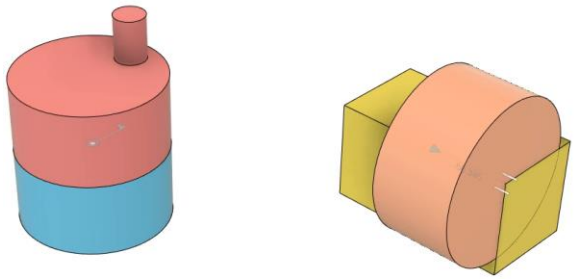
Lesson: Create Bodies and Components

In this lesson, you'll discover some of the differences between Fusion 360's bodies and components.

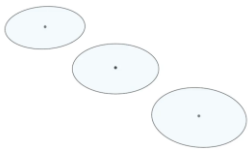


The completed exercise

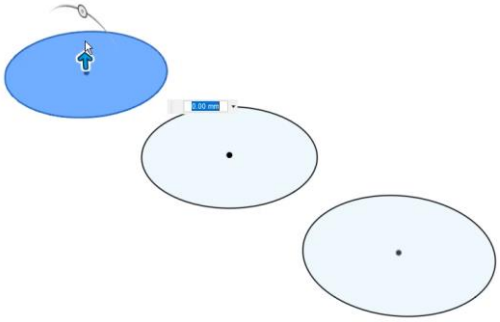
Learning Objectives

- Create a body and component.
- Use component color cycling.
- Demonstrate how to convert a body to a component.

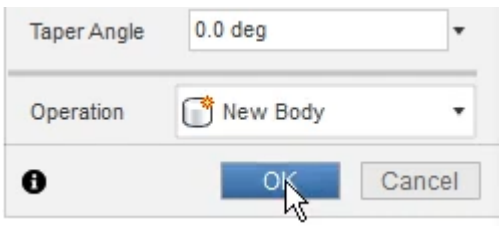
1. Upload and open the supplied *Bodies and Components* file. This file contains a single sketch that has three circles in it.



2. Understanding the differences between bodies and components is a fundamental part of a successful experience in Fusion 360. Click Create> Extrude. Select the first circle and use the on-screen manipulator to drag the selection upwards 50 mm.

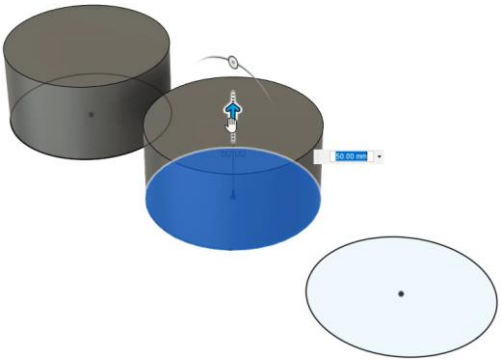


3. Note that the Operation type is set to New Body. Click OK.

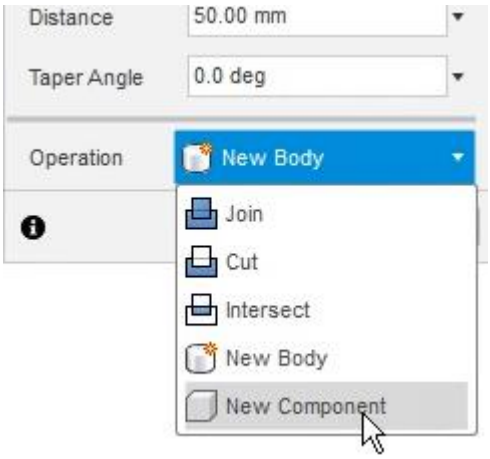


4. The new body is added to the Browser's Bodies folder and is named Body1. Expand the Sketches folder and turn on the visibility for Sketch1 by clicking the eyeball icon. Because this new cylinder is a body, it is fixed in space and cannot move. The cylinder will not move if you click it and try to drag it to a new position in the Canvas.

