Materials and Mapping Techniques—A Review

Materials and Mapping Joan of Arc

Michel Roger has produced a wonderful tutorial called Modelling Joan of Arc which you have been looking at. He has 17 detailed pages dedicated to Materials and Mapping Techniques which cover all how he makes the materials and maps for the Joan of Arc character. To see these tutorials go to:

http://www.3dtotal.com

At that Web site, select Free Stuff from the menu bar, and choose Tutorials.
Click Complete Projects tab to the right of the tab marked "Beginners."
Scroll down to the seventh (or so) tutorial "Modeling Joan of Arc by Michel Roger

This is a very complete and lengthy tutorial, so even if you've seen it before, you may not have studied the Materials sections closely and slowly. Go to 4.UVW Mapping column and click each of the boxes in the rows (Bases, Sword, Clothing, Armor, Body). Bases covers the fundamentals of material and mapping using a simple rubrics cube type puzzle., Sword covers the mapping of the sword using Unwrap UVW techniques, as does he Armor tutorial that follows it. The Clothing tutorial teaches the basics of UVW texture editing, and The Body tutorial (at the bottom of the column) includes texture vertex welding techniques. These are old tutorials from 3ds Max 4, but the technique is classic and perfect.
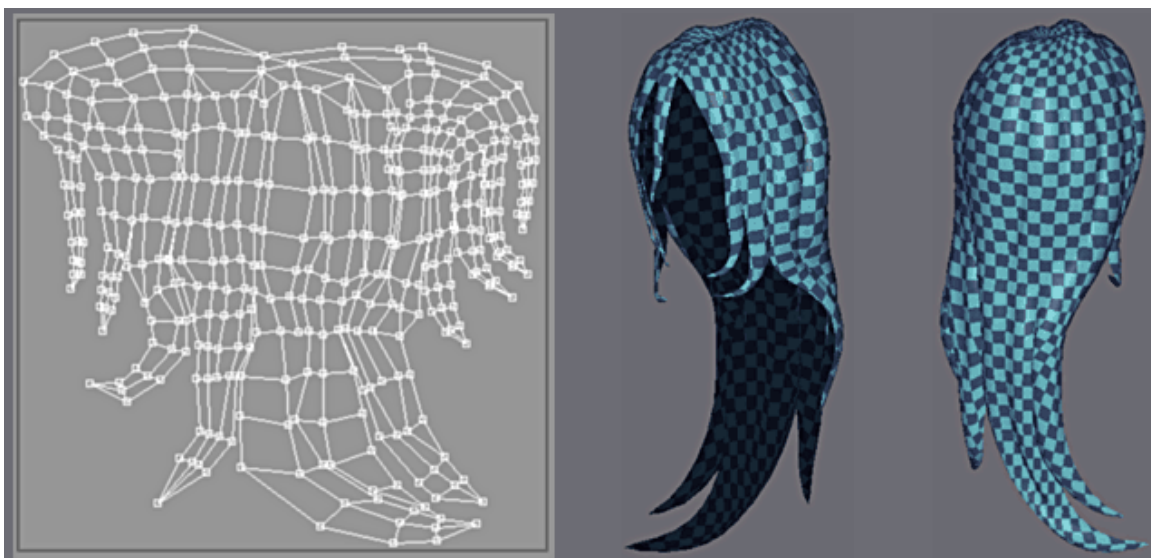
Example of mapping the hair by Michel Roger from Joan of Arc Materials tutorials

Low Polygon Modeling and Animation

It's probably a good idea to review the general way that 3ds Max materials work to make sure there are no key concepts missing from your knowledge base.

