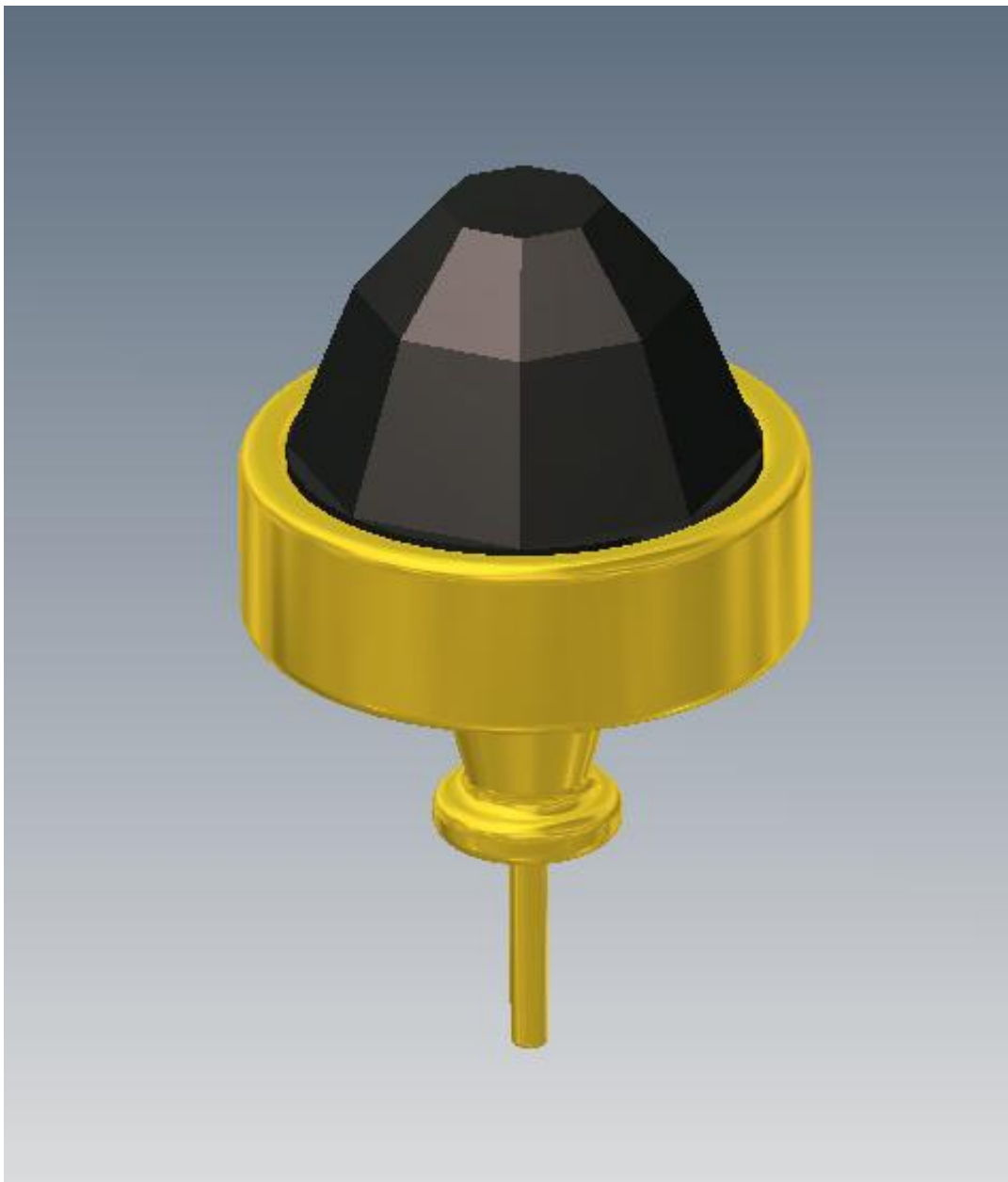# AutoDesk Inventor

Earring Tutorial – AutoDesk Inventor 2011

In this tutorial, you will construct a multi-part assembly – an Ear Ring.

Part 1 – The Fitting

1. Open *Inventor*. In the *Get Started* tab, click on **Projects > New > New Single User Project**. Click Next.

2. In the **Project Name** box, type *Earring*. In the **Project (Workspace) Folder**, Click on the browser box [....] to select your **H:\ drive.**

3. In the **Browse for Folder** box, navigate to your **CAD** folder. Click on **Make New Folder**, and name the new folder **Earring**. Click **OK** > **Finish > Apply > Done.**

4. *You will use this process whenever you start a new project.*

5. In the **Get Started** tab, click on **New**. Choose **Templates > Metric > Standard(mm).ipt,** then OK. This will open a new, standard **METRIC** part file in Inventor.

6. Click on the **Save** icon [💾]. Since you created a **Project Folder**, your Earring parts should automatically be saved in your Earring project folder. Be sure the file name for this part is *fittingINL_CAD_1.*

7. Go to **Tools > Document Settings > Units.** Be sure *Millimeters* is selected in the *Length* dropdown menu. Click **Apply > Close**. **Watch Video 2**
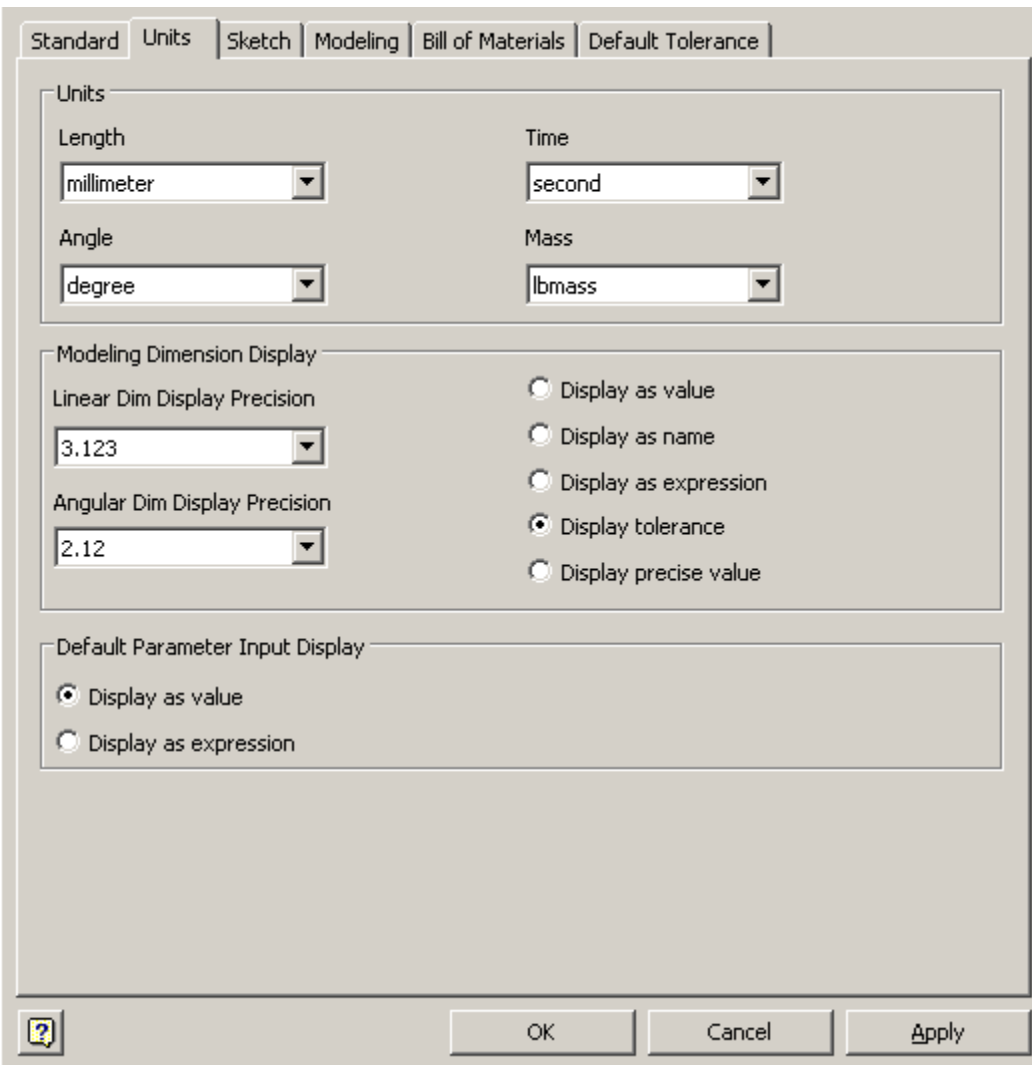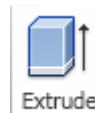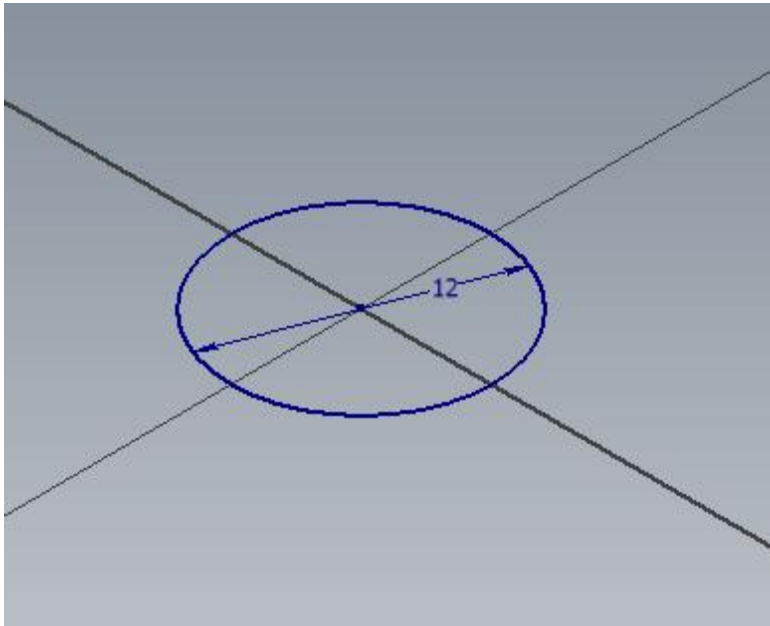
8. Click the "+" sign next to the *Origin folder* in the *Browser Window*. Right Click on the **XZ Plane > New Sketch.**
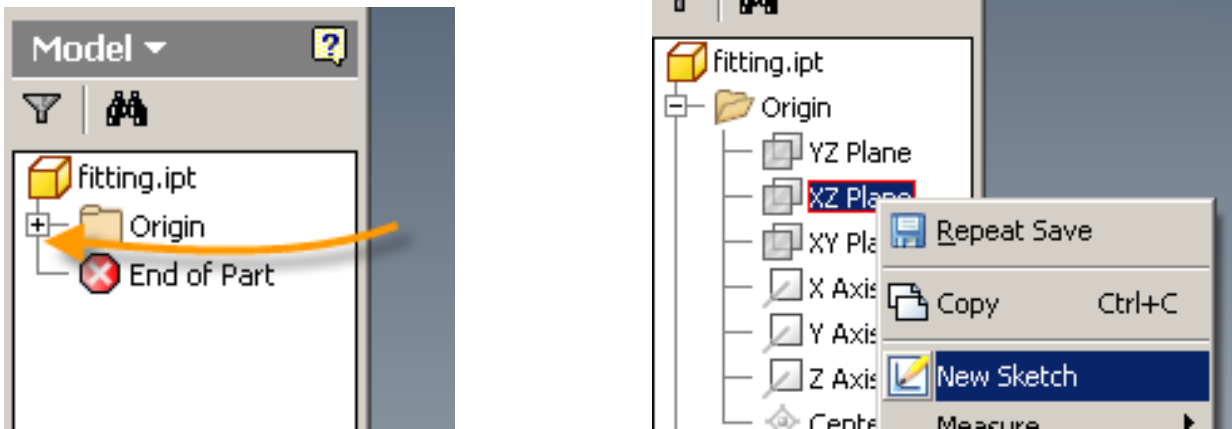

