# ATTACHING NCLOTH TO A CHARACTER RIG TUTORIAL

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OVERVIEW

- This tutorial will go through the process of making character clothing dynamic, and attaching it to the character rig.

- For this tutorial, you will need a character that has already been rigged.

  - The character may be a full body model with the clothing as a separate geometry,

  - Or, a character model that has the clothing built into the geometry.

EX: FULL BODY MODEL WITH CLOTHING SEPARATE
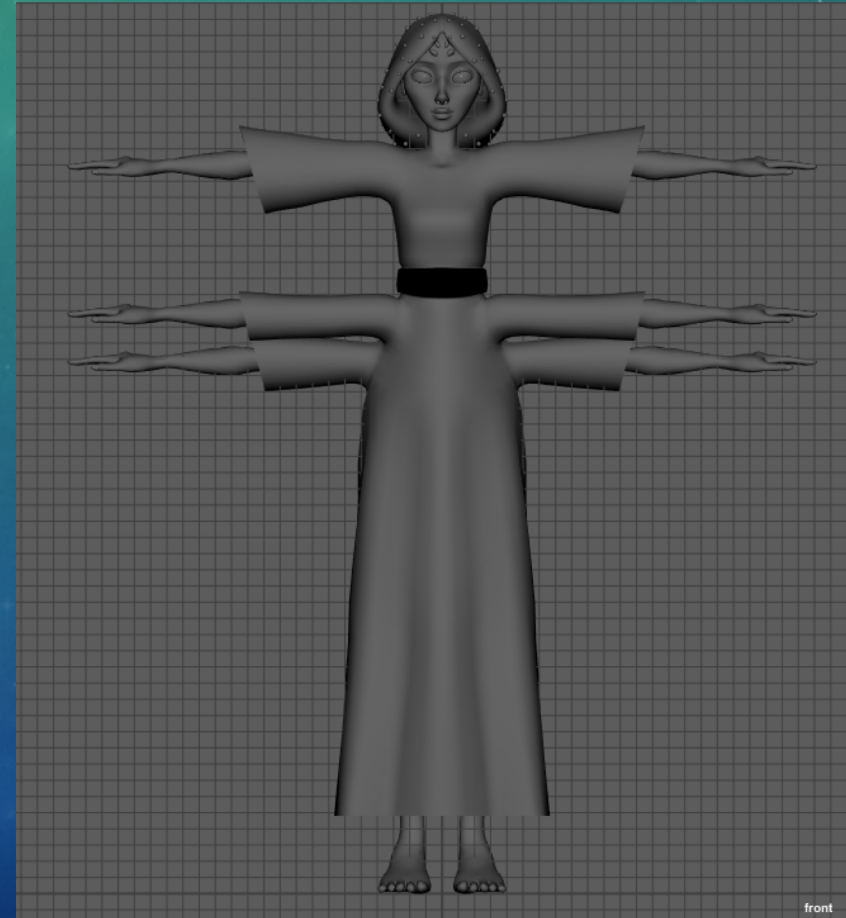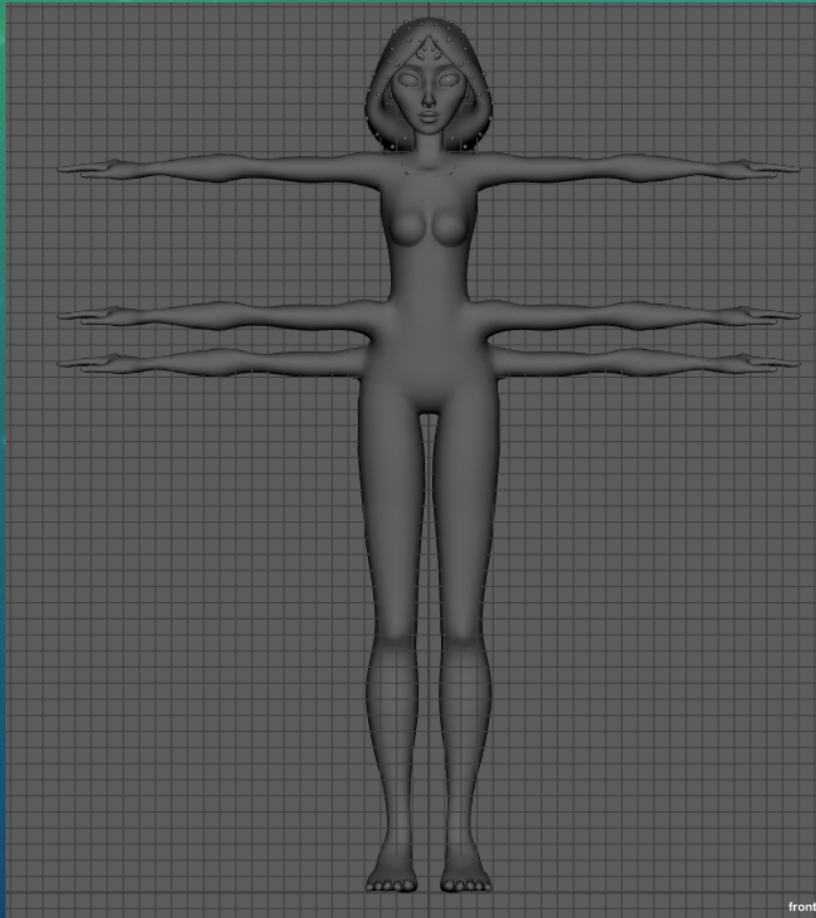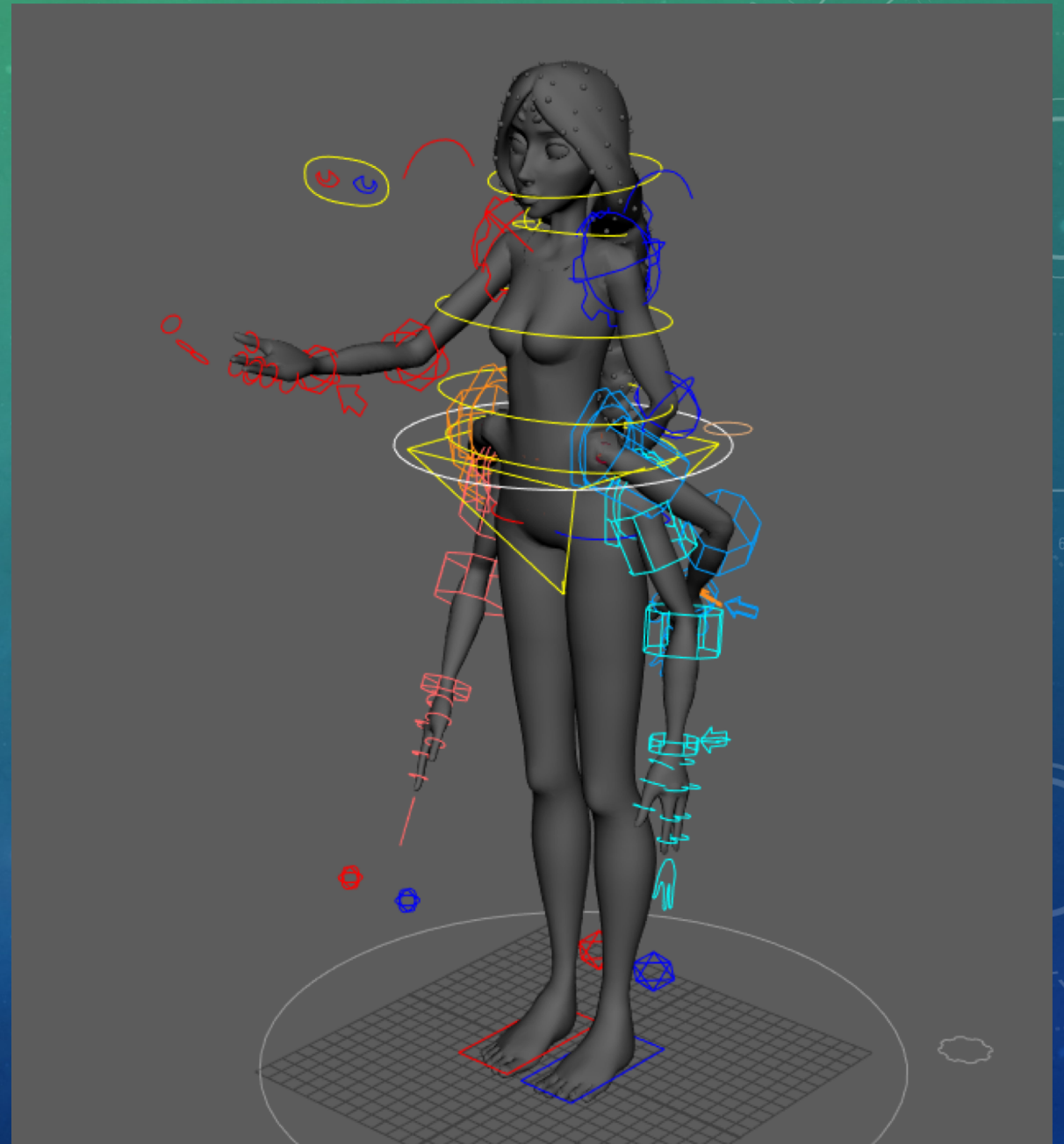
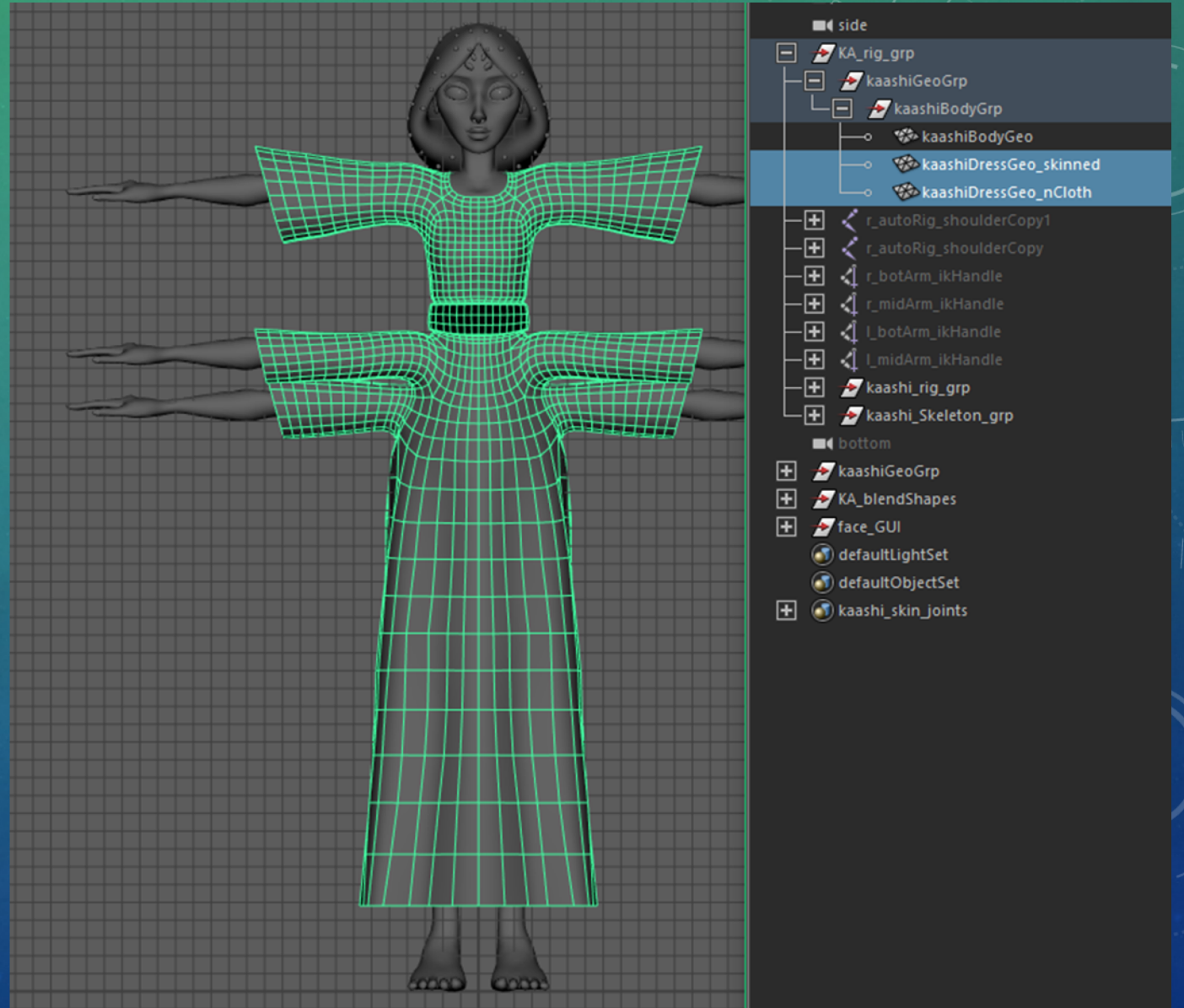# EX: CLOTHING BUILT INTO THE MODEL
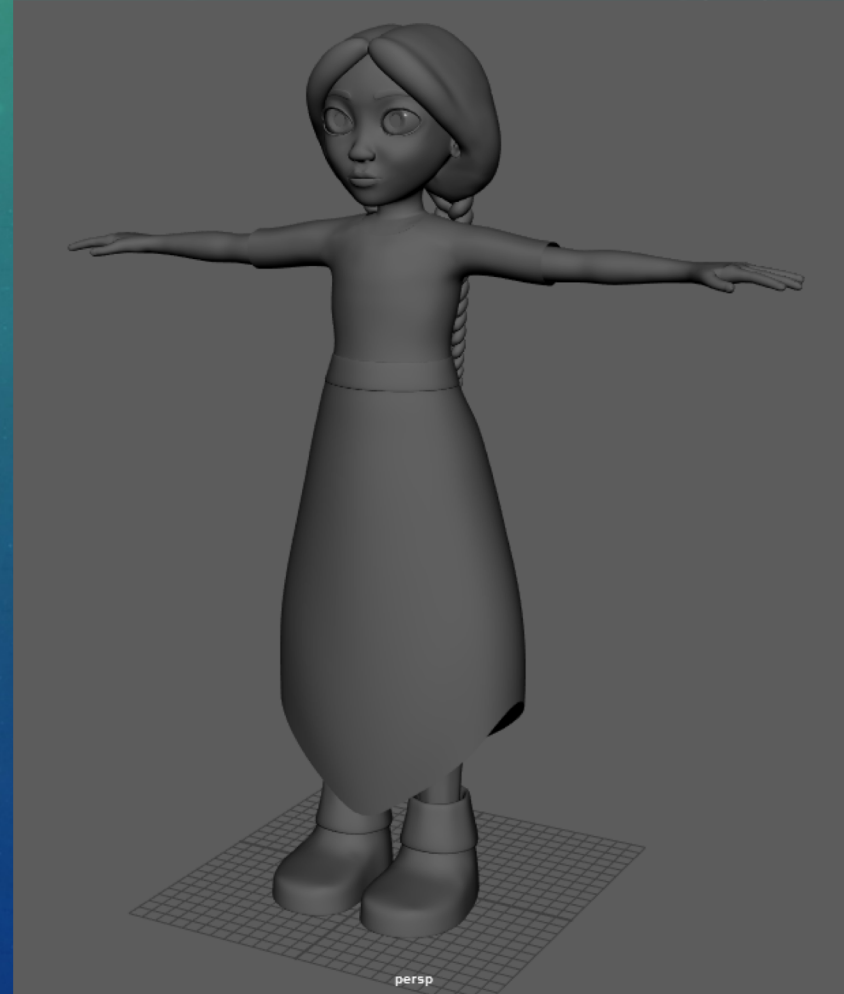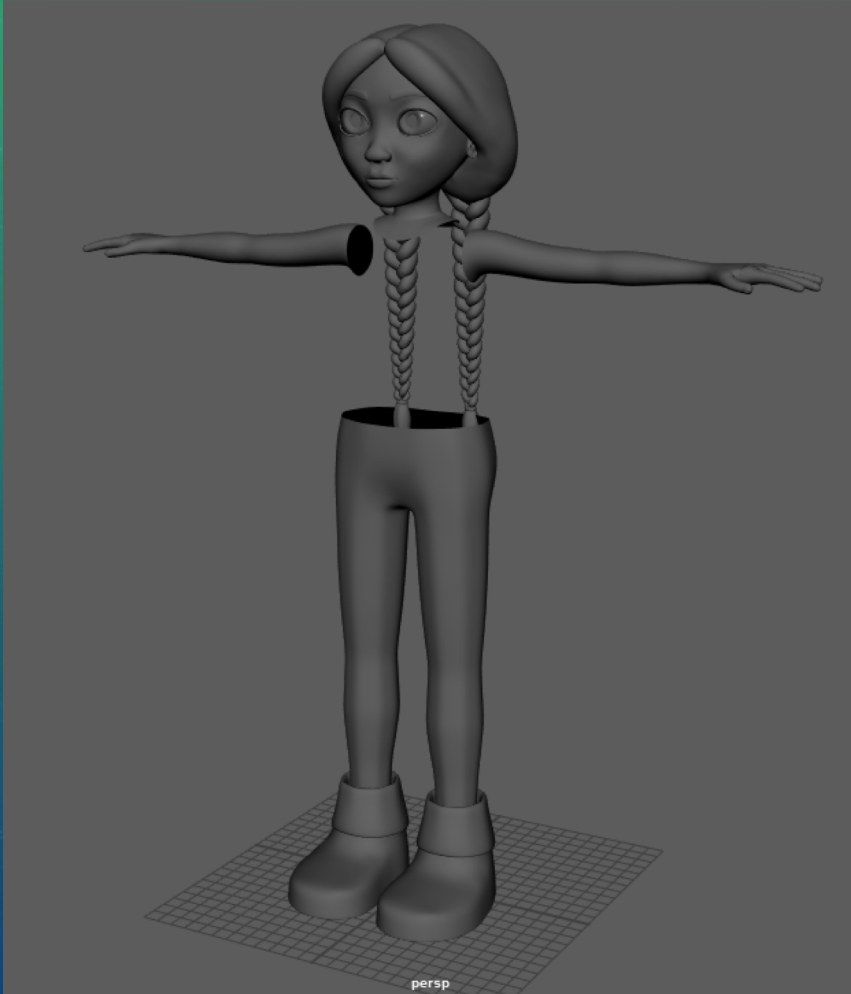
GETTING STARTED

