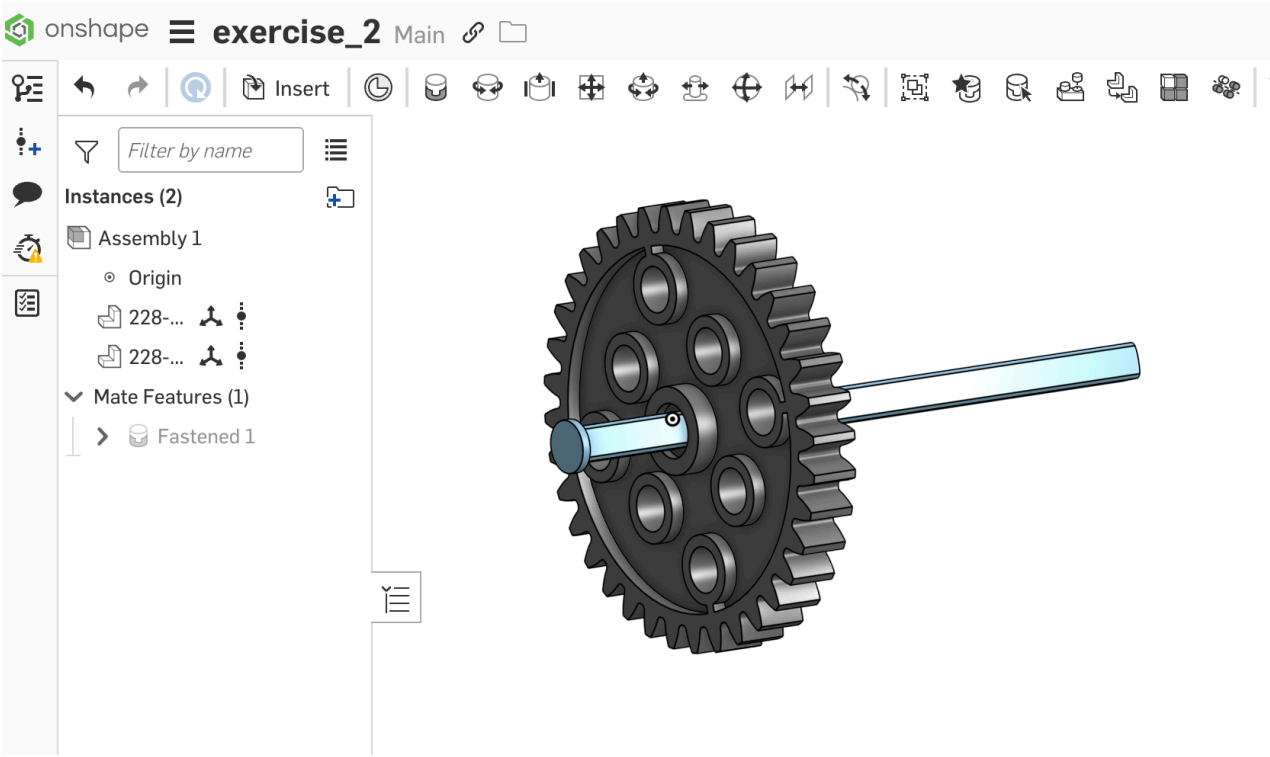
Exercise 2: Connect a VEX IQ Gear to a Shaft