9. Hover your mouse over the **View Cube** area and click on the house icon 🏠. This will set the screen view to *isometric.*
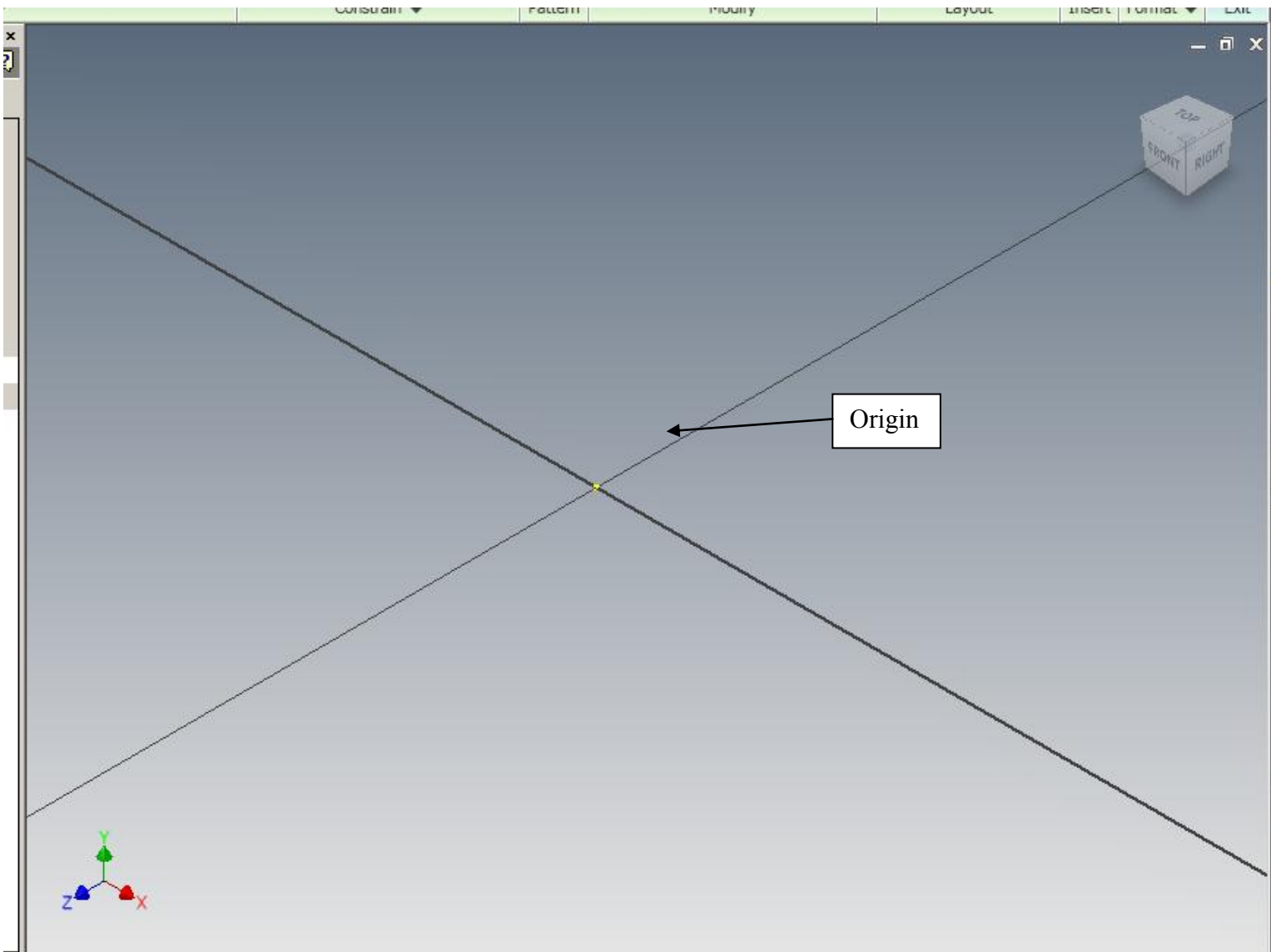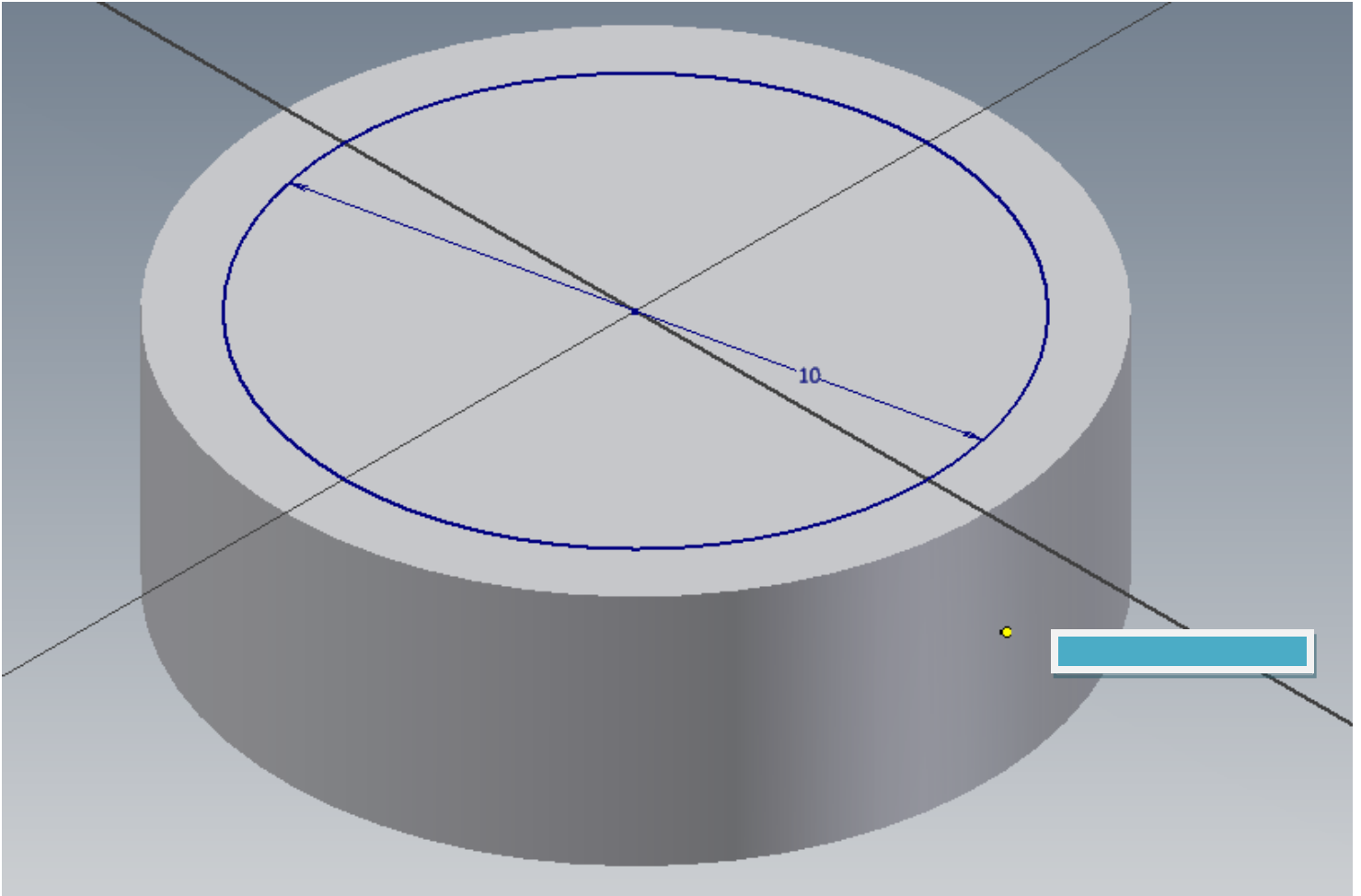

Origin

10. In the *Draw* tab, select the *circle* tool. Staring at the *Origin*, drag out a circle of **12 mm**. Click on Finish
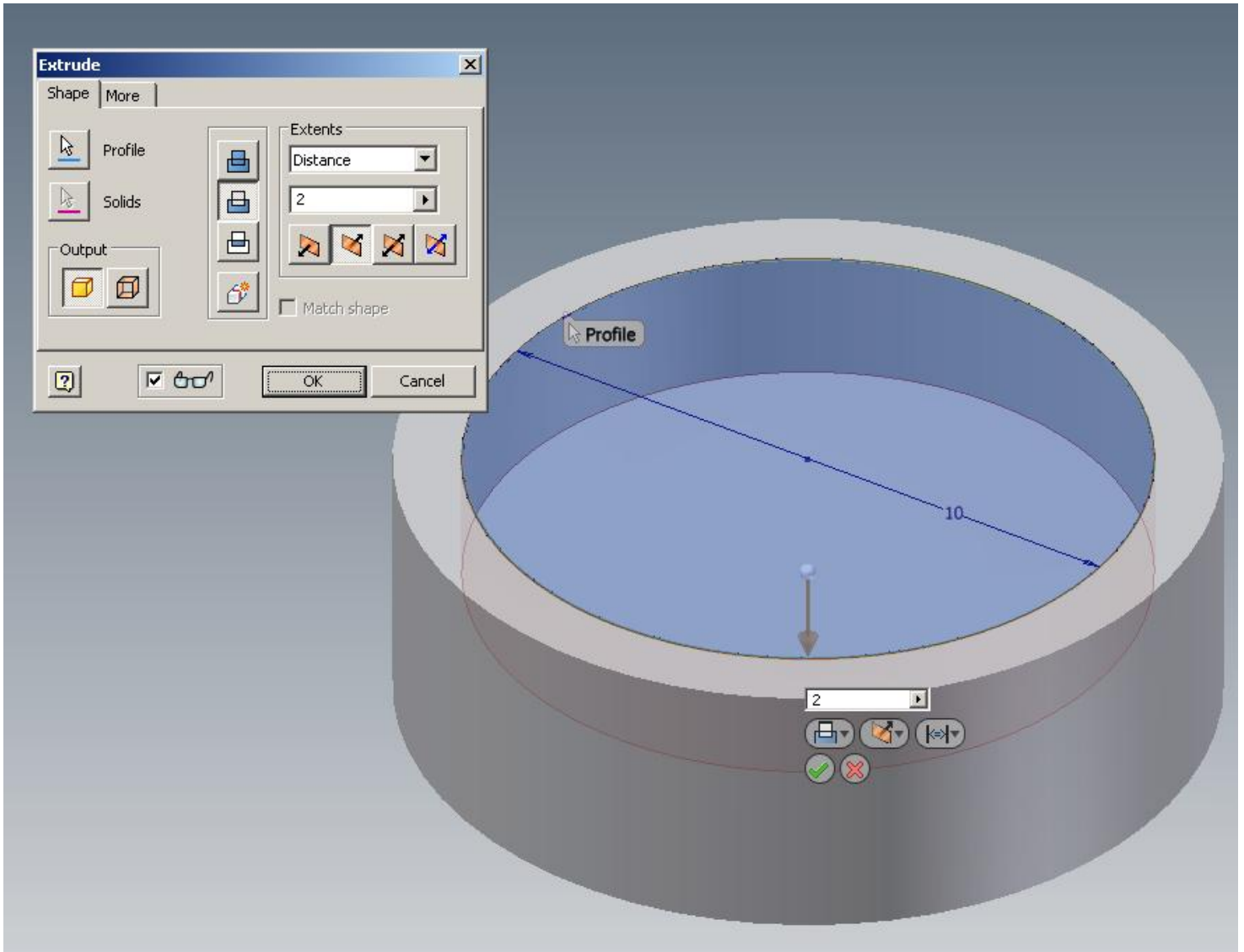   Sketch.