- Open Maya

- Set your project

- Open your project scene

- At this point, your character should already be rigged and skinned.

WHAT YOU WILL NEED

- You will need two copies of the clothing

- Select the clothing geometry

- Duplicate it

- Name the first "clothing_skinned"

- And the duplicate "clothing_nCloth"

CREATING THE CLOTHING_SKINNED
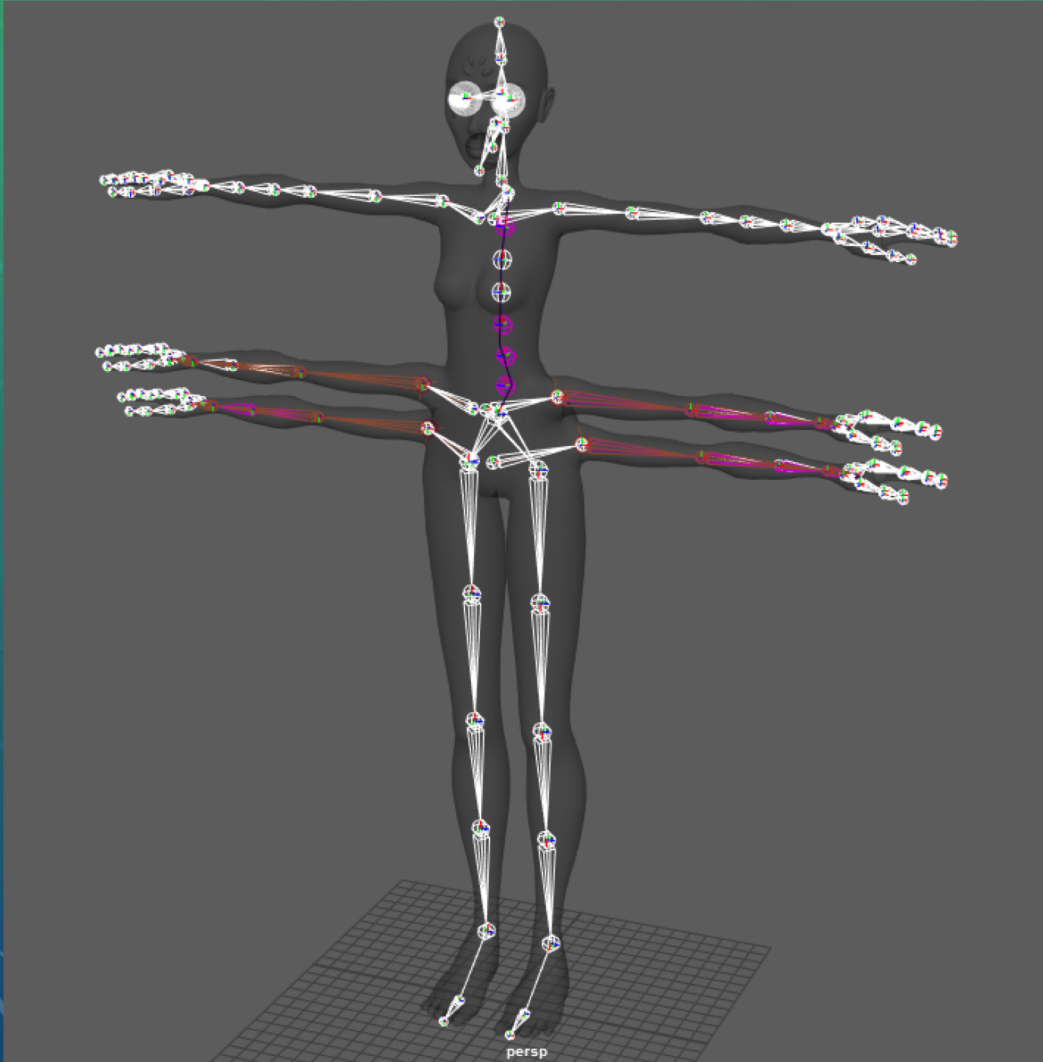
- We'll be creating the clothing_skinned first so hide the clothing_nCloth for now by selecting it and hitting ctrl + h on the keyboard.

- Skin the clothing_skinned using the same skin joints that you used when skinning the body.

  - Select the skin joints

  - Select the clothing_skinned

  - Go to Skin > Bind Skin > Options

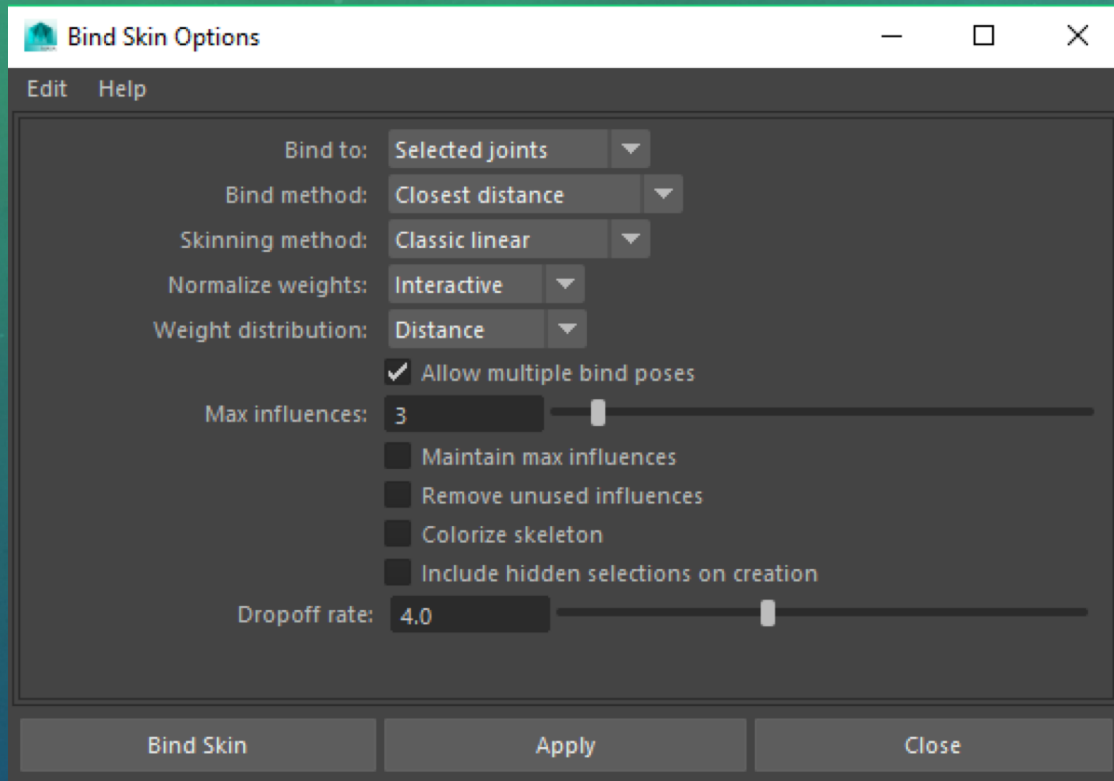# BIND SKIN OPTIONS
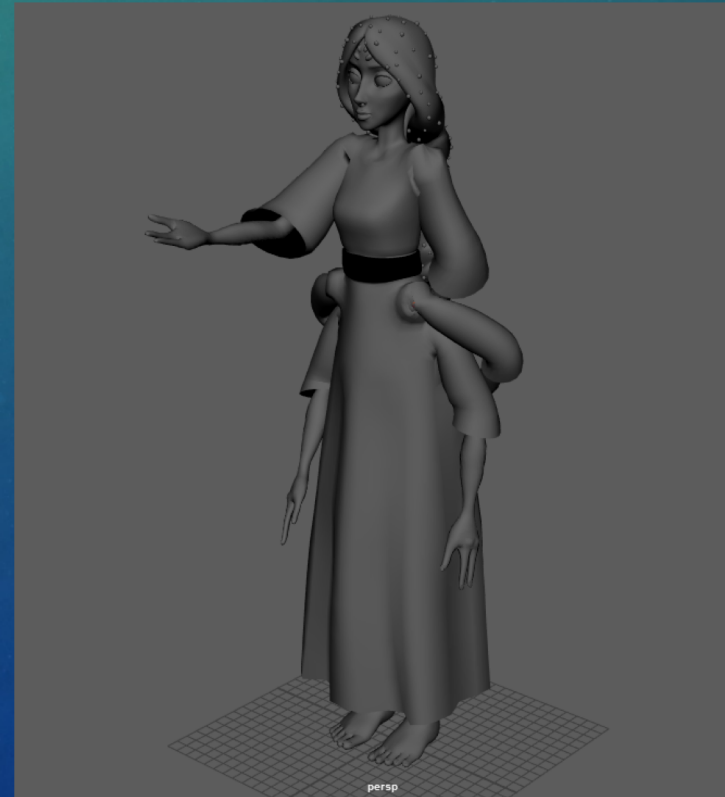