Material Editor

Materials are created in the *Material Editor*, which is a floating dialog.
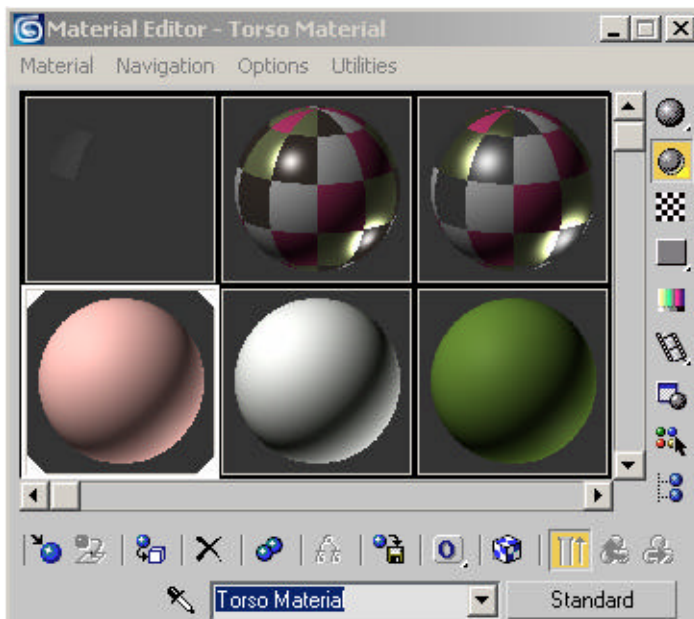
On the menu bar choose *Rendering —> Material Editor* to launch this window or click the *Material Editor* icon on the *Main Toolbar*.

Tip: Press M on the keyboard to open the *Material Editor*.

New Feature: In 3ds Max, clicking the icon will toggle the *Material Editor* on and off. The keyboard shortcut now closes and opens the *Material Editor* as well.

Material Sample Spheres

The *Material Editor's* default setting shows 6 sample spheres. One of the samples will have a white highlight around the sphere indicating the material that is currently active in the *Material*

Editor as shown here. White triangles at the corners of the sample indicate that the material is also in the scene and applied to an object.

NOTE: Materials can exist in three distinct and independent locations in 3ds Max. Materials can exist in the *Material Editor* and also on the scene objects. Materials can also be saved to a material library. These three locations are not coordinated and they do not necessarily reference each other. You can have a material called Torso on a scene object, but not in the *Material Editor*. You could also have three different materials named Torso, one in a material library, one in the *Material Editor*, and one in the scene.

If you use the eyedropper icon, you can have the material from the scene object appear in the active slot.

If you do use the eyedropper, then the same material appears in the *Material Editor* and the scene object, and changes made to the material in the *Material Editor* will be updated in the viewport.
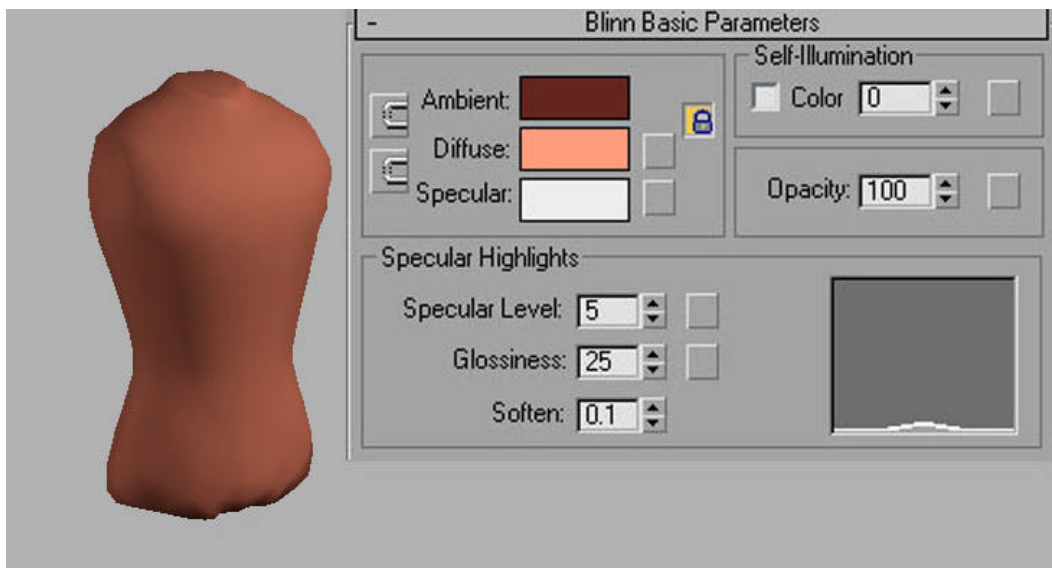

Pink Diffuse color in the *Material Editor*, pink torso color in the viewport.