12. Click on the *Extrude* tool **Extrude** from the **Model** tab of the ribbon. Select the *circle* for the profile, and set
the distance to **4 mm**. Click **OK**. *SAVE YOUR WORK NOW!!*
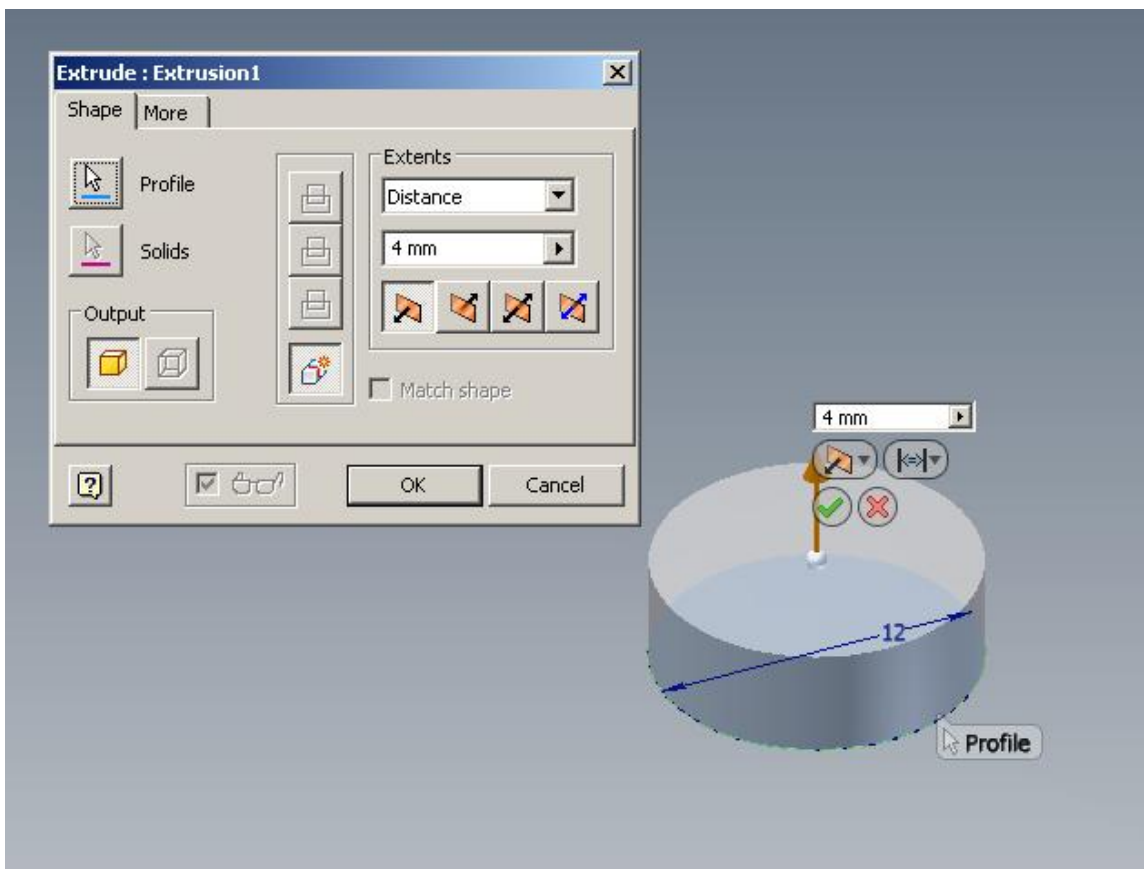
14. It is very important to keep track of the *sketches* and *features* of a part in Inventor. We do this by assigning names to sketches and features which are **descriptive**. Click ONCE on **Sketch 2**, pause, then click once again. This will allow you to rename the sketch. Change the name of **Sketch 2** to a name of your choosing. **Be sure it describes the sketch. Use the same procedure for the Extrusion.** *SAVE YOUR WORK!!* Watch Video 3

15. Next, we are going to place a circle on the top face of the fitting, then extrude the circle as an inset cavity – here's how.
16. Click on the *top face*, then **Right Click > New Sketch**.

17. Select the **Circle** tool from the *Draw* tab, and draw a **10 mm** concentric circle (a circle that shares the same center point) on the top face. *Finish Sketch* when done.   *SAVE YOUR WORK!!*

18. Extrude the 10 mm circle **2 mm > below the surface > remove material.** *SAVE YOUR WORK!!* **Watch Video 4**
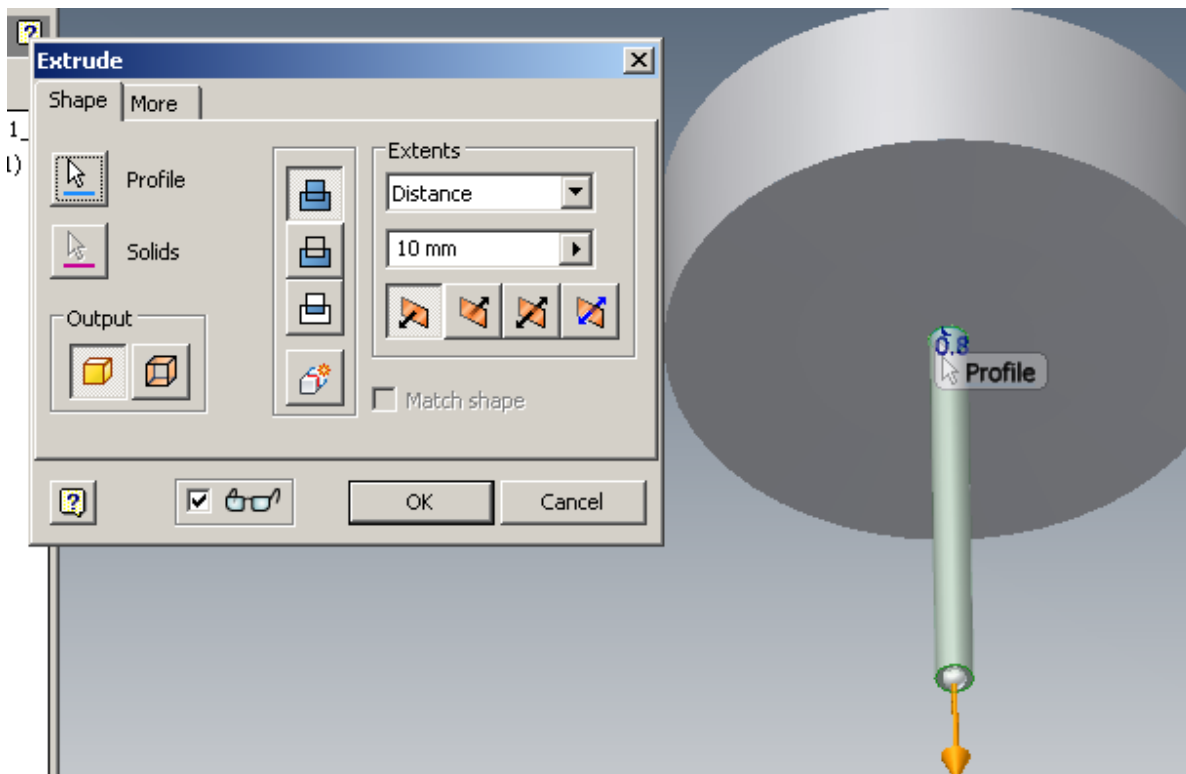
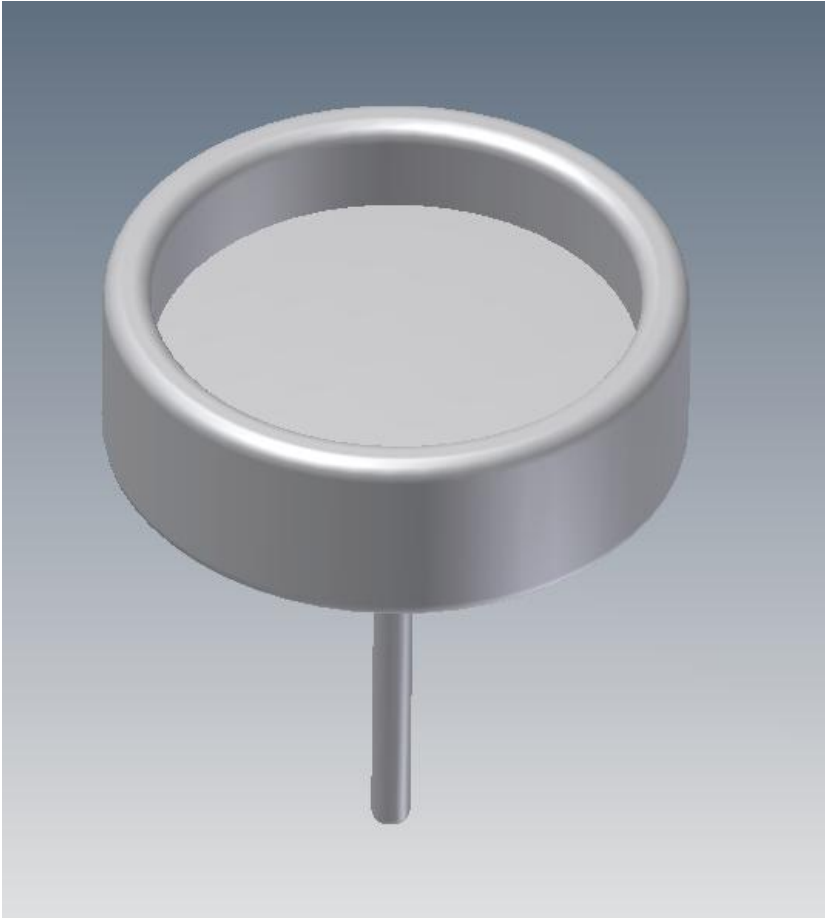19. Use the *View Cube* to adjust your view to the *bottom* of the fitting.
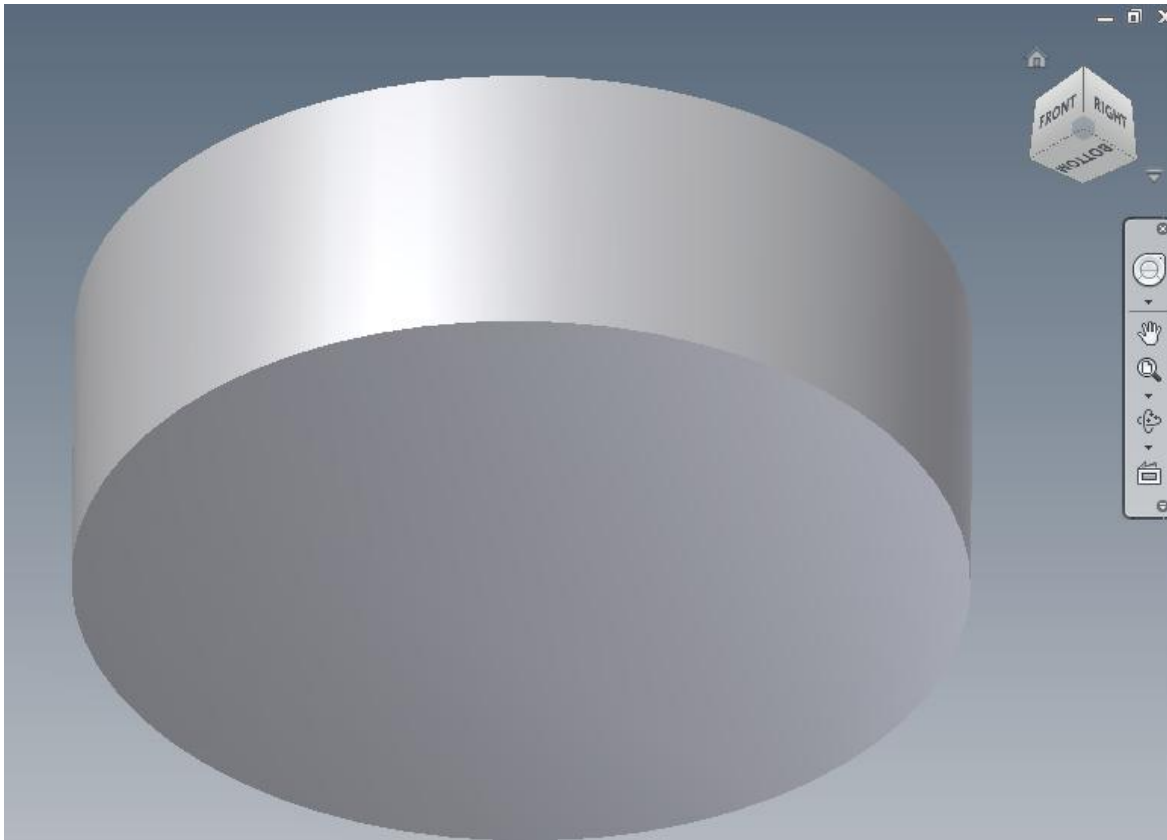
20. **Right Click > New Sketch.** Draw a **.8 mm** concentric circle, starting from the origin point. *Finish Sketch* when done.
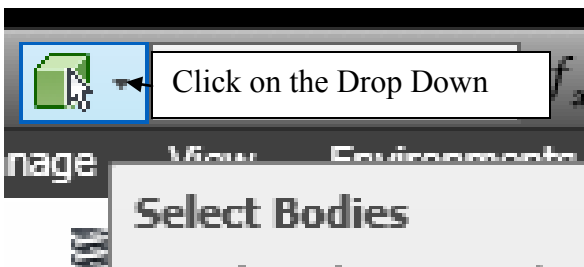21. *Extrude* the circle to a distance of **10 mm**.   *SAVE YOUR WORK!!*

