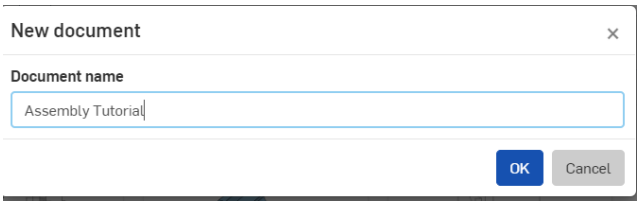
OnShape: Assembly Tutorial

By: Matthew Jourden

Brighton High School

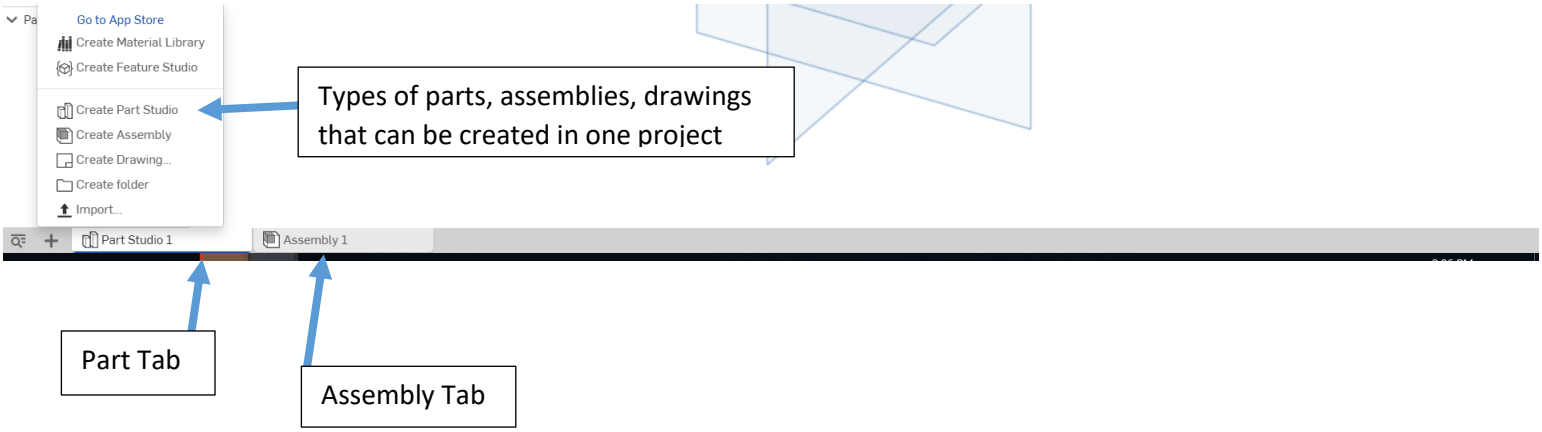
Brighton, MI

1. Navigate to Onshape.com > Login > Create > New Document > Name: Assembly Tutorial > Select OK



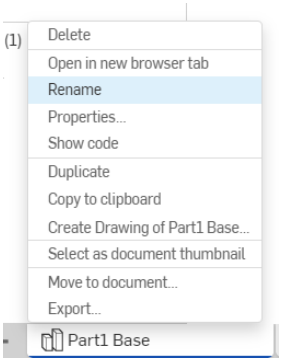
OnShape does allow users to import files from other CAD Software. User would do this through the My OnShape User Portal.

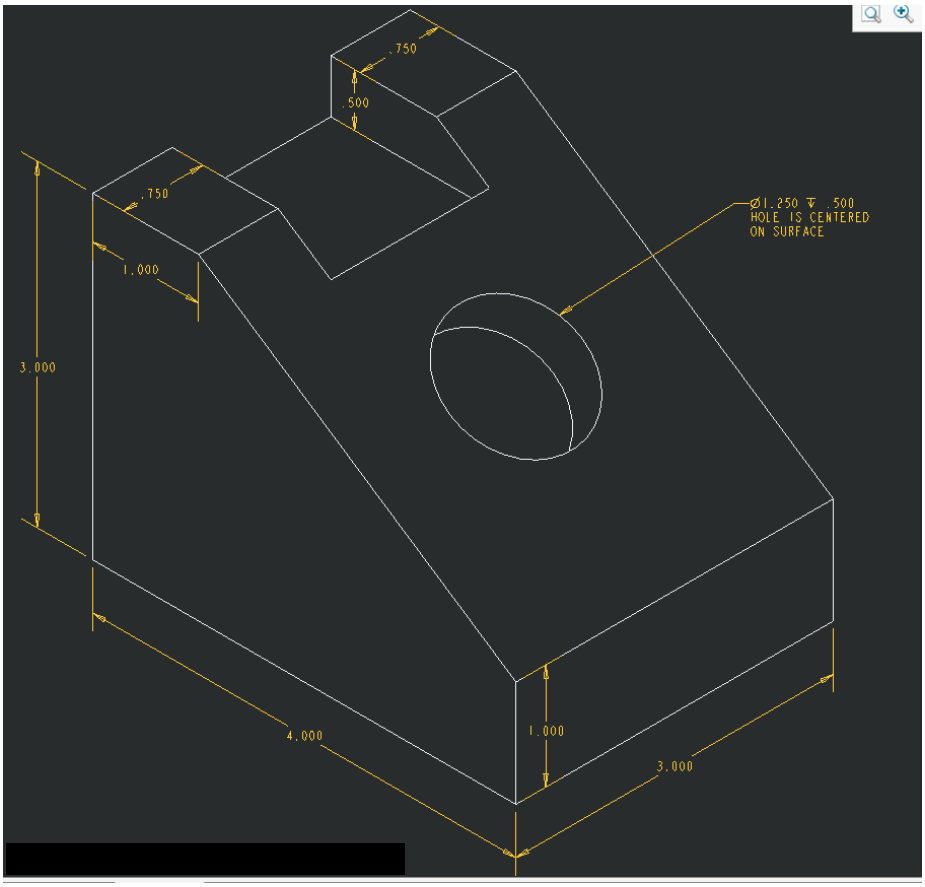
User can also create all of the parts needed for an assembly within one document by creating new tabs at the bottom of the work area. Think of the document we created is a Project Folder that houses all of the files within.



