# Modeling a Sailor Fuku in 3ds Max - Part 1 - Leotard

Well, intrepid modeling tutorial readers - I'm bringing you another one based around a single project - because I can! In this little series, we'll be taking a look at making a Sailor Moon costume for V4/A4.

The main base element to this outfit is a leotard. It then has a skirt, sailor collar, boots and gloves. We're starting here with the leotard. I have my plain V4 base loaded in Max and setup in a way to make things a little easier on myself. The head and trunk body parts are in a separate layer from the rest of the arms and lower legs. Normally when modeling a leotard, I'd simply delete the body parts I don't need - but because I'm going to need them later, I simply separated them out to hide them when I don't need them.

What's that? You don't know what I'm talking about with layers? It is one of the single most useful things you can put to work for you in Max. In the main top toolbar, you should see an icon that looks like three sheets of paper on top of each other:
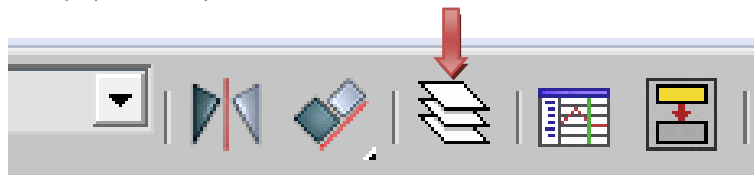
Clicking on this will bring up the layers dialog. Everything is set to default to the Zero layer (and is thus labled accordingly). This layer is there in every scene you have in Max - it cannot be renamed and it will always be at the top of the stack. What's nice about layers is you can turn them off and on, freeze them so items cannot be moved/edited/deleted and other Max specific tasks. Layers can be very helpful when creating Poser content since you can separate the base figure from your clothing and be able to turn things off and on much quicker when needing to make adjustments. You can organize named layers to your heart's content - and see what is in each one with a simple click.
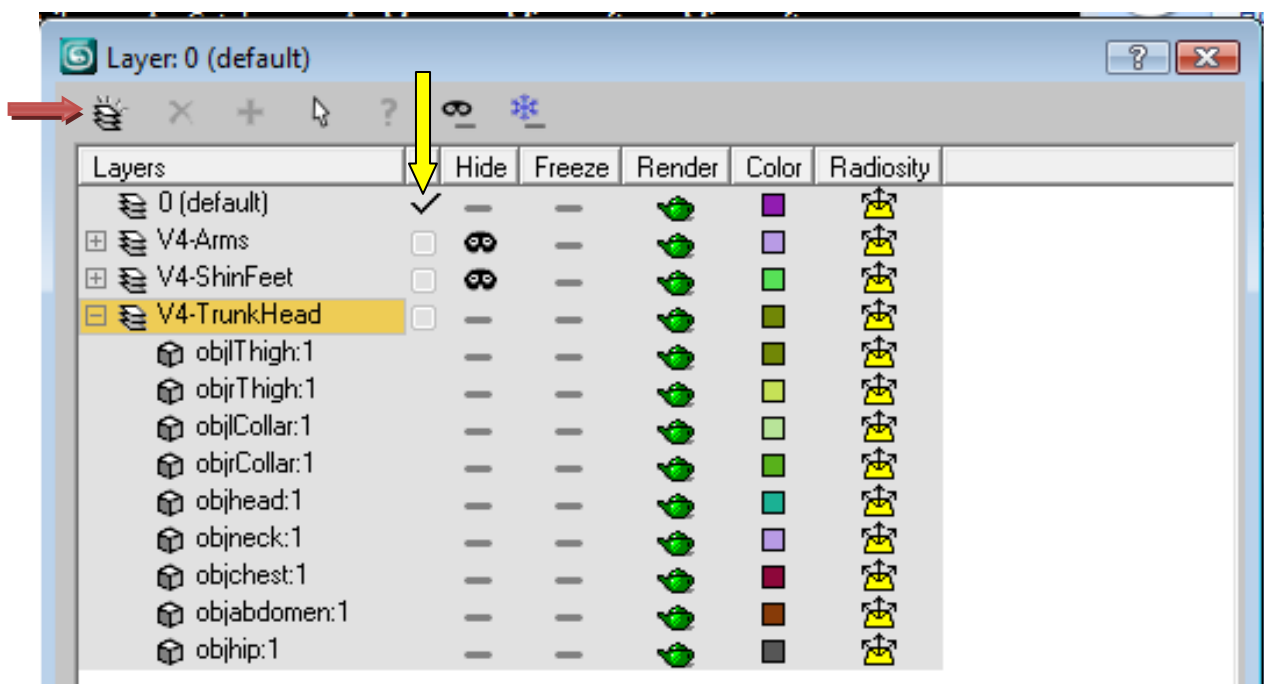
Not only can you hide an entire layer, but you can expand one and hide specific elements contained within that layer (the little mask icon you see up there). The little red arrow at the top left of the image is pointing to **Create New Layer (containing selected objects)**. You would first make a selection of the elements you want grouped together on a layer, or just a single object, and then click the Create New Layer button to generate a new layer with your selection. The yellow arrow is pointing to the one thing you'll need to keep an eye on. Whatever layer has the checkmark next to it is the one where new objects will go - either imported or created in Max.

Unless frozen or hidden - all objects regardless of layer are accessable and editable. The little check mark simply denotes a "primary" layer so to speak so Max has an idea of where to put things. I'm saying you have to keep an eye on this in the event you create or import something and can't find it - you probably have a hidden layer checked as primary (Yup, I have been there, done that). And remember, if something ends up on a layer you didn't want it on - just select it and create a new layer.