22. ***Round*** the edges using the **Fillet** tool ![Fillet icon] . *SAVE YOUR WORK!!* **Watch Video 5**

23. On the ***Quick Access toolbar***, click on the selection priority drop down. Choose **Select Bodies**. Click on the ***fitting*** to select it.

24. Click on the ***Color Override*** drop down. Choose a material by experimenting with different materials.
25. ***Be sure to reset the Selection Priority back to Faces and Edges!!***

26. ***RENAME ALL OF YOUR SKETCHES, EXTRUSIONS AND FILLETS SO THAT THAE MAKE LOGICAL SENSE!!*** **Watch Video 6**

Part 2 – The Stone

**If you have logged off since finishing the last part, go to Get Started > Projects > Be sure your "Ear Ring" project is set as the default. **
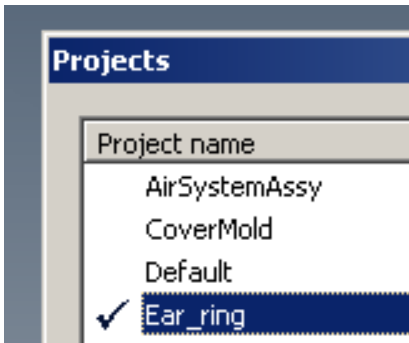

1. In the **Get Started** tab, click on **New**. In the **New File** box, click **"standard.ipt",** then OK. This will open a new, standard part file in Inventor.

2. Click on the **Save** icon . Since you created a **Project Folder**, your Earring parts should automatically be saved in your Earring project folder. Be sure the file name for this part is *stoneINL_CAD_1.*

3. Go to **Tools > Document Settings > Units.** Select *Millimeters* from the *Length* dropdown menu. Click **Apply > Close**.

4. Click the **"+"** sign next to the *Origin folder* in the *Browser Window*. Right Click on the **XZ Plane > New Sketch.**

5. Sketch an *8 sided, inscribed polygon (octagon)*, with a radius of *5 mm - here's how.* Click on the **polygon** tool from the Draw tab. Choose *inscribed.* This means that the polygon will be *inside* of a circle of 5 mm. Type *8* for the number of sides.


6. Click on the origin to *start* the polygon, then on the horizontal plane indication to *end* the polygon.
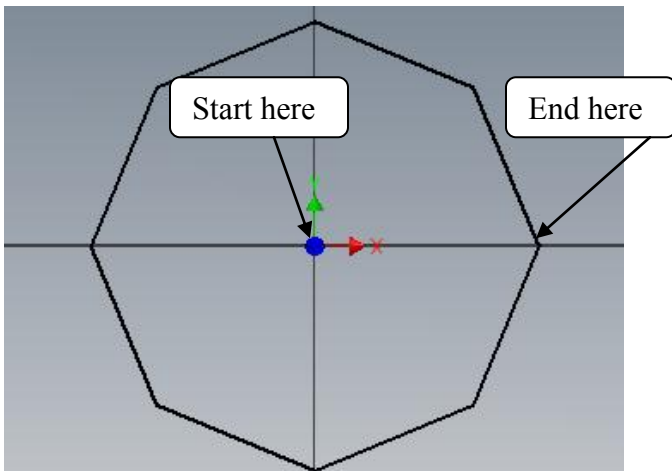
7. Dimension the octagon at a radius of **5 mm**. Click **Finish Sketch. Watch Video 7**
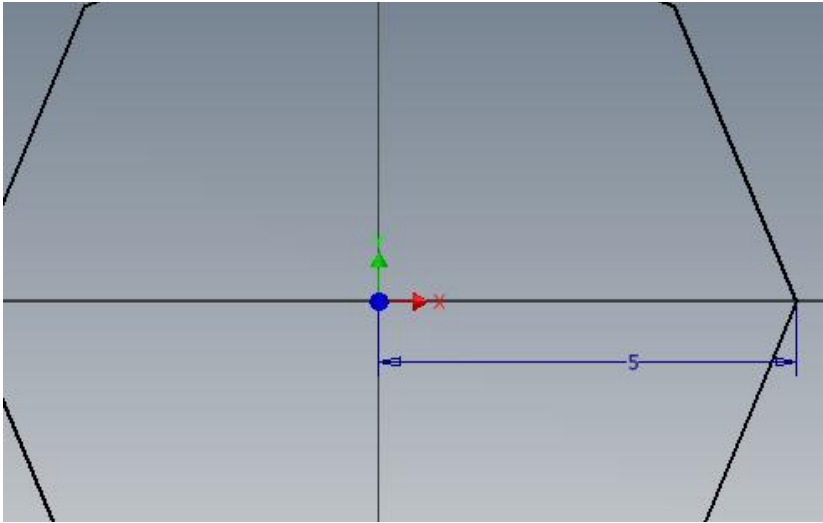

