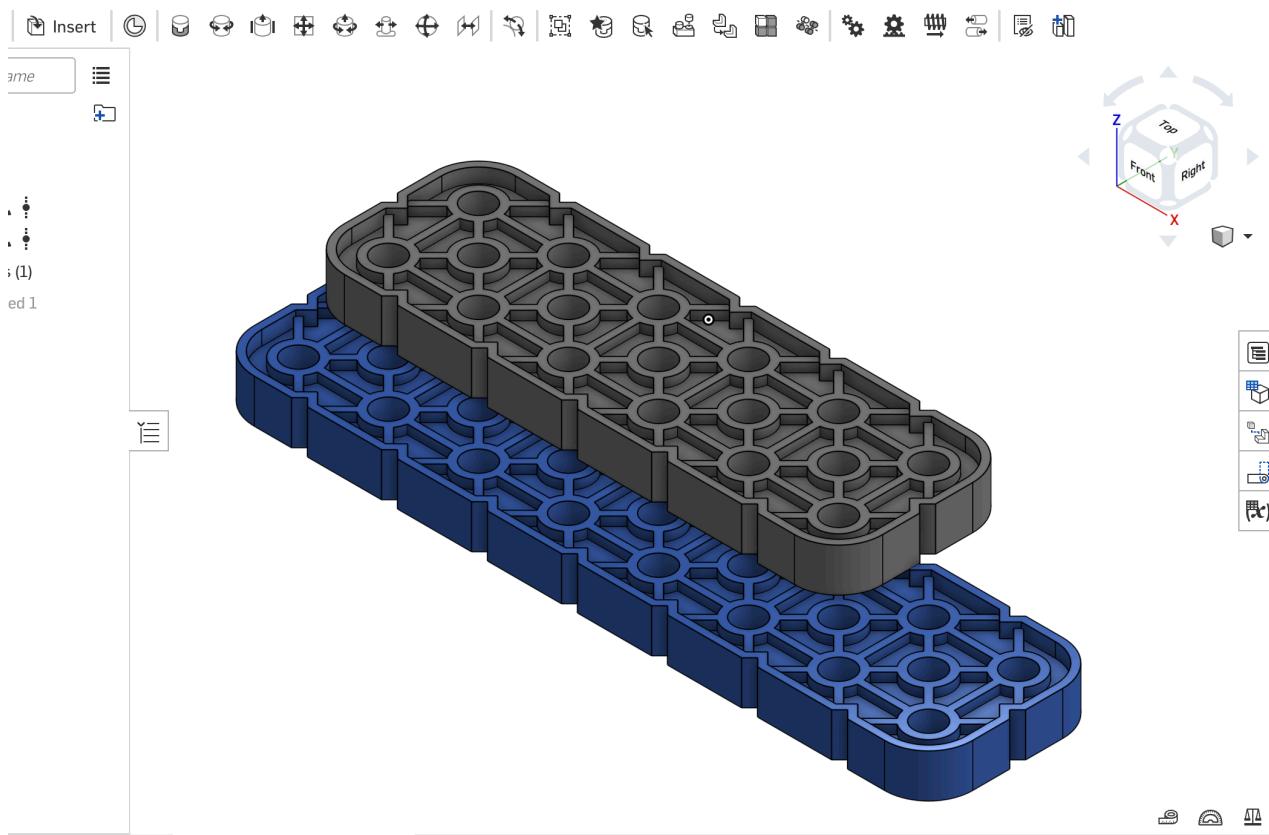


# Exercise 1: Assemble Two VEX IQ Beams

## Objective:

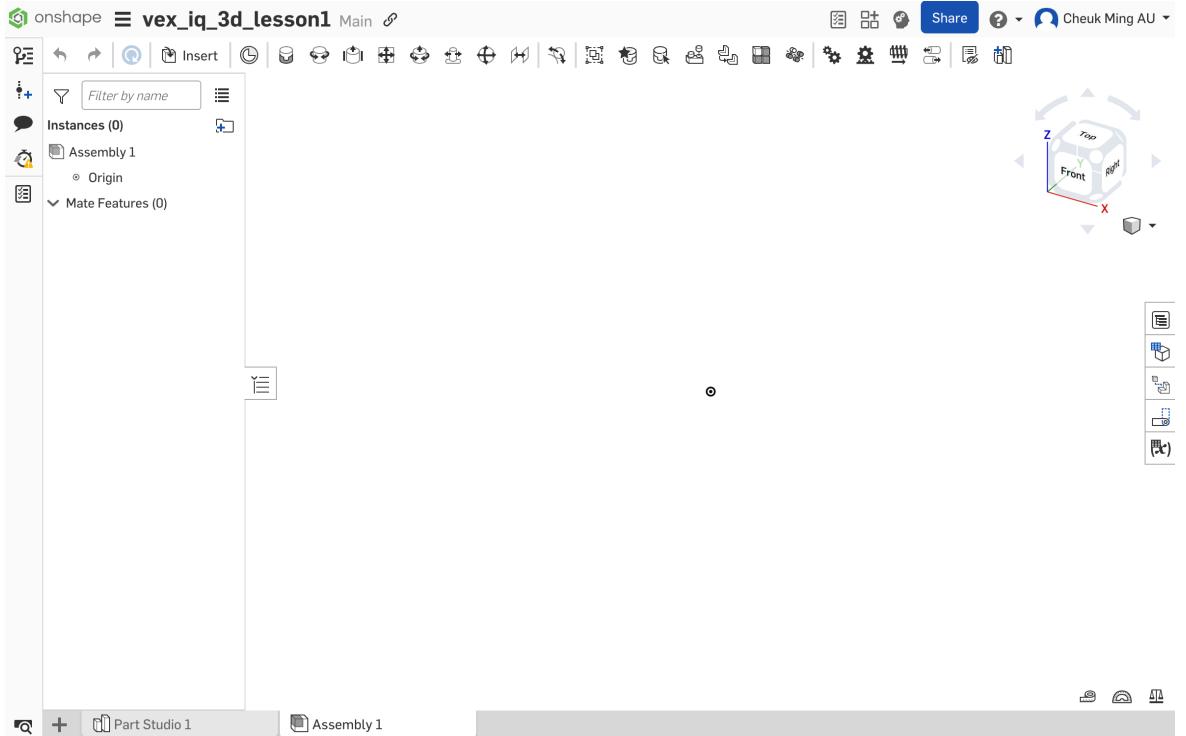
To model and assemble two VEX IQ beams (2x6 and 2x8) using the **Fasten Mate** function in Onshape, ensuring proper alignment and rigid connection at one of their holes.