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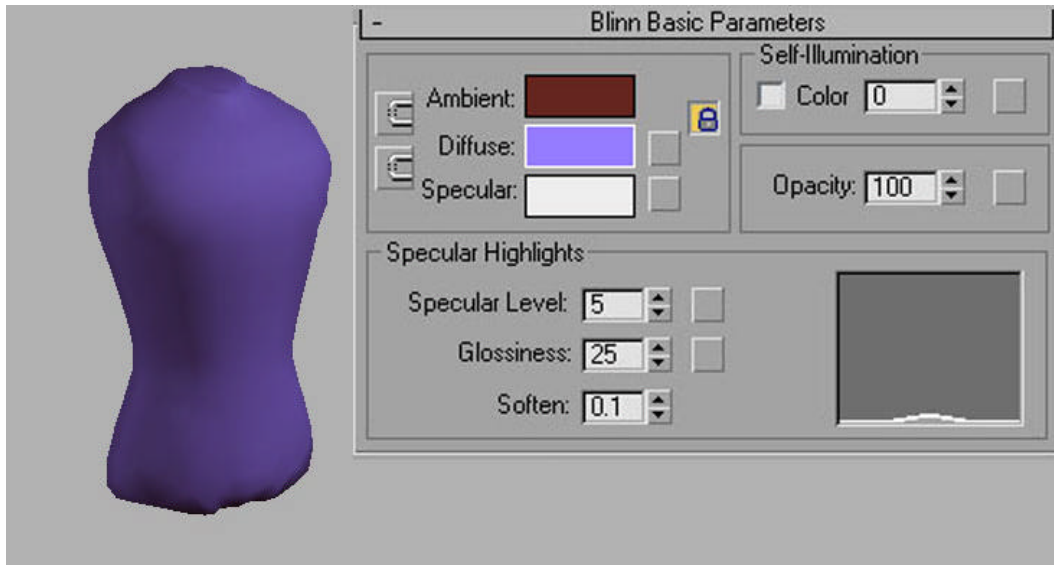
When you change the *Diffuse* color to blue, the torso is updated with the same color.

The Diffuse color channel is a button within any material accessed through the Material Editor. It is also where you add your texture map. Let's use a simple striped bitmap as an example. A small bitmap that ships with 3ds Max called *Concrete.Cast-In-Place.Ribbed.Vertical.2.bump.jpg* is shown here.
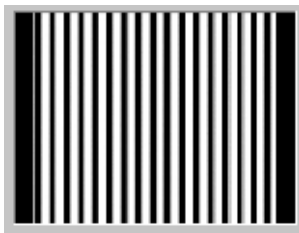

Concrete.Cast-In-Place.Ribbed.Vertical.2.bump.jpg

TIP: You'll find a number of interesting materials that shipped with 3ds Max in the *3ds max*/maps subdirectories.

If you define the map and it's not visible in the viewport, click *Show Map* in the *Viewport* button.


If the object still doesn't display the map, it means you have no *Mapping Coordinates* assigned to the object, and 3ds Max viewport renderer has no clue how you want the texture to be mapped to the surface.
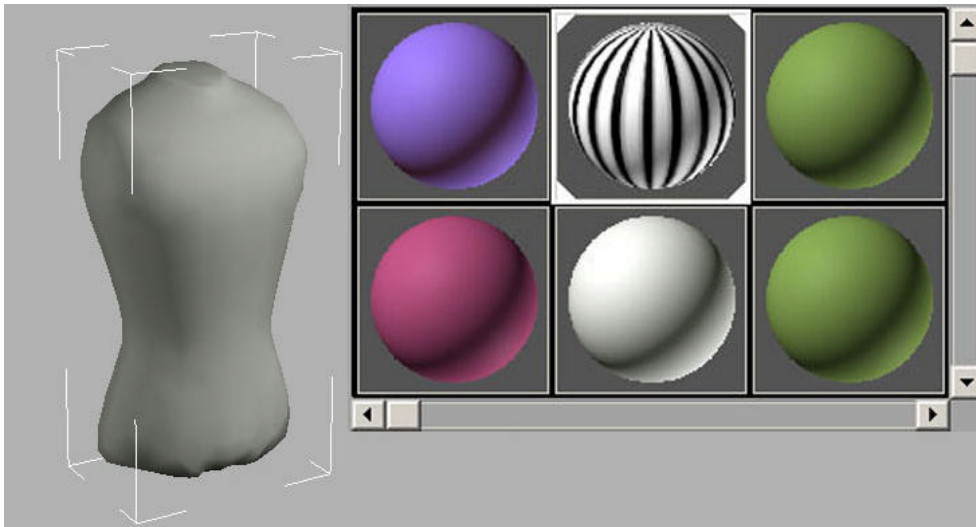
White mesh in the viewport indicates that there are no mapping coordinates. You will add mapping coordinates using 3ds Max modifiers.

