AUTODESK UNIVERSITY

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Everything You Need to Know about Latticing and Texturing in Fusion 360

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Learning Objectives

- Learn how to apply appearances to your 3D model
- Learn how to add 3D printable textures and patterns to the surface of your designs using Geometric Patterning
- Learn how to use Volumetric Latticing to lightweight your parts and create visually distinct or appealing geometry
- Learn how to convert a Volumetric Lattice into a mesh body

Description

The consumer product industry is more competitive than ever before. In order to maintain an edge over the competition, it's important to differentiate your product from the pack. Autodesk Fusion 360 software is leading the industry with advanced tools to help you design lighter and more complex products with ease. In this class, you'll learn how to best use two tools from Autodesk Fusion 360 Product Design Extension. First, you'll learn how to apply a volumetric lattice to your parts (to lightweight them and create visually distinct geometry). Next, to provide grip and/or a visual interest, you'll learn how to apply 3D-printable patterns and textures to your part's surface. If you design consumer products and are interested in taking your products to the next level, this class is for you.

Speaker(s)

Jason is a Fusion 360 expert who focuses on product design and development. He comes from an education in mechanical engineering and over 15 years of industry experience bringing innovative consumer products to market. Jason's specialties include: plastic product design and development (especially for injection molding), 3D printing, 3D scanning, reverse engineering and laser cutting. When Jason isn't working on Fusion 360 projects, he spends his summers riding mountain bikes & camping and his winters skiing & snowboarding

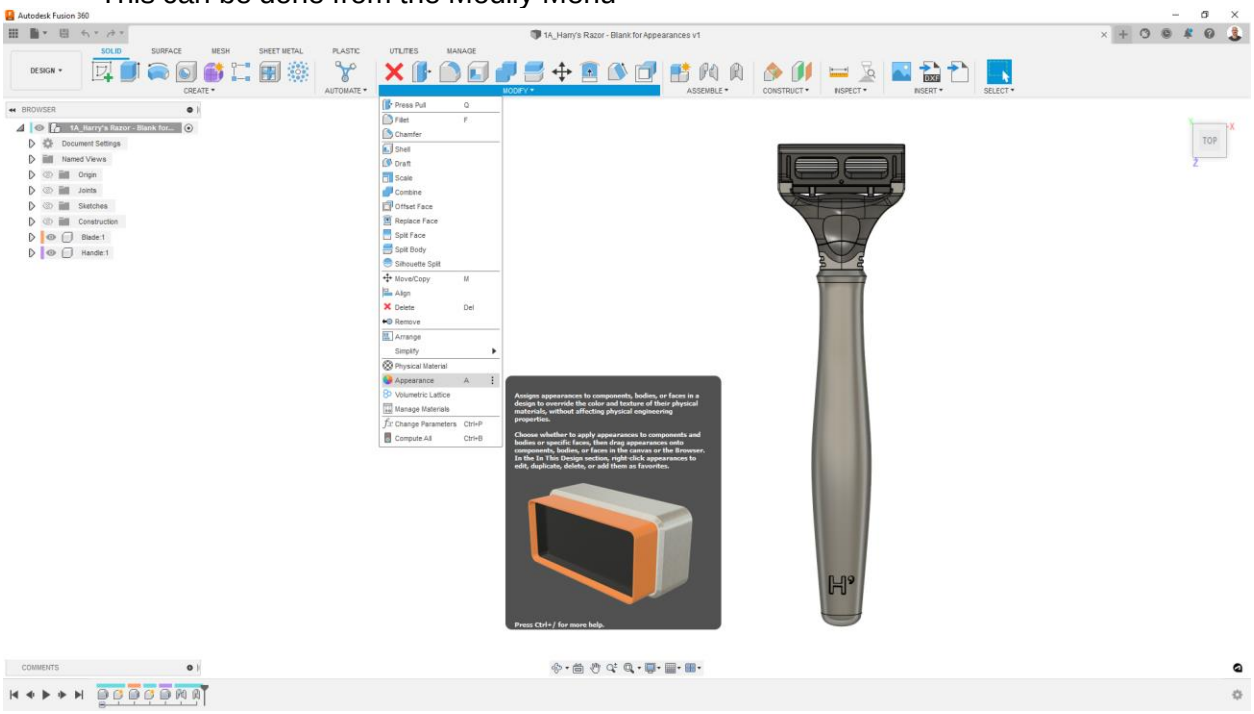
Appearances

Appearances in Fusion 360 are meant for Photorealistic RENDERING. Appearances may look 3D, but they will NOT show up in a manufactured part. There is an extensive library of material appearances. You can customize an existing appearance OR even create one from scratch You can assign appearances by Component, Body or Face.

How to Assign an Appearance to your Design

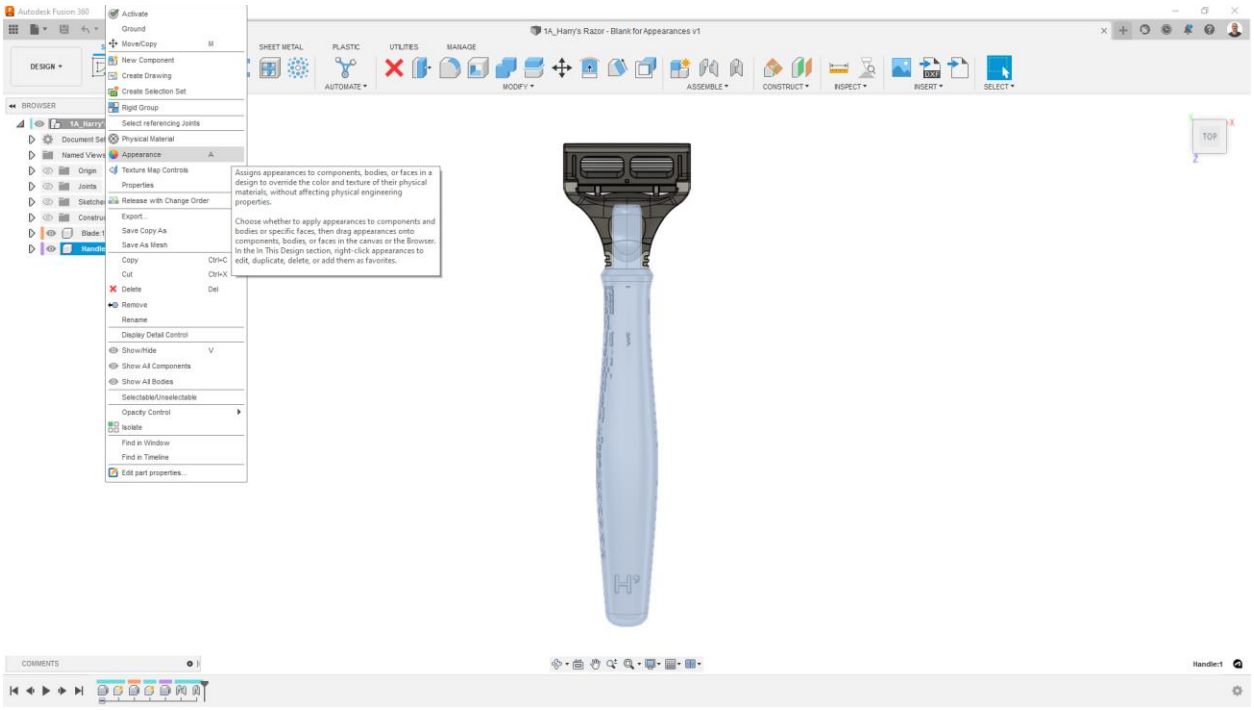
Step 01 – Open Appearances

This can be done from the Modify Menu



Appearances from Modify Drop Down

This can also be done by right clicking on the Component or Body you want to apply an Appearance.

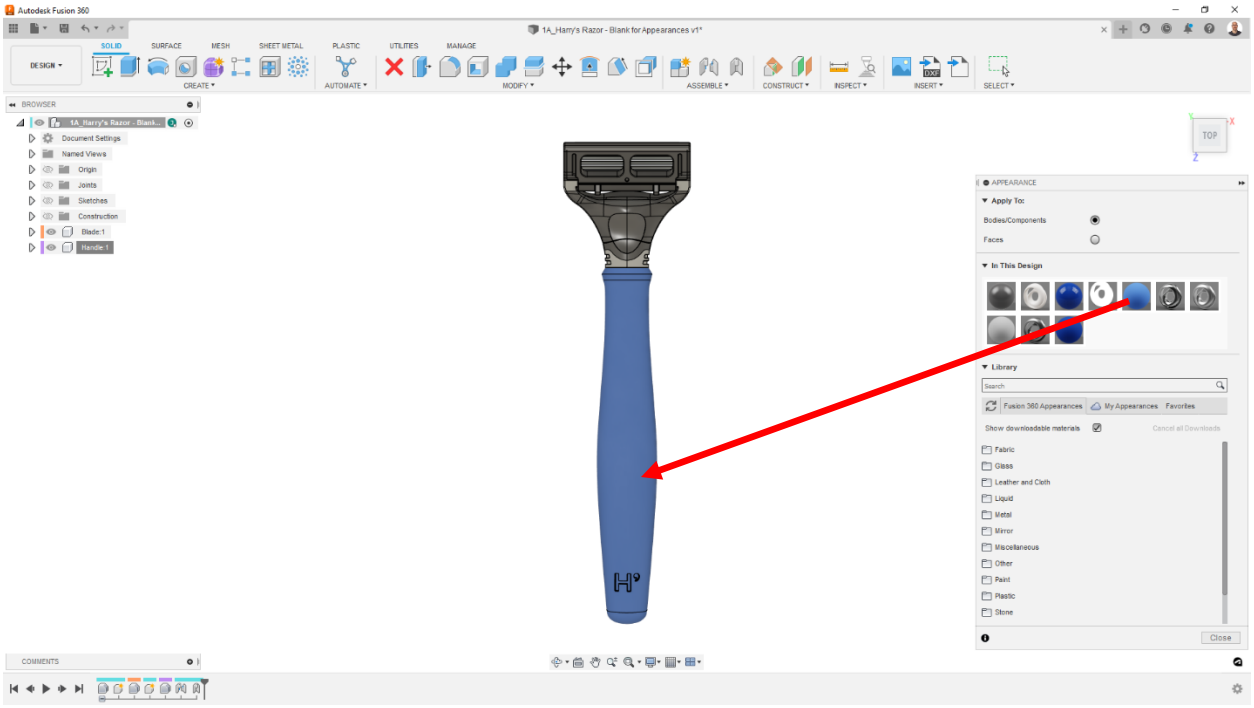


Appearances from Right Click Menu

This can also be done using the default keyboard shortcut “A” by simply pressing the letter “A” on your keyboard

