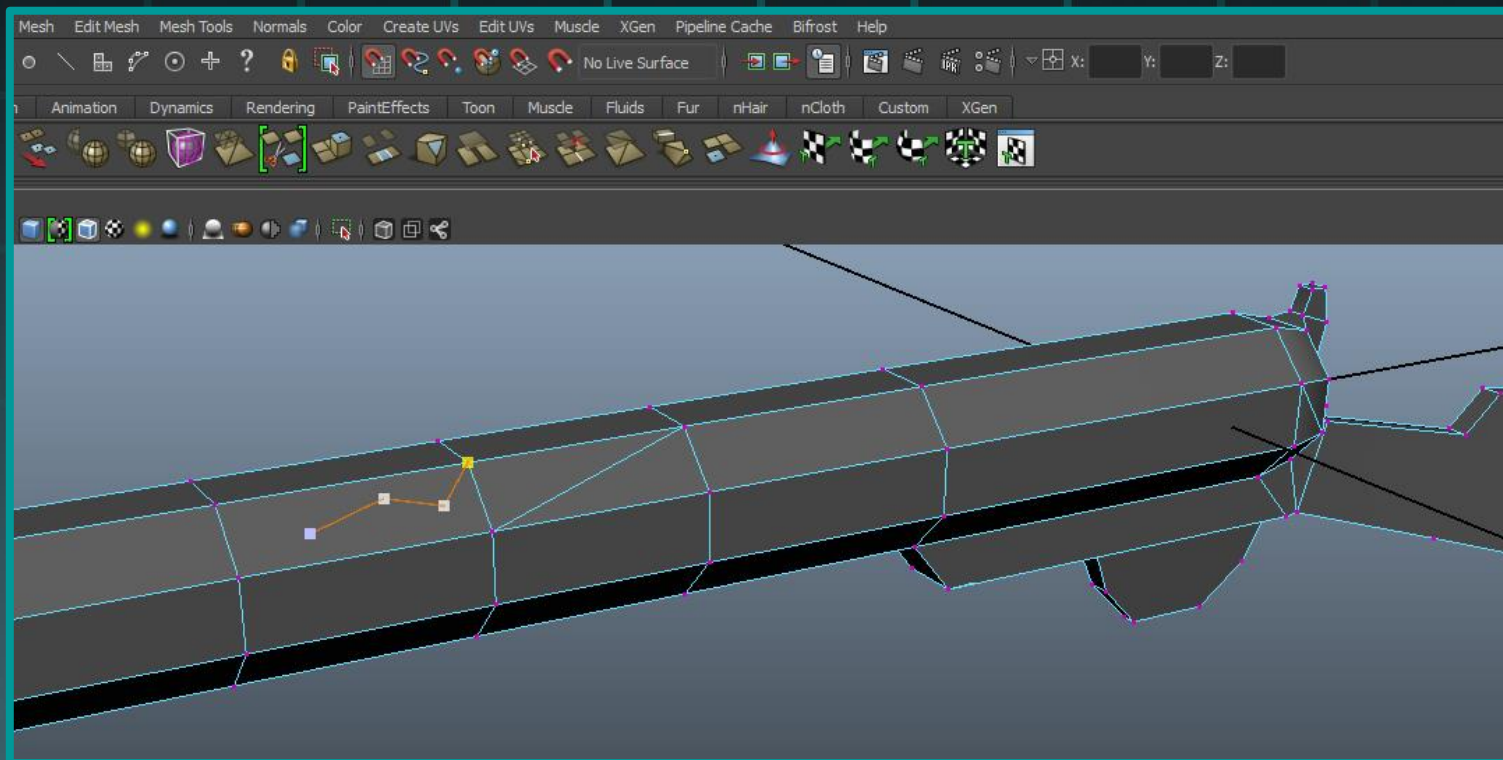


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Multi-Cut Tool

This can be done by clicking vertex to vertex, along an edge or within existing geometry. Press **ENTER** to complete the process or you will continue to cut your geometry!



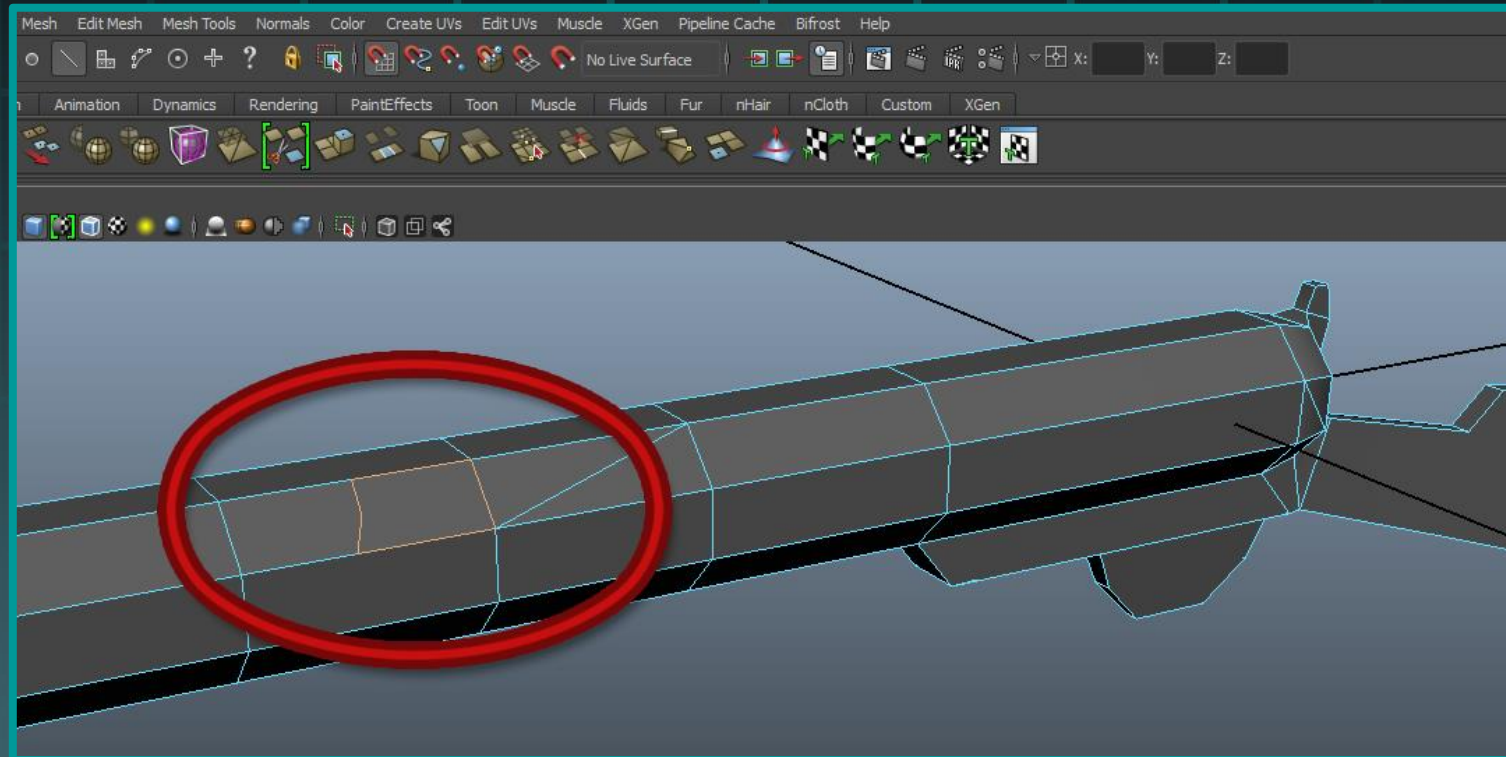


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Multi-Cut Tool

NOTE: Be careful to not create N-sided faces when cutting!





ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Maya Tools: Edge Loop Tool



ENVIRONMENT DESIGN

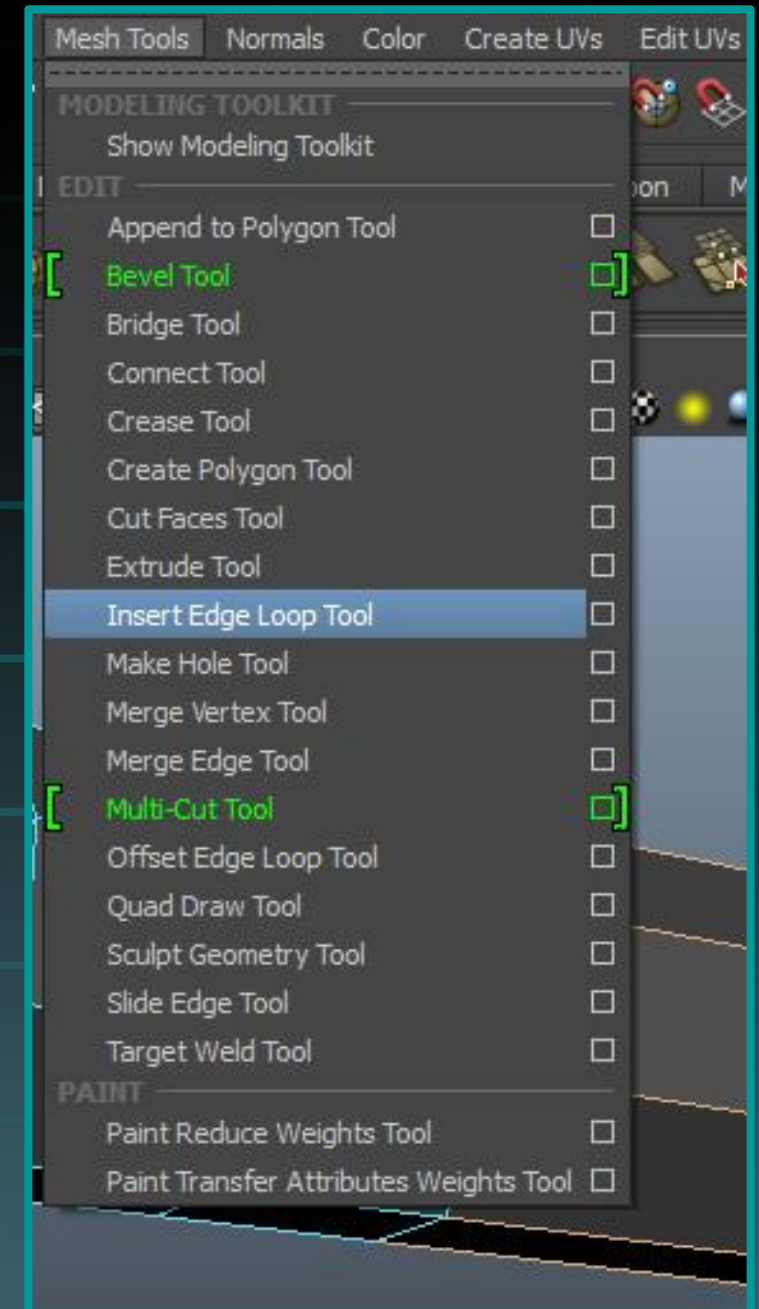
3D Model Cleanup Exercise

Insert Edge Loop Tool

The **Insert Edge Loop Tool** adds an entire 'loop' to your mesh, essentially cutting a number of faces in half at once.

The tool can be found in the Mesh Tools menu in Maya.

- Mesh Tools > Insert Edge Loop Tool



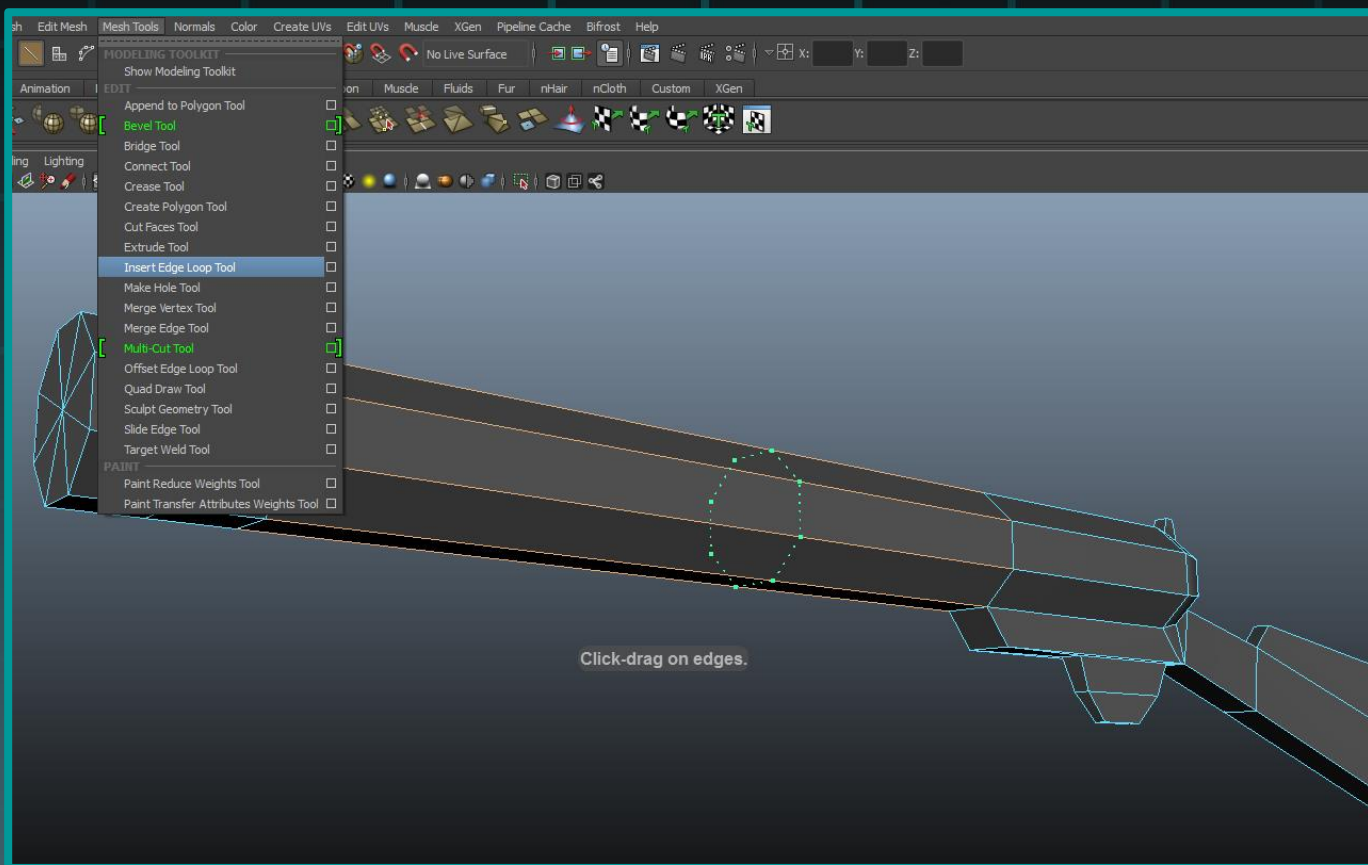


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Insert Edge Loop Tool

Edge loops are good for creating sections of geometry that can be extruded.



