

Intro to Blender Mesh Modeling- Basic Meta Modeling

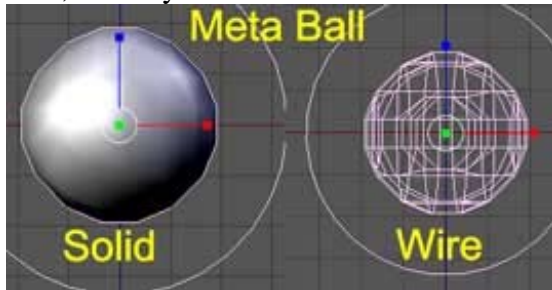
By Mr. D at Delta 3d

WHAT ARE META SHAPES

As stated elsewhere in another paper, primitive Meta Shapes or Meta Balls are graphical representations of mathematically defined volumes. These shapes can have a positive (attract) or negative (repel) property when put in proximity to other Meta Shapes.

By combining a number of Meta Shapes primitives they redefine a new volumetric shape, which can then be converted into a Mesh Object.

Now clear out a work **3d View** work area, and have another Window Type setup for **Buttons Type**. Then in the **Information Type-Header Bar** do an **Add >Meta >Meta Ball**, or use your 'Tool Box/Marker Menu' to do the same.



First off toggle back and forth between Solid and Wireframe, where the Solid view helps give you an idea of the Volume defined by the Meta Sphere. The wireframe however is **Not the sub-components** of the Meta Sphere, but a representation of what would be the resulting Mesh if the Meta

Sphere was converted to a Poly Mesh based on current settings.

To help further understand this go into 'Edit Mode', and look at your 'Header Menu Bar' and notice how unlike with a mesh primitive you see **no Icons for Vertices-Edges-Faces**.

Now look at the Meta Sphere in 'Edit Mode' and notice the two rings around it, one green and one pinkish. These circles show you the Meta Sphere's area of influence with green falling off towards pink.

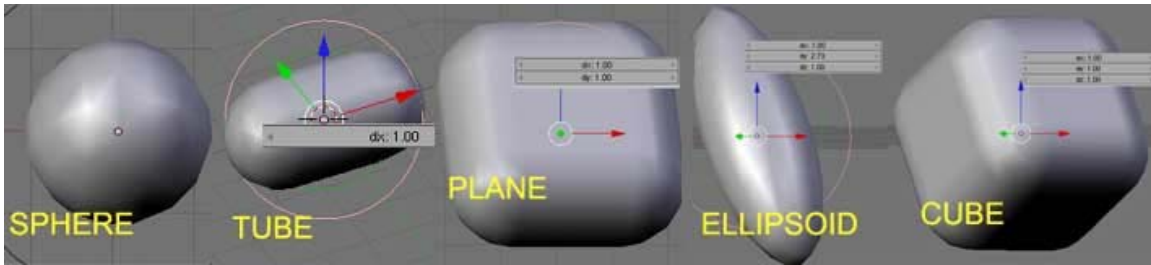
METABALL TOOLS

Next look in your 'Buttons Type Window' (in 'Editing' mode) at the **MetaBall Tools Panel** where the primitive shape types are shown and where 5 types are listed (1) *Ball* – *Tube* – *Plane* – *Ellipsoid* – *Cube*. Try out the different types by clicking on them, and your Meta Sphere will morph into that type of primitive.

This is handy as in MetaBall Modeling you often likely to simply '**Shift d**' duplicate a new Meta Object rather than create a new one from the menu. Why? Because when modeling your object it's easier just to duplicate and drag a new Meta Shape away, than to create new and try positioning a Meta into your shape.

Take note of the area below the input for '*Stiffness*', where options dealing with certain size values will show for different types. For 'Ellipsoid' you may need to change the values a bit as in the following image, as a default Ellipsoid looks just like a Sphere.