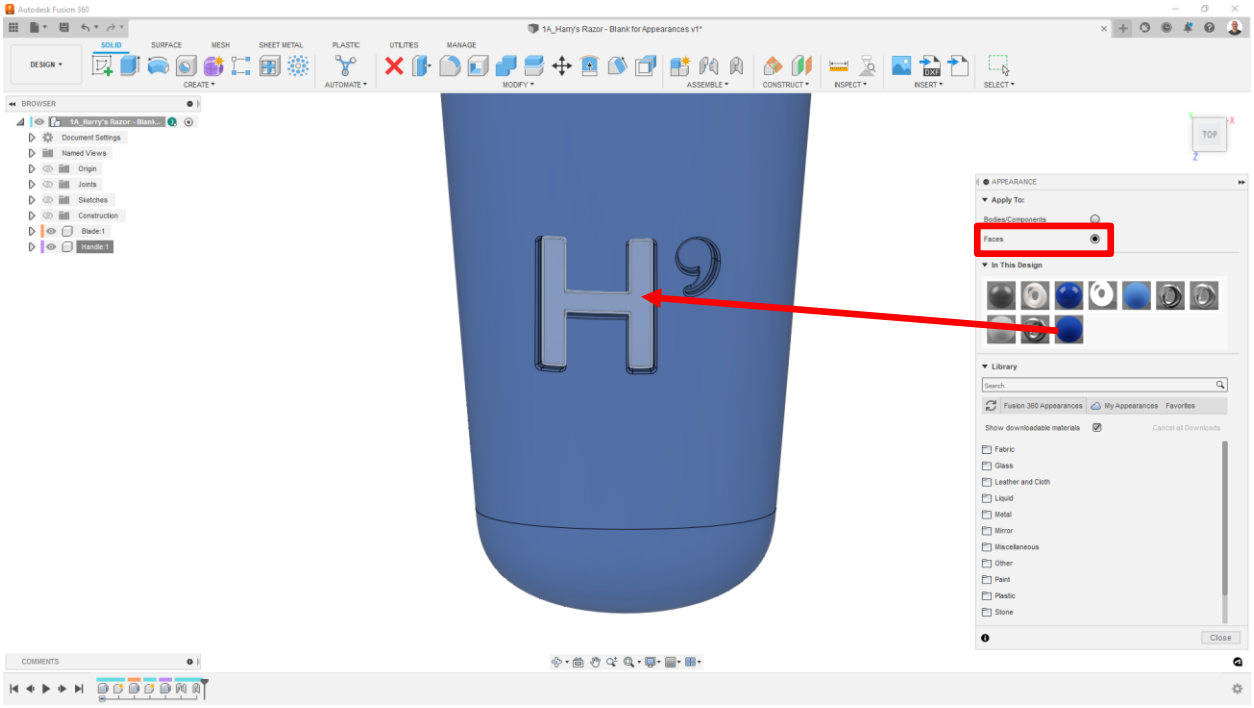
Step 02 – Apply an Appearances

Find an appearance you would like to use.
Left click (keep the left click pressed) and drag the appearance onto the Component or Body you would like to apply the appearance



Assigning an Appearance to a Component or Body

To apply an Appearance to a Face, change the “Apply to” option to “Faces”

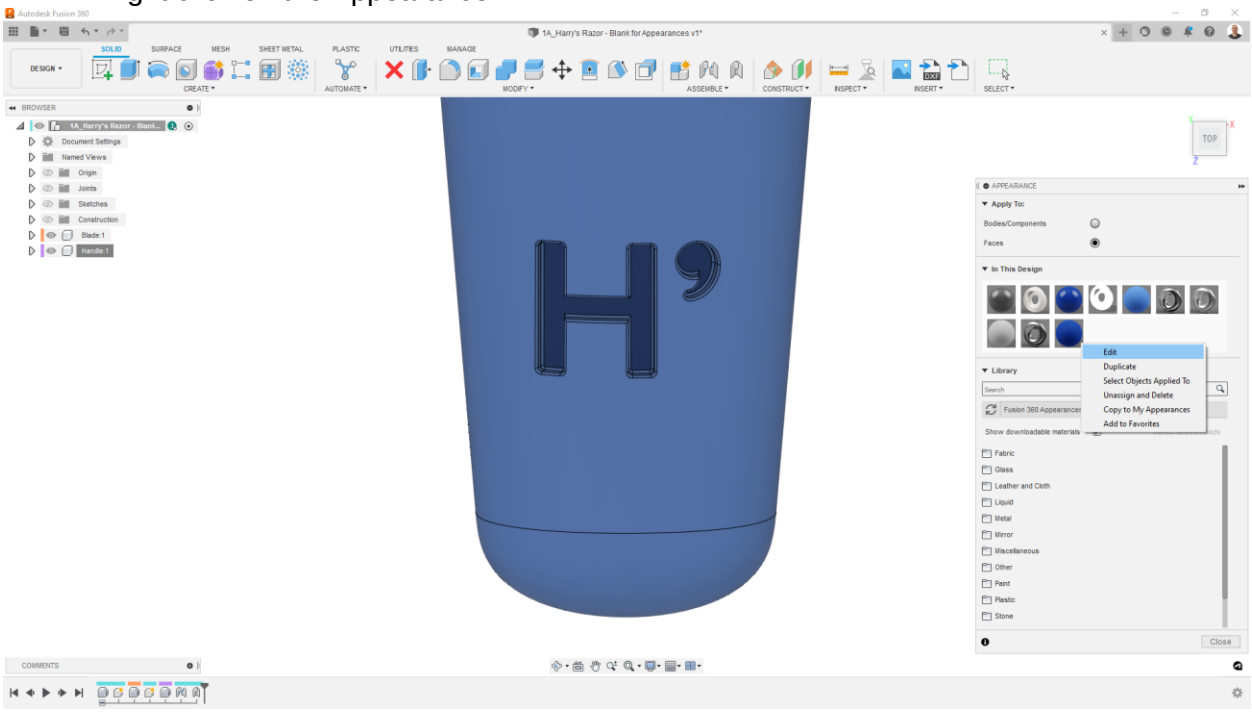


Assigning an Appearance to a Face

Then, drag an Appearance onto a Face

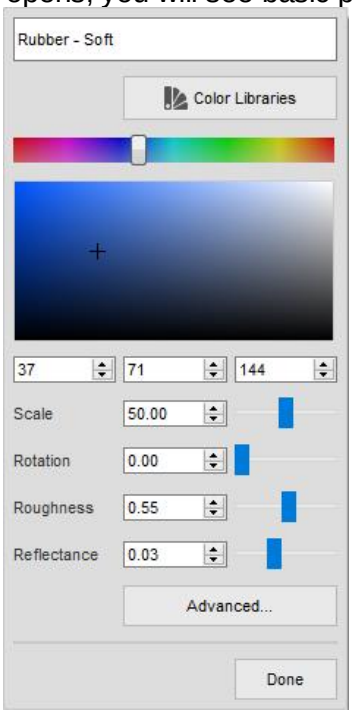
How to Edit an Appearance

Find an appearance you would like to edit, whether it is in use or not.
Right click on the Appearance and choose “Edit”



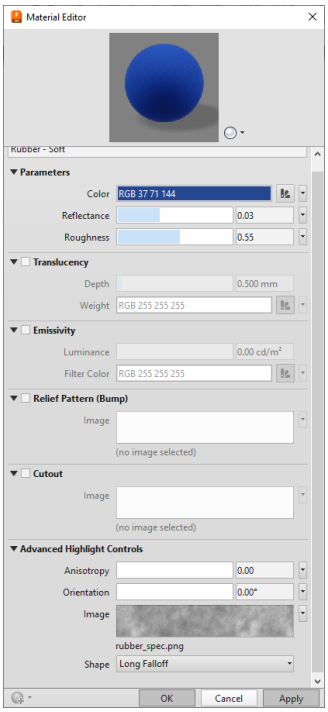
Editing an Appearance

Once the edit dialogue box opens, you will see basic properties you can modify



Basic Appearance Options

For additional properties, click “Advanced…”
Here, you will have additional advanced properties you can modify



Advanced Appearance Options

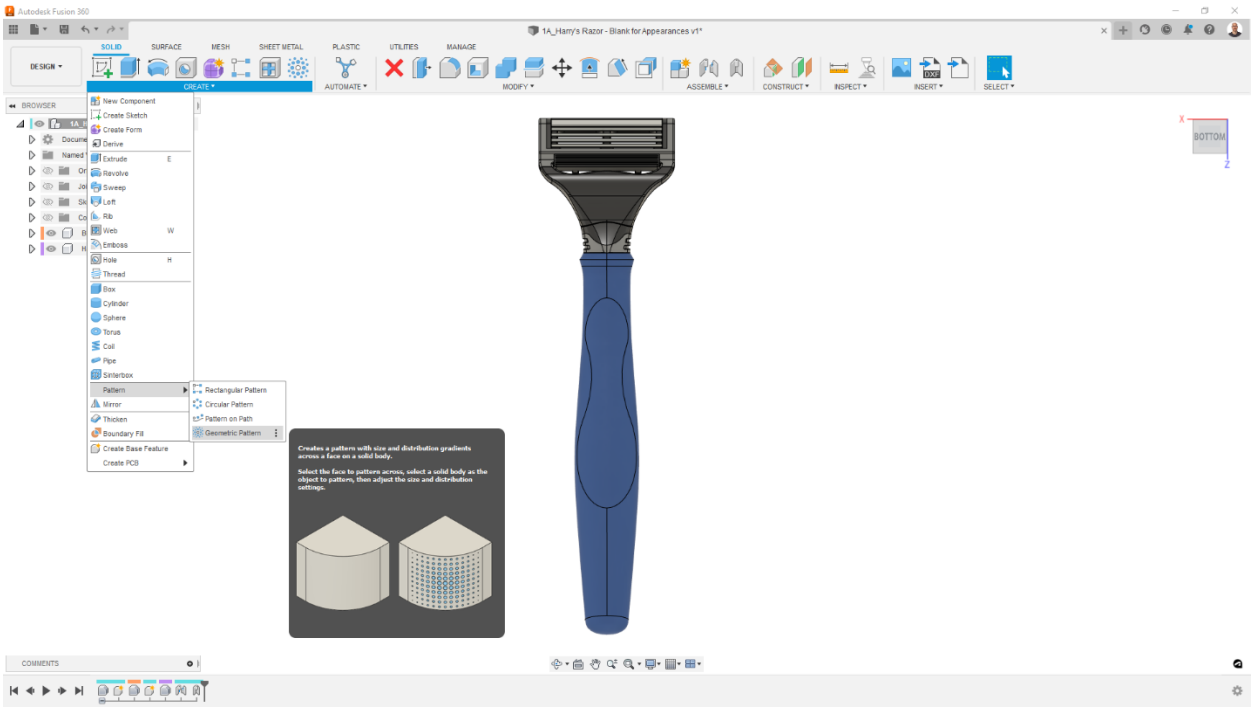
Geometric Patterns

Geometric Patterning is a great way to apply a physical pattern or texture to a Face of a design. These resulting patterns ARE manufacturable.
Note: Geometric Patterning is only available via the Product Design Extension.