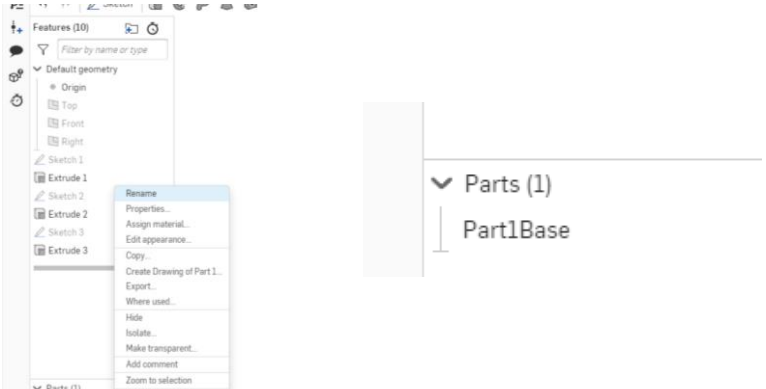
Part 1: Base Block

1. Select Part Studio 1 Tab > Design the following part
2. Rename Tab > Right Click on the Tab > Select Rename > Part1 Base



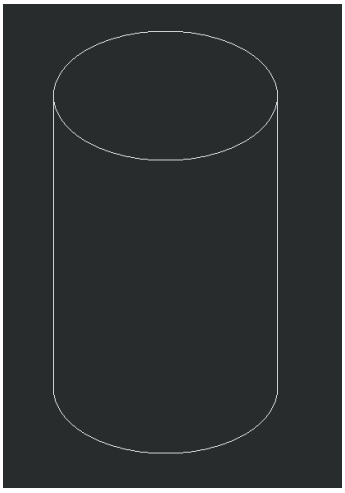


3. Change Part Name in Model Tree: Select Part 1 from Parts Menu part of the Model Tree > Right Click > Select Rename > Rename to Part1Base
   NOTE: This will make it easier to view between parts on the assembly tab



Part 2: Plug

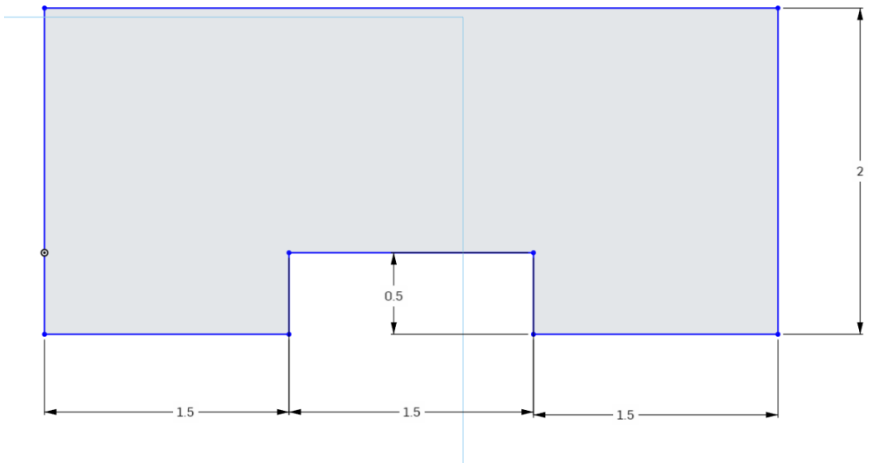
1. Select + Sign on the bottom left > Select Design the Following part > Cylinder Diameter 1.25 x 2 Tall
2. Rename Tab > Right Click on the Tab > Select Rename > Part2 Plug
3. Change Part Name in Model Tree: Select Part 1 from Parts Menu part of the Model Tree > Right Click > Select Rename > Rename to Part2Plug (See Part 1 for details on renaming part)



Part 3: Bracket

1. Design the following part
2. Rename Tab > Right Click on the Tab > Select Rename > Part3Bracket
3. Change Part Name in Model Tree: Select Part 1 from Parts Menu part of the Model Tree > Right Click > Select Rename > Rename to Part3BRacket (See Part 1 for details on renaming part)