These are the settings that I used:

- Bind to: Selected Joints

- Bind method: Closest distance

- Skinning method: Classic linear

- Normalized weights: Interactive

- Weight distribution: Distance

- Allow multiple bind poses

- Max influences: 3

- Dropoff rate: 4.0

NOW, THE CLOTHING_SKINNED SHOULD MOVE WITH THE BODY

Body pose

Body with clothing

PAINTING SKIN WEIGHTS

- At this point, if you haven't already, you should paint skin weights on the body, as well as on the clothing_skinned in order to fix any problem areas.

- You could paint skin weights for the body, and the copy them onto the clothing:

  - After painting skin weights on the body,

  - Select the body (that has the skin cluster)

    - Shift + select the clothing_skinned

  - Go to Skin > Copy Skin Weights > Options
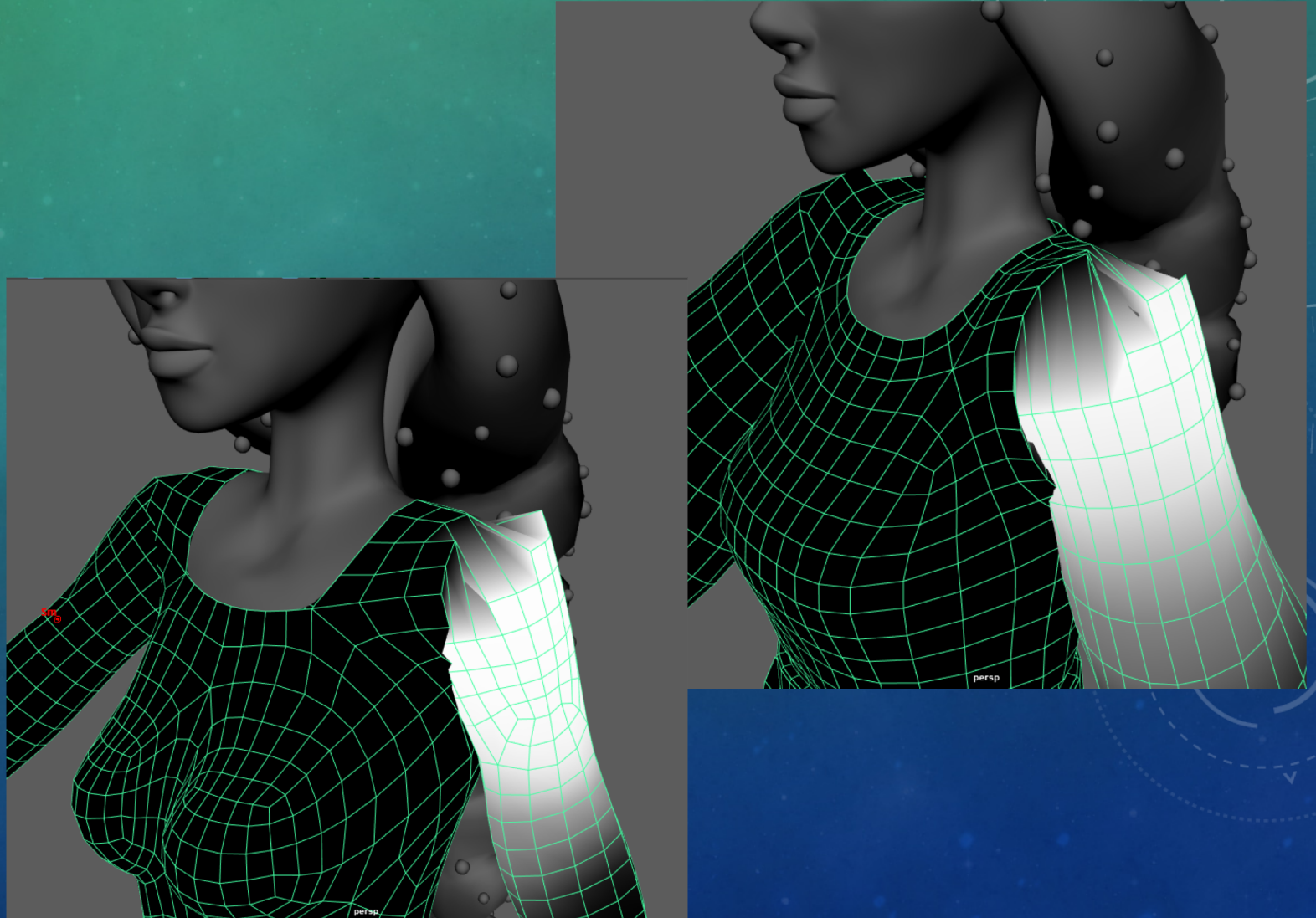
COPY SKIN WEIGHTS OPTIONS

These are the settings that I used:

- Surface Association: Closest point on surface
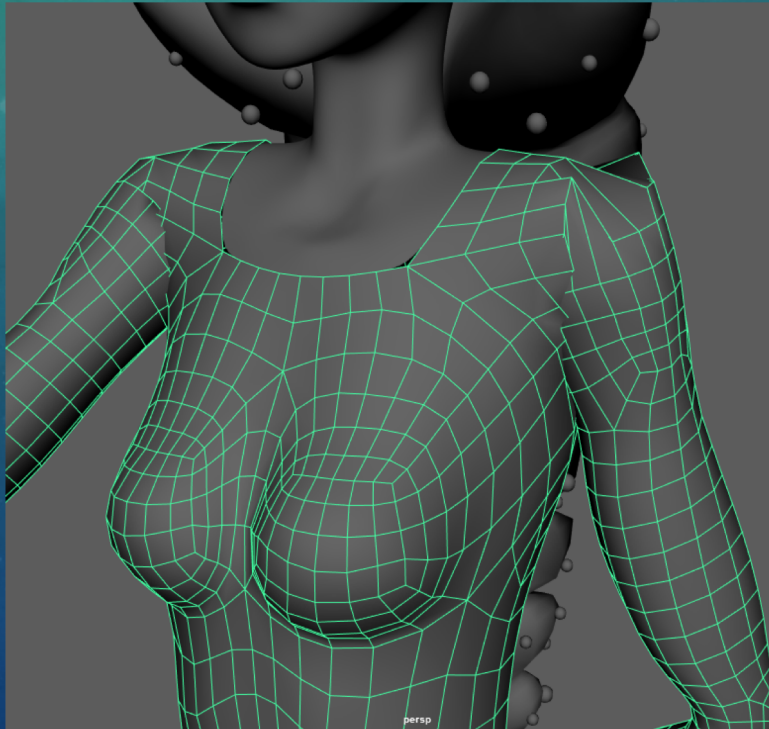
- Influence Association 1: One to One

- Influence Association 2: One to One

- Influence Association 3: One to One

- Normalize

PROBLEM AREAS
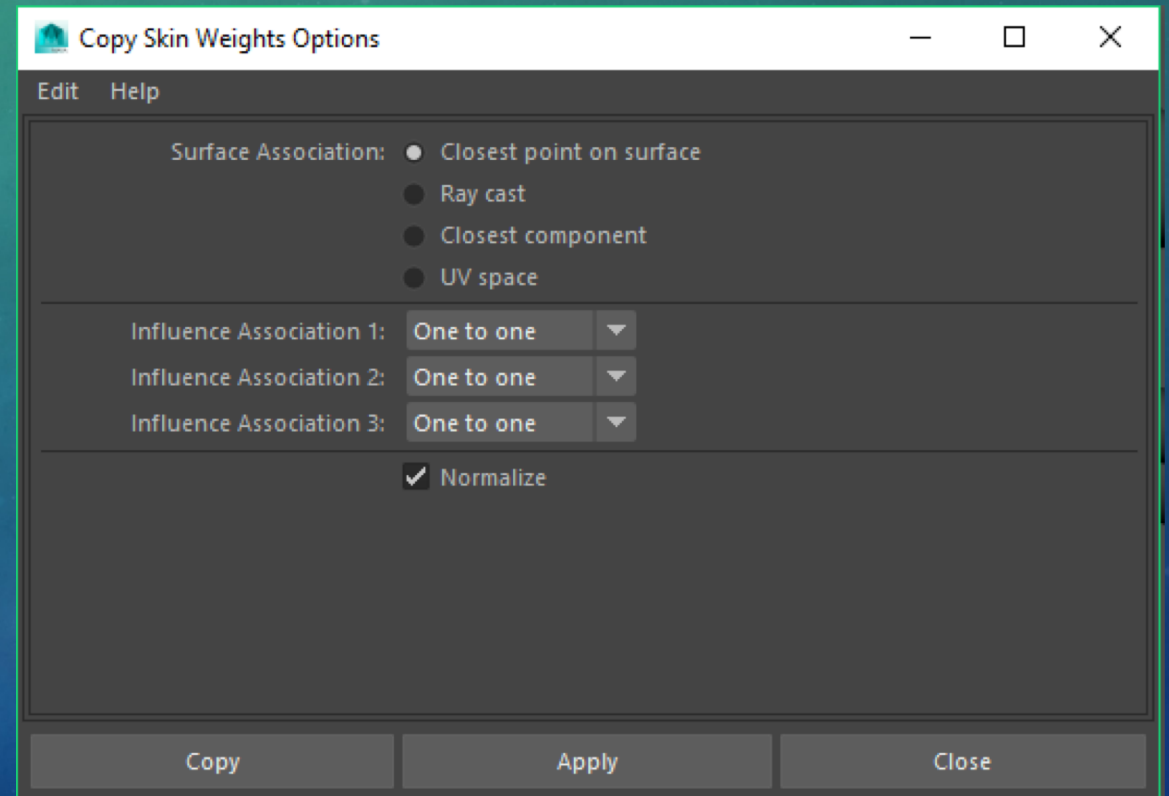
Before Painting

After Painting

- Problem areas usually happen where the bend of the body changes direction.

