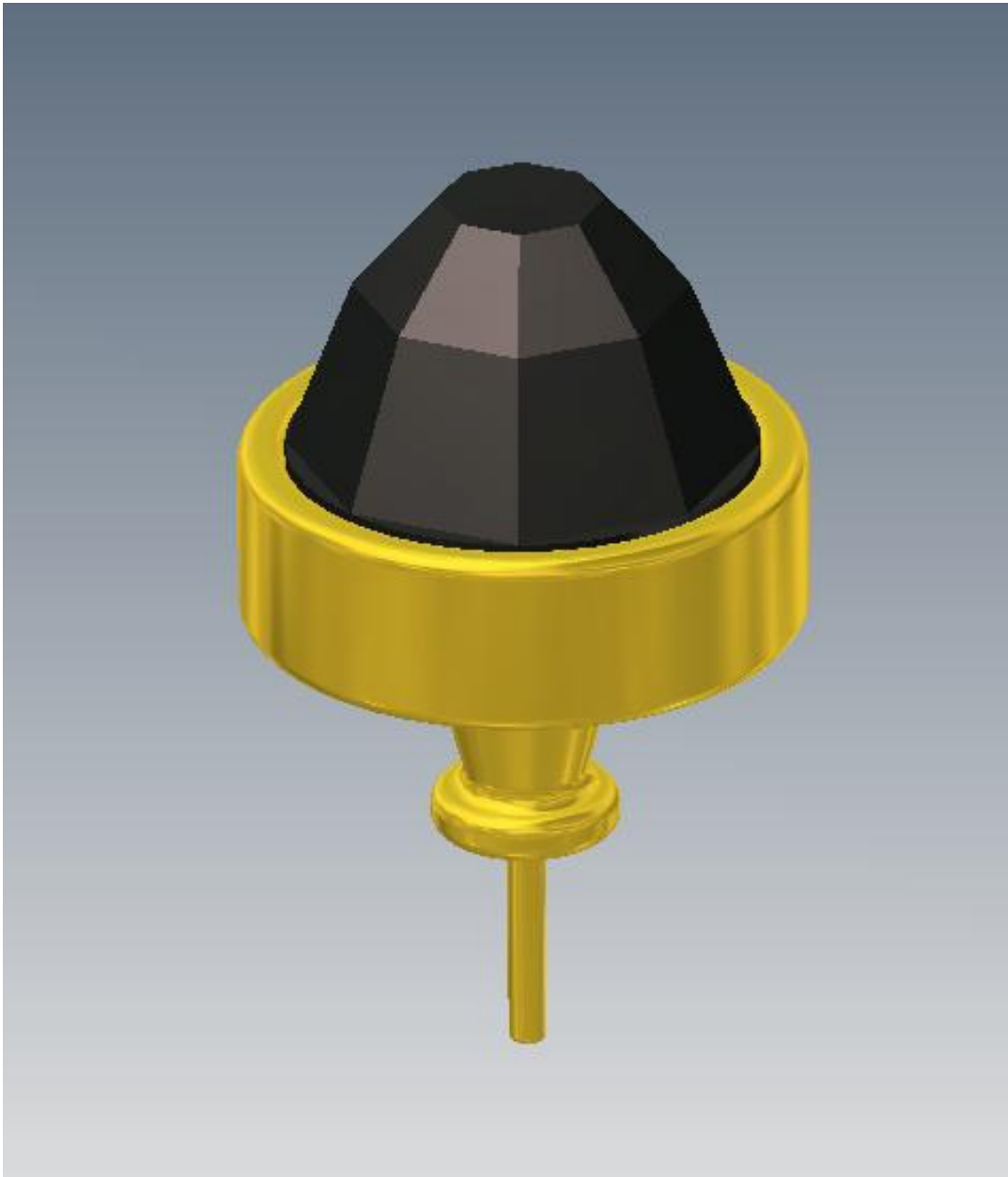


AutoDesk Inventor

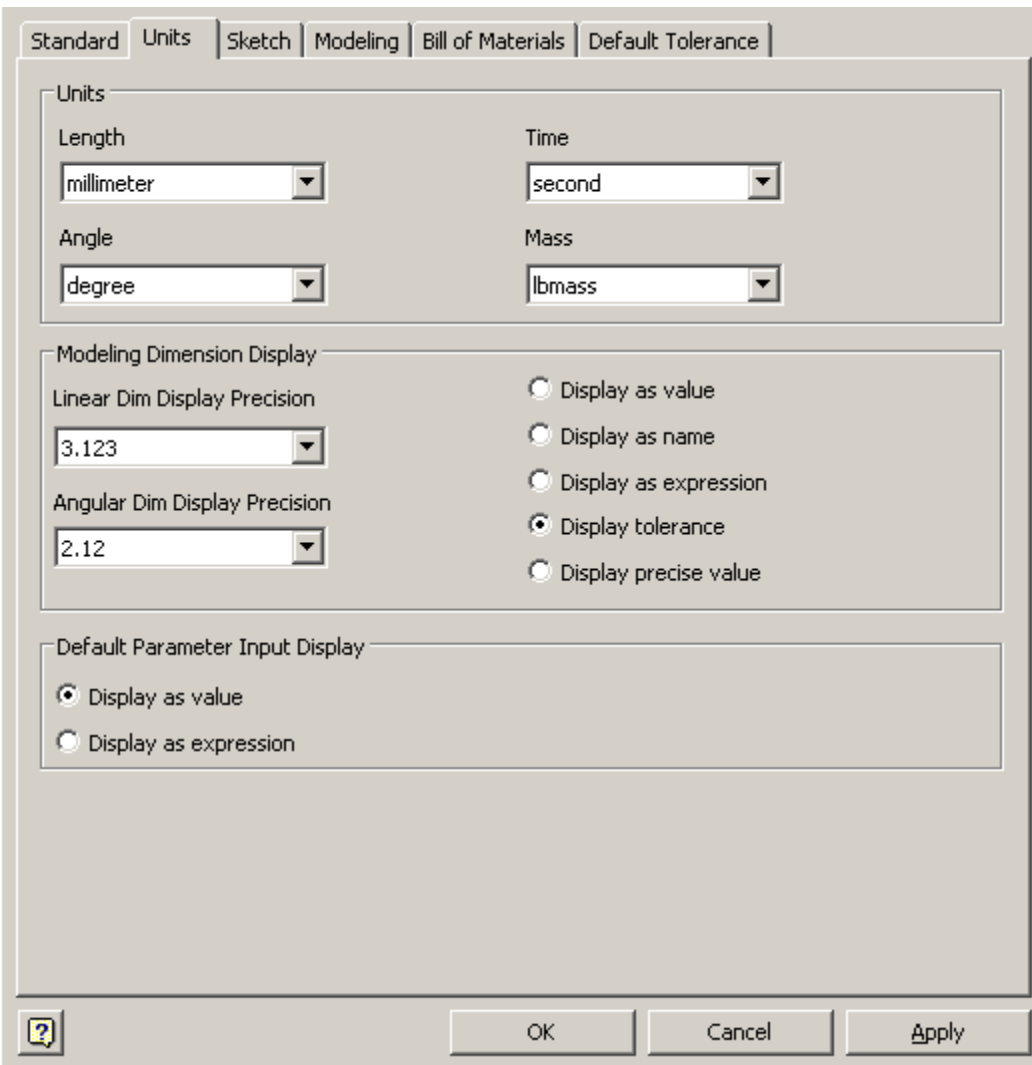
Earring Tutorial – AutoDesk Inventor 2011