How to Apply a Geometric Pattern to a Face

Step 01 – Open Geometric Pattern Tool

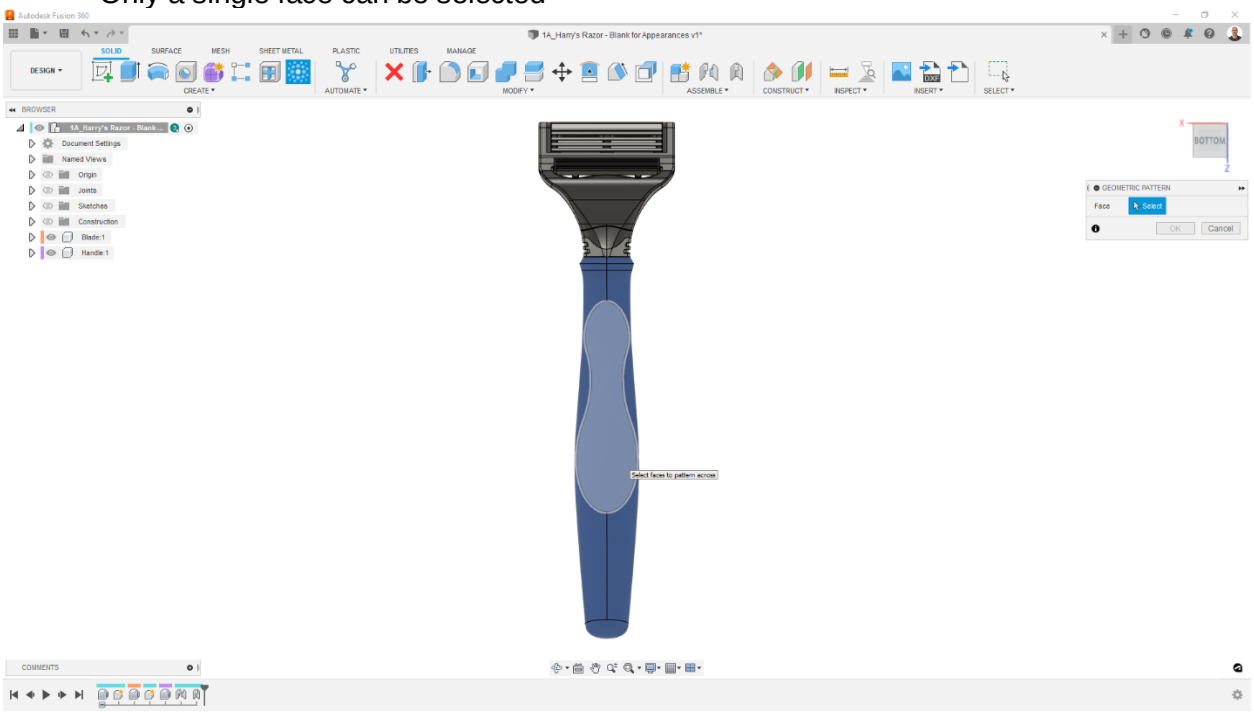
This can be done from the Create Menu



Geometric Pattern from Create Drop Down

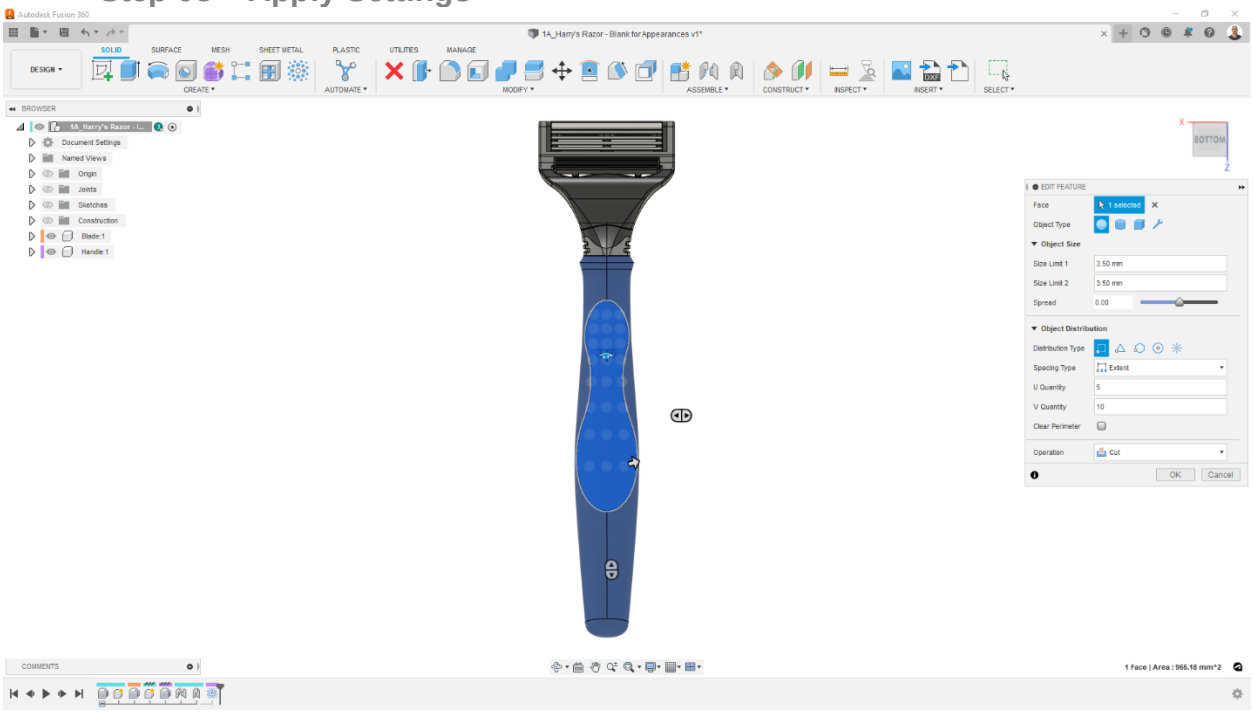
Step 02 – Choose Face to Apply Pattern

Only a single face can be selected



Choosing Face to Apply Geometric Pattern

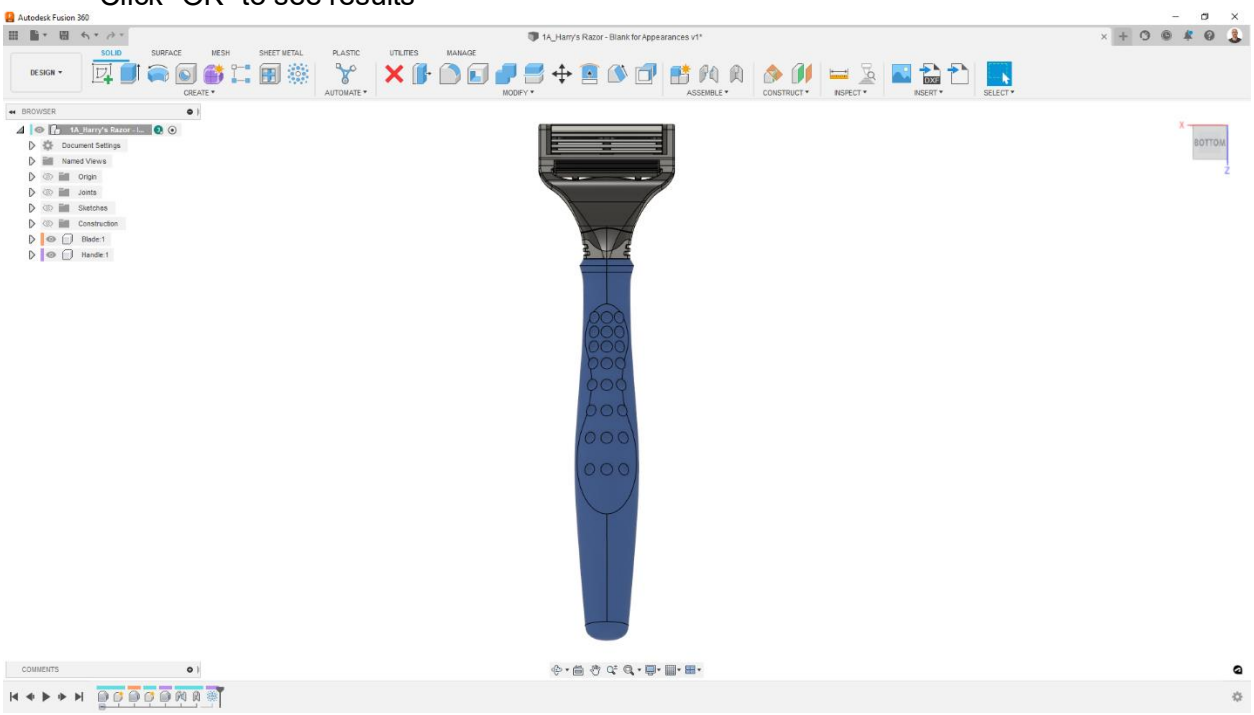
Step 03 – Apply Settings



Example Settings for Geometric Pattern

Step 04 – Review Resulting Pattern

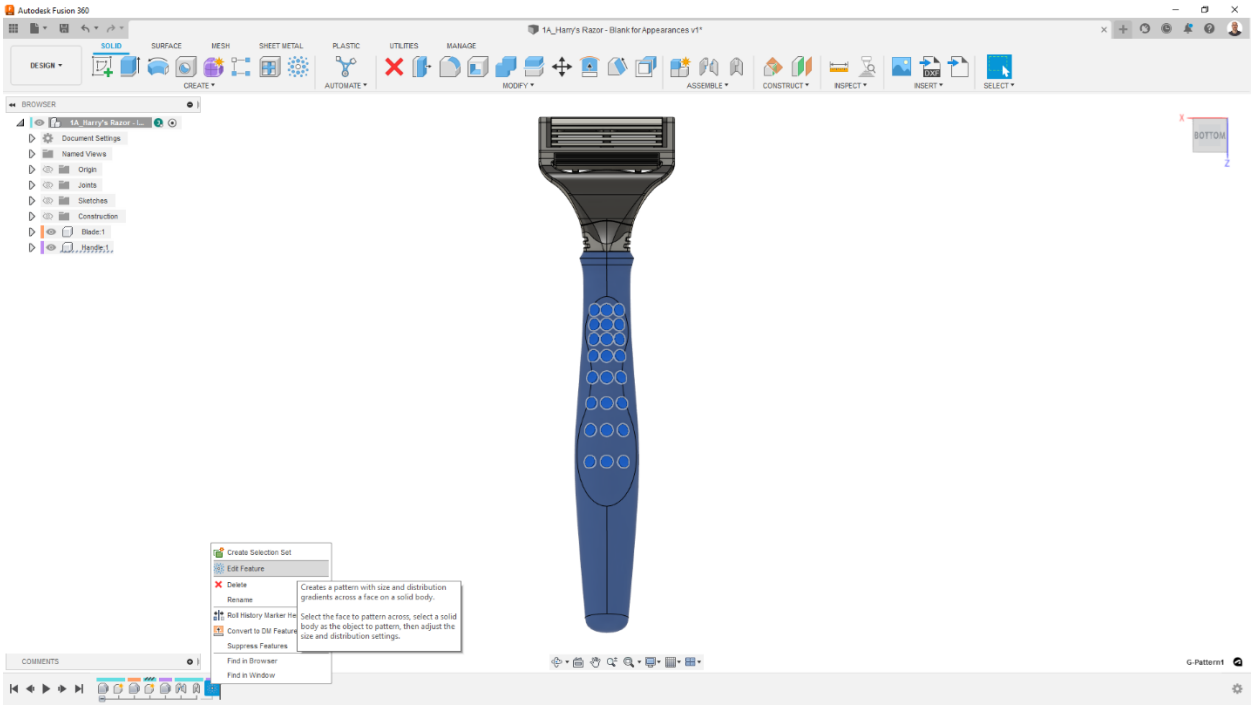
Click “OK” to see results



Resulting Geometric Pattern

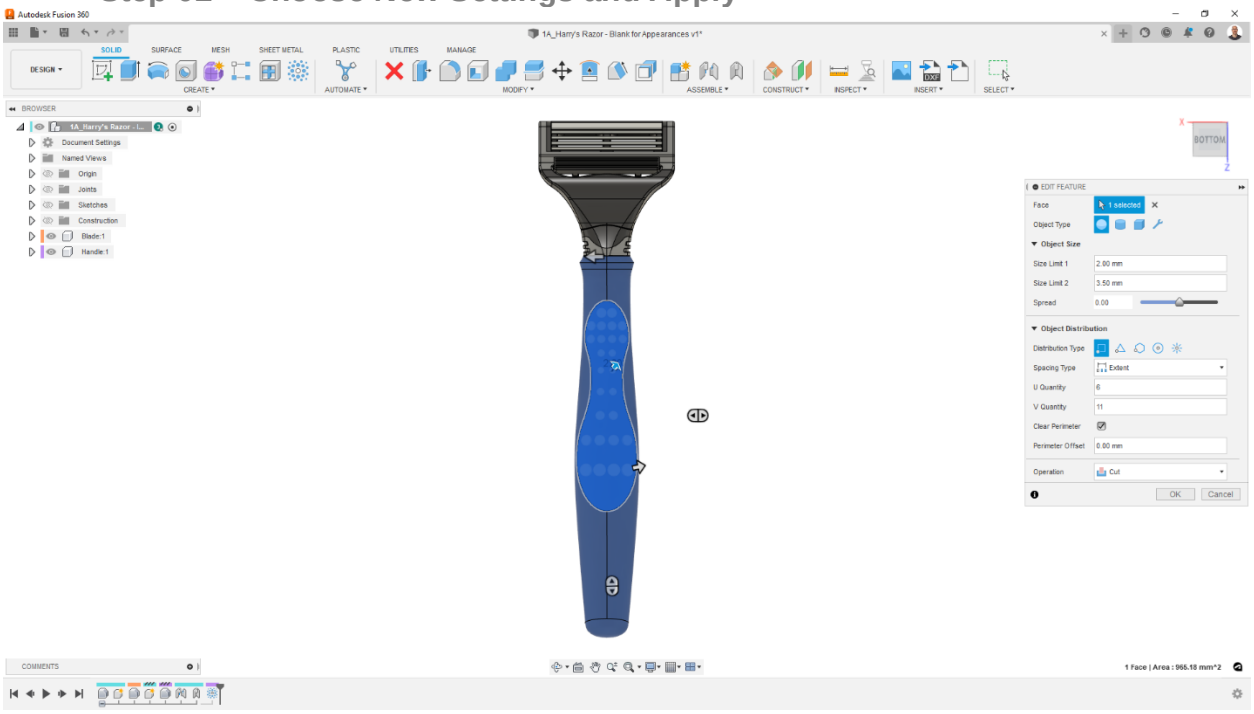