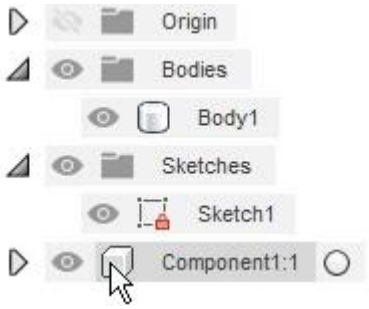
5. Click Create> Extrude. Select the center circle's geometry and use the on-screen manipulator to extrude it upwards 50 mm.



6. Choose the New Component from the dialog's Operation menu, then click OK.

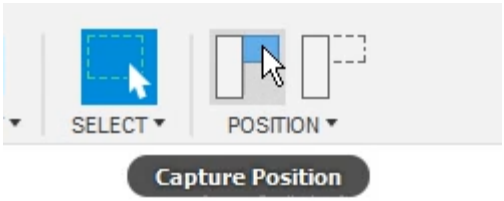


7. The component is added to the Browser and is not located inside a folder. Notice the component's icon is a cube but the body's icon is a cylinder.

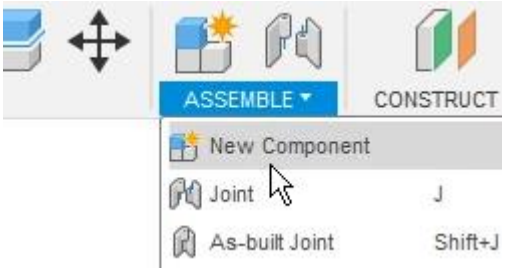


8. In the Browser, expand Component1 and notice that it has an Origin folder and a Bodies folder. Because components have their own origin, they can be moved in the Canvas. Click the center cylinder and drag it to a new location in the Canvas. Fusion 360 keeps track of the component's origin in relation to the file's origin.

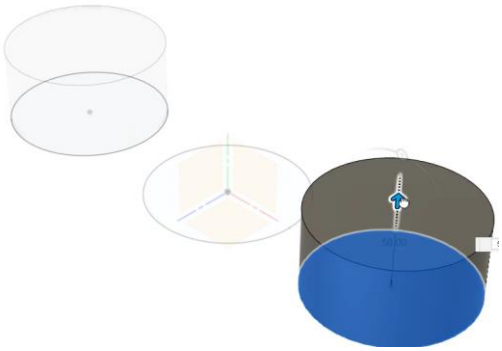
9. The cylinder's new position can be captured if needed. If you need to capture the new position, click Position> Capture Position. If the new position does not need to be captured; click Position> Revert to place it back in its original position. Capture the new position by clicking Position> Capture Position.



10. Click Assemble> New Component. Leave the dialog's options set to the default selections, then click OK. Component 2 is added to the Browser.

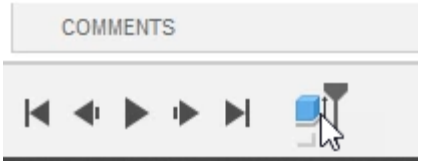


11. Click Create> Extrude and select the third circle in the sketch. Extrude the circle upwards 50 mm, then click OK. Because the new component was active when the cylinder was created, the new cylinder body is added to the component's Bodies folder.



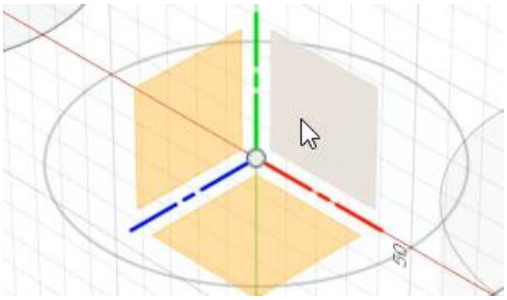
12. Activate the Browser's Component1 by clicking the radio button next to it, and notice that only the features used to create this component are shown in the timeline.