But let's get on to modeling! For my base figure - I exported V4 out of Poser with her thighs at zero bend/twist and a side-side of 2. Feet are flat on the floor rather than the default of pointing down into nothingness. I set the legs this way because I'm going to need room to work the crotch area of the leotard - and this is hard to do with how close together figure's legs are usually set. I then used objScaler to enlarge the obj file by a factor of 100 up from teeny tiny Poser scale. Kudos to you if you can get the scaling utility in Max to work with you - I've never had it cooperate.
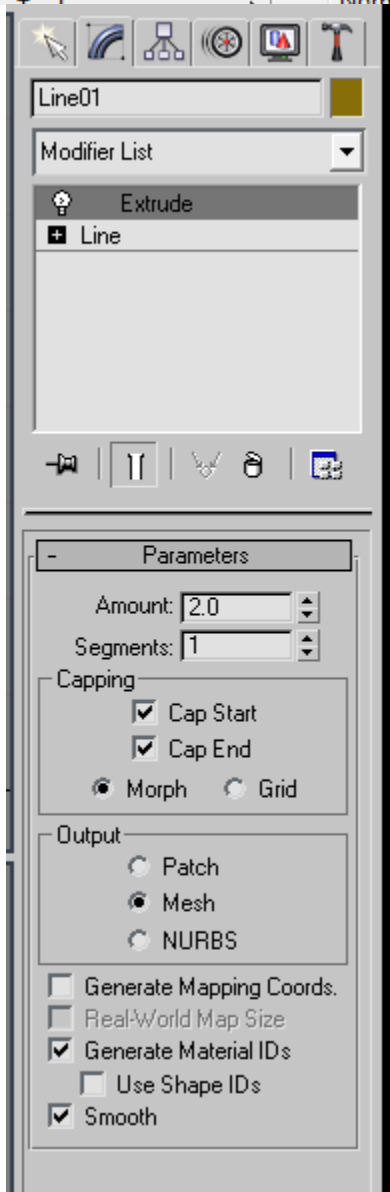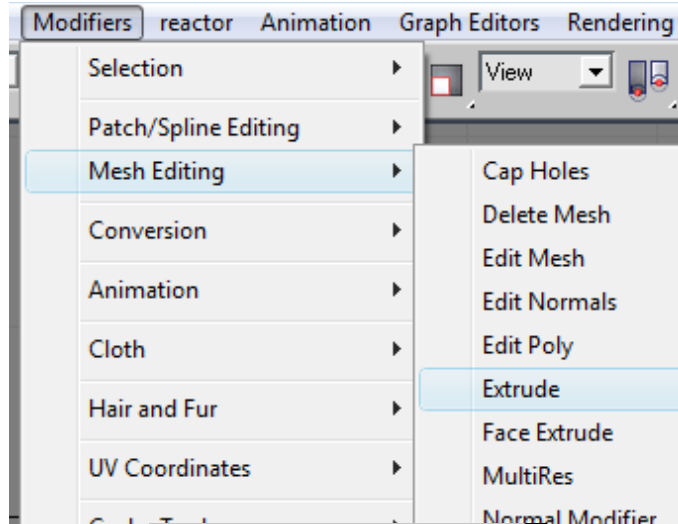
Ok, so we need to start the base for our leotard. I'm going to do this by creating splines I will then extrude a mesh from. In side view, I'm going to trace a spline around the torso, matching the figure's base curves. I'll be doing a few and then combining them - because I need one for the center crotch zone, as well as ones to match the breasts and buttocks. This may seem like a lot of extra work - but in all honesty, it goes much quicker than adjusting any sort of solid primitive to the figures shape.
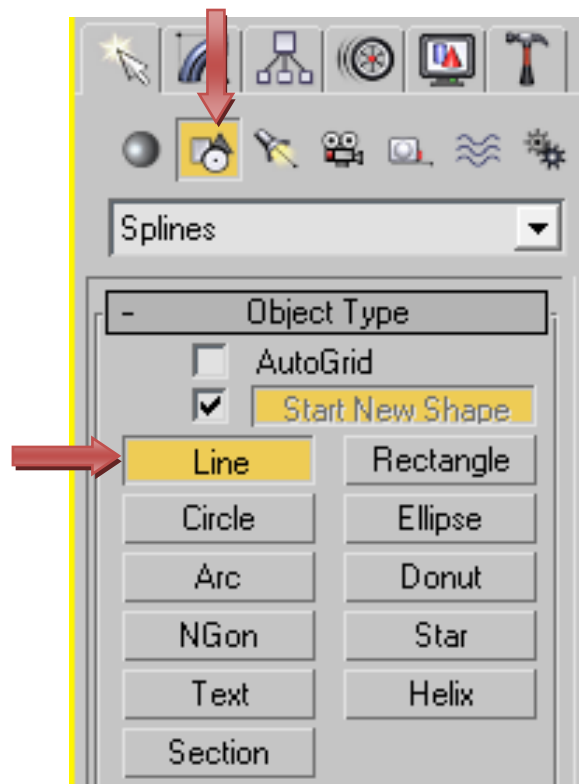
The spline doesn't have to be 100% exact - we'll be adjusting things after they're all connected and any blank areas filled in with needed polygons. Just enough we have the base curves. First one will be the center spline. With the line tool selected, left click to start the spline, and continue left clicking to create points around the figure. When finished - right click to end the spline. You can see that I've left it unconnected - I can't really have clothing going through her neck now can I?
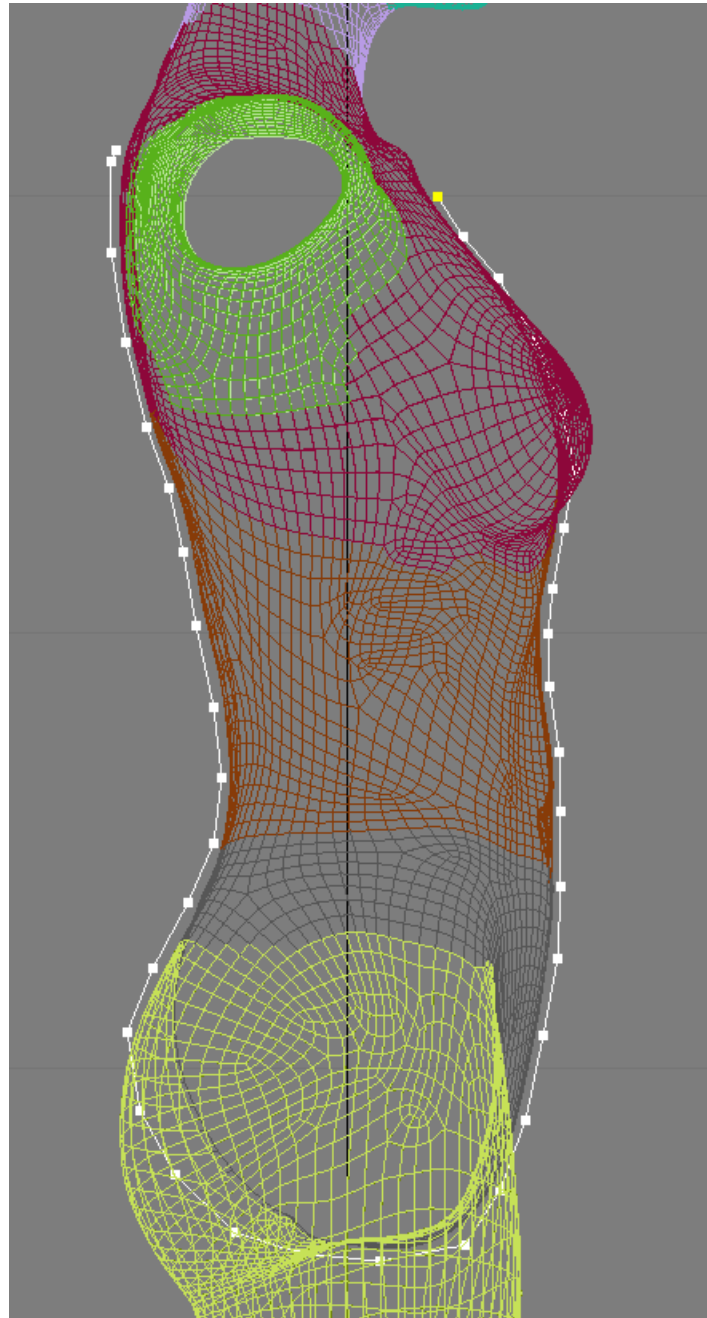
This center spline goes "behind" the breast in side view, on top of the chest, following the torso and then between the legs and on up the back. You can see I wasn't worried about exact placement of the point on her rear because I'll need to fiddle with them to have the leotard cover her butt. Now, I'll extrude out a mesh from my spline.