Extrude Distance = 1

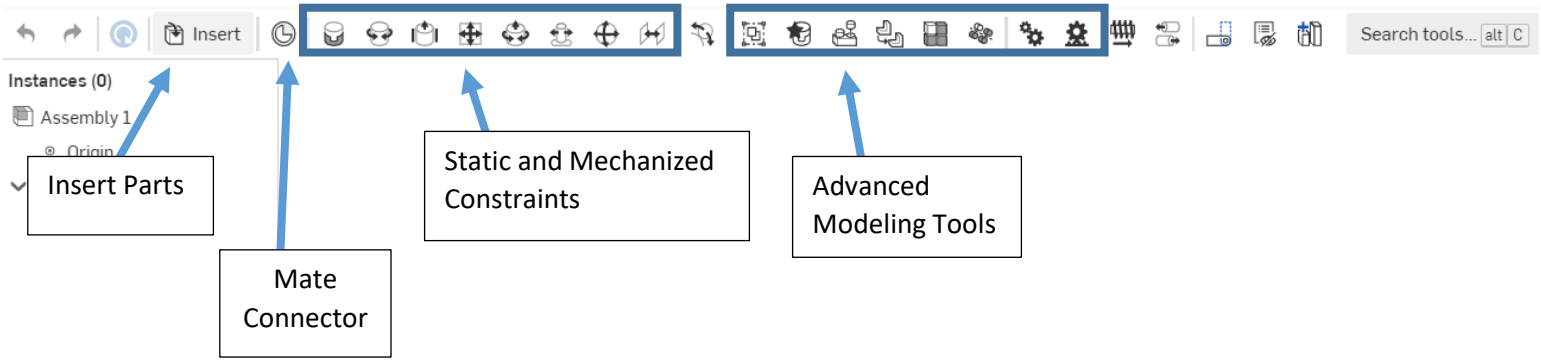


Assembly

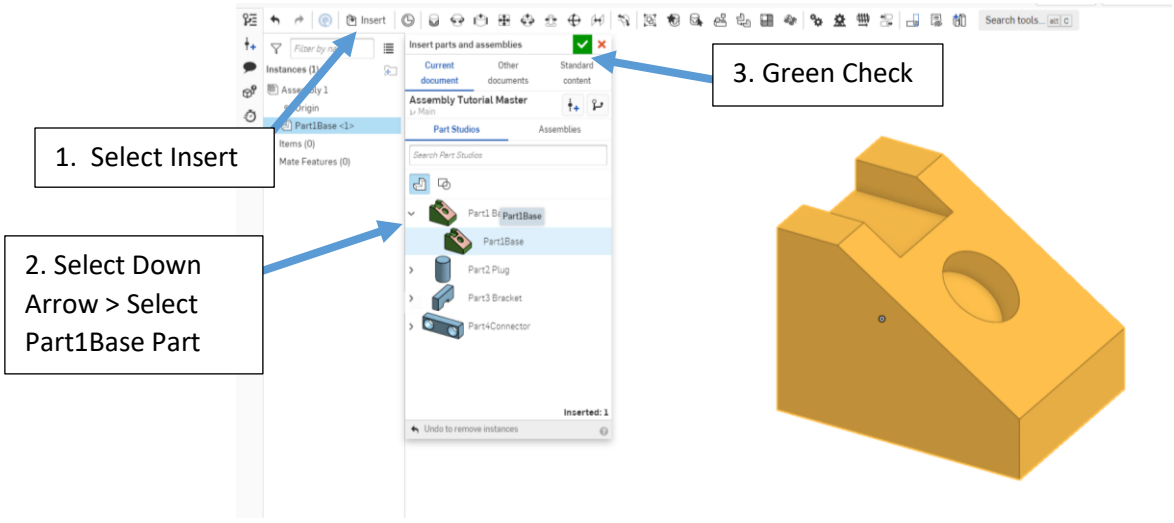
1. Select Assembly Tab at the bottom of the screen