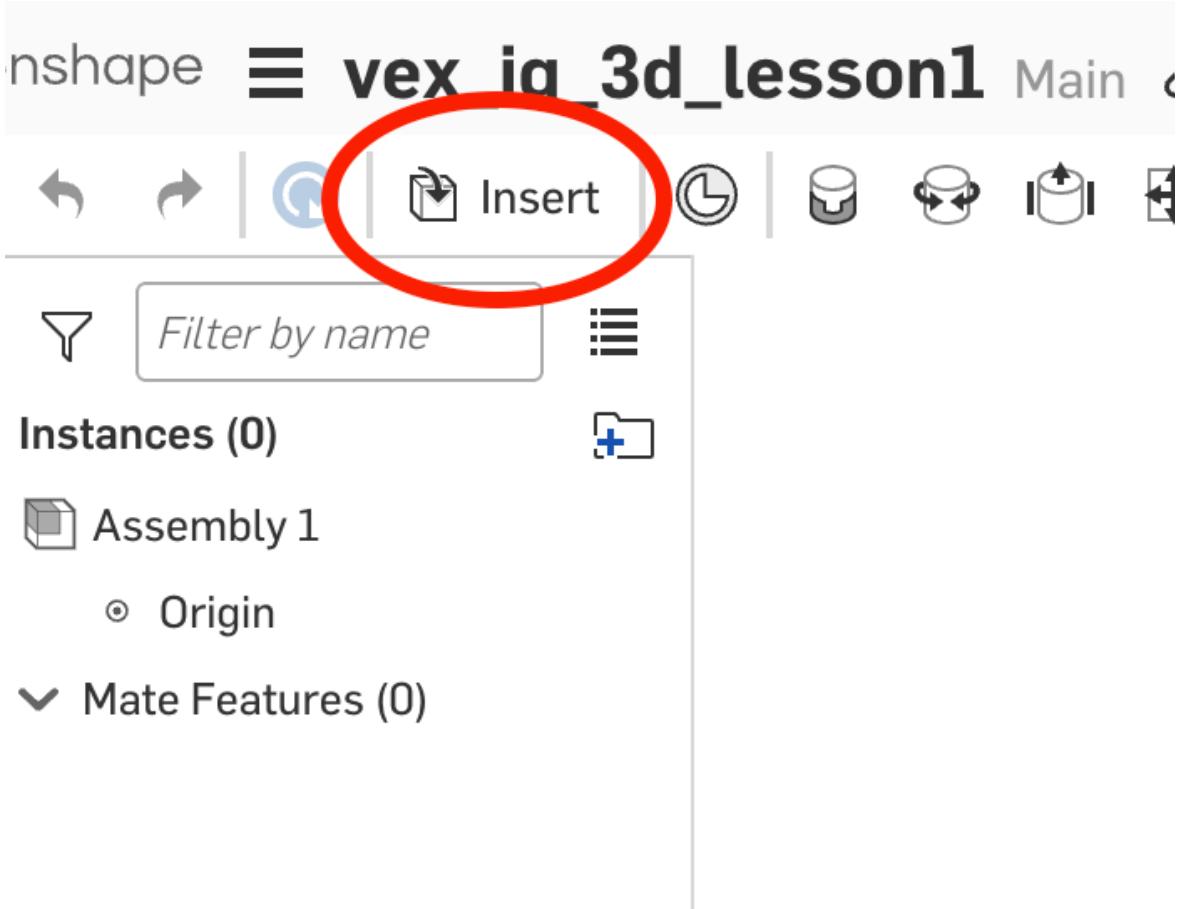
The final result of Exercise 1

## Step 1: Insert the Beams into an Assembly