You can add a *UVW Mapping* modifier to the stack. This lets you assign the type of mapping to be used to the torso model, so that the texture can be displayed on the surface geometry in the viewport.
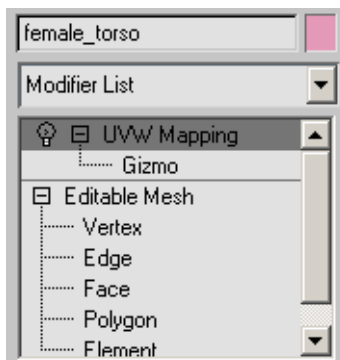

UVW Mapping modifier

In the *Parameters* rollout, you can choose the Mapping type you want. You can use Planar, Cylindrical, ShrinkWrap, Box, Face, or XYX to UVW. The gizmo display will change with the type.

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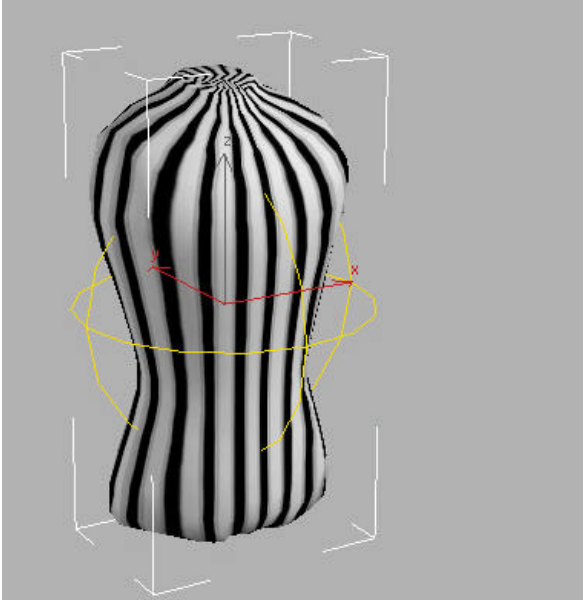
Spherical Mapping Gizmo

Expand the stack entry and choose Gizmo. You can transform the gizmo, rotate it, and scale it to control the way the texture is applied to the mesh.
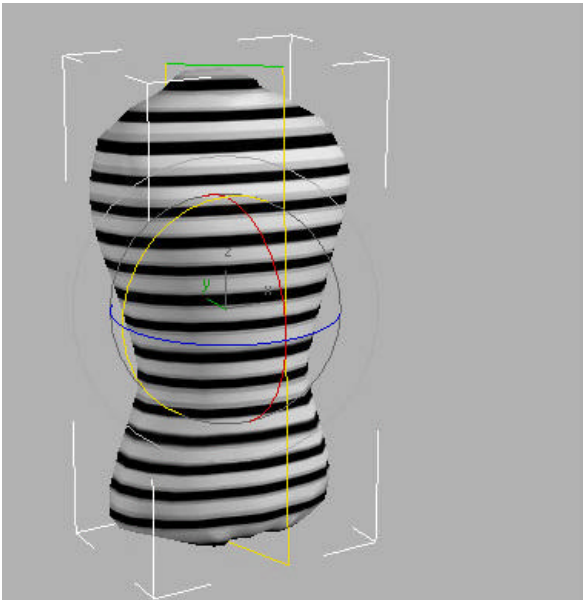
Here a Planar map has been rotated in the viewport, so the stripes follow the contour of the torso.