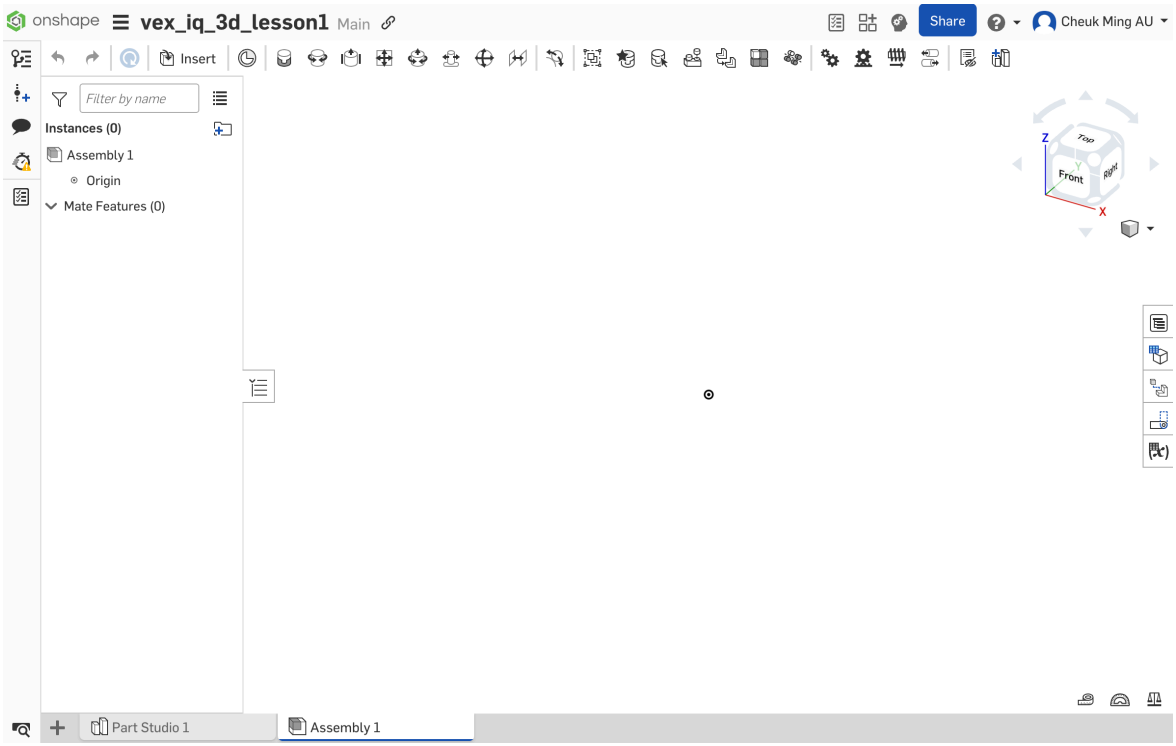
The final result of Exercise 2

Objective:

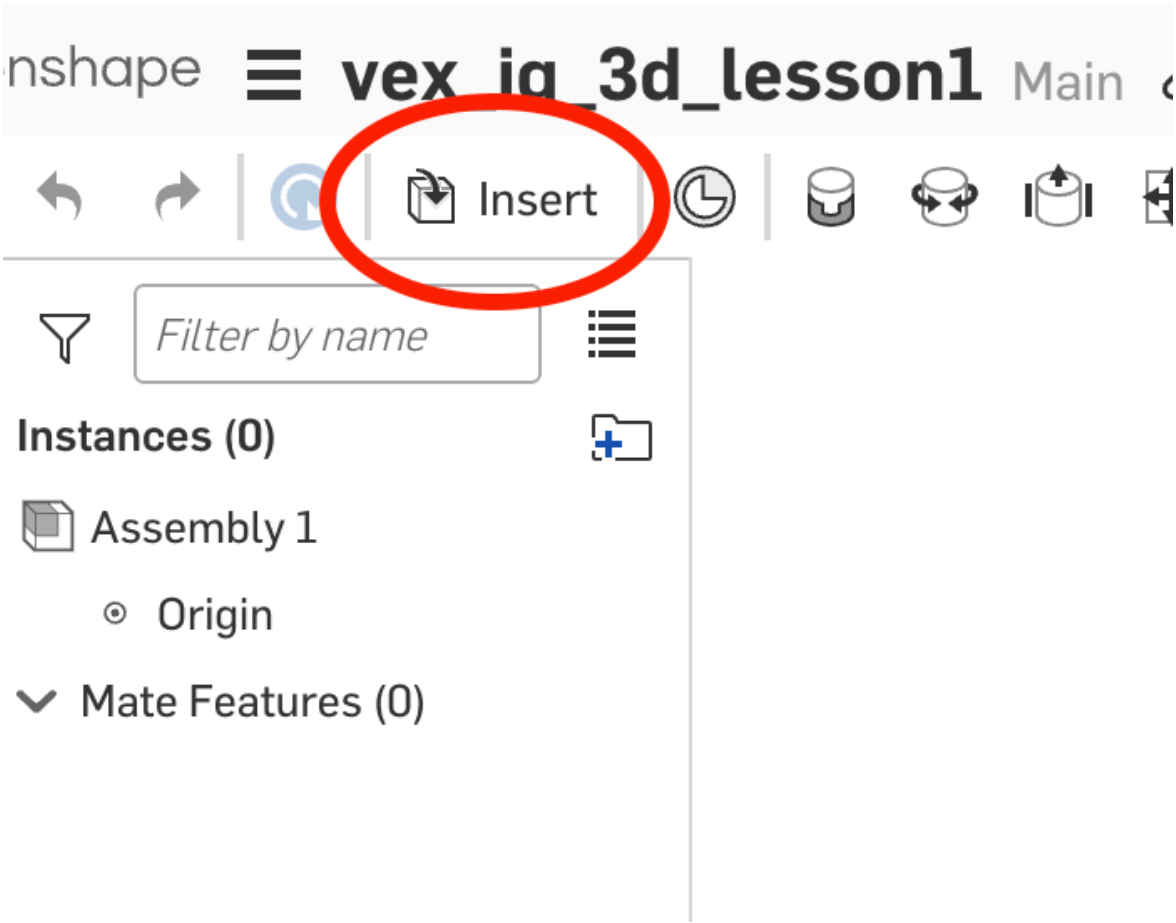
To model and assemble a VEX IQ 36-tooth gear and capped shaft using the **Fasten Mate** function in Onshape, ensuring the gear is rigidly connected to the shaft so it rotates as a single unit.