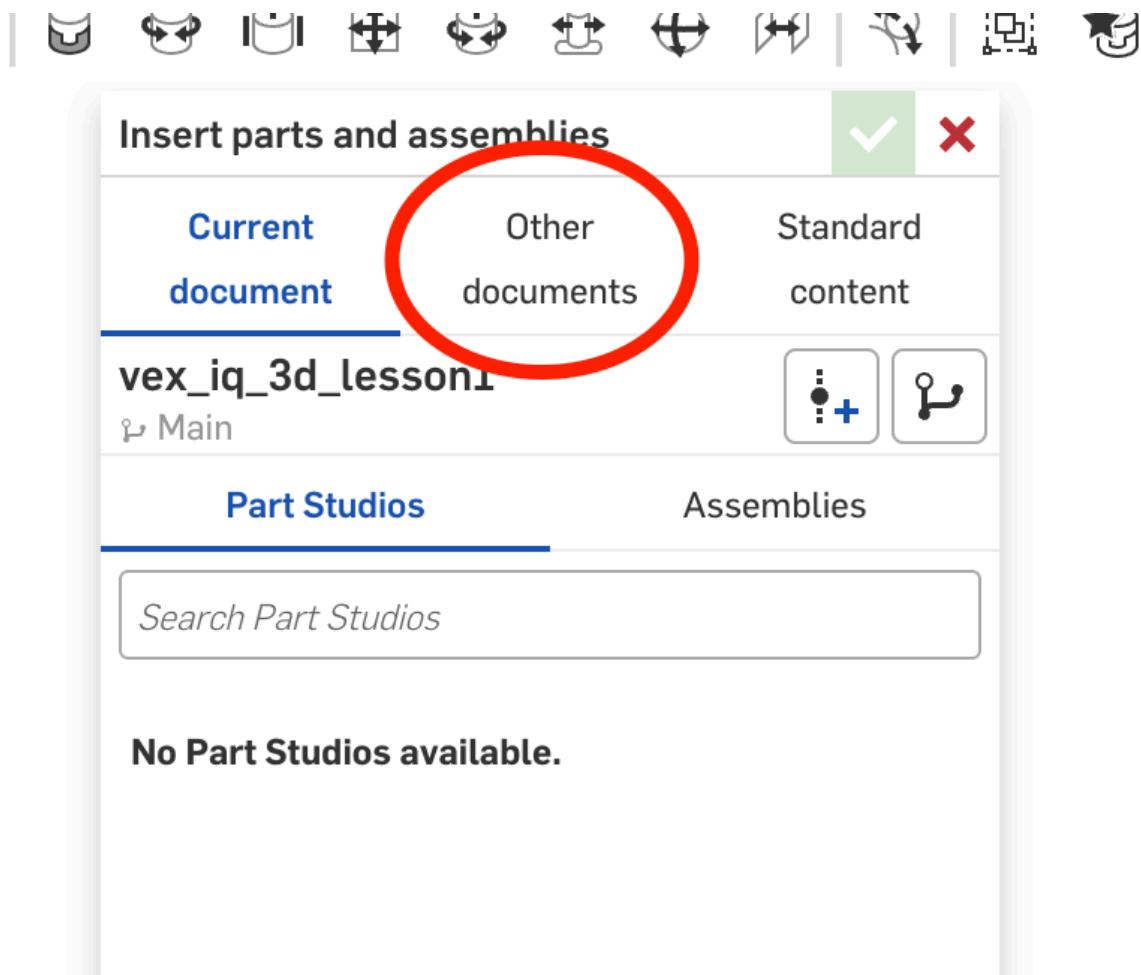
- **Create an Assembly:**  
Go to the **Assembly tab** in Onshape.