Use Powers of Two for Textures

Textures are made in powers of two (2, 4, 8, 16, 32, 64…) In most engines the consoles run what are called texture pages (blocks of memory) that lay out the textures used in the game or texture RAM. These textures are set up with a page being equal to either what would be a 1024 x 1024 or a 2048 x 2048-sized texture. The size and number of pages will increase as the newer product appears. You need to understand that the better your textures fit into the pages, the more textures you can have, and the faster the load time of these textures will be. A console has an easier time fitting four 512x512 textures onto a 1024x1024 page than a mixed batch of 2x16…16x32…256x512…32x128 onto the same size page.

Always remember to check that your textures are powers of two!

Mike Dunhour
**2D and 3D Expert**

Multi/Sub-Object Materials

3ds Max only allows one material to be added to an object. If you need to add more than one material on your mesh, you can use a Multi/Sub-Object material. Define your own Multi/Sub-Object Material by clicking the Standard button and choosing Multi/Sub-Object from the Material/Map Browser list.
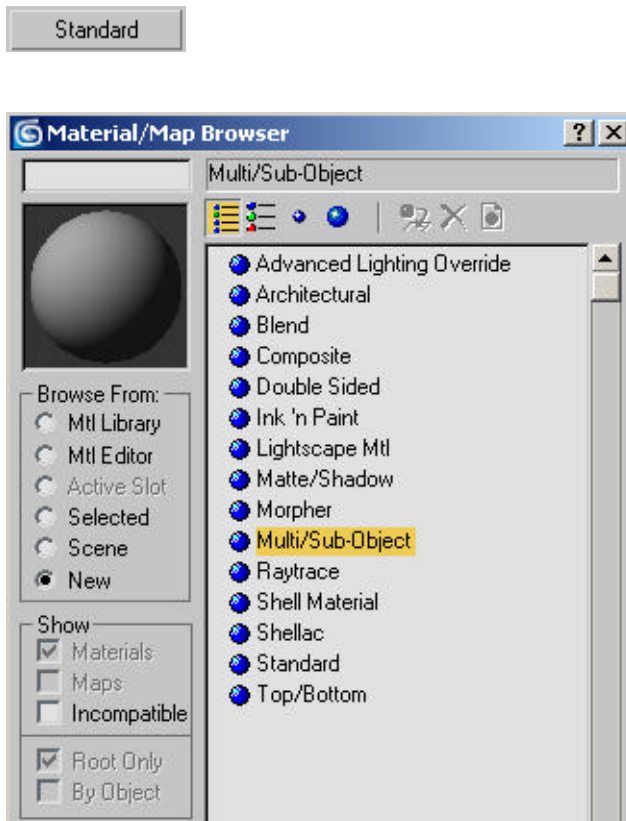

You can define how many materials will be in your Multi/Sub-Object material when you create it.

Tip: There's also an easier way to create Multi/Sub-Object materials. If you collapse your object to an Editable Mesh or Editable Poly, you'll be able to select polygons and drag materials from the *Material Editor* samples directly onto the selected polygons.
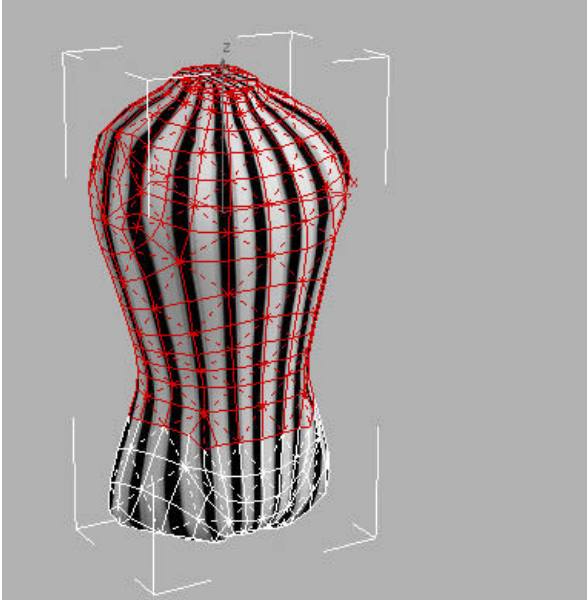
Select these polys and drag the material from the *Material Editor* to the mesh.
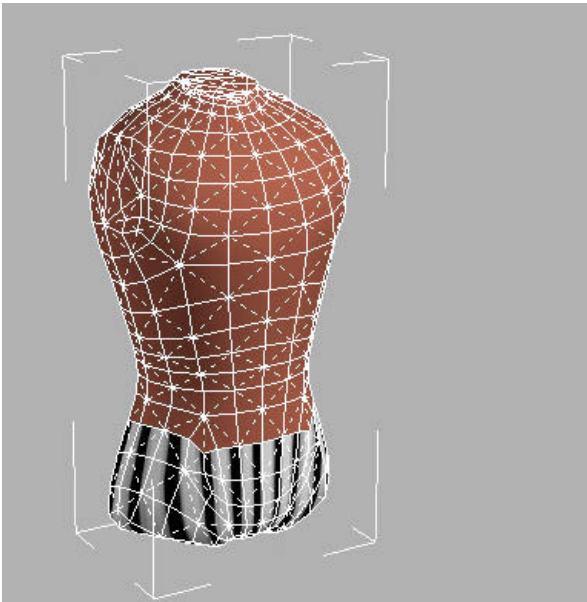
Skin tone material is added to the selected polygons