Modifiers   reactor   Animation   Graph Editors   Rendering

Selection	▸		View ▾
Patch/Spline Editing	▸	
Mesh Editing	▸	Cap Holes
Conversion	▸	Delete Mesh
		Edit Mesh
Animation	▸	Edit Normals
Cloth	▸	Edit Poly
		Extrude
Hair and Fur	▸	Face Extrude
UV Coordinates	▸	MultiRes
		Normal Modifier

Line01

Modifier List ▾

    Extrude
  ⊞ Line

Parameters

Amount: 2.0
Segments: 1

Capping
  ☑ Cap Start
  ☑ Cap End
  ⦿ Morph   ○ Grid

Output
  ○ Patch
  ⦿ Mesh
  ○ NURBS

☐ Generate Mapping Coords.
☐ Real-World Map Size
☑ Generate Material IDs
  ☐ Use Shape IDs
☑ Smooth

I set the amount to 2.0 - that seems to be a good starting point - less if you feel it's needed, but more tends to be a little too much. Now, don't panic if things look a little off. Occasionally, Max will have the normals reversed on the polys making up the extruded mesh. Don't ask me why it does this - it might just be me (programs have hated me for years). This is easily fixed here in a bit. I'll also need to adjust the positioning since the extrude happens off to one side of the spline.
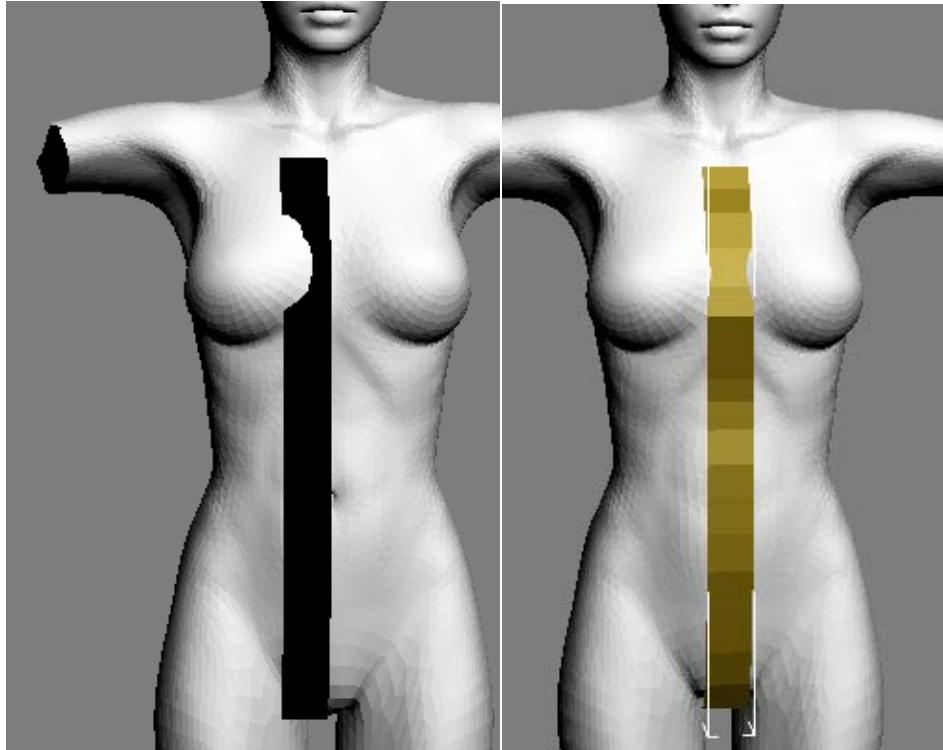

Collapse the modifier stack (right click menu) and then convert to editable poly (right click menu again). Set selection to polygon - select all polys in the extruded spline mesh, right click and flip normals. Center it