13. Activate the Browser's Component 2 by clicking its radio button and notice that only the features used to create this component are shown in the timeline.

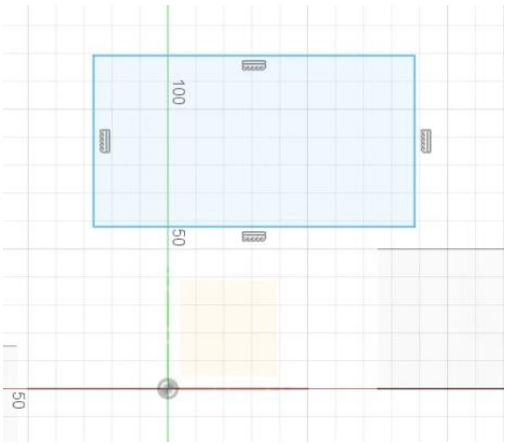


14. Activate the Browser's top level by clicking its radio button and notice that every feature in the file is shown in the timeline.

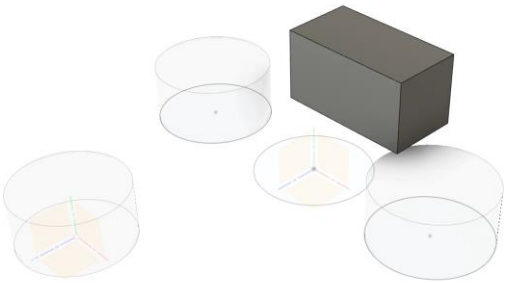
15. Making sure the top level is active, click Assemble> New Component. Don't change any of the dialog's default values, then click OK. Click Create> Create Sketch. Choose to sketch on the XY plane or the front plane.



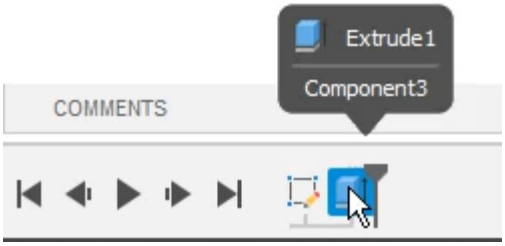
16. Draw a rectangle in an area that does not overlap the cylinders, then click Finish Sketch.



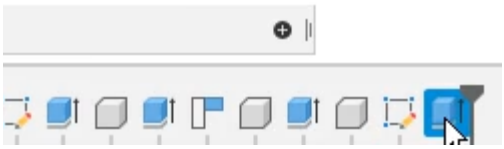
17. Press E to open the Extrude tool and extrude the rectangle 60 mm. Click OK in the dialog to create a solid body.



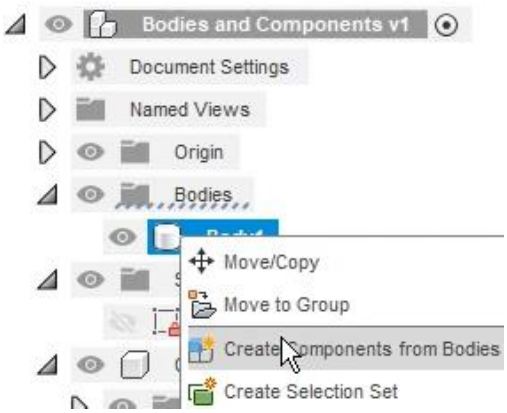
18. Because the new component is active, the timeline shows only the features used to create sketches, bodies, and components inside the current component.



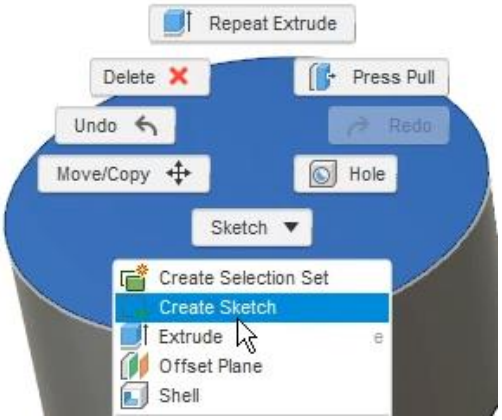
19. Activate the Browser's top level and notice that the two timeline features used to create Component3 have been added to the timeline.