If you use the eyedropper button to click on the object in the viewport now, you'll see that 3ds Max has automatically created a Multi/Sub-Object material for you. The sample sphere in the viewport now displays the new material.

*A Material Editor* sample for Multi/Sub-Object material.

Warning: There is a bug in 3ds Max. Edit Poly modifier doesn't support drag and drop creation of multi/sub-object materials. Use Editable Poly or Edit Mesh/Editable Mesh if you want to use this technique. For Edit Poly, you will need to assign the Material ID, and then construct the Multi/Sub-Object material by hand.

When you drag the material to the selected polygons you won't instantly see the effect if the selected polygons are shaded red when selected.

**TIP:** Use F2 to toggle Shade Selected to Off, so you can see the material in the viewport.
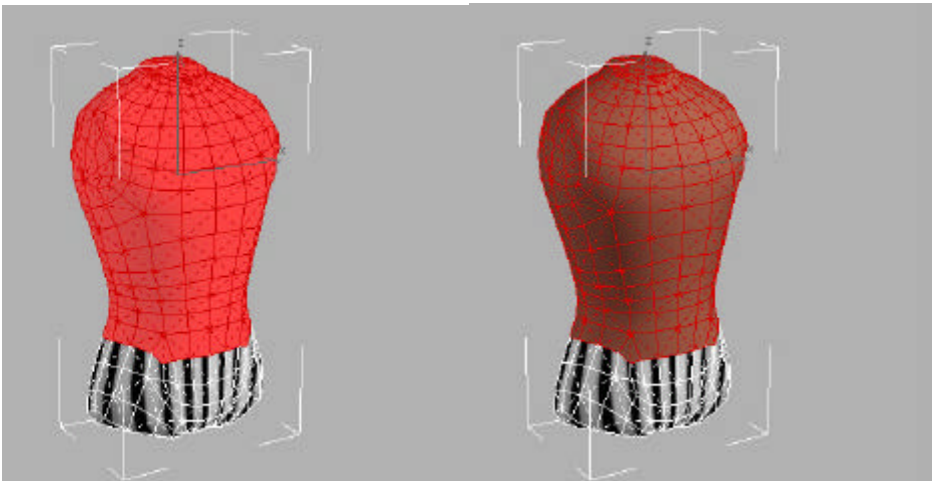
F2 will toggle the *Shade Selected* Polygons off (Left view is On, Right view is Off).
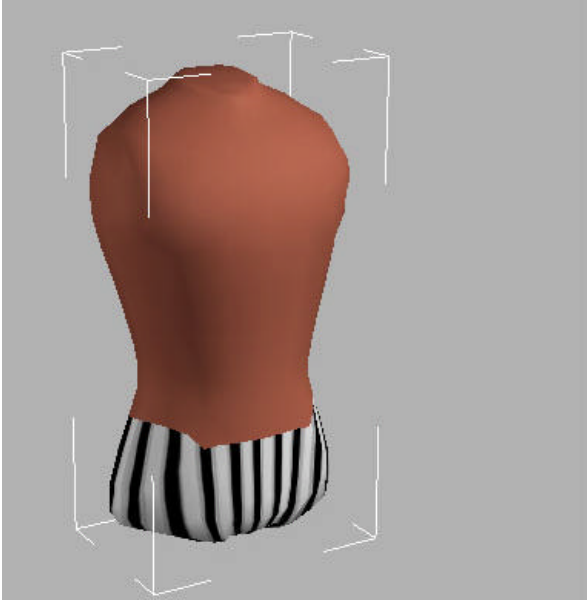
Finished result

