CORNELL NOTES – GRAPHICS FOR GAME DEVELOPMENT

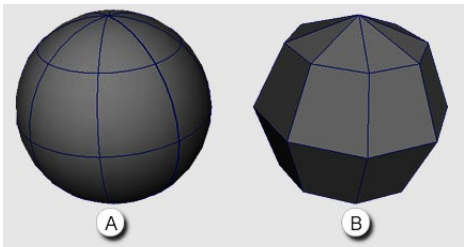
	Topic/Objective: ***Lesson 2: Polygonal Modeling***	*Name:*
		Class/Period:
		Date:

Lesson Objective:
To understand why we use Polygonal Models over NURBS as well as how to model these mesh objects using a variety of tools from the Modeling Toolbox

Questions:	*Notes/Answers/Definitions/Examples/Sentences:*

Modeling in Maya

- **NURBS Modeling:**
  a. Considered a **patch-based modeling system**
  b. Consists of **curves** rather than **straight lines**
  c. You can get the same amount of **curvature** for a lot less detail
  d. So why don't we just use these objects for game design art?
     i. Less detail means there's less **flexibility**



Nurbs sphere(a) and polygon sphere(b) with the same number of points.

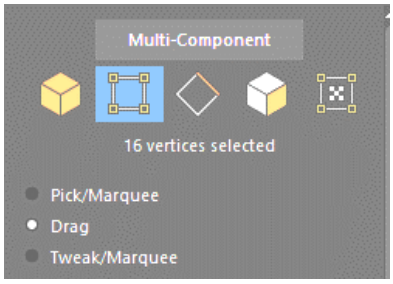
- **Polygonal Modeling:**
  a. Most common geometry type used in 3D
  b. You know by now they are made up of **vertexes, edges, and faces.**
     i. Of the three, the viewer can only see the **edges**.
  c. Downside: individual faces are always just **flat planes** which can in turn make the object look **unreal**
  d. To fix this and smooth out the areas: **add more polygons!**

Ways to Add Polygonal Models

1. Use the **Poly Modeling** tab in the **Shelf**
2. Menu Commands: **Create > Polygon Primitives**
3. Add primitives interactively by checking **Interactive Primitives**
   a. Allows you to **manually adjust** the size of primitives during creation

Working with the Modeling Toolkit

- Top portion gives you various ways to select **the object, it's vertices, edges, and/or faces**
- Multi-Component
  - Let's you select any combination of the vertices, edges, and/or faces
- Instead of holding your **SHIFT** to select multiple vertices/edges/faces, click the **Drag** feature instead



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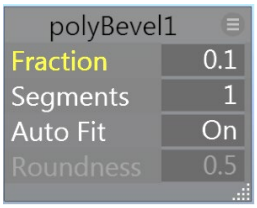
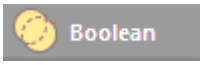
- When you activate many of the following tools below, you will see the **<u>In-View Editor</u>** show up on your screen
  - Contains lots of options for that particular tool



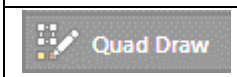
1. Mesh

	<u>Joins the selected polygon objects into one</u>
	<u>Divides the selected polygon back to it's original shells</u>
	<u>Subdivides a polygon object; allows you to control the number of divisions it has</u>
	**<u>Modeling with polygonal objects (union, difference, intersection)</u>** • Must have at least **<u>(2) objects</u>** selected • The **<u>order of objects</u>** you select makes a difference on how these objects are modeled

2. Components

	<u>Pulls out new polygons from the selected polygon object</u>
	<u>Expands each selected edge into a new face; rounding the edges of a polygon mesh</u>
	<u>Connect two sets of edges together with a piece of mesh</u>
	<u>See "Smooth Tool" (both are similar)</u>

3. Tools

	<u>Various tools to cut, slice, or insert edges in polygons</u>
	<u>Merges two edges or vertices into a single component</u>
	<u>Connects the selected polygon components (Similar to Bridge Tool)</u>
	**<u>Creates quads, extends edges, and auto-weld components together</u>**

Add this tool:

- **<u>Create Polygon – creates a custom polygon mesh that can be later used with the Extrude Tool to turn into a 3d Object</u>**