8. *Extrude* the stone to a distance of your choosing. In the Extrude box, choose **More**. *Taper* the extrusion to a degree of your choosing. You can also *pull/push* on the arrows to set the distance of the extrusion and taper.
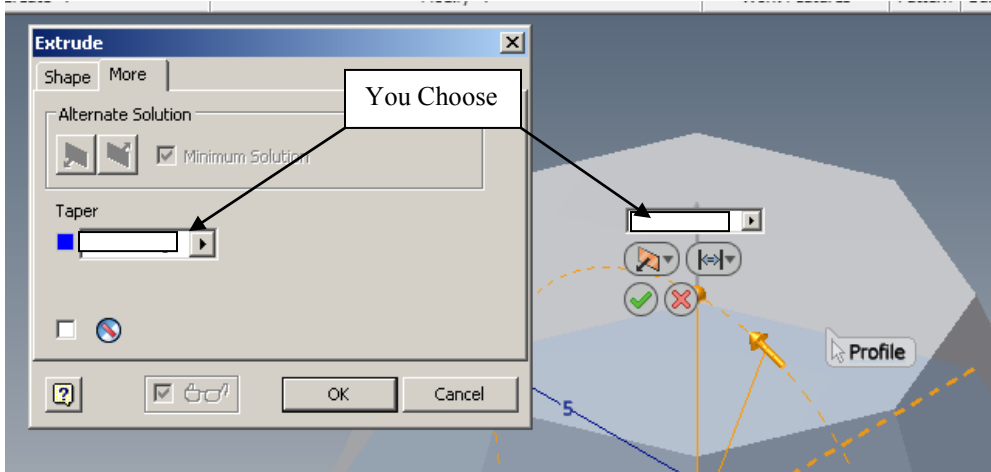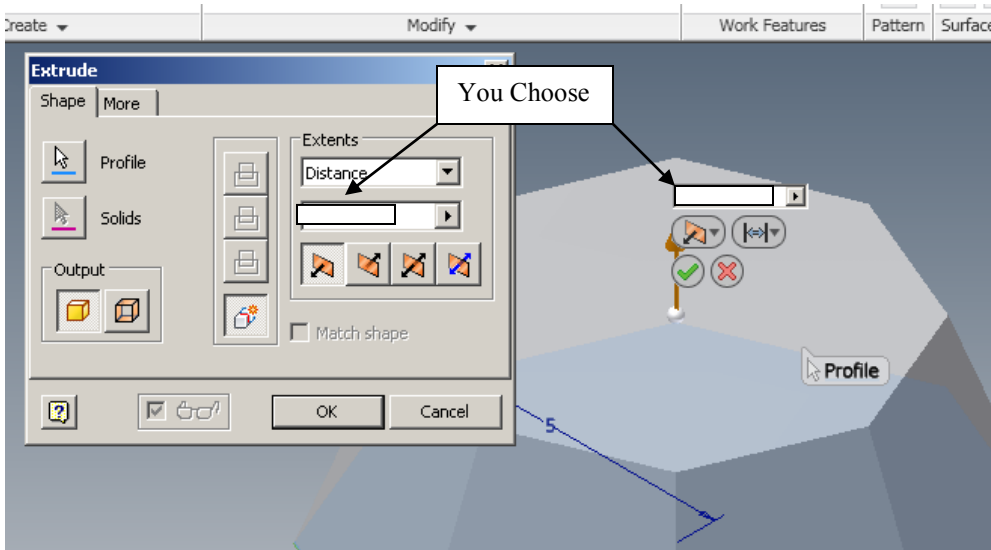
9. Create a New Sketch on the *bottom* of the stone. Draw a *10 mm circle* and extrude it to **2 mm**. *SAVE YOUR WORK!!* **Watch Video 8**
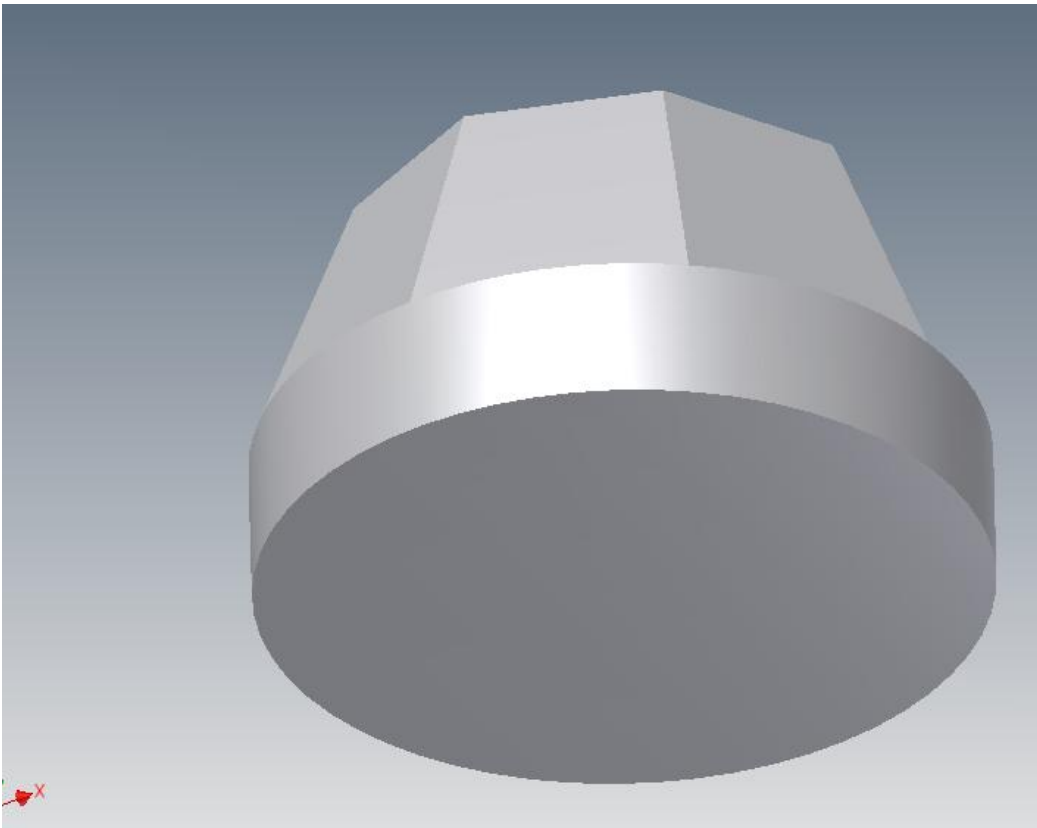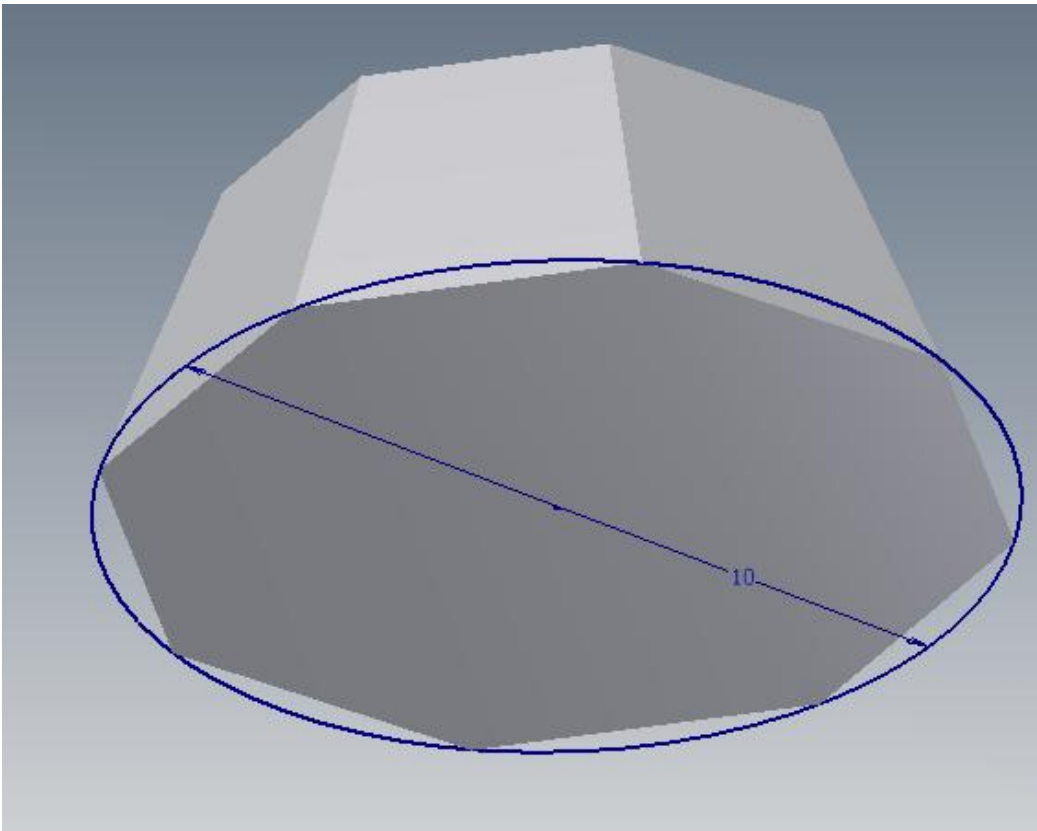
10. Create a **New Sketch** on the top of the stone. Click on *Project Geometry* from the Draw tab. Select the *top face* of the stone as the geometry to project. This will create a sketch from the *edges* of the top face. This will become the *Top Facet* of the stone. **Finish Sketch.** *SAVE YOUR WORK!!*

Edges become the sketch
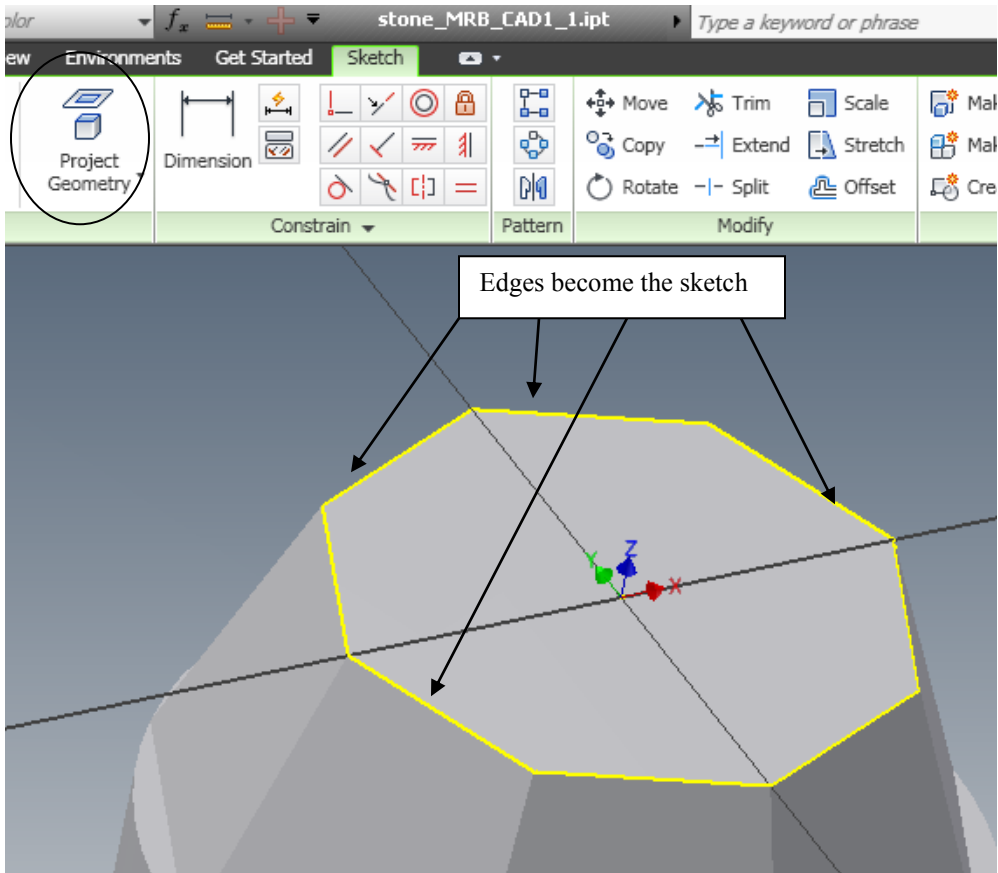
11. *Extrude* and *Taper* the Top Facet to dimensions of your choosing.
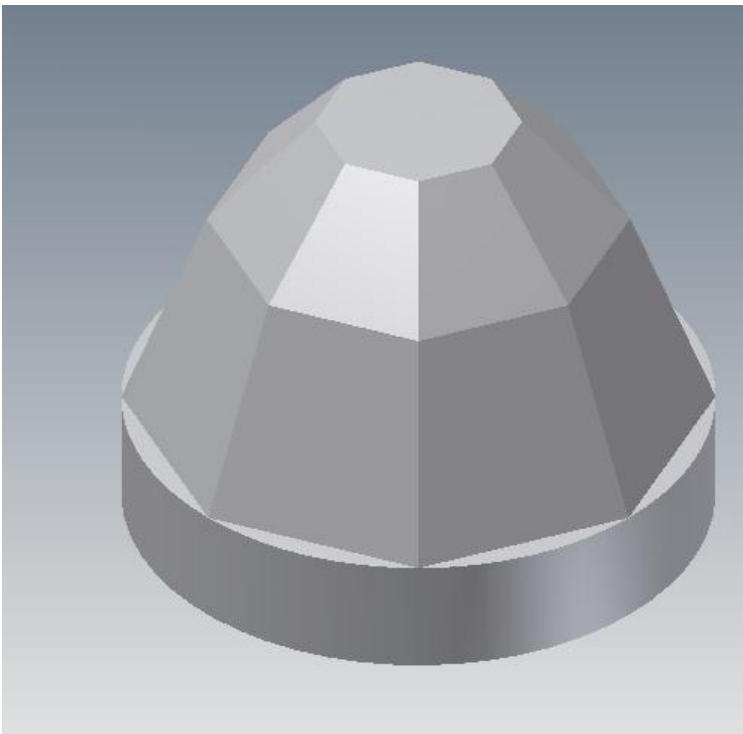
12. On the *Quick Access toolbar*, click on the *selection priority* drop down. Choose **Select Bodies**. Click on the *stone* to select it.