Step 1: Insert the Gear and Shaft into an Assembly

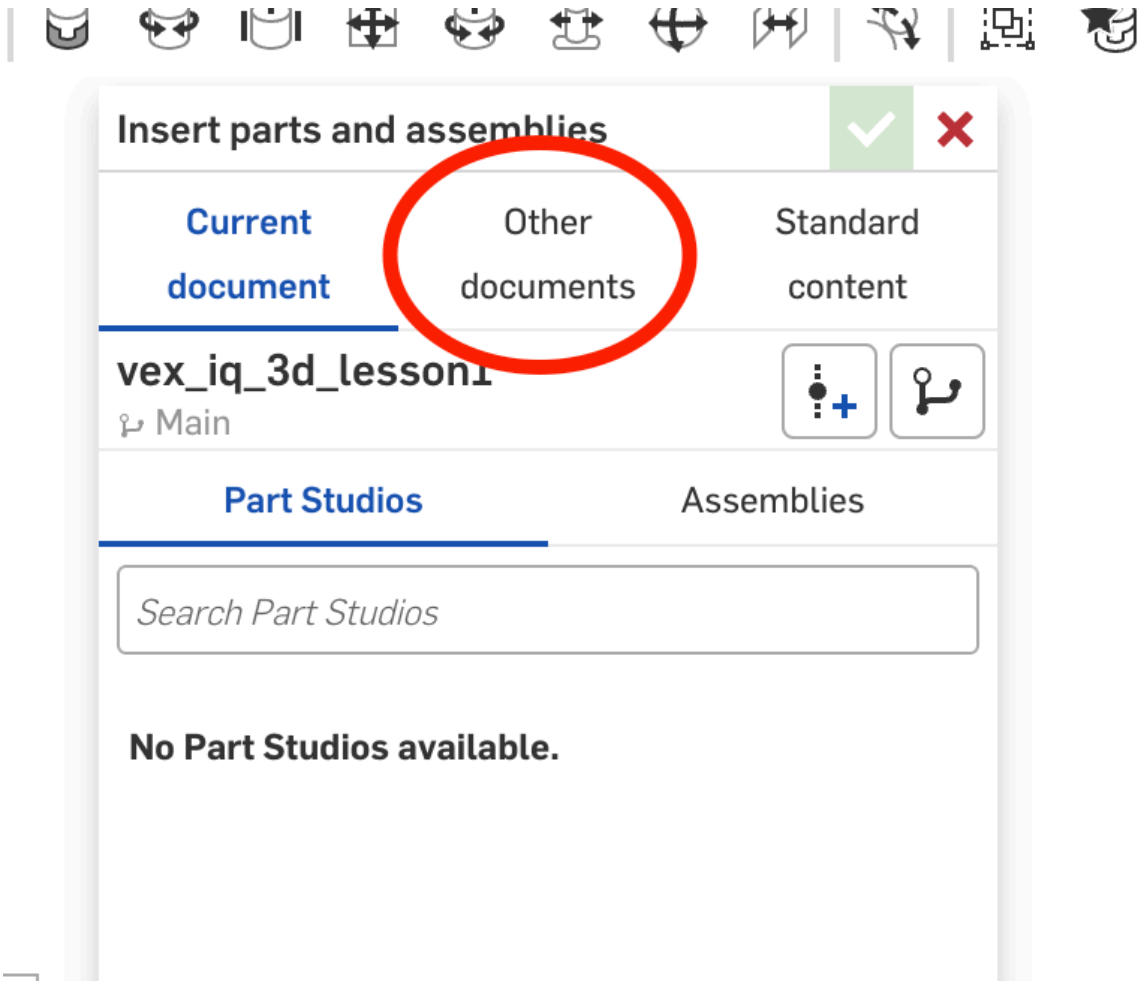
- **Create an Assembly**:
  Go to the **Assembly tab** in Onshape.



Click the **Insert** tool.



Click "Other documents".



Go to the folder "VEX IQ/Part List".

Insert parts and assemblies

Current document | Other documents | Standard content

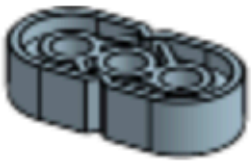
Search in "Shared with me"