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



## 1x7 Beam (228-2500-006).step

V1

Select "2x6 Beam (228-2500-021)" and "2x8 Beam (228-2500-023)" from the Part Studio and insert them into the assembly workspace.

**Insert parts and assemblies** ✓ ✗

Current document Other documents Standard content

**2x6 Beam (228-250...)**

**V1**

---

**Part Studios** Assemblies

*Search Part Studios*

**2x6 Beam (228-2500-021)**  
  
**228-2500-021**

A large red oval highlights the "2x6 Beam (228-2500-021)" entry in the list.

## Insert parts and assemblies



Current  
document

Other  
documents

Standard  
content



2x8 Beam (228-250...

V1



Part Studios

Assemblies

Search Part Studios

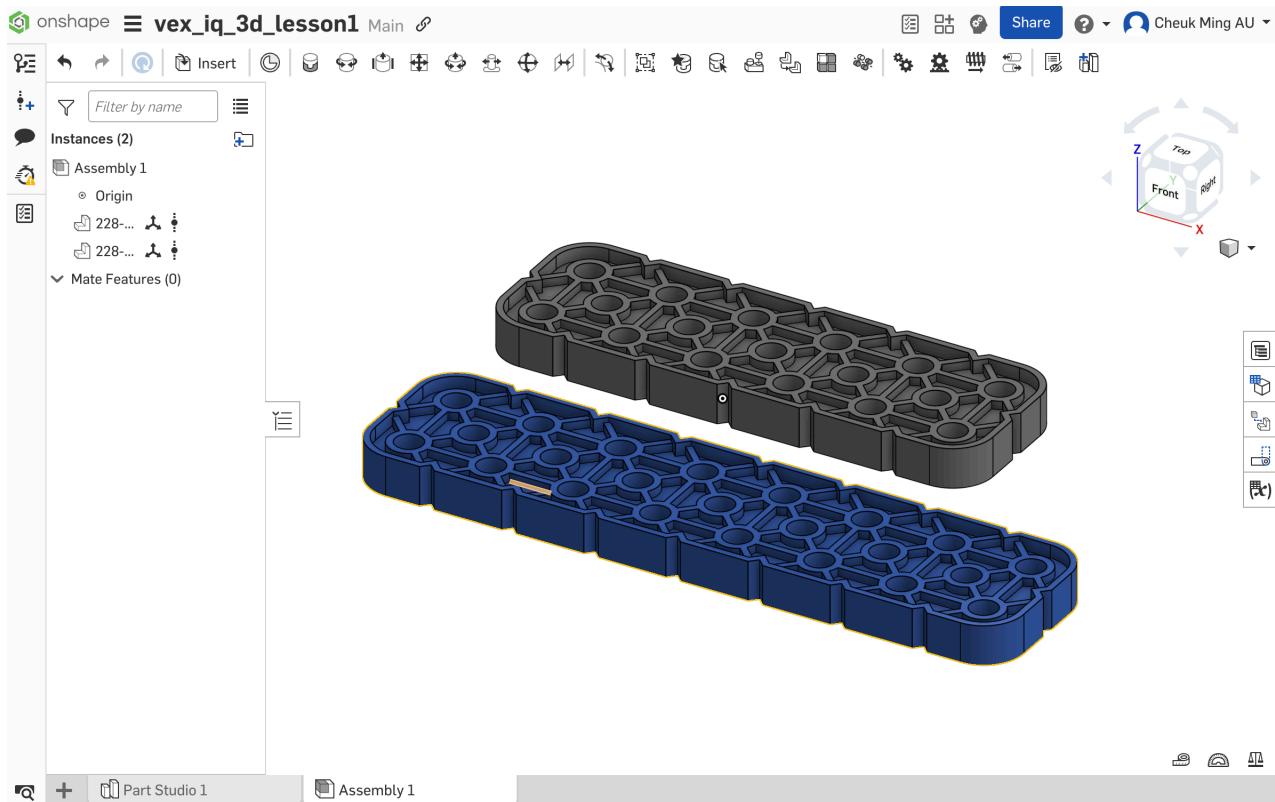


2x8 Beam (228-2500-023)