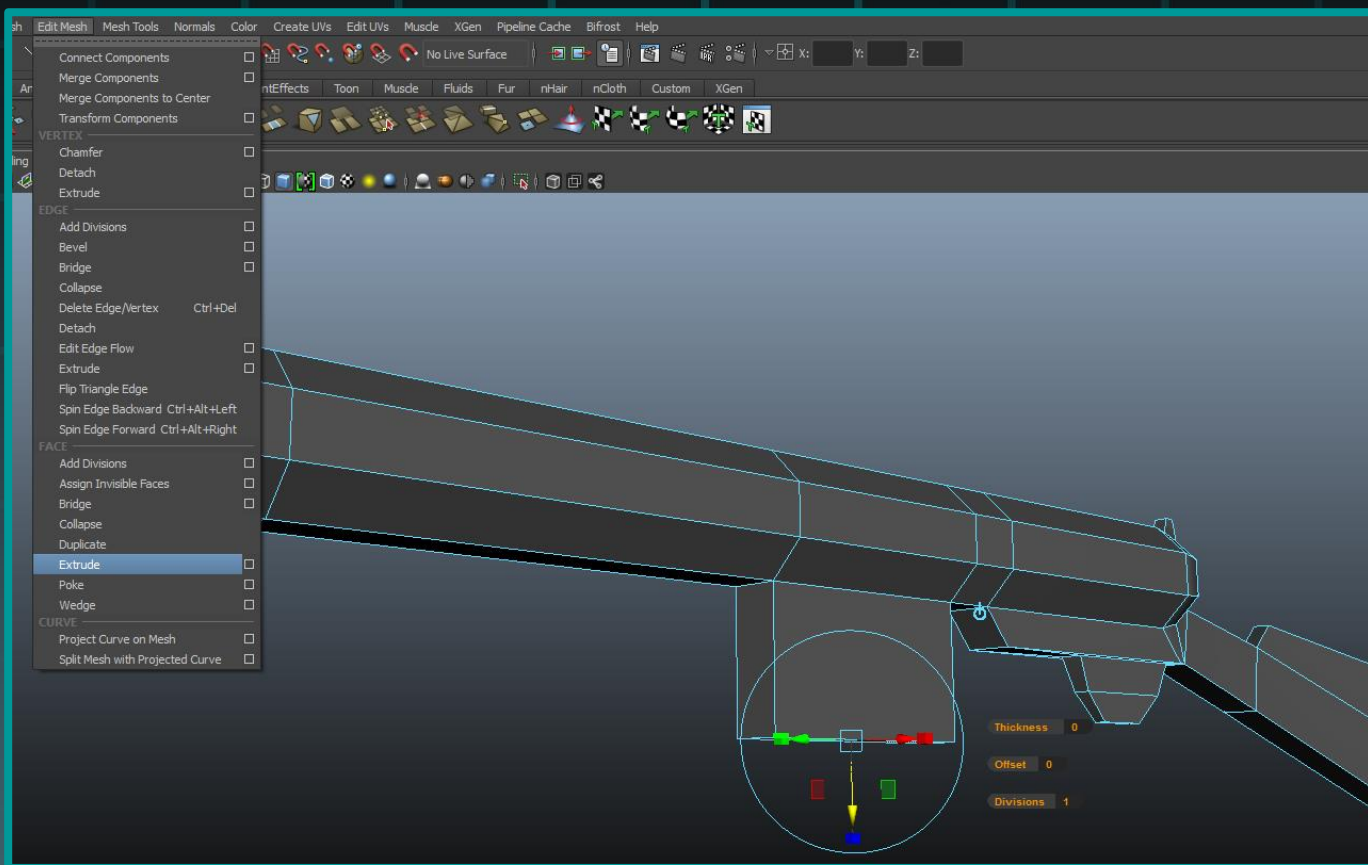


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

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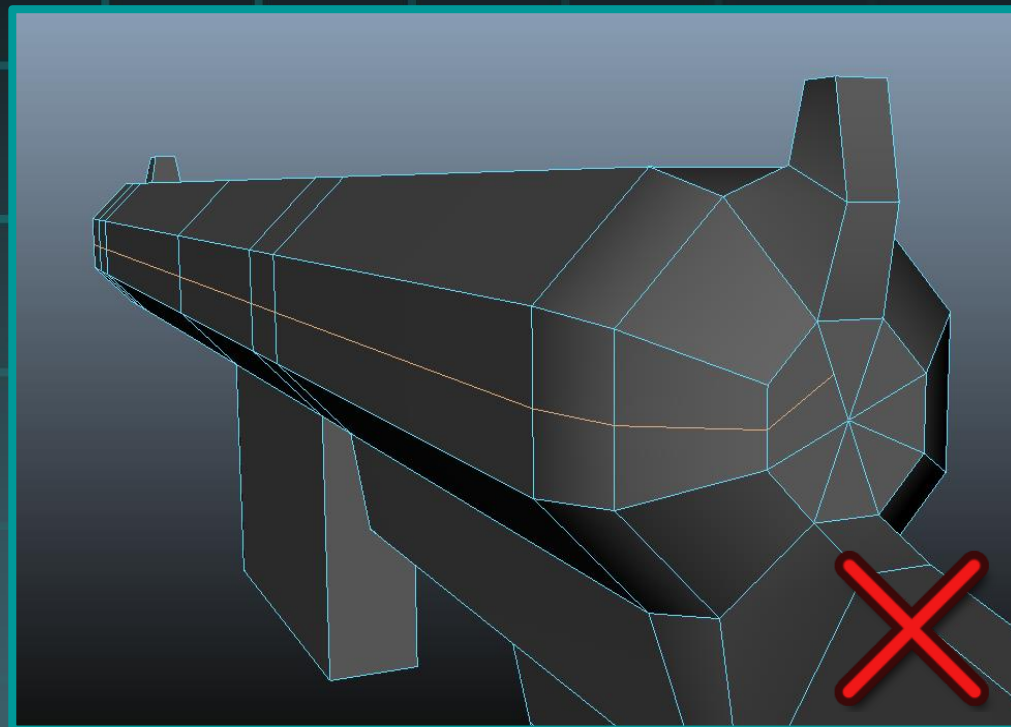
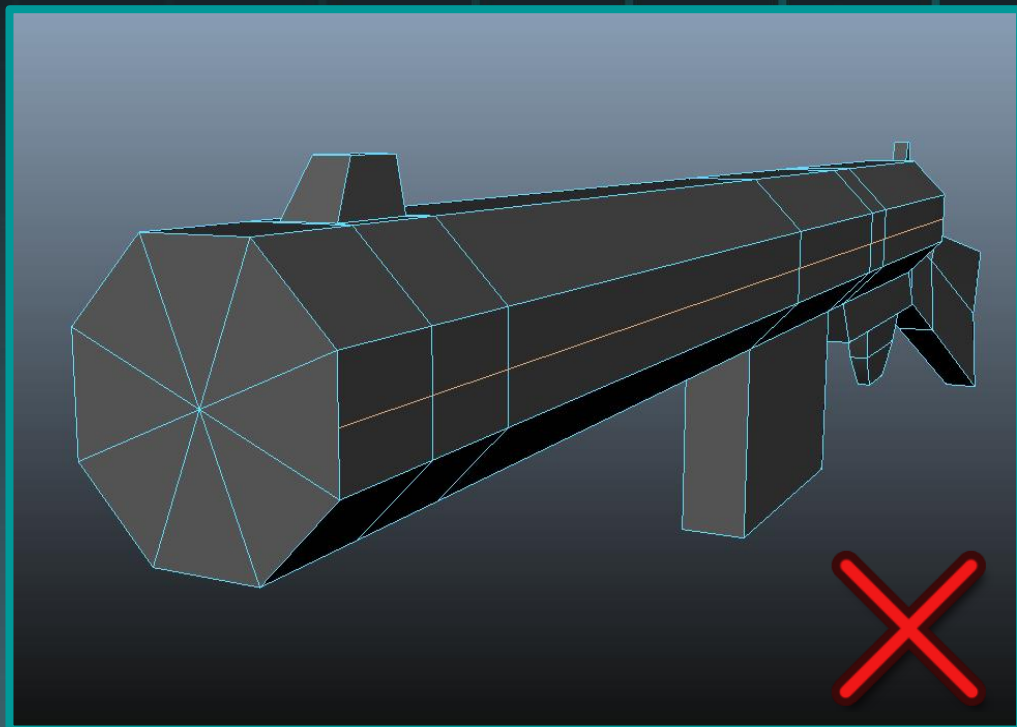


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Insert Edge Loop Tool

NOTE: Good edge flow / clean modelling is essential when using edge loops – **they will not always perform as intended if the model has awkward edge flow.**



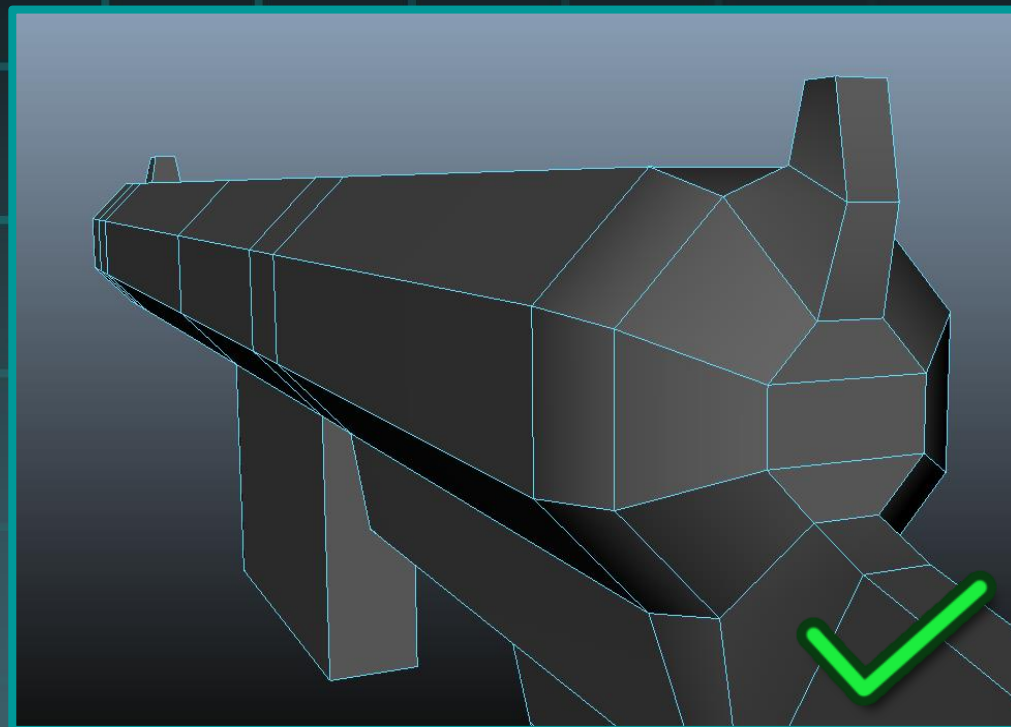
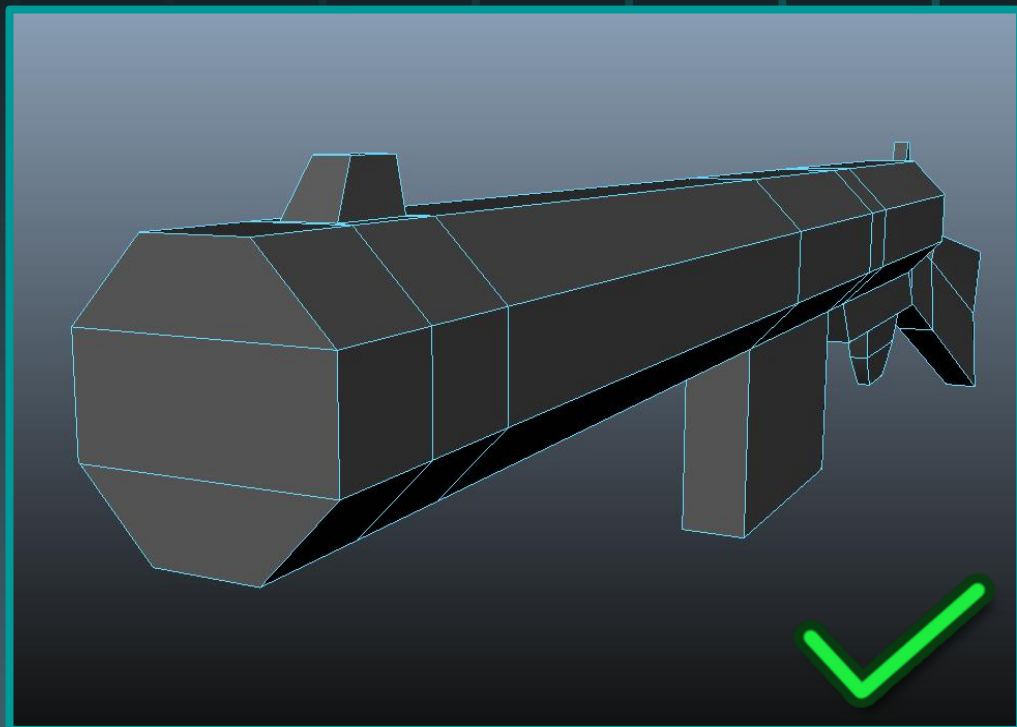


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3D Model Cleanup Exercise

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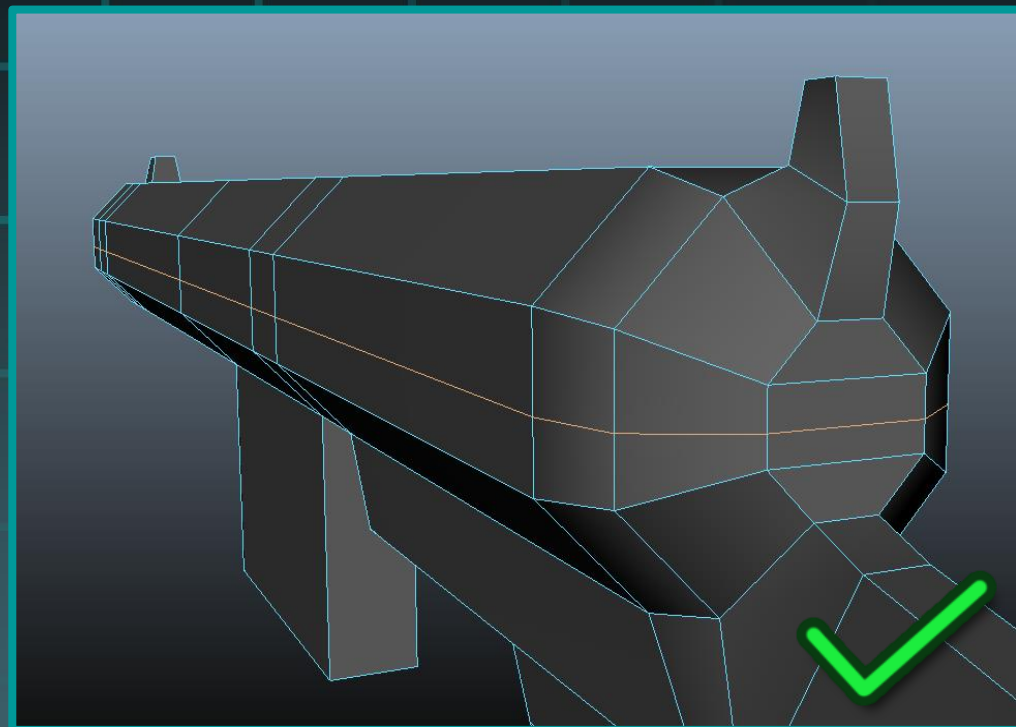
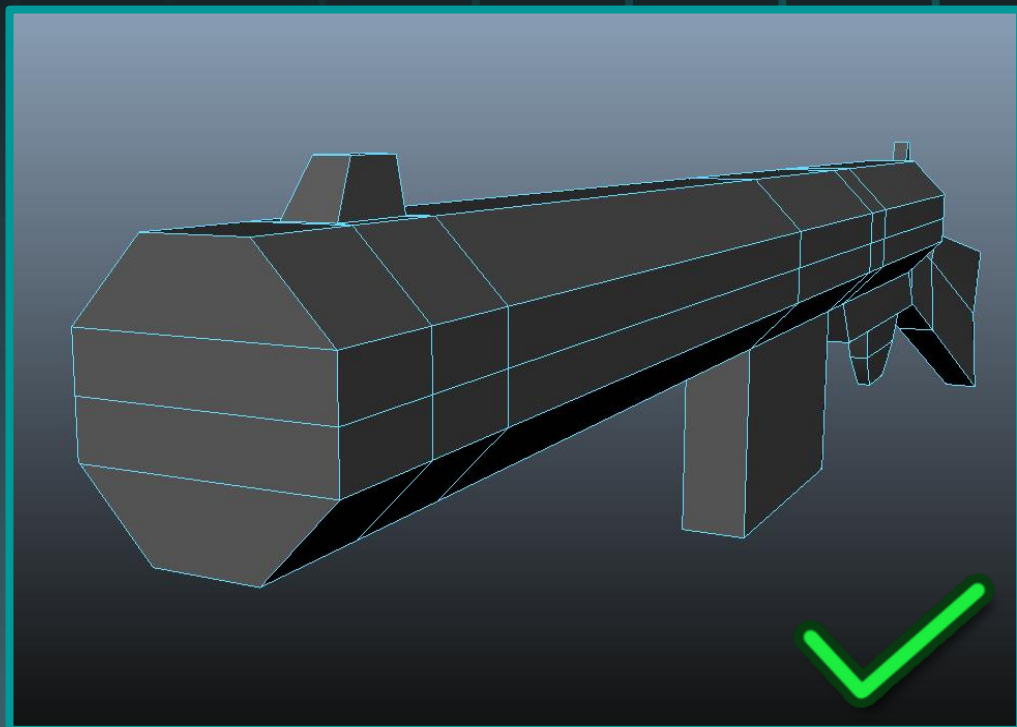


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

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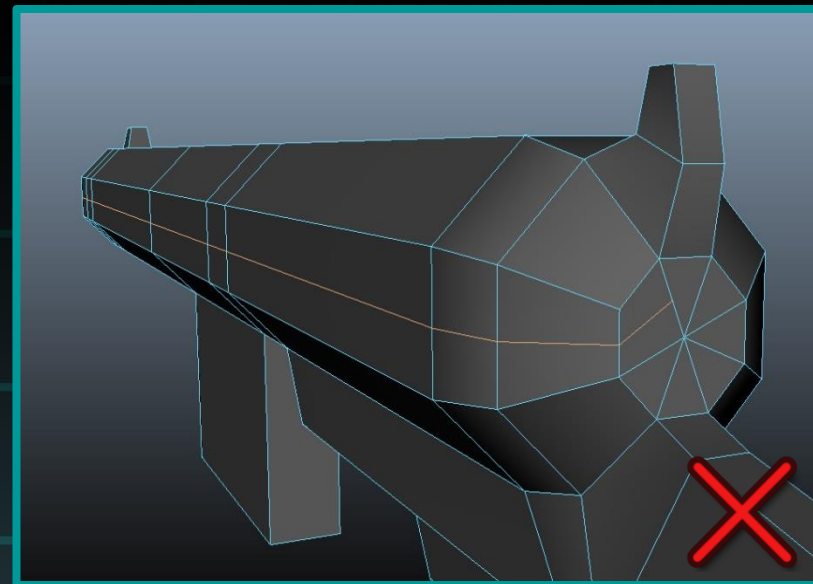
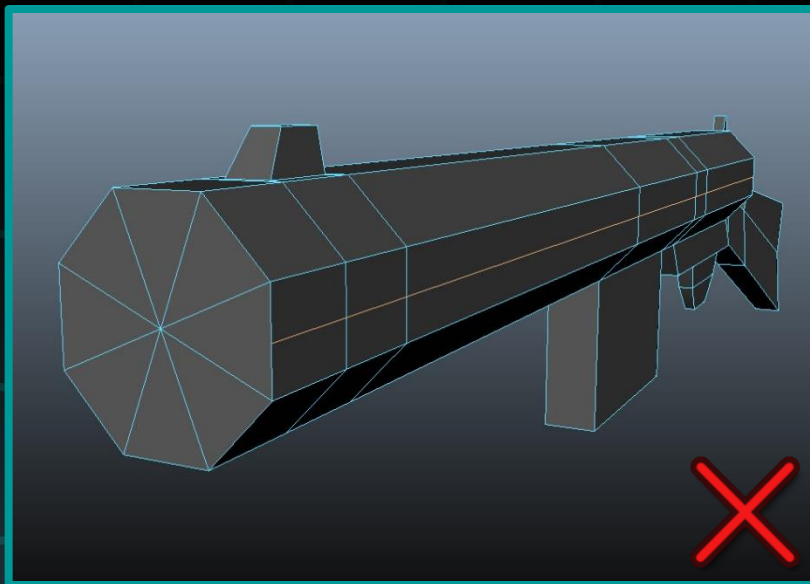


ENVIRONMENT DESIGN

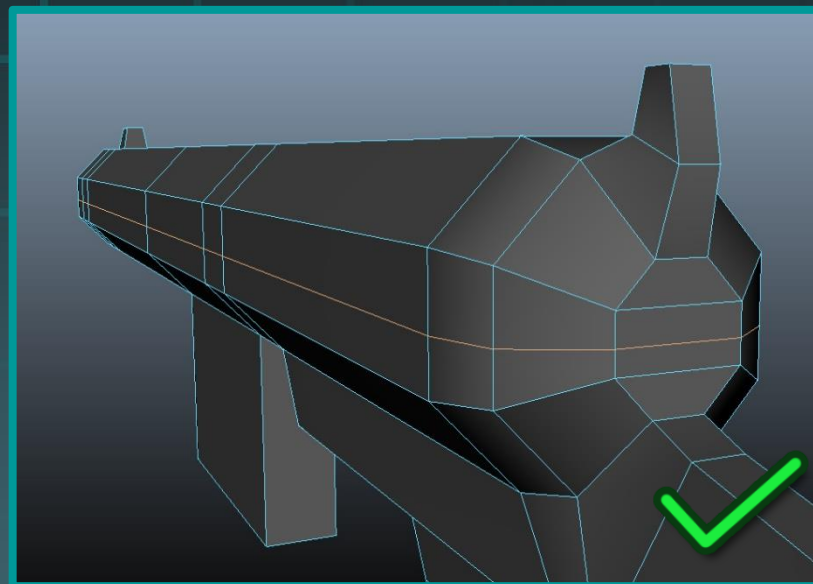
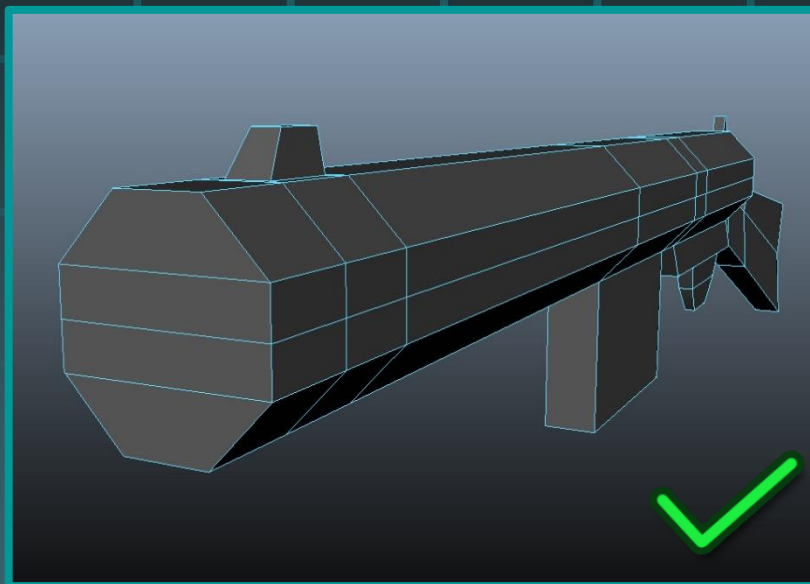
3D Model Cleanup Exercise