  - Shoulders and armpits

  - Elbows and knees

  - Fingers
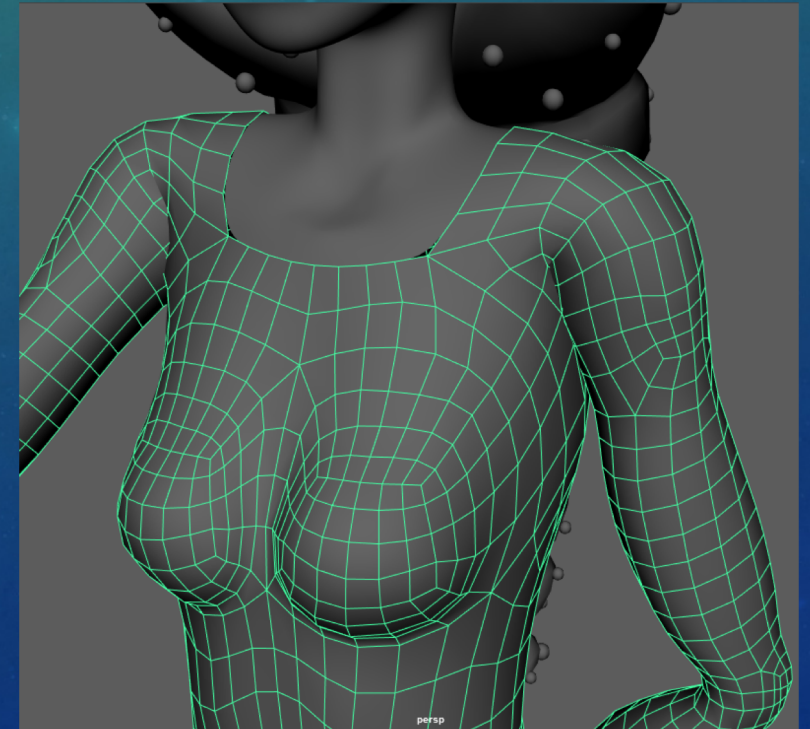
PROBLEM AREAS

Before Painting
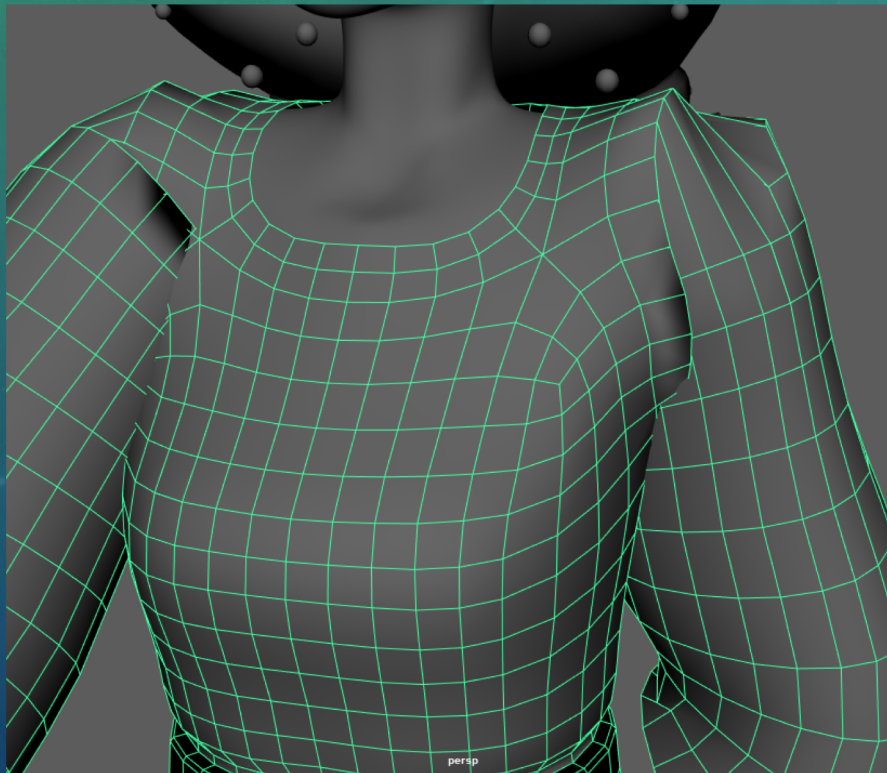
After Painting
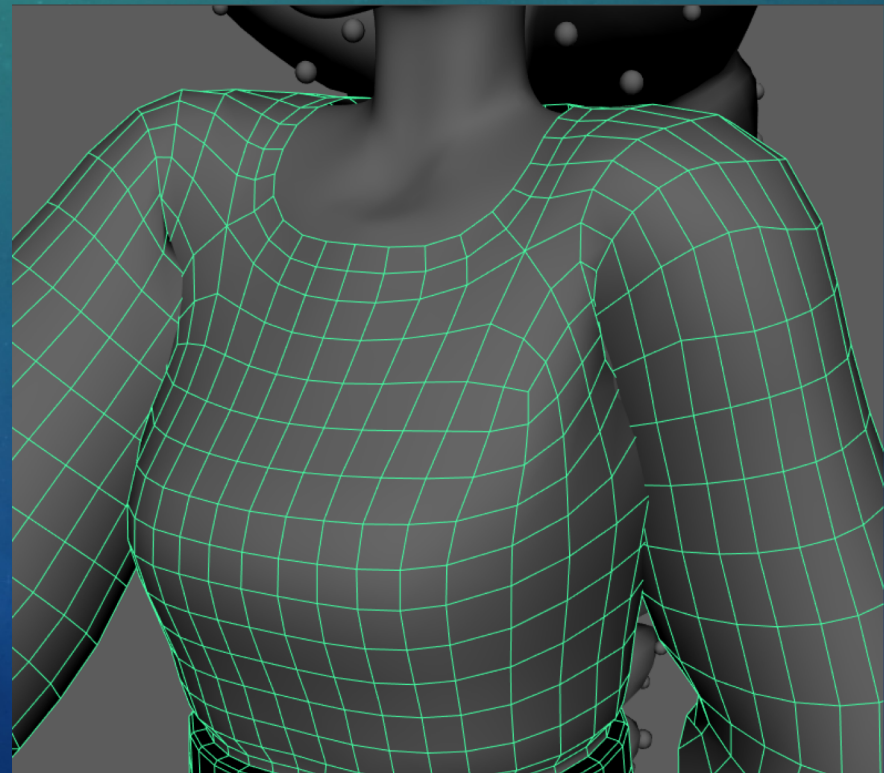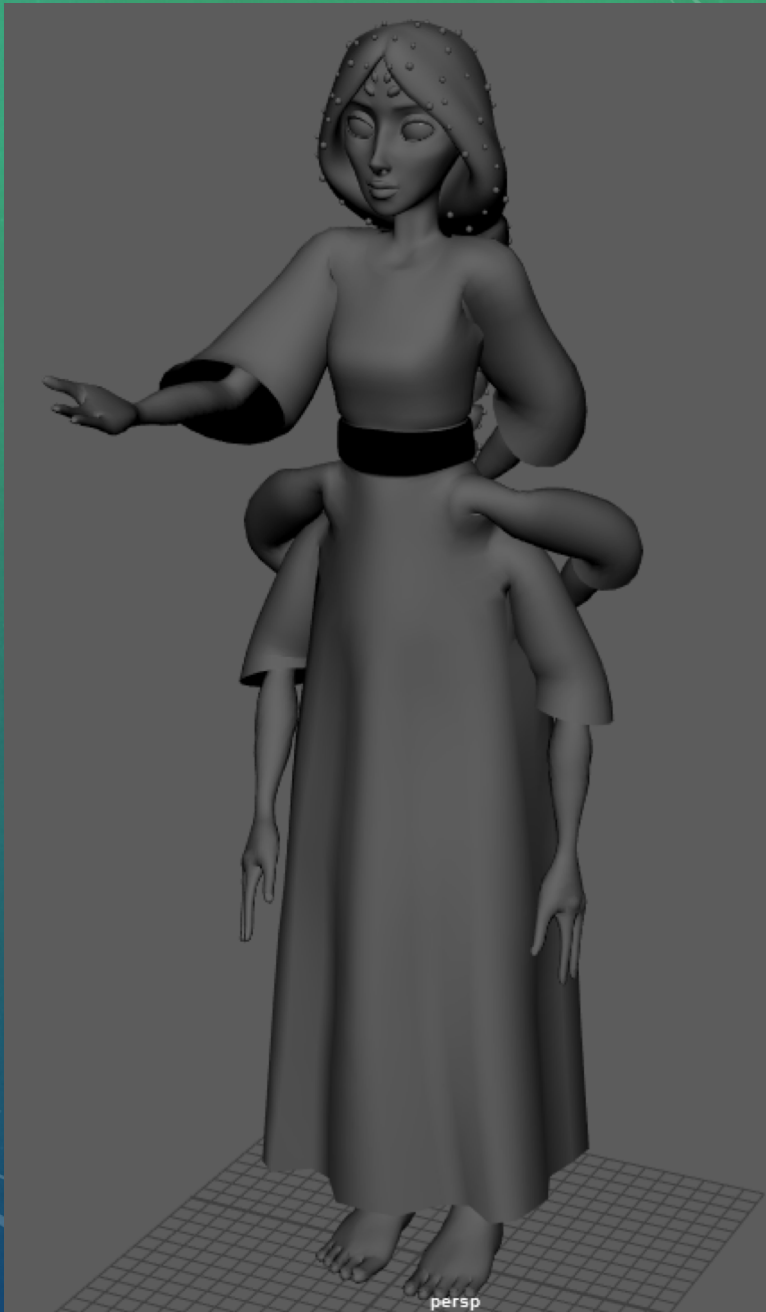
FINISH THE CLOTHING_SKINNED

- After you have attached the clothing_skinned to the body and painted skin weights, you are done with the clothing_skinned and can move onto the clothing_nCloth.

- Hide the clothing_skinned (ctrl + h) and make the clothing_nCloth visible (shift + h).

CREATING NCLOTH

- Select the clothing_nCloth

- Go to FX > nCloth > Create nCloth > Options

- The default settings are fine so select Edit and Reset, then Create Cloth.
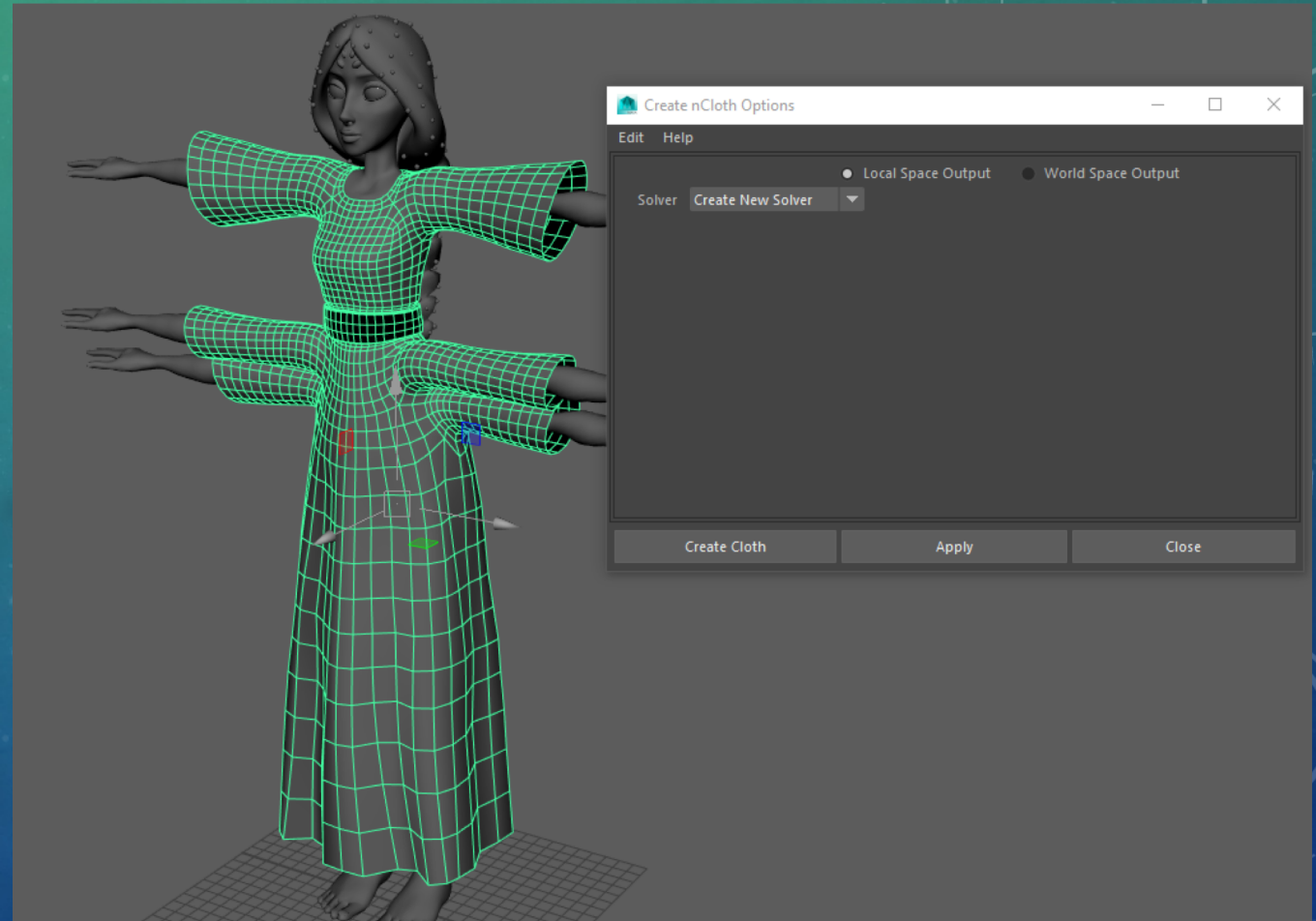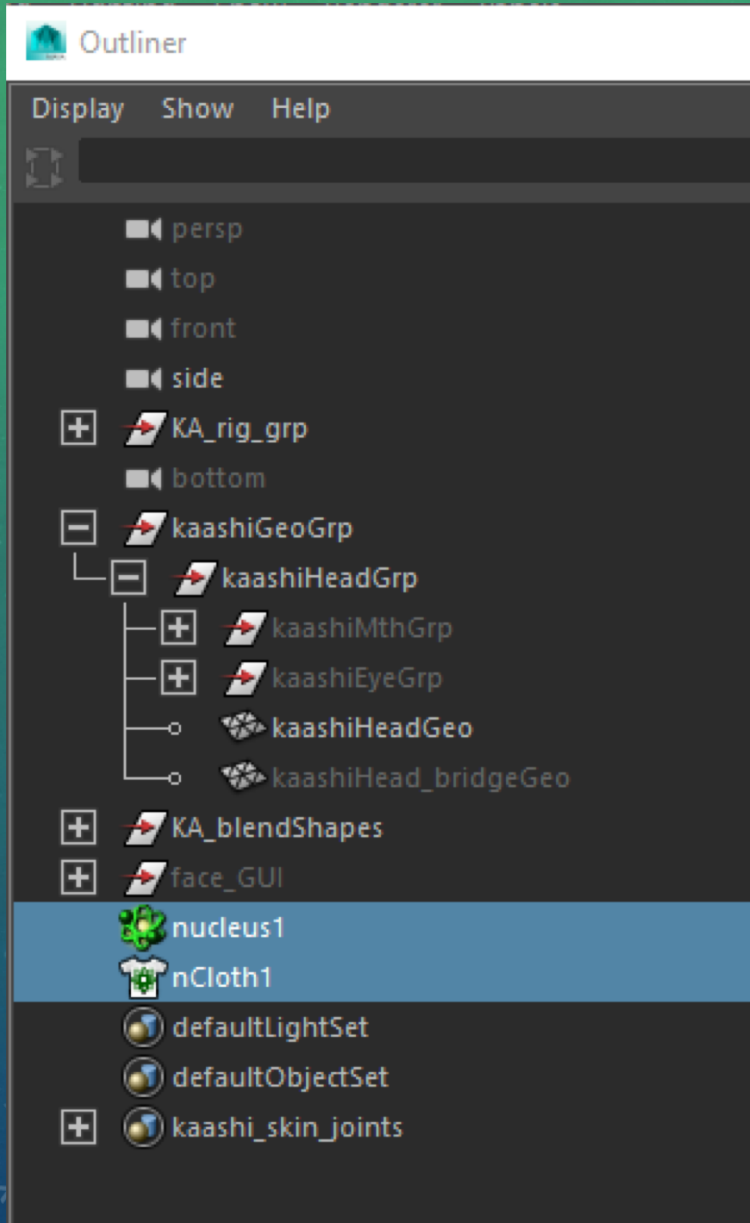
NCLOTH