228-2500-023

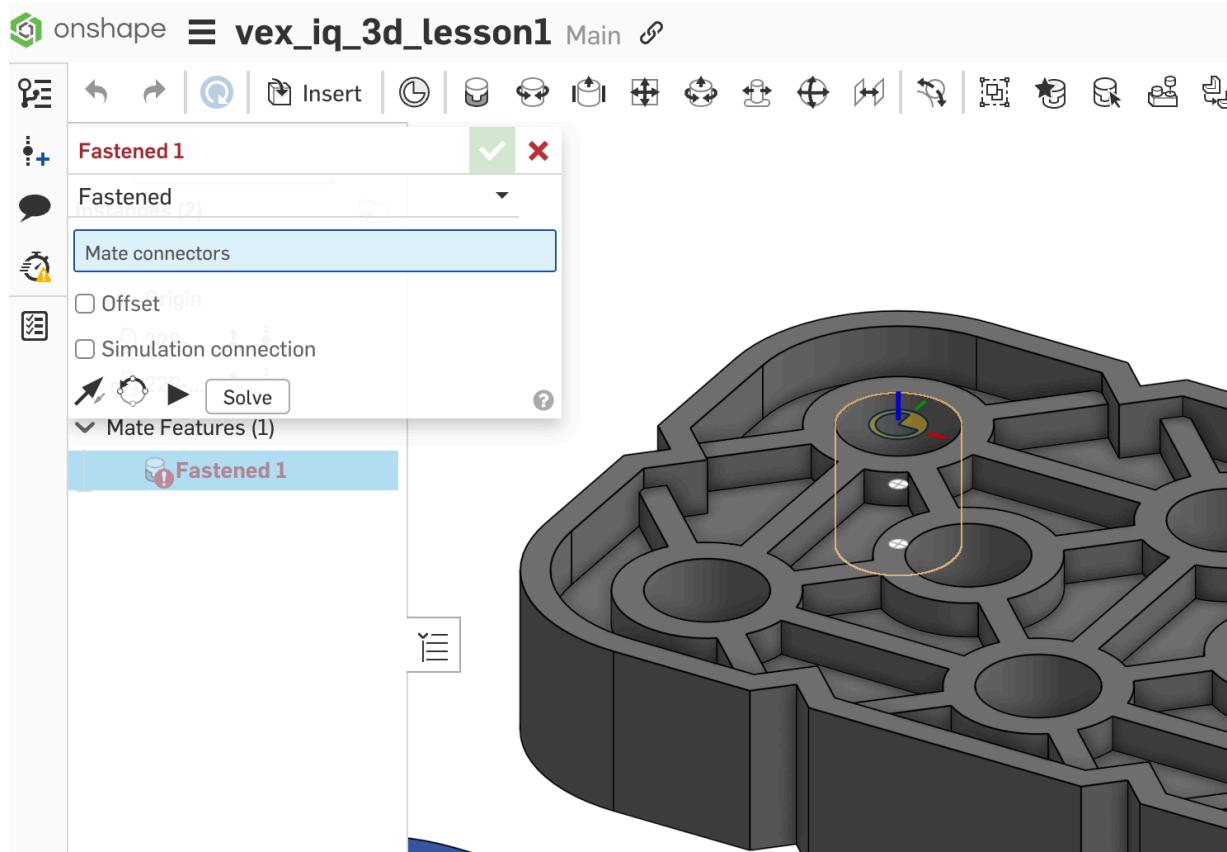
The result should be like this:



## Step 2: Apply the Fasten Mate

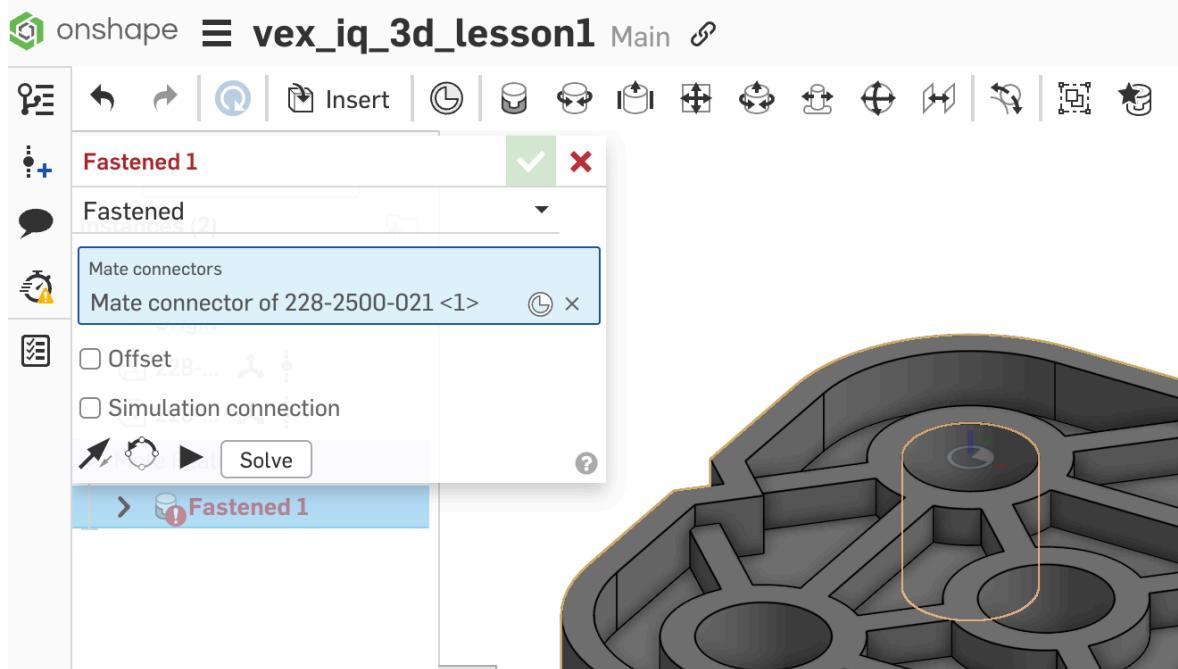
- **Select the Fasten Mate Tool:**

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

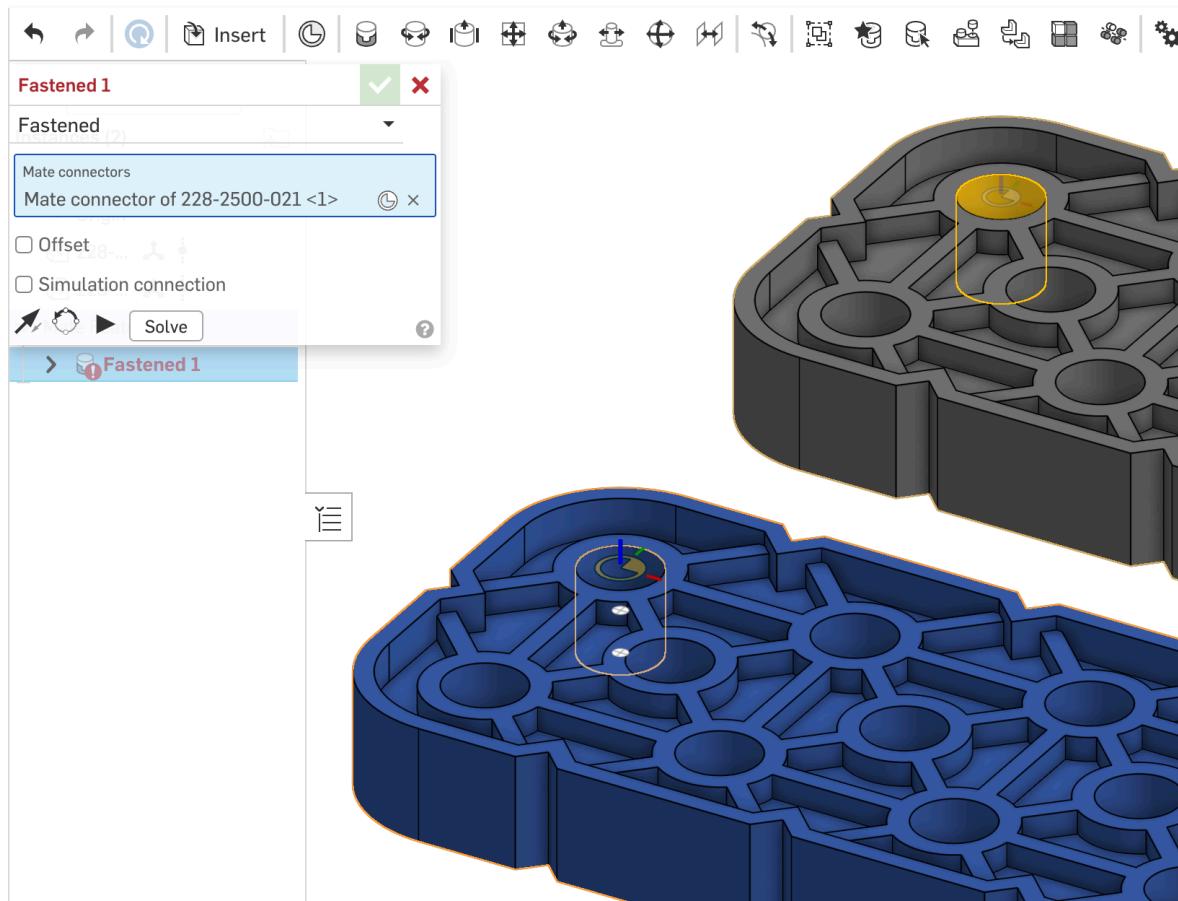


- **Choose the First Mate Connector (Beam 2x6):**

Hover over the 2x6 beam and Onshape will show mate connectors at the hole positions.