13. Click on the *Color Override* drop down. Choose a material by experimenting with different materials. *SAVE YOUR WORK!!*
14. *Be sure to reset the Selection Priority back to Faces and Edges!!* Watch Video 9

Part 3 – Ear Ring Back

**If you have logged off since finishing the last part, go to Get Started > Projects > Be sure your "Ear Ring" project is set as the default. **
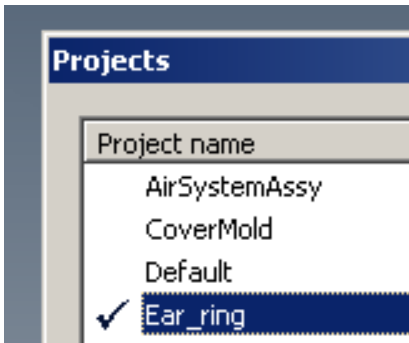

1. In the **Get Started** tab, click on **New**. In the **New File** box, click **"standard.ipt",** then OK. This will open a new, standard part file in Inventor.

2. Click on the **Save** icon [icon]. Since you created a **Project Folder**, your Earring parts should automatically be saved in your Earring project folder. Be sure the file name for this part is *backINL_CAD_1.*

3. Go to **Tools > Document Settings > Units.** Select *Millimeters* from the *Length* dropdown menu. Click **Apply > Close**.   7

4. Click the "**+**" sign next to the *Origin folder* in the *Browser Window*. Right Click on the **XZ Plane > New Sketch.**

5. *Draw a circle* – **5 mm** in diameter. **Extrude** the circle to **1 mm.** *SAVE YOUR WORK!!* **Watch Video 10**
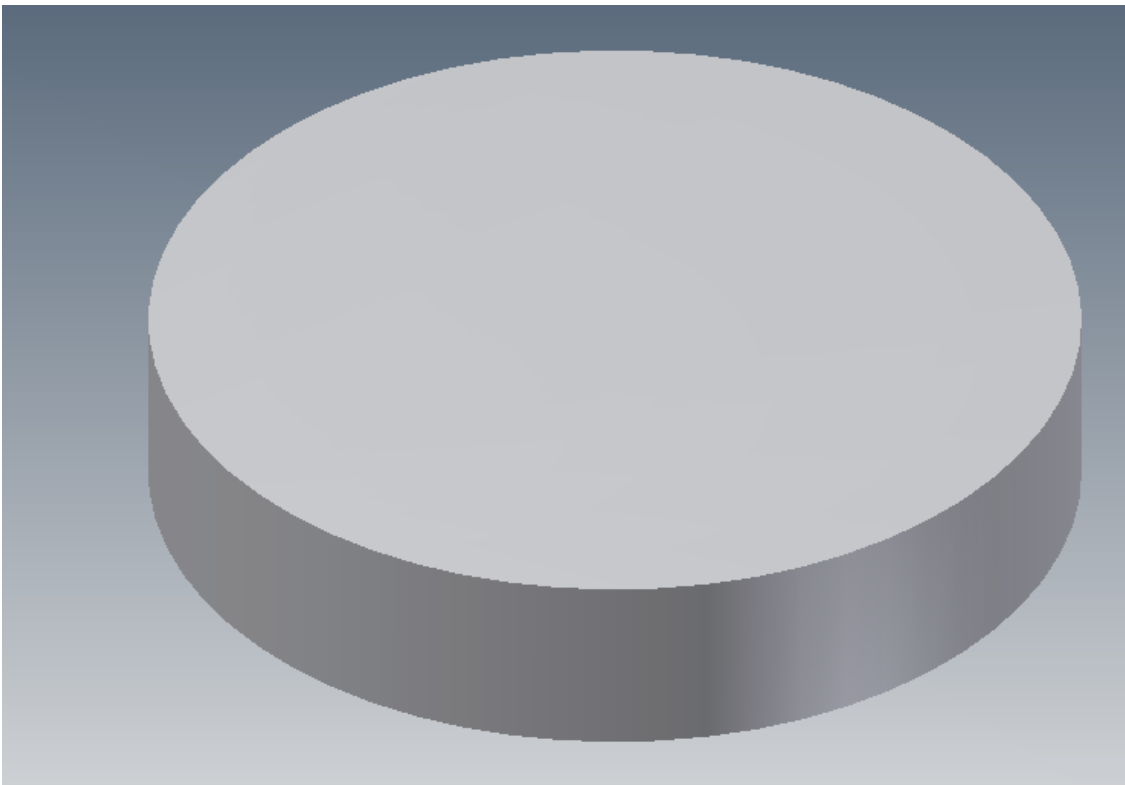
6. Create a **New Sketch** on the *top face*. Draw a *concentric circle* of **4 mm**. **Extrude** the circle to **3mm**, with a taper angle of **-15 degrees.**
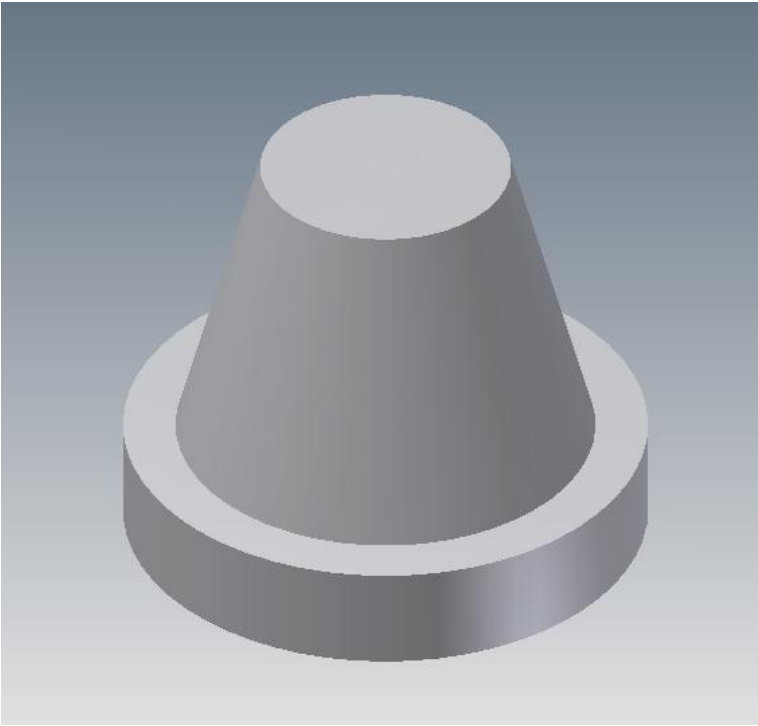
7. Create a **New Sketch** on the **NEW** *top face*. Draw a *concentric circle* of **4 mm**. **Extrude** the circle to **1 mm**. **Watch Video 11**
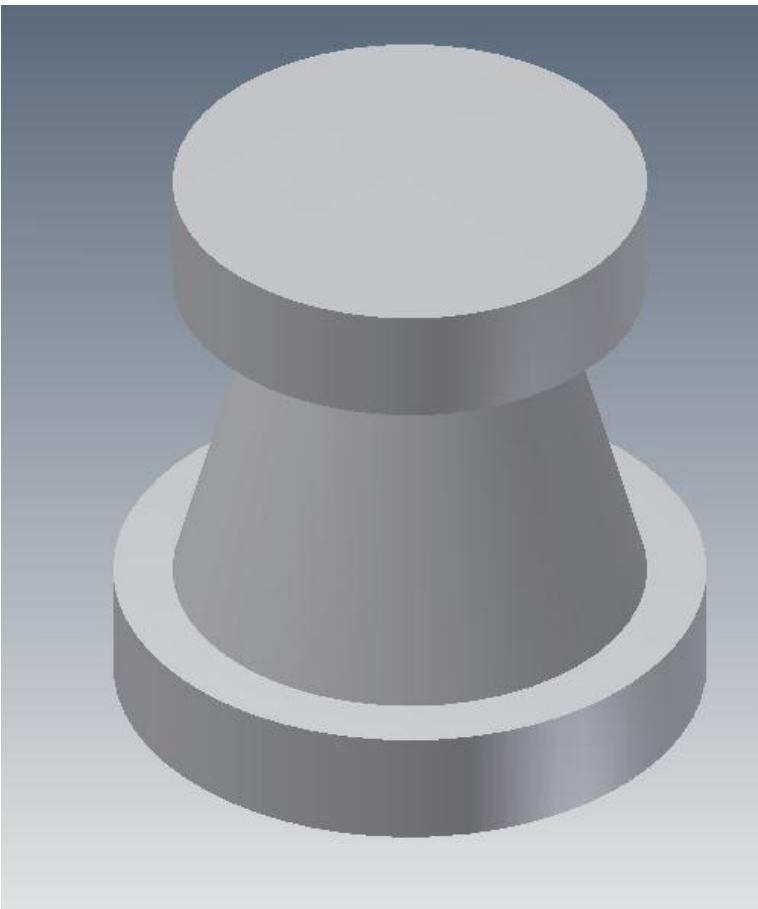
8. Create a **New Sketch** on the **NEW** *top face*. Draw a *concentric circle* of *.8 mm.* **Extrude** the circle *through all*, *remove* material.   *SAVE YOUR WORK!!*
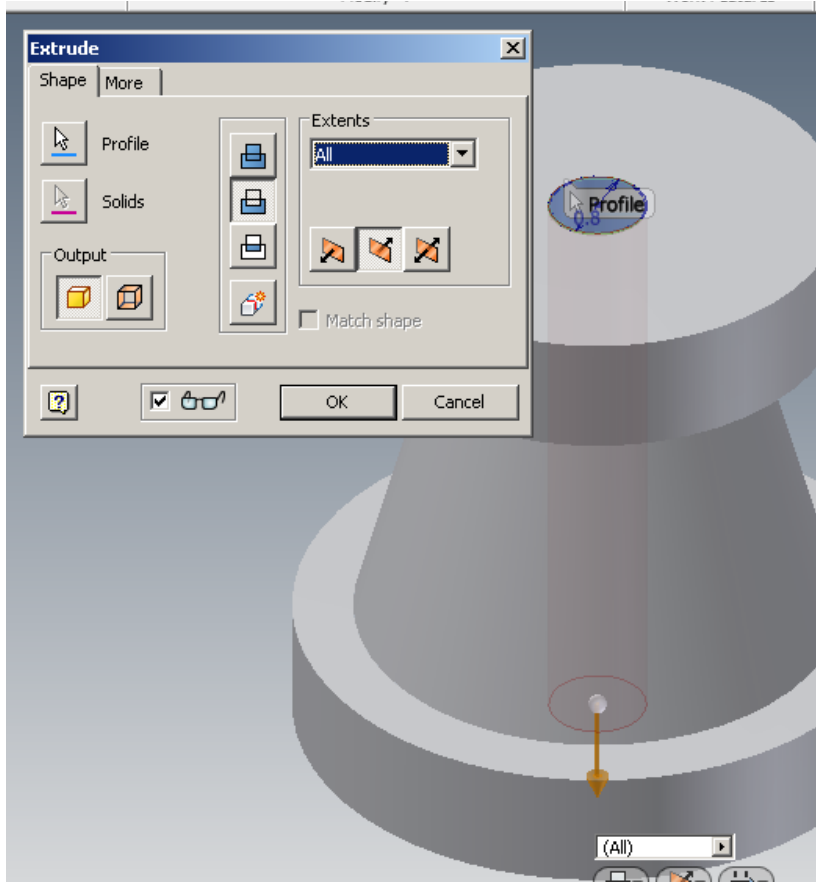
8. *Round* ALL of the edges using the **Fillet** tool.