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

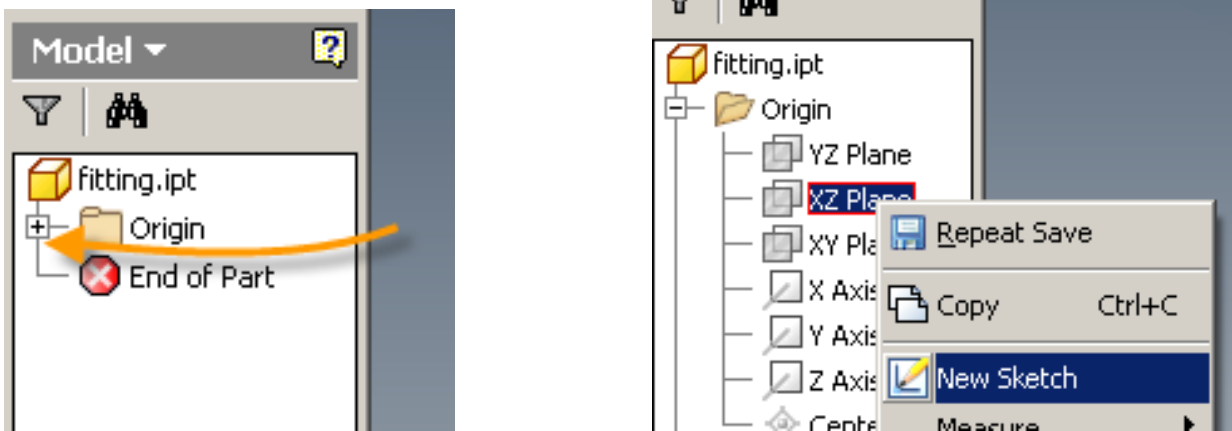



Part 1 – The Fitting

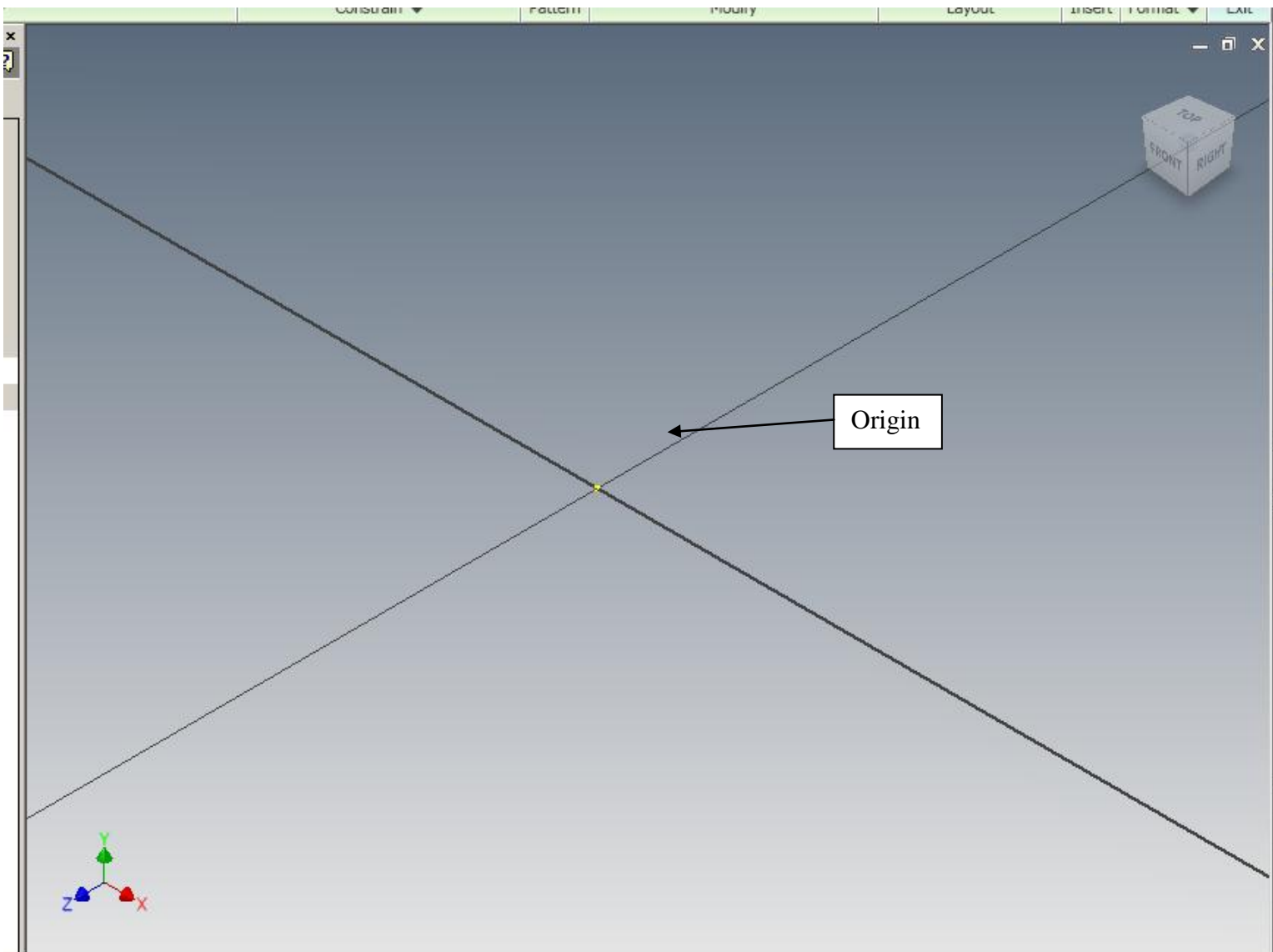
1. Open *Inventor*. In the *Get Started* tab, click on **Projects > New > New Single User Project**. Click Next.
2. In the **Project Name** box, type *Earring*. In the **Project (Workspace) Folder**, Click on the browser box  to select your **H:\ drive**.
3. In the **Browse for Folder** box, navigate 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**. In the **New File** box, click “**standard.ipt**”, then OK. This will open a new, standard part file in Inventor. **Watch Video 1**
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**. Select *Millimeters* from the *Length* dropdown menu. Click **Apply > Close**. **Watch Video 2**



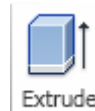
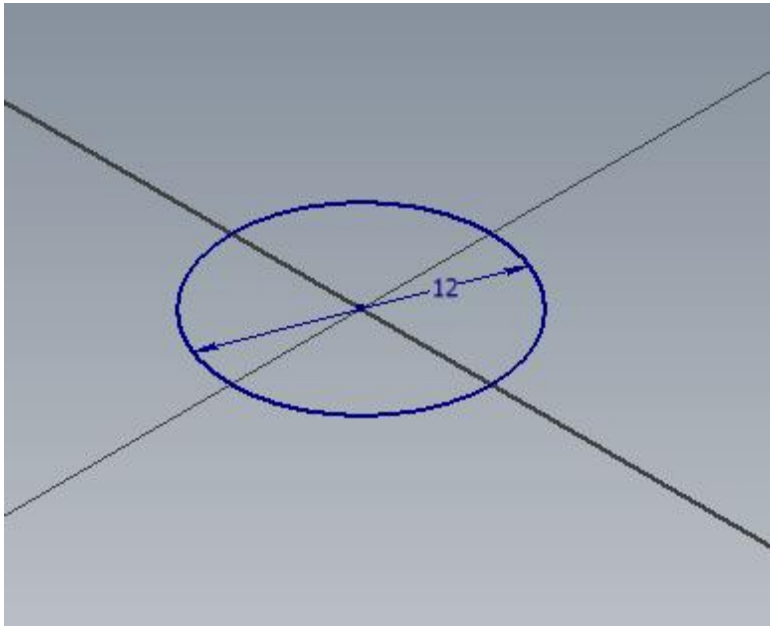
8. Click the “+” sign next to the *Origin folder* in the *Browser Window*. Right Click on the **XZ Plane** > **New Sketch**.



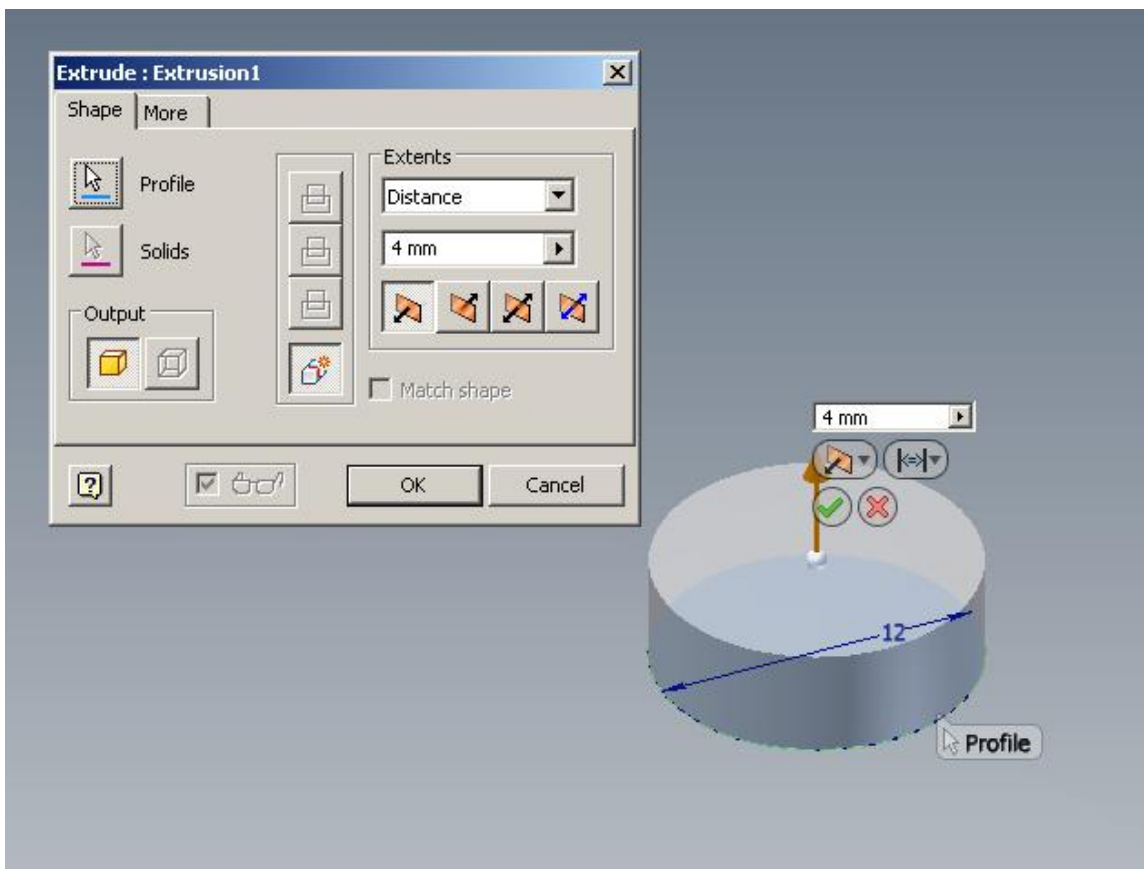
9. Hover your mouse over the **View Cube** area and click on the house icon . This will set the screen view to *isometric*.



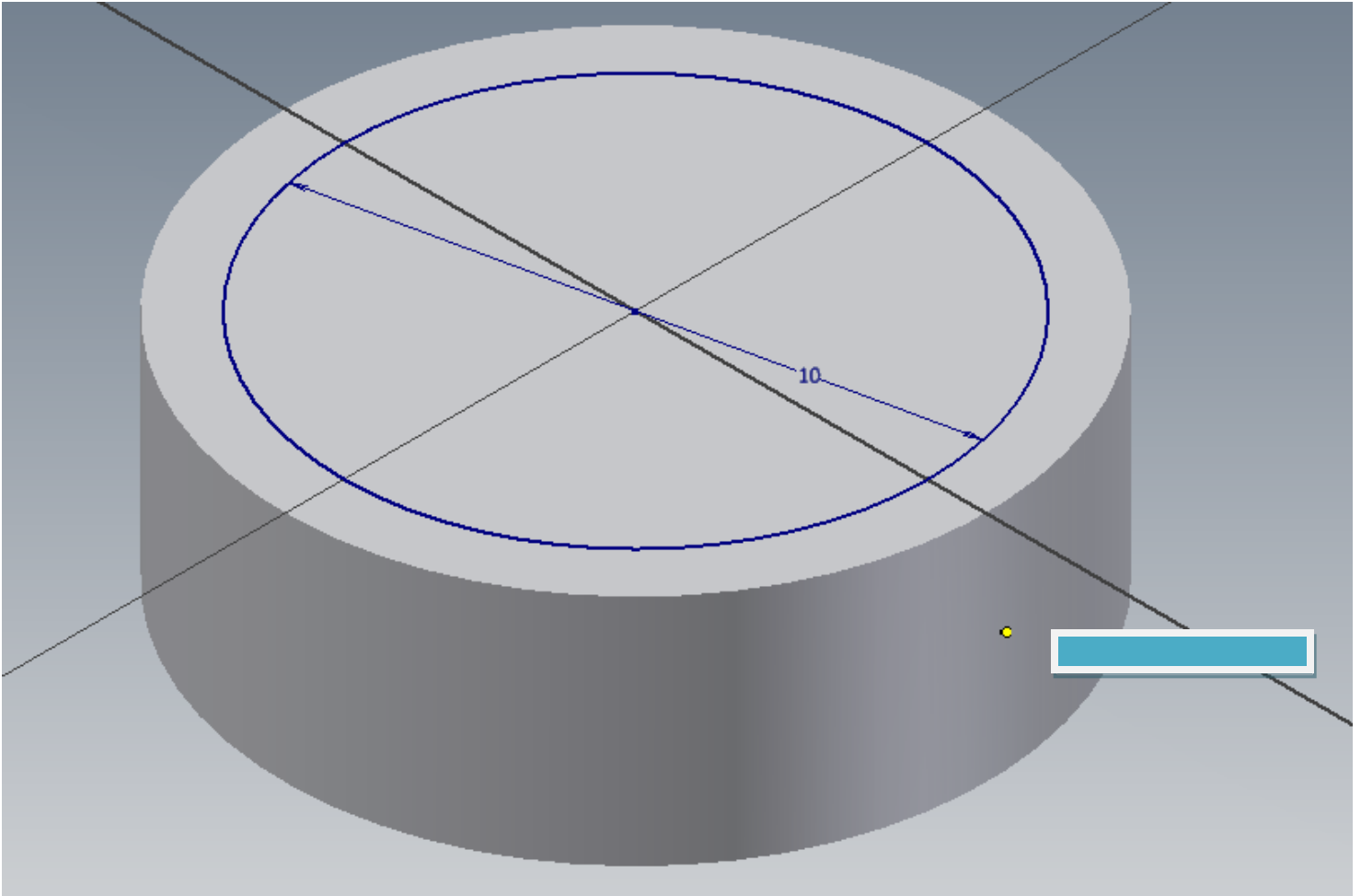
10. In the **Draw** tab, select the **circle** tool. Starting at the **Origin**, drag out a circle of **12 mm**. Click on Finish Sketch.