- Once you create the nCloth, you will see a few new nodes in your outliner:

  - An nCloth1 node: this belongs to the clothing geo that you just made dynamic

  - A nucleus1 node: this will control how the nCloth behaves.

- If you hit the play button, you will see the nCloth clothing simulate.

- However, you will see that the nCloth clothing penetrates the body geometry of the character when it simulates.
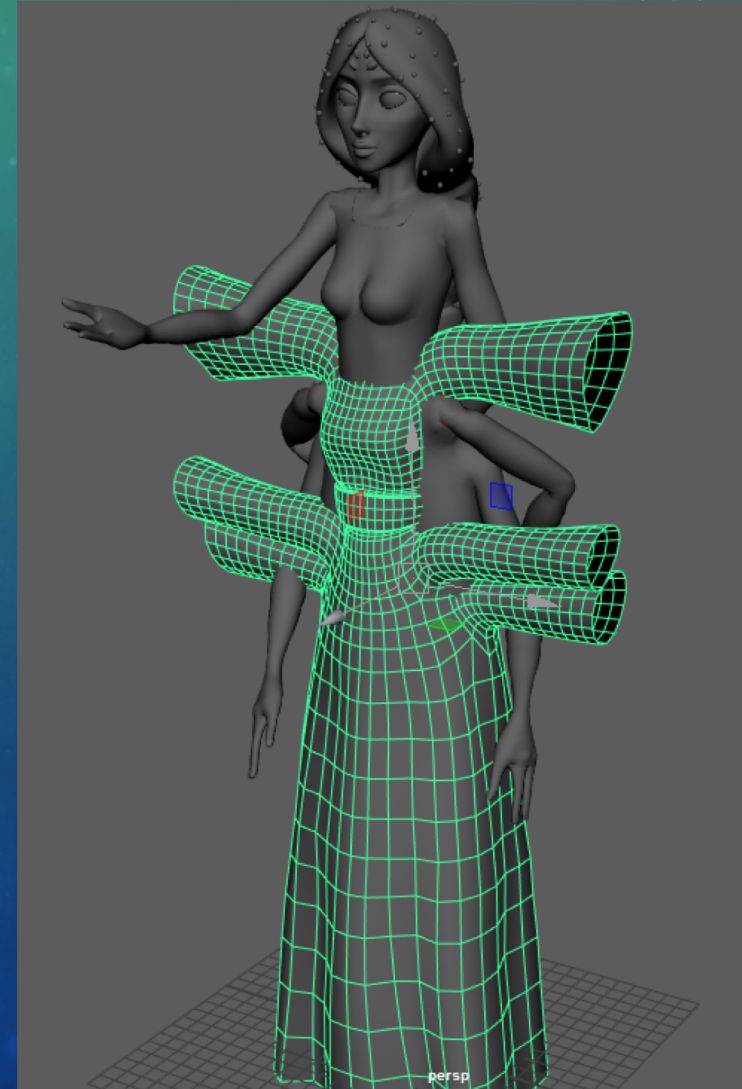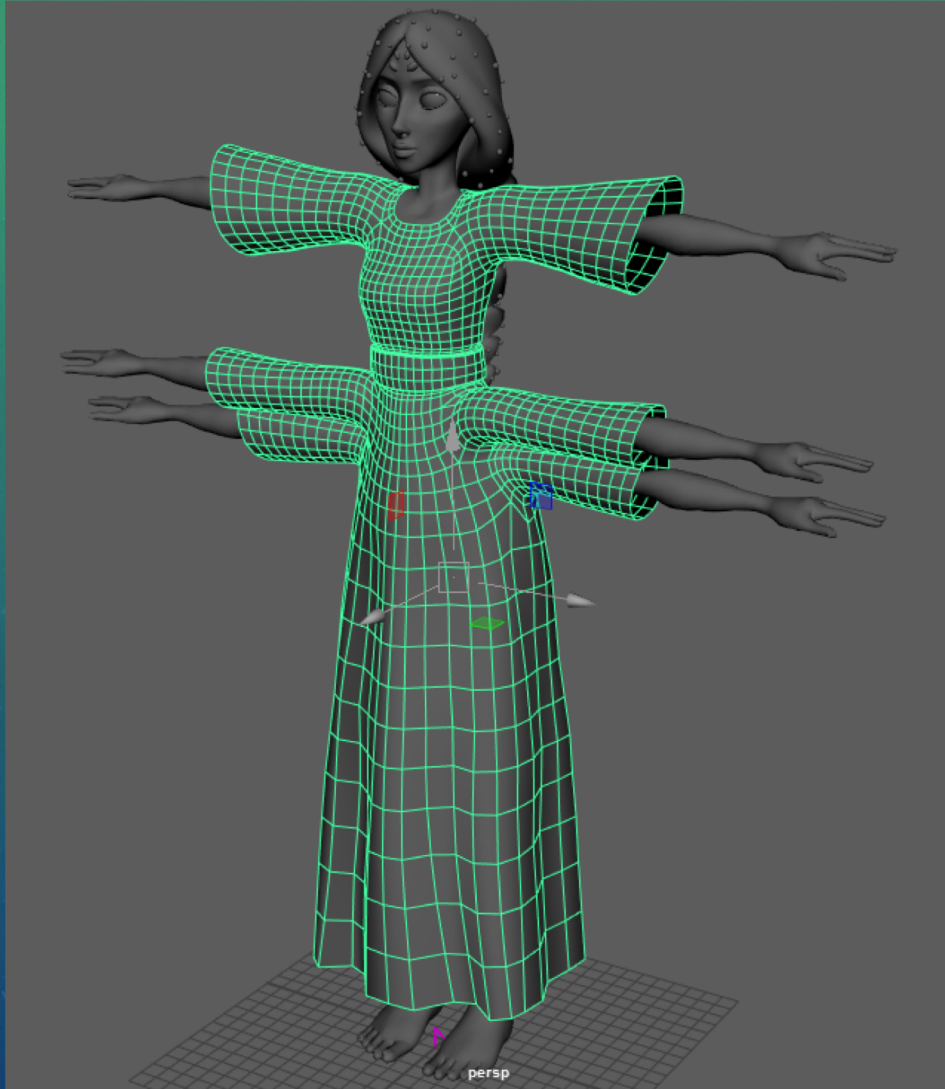
CREATING PASSIVE COLLIDERS

- To prevent the nCloth clothing from penetrating the body when it simulates, you must make the body a Passive Collider.

- Select the body

- Go to FX > nCloth > Create Passive Collider > Options

- Make sure that the Solver is attached to the nucleus that is controlling the nCloth. This will be the one that was created along with the nCloth, in this case, nucleus1.
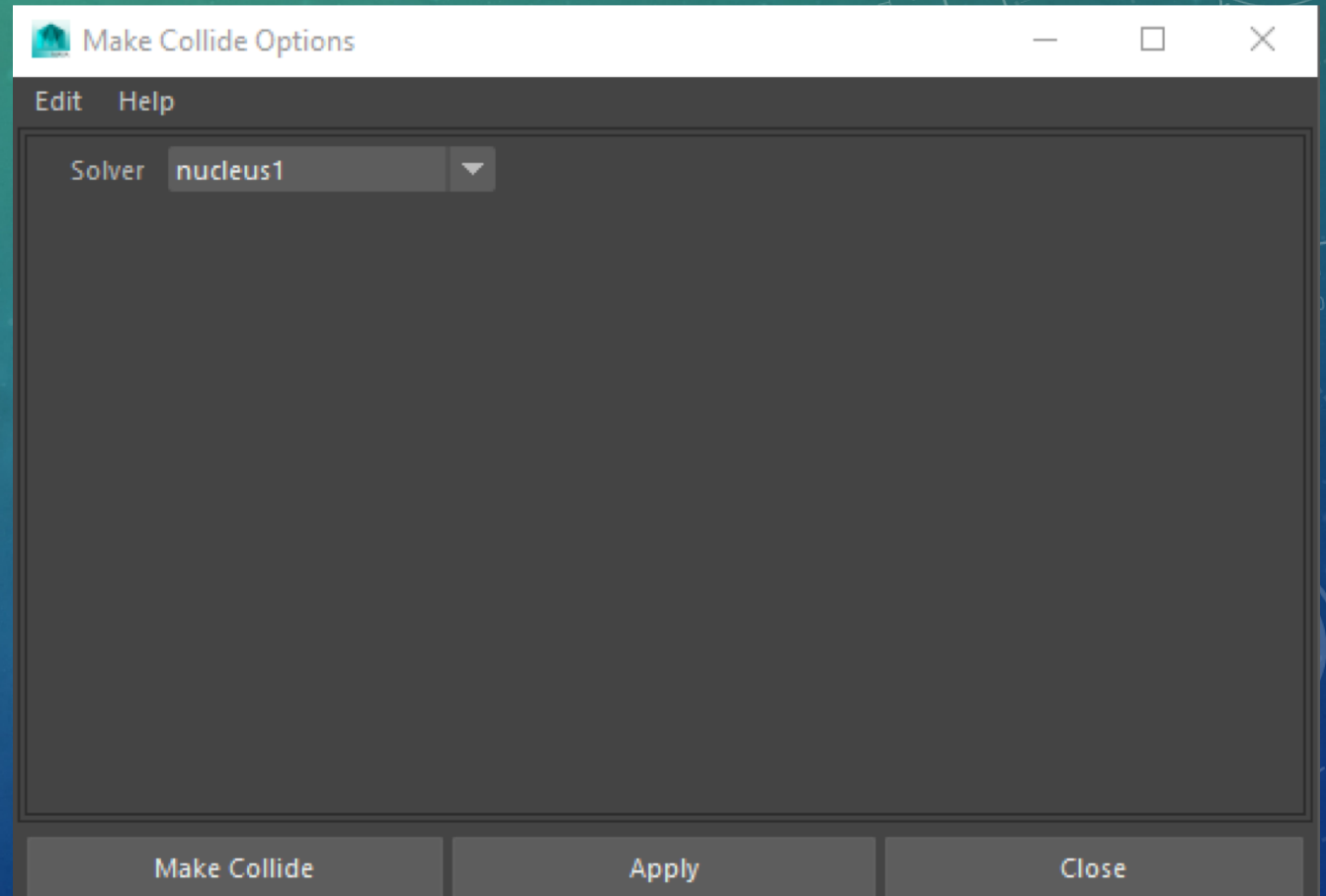
CREATING PASSIVE COLLIDERS
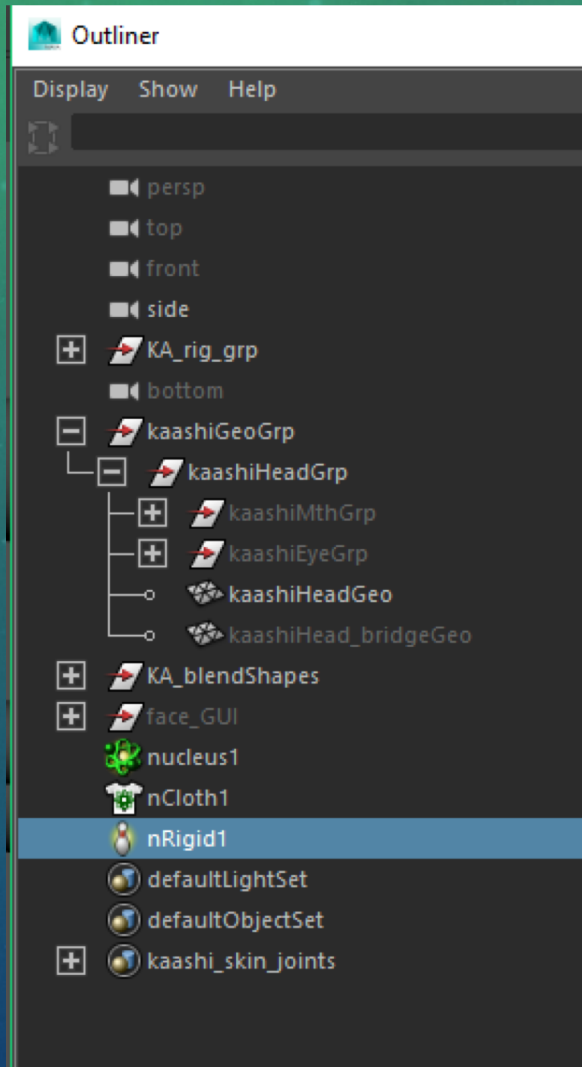
- When you make the body a passive collider, a new node will appear in your outliner.