Editing a Geometric Pattern

Step 01 – Right Click on the Geometric Pattern Feature from the Timeline and Choose “Edit Feature”



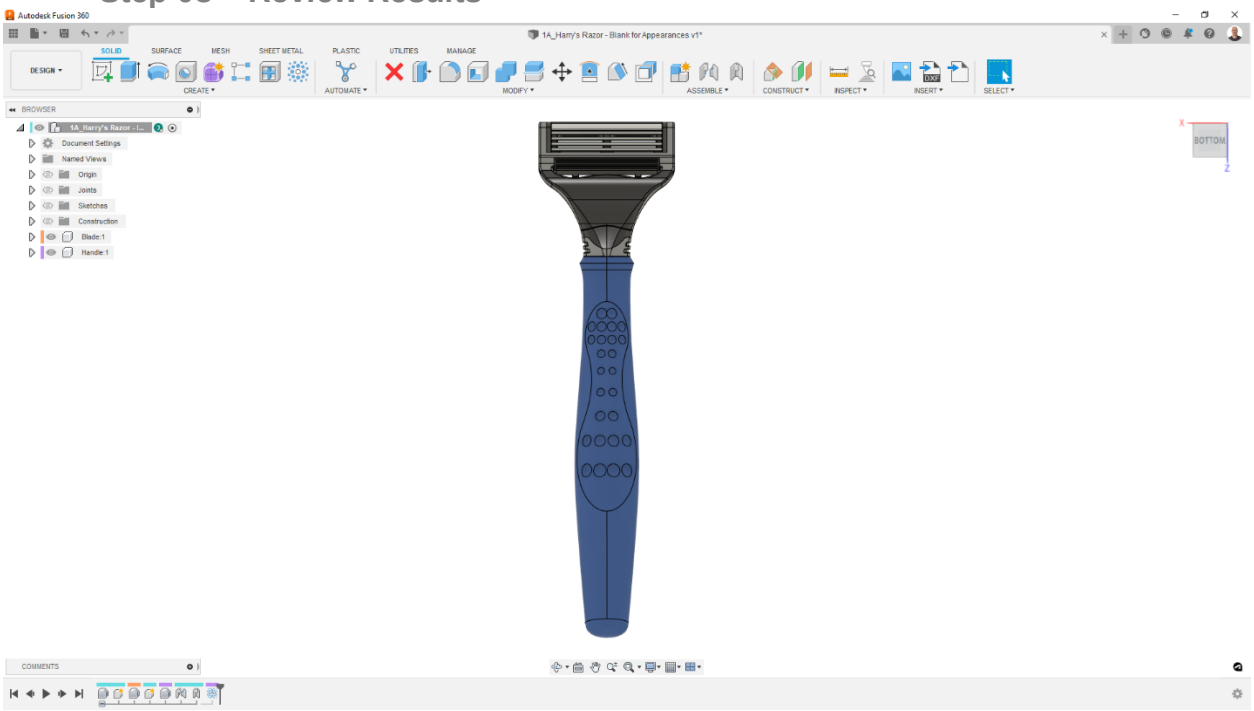
Editing a Geometric Pattern from the Timeline

Step 02 – Choose New Settings and Apply



Choosing New Geometric Pattern Settings

Step 03 – Review Results



Resulting Geometric Pattern

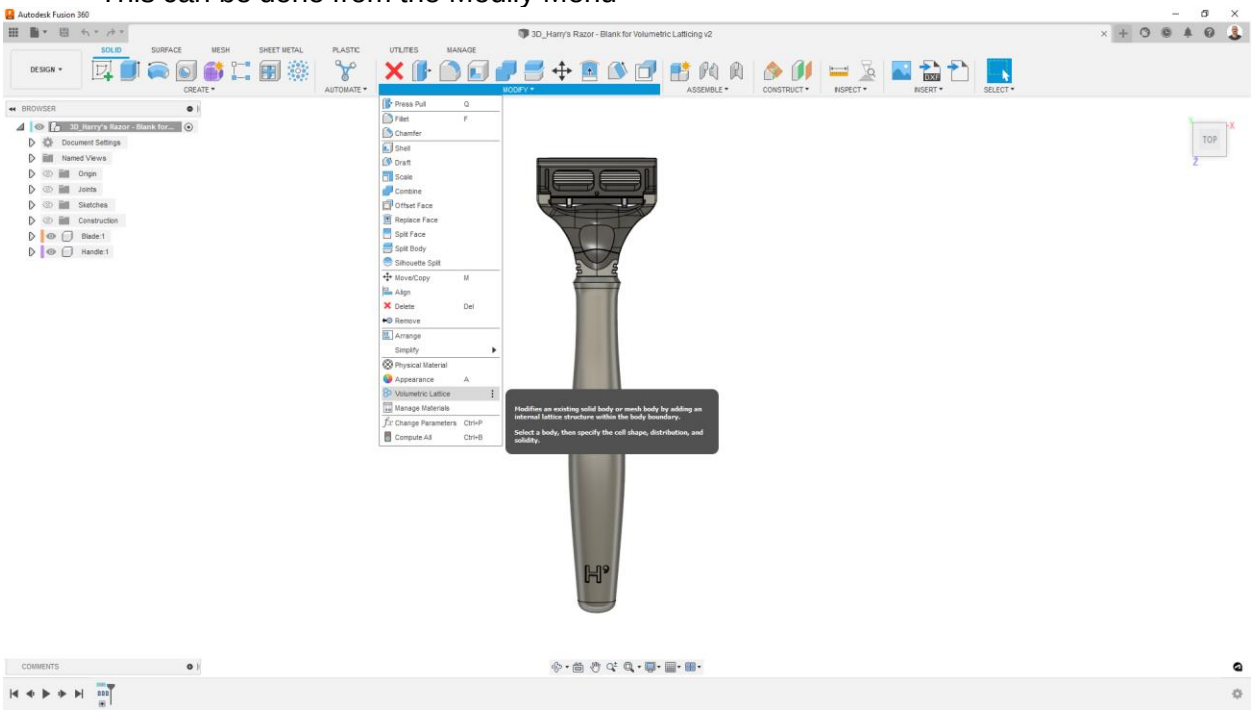
Volumetric Latticing

Volumetric Latticing is a great way to reduce the weight of your part OR to create visually distinct design geometry.
Volumetric latticing is ideal for additive manufacturing.
Note: Volumetric Latticing is only available via the Product Design Extension.