Part_list

Generating preview

Untitled document
Start

200mm Omni Wheel 2-pack.step
V1



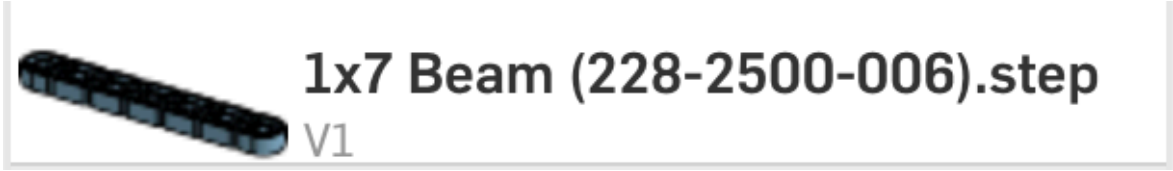
1x2 Beam (228-2500-001).step
V1

1x3 Beam (228-2500-002).step
V1

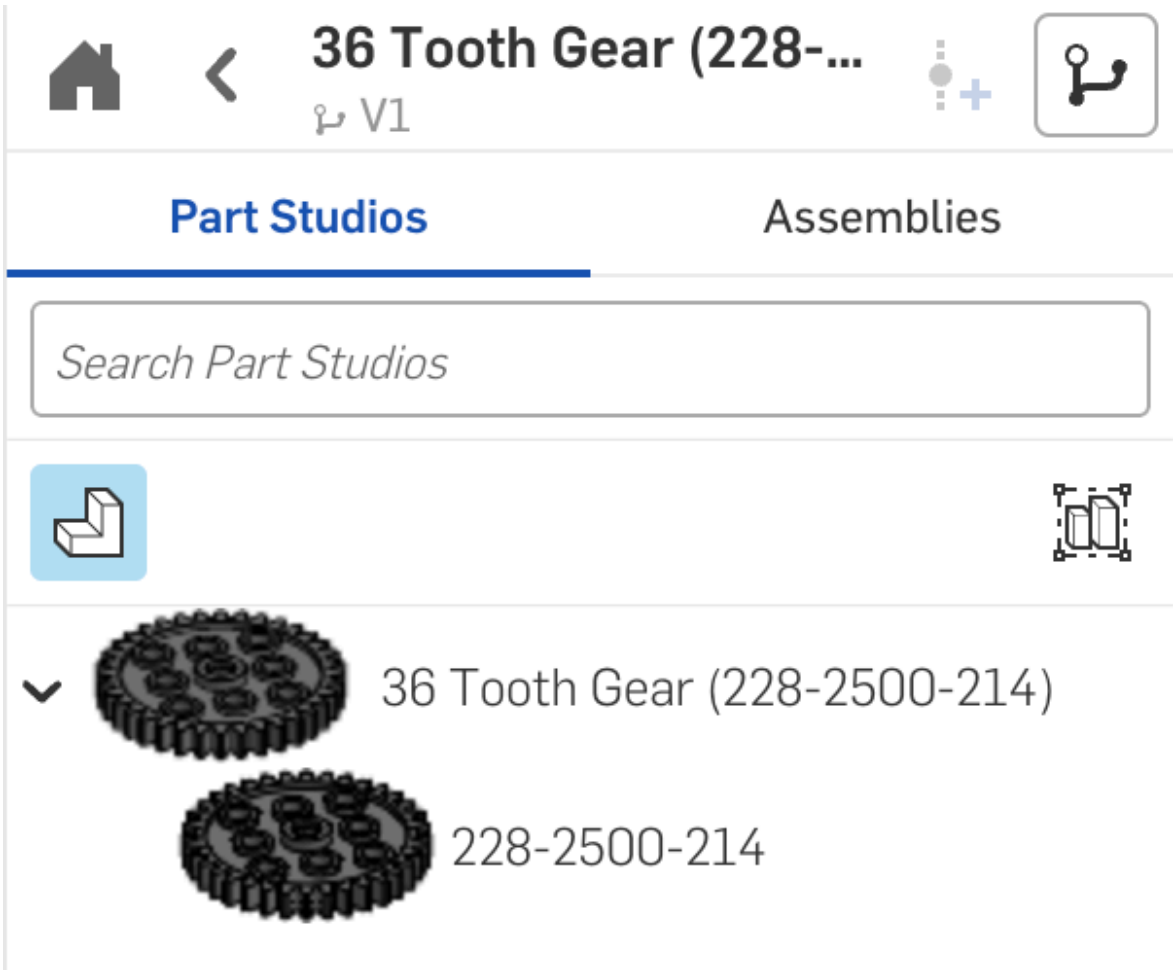
1x4 Beam (228-2500-003).step
V1

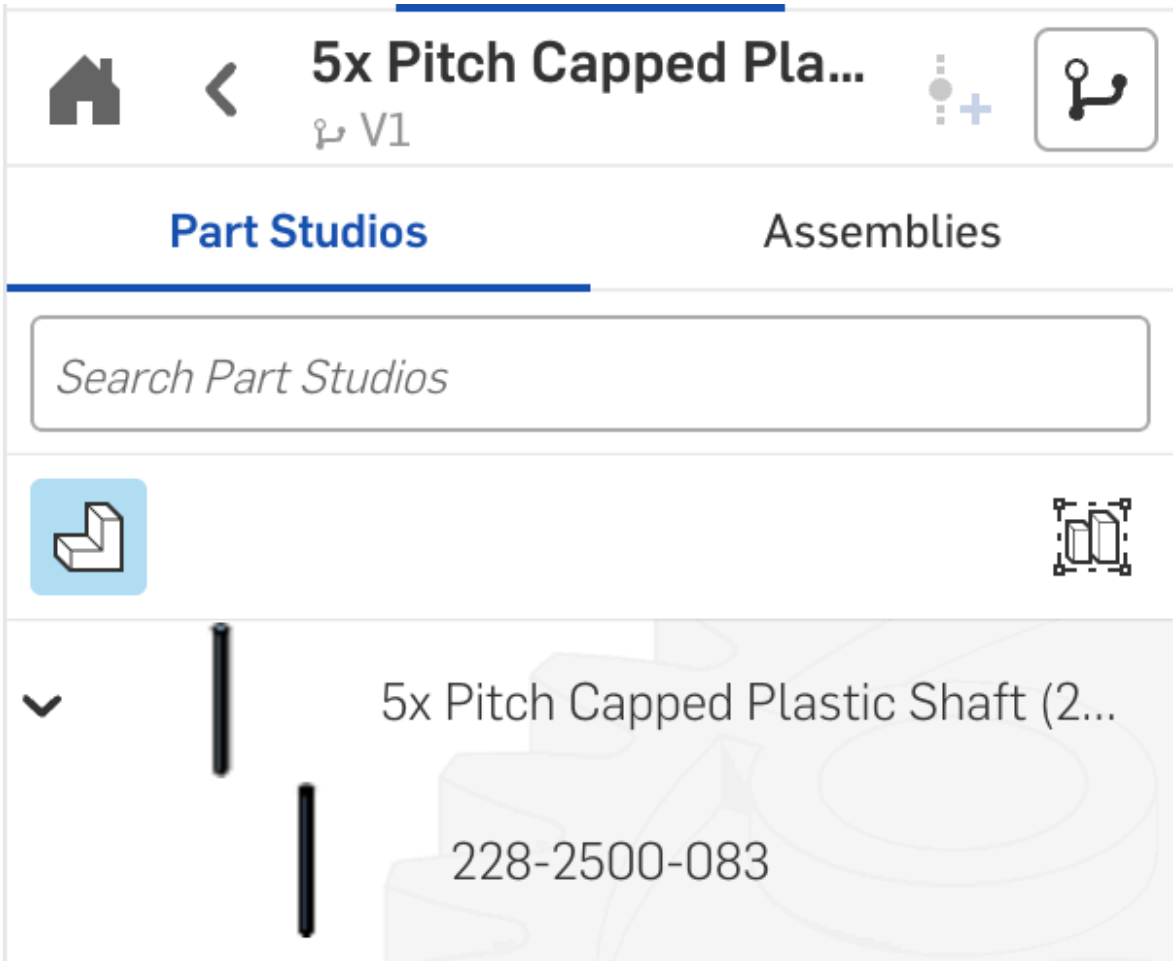
1x5 Beam (228-2500-004).step