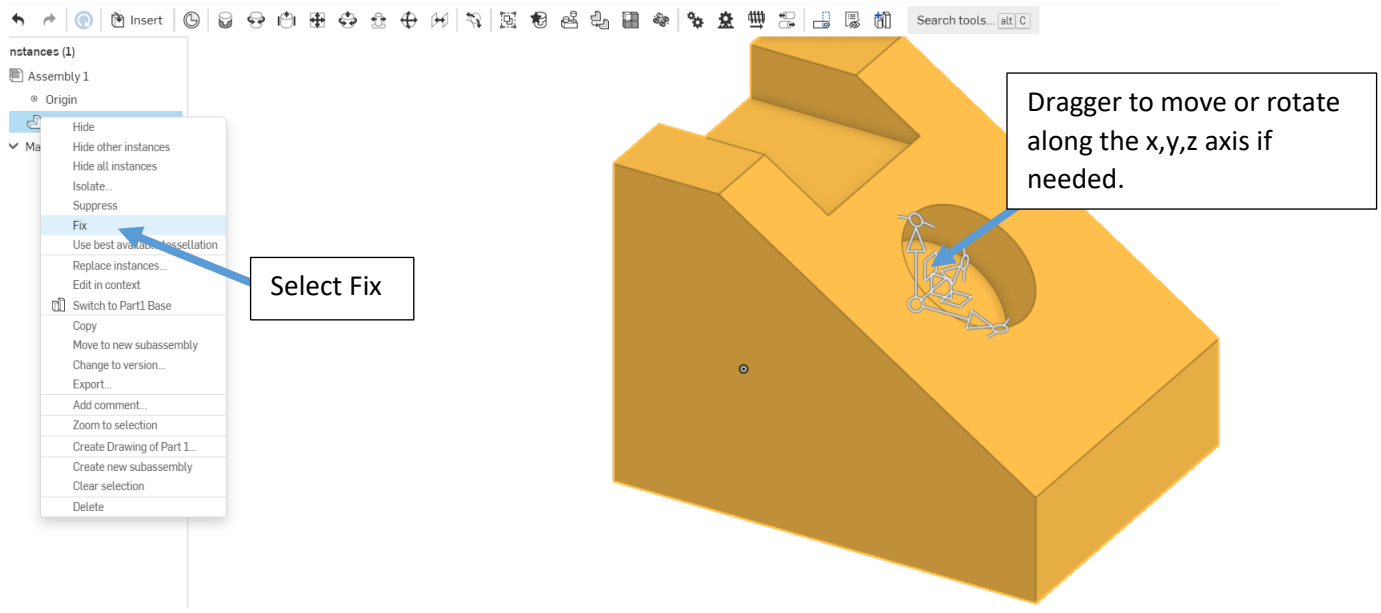
2. Tools



3. Select Insert > Pop Up Menu showing parts made within the document or user can select Other Documents or Standard Content to select models from other locations > Select Down Arrow next to Part1 Base: This will show user all of the parts designed in that part studio > Select Part1Base > Keep Cursor in the Insert Menu (NOTE: Keeping the cursor in the Insert Menu will place the part in the default location; Moving the cursor outside of the Insert Menu will move the part freely in space) > Select Green Check

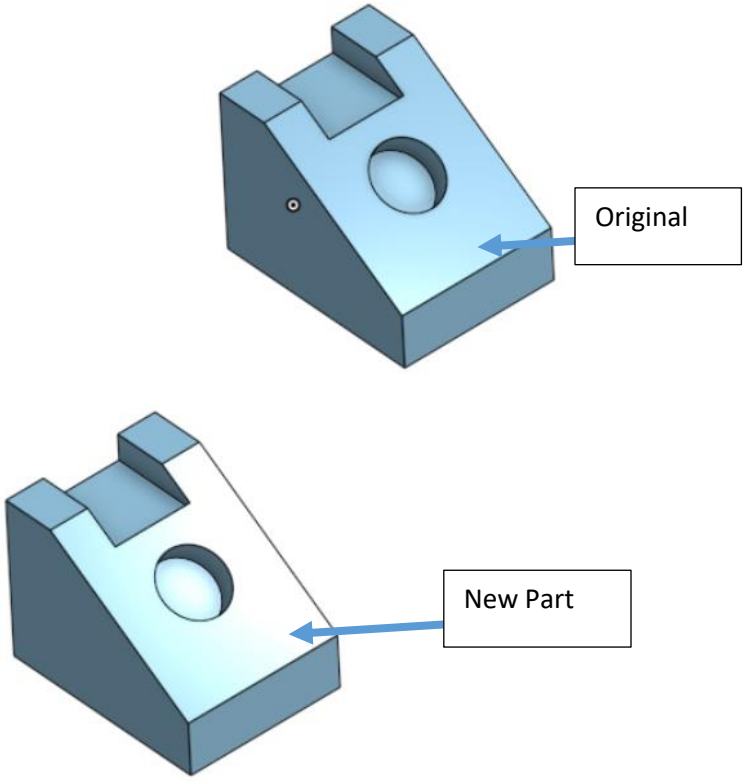


4. Select the Part1 Base from model tree or workspace > Right Click > Select Fix
   This will lock the three axis of the part



5. Inserting Second Part: Part1 Base

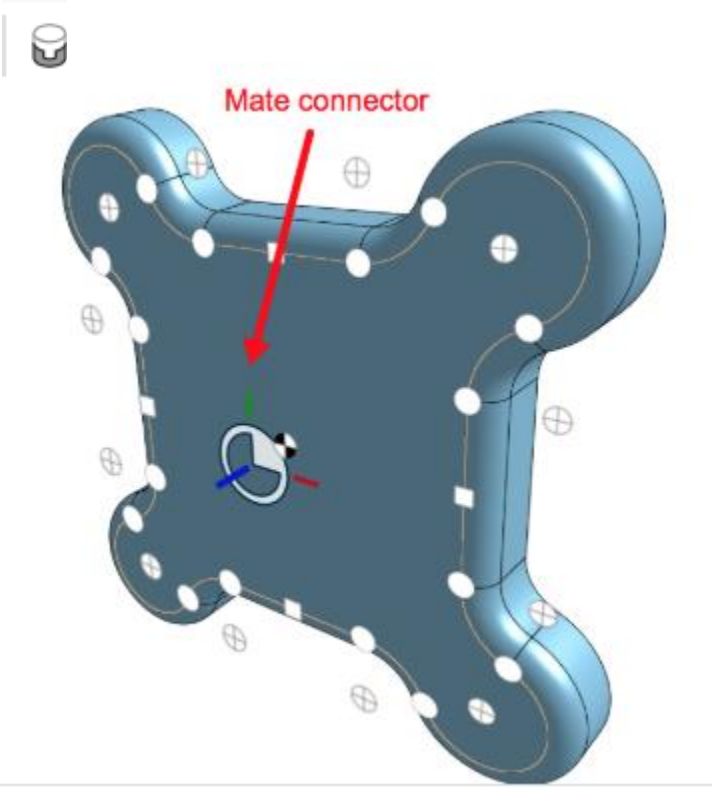
a. Select Insert Icon > Select Part1 Base > Left Click in Workspace (Be sure to zoom out before placing so the part is not accidently placed inside the assembly)