on the figure, and we're done with the first one. Don't worry about mesh intersections at this point because it's not worth it (unless things are totally hidden inside the mesh - which they shouldn't be right now).

Repeat the process for the second front-back spline that will cover the butt-shoulder-breast zone. It will go through her neck, but the spline will be moved outside that after it's finished - this gives us our shoulder covering start (ignore the point out in no man's land - that's where the mouse was when I took the screen shot so you could see the spline better)

You may have noticed that my points aren't all lined up with the other spline - this will be fixed later with welds/cuts as needed between them.
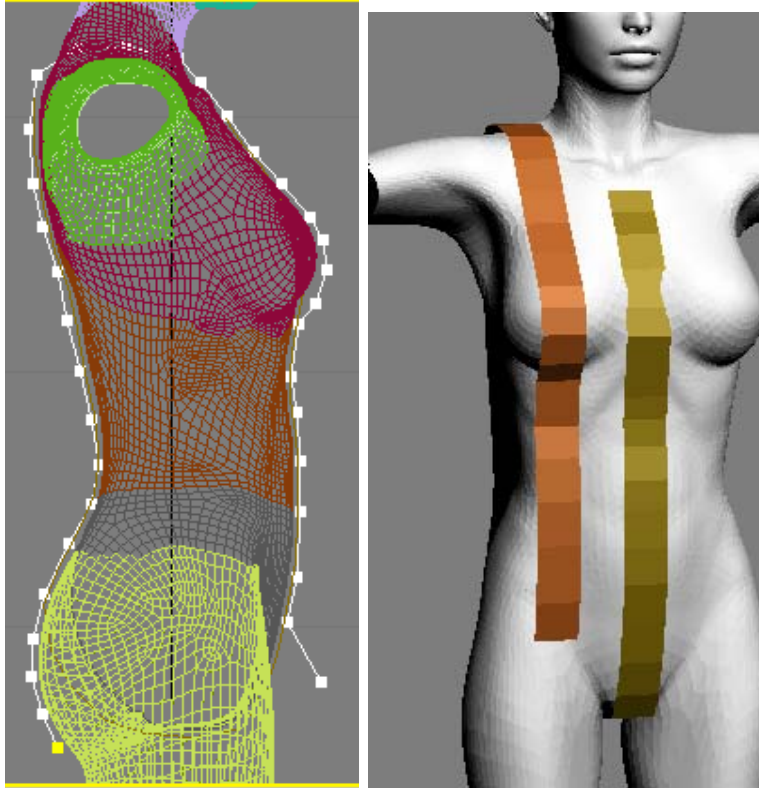
One more spline and we're done with the base leotard creation. This time, in front view, I'll create one from her armpit to her hip - this will be the bridge between front and back spline sections.
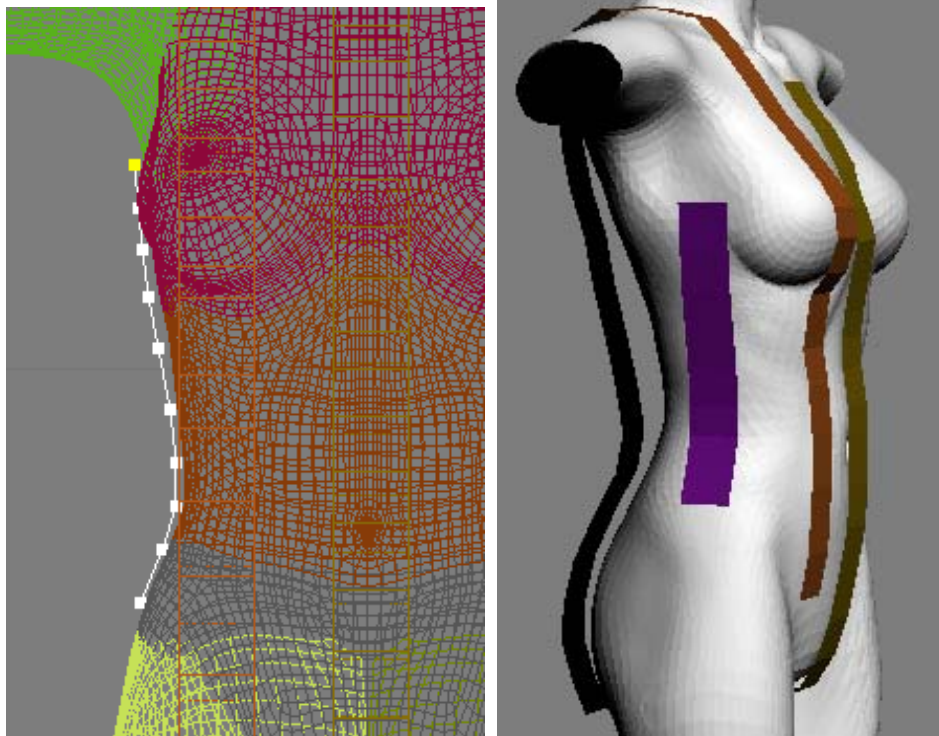
And there we have it - three quick extruded splines that will be combined into one mesh and eventually look more like a proper leotard. Pick any one of them and attach the other two into one mesh object (not group - attach - they need to be one thing). After that, I then move it from the zero layer to one of its own.