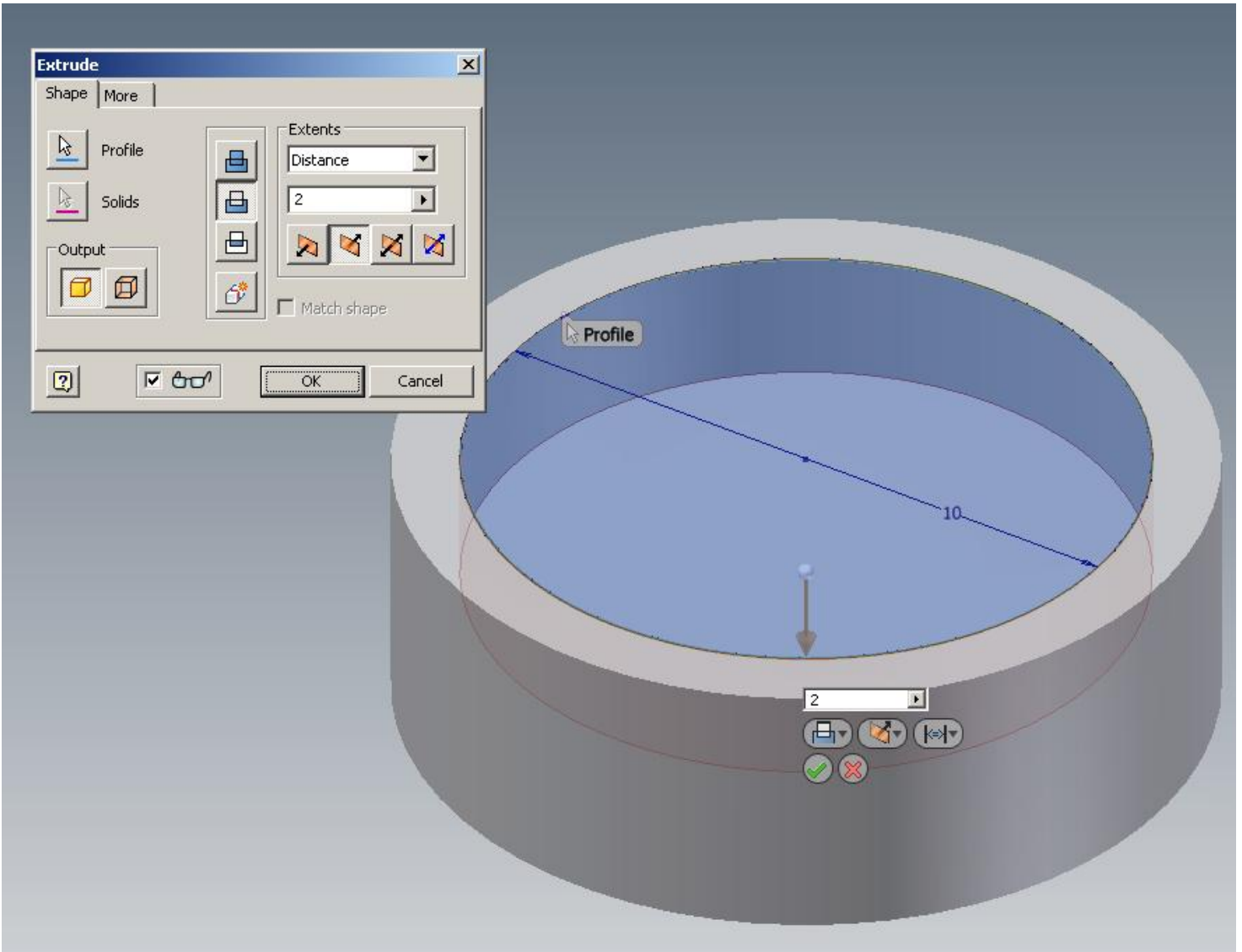
12. Click on the **Extrude** tool from the **Model** tab of the ribbon. Select the **circle** for the profile, and set the distance to **4 mm**. Click **OK**. **SAVE YOUR WORK NOW!!**



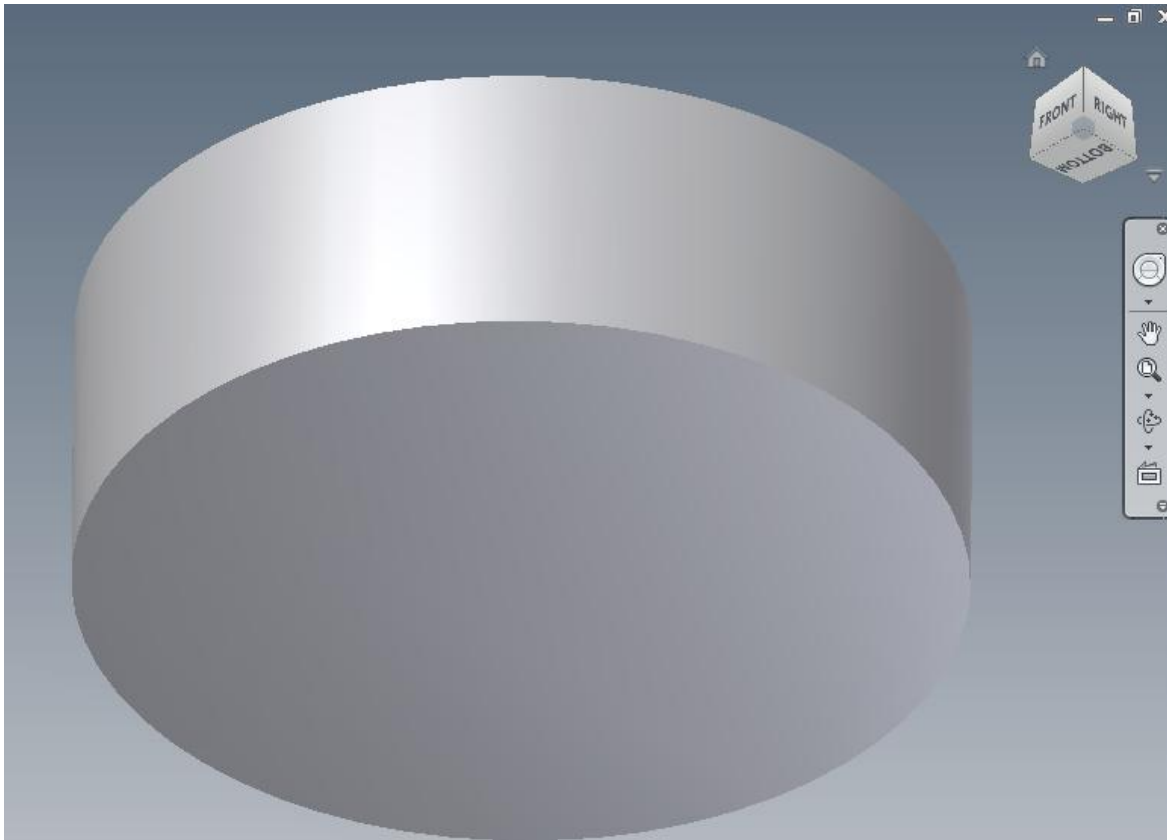
14. It is very important to keep track of the *sketches* and *features* of a part in Inventor. We do this by assigning names to sketches and features which are **descriptive**. Click ONCE on **Sketch 2**, pause, then click once again. This will allow you to rename the sketch. Change the name of **Sketch 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**