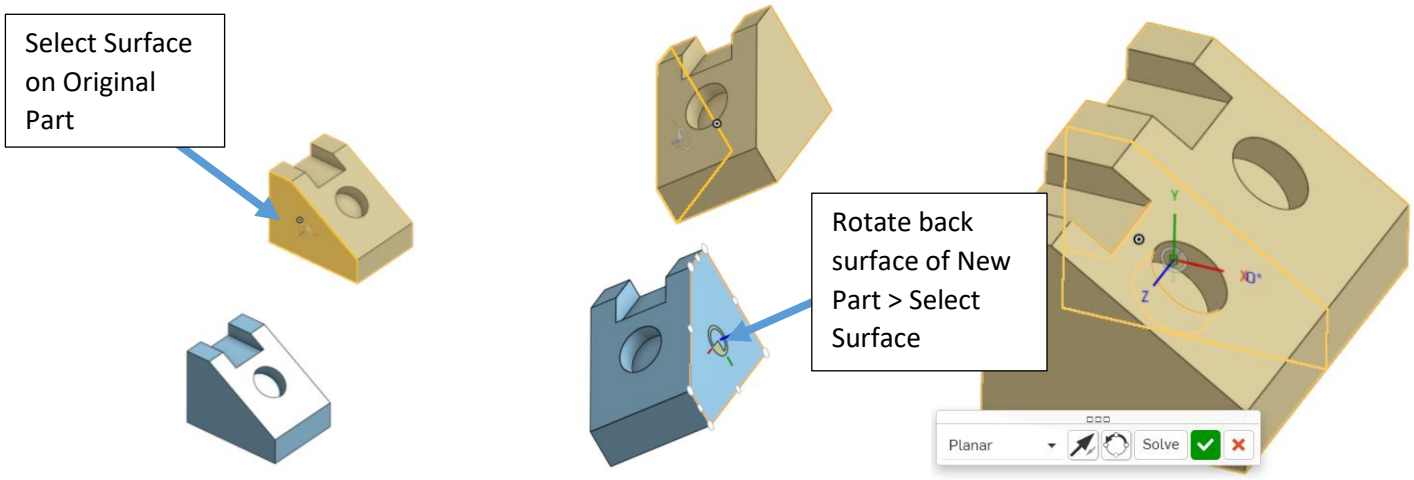
When setting constraints OnShape parts will be mechanized based on the selection type (See Assembly Reference Article (Hold CTRL + Left Click on Link to Open) that will show parts assembled together)

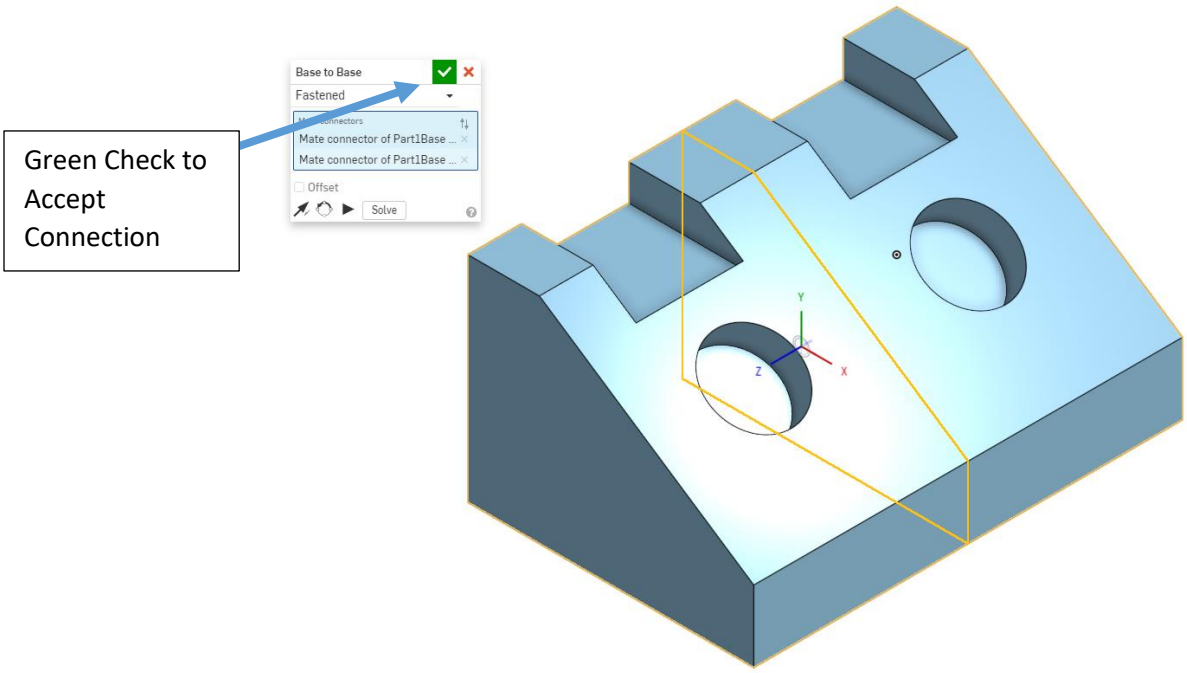
a. **Fastened** 0 degrees of freedom - no motion**, select two surfaces will lock other 2 axis in place aligning edges and surfaces**
b. **Revolute** 1 degree of freedom - rotation about Z
c. **Slider** 1 degree of freedom - translation along Z
d. **Planar** 3 degrees of freedom - translation along X and Y, and rotation about Z.
e. **Cylindrical** 2 degrees of freedom - rotation about Z and translation along Z
f. **Pin slot** 2 degrees of freedom - rotation about Z and translation along X
g. **Ball** 3 degrees of freedom - rotation about X, Y, and Z
h. **Parallel** 4 degrees of freedom - translation along X, Y, and Z and rotation about Z