One thing I like to do before losing myself in the modeling - change the lighting from the default. I hate working against shadows - so I create a few omni lights, set them to white at half intensity or so, and my scene is lit from all sides, top and bottom. Lights are then moved to their own layer, and hidden so they're not in the way.
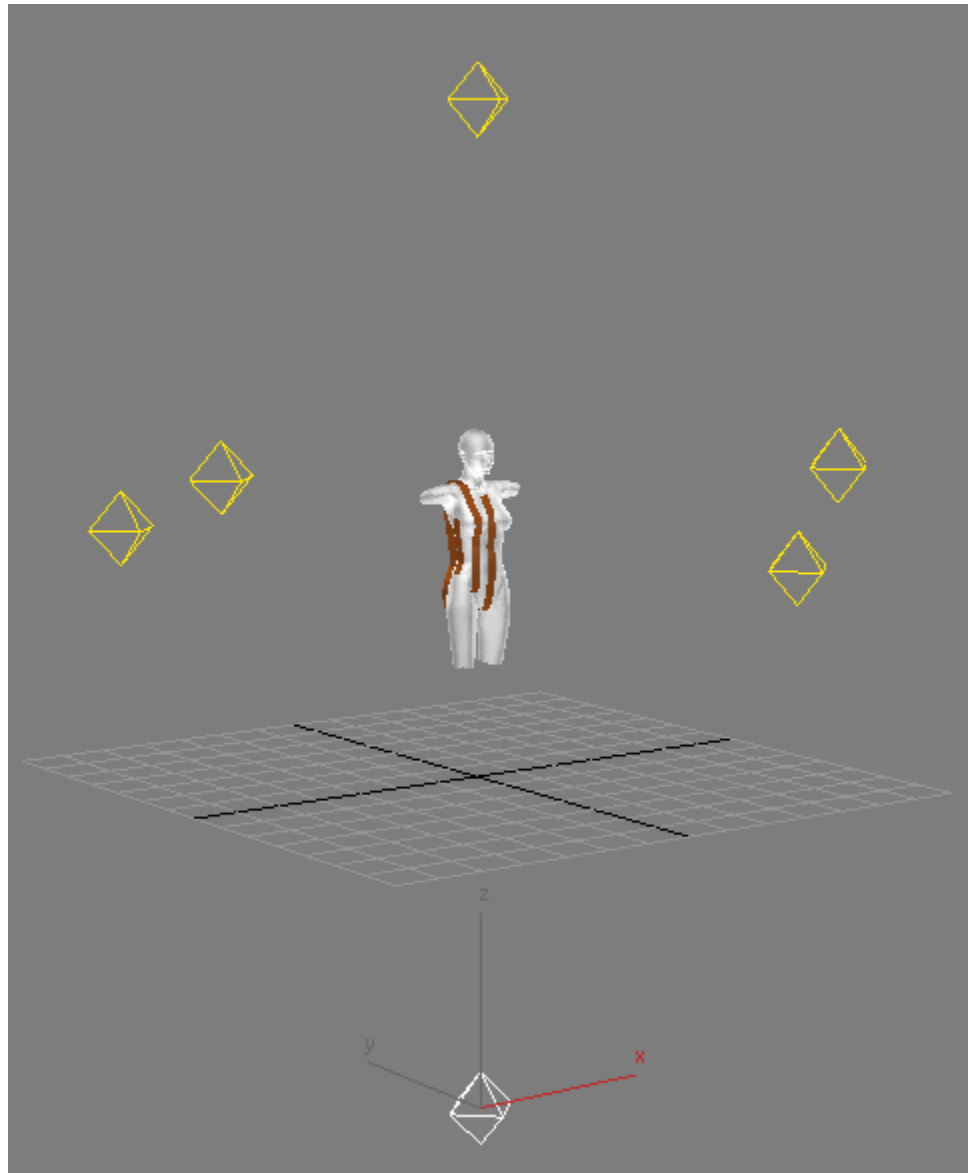