Comparison

Poor edge flow
(tris and quads)



Good edge flow
(quadded)



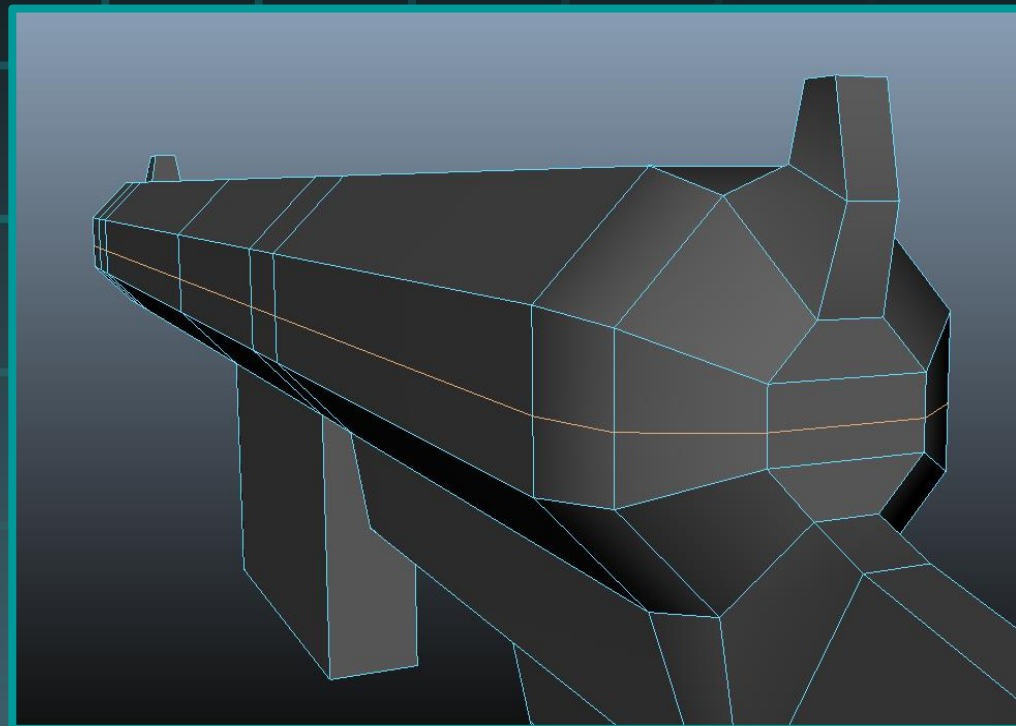
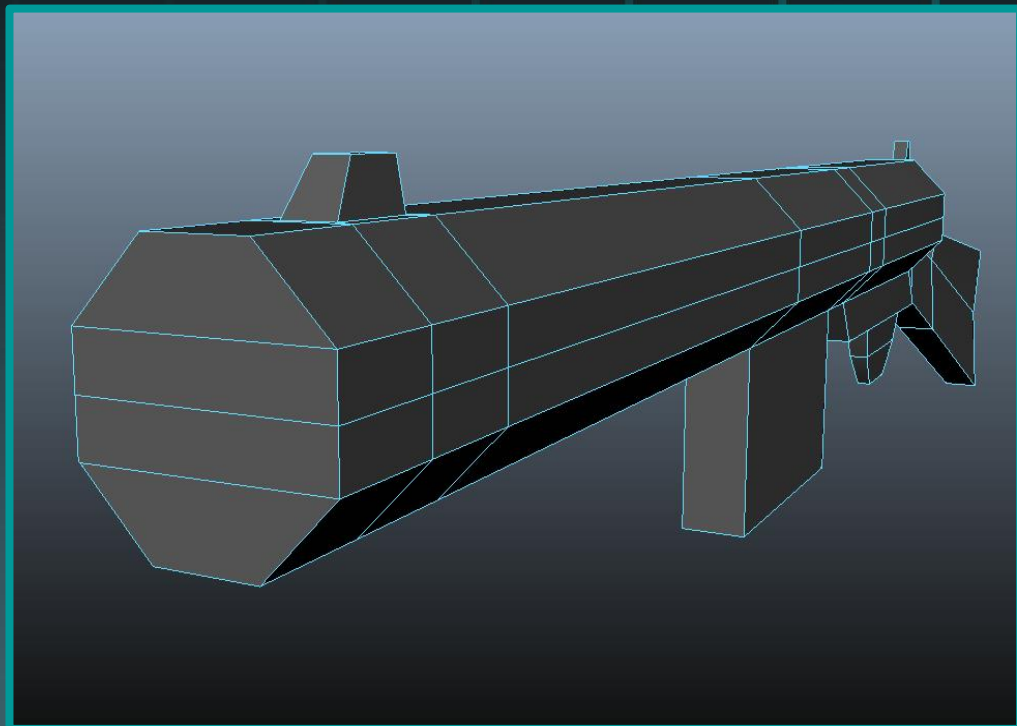


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Insert Edge Loop Tool

NOTE: Press the **Q** key on the keyboard when you are finished with the tool to **quit** – or you may accidentally add more edge loops to the model.





ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Select Using Constraints



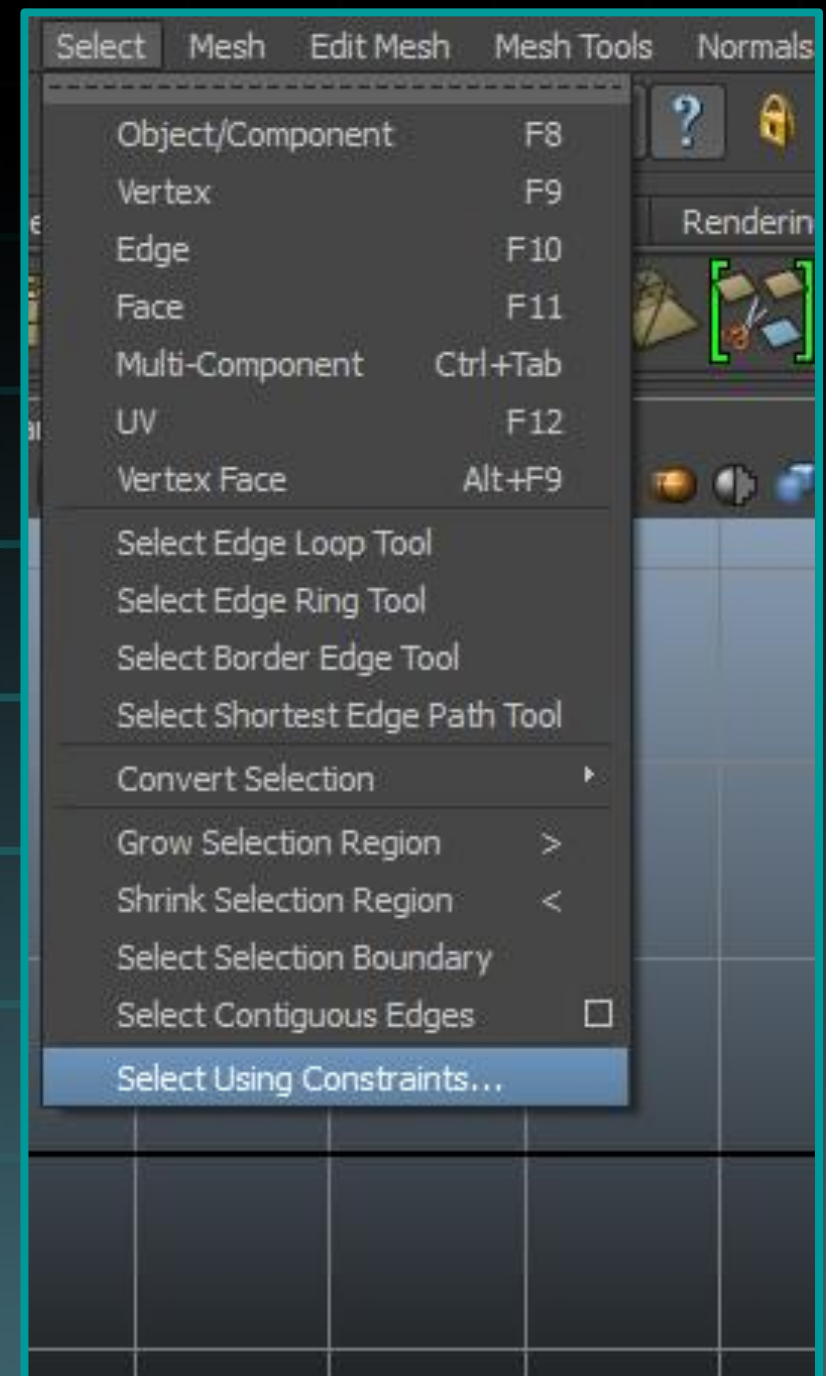
ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Select Using Constraints

- **Select > Select Using Constraints** allows you to isolate certain parts of 3D models in **Component Mode**.

This is particularly useful when trying to **identify potential problems with models** – errors can easily go unnoticed!