How to Apply a Volumetric Lattice to a Body

Step 01 – Open Volumetric Lattice Tool

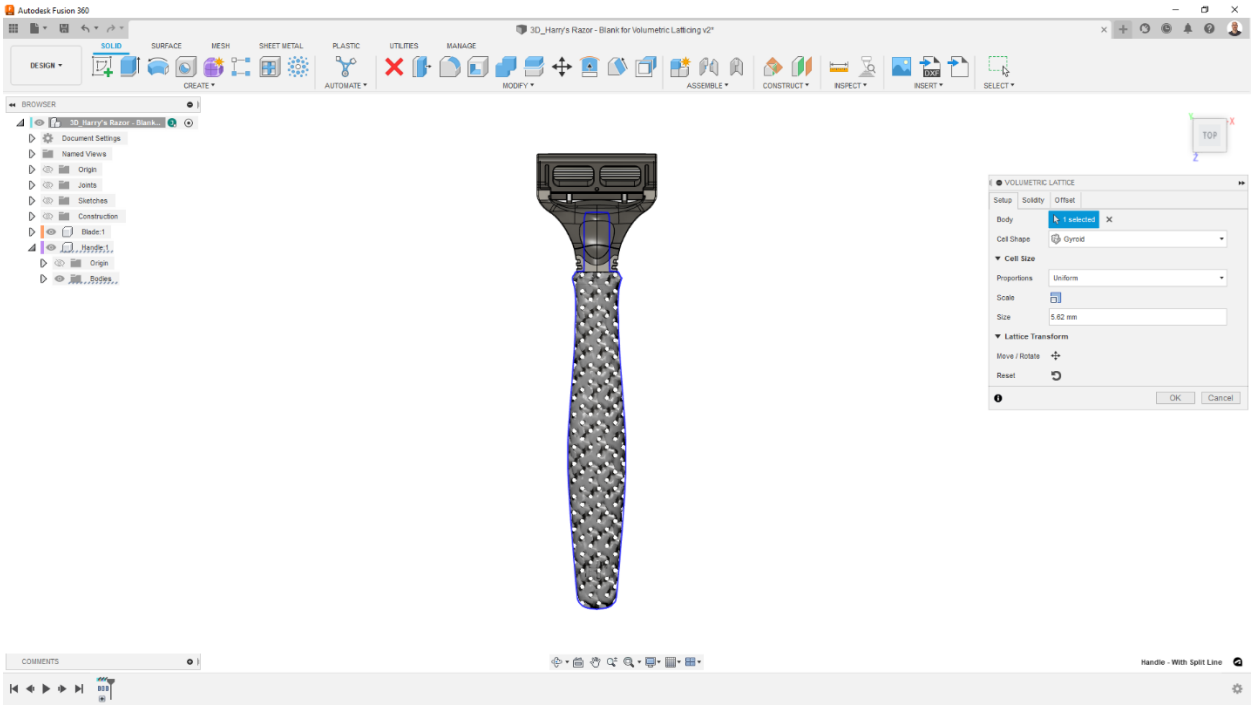
This can be done from the Modify Menu



Volumetric Latticing from Modify Drop Down

Step 02 – Choose Body to Apply Volumetric Lattice

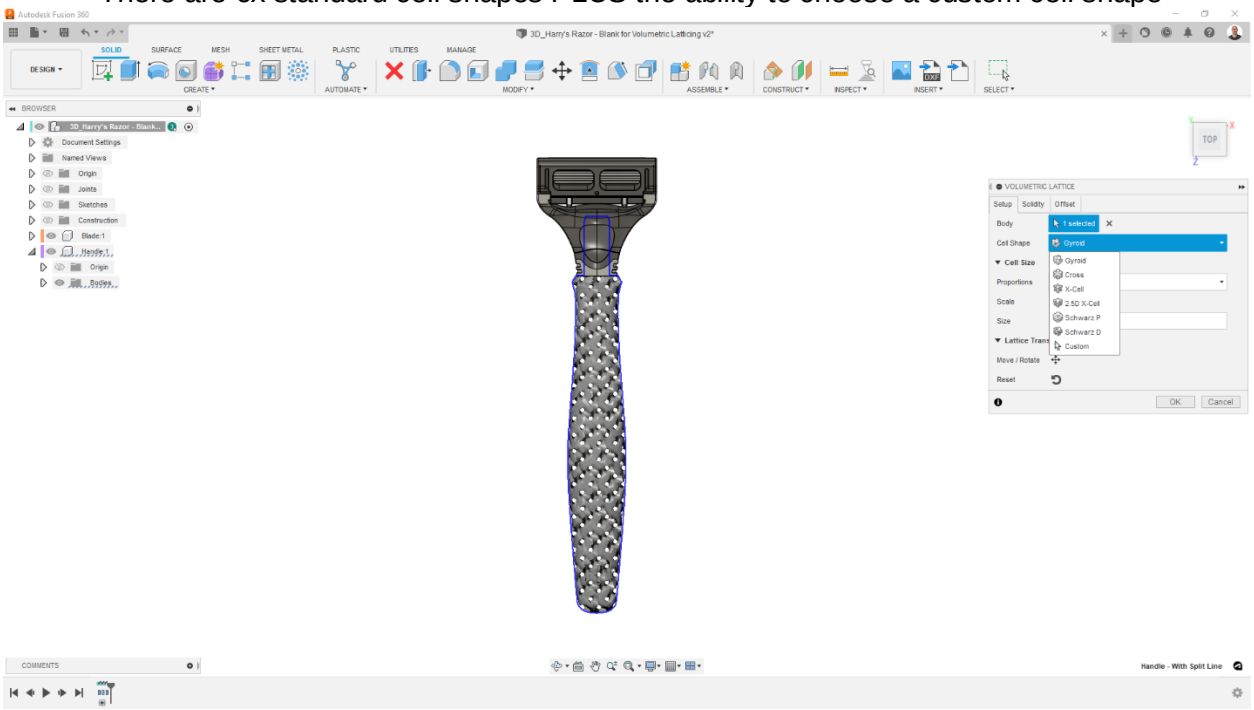
Only a single body can be selected



Choosing Body to Apply Volumetric Lattice

Step 03 – Choose Volumetric Lattice Cell Shape

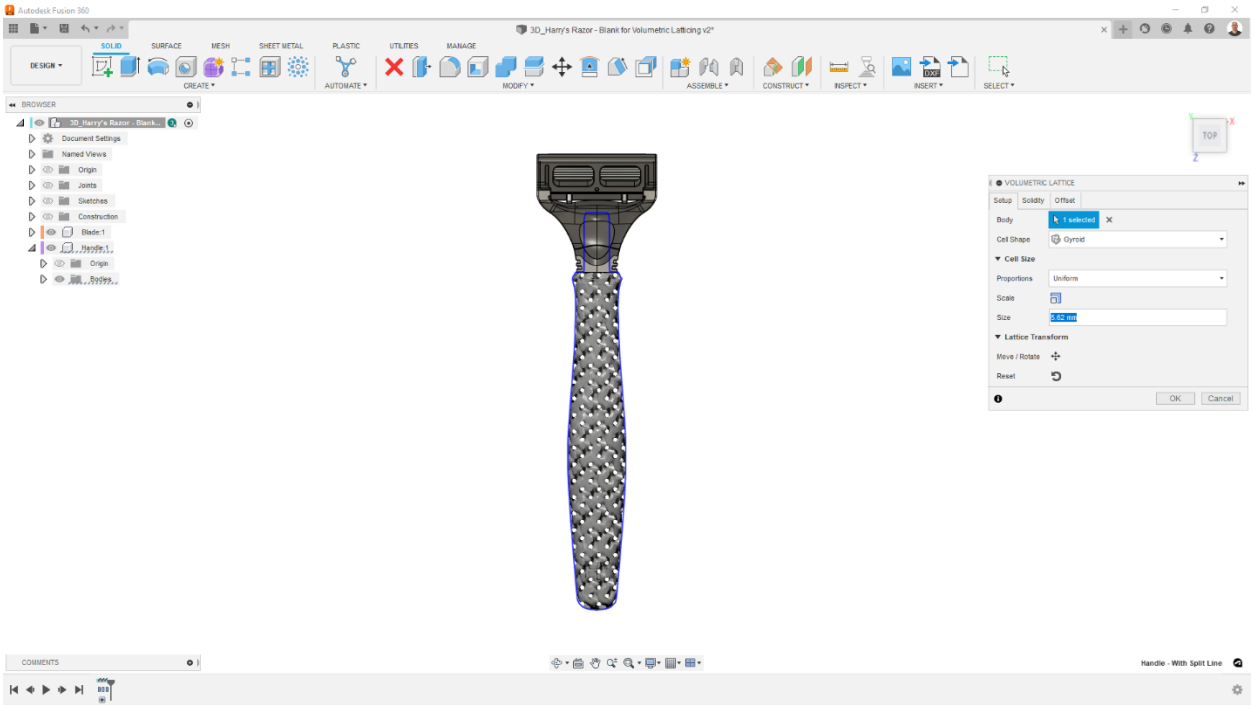
There are 6x standard cell shapes PLUS the ability to choose a custom cell shape