Now, the first thing I've done is to adjust the mesh that was half stuck in her butt by scaling and moving selected edges. This is not a "final" fit - just enough I can see at the verts later on for final adjustments.
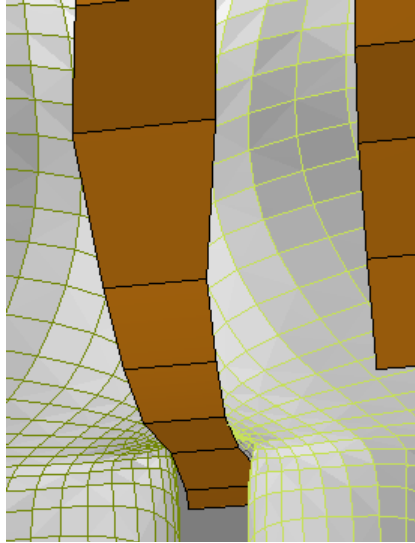
In polygon mode, I use the create function to fill in the gaps with new polygons. I'm not worried about where they intersect the figure mesh, I just need to fill out the rest of the leotard right now. When needed to better match between the two splines, I'll move edges, or weld together on one side, or connect two edges to create a new one if the space is too large.
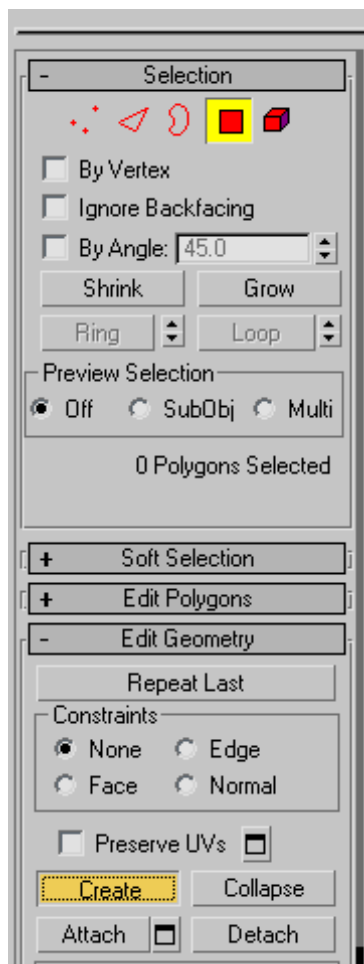
With the create tool, you should now see the verts highlighted while in poly mode - pick one to start with, and click around to the other ones desired to create a new polygon. This is finalized by clicking again on the one you started with.
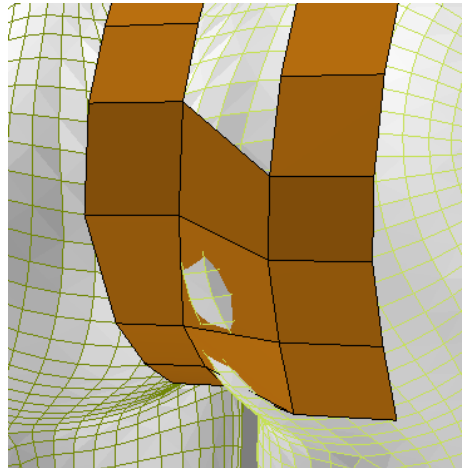

Here, I will probably move the edges on the center spline down to better match the other one rather than move them up. Later, I'll go back in and adjust particular edges/verts to bring the leotard mesh out from the figure.
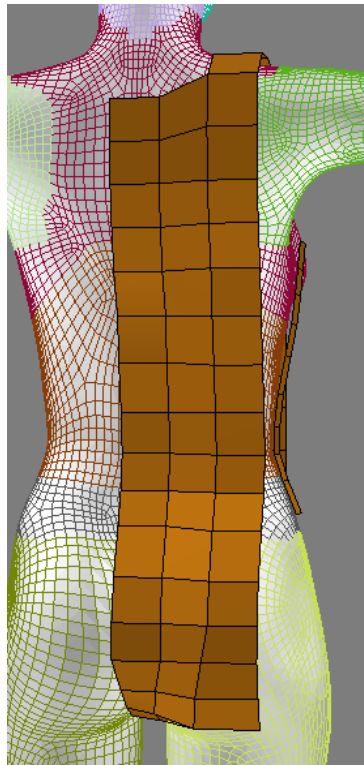

Here is the back filled in. This process is repeated for all gaps between splines. Once this is all complete, I do some base mesh adjusting where needed before I drop a mesh smooth modifier on for final touches.

Where you end up with long joining polygons, you'll want to split them in half (or a few more times depending on length). You can accomplish this by selecting said polygons and using the slice plane on them, or you can select an edge, hit the ring button to select all parallel edges and connect them.
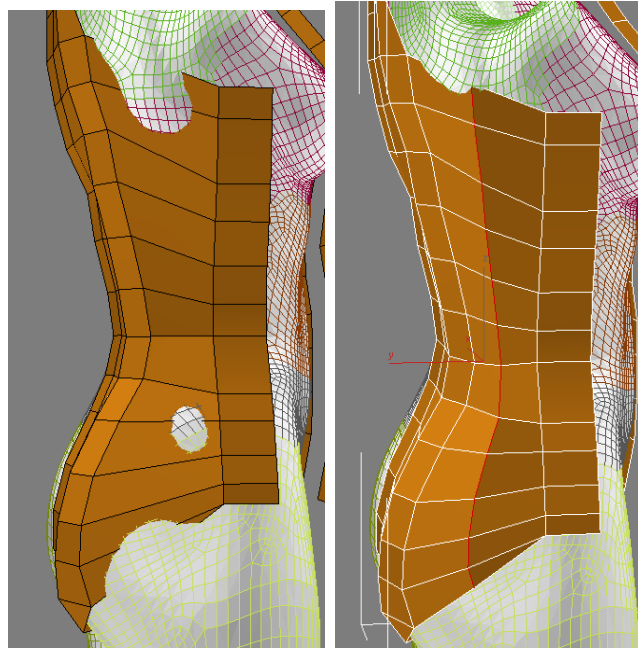