Surface Points: Placing the cursor over the surface will highlight selection points. These points can be used to select one point from one part and a second point from another part to have touching. Points are shown below in WHITE. To Select Move cursor to desired point > Left Click

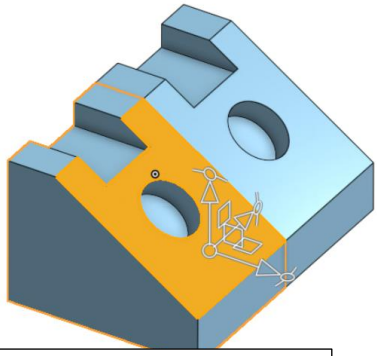


b. Select Fastened Tool  > Rename Connection to Base to Base (Naming the Connection Constraint will make it easier to sort out and edit assembly later > Select Surface from the original part > Rotate part to show the back side of the New Part > Select Back Surface > Parts will move Together > Green Check Fastened 1 Properties > Green Check Fastened Connection

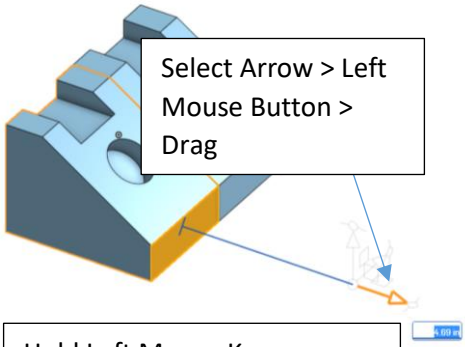




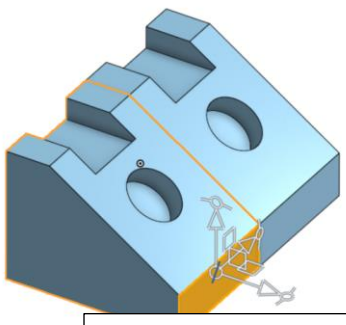
Test Movement > Select Part1 Base (2) > Place Cursor on one of the dragger connections > Hold Left Mouse Key > Drag Cursor > Notice the Part Moves with an Offset Value > Let go of Mouse Button > Part should Snap back to original location