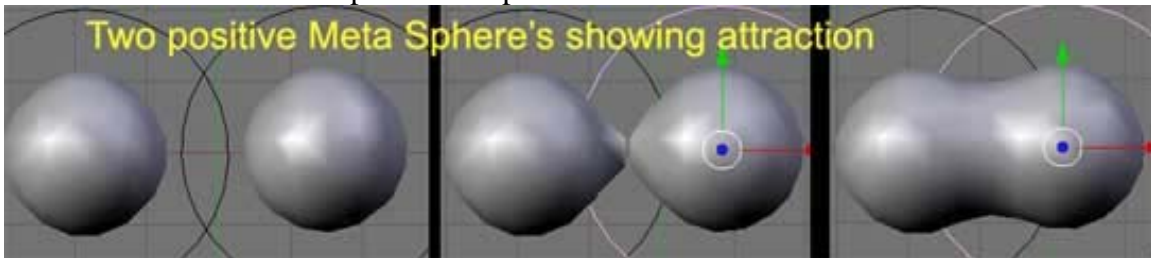




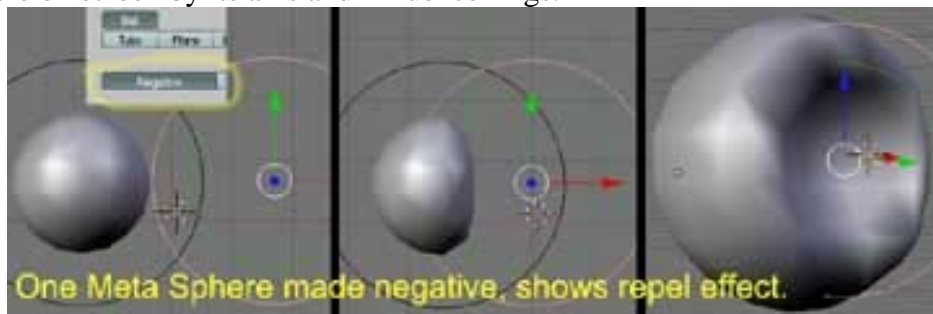
Types of Meta Primitives Available

POSITIVE AND NEGATIVE:

Positive Meta Shapes are attracted to one another and will deform themselves to try and make contact with another positive shape to define a new volume.



2) From above shows the button to activate if you want a Meta Shape to act as a negative or repelling force. **Caution** here as when you turn the Meta to negative it is only noticeable on screen by its axis and influence rings.



3) Hide: Simply hides the Meta Shapes, useful as when Meta Modeling occasionally you will want to check out what the resulting Polygon Mesh will look like. So you can convert and keep the Metas, then hide them and check out you results; next delete the Poly and tweak the Meta Shapes if undesired results on conversion.

STIFFNESS: Stiffness of *active Meta*, goes from 0 to 10. Deals with influence effect; or better way to look at it controls distance between green and pink influence circles. 10 makes green extremely close to pink meaning full influence of Meta effect on Shape.



METABALL: (3d view in edit mode)

Buttons Type Window > Editing Panel > MetaBall

1) Wiresize: goes from .05 to 1. Controls polygonization resolution in 3d view, or how dense a mesh approximation is displayed in the 3D View. With .05 very dense, 1 highly optimized.

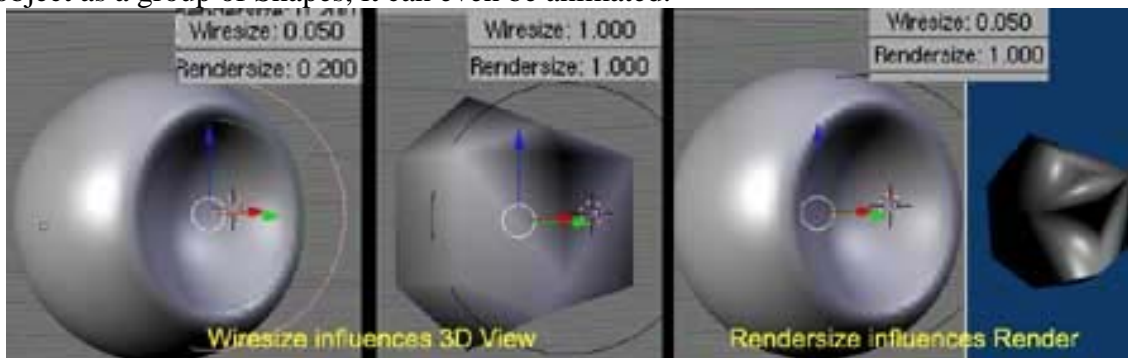
IMPORTANT NOTE: When converting a Meta Shape to a Polygon object, the mesh density of the resulting object comes from this value.



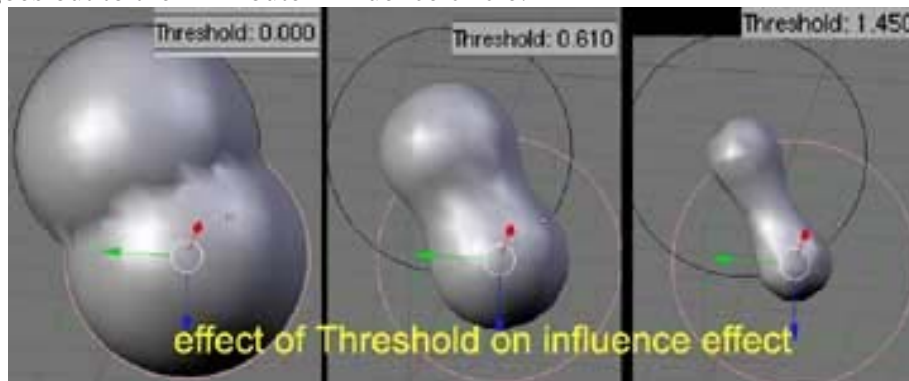
2) Rendersize: goes from .05 to 1. Controls polygonization on render; as with Wiresize lower number means more dense mesh rendered. But only shows when a full render is done from camera view.

