**Head Modeling Terms/Tools**

**Terms**

**Topology** – The way in which a polygonal mesh is constructed: the arrangement of edge loops and how they flow across the objects surface. Good topology uses quads with logical edge-flow, such that when the object is smoothed there are no unwanted kinks in the geometry. Signs of bad topology are “n-gons” and edges flowing in directions that don’t make sense.

**N-gon** – A polygon with more than four sides.

**Articulation** – In this context, we’re referring to the way a model moves when is it rigged and animated. Good facial articulation means that the model is able to create realistic and believable expressions and/or shapes.

**Pole** – An intersection of geometry where more or less than 4 faces are connected. These can cause smoothing and rigging issues if not placed correctly on the model.

**Topics Covered**

* **Reference Planes**
* **Create Polygon Tool**
* **Modeling Toolkit**
* **Sculpting Tools**
* **Proper Edge Flow (Hippydrome)**
* **Organic Modeling workflow**
* **Ear Modeling**
* **Mirroring**

**Tips**

* ***SAVE ITERATIONS***. Do it repeatedly, do it often. This is applicable to anything and everything you work on.
* When working on a particular part of the head, let one of the orthographic cameras be the “dominant” camera. If, for example, you’re working on the face, then the front orthographic camera should be used for X and Y axis positioning of facial vertices; use the side orthographic camera to determine the correct Z translation.
* Pay particular attention to defining the nasolabial fold; good definition here is fairly crucial when rigging the model for facial expressions.

**Additional Resources**

* <http://hippydrome.com/>
* [Modeling the Human Ear Tutorial](http://www.erraticimagery.com/extras/earmodeling.mov)

**Tools**

* **Modeling Toolkit** 
  1. Under Mesh editing tools, we used Target weld, Quad Draw and Extrude
  2. For quad draw, go to front or side orthographic view (in the demo, we used front) place your dots and then hold shift to place quads
  3. Target Weld, be careful, this tool is very sensitive and will sometimes weld to things you don't want it to
* **Create Polygon Tool**
  1. Create a single polygon by manually placing vertices. Left-mouse to add vertices. Press Backspace to undo the most recent vertex. Press Enter to finish.
  2. *Where to find*: Mesh Tools -> Create Polygon Tool
* **Extrude (Edge)**
  1. Duplicates the selected edge and connects it to the original. For translating or rotating the extrusion, the individual Translate and Rotate tools usually behave more consistently than the manipulator that appears immediately after extruding.
  2. *Where to find*: Edit Mesh -> Extrude, or in the marking menu, Extrude Edge accessed by holding shift and right-mouse while at least one edge is selected. **OR in the modeling toolkit**
* **Append to Polygon Tool**
  1. Creates a new polygon that spans the gap between two or more existing polygons. Left-mouse once on the starting edge, and then again on the edge to span to. Press Enter to finish.
  2. *Where to find*: Mesh Tools -> Append to Polygon Tool, or in the marking menu, Append to Polygon Tool accessed by holding shift and right-mouse while an object is selected.
* **Merge Vertices**
  1. When three or more vertices are selected, merges any vertices within the distance threshold designated in the options. If only two vertices are selected, merges them regardless of distance.
  2. *Where to find*: Edit Mesh -> Merge, or in the marking menu, Merge Vertices -> Merge Vertices accessed by holding shift and right-mouse while at least one vertex is selected.
* **Merge Vertices To Center**
  1. Merges any number of vertices to the center point in space between them all.
  2. *Where to find*: Edit Mesh -> Merge To Center, or in the marking menu, Merge Vertices -> Merge Vertices To Center accessed by holding shift and right-mouse while at least one vertex is selected.
* **Combine**
  1. Combines two separate polygonal objects into a single object.
  2. *Where to find*: Mesh -> Combine.
* **Sculpt Tool**
  1. Manipulate topology with a brush interface
  2. *Where to find*: Mesh Tools -> Sculpt Tools.
* **Soft Selection**
  1. Create a tapered area of influence
  2. *Where to find*: Press the b key with the move, rotate, or scale tool selected. Change soft selection behavior in the Tool Settings for move, rotate, or scale.
* **Conform Normals**
  1. Give all faces a uniform direction to face
  2. *Where to find*: Under the Modeling menu set, Mesh Display -> Conform