V1

1x6 Beam (228-2500-005).step
V1

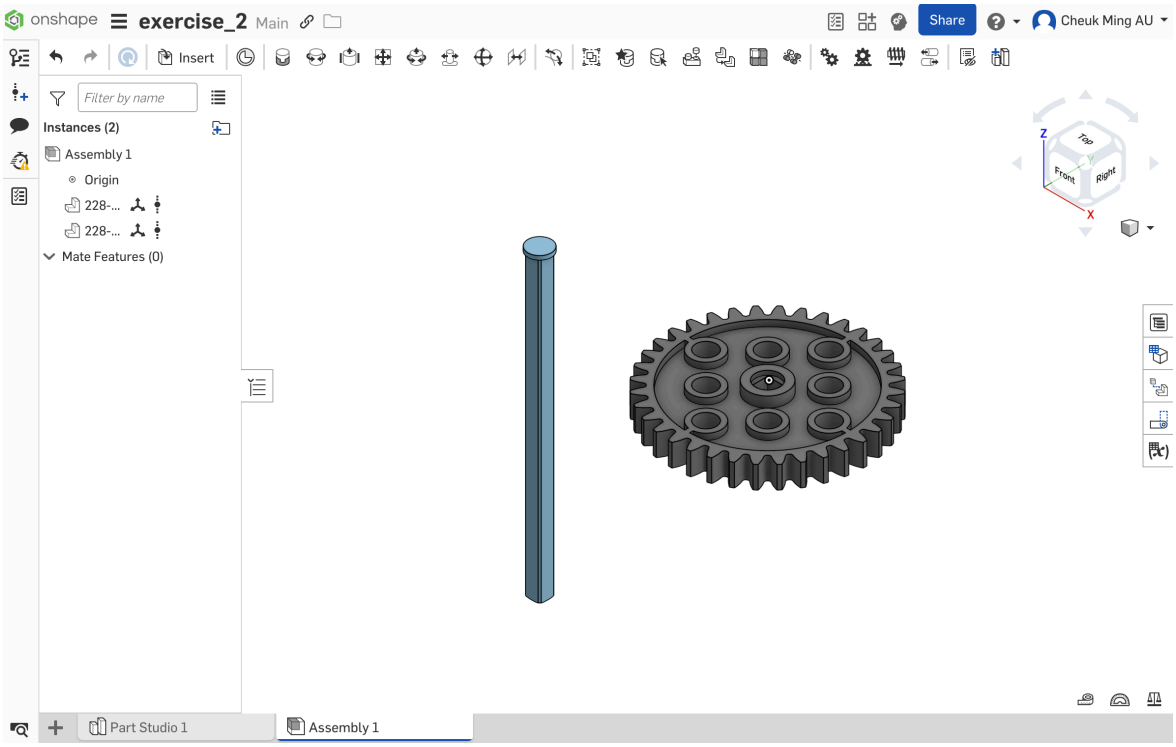


Use the **Insert** tool to bring both the "36-Tooth Gear (228-2500-214)" and "5x Pitch Capped Plastic Shaft (228-2500-083)" into the assembly from the Part Studio.





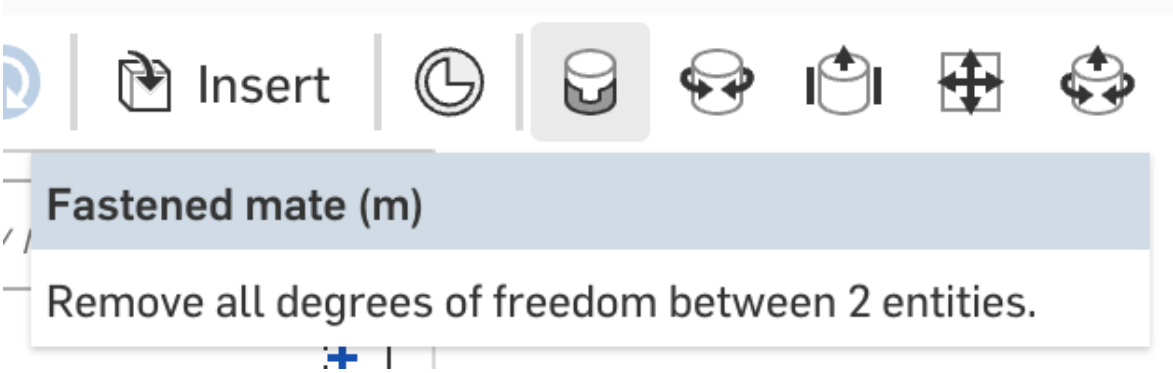
Click on the workspace to place both components.