- This nRigid1 node is assigned to the body, and tells the nCloth to collide with the body.

- So, it is a good idea to name this node something like "body_nRigid" so that you know which collider this Rigid belongs to.

  - Some rigs, like this one, have a head geometry that is separate from the body geometry.

  - You will need to make both the head and the body nRigid passive Colliders.

ATTRACT TO MATCHING MESH

- Now that we have our skinned clothing and our nCloth clothing, we are going to attach the clothing_nCloth to the clothing_skinned using the "Attract to Matching Mesh" constraint.

- The Attract to Matching Mesh constraint attracts the vertices of an nCloth object to the corresponding vertices of a mesh with matching topology

- Select the clothing_skinned first, then shift + select the clothing_nCloth

- Go to FX > nConstrain > Attract to Matching Mesh

- The default settings are fine
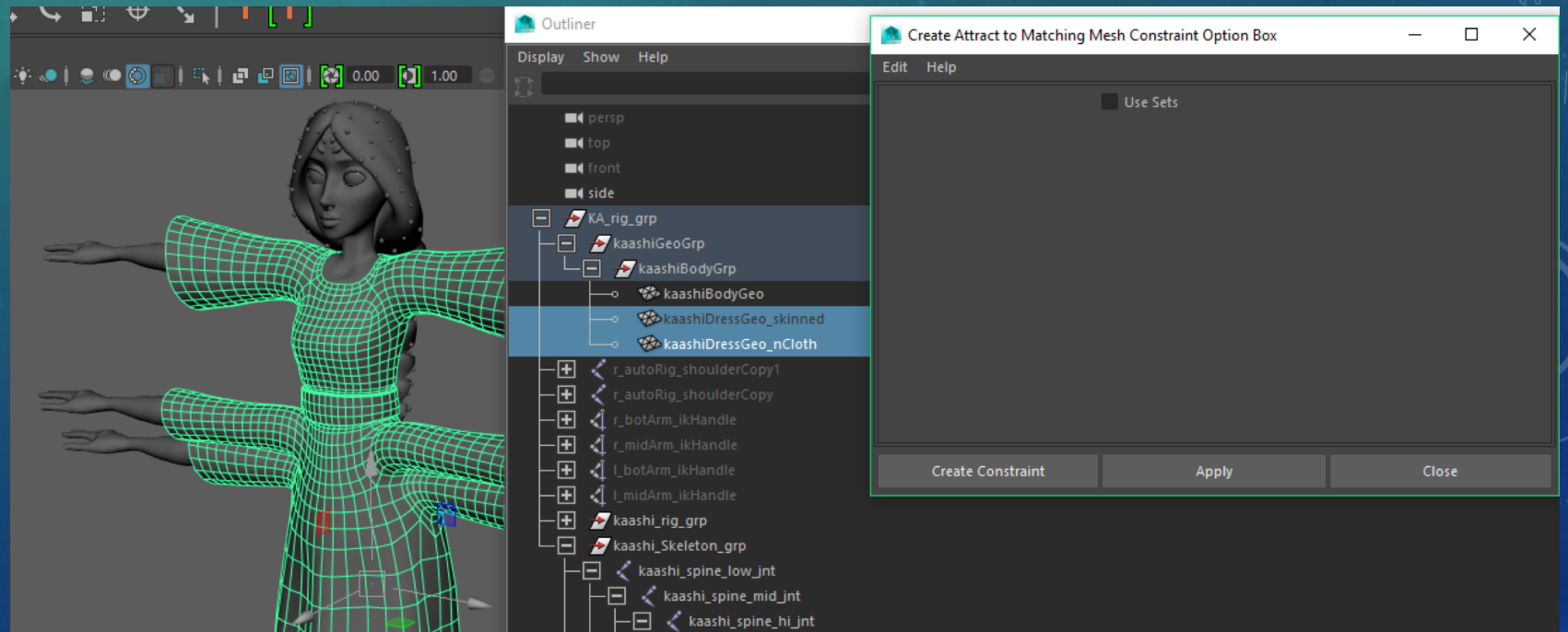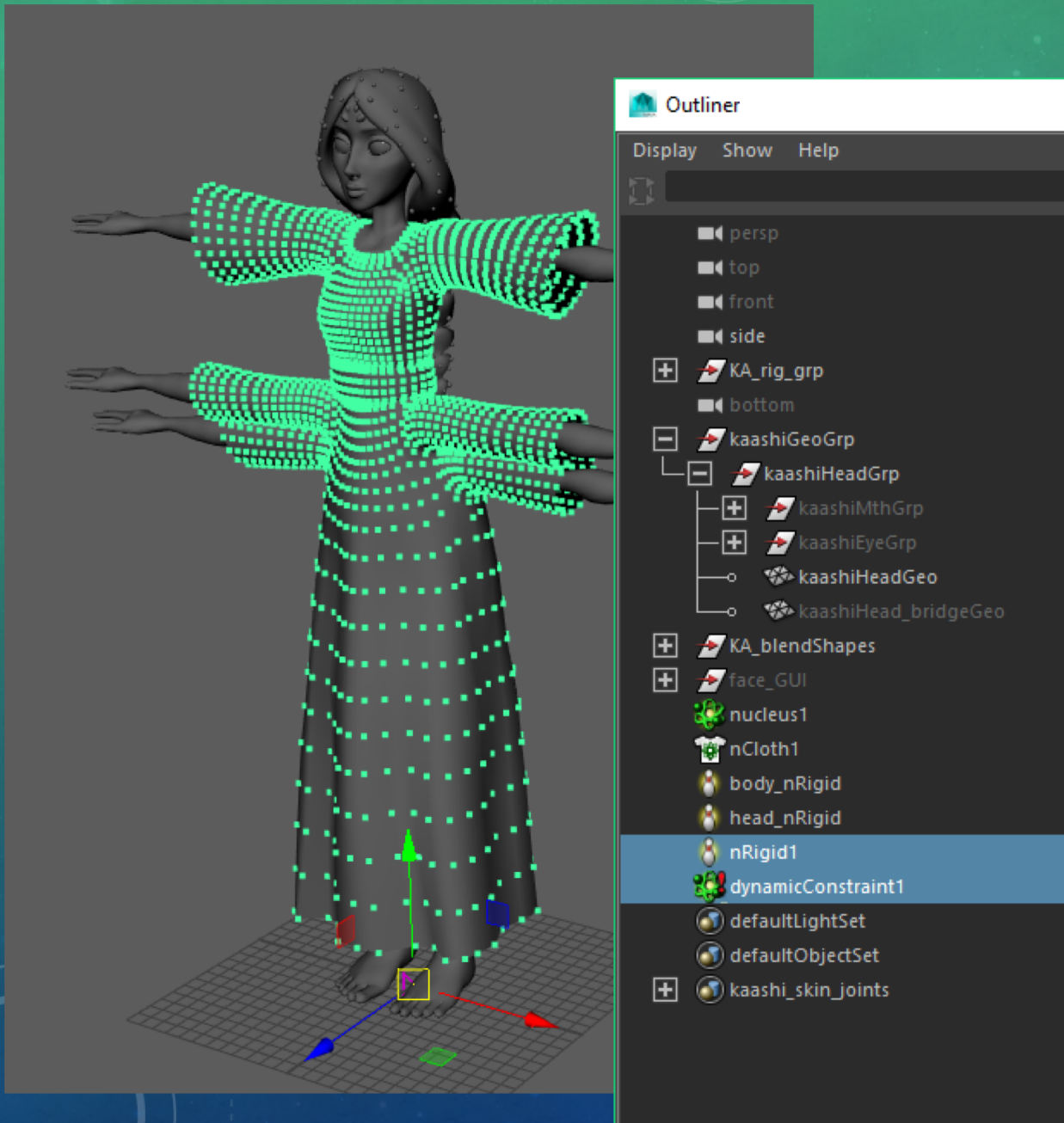
DYNAMIC CONSTRAINT

- You will know that the "Attract to Matching Mesh" has worked when you see the constraint attached to the cloth in the preview window.

- There will also be two new nodes in your outliner.

  - A new nRigid1 node: automatically created for the clothing_skinned

  - A dynamicConstraint1 node: this constrains the vertices of the clothing_nCloth to those of the clothing_skinned.

FROM THE AUTODESK MAYA KNOWLEDGE WEBSITE:

- "Attract to Matching Mesh constraints attract the vertices of an nCloth object to the corresponding vertices of a passive object with matching topology. This type of constraint is useful when you want your nCloth to assume a specific shape during simulation.

- For example, use this constraint to create a specific end shape for a garment falling off of a character that must land in a specific shape, or orientation in the scene. The Strength attribute on the dynamicConstraint node determines how closely your nCloth object resembles your target mesh. nParticle objects do not support Attract to Matching Mesh constraints."

- http://download.autodesk.com/global/docs/maya2014/en_us/index.html?url=files/GUID-FAD8F763-5E3D-4872-8773-CE095E3BDFD6.htm,topicNumber=d30e512357,hash=WS1A9193826455F5FF-4FDFBFFB11A5310C890-6500
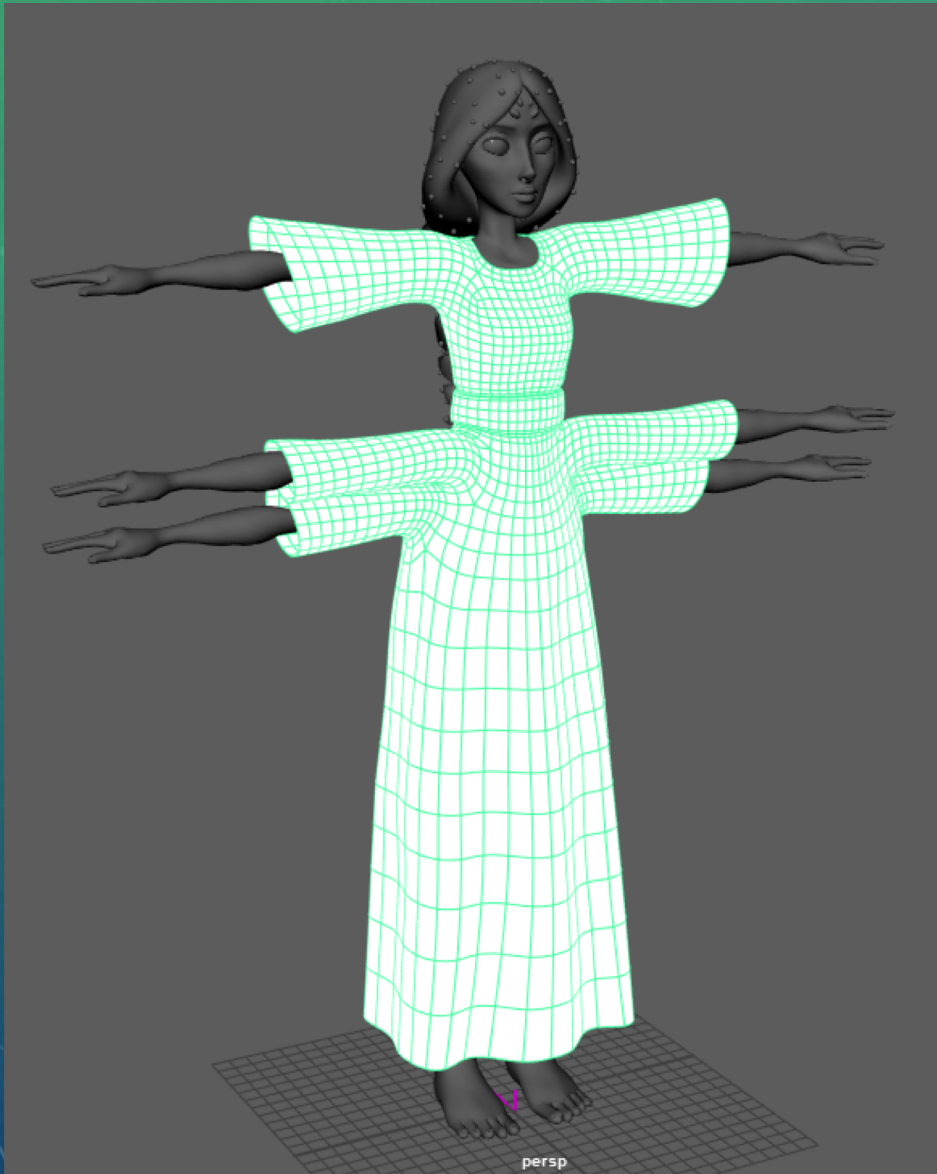
DYNAMIC CONSTRAINT

- Now, when you play the simulation, you will see that the clothing_nCloth follows the deformation of the clothing_skinned. It also does not simulate like a normal nCloth anymore.