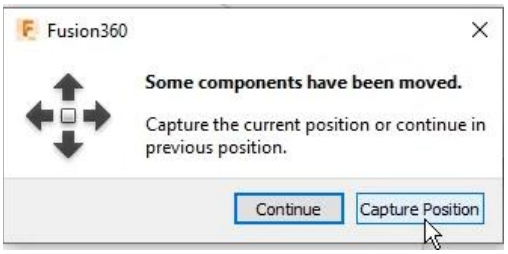
20. Use the Browser to turn off the visibility for the original sketch. Select the first cylinder body, right-click it, then choose the Create Components from Bodies option from the menu. The original body is converted to a component and added to the Browser as Component4. Because this body is now a component, it can be moved around the Canvas. If you move it, revert the component to its original position by clicking Position> Revert.



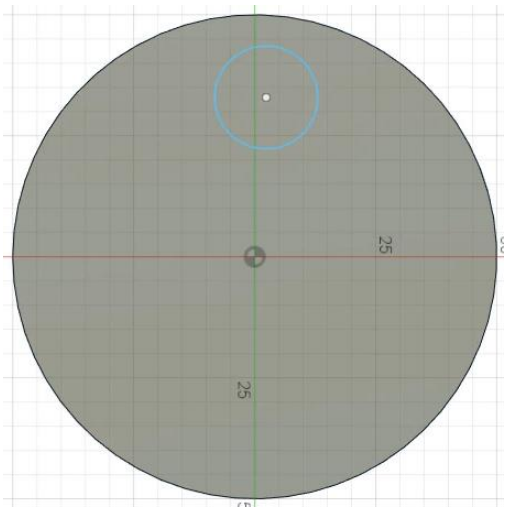
21. Components are needed to create mechanical motion in Fusion 360. In the Browser, activate Component1. Select the component's top face, right-click it, then choose the Create Sketch option from the menu.



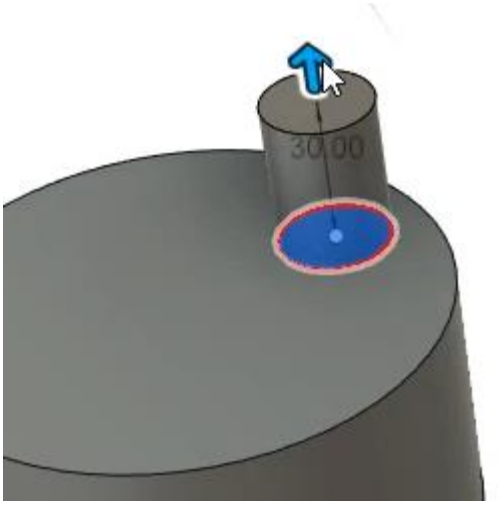
22. If Fusion 360 asks you to capture the component's position, click Capture Position.



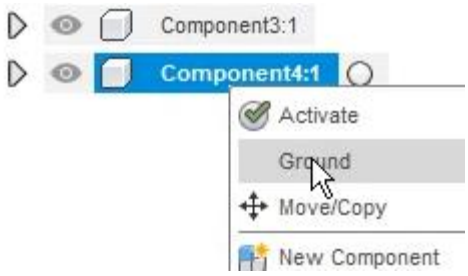
23. Press C to open the Circle tool and draw a small circle on the cylinder's face. Click Finish Sketch to end the sketch.