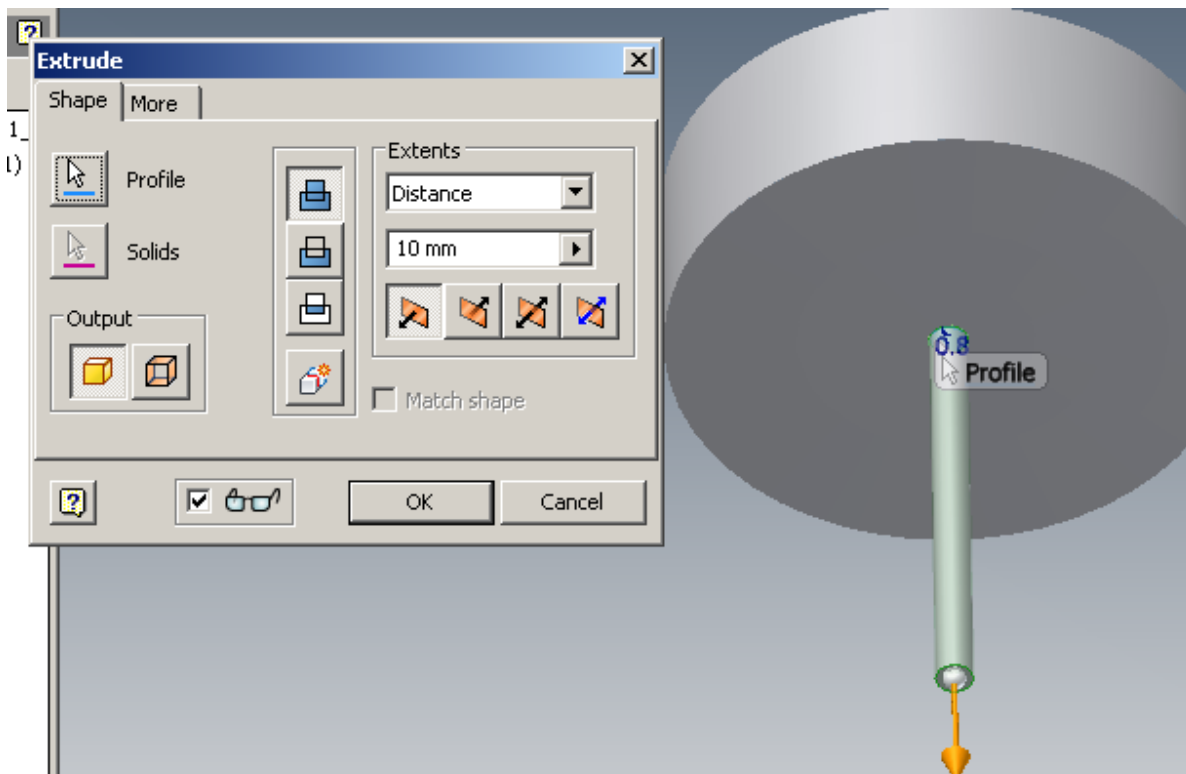


19. Use the *View Cube* to adjust your view to the *bottom* of the fitting.



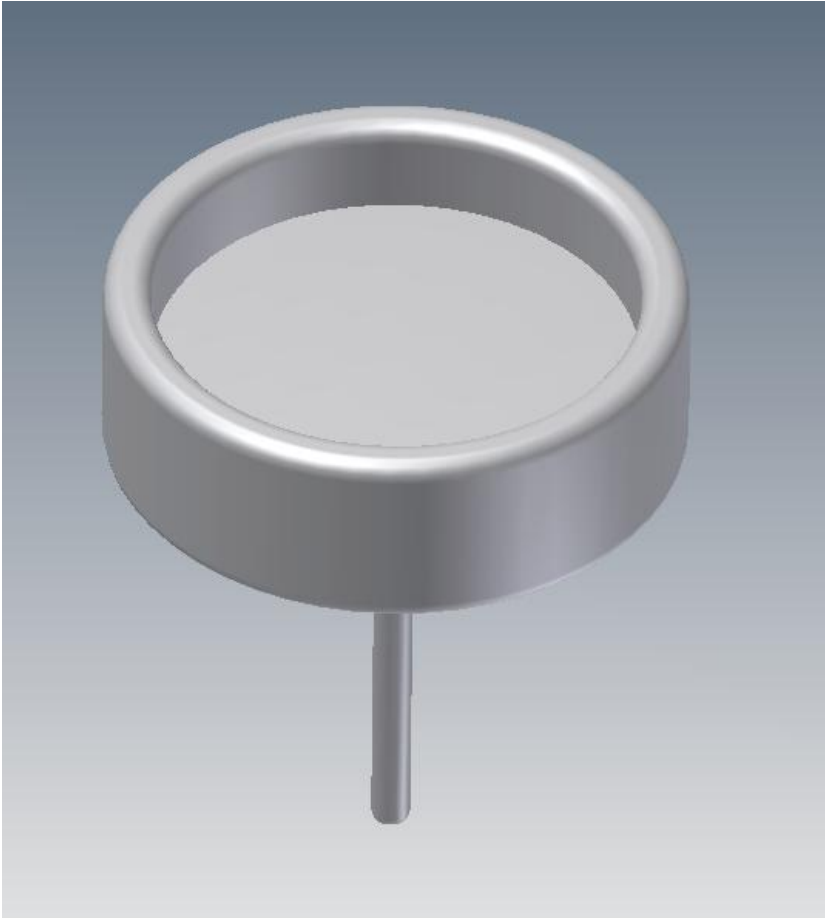
20. **Right Click > New Sketch.** Draw a **.8 mm** concentric circle, starting from the origin point. *Finish Sketch* when done.

21. **Extrude** the circle to a distance of **10 mm.** **SAVE YOUR WORK!!**

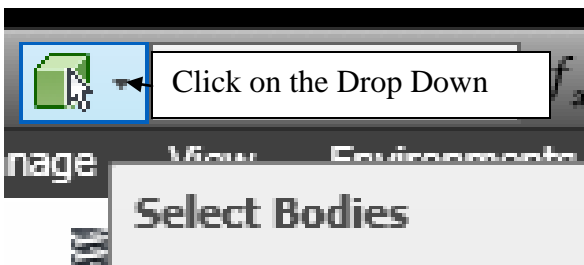




22. **Round** the edges using the **Fillet** tool . **SAVE YOUR WORK!! Watch Video 5**



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



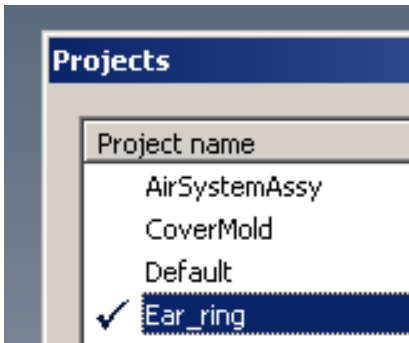
24. Click on the **Color Override** drop down. Choose a material by experimenting with different materials.


25. **Be sure to reset the Selection Priority back to Faces and Edges!!**

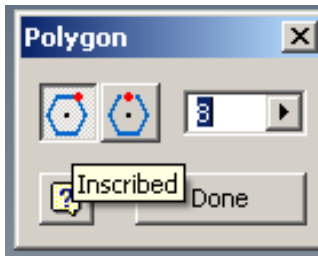
26. **RENAME ALL OF YOUR SKETCHES, EXTRUSIONS AND FILLETS SO THAT THAE MAKE LOGICAL SENSE!! Watch Video 6**

Part 2 – The Stone

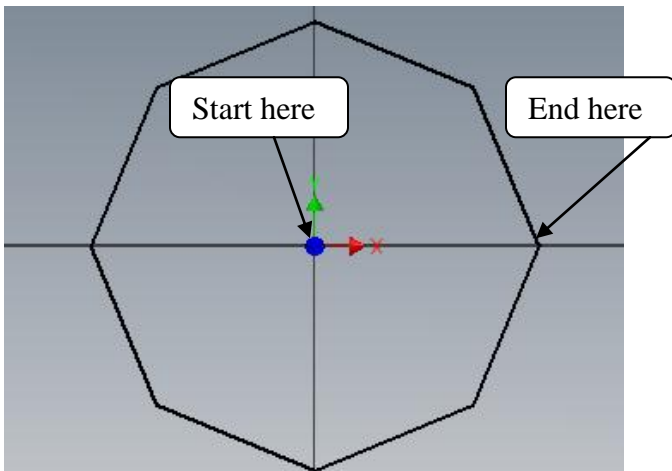
****If you have logged off since finishing the last part, go to Get Started > Projects > Be sure your “Ear Ring” project is set as the default. ****



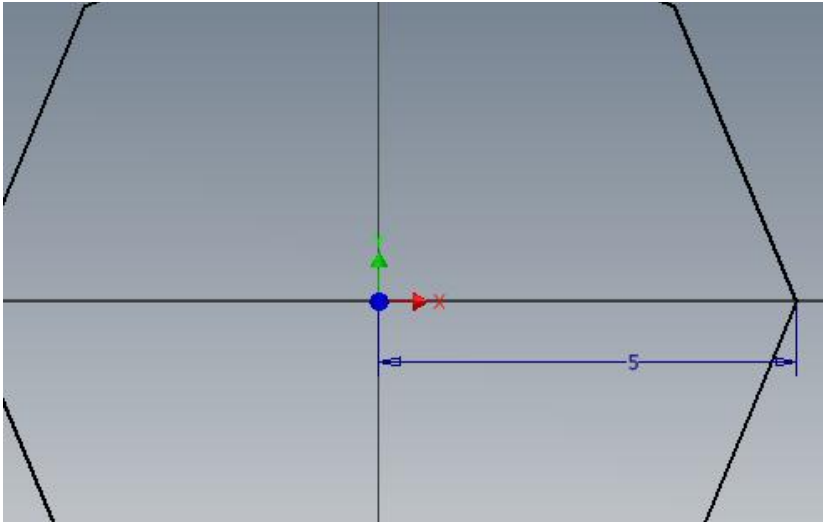
1. In the **Get Started** tab, click on **New**. In the **New File** box, click “**standard.ipt**”, then OK. This will open a new, standard part file in Inventor.
2. Click on the **Save** icon . Since you created a **Project Folder**, your Earring parts should automatically be saved in your Earring project 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.