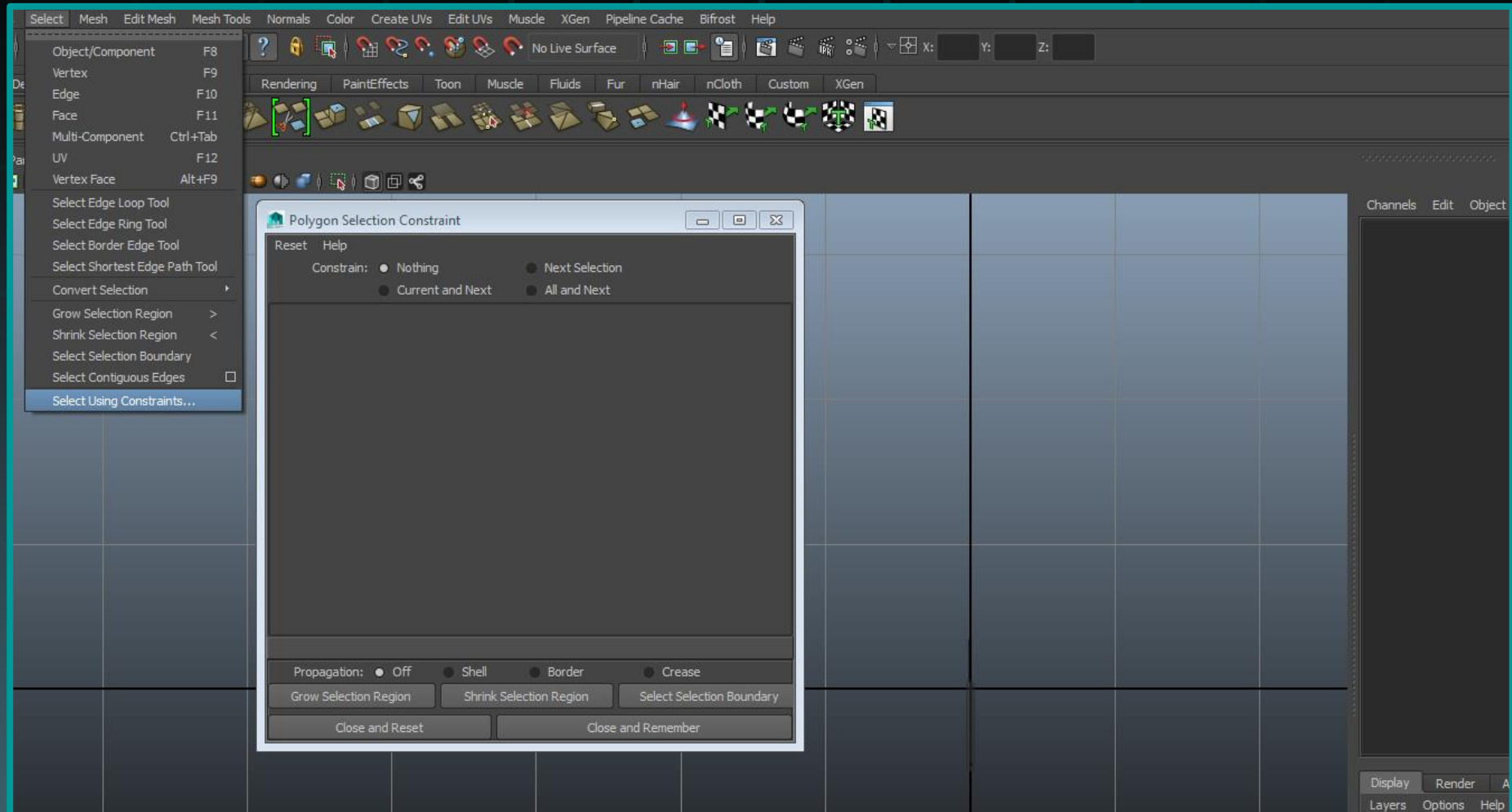




ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Select Using Constraints

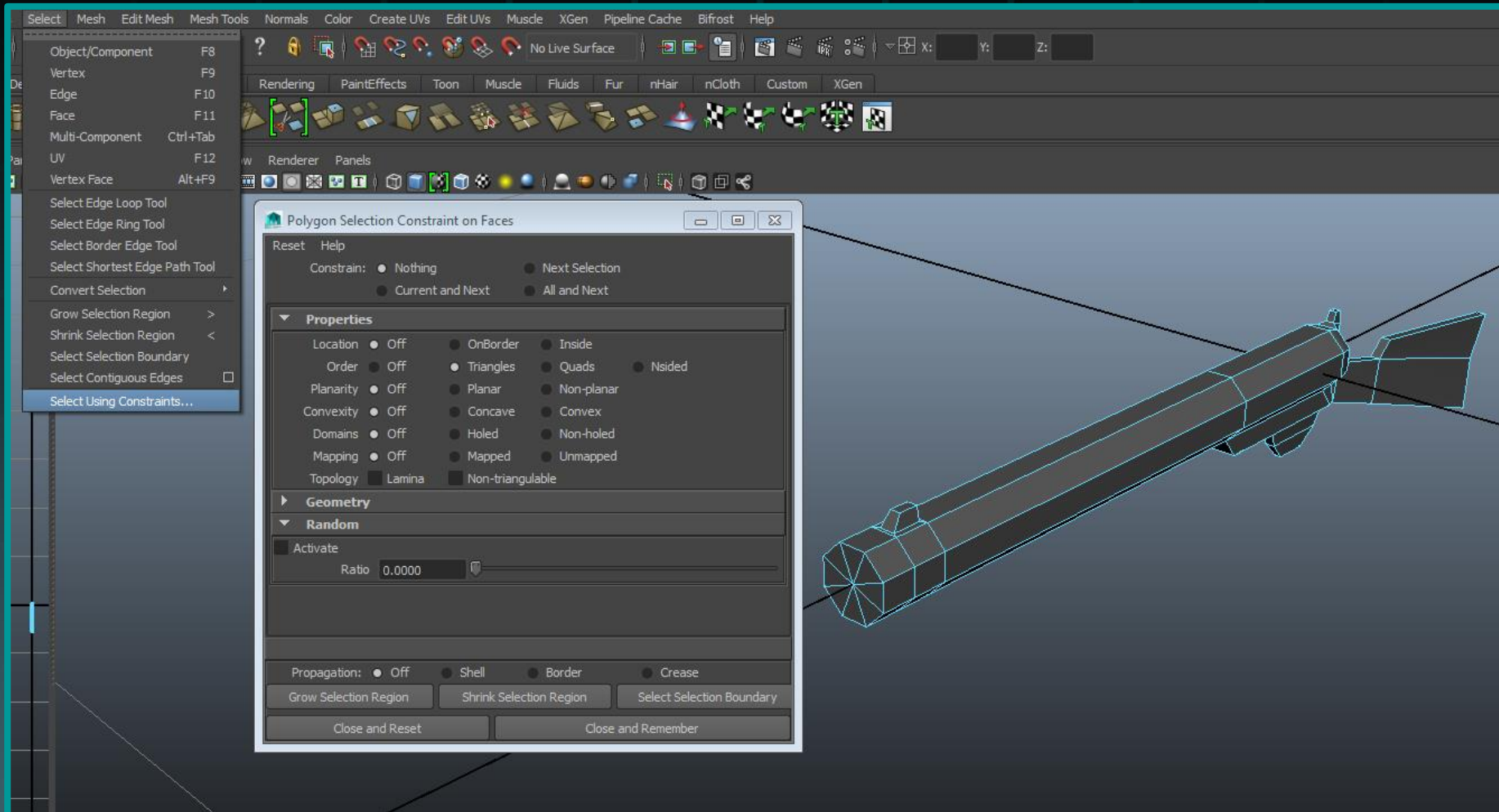




ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Select Using Constraints

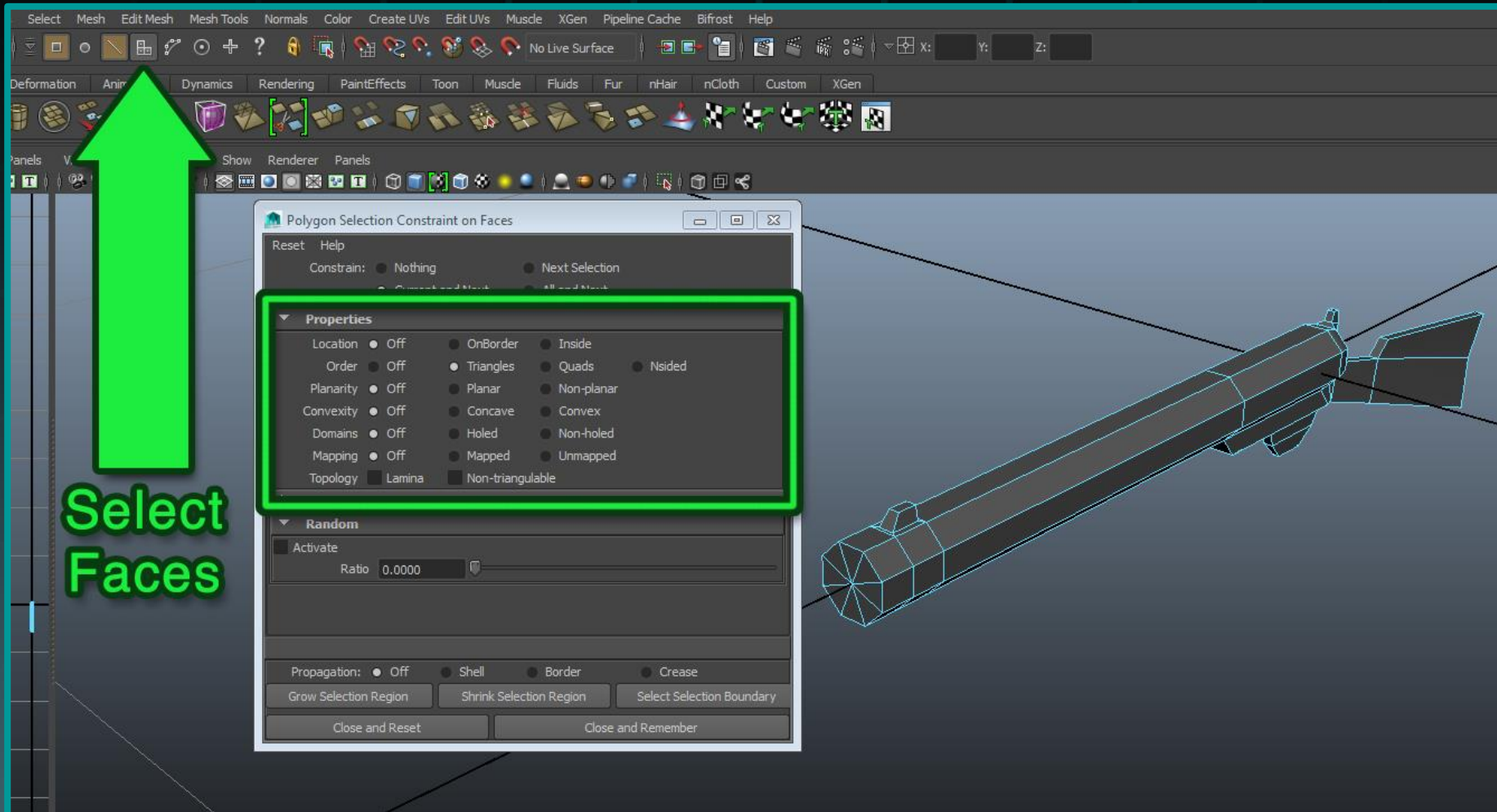




ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Select Using Constraints

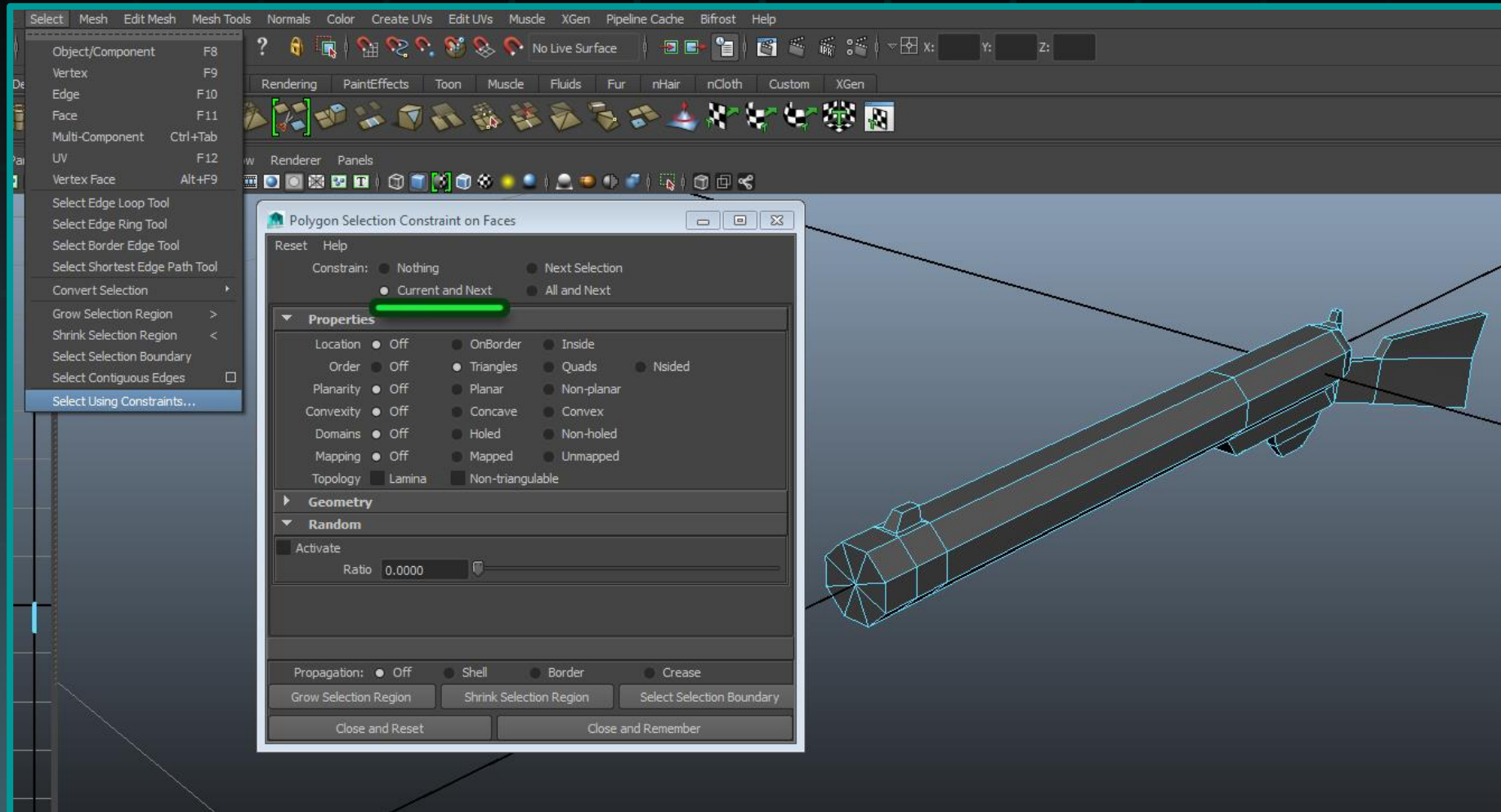




ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Select Using Constraints: Current and Next

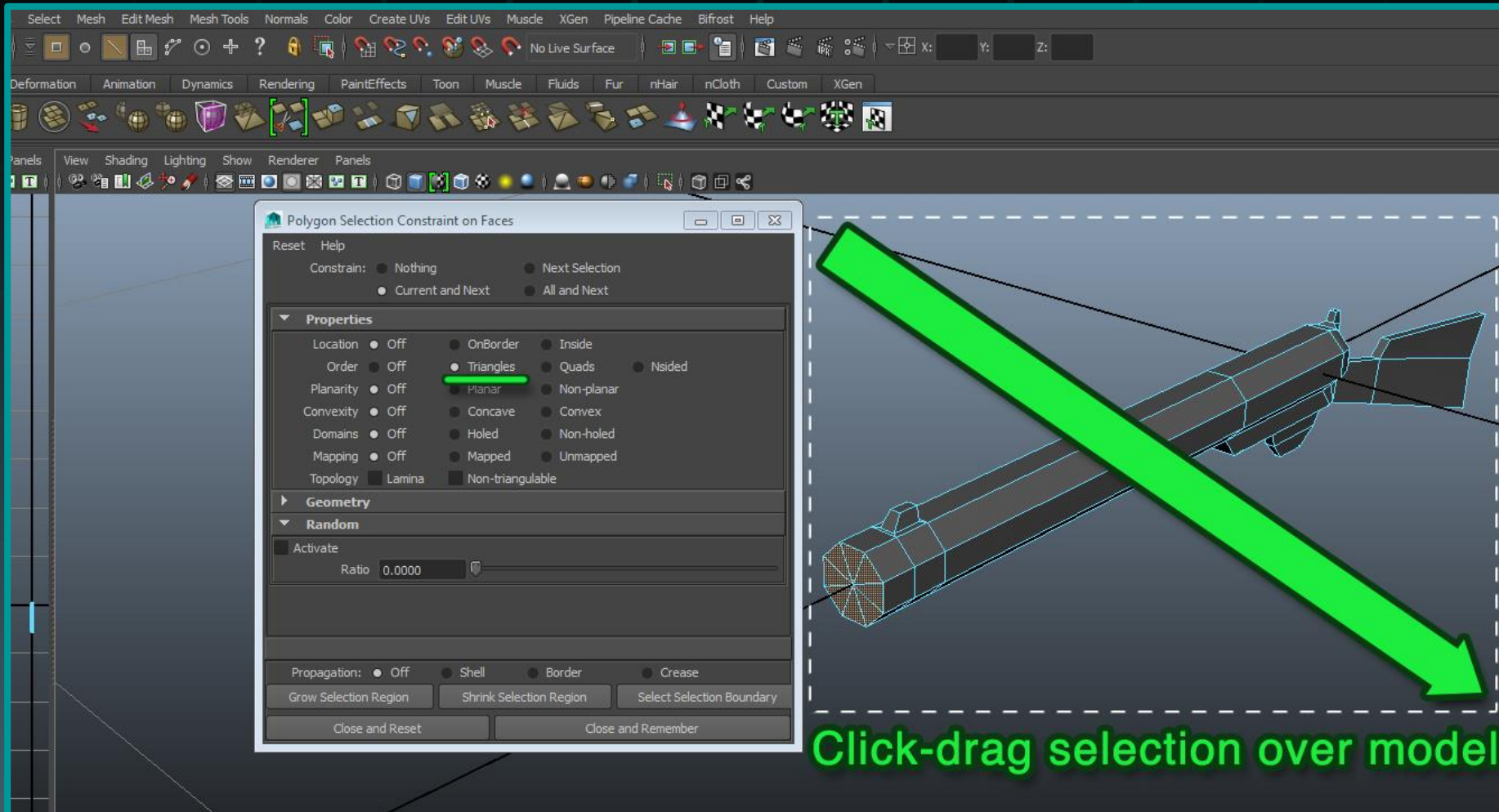




ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Select Using Constraints: Triangles / Tris

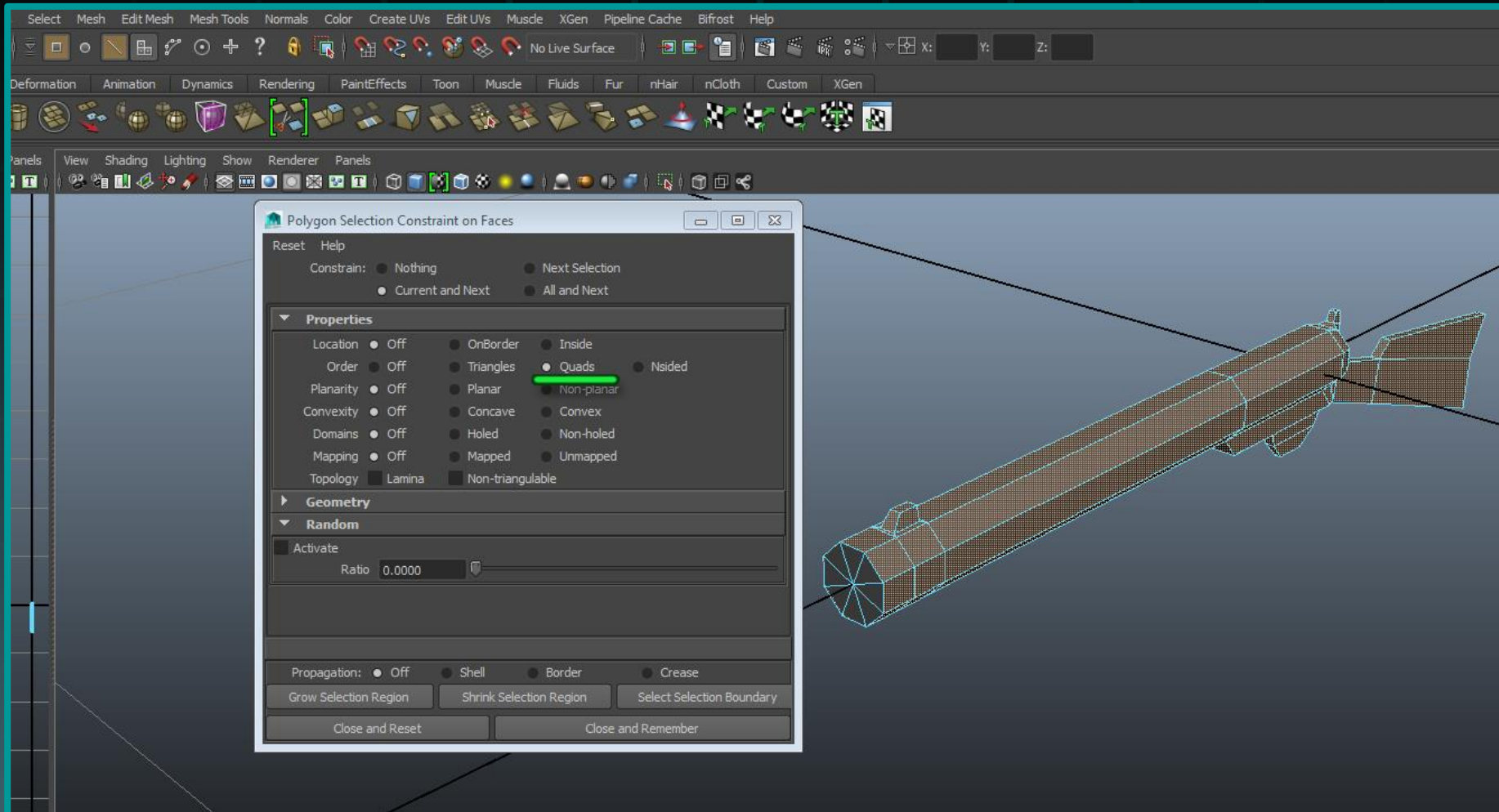




ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Select Using Constraints: Quads (4-sided faces)

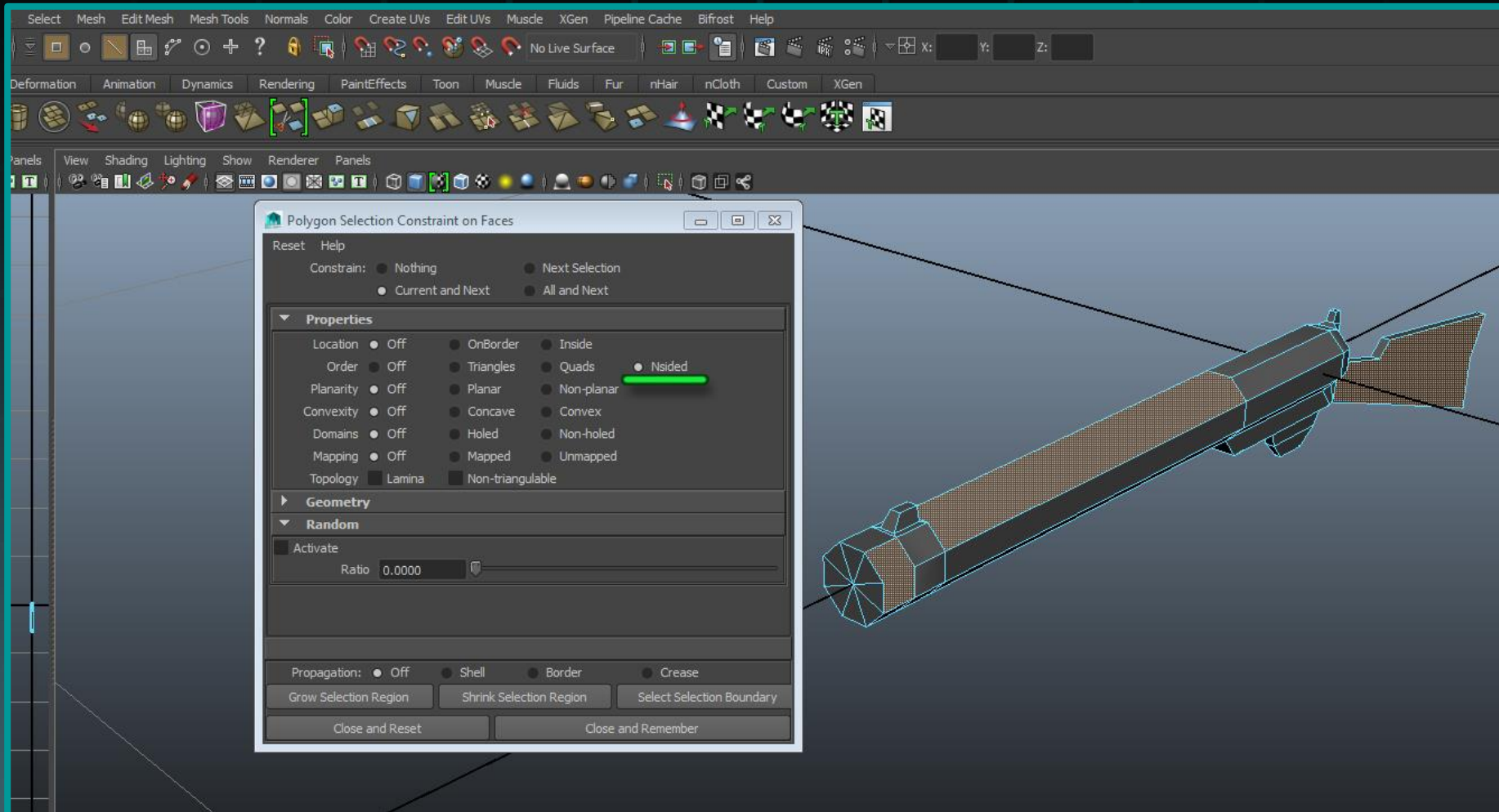




ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Select Using Constraints: Nsided / N-gons (5 or more sides)





ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Cleanup Exercise:

Fix your gun!



ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Cleanup Exercise

Files to download on Moodle:

ELD_gun_ex_broken.fbx

 Resources

Resources for Environment and Level Design exercises

 Diorama Project Files
10.3MB Archive (ZIP) Uploaded 31/01/18, 16:22

This zip folder contains the Unreal Project (UE4.18) which you will construct your dioramas within, it also contains the diorama measurement base in FBX and MB formats.

 Maya Whitebox reference image

 Maya Simple Gun Model .fbx file - Cleanup Exercise





ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Exporting Models



Exporting Models

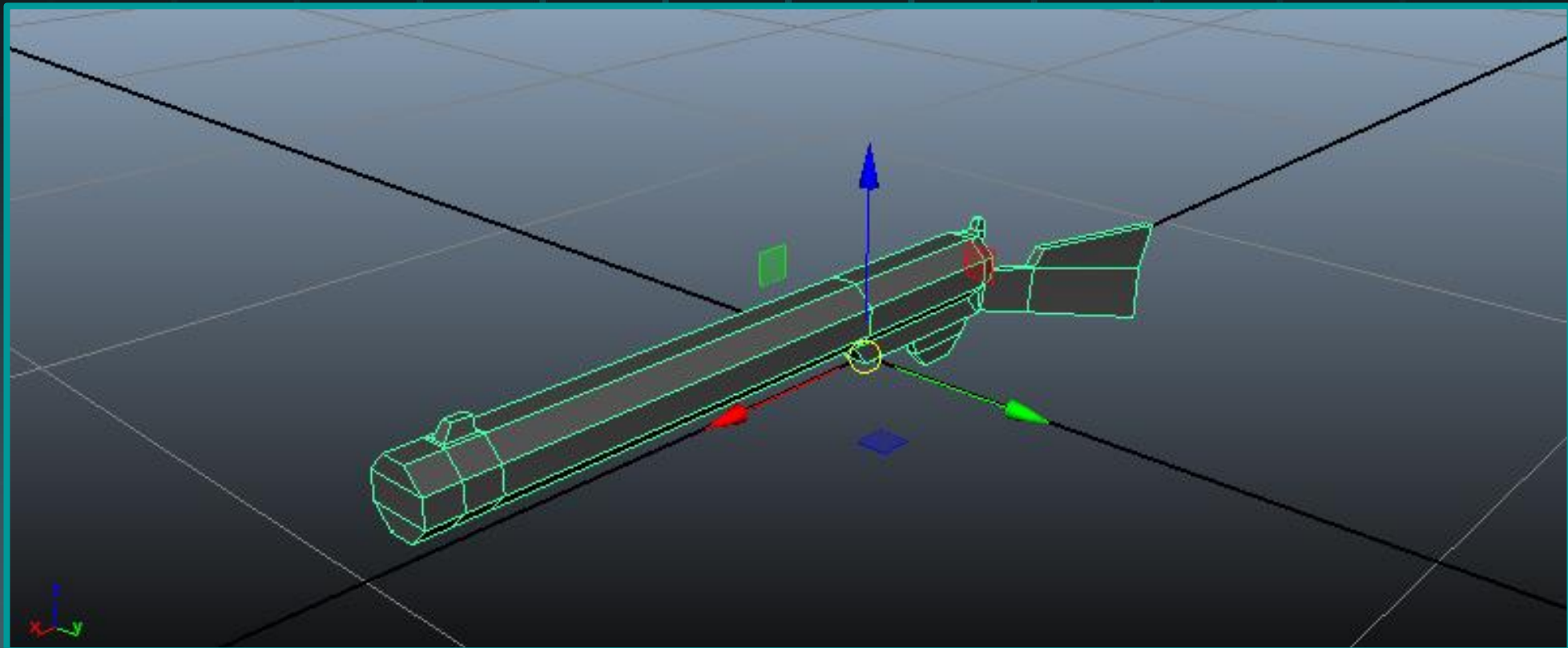
To ensure your geometry is **suitable for engine usage**, you must do the following:

- **Check Orientation**
- **Triangulate Mesh**
- **Delete Object History**
- **Export as **.OBJ** or **.FBX****



Exporting Models: Check Orientation

Make sure the model is positioned correctly on the **X**, **Y** and **Z axes** for the engine you intend to use.



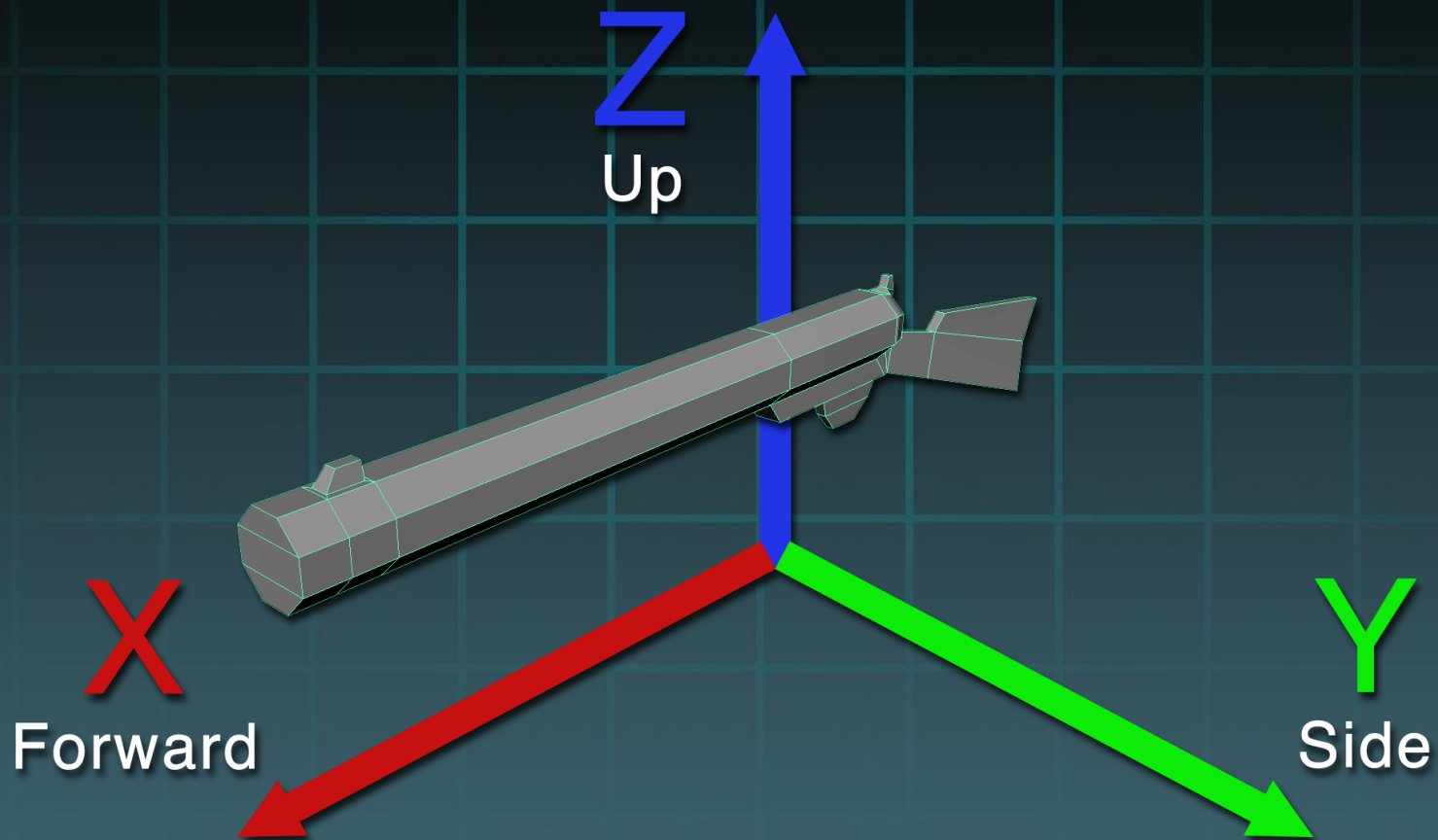


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Exporting Models: Check Orientation

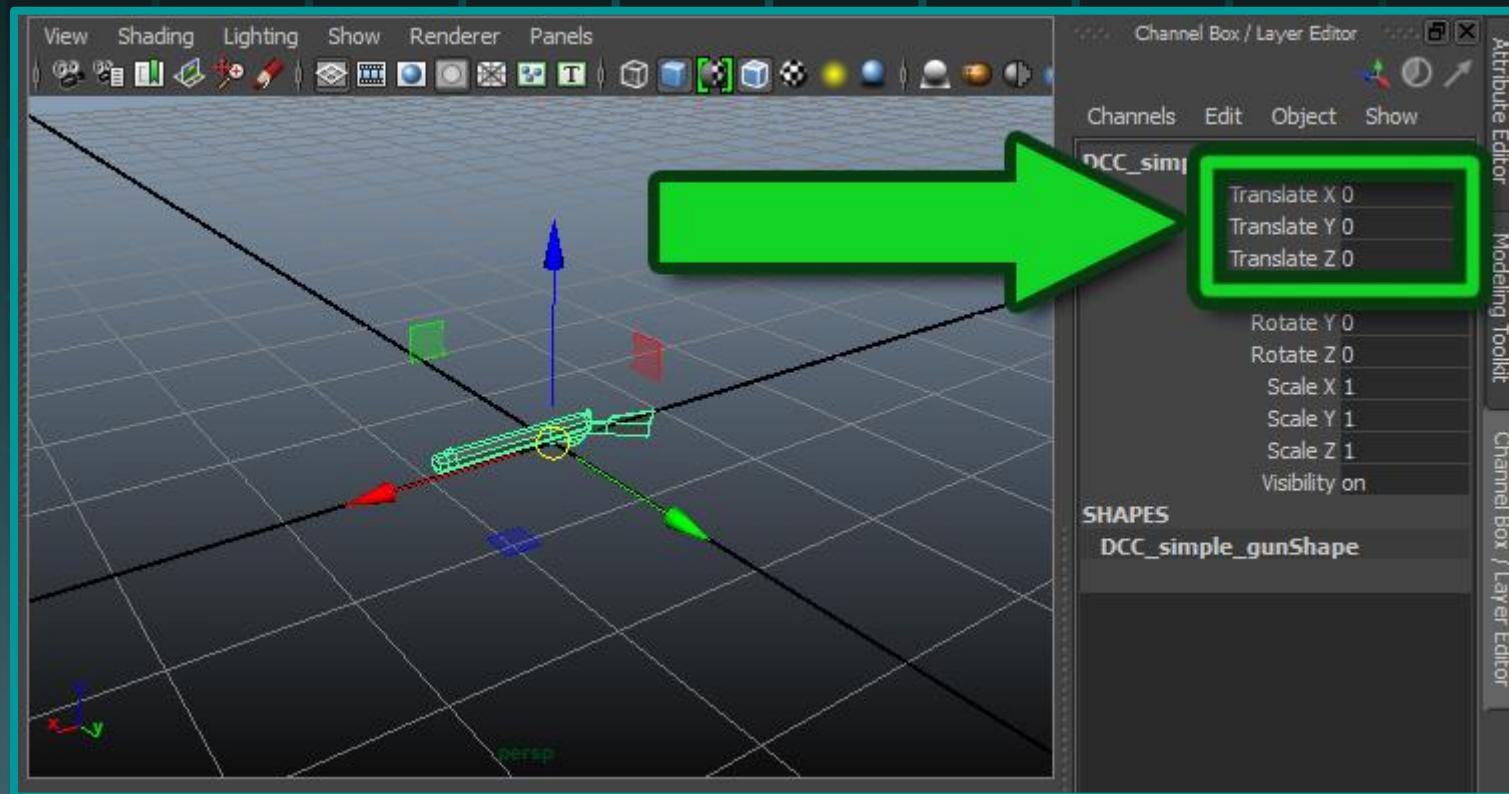
Orientation for Unreal Engine





Exporting Models: Check Orientation

Additionally, **all objects should be centered** in your Maya scene before exporting or deleting object history.

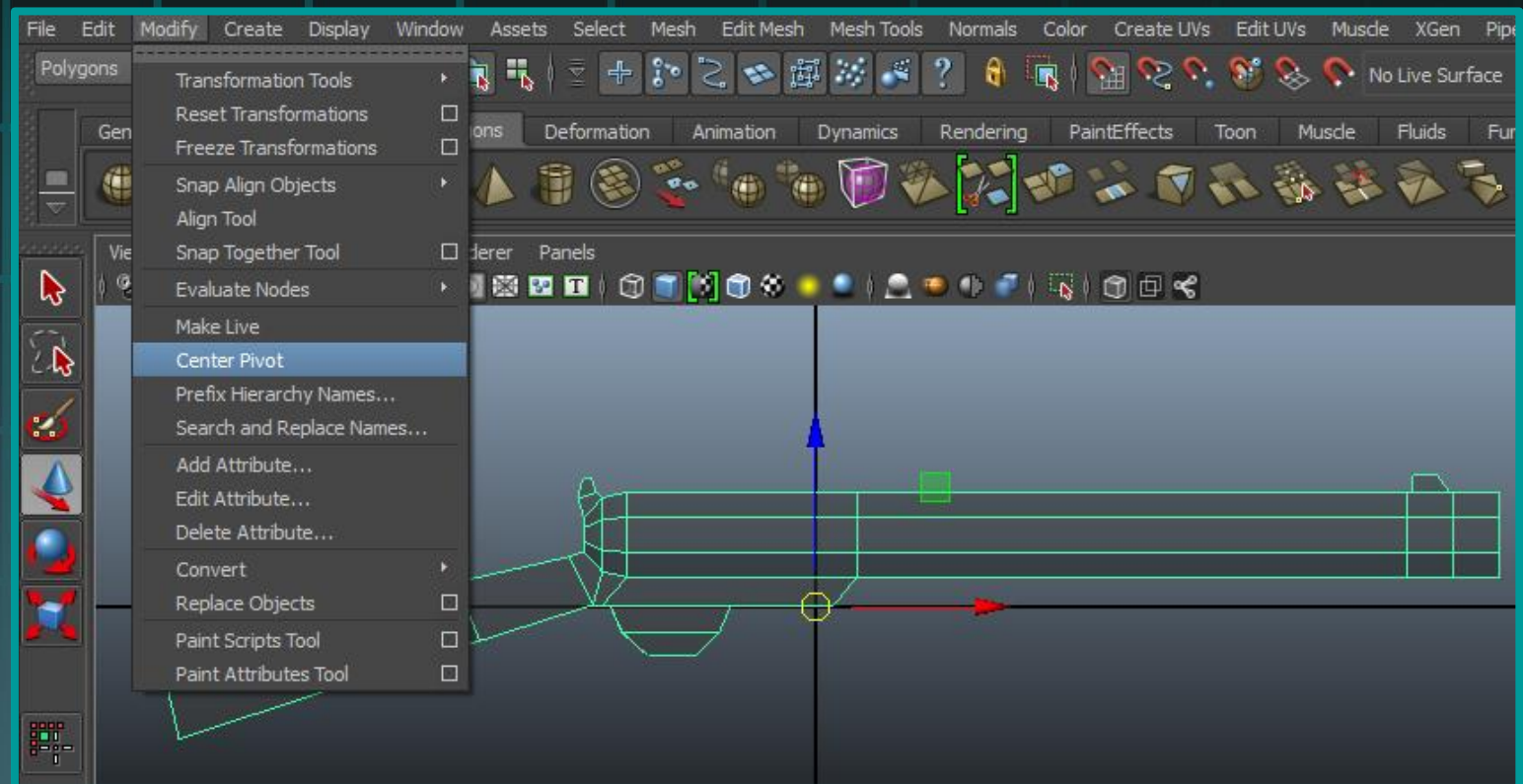




Exporting Models: Check Orientation

The object's **Pivot Point** must also be centered. Use the **Center Pivot** function in the **Modify Menu** to do this.

- Modify > Center Pivot

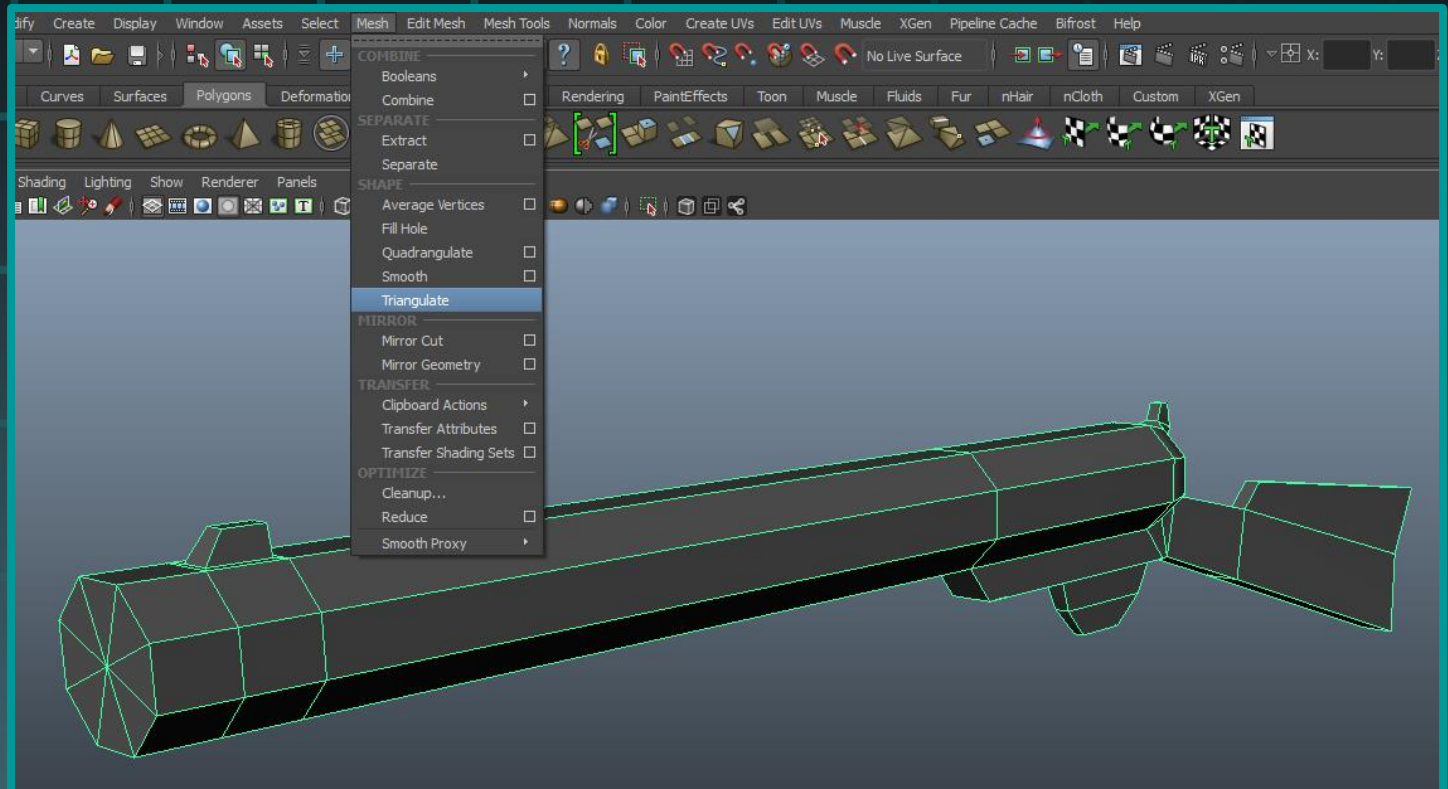




Exporting Models: Triangulate Mesh

All models should be **triangulated** before exporting the asset for use in game engines. This can be performed by using the **Triangulate** function in the **Mesh** menu.