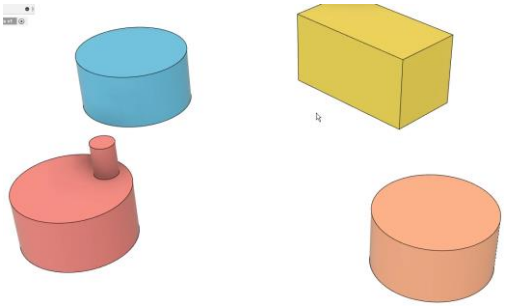
24. Open the Extrude tool by pressing E and extrude the circle upwards 30 mm. Make sure the Joint option is selected from the dialog's Operation menu, then click OK.



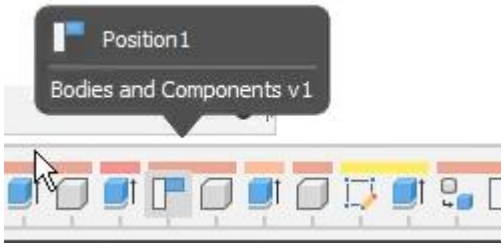
25. Activate the Browser's top level. Before applying joints, ground Component4. To do this, select it, right-click it, then choose Ground from the menu. Grounding a component means that it is no longer free to move around the Canvas.



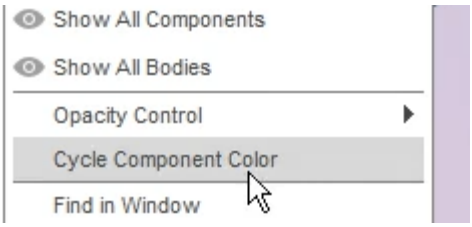
26. To help differentiate between the components, visual methods can be used. Click Inspect> Component Color Cycling Toggle. Each component is given a different color.



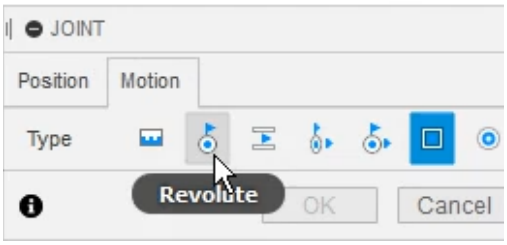
27. Color swatches appear above each timeline feature to indicate the component they belong to. The same color swatches are displayed next to the components in the Browser.



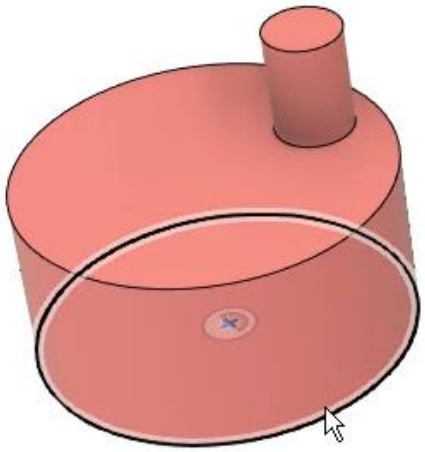
28. If the colors are too close in appearance, right-click the Browser's top level and choose the Cycle Component Color option from the menu. This option will change the color of each component.



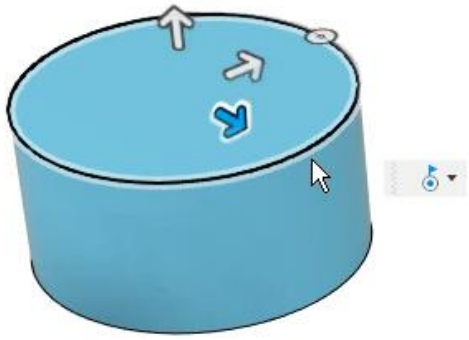
29. Click Assemble> Joint; if Fusion 360 asks to capture the components' positions, click Capture Position in the dialog. Navigate to the dialog's Motion Tab and Choose the Revolute option in the Type section.