A complex Meta Shape can include a large number of Metas, where you might like to turn down the Wiresize for easier viewing and quicker 3D View updating. However you may be working on a high rez mesh and want to see how it will look rendered.

You Do Not have to convert a Meta Shape to a Polygon Mesh, you can simply leave an object as a group of Shapes, it can even be animated.



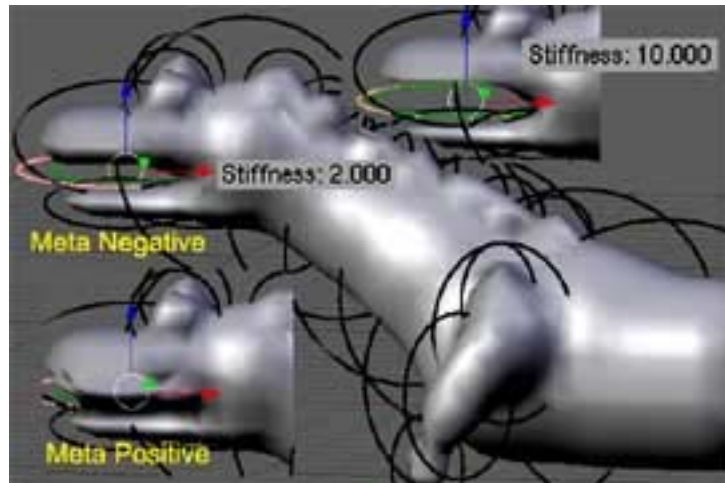
3) Threshold: Defines influence of Meta elements, goes from 0 to 5. ***Applies to all Meta Shapes being used***, with 0 being full influence, or notice in the image how the Meta Sphere goes out to the Pink outer influence circle.



4) Update: Deals with type of 3D View redraw updating of Meta shapes, options are ***Always- Half Rez- Fast- Never***. For you to see a Meta Shape represented in the 3D View Blender does a on the fly conversion and rendering of the Meta Shape as if it were a Polygon Object. Remember for you to see that shaded object in the 3D View Blender

needs to have a polygonal shape with normals to base its shading on. Since a Meta is only a mathematical equation Blender needs to do this or there would be nothing to show. Choices here reflect the level of speed and optimization used in calculating that display.

Kind of difficult to grasp by just showing two Meta Balls, so I laid out this fellow by quickly duplicating then resizing one Meta Ball a number of times. Notice all the black circles, they represent various MetaBalls used. Not pretty but perhaps 15 minutes to rough out.



As you can tell by the multitude of MetaBalls, you can see why you might need to turn down your Meta density in your 3D View on complex creations. Also for the mouth see where I needed an opening, I made use of a *Negative MetaBall* to push the upper and lower jaw Metas apart. Further I increased the '*Stiffness*' of that Negative MetaBall to get a cleaner/flatter looking opening.

CONVERTING TO MESH

To carry out a conversion you will need to be in 'Object Mode', so put your 3D View Window into that Mode. Now select your Meta Object by selecting the first Meta Shape you created, as Blender is designed that all Meta Shapes you create after the first one in a scene are part of this Metas final volume shape. Even if other Meta shapes do not touch this one, they are considered part of it.

You'll know you have the right one if all other Metas and your shape highlight in pink. Now before converting *switch your 3D View to Wire* and decide if the wireframe you see displayed has the density you want. If more or less go to your *Buttons Type Window > Editing Panel > MetaTools* and adjust your '*Wiresize*' till you get the desired density.

Next in the **3D View Type Header Bar** go to '**Object**' and select '**Convert Object Type**' or "**ALT c**". Clicking will bring up a pop up menu under your cursor of *Convert MetaBall to:* with two choices on whether to *keep your Meta Shapes or Not on Conversion*. Pick the one you want and click, and now the shape is a Polygon Mesh.

A FEW THINGS TO UNDERSTAND

Before converting your Meta to a Mesh there are a few things to understand.

- 1) Metaballs have uniform density, so you can not assign different *Wiresize* values to different individual Metaballs.
- 2) Create a few Meta shape in a Window and maximize it, next move and rotate the Shapes about and watch carefully how the volume mesh has to reshape itself. You need to check your volume before converting and adjust if needed.