And yes, you are seeing some tri polys in there. That's simply because there are some things a square simply can't do - like connect to a smoother curve when needed in some areas. I use them sparingly and only when needed, as I am here for the leg opening. Now we can see everything come together with all gaps filled, and adjustments made as needed. In a few areas, I had to make some additional cuts to better adjust things.
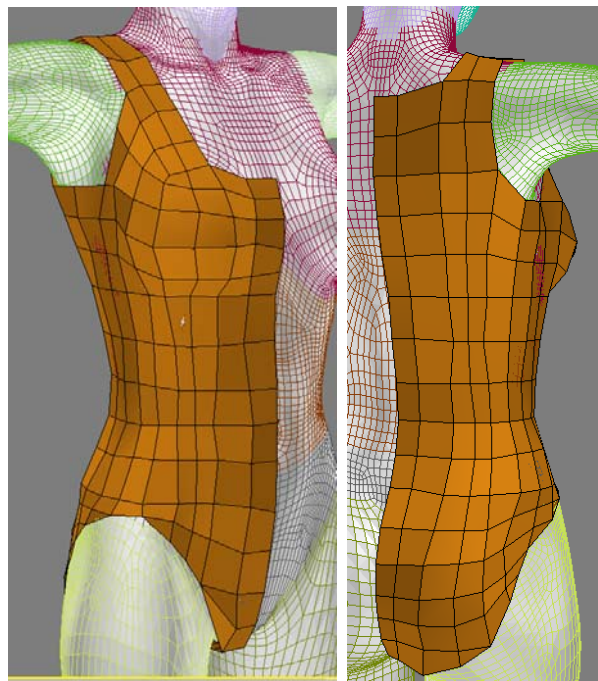
To get the other half of the leotard, we simply mirror it and weld the center seam. With a mesh smooth modifier in the stack, we can get an idea of our nearly finished leotard - there are still some small details I want to add, but I think it's looking pretty decent thus far.
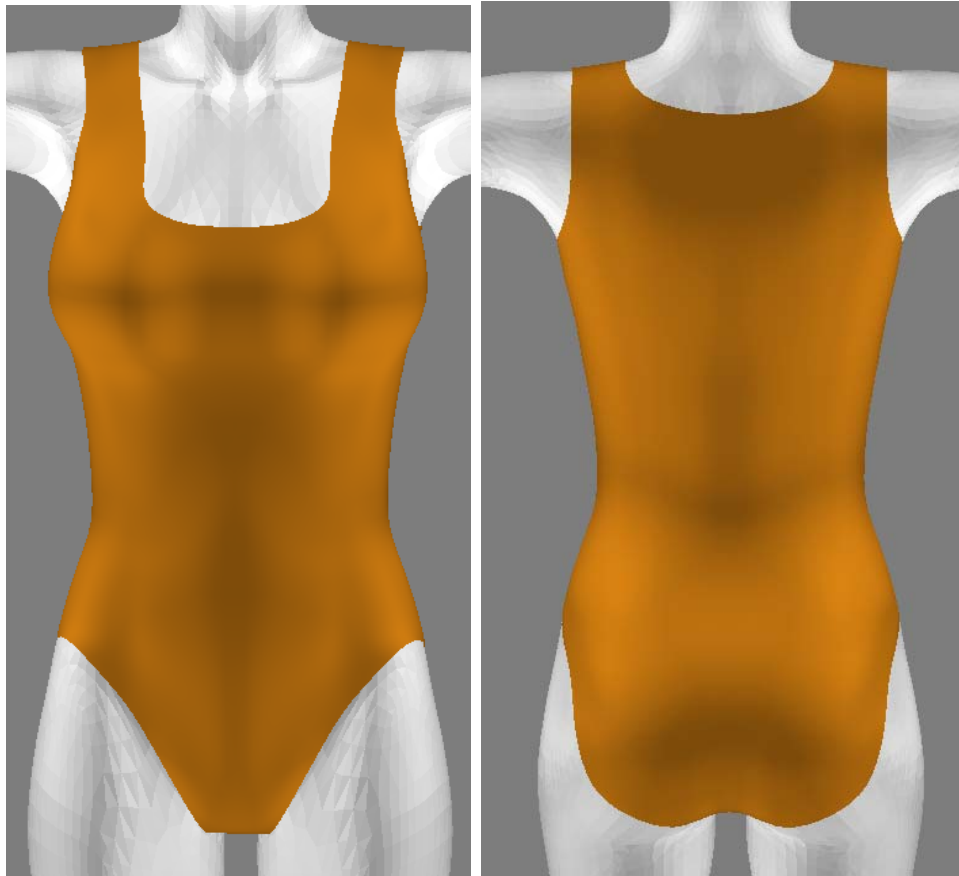
Now, for a more accurate look to the leotard for our Sailor Moon costume, there's a line that runs around the upper torso under the breasts. Now, I don't want just this line to poke out above the rest of the mesh, so I'm setting things up to put a small extrude on the upper polygons. To keep a sharper definition on the line, I did an edge loop to select my modified area, and did a small chamfer on it. This extra line is for when I go to smooth things so I won't lose what I'm adding in. Extruding the mesh slightly will also give it some depth, so it will appear as more than a piece of paper tacked onto the figure.
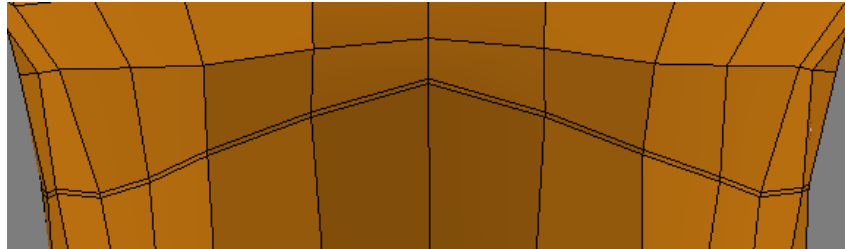
I want that same feeling of depth to the leg openings, but I don't want to extrude it as much as I did at the top. Selecting the remaining polygons under the chamfer area, I do the same, just making the