9. On the *Quick Access toolbar*, click on the *selection priority* drop down. Choose **Select Bodies**. Click on the *back* to select it.


10. Click on the *Color Override* drop down. Choose a material by experimenting with different materials. *SAVE YOUR WORK!!*
11. *Be sure to reset the Selection Priority back to Faces and Edges!!* **Watch Video 12**

Part 4 – Assembling the Ear Ring

**If you have logged off since finishing the last part, go to Get Started > Projects > Be sure your "Ear Ring" project is set as the default. **
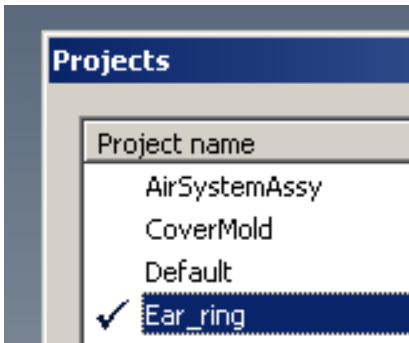

1. In the **Get Started** tab, click on **New**. In the **New File** box, click **"standard.iam"** **,** then OK. This will open a new, standard *assembly* file in Inventor. Save as ***assembly_ear_ring_MRB_CAD1_1.***
2. In the **Assemble > Component** tab, click on *Place.* Choose the *fitting* file. Inventor will automatically place a the part in the design window, and will be ready to place a second part. Hit Escape to cancel adding the second fitting.

3. Notice that the *fitting* has a **"pin"** attached to it in the *browser* (below). This means that the fitting will be the *main part*, and will be **fixed** in place. Subsequent added parts will move in order to create an assembly constraint with the fitting. **Watch Video 13**
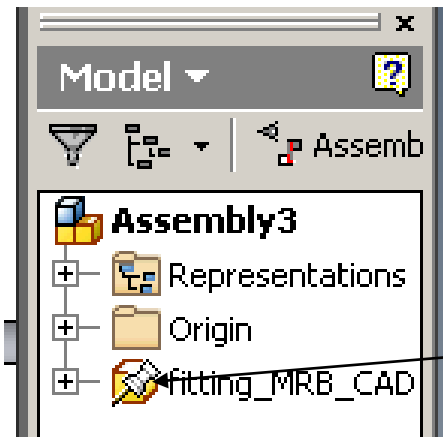

Pin attached here means that the part is constrained to be immobile or *fixed*.

4. Click on **Place**, this time adding the *stone* to the assembly. Hit *escape* so that you place only one stone. Notice that the stone *is not* pinned. The stone will be moved as a result of assembly constraints.
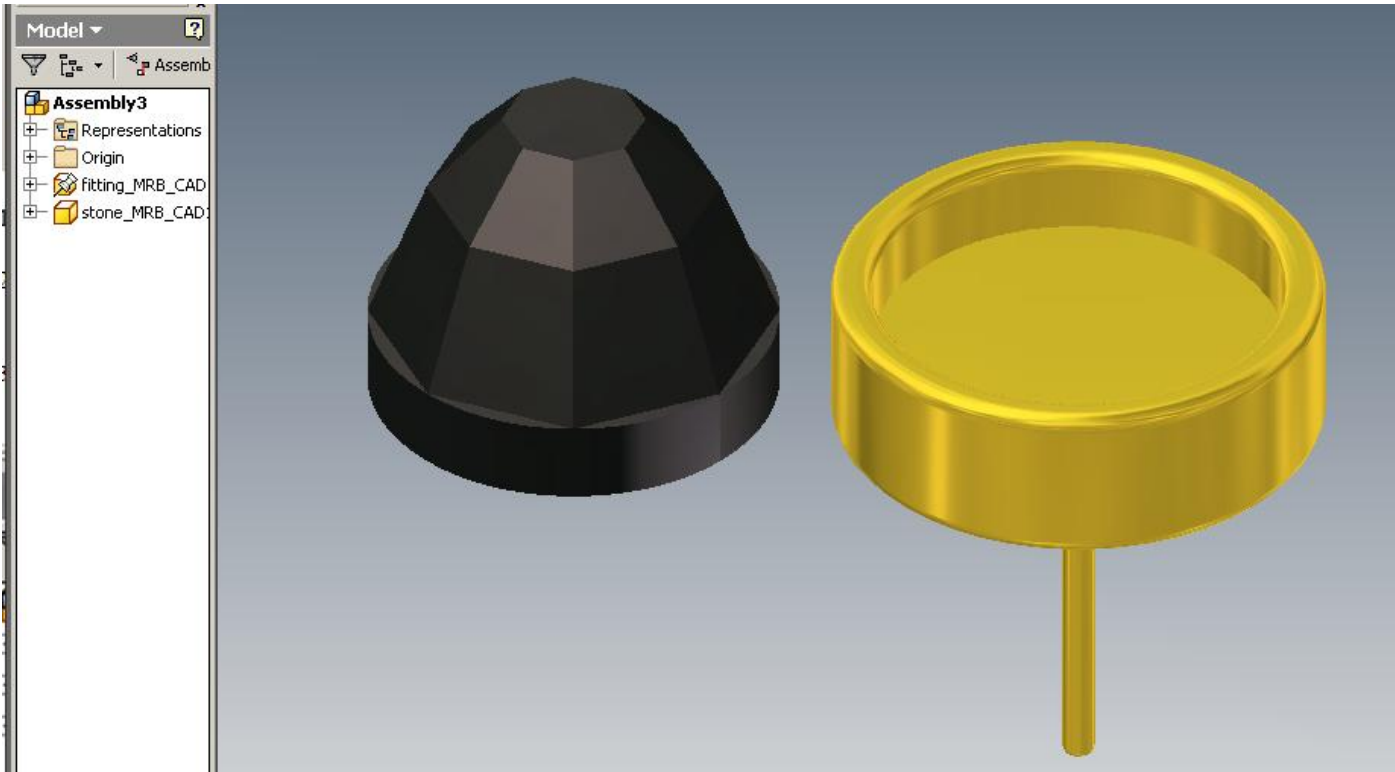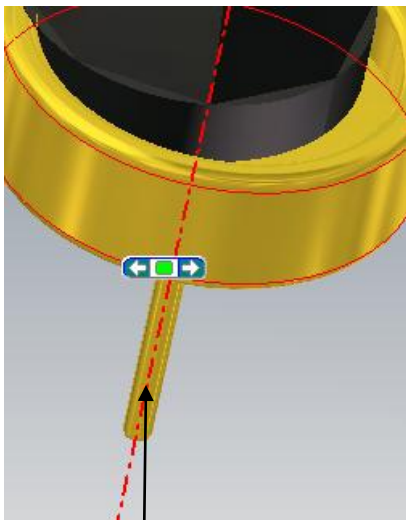

5. Create a *Mate-Face/Face* constraint. This will constrain the bottom face of the stone to the top of the inset face.

Click on the *Constrain* tool [Constrain]. Select the *bottom of the stone*, then the t*op of the inset*, then **Apply**. The two faces should be mated.

The *Mate-Face/Face* constraint.

Bottom of the stone…

To the top of the inset.
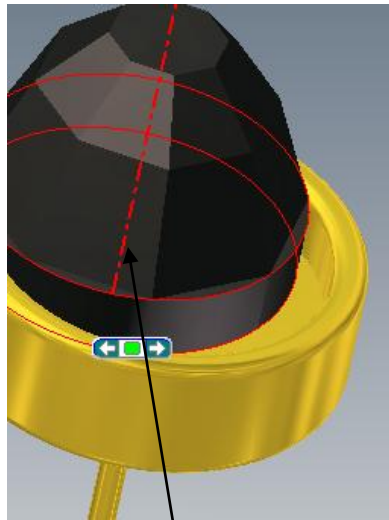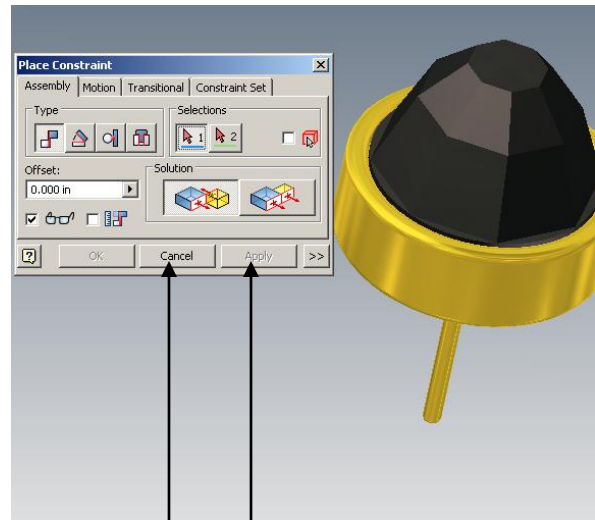
Mate…