- Mesh > Triangulate

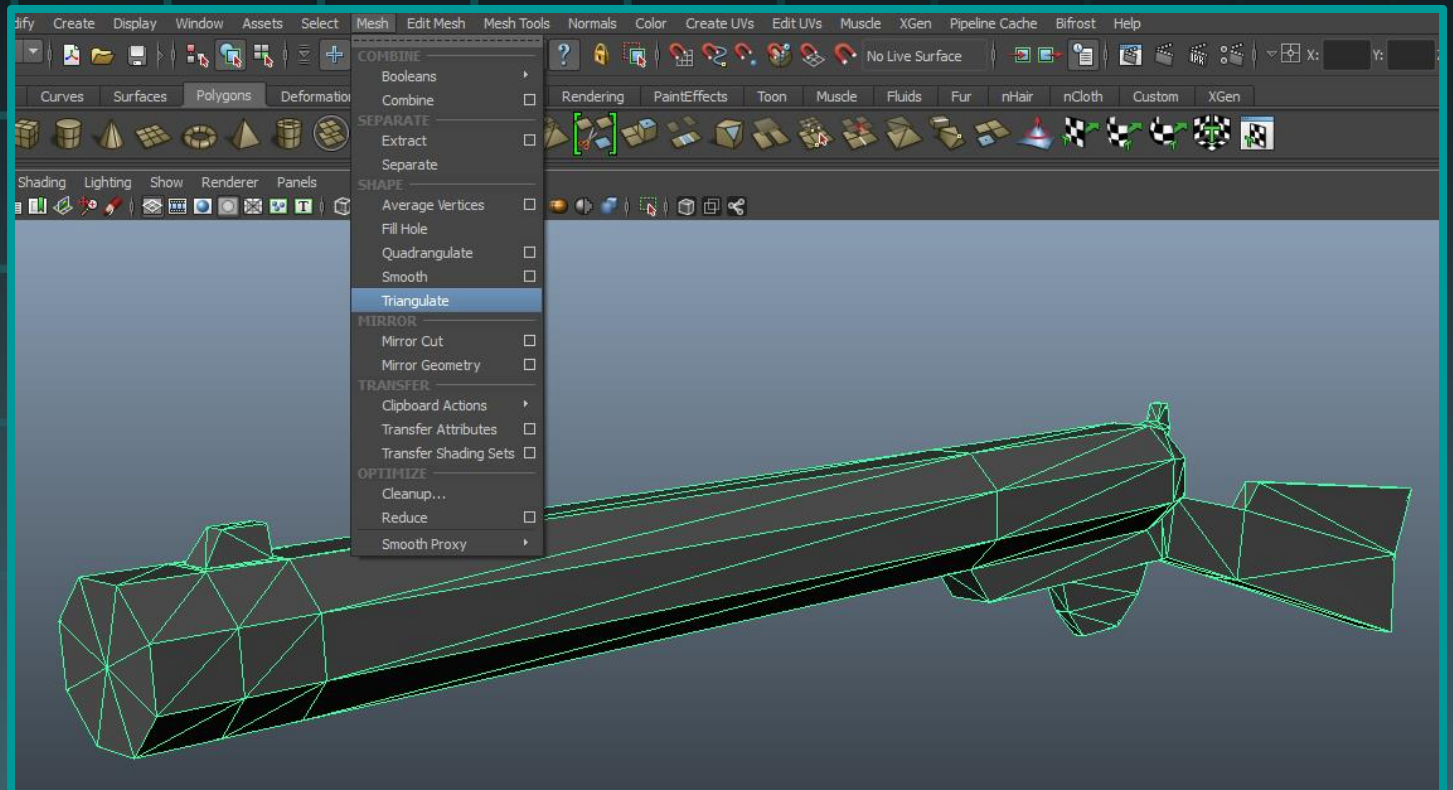




Exporting Models: Triangulate Mesh

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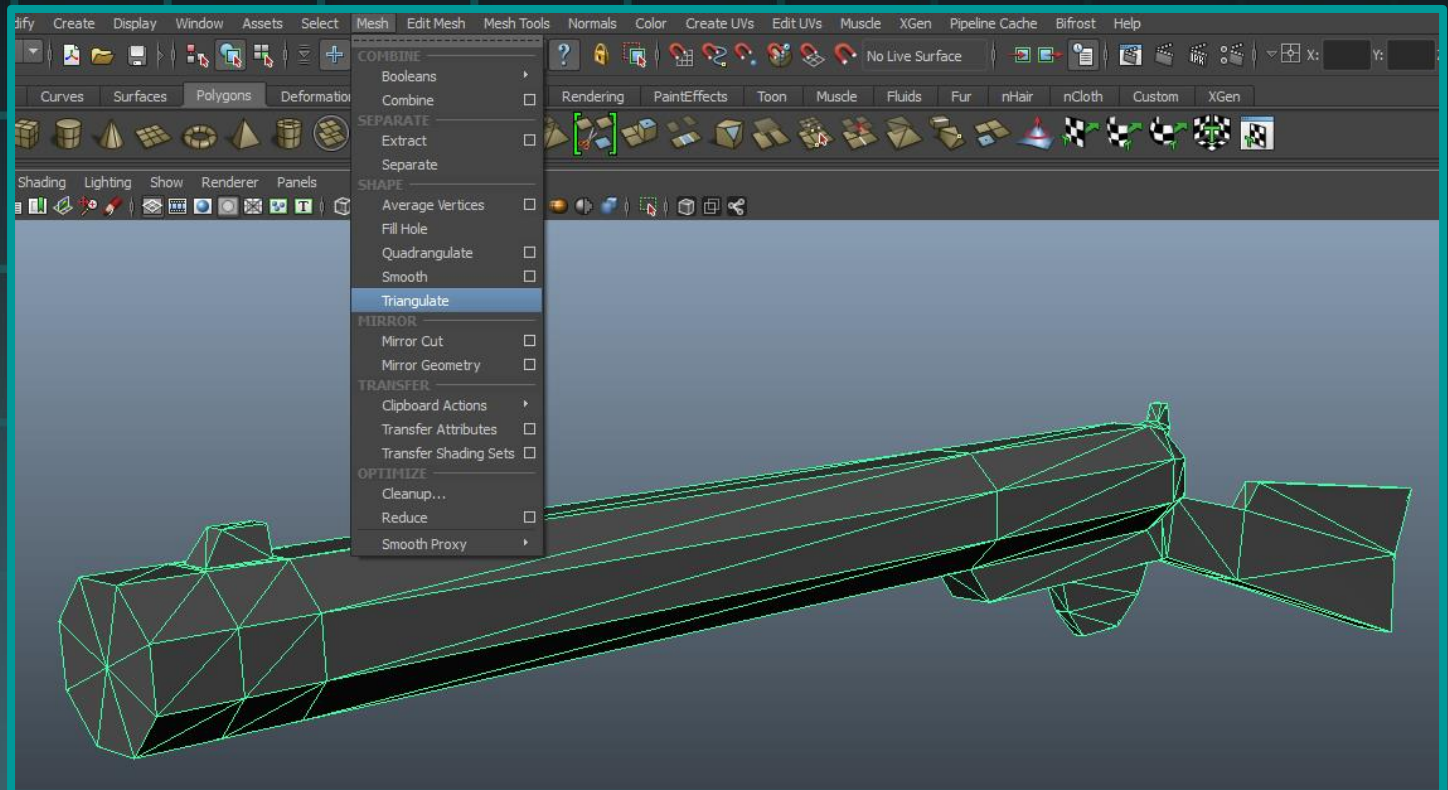
- Mesh > Triangulate





Exporting Models: Triangulate Mesh

NOTE: UV unwrapping should be completed **BEFORE** Triangulating a model!



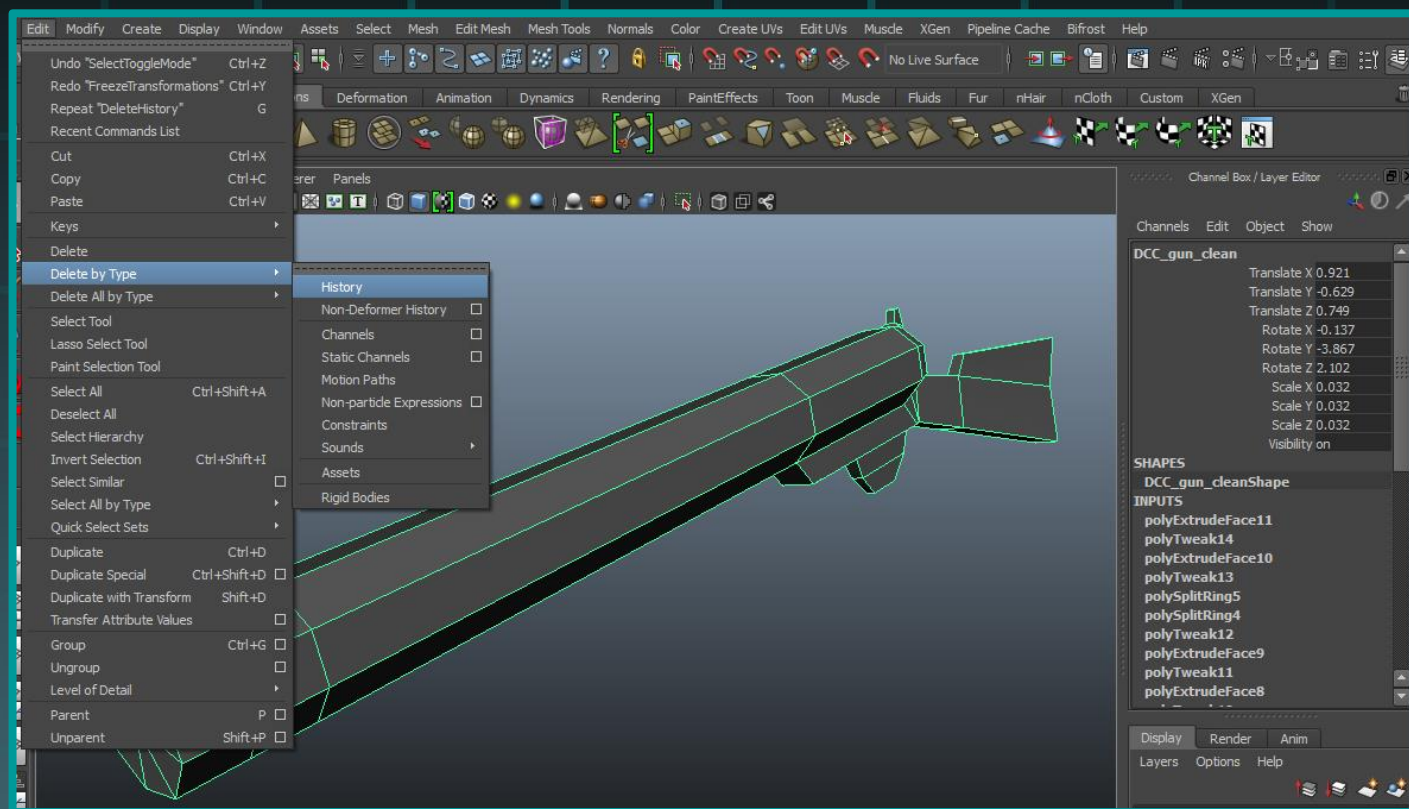


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Exporting Models: Deleting Object History

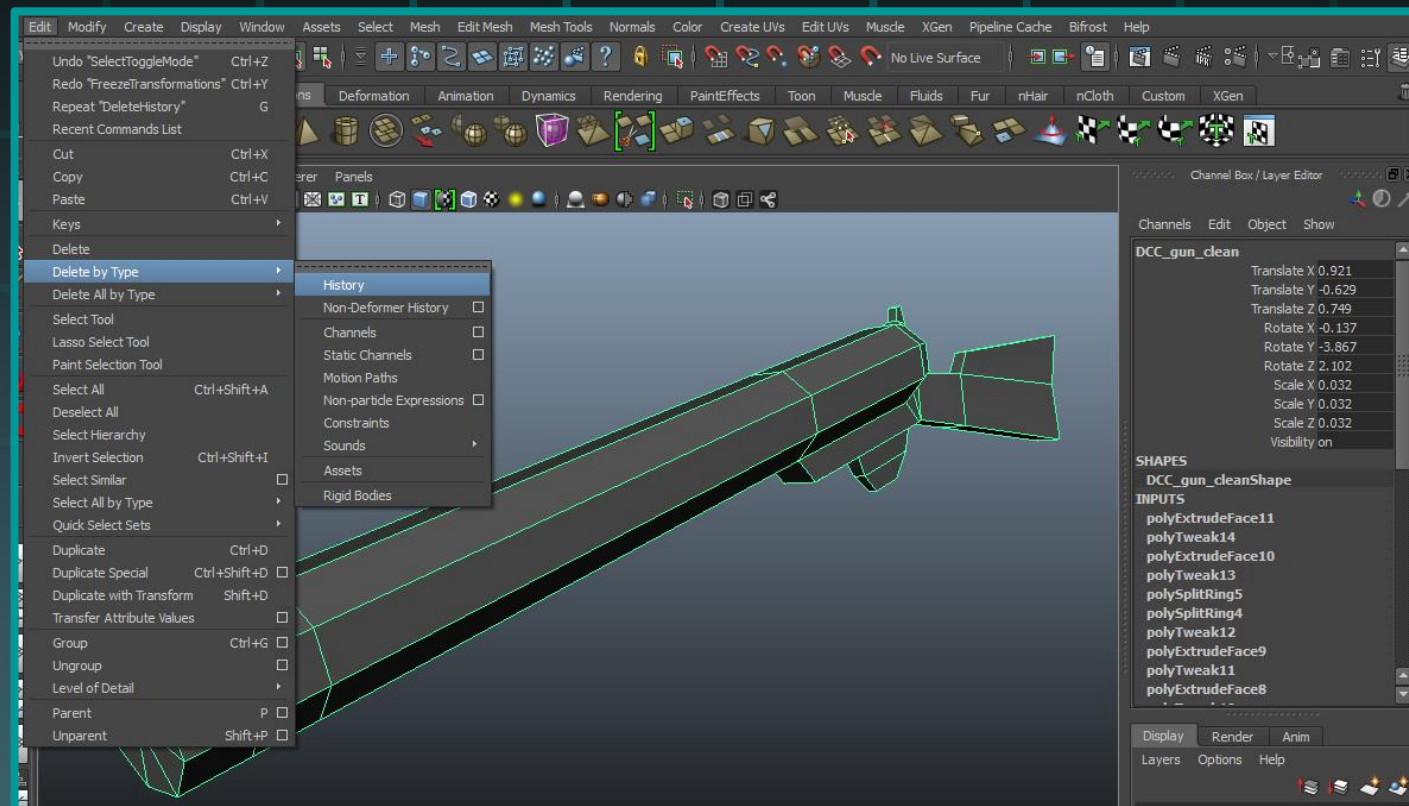
As part of good practice and optimization of assets, completed assets should have their **history and transformations deleted** before being exported for use.





Exporting Models: Deleting Object History

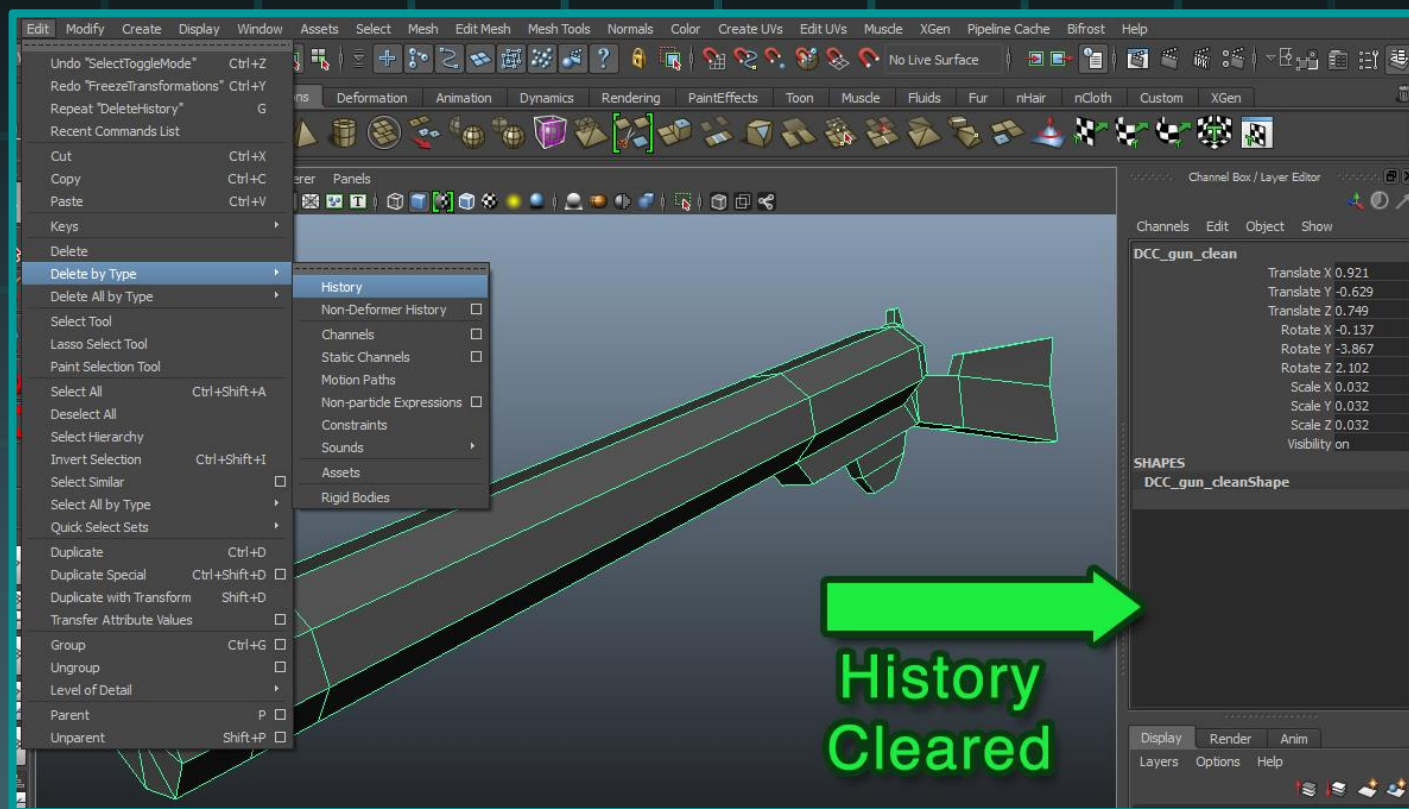
- Edit > Delete Object History > History