Choosing Cell Shape to Use for Volumetric Lattice

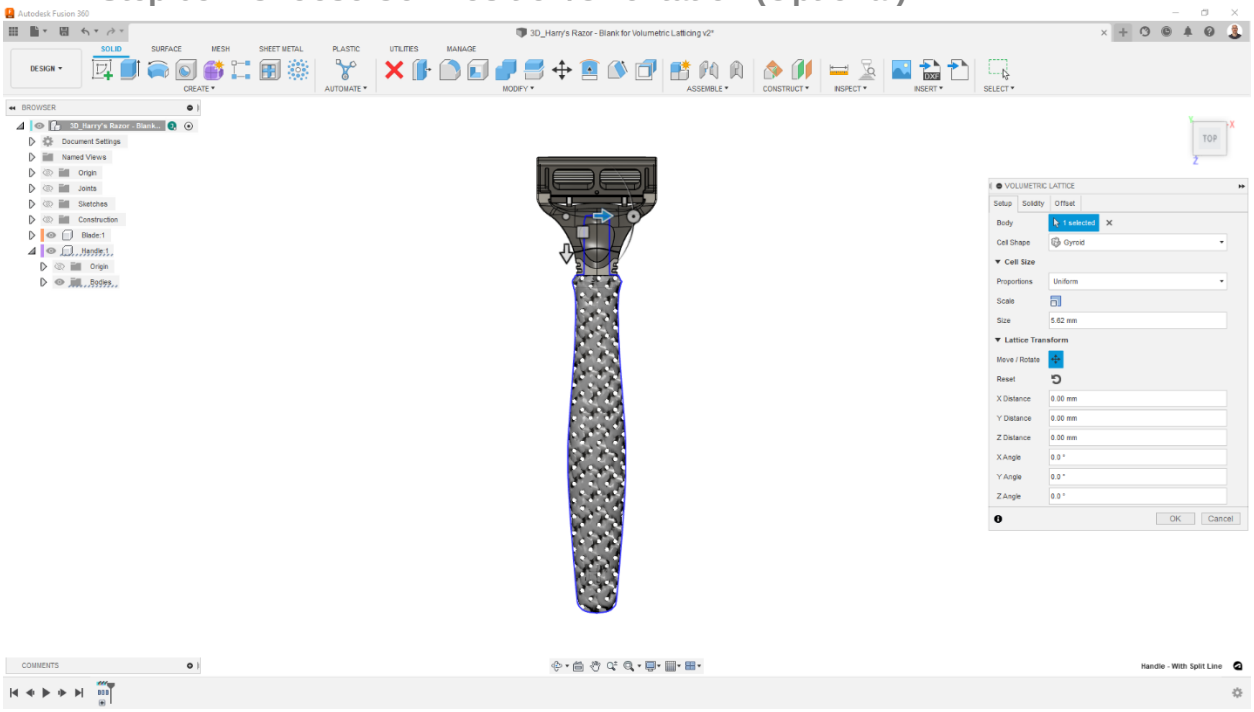
Step 04 – Choose Cell Size

You can enter a cell size OR use the arrow/handle to manipulate the size on screen



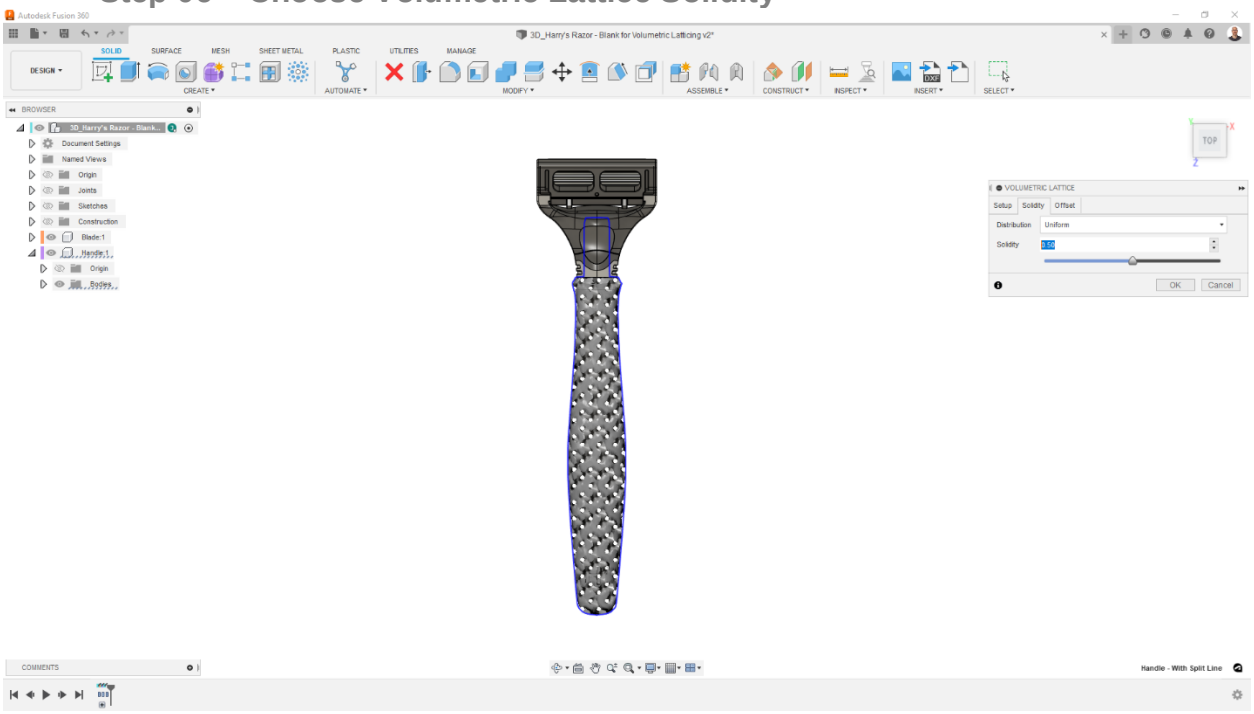
Choosing Cell Size for Volumetric Lattice

Step 05 – Choose Cell Position/Orientation (Optional)



Choosing Cell Position/Orientation for Volumetric Lattice

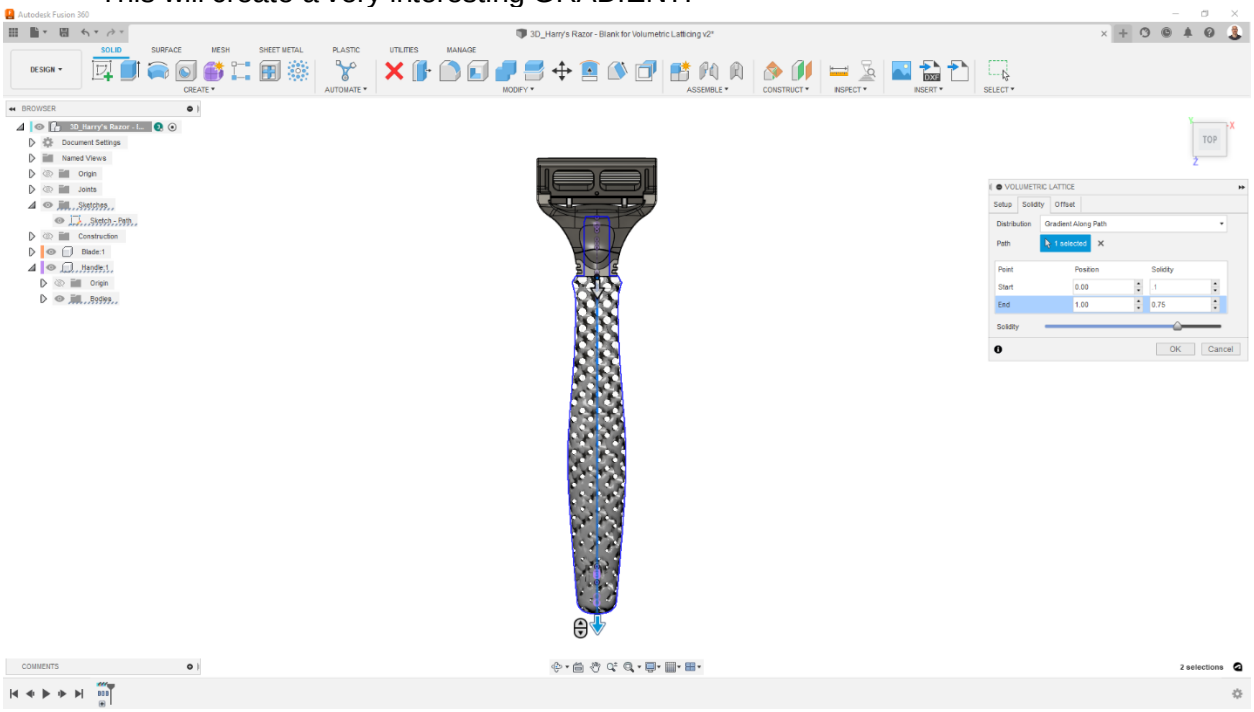
Step 06 – Choose Volumetric Lattice Solidity



Choosing Volumetric Lattice Solidity

Alternatively, you can choose a Gradient Along a Path.
In this case, choose a sketch to be your path.

Choose a solidity for the start of your path and a solidity at the end of your path. This will create a very interesting GRADIENT!