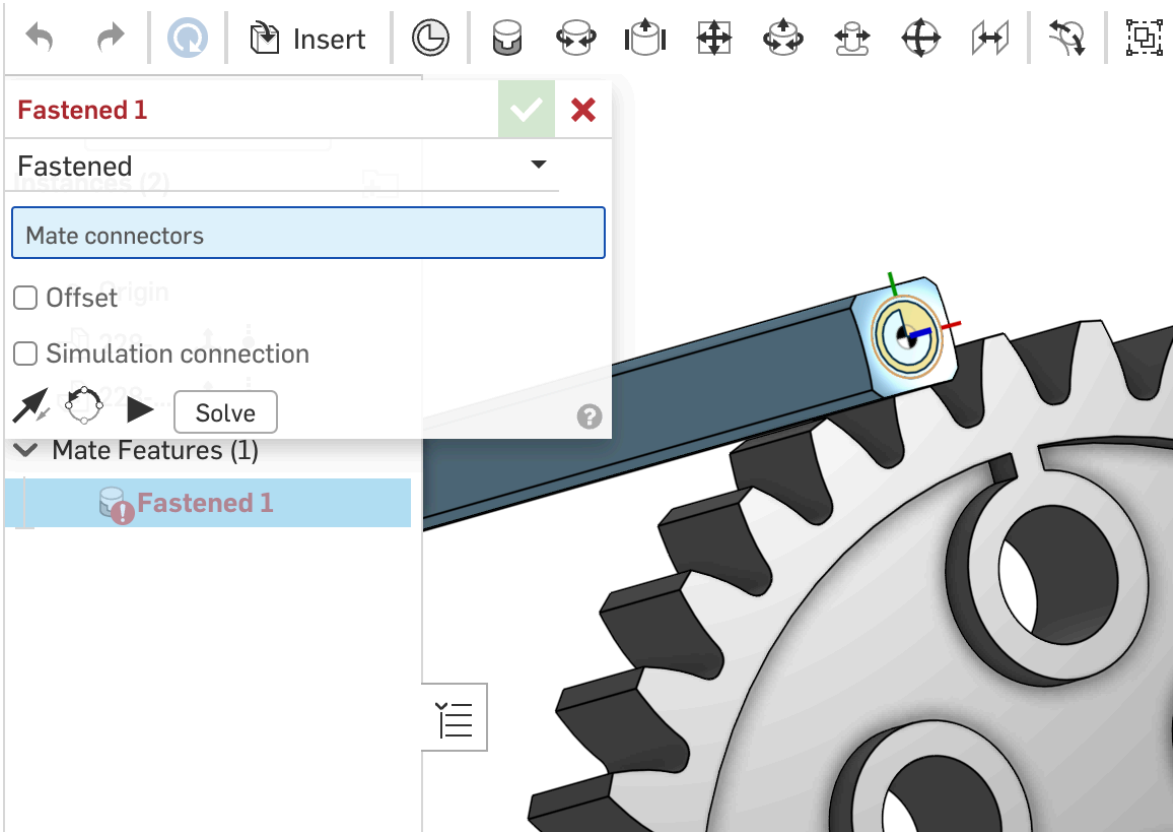
Step 2: Apply the Fasten Mate

- **Select the Fasten Mate Tool**:

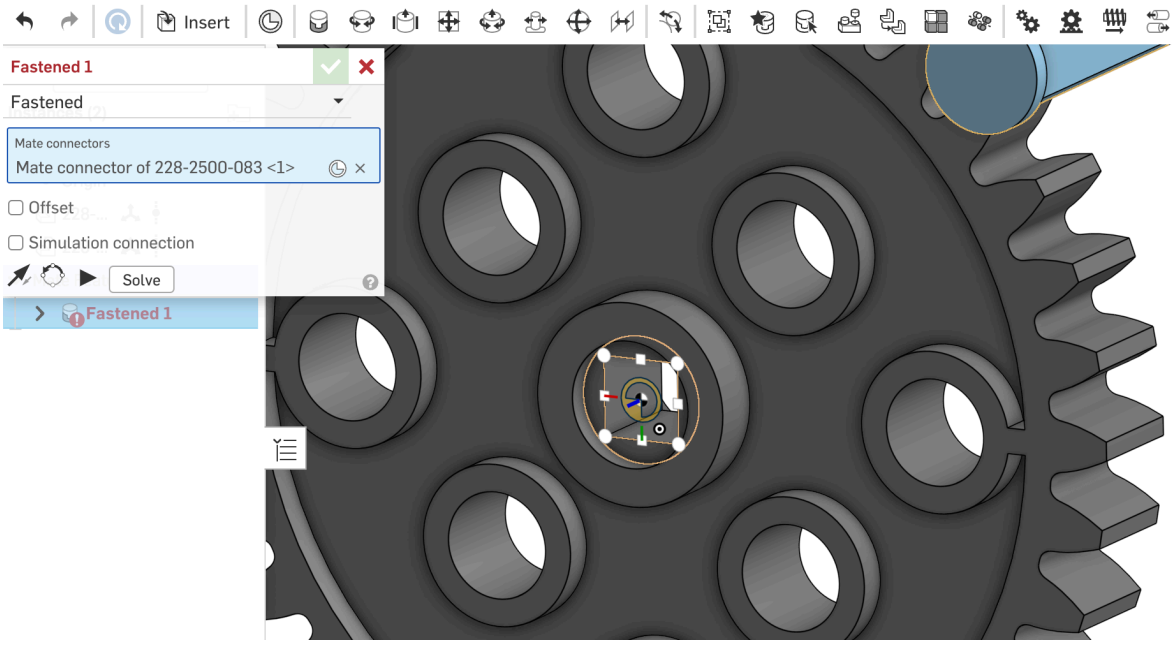
In the Assembly workspace, click on the **Mate** tool and choose **Fasten Mate** from the available mate options.



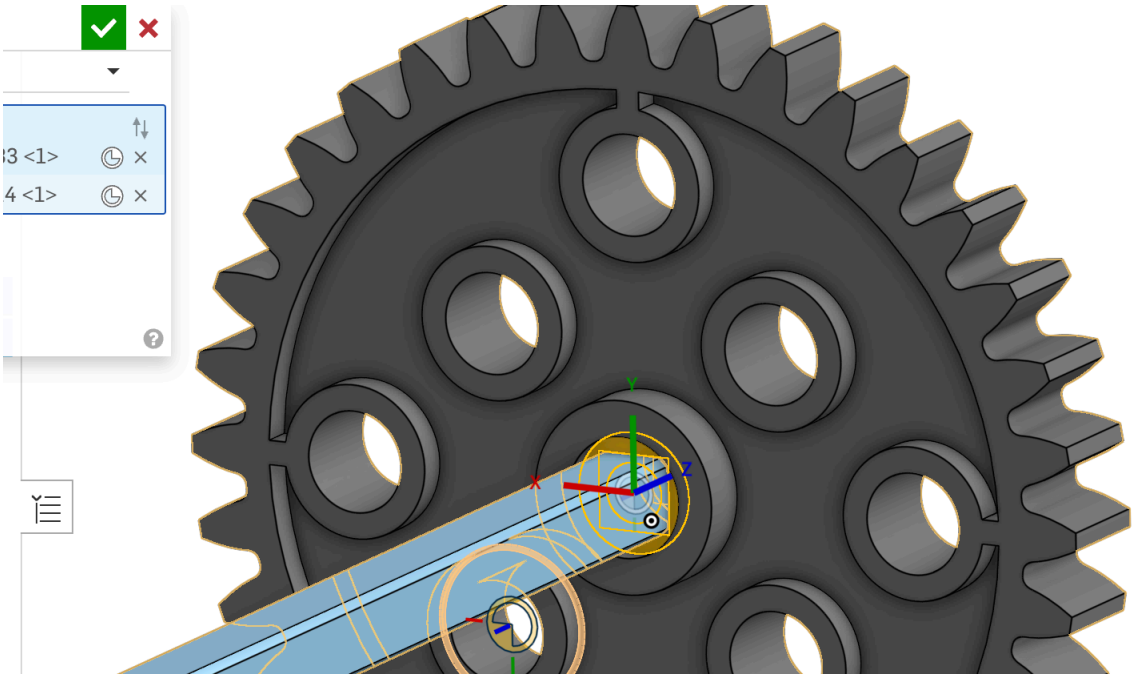
- **Choose the First Mate Connector (Shaft)**:
  Hover over the **5x Pitch Capped Plastic Shaft (228-2500-083)** in the assembly until you see mate connectors appear.
  Select the mate connector at the **end of the shaft**, making sure it aligns with the square profile of the gear hole.



- **Choose the Second Mate Connector (Gear)**:
  Now, select the mate connector at the **center hole** of the **gear**, where the shaft is intended to fit.