Select Part to bring up the Dragger



Hold Left Mouse Key on one of the arrows > Drag Cursor

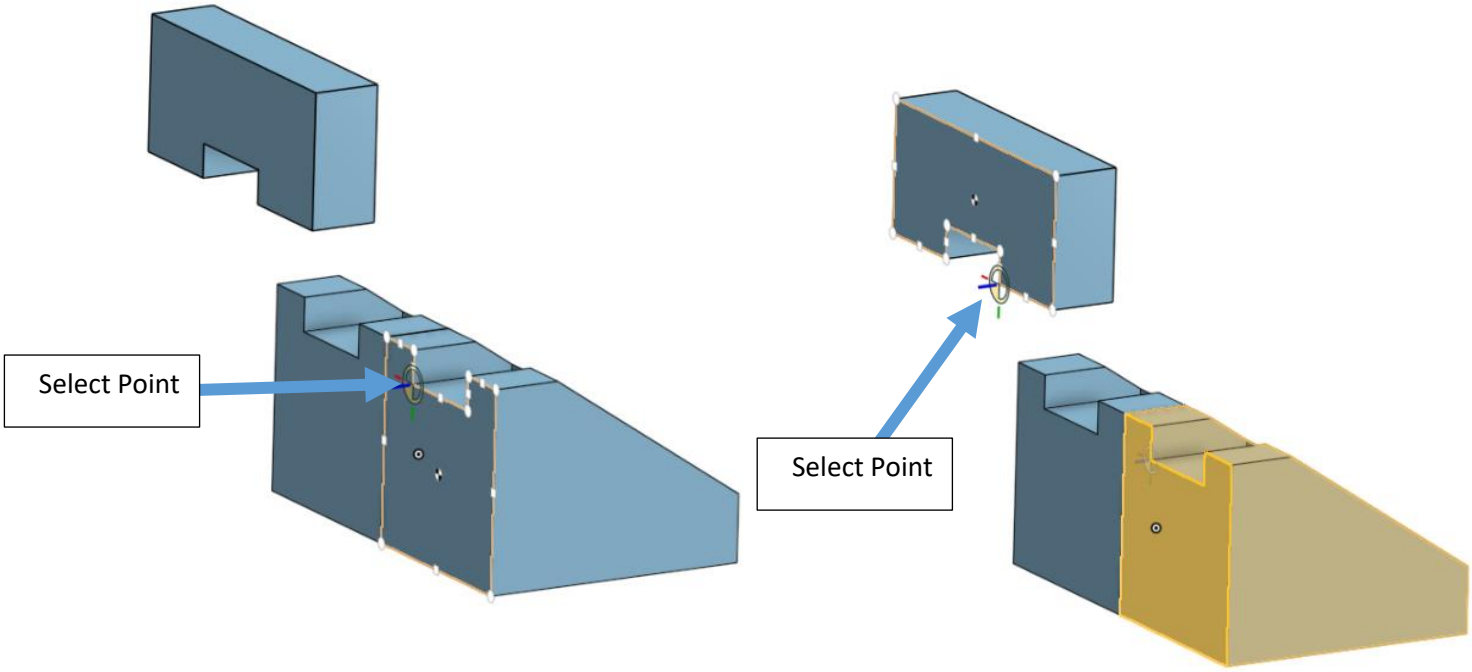


Let Mouse Button Go > Part will snap back to original place

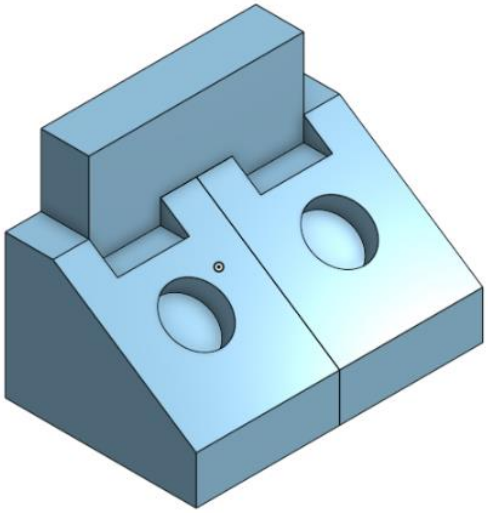
6. Part 3 Bracket Placement

a. Select Insert Icon > Select Part3 Bracket > Left Click in Workspace to place part (Be sure to zoom out before placing so the part is not accidently placed inside the assembly)

b. Select Planar Icon  > Rename Connection Base <2> to Bracket > Select the following two Points (NOTE: Let Cursor hover over the Surface to show points > Left Click to Select point > Green Check to Accept Connection