- If you hide the dynamicConstraint1, it should still function normally. Hide the constraint so that it does not distract your view.
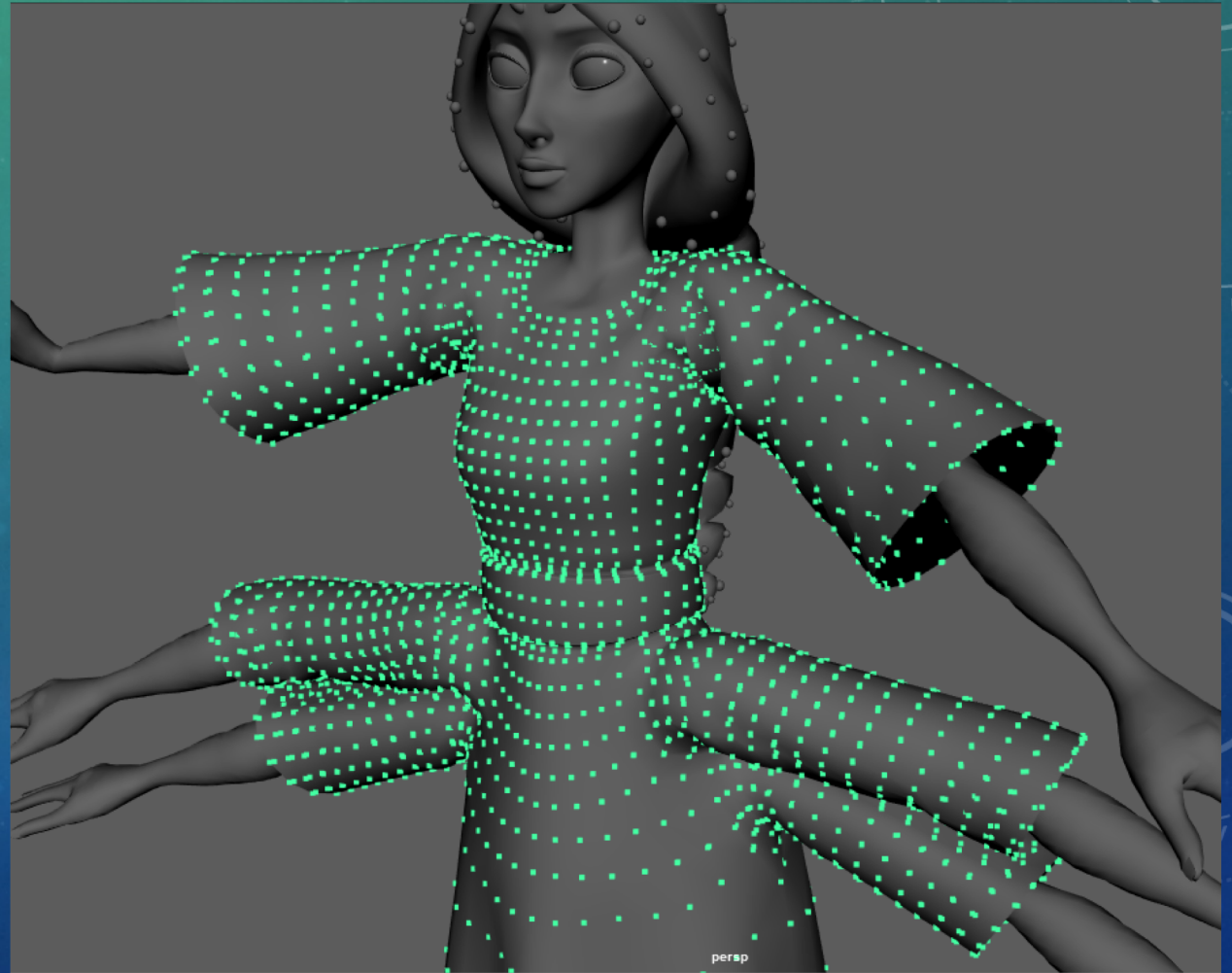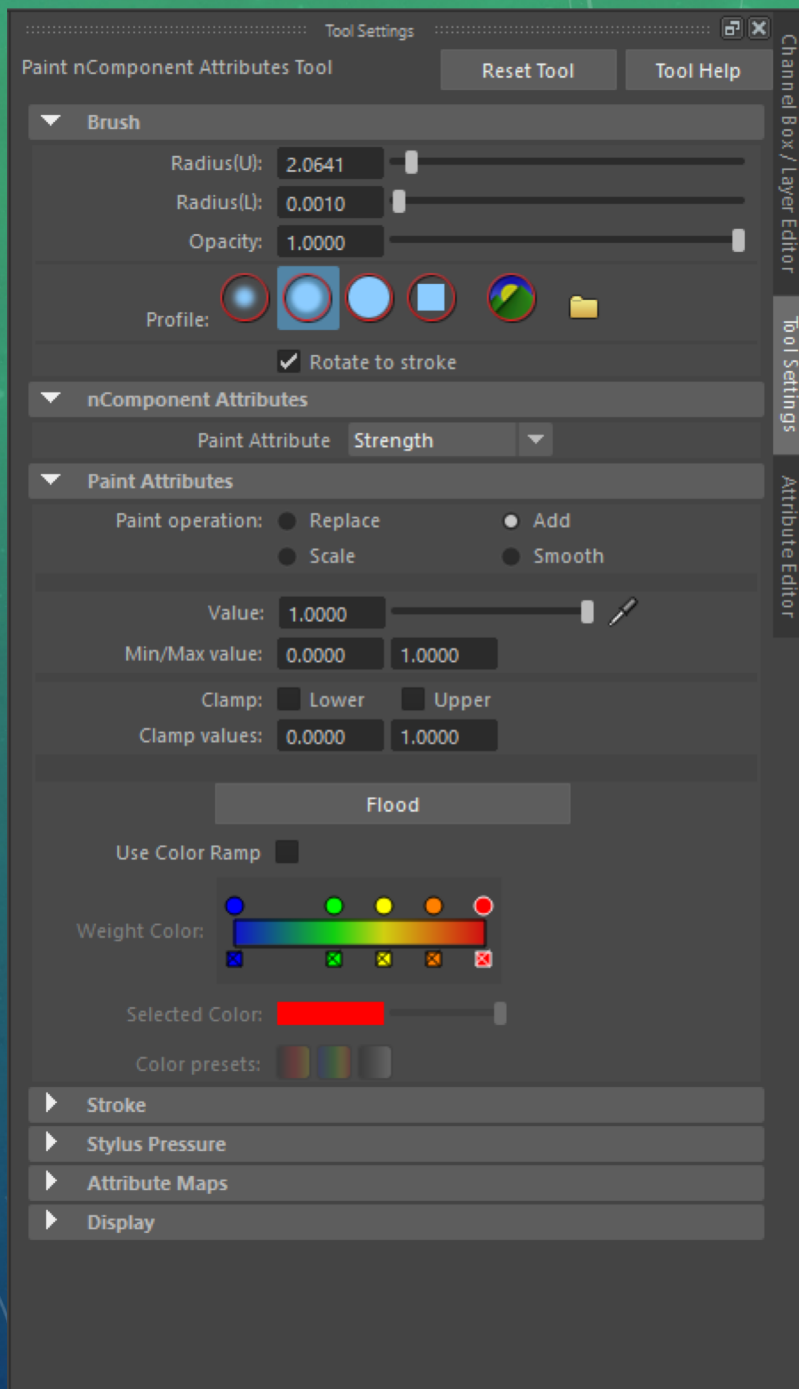
PAINT PROPERTIES BY VERTEX MAP

- Now, we are going to tell the dynamic Constraint1 that is controlling the clothing_nCloth where to follow the clothing-skinned and where to follow the nCloth.

- We will do this using the Paint Properties by Vertex Map Option

- This will let you paint any of the available properties on the component members of your nCloth constraints. The constraint property values you paint are stored per-vertex, per constrain component member.

- https://knowledge.autodesk.com/support/maya/learn-explore/caas/CloudHelp/cloudhelp/2015/ENU/Maya/files/nConstraints--Paint-properties-by-Vertex-Map-htm.html

PAINT PROPERTIES BY VERTEX MAP

- To Paint Properties By Vertex Map:

- Select the clothing_nCloth

- Go to FX > nConstraint > Paint Properties By Vertex Map > Strength

- The clothing_nCloth should appear completely white. This means that the entire clothing_nCloth is 100% attracted to the clothing_skinned.

PAINT PROPERTIES BY VERTEX MAP

- Use the Paint Properties By Vertex Map Tool to paint values for where the clothing_nCloth is attracted to the clothing_skinned and where it is not, and is instead following the nCloth.

- White represents areas where the clothing_nCloth will follow the clothing_skinned, and black represents areas where it will follow the nCloth simulation. Just like painting skin weights!

- Grey areas will follow both the clothing_skinned and the nCloth each by a percentage based on the painting.

PAINT PROPERTIES BY VERTEX MAP

- Basically, areas where the clothing is supposed to be skin tight, will follow along the clothing skinned (will be white)

- And areas where the clothing is hanging off of the body, will follow the nCloth (will be black).