The Multi/Sub-Object material uses Material ID numbers to apply the material to the polygon. There is a Material ID modifier you can apply if you want to do this task manually, or you can define the Material ID using the Set ID field in the *Surface Properties* rollout of the Polygon sub-object level of the Editable=Mesh object.
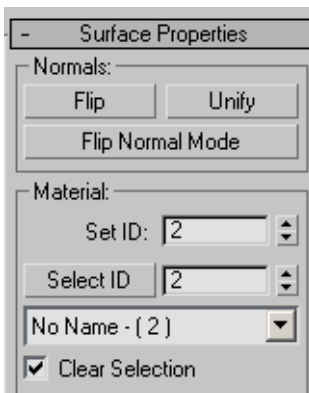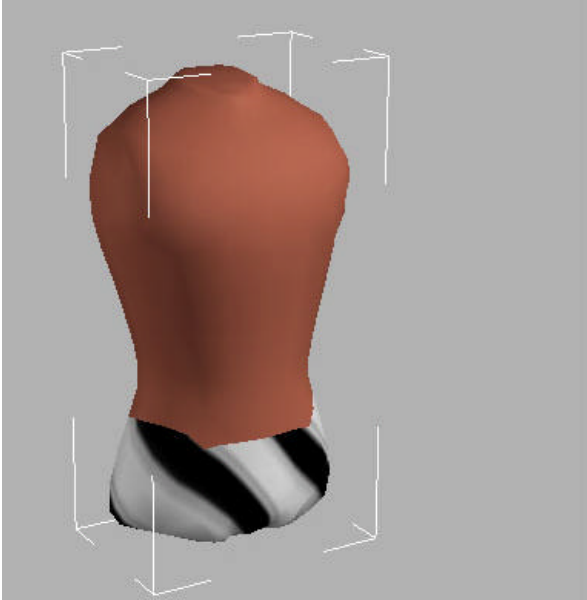
Tiling

The Offset, Angle, and Tiling fields in the Coordinates Rollout let you adjust the mapping from the *Material Editor*. Here the U and W angle values are adjusted so that the stripes run crosswise over the bathing suit.
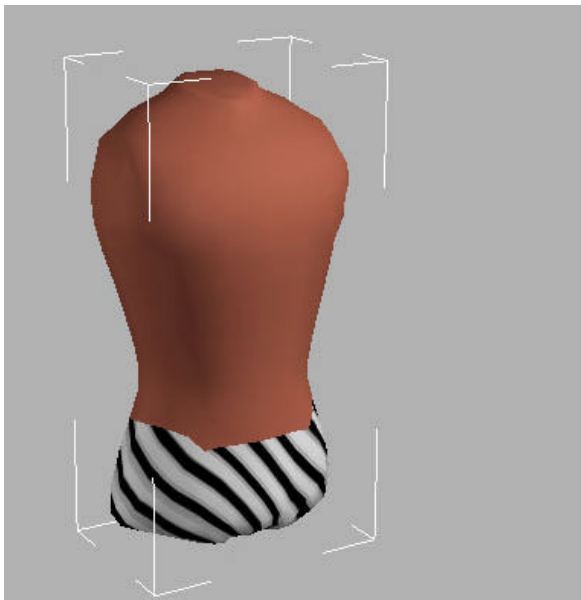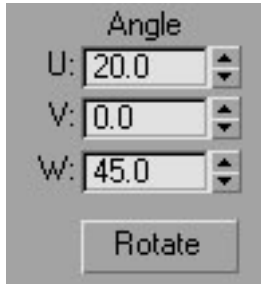
Angle fields used to change the direction of the stripe.

Here the Tiling has been reduced to 0.3, to increase the width of the stripe. Notice that the pixilation is much more evident as the Tiling is reduced.

TIP: 3ds Max has the ability to preserve UV's in Edit Poly modifier or Editable Poly objects. Turn on Preserve UV's before you begin adding vertices, and you will be able to edit your geometry while maintaining your mapping. This is one really good reason to use Edit Poly/Editable Poly object.