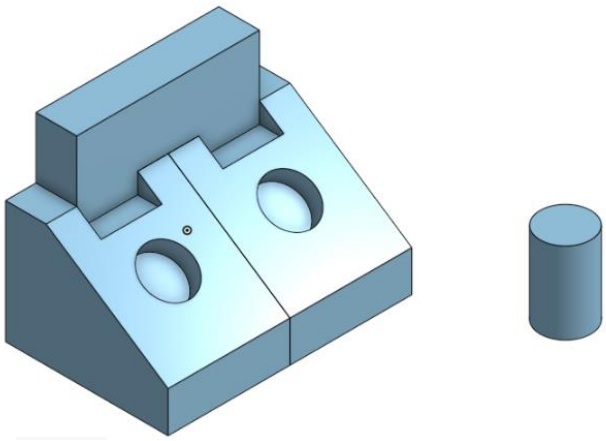


Connection Looks as Follows

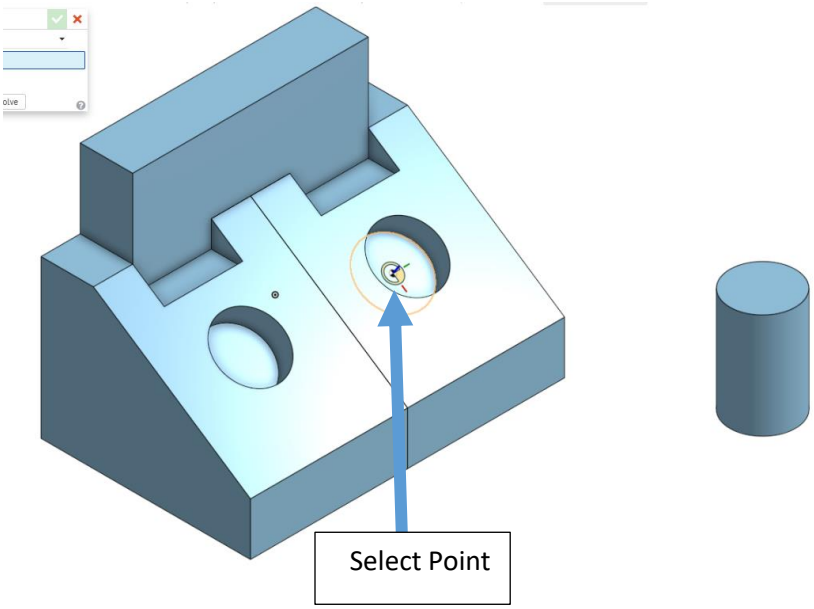


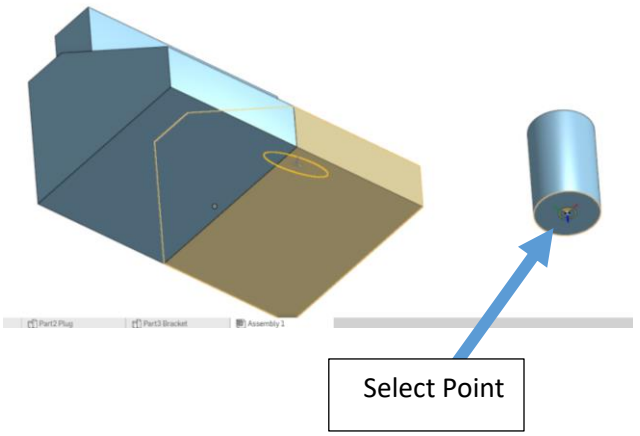
7. Part 2 Plug Placement

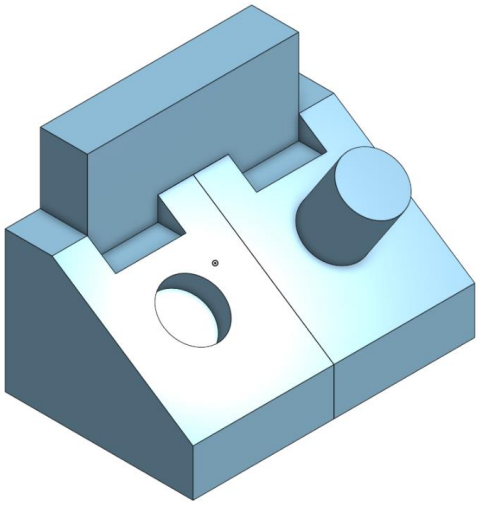
a. Select Insert Icon > Select Part 2 Plug > Rename Connection Base <1> to Plug <1> > Left Click in Workspace to place part (Be sure to zoom out before placing so the part is not accidently placed inside the assembly)



b. Select Planar Icon  > Select the following Centerpoint of the Hole and Cylinder; Place Cursor on Circuliar Surface to show Mate Connection Points (White Points) (NOTE: Let Cursor hover over the Surface to show points > Left Click to Select point > Green Check to Accept Connection

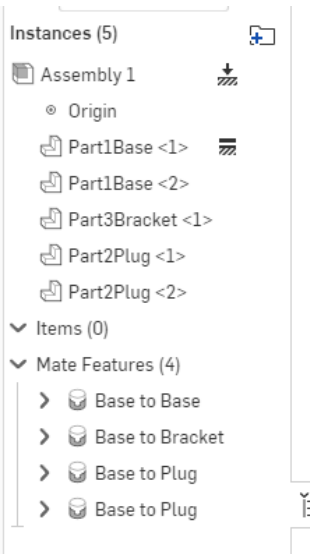


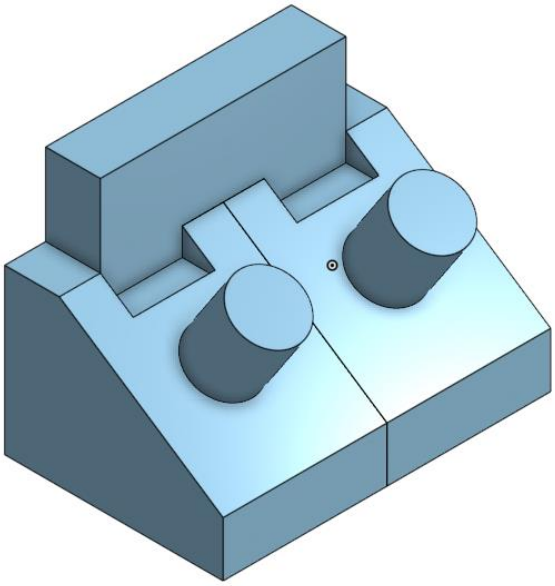




c. Place another Part2 Plug in the other hole
Rename Connection to Base <2> to Plug <2>

Model Tree



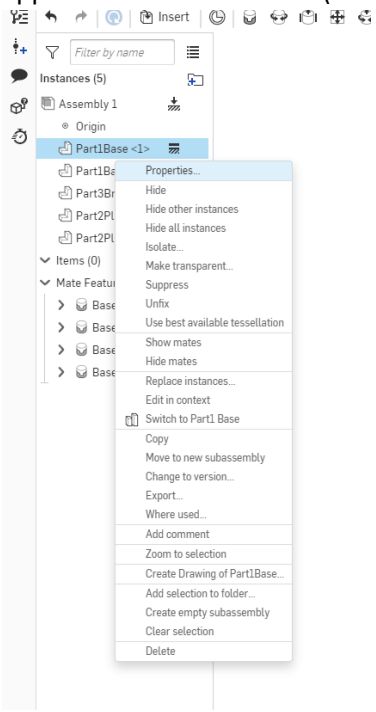


8. Optional: Part Properties and Renaming

In The Model Tree notice that the Part Names maybe all the same. This Happens when the Tabs of the Part Studios are not changed to something other than the default. Note this could be confusing when selecting between parts to activate.

Changing Properties

a. Select 1 one of the parts from the Model Tree > Right Click > Select Properties
This menu allows the user to add/change data information about the part. This information can also be applied to Bill of Materials (BOM) Chart on the working drawings of the assembly





9. Assignment Part 4 Connector

Design piece that will connect the two Plugs (See below for example)

10.Submission

Share Document to jourdem@brightonk12.com

i. Total Parts 6
   1. 2 x Part1 Base
   2. 2 x Part2 Plug
   3. 1 x Part3 Bracket
   4. 1 x Part4 Connector

Example Finished Assembly