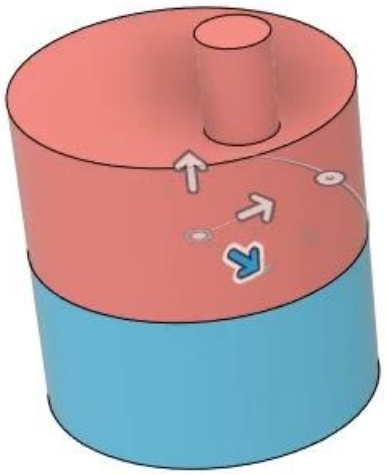
30. Navigate to the dialog's Position tab. For the dialog's Component 1 Snap selection, choose the bottom edge shown in the image on the right.



31. For the dialog's Component 2 Snap selection, choose Component4's top edge shown in the image on the right.

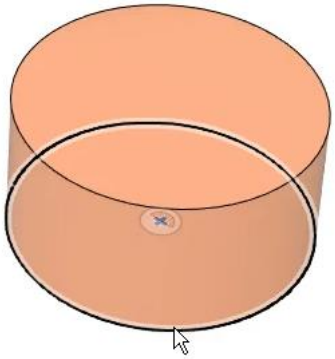


32. The component moves into place and rotates one time to show the degrees of freedom. Click OK in the dialog. The top component can be rotated by grabbing the cylindrical handle and rotating it.

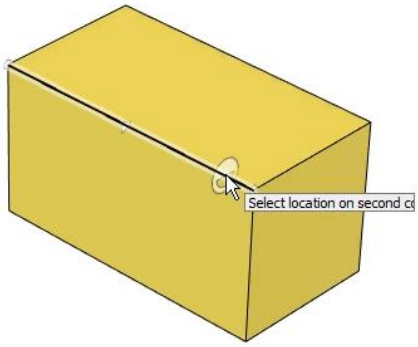


33. Click Assemble> Joint. The Fusion 360 asks to capture the component's position; click the dialog's Continue to refuse. Navigate to the dialog's Motion tab and choose the Slider option from the Type section.

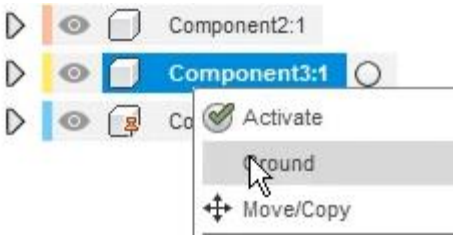
34. For the dialog's Component 1 Snap selection, choose Component2's bottom edge shown in the image on the right.



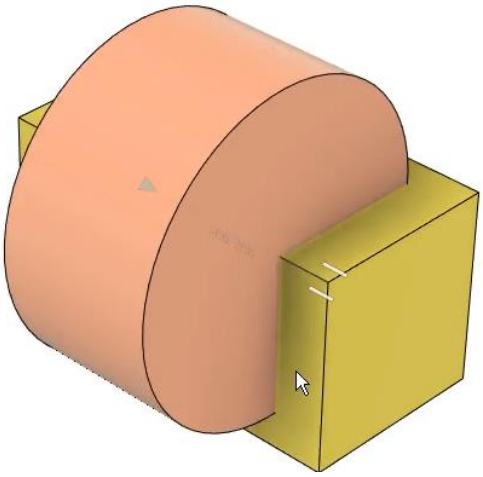
35. For Component 2's Snap selection, choose Component3's edge shown in the image on the right. Select the line's endpoint as the starting point of the slide. After the component shifts into position, it will actuate to show its degrees of freedom. Click OK in the dialog to accept the joint.



36. In the Browser, ground Component3.



37. The cylinder is free to move back and forth along the edge you selected in Step 35.



38. Activate the Browser's top level. Similar to sketches and features, components can be renamed to organize the Browser. Rename Component 1 as **Handle**. Also rename the body in its Bodies folder as **Handle**. Continue to add names for the other components.

39. The color component cycling can be turned off by clicking Inspect> Component Color Cycling Toggle. The colors will be removed from the models in the Canvas, the timeline, and the Browser. Save the file and continue to the next module.