Exporting Models: Deleting Object History

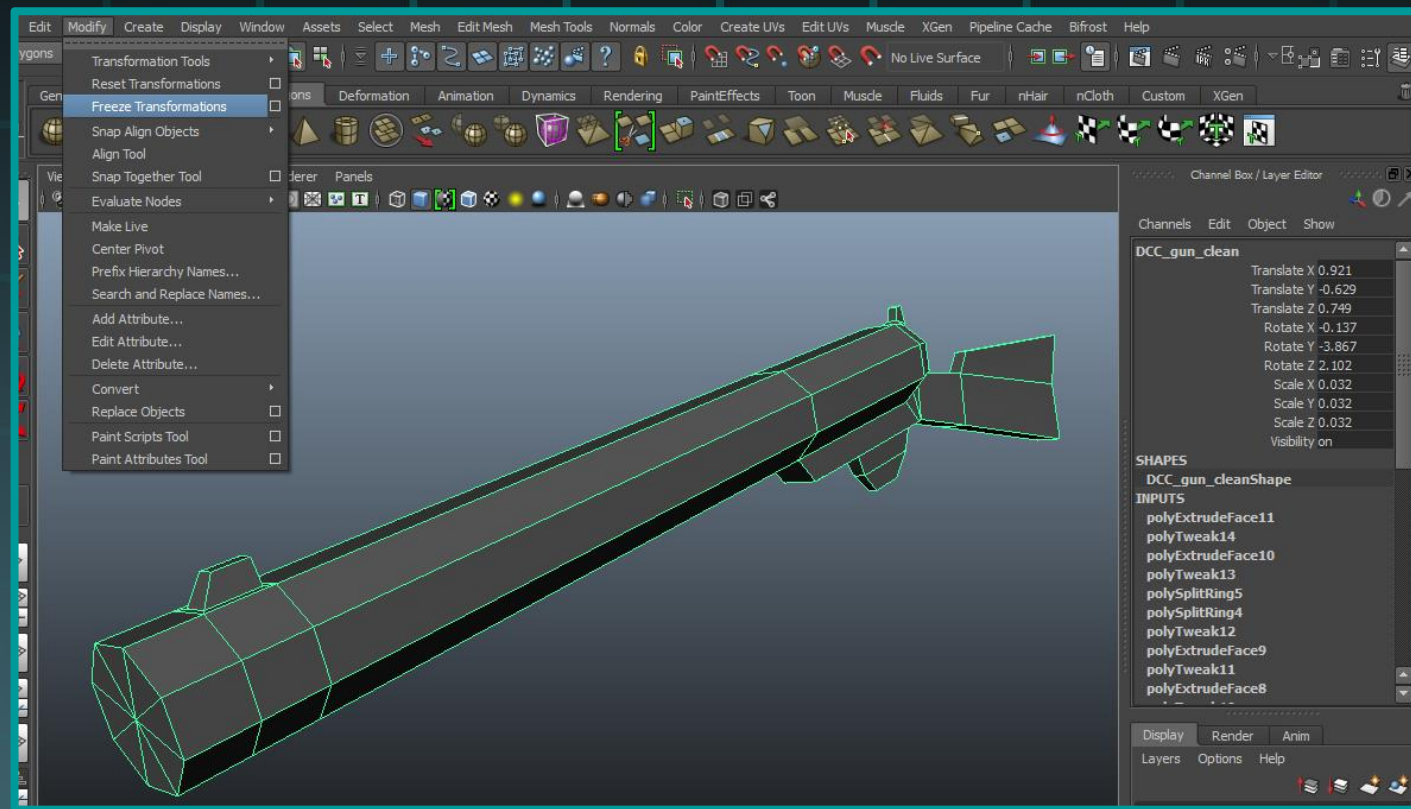
This will clear the history of your model (visible in Maya's **Channel Box**).





Exporting Models: Freeze Transforms

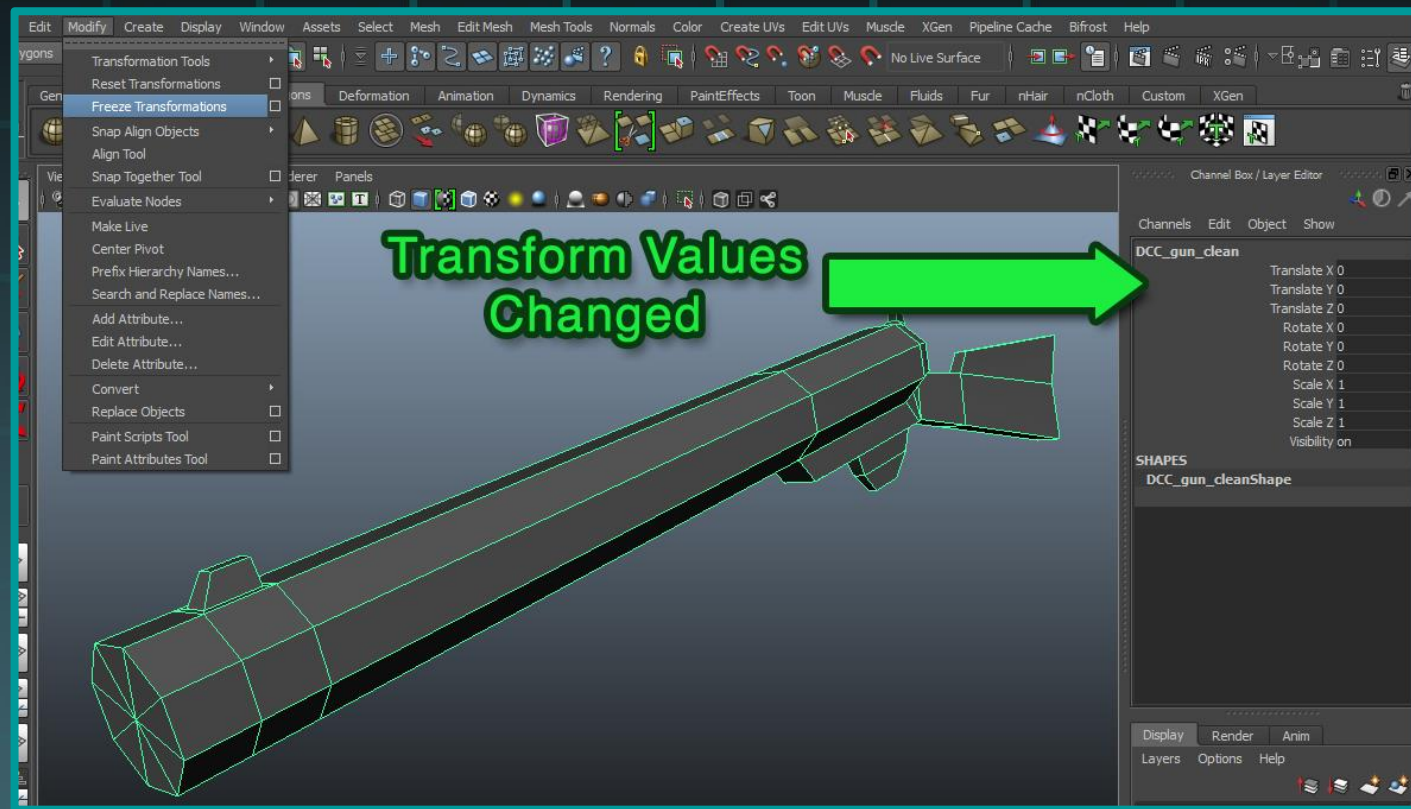
Freeze Transforms can be found in the **Modify** menu. This will reset any transformations you have made to your model (visible in Maya's **Channel Box**).





Exporting Models: Freeze Transforms

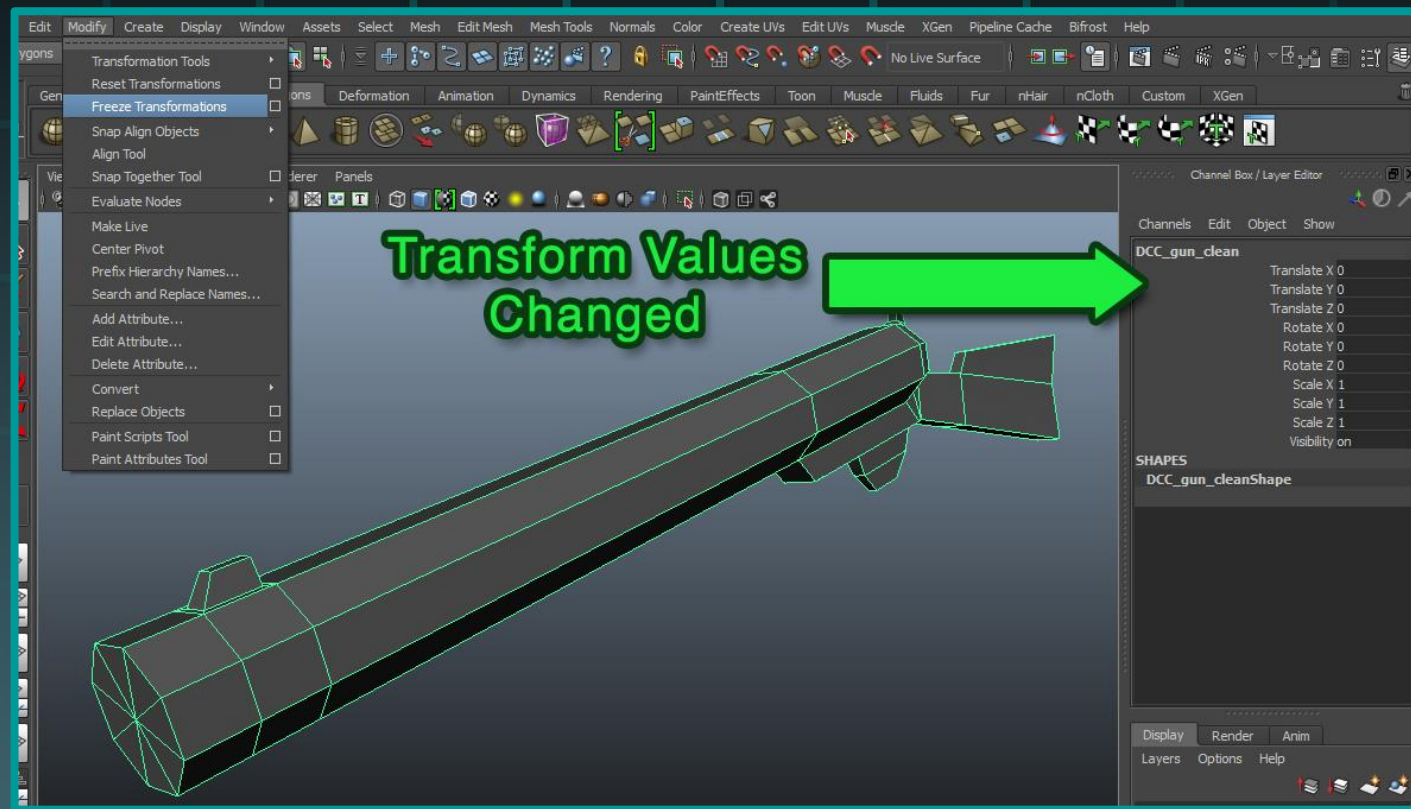
Freeze Transforms can be found in the **Modify** menu. This will reset any transformations you have made to your model (visible in Maya's **Channel Box**).





Exporting Models: Deleting History / Freeze Transformations

NOTE: Please remember that these functions **CANNOT** be undone once the Maya file is saved and closed!



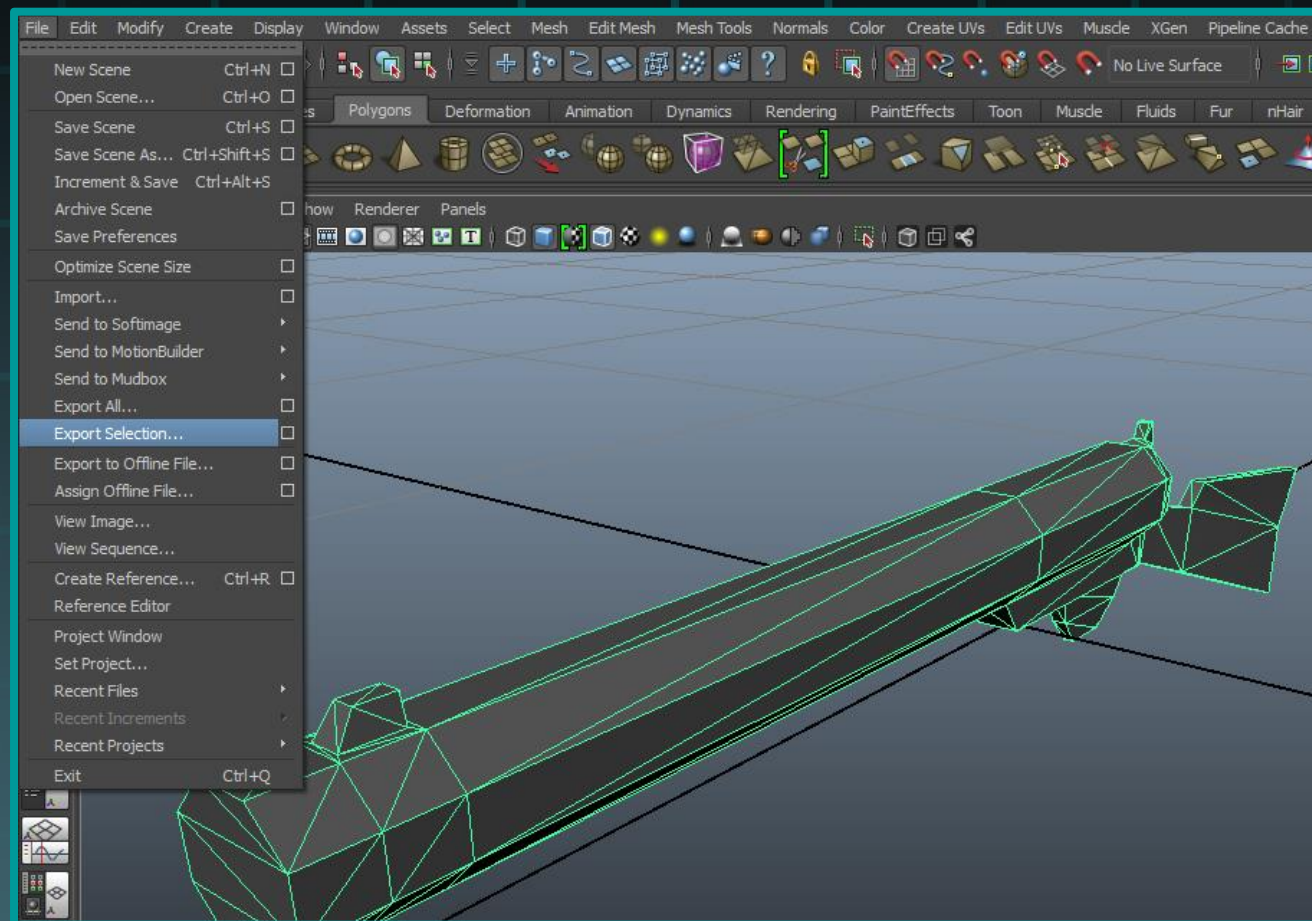


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Exporting Models

To export a model, use **File > Export Selection**. Click on the  Icon for more options.