extrude amount less than before. You can use a method like this to create seams and other related details in your clothing meshes - experiment and see what happens! But first, the relatively finished leotard (I'm still debating on fiddling with the neckline, but for general purposes - the modeling is done)
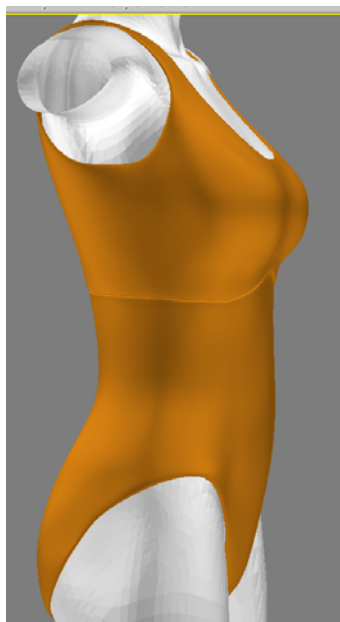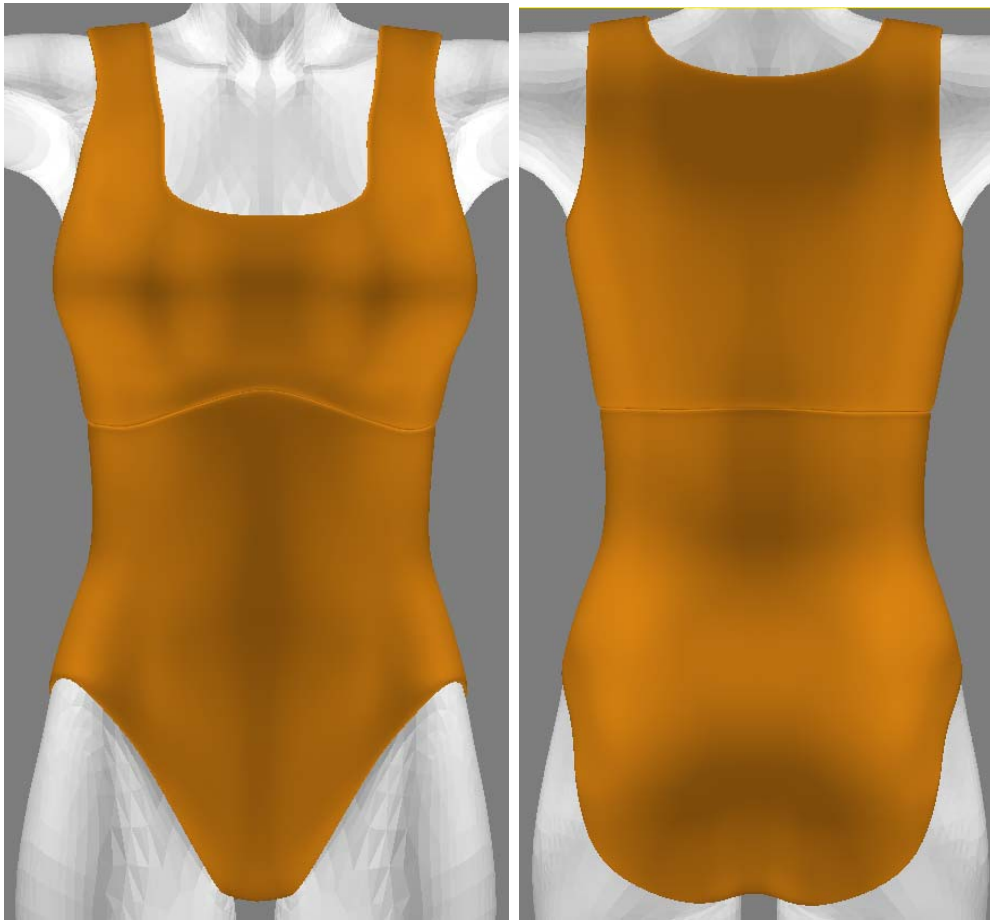
And with a final adjustment to the neckline, I think I'm happy now.

In part two, we'll make the sailor collar. So see you then!