Choosing Gradient Along a Path Solidity Option

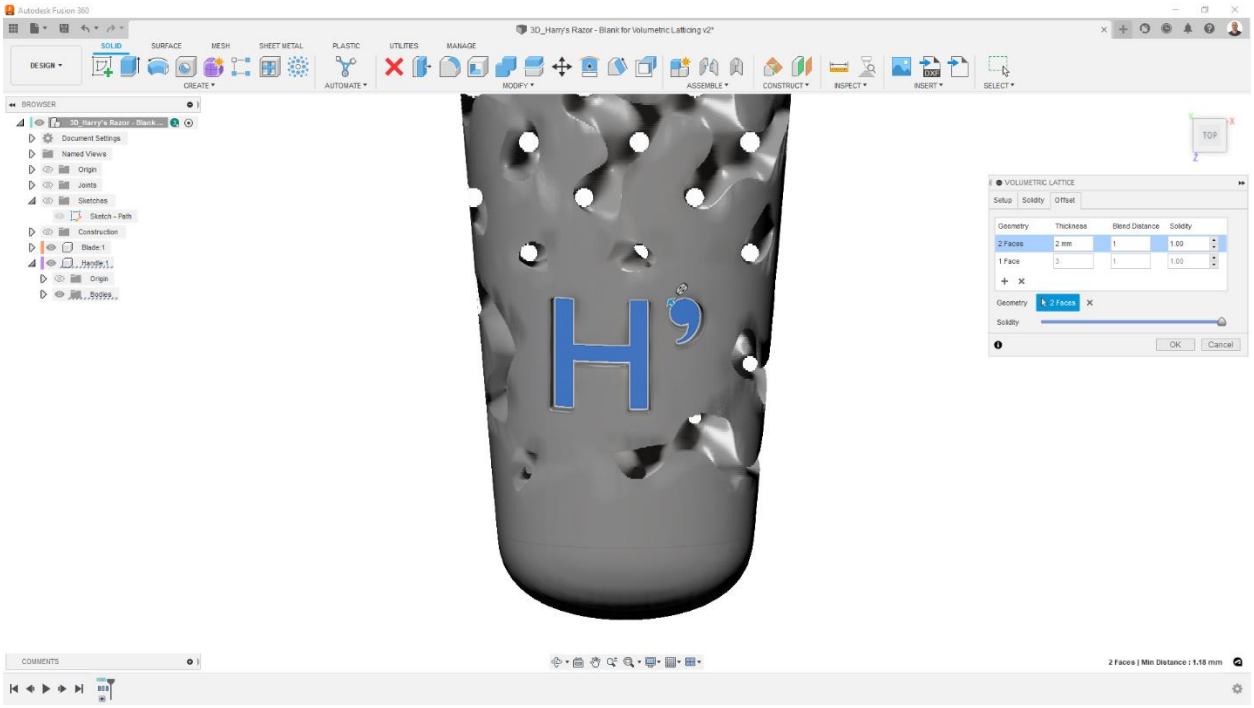
Step 07 – Use Offset to Create Solid Geometry in Key Areas

If you have an area that must be solid, use Offset to solidify that area.

You can have multiple offsets with their own unique settings.

In this example, I wanted the Harry's logo to be solid. I don't want any of the logo missing due to the volumetric lattice I apply to the rest of the handle. So, I use offset to make sure the logo is always there and is solid.

I do the same for the tip of the handle.



Volumetric Lattice Offset Surfaces

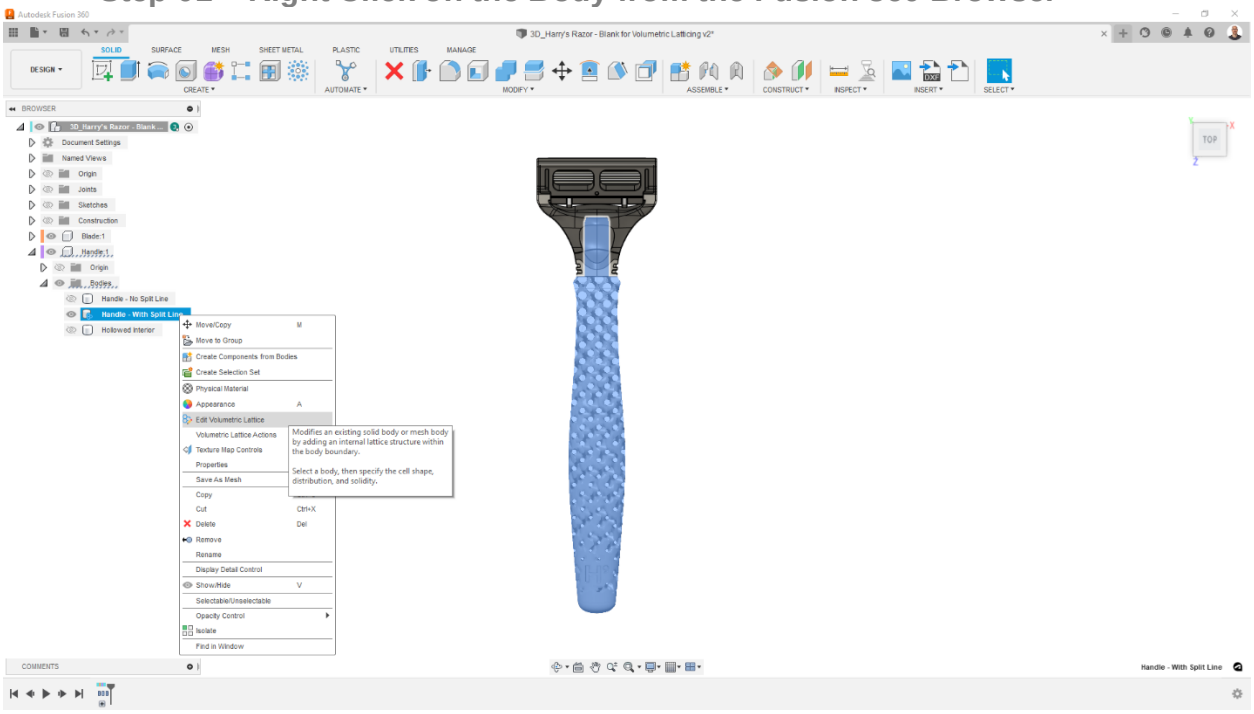
Step 08 – Confirm Choices and Exit Volumetric Lattice Menu

At this point, you will have a solid body with a volumetric lattice applied to it.
You CANNOT manufacture the body without converting it to a mesh first!

How to Edit a Volumetric Lattice

The Volumetric Lattice feature will not show up in the timeline like most features would. Technically, it is an APPEARANCE of a lattice until you convert the lattice into a mesh.
So, you will find the Volumetric Lattice options as a RIGHT CLICK from the Body in the Fusion 360 Browser

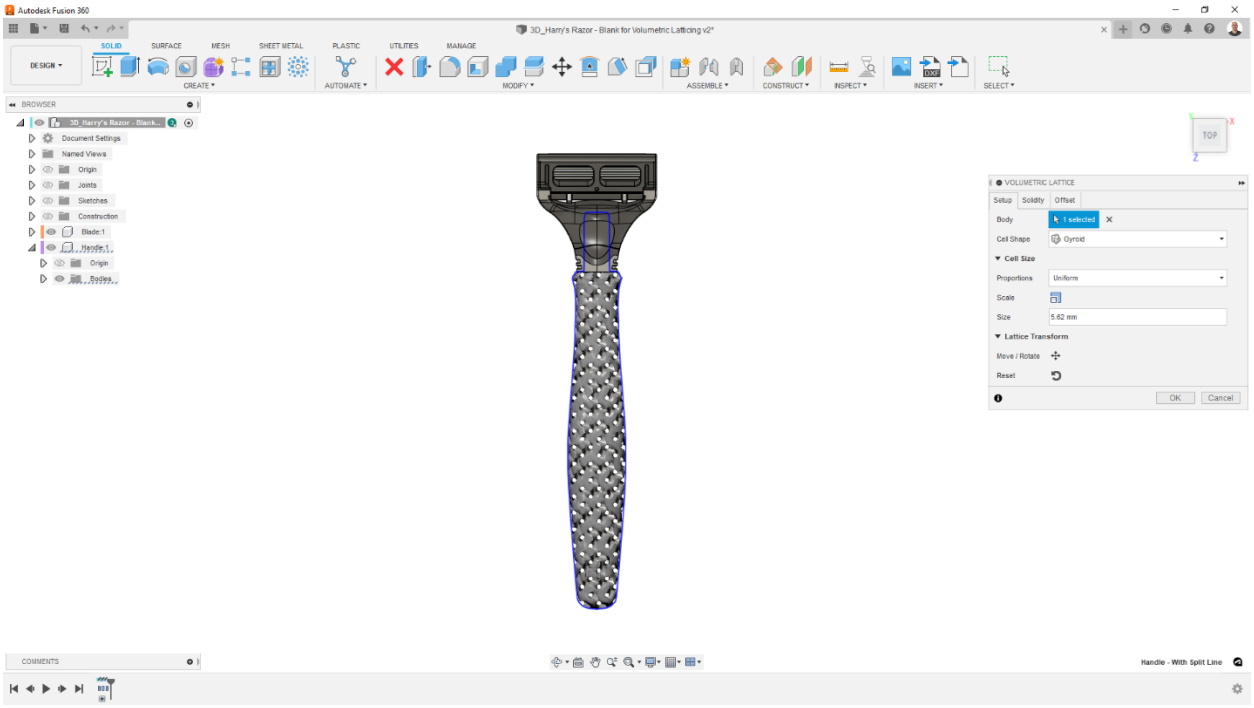
Step 01 – Right Click on the Body from the Fusion 360 Browser



Right Clicking on a Body with a Volumetric Lattice Applied to it

Step 02 – Choose Edit Volumetric Lattice

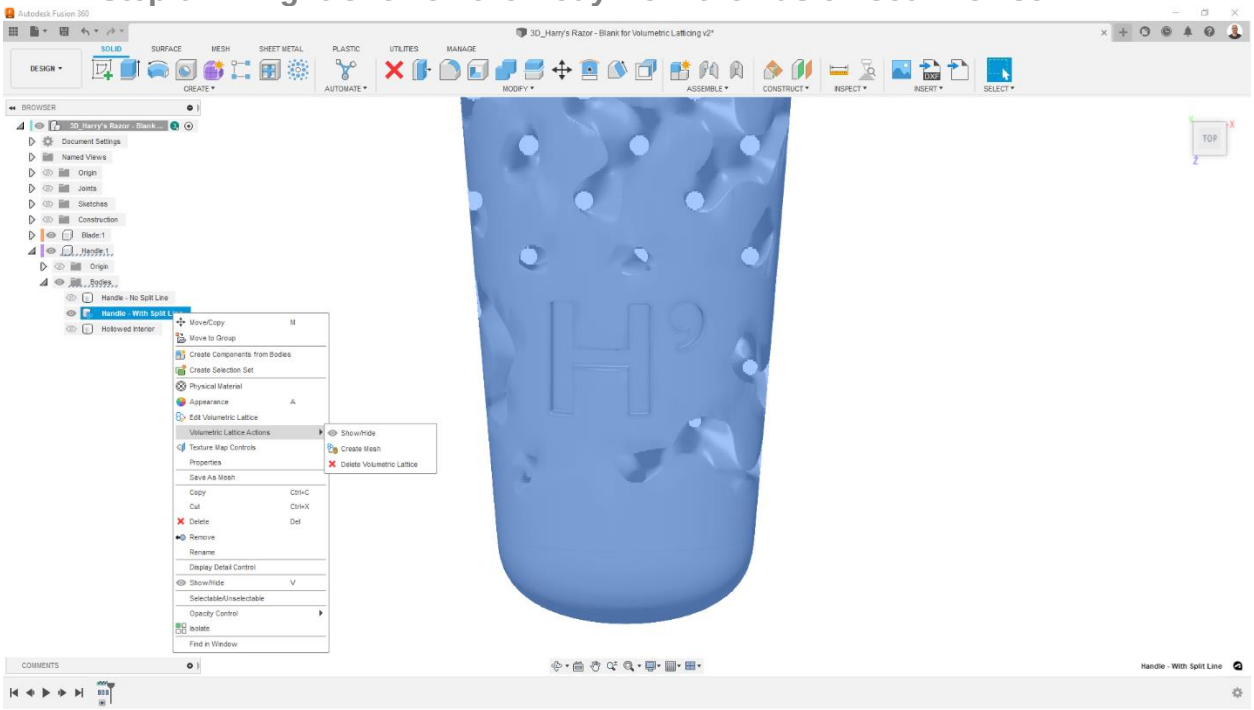
You will find your self back where you when you were choosing options to create the volumetric lattice in the first place