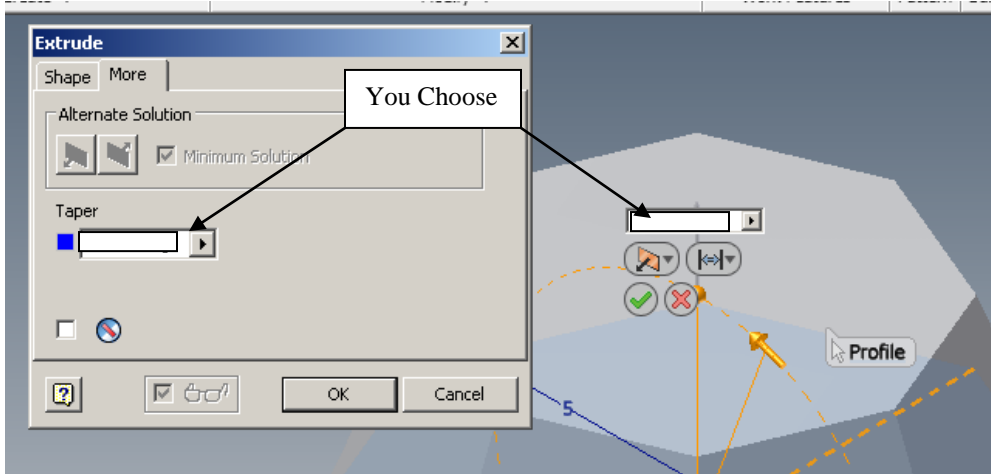
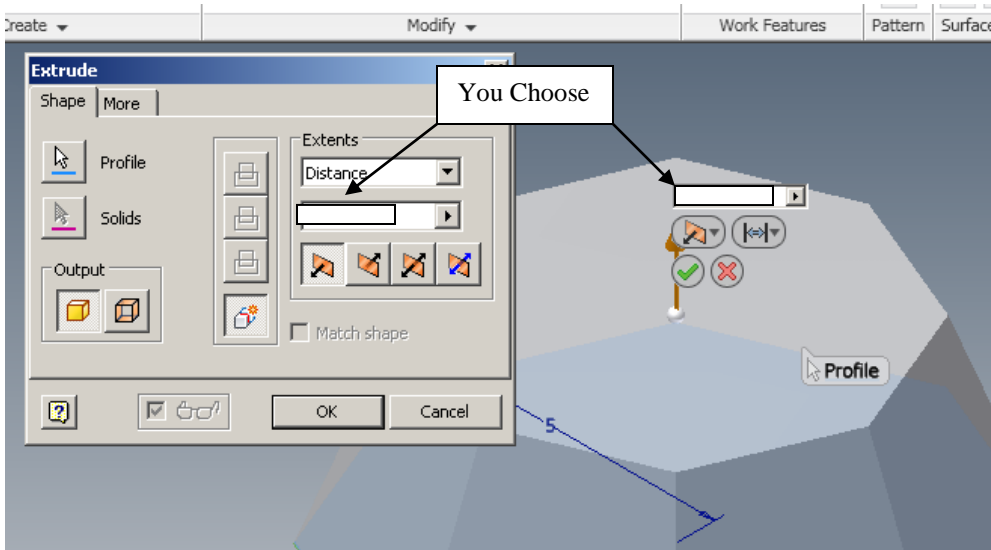
6. Click on the origin to **start** the polygon, then on the horizontal plane indication to **end** the polygon.



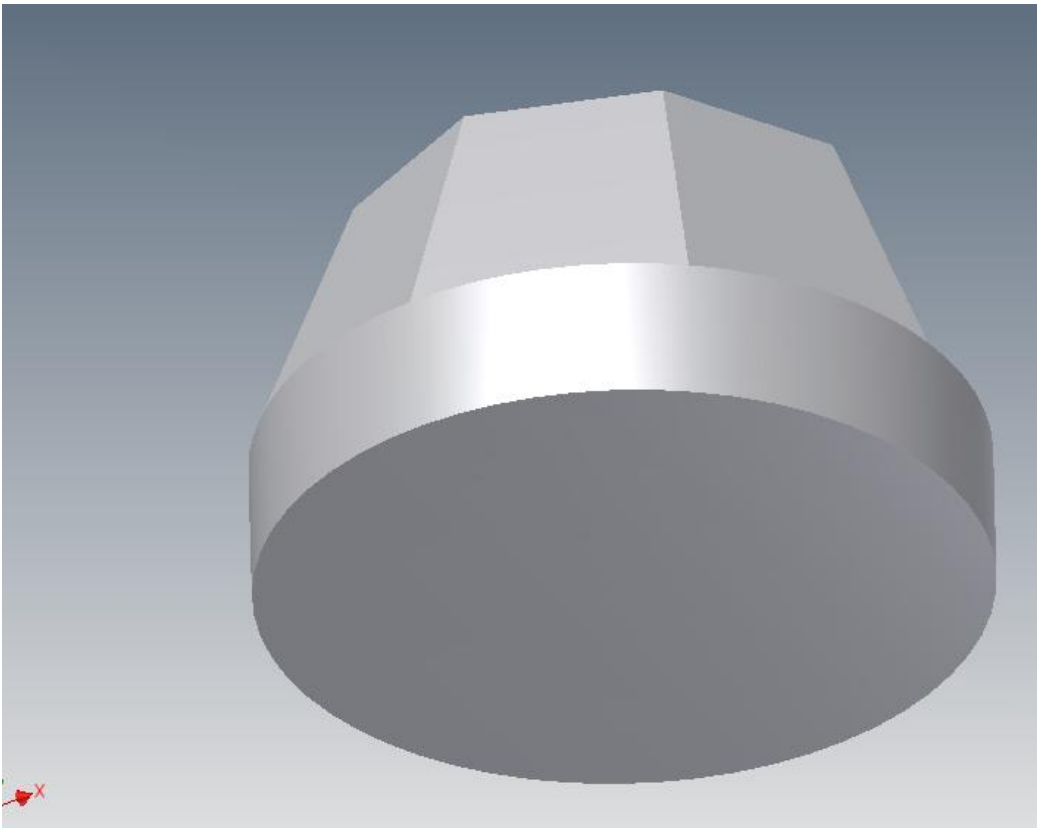
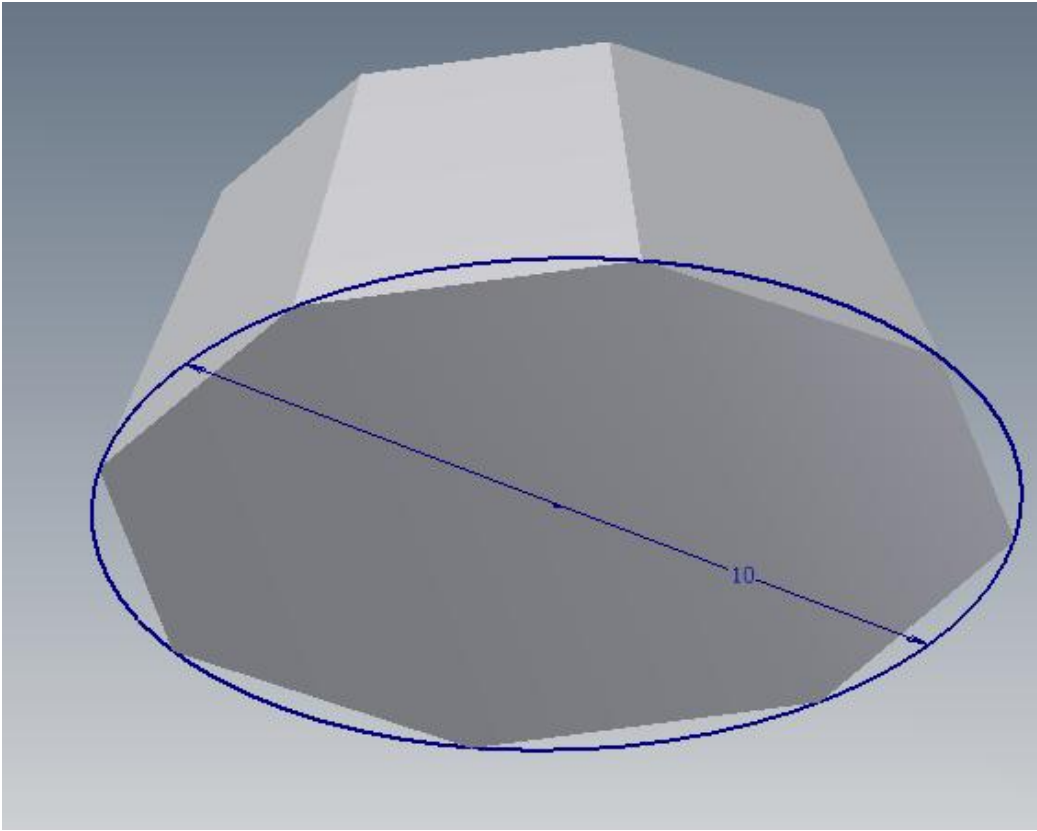
7. Dimension the octagon at a radius of **5 mm**. Click **Finish Sketch**. Watch **Video 7**



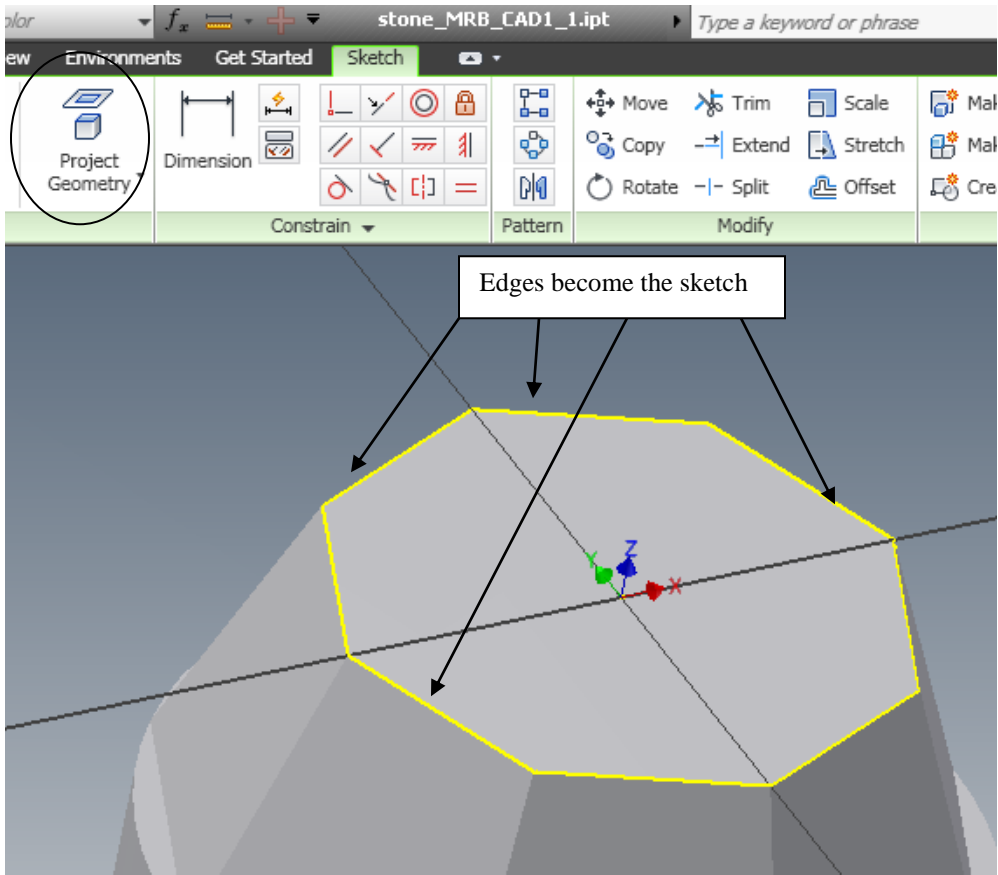
8. **Extrude** the stone to a distance of your choosing. In the Extrude box, choose **More**. **Taper** the extrusion to a degree of your choosing. You can also **pull/push** on the arrows to set the distance of the extrusion and taper.