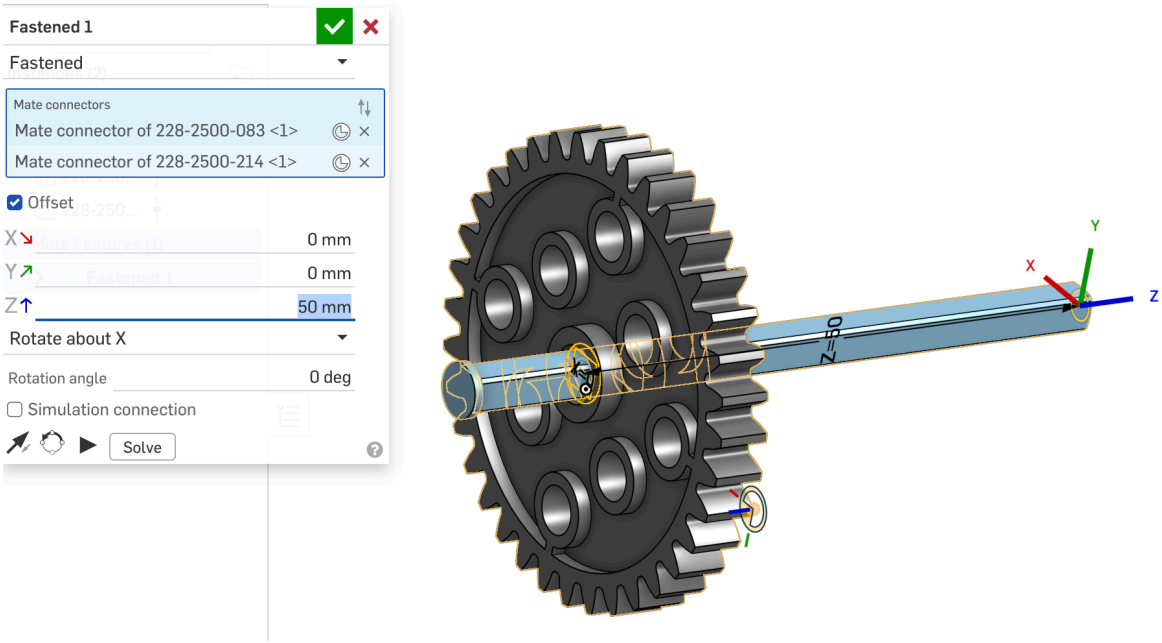


Onshape will automatically align and fasten the gear to the shaft at the selected points.



Step 3: Adjust the Alignment (If Necessary)

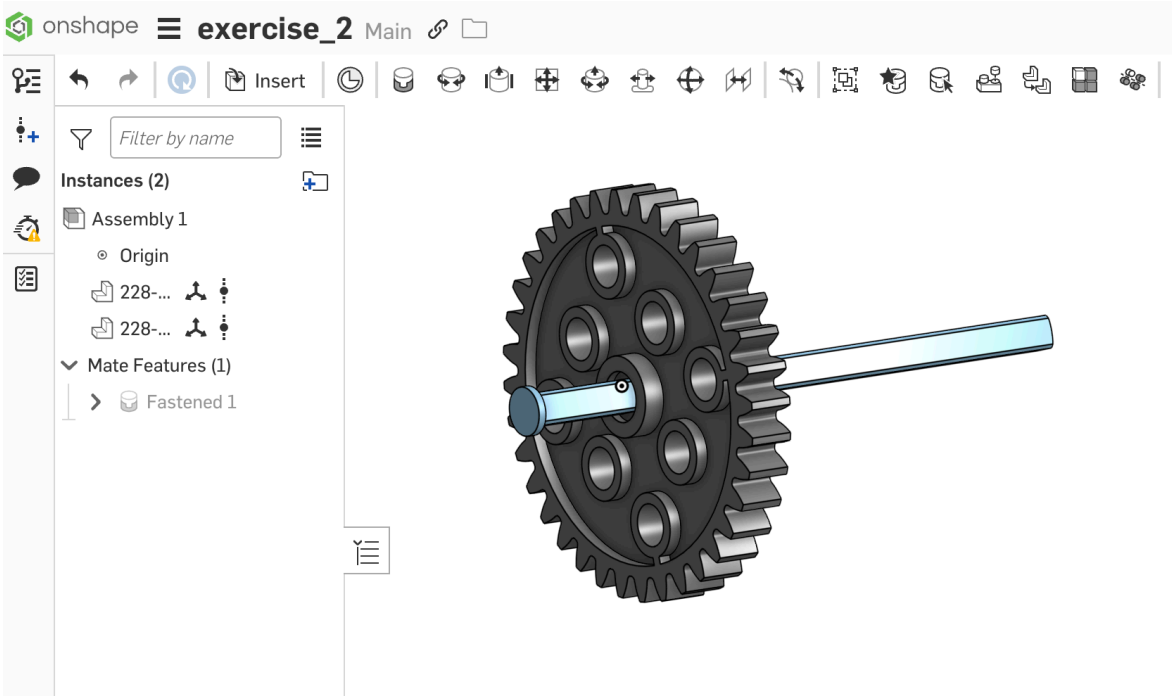
- **Check the Alignment**:
  Verify that the gear is properly aligned and positioned on the shaft. The hexagonal hole in the gear should fit snugly around the hexagonal shaft, ensuring no relative movement between the two.
- **Flip or Offset (Optional)**:
  If the gear is not aligned as expected, use the **Flip** option to change its orientation.
  If necessary, apply **X, Y, or Z offsets** to shift the gear's position slightly for precise alignment.



Setting the z-offset to 50mm.

Step 4: Finalize the Assembly

- **Confirm the Mate**:
  Once satisfied with the alignment, click the green checkmark to confirm the **Fasten Mate**.
  The gear is now rigidly connected to the shaft and will rotate as a single unit.



Conclusion:

By following these steps, you have successfully modeled and assembled a VEX IQ 36-tooth gear and shaft using the **Fasten Mate** function in Onshape. The gear should now be rigidly attached to the shaft, ensuring they rotate together as a single unit, mimicking real-world mechanical systems.