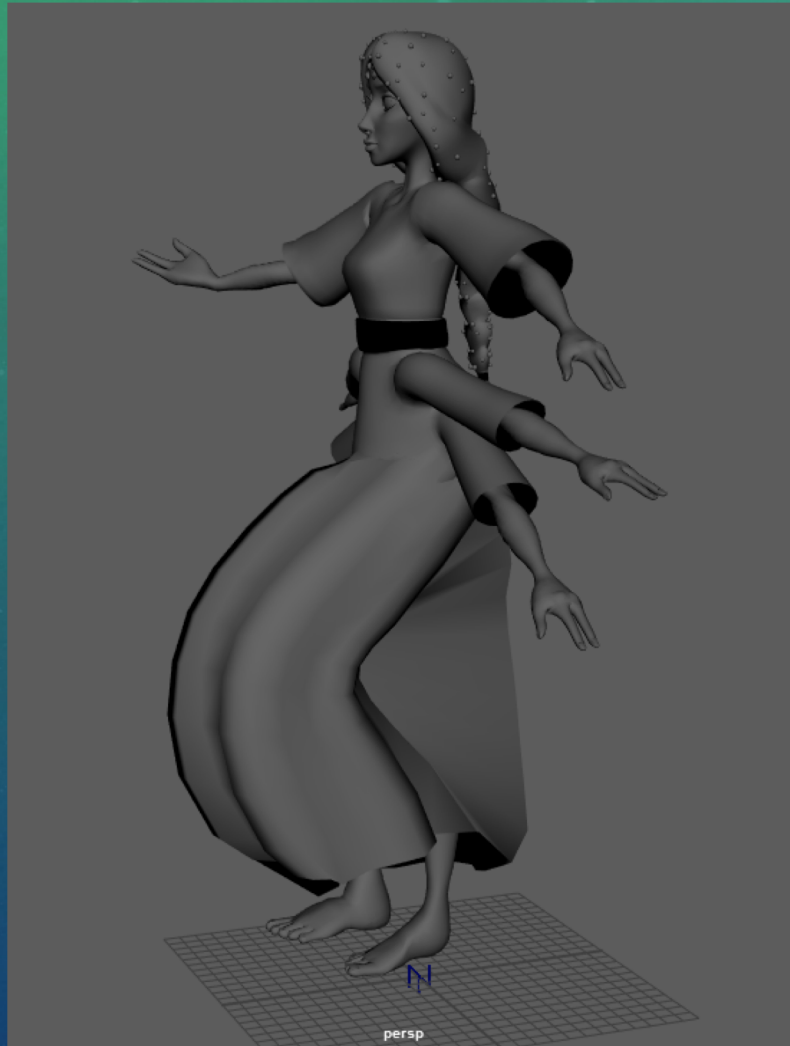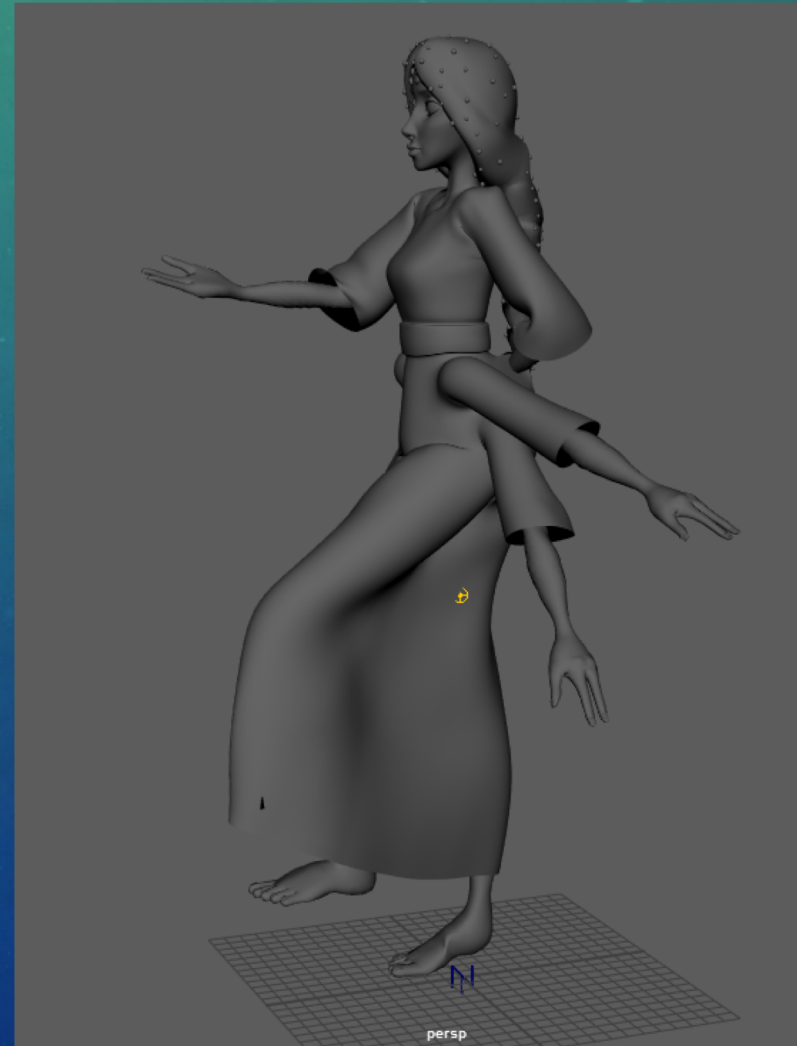- The next step, is to play the simulation.
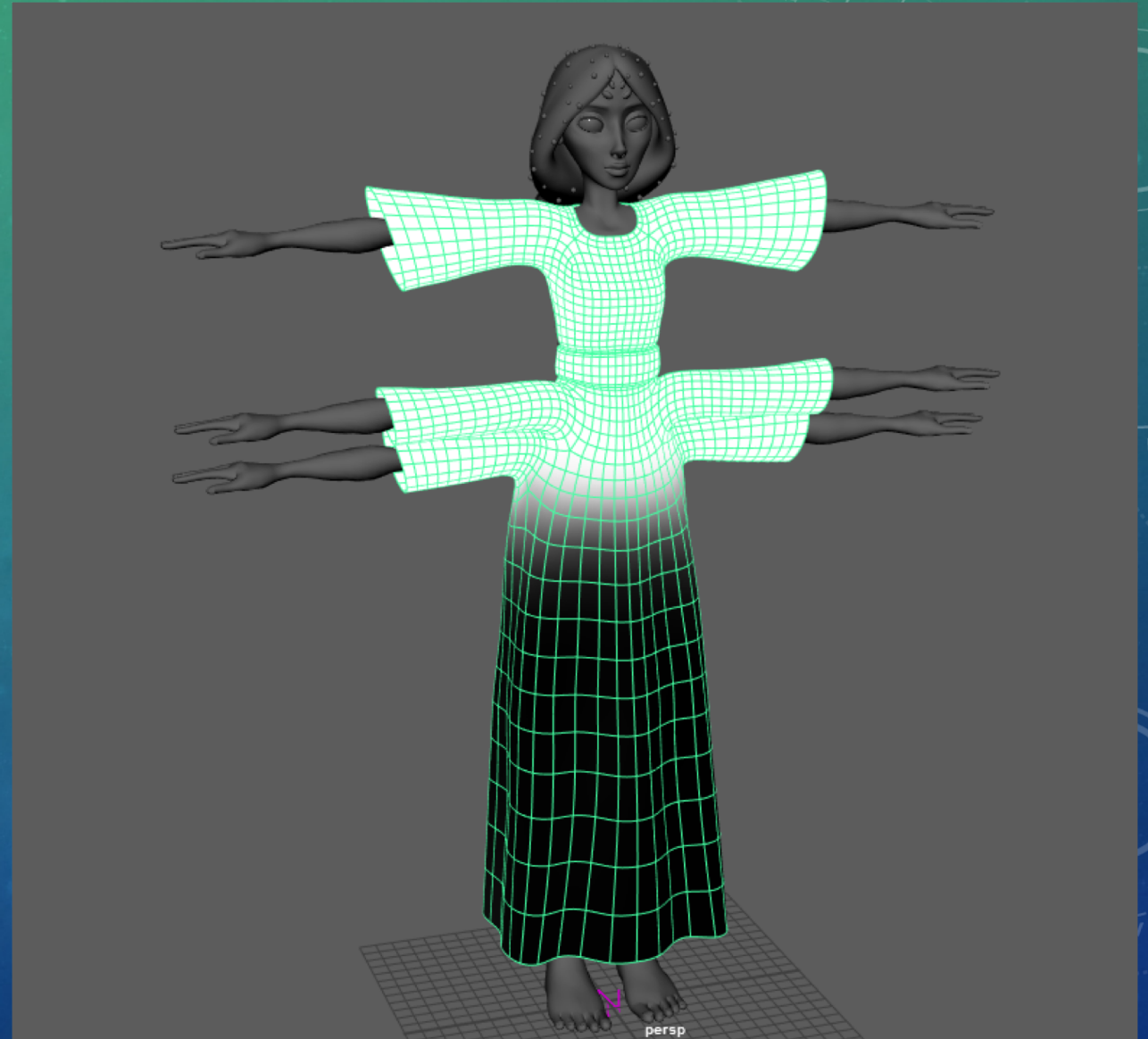
NCLOTH

- When you play the simulation, you should see that the clothing_nCloth is attached to the character and follows along with the rig animation, but is also dynamic under the nCloth properties being controlled by the nucleus1.

- You can compare the motion of the clothing_skinned to the movement of the clothing_nCloth by turning on and off the visibility of each and playing the simulation.
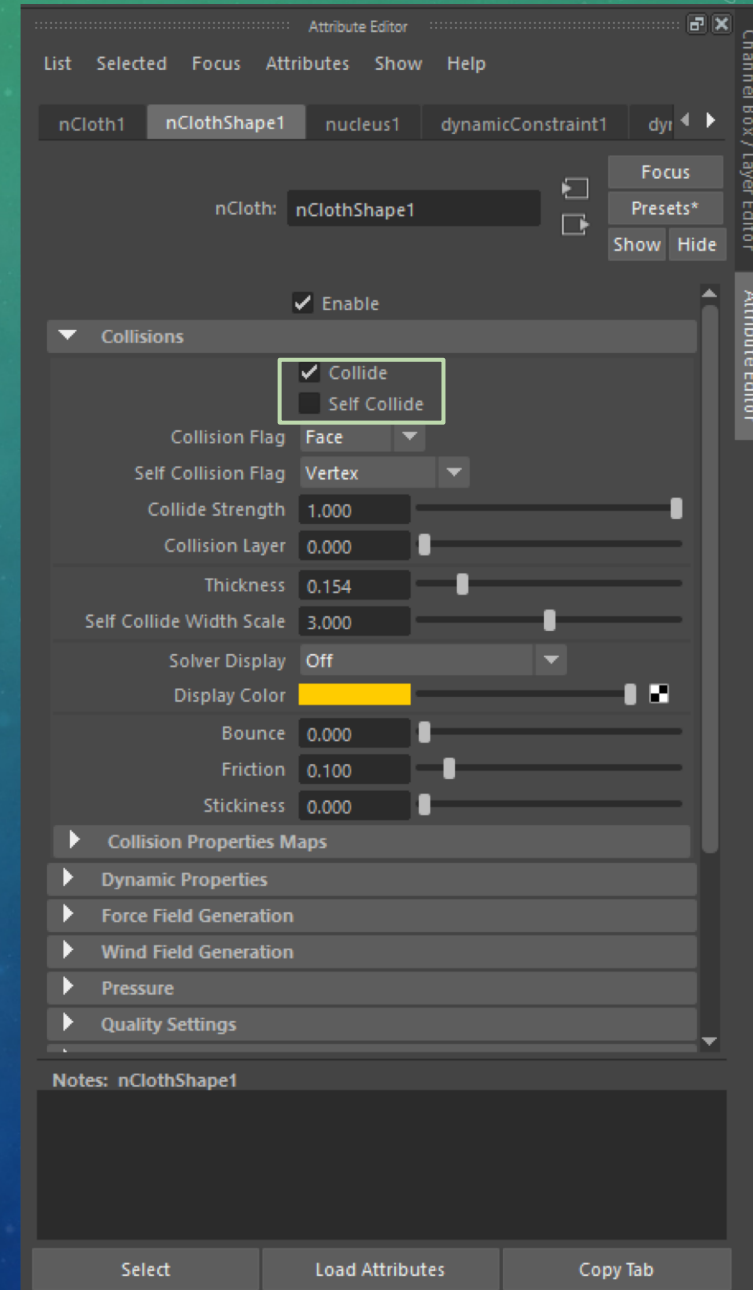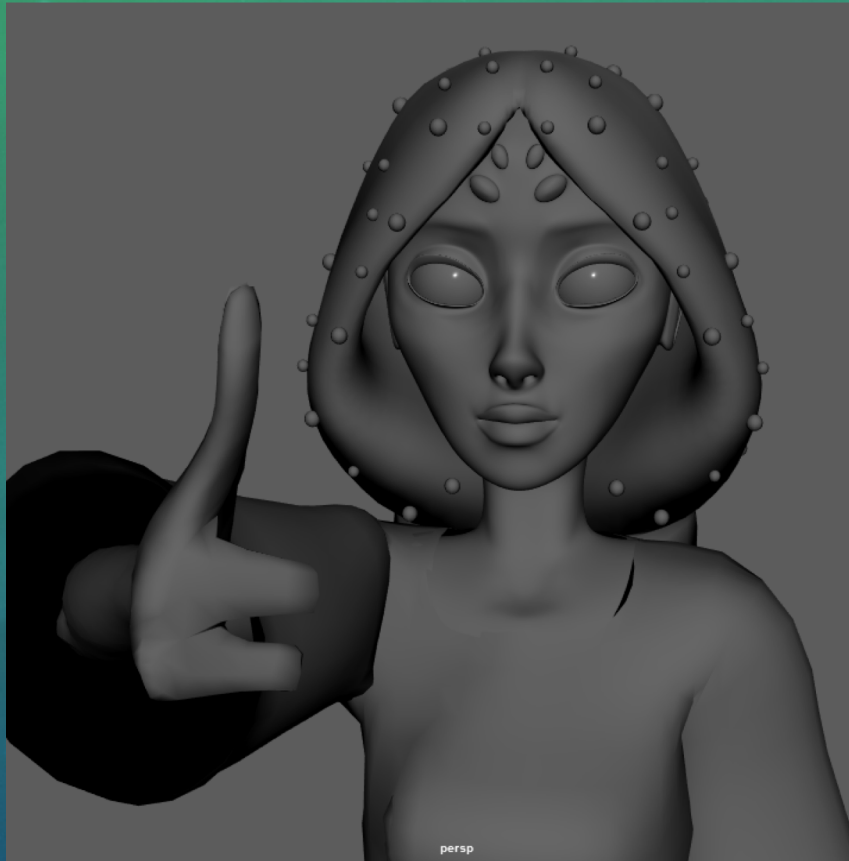
COMPARISON

Clothing_skinned

Clothing_nCloth

NCLOTH ATTRIBUTES

- The next step is to adjust the attributes of the nCloth and those of the nucleus1 in order to fit the needs of your simulation.

- You may notice that the nCloth behaves strangely in areas like the armpits.

  - The best thing to do is to turn Self-Collide off.

THAT'S ALL FOLKS

THANK YOU!!!! ☺