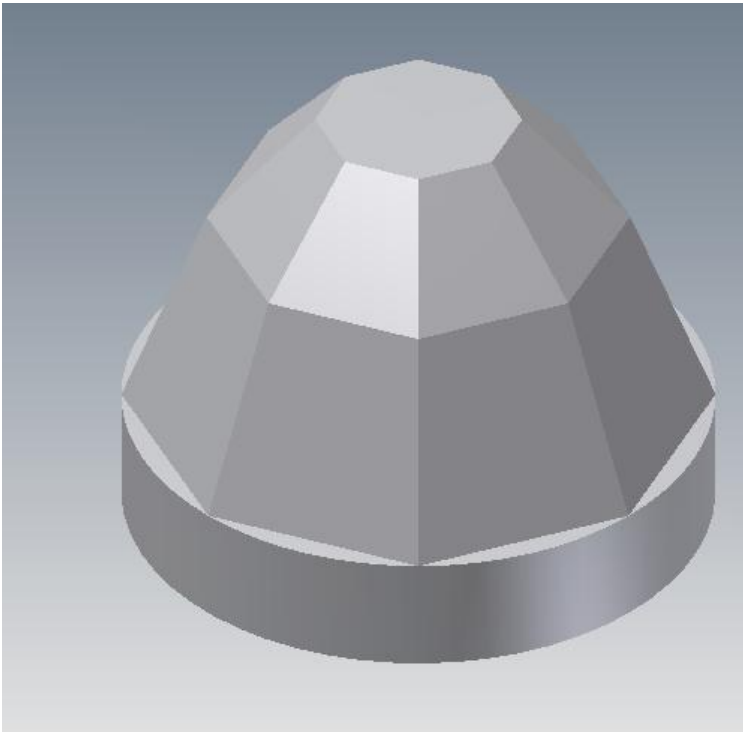
9. Create a New Sketch on the *bottom* of the stone. Draw a *10 mm circle* and extrude it to *2 mm*. **SAVE YOUR WORK!! Watch Video 8**



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!!**



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.

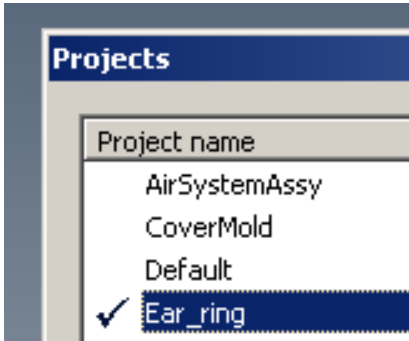



13. Click on the *Color Override* drop down. Choose a material by experimenting with different materials. **SAVE YOUR WORK!!**

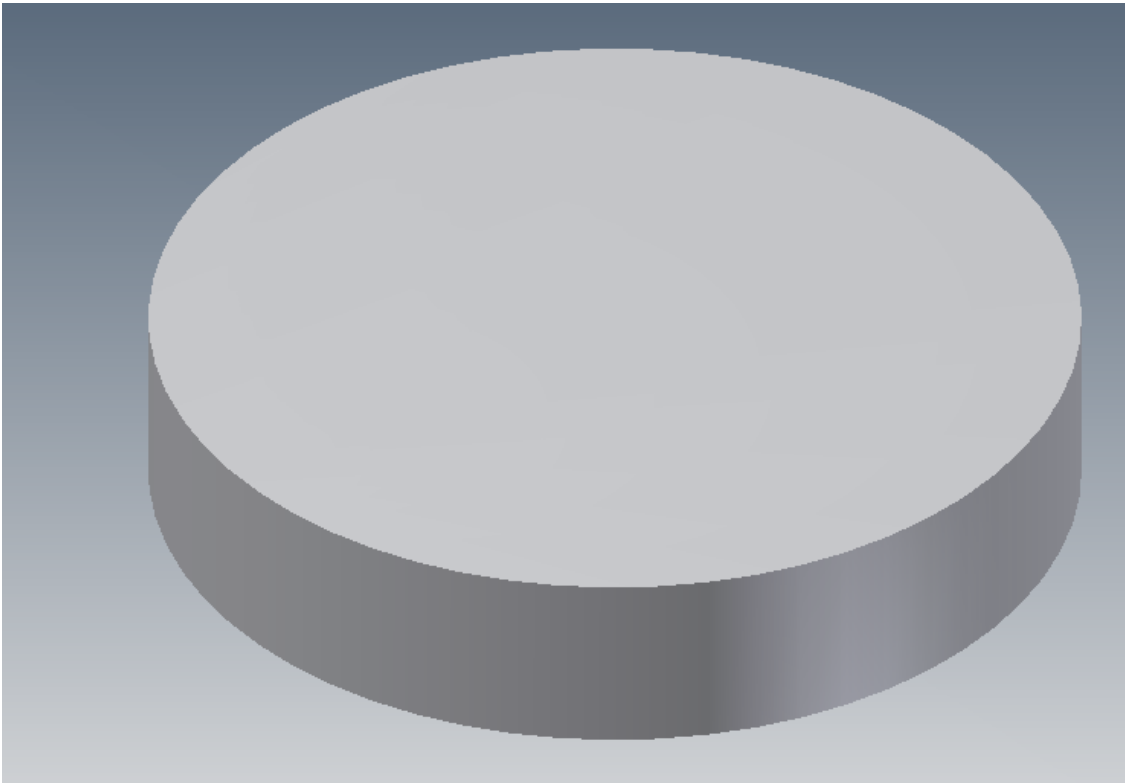
14. **Be sure to reset the Selection Priority back to Faces and Edges!! Watch Video 9**

Part 3 – Ear Ring Back

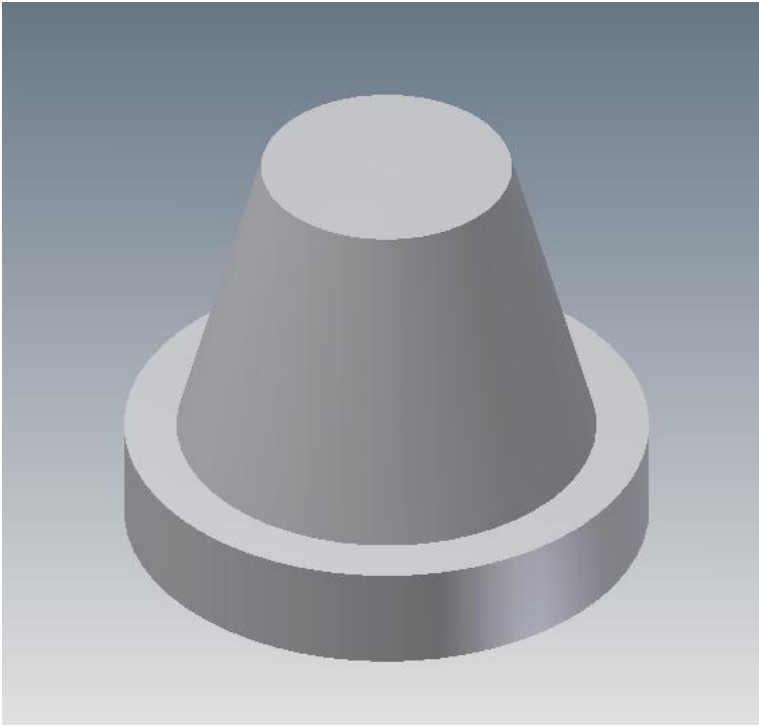
****If you have logged off since finishing the last part, go to Get Started > Projects > Be sure your “Ear Ring” project is set as the default. ****



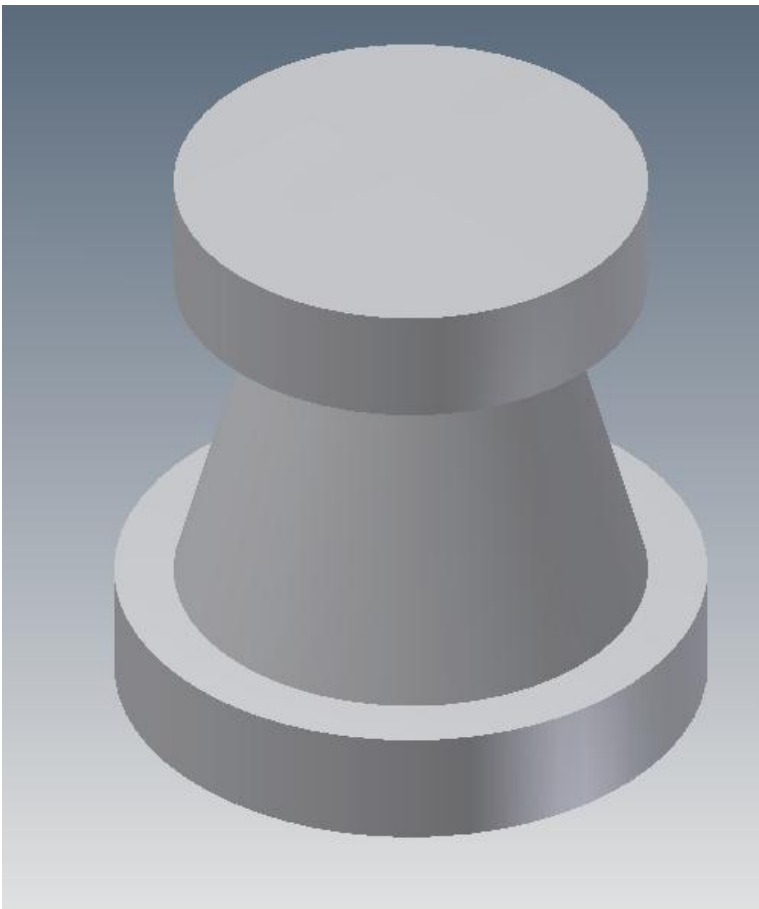
1. In the **Get Started** tab, click on **New**. In the **New File** box, click “**standard.ipt**”, then OK. This will open a new, standard part file in Inventor.
2. Click on the **Save** icon . Since you created a **Project Folder**, your Earring parts should automatically be saved in your Earring project 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**