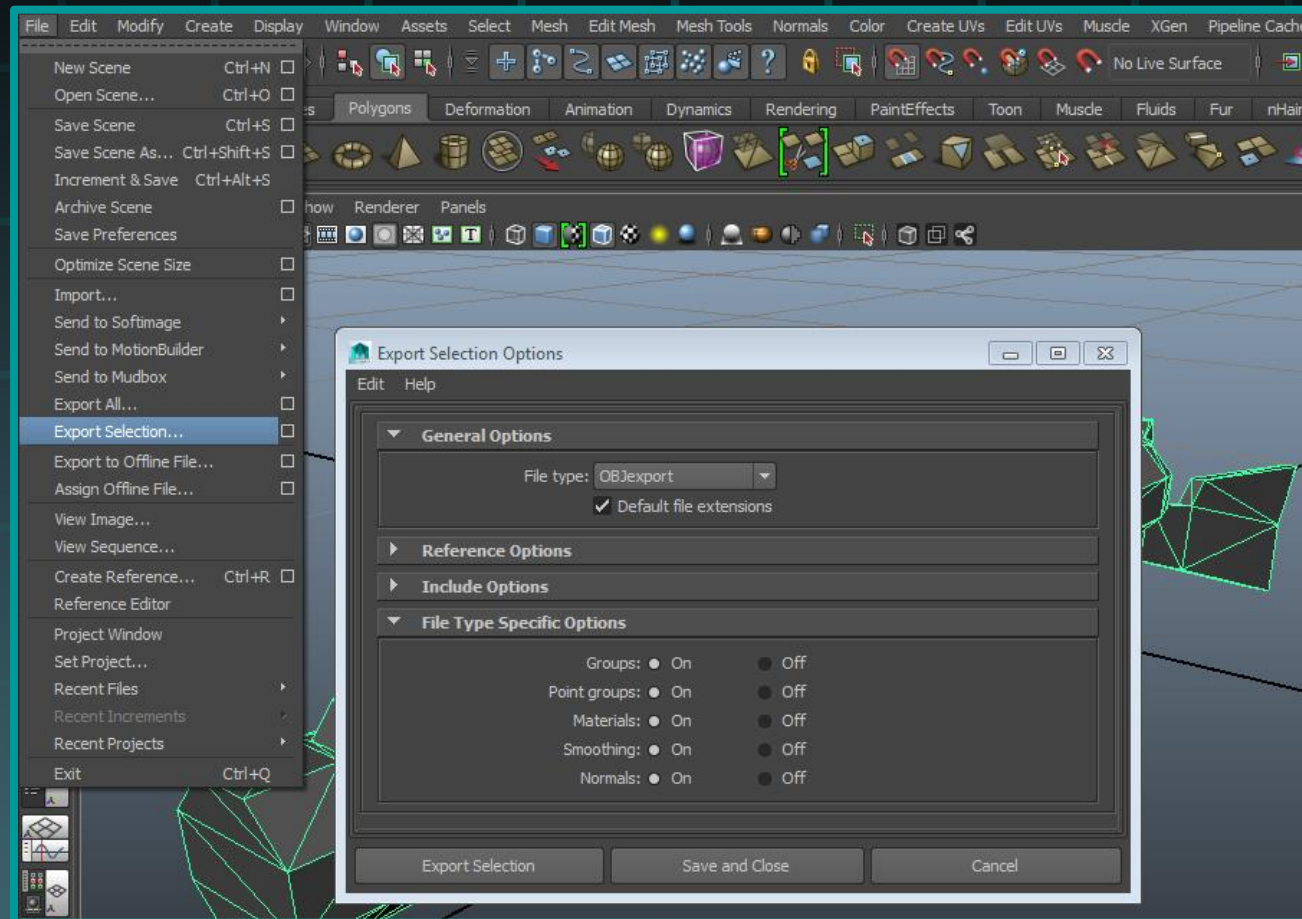


ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Exporting Models

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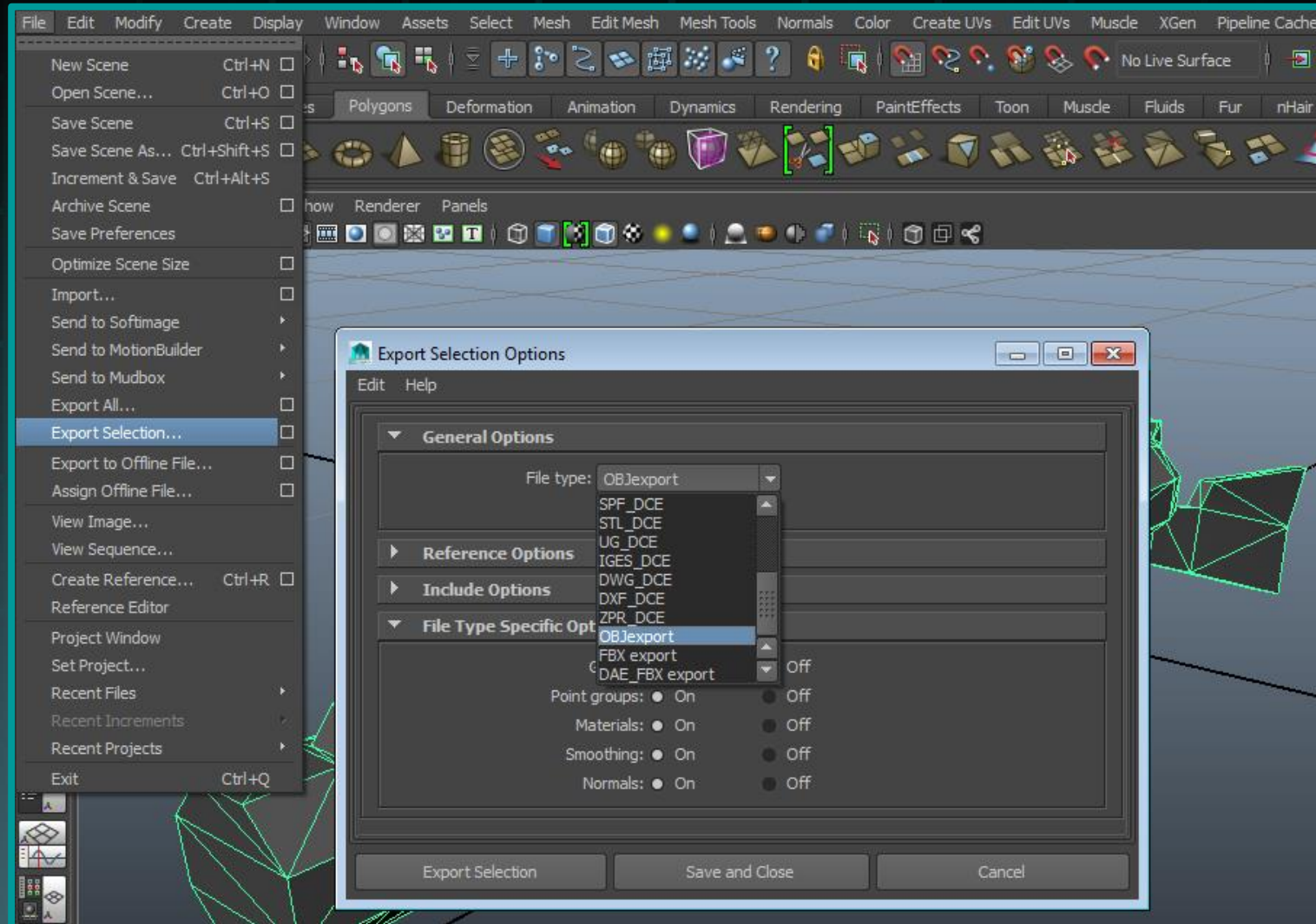




ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Exporting Models: Export as .OBJ

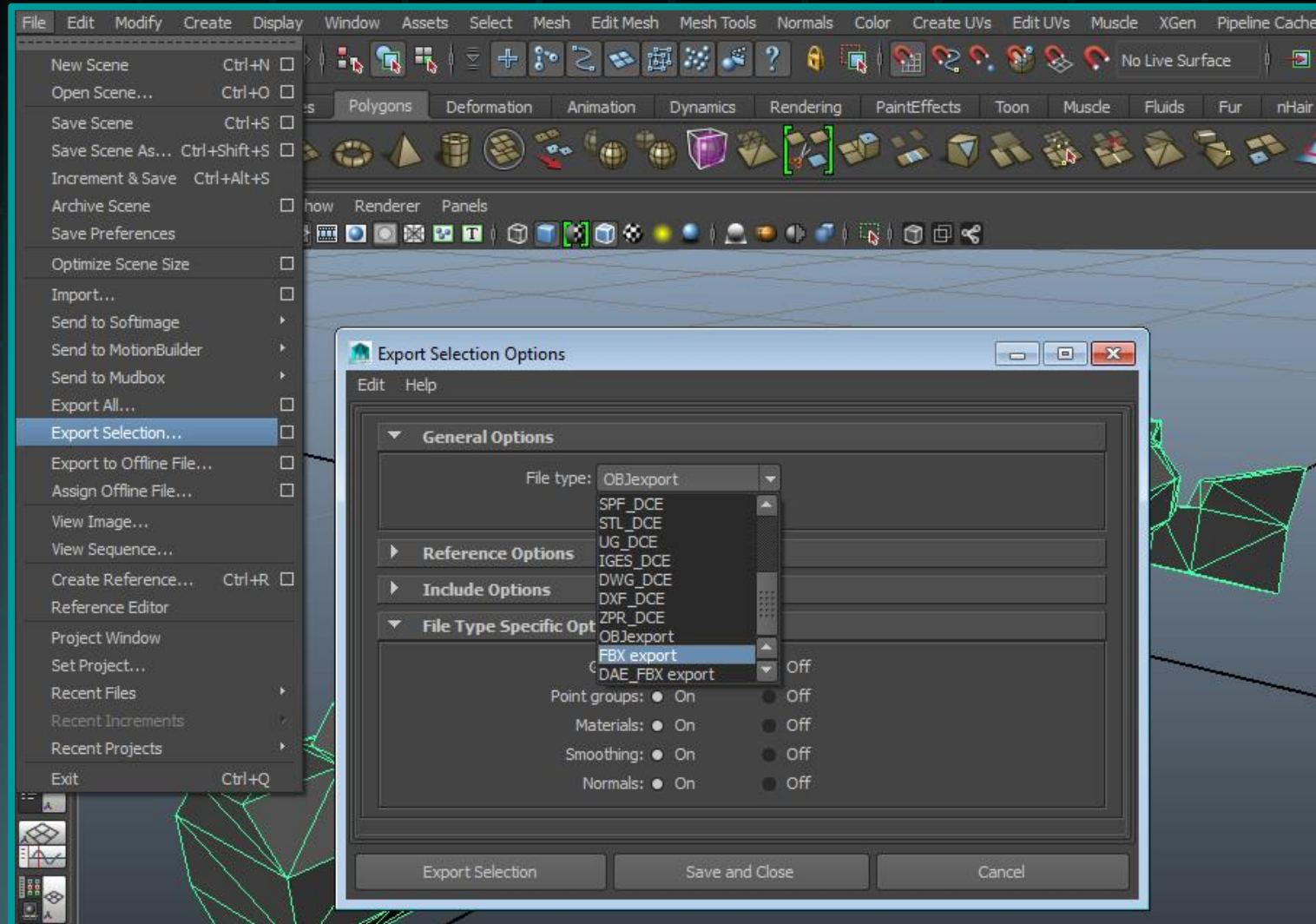




ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Exporting Models: Export as .FBX

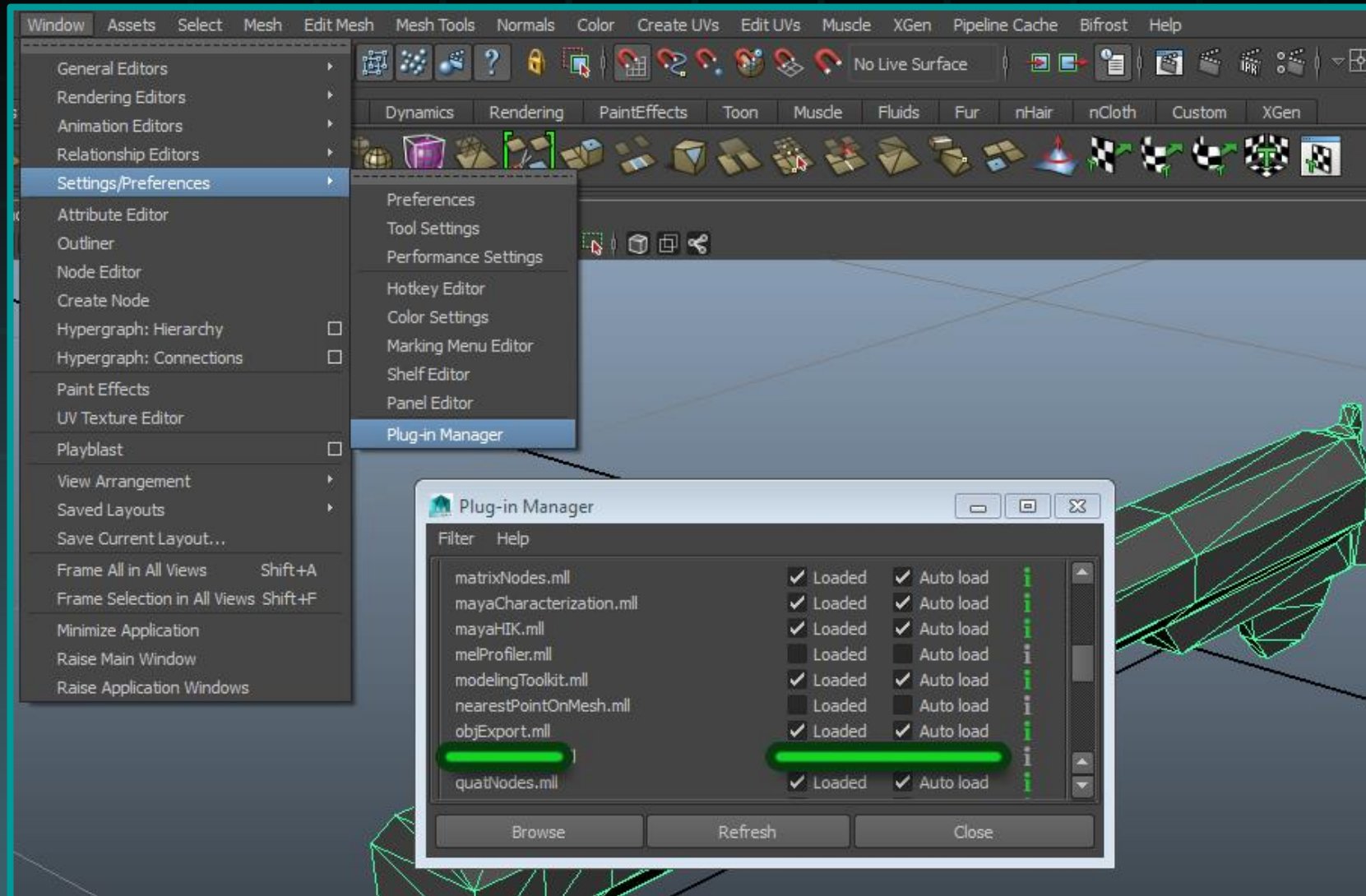




ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Exporting Models: Plug-In Manager (OBJ)

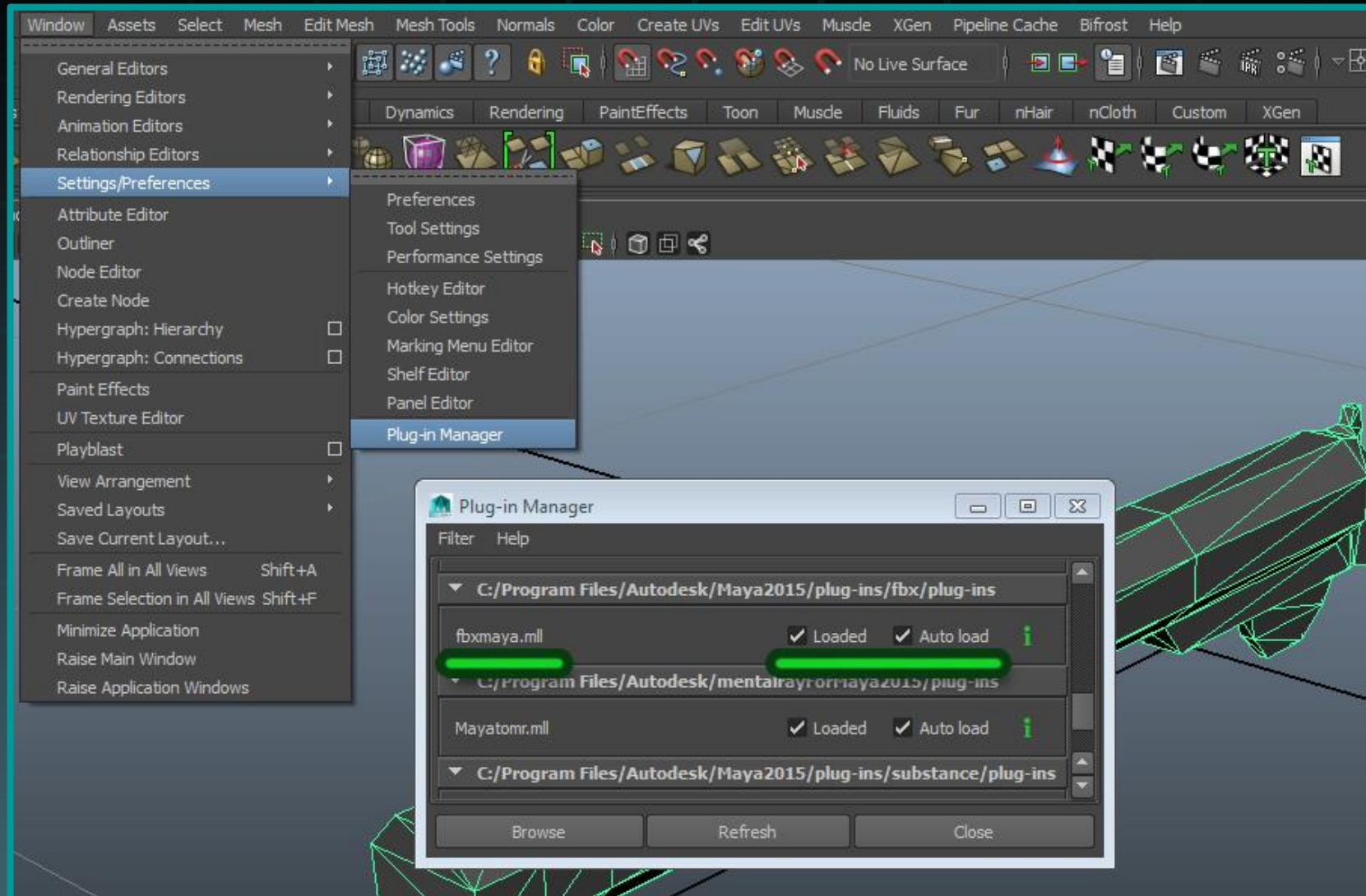




ENVIRONMENT DESIGN

3D Model Cleanup Exercise

Exporting Models: Plug-In Manager (FBX)





Exporting Models

REMEMBER: NAMING CONVENTIONS DO MATTER!

ELD_gun_exercise_repaired.fbx



mystuff.obj



shooty_boi_v48.fbx



Firstyearwork04.obj



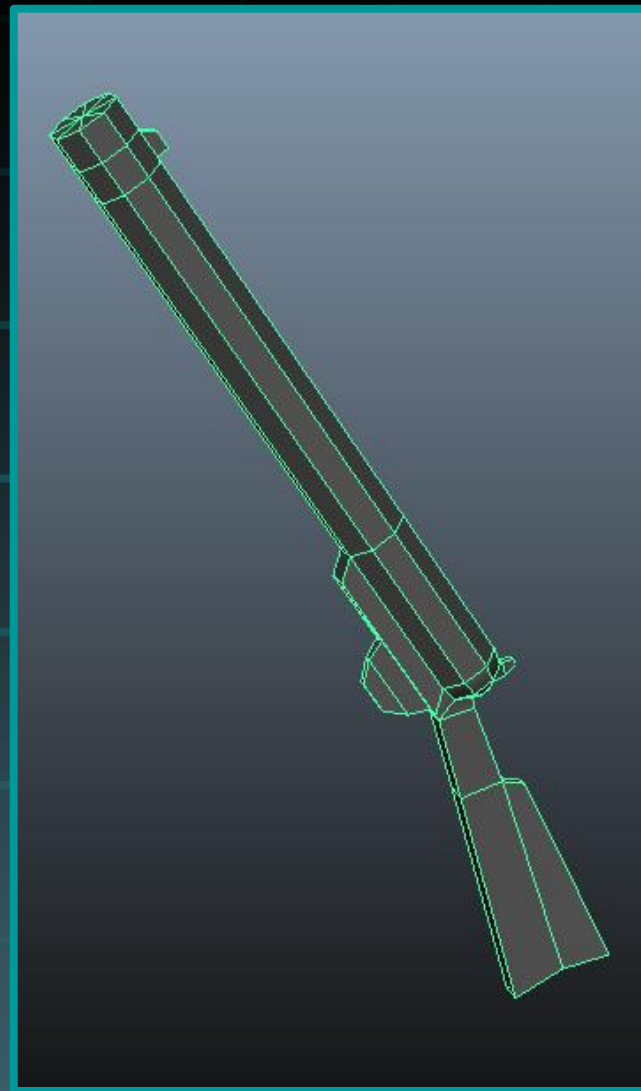


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3D Model Cleanup Exercise

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Remember:

**SAVE YOUR WORK
AND SAVE IT OFTEN!**



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