Volumetric Lattice Menu

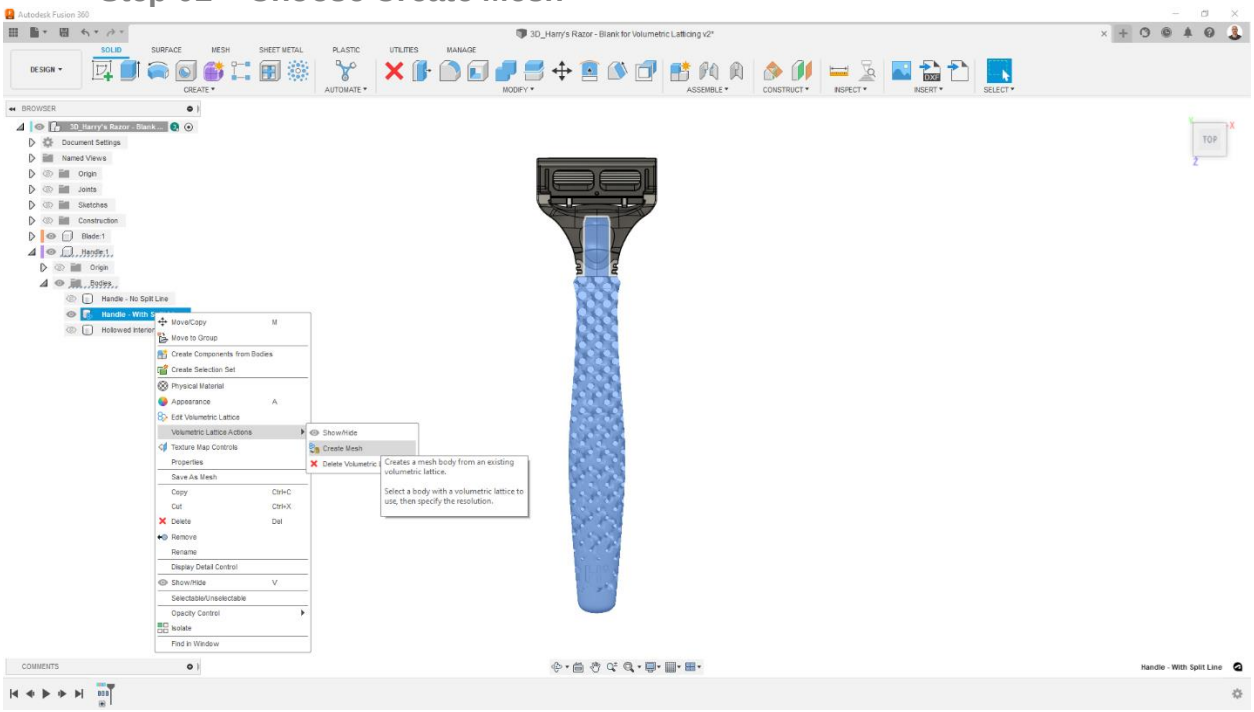
How to Convert a Volumetric Lattice to a Mesh for Manufacturing

Step 01 – Right Click on the Body from the Fusion 360 Browser



Right Clicking on a Body with a Volumetric Lattice Applied to it

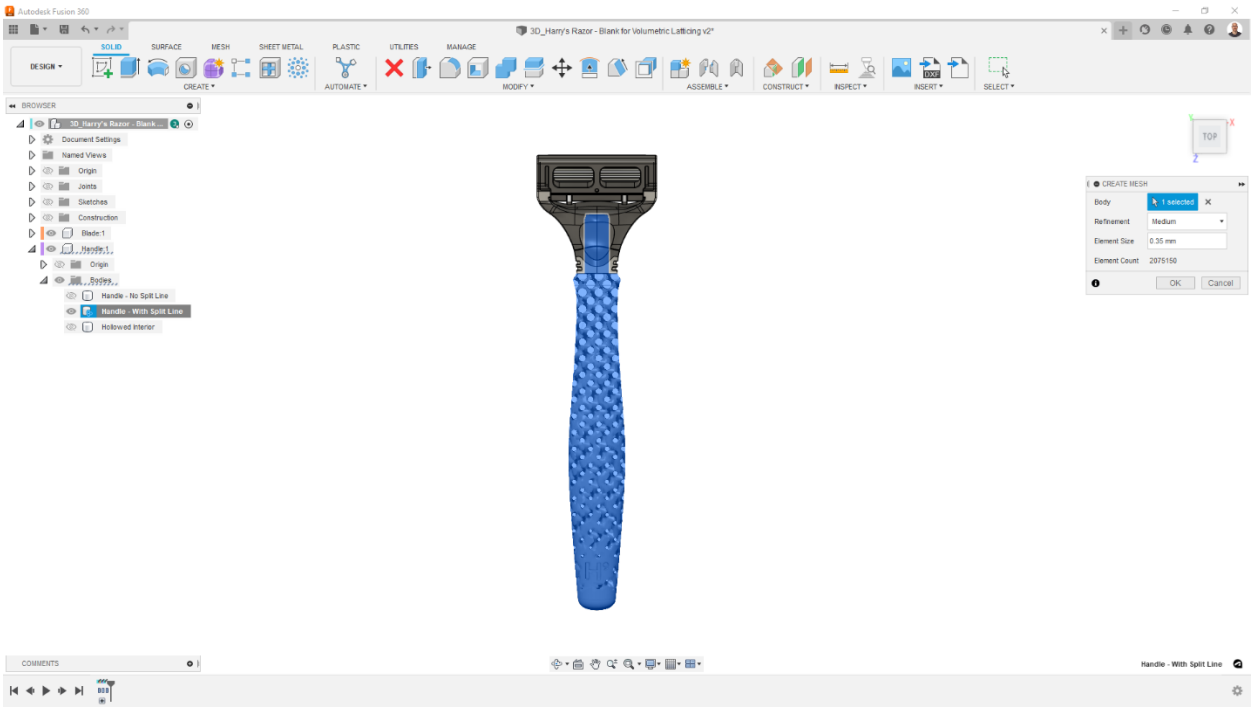
Step 02 – Choose Create Mesh



Choosing Create Mesh from Volumetric Lattice Right Click Menu

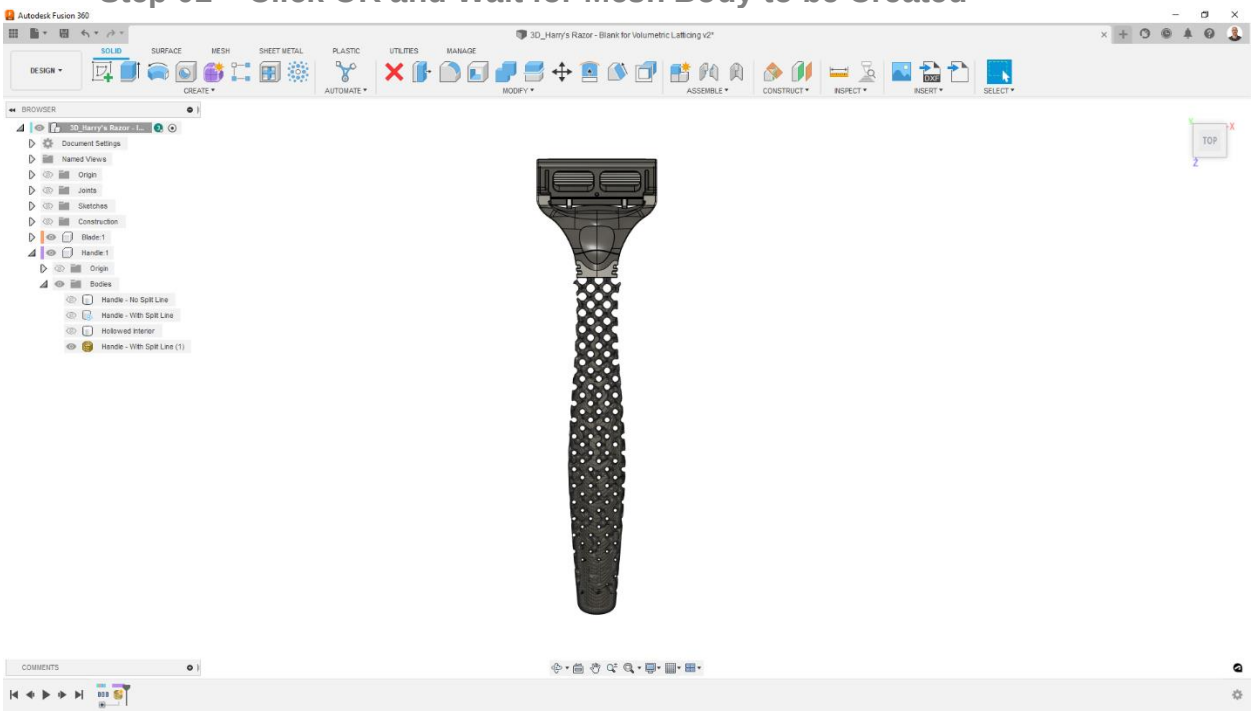
Step 02 – Choose Mesh Settings

Note: I don't typically change these settings



Choosing Create Mesh from Volumetric Lattice Right Click Menu

Step 02 – Click OK and Wait for Mesh Body to be Created



Mesh Body Created from Volumetric Lattice

Note: Once your volumetric lattice is a mesh body, you can continue to edit it using the Mesh features in Fusion 360.
I often will use the COMBINE tool to combine this mesh body with other mesh bodies.

Note: the conversion of a volumetric lattice to a mesh body is NOT parametric. Once this is done, editing the volumetric lattice will NOT update the mesh body. You will have to convert the lattice into a mesh again.