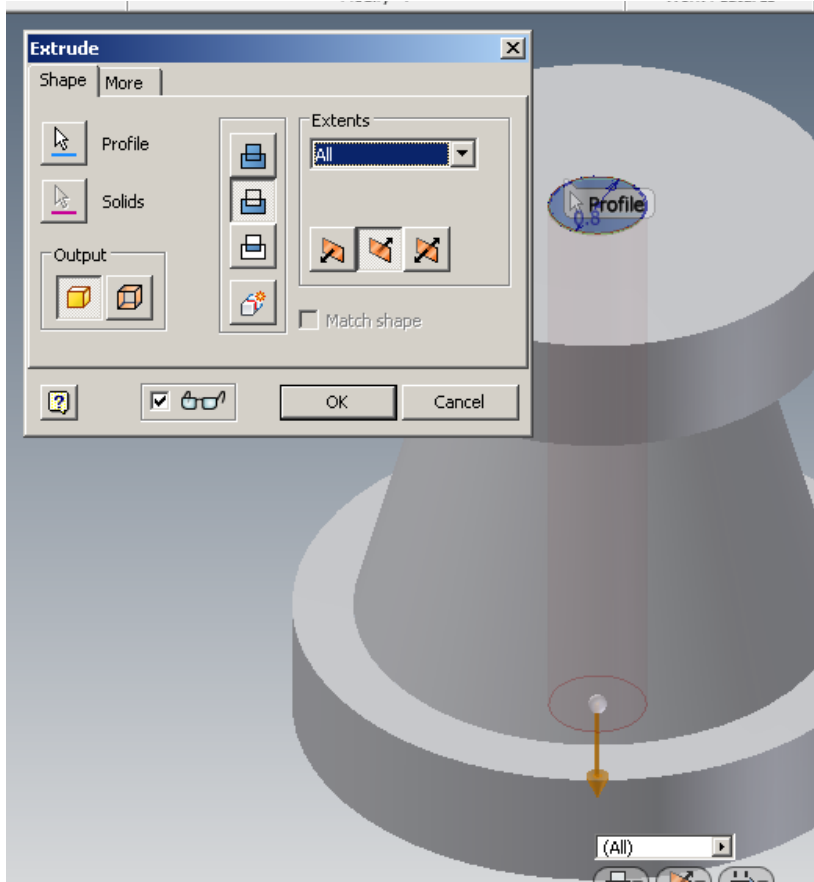
6. Create a **New Sketch** on the *top face*. Draw a *concentric circle* of **4 mm**. **Extrude** the circle to **3mm**, with a taper angle of **-15 degrees**.



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.



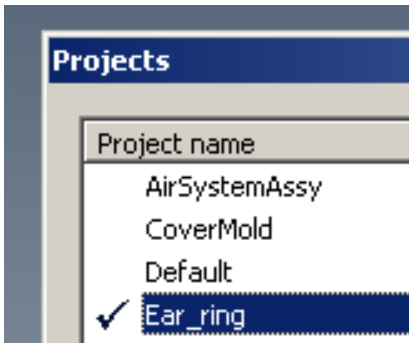
9. On the *Quick Access toolbar*, click on the *selection priority* drop down. Choose **Select Bodies**. Click on the *back* to select it.




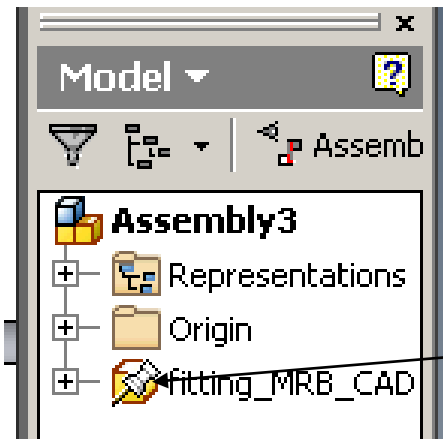
10. Click on the *Color Override* drop down. Choose a material by experimenting with different materials. **SAVE YOUR WORK!!**
11. **Be sure to reset the Selection Priority back to Faces and Edges!! Watch Video 12**

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. ****

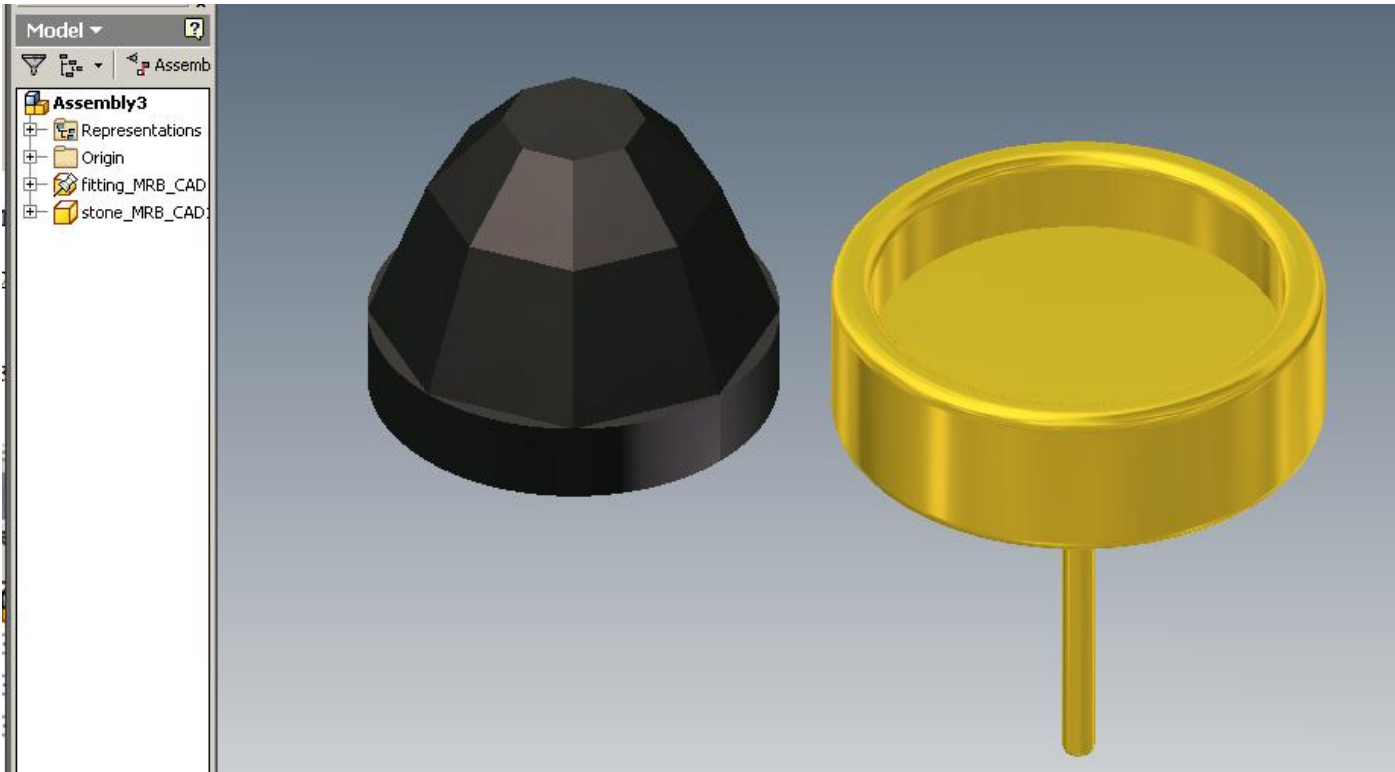


1. In the **Get Started** tab, click on **New**. In the **New File** box, click “**standard.iam**” , then OK. This will open a new, standard *assembly* file in Inventor. Save as *assembly_ear_ring_MRB_CAD1_1*.
2. In the **Assemble > Component** tab, click on **Place**. Choose the *fitting* file. Inventor 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**




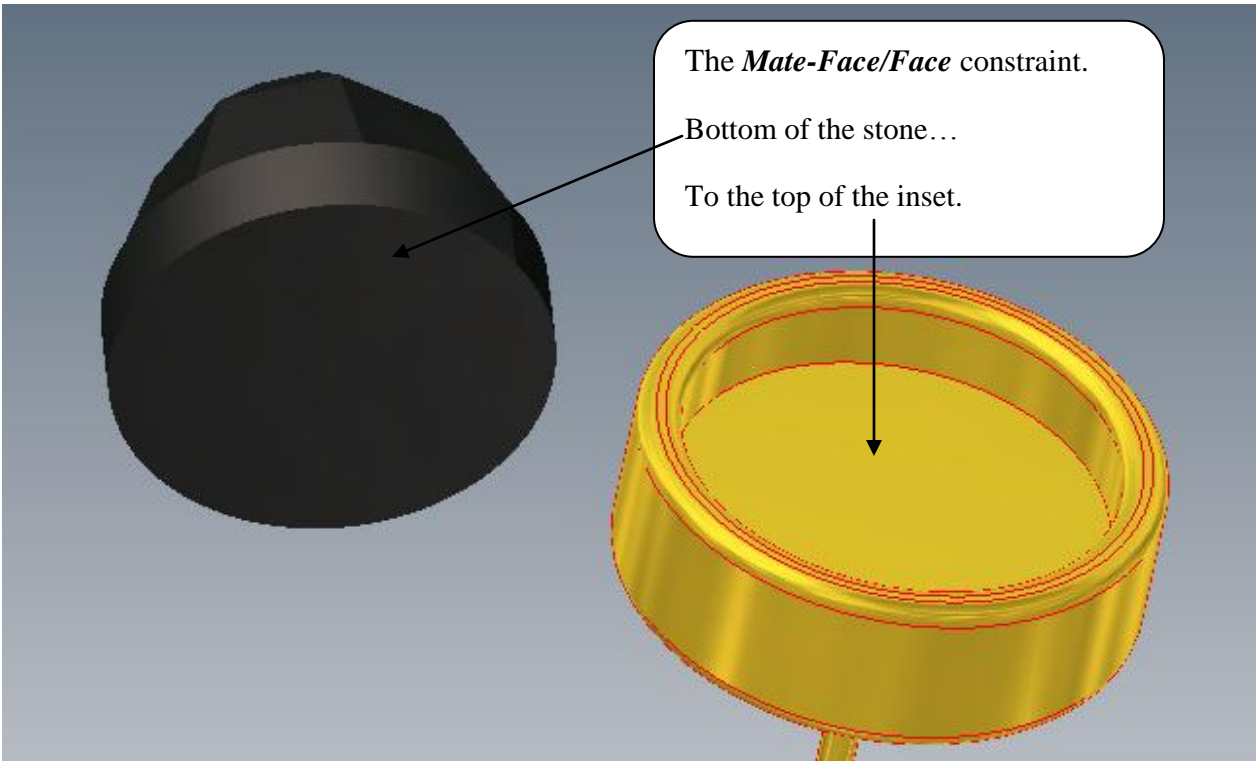
Pin attached here means that the part is constrained to be immobile or *fixed*.