Face/Face
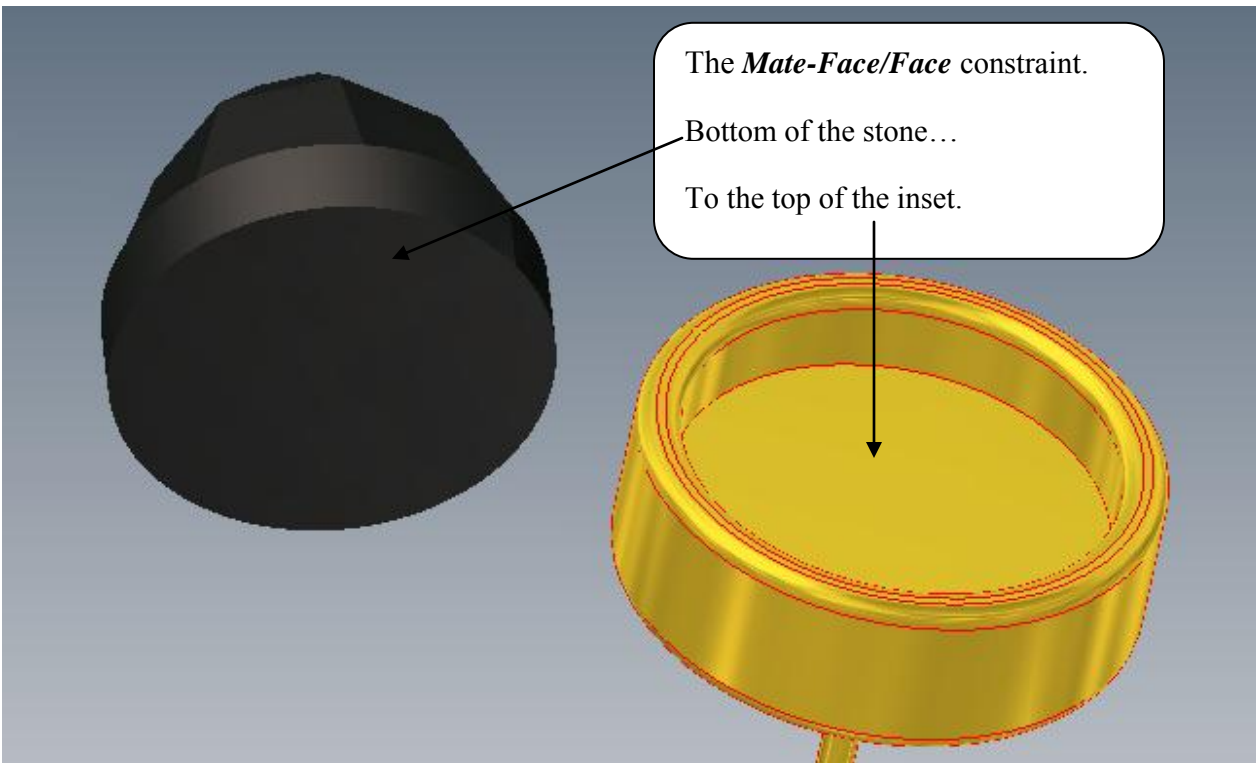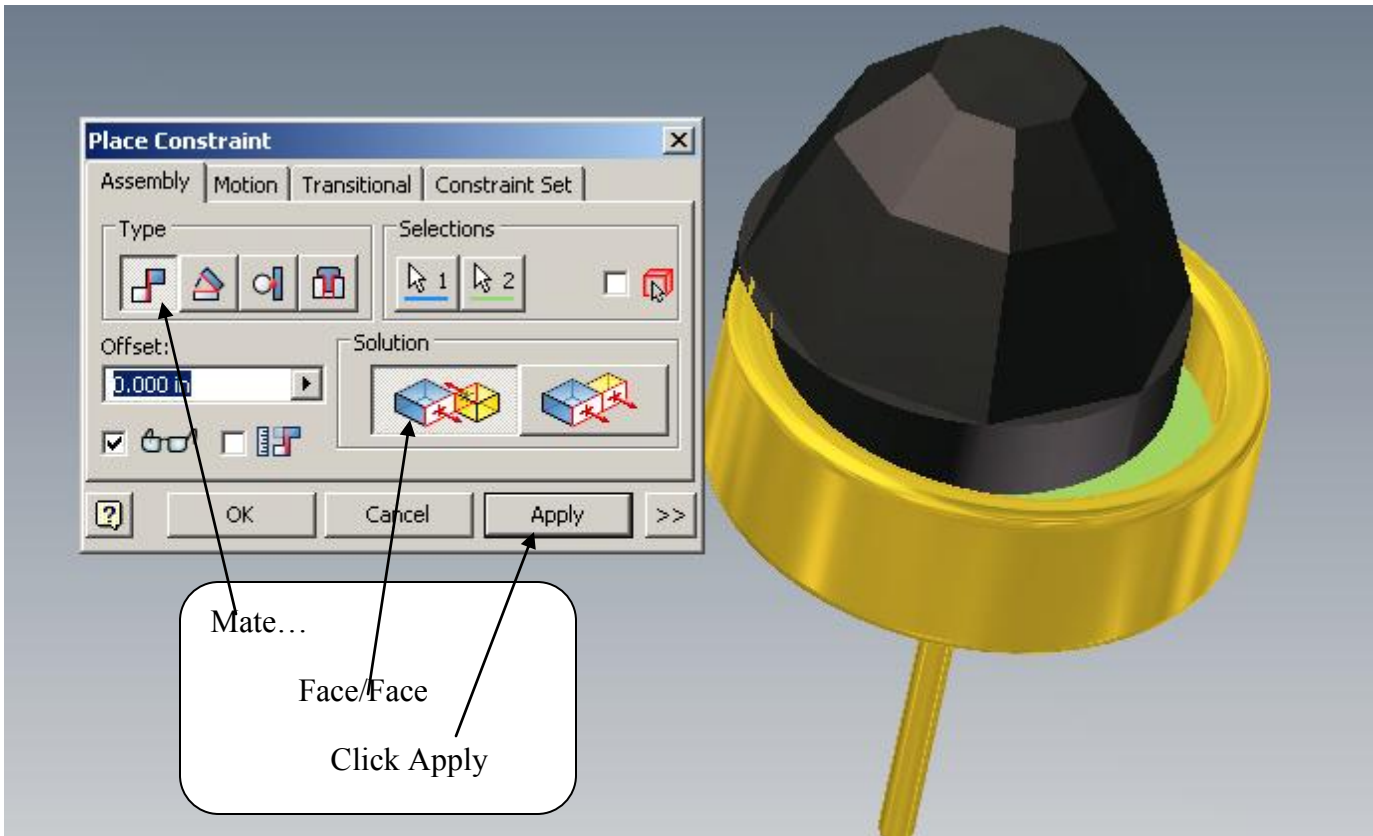
Click Apply

6. Next, you will create a *Mate-Axis/Axis.* Select the *axis line of the post*, then the *axis line of the stone*, then click **Apply > Cancel** (to finish). **Watch Video 14**
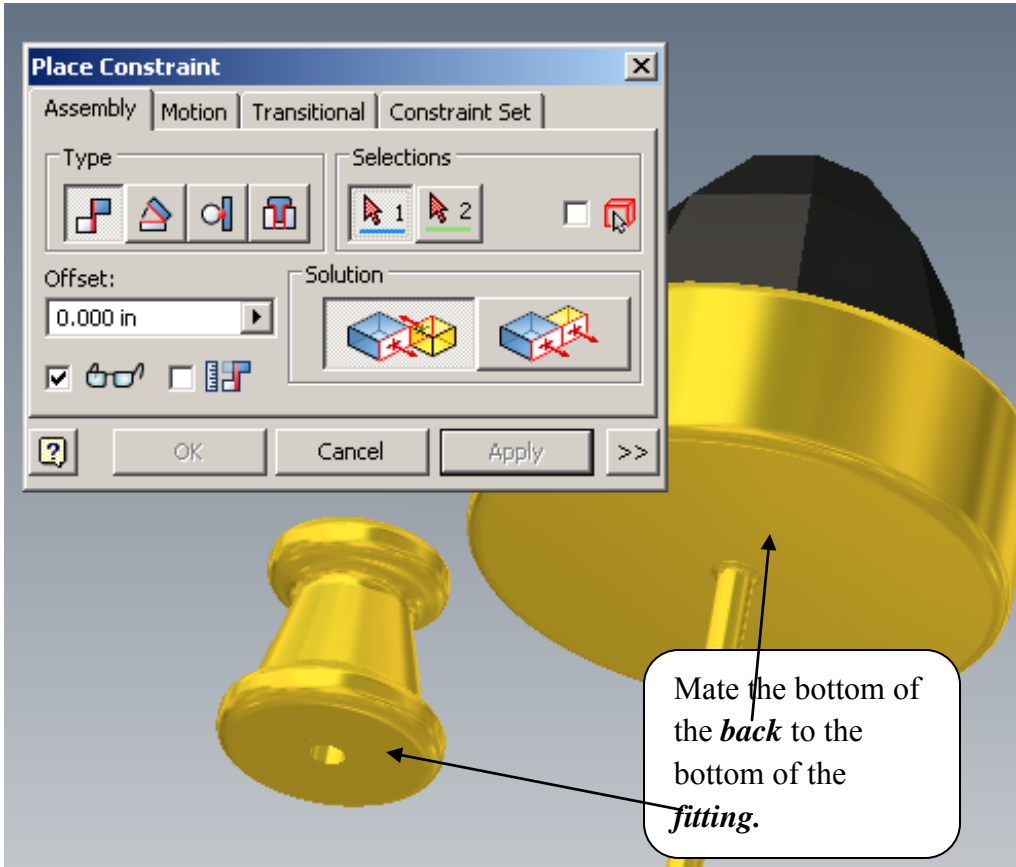

Select the axis of the post…

… the axis of the stone…

… click Apply, then Cancel…

7. Next, we will add the *Back* part. Click on **Place > Back.** Hit Escape after placing the back part.
8. Click on Constraint to create a *Mate-Face/Face* constraint. This will constrain the bottom face of the *back* to the bottom face of the *fitting*. Click *Apply > Cancel* (to finish).

Mate the bottom of the *back* to the bottom of the *fitting.*

9. Next, create a *Mate-Axis/Axis.* Select the *axis line of the post*, then the *axis line of the back,* then click **Apply > Cancel** (to finish). **Watch Video 15**

Grading Rubric

	Criteria	Possible	Earned
1	Filename = *ALL filenames use the format filenameINL_CAD_1*	**8 pt**	
2	**Constraints** – The pieces of jewelry are fully constrained	**10 pt**	
3	**Materials** – The pieces of jewelry have material properties	**10 pt**	
4	**Creativity** – The piece of jewelry should be considerably different from the Earring. A different type of earring, or a different type of jewelry will earn credit here	**0 – 12 pt**	