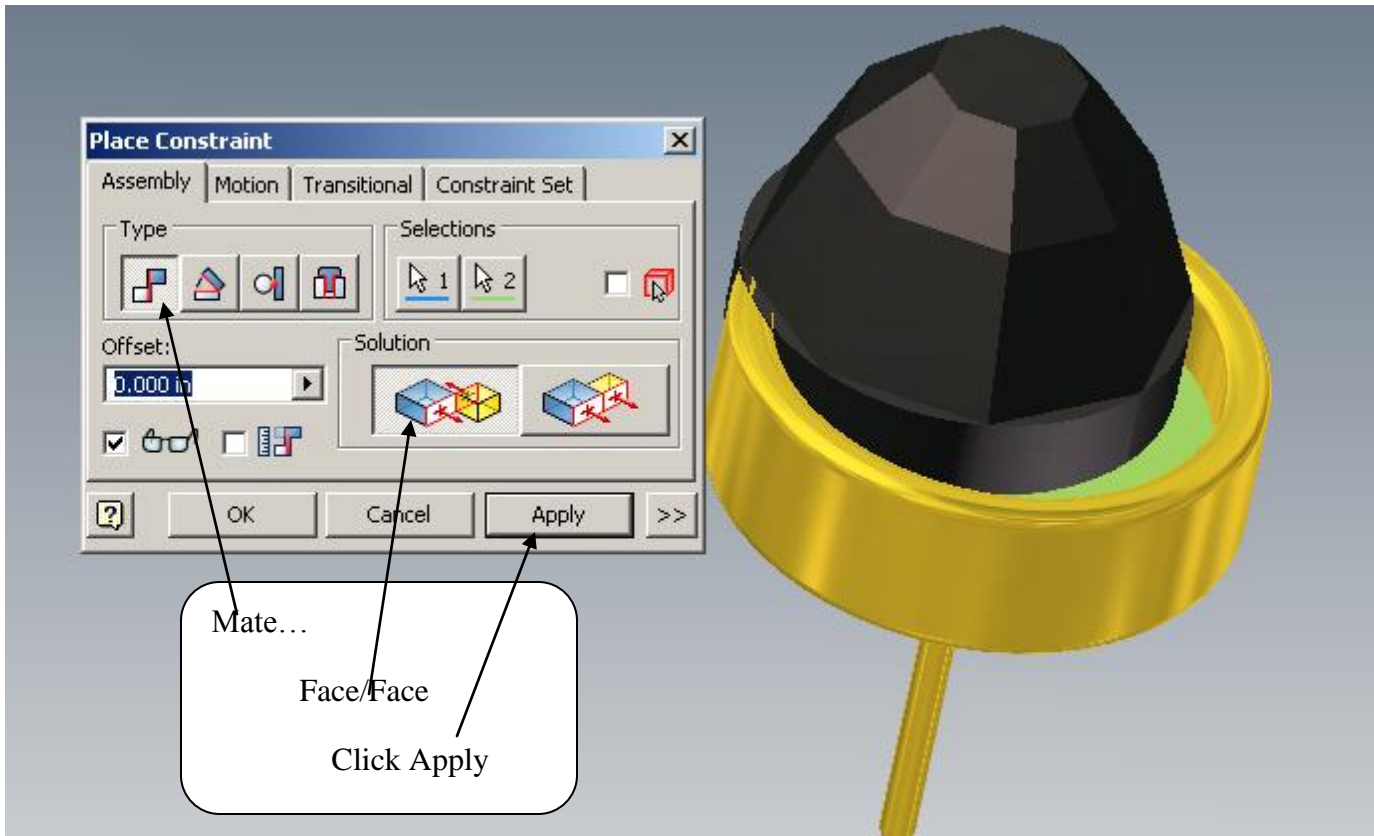
4. Click on **Place**, this time adding the *stone* to the assembly. Hit *escape* so that you place only one stone. Notice that the stone *is not* pinned. The stone will be moved as a result of assembly constraints.



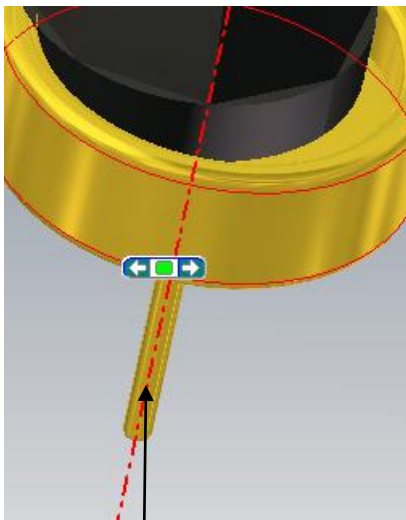
5. Create a *Mate-Face/Face* constraint. This will constrain the bottom face of the stone to the top of the inset face.

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

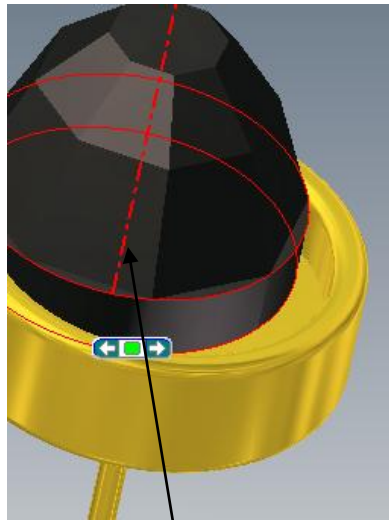




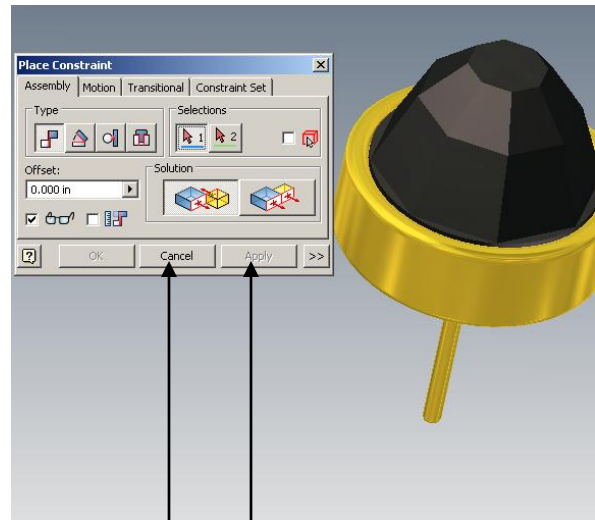
6. Next, you will create a *Mate-Axis/Axis*. Select the *axis line of the post*, then the *axis line of the stone*, then click **Apply** > **Cancel** (to finish). **Watch Video 14**



Select the axis of the post...

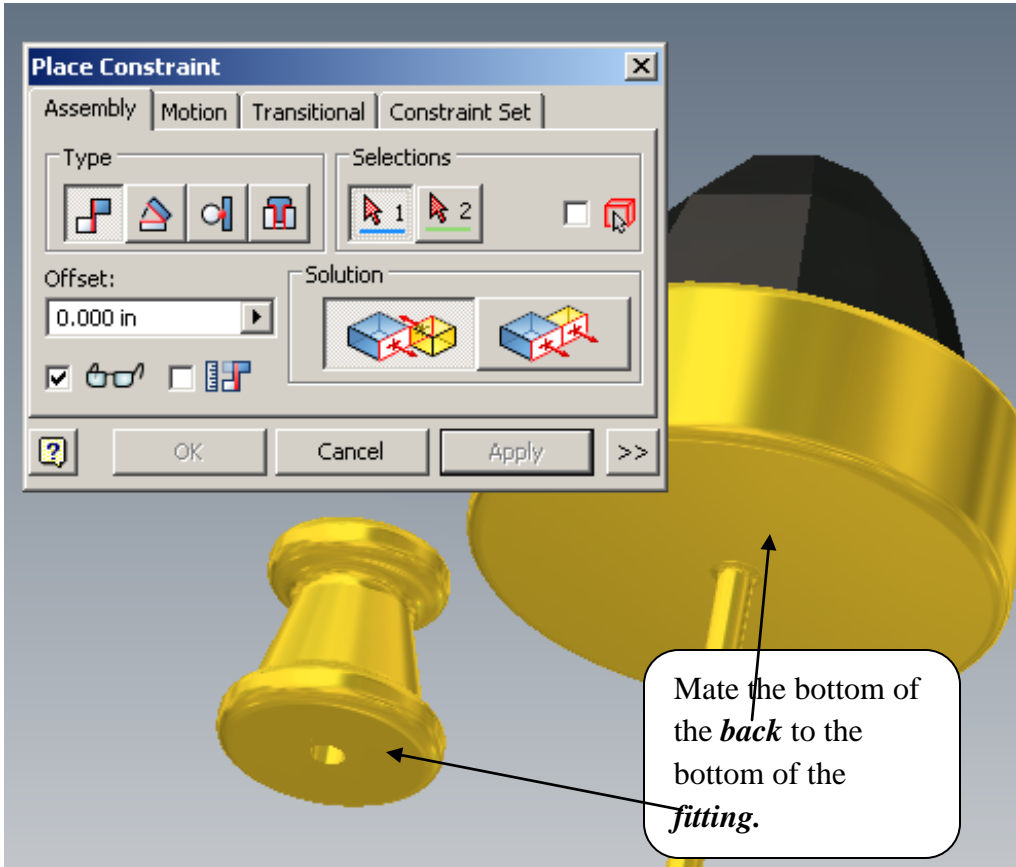


... the axis of the stone...



... click Apply, then Cancel...

- Next, we will add the **Back** part. Click on **Place > Back**. Hit Escape after placing the back part.
- 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).



- 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 = <i>ALL filenames use the format filenameINL_CAD_1</i>	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	