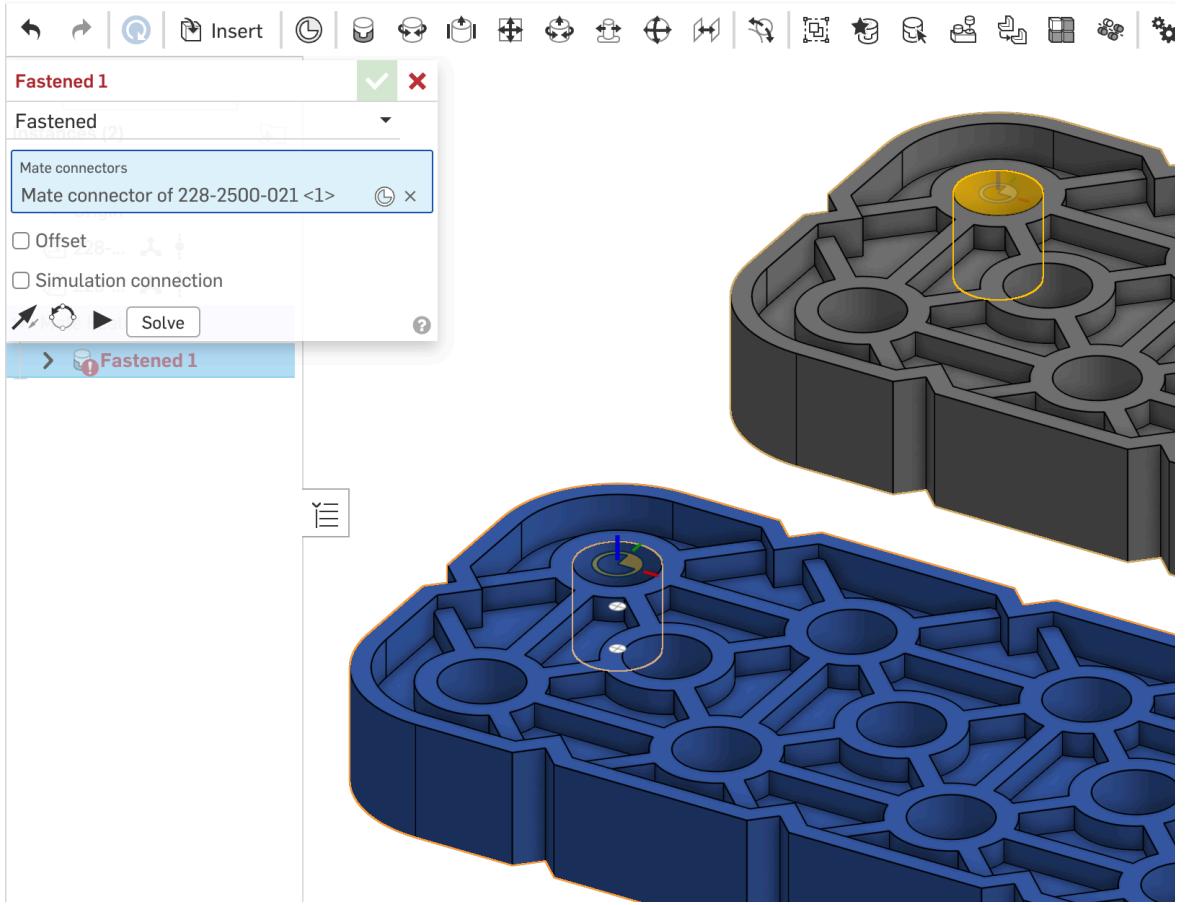


Select one of the holes on the **2x6 beam** as the first mate connector (e.g., the hole on the far edge).

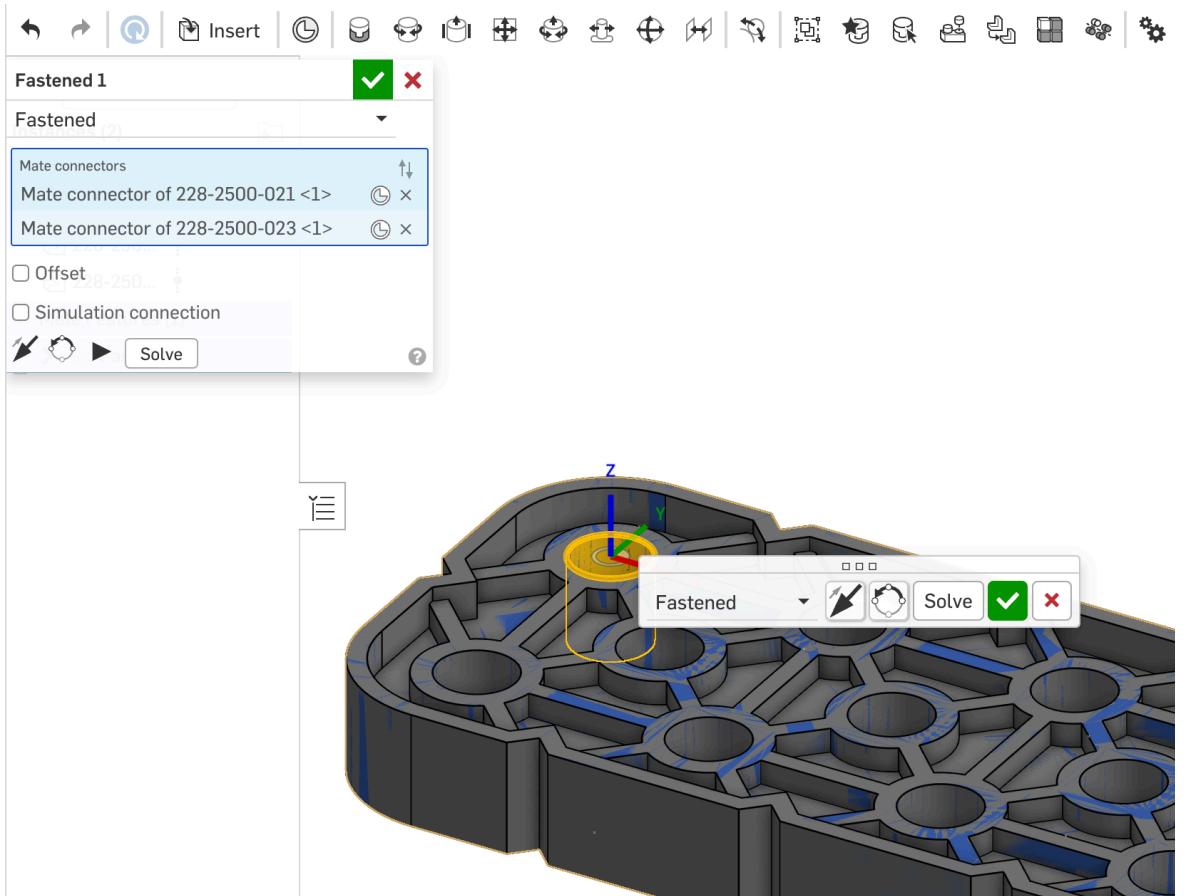


- **Choose the Second Mate Connector (Beam 2x8):**

Now, select a corresponding hole on the **2x8 beam**. Make sure the chosen hole aligns with the position of the hole on the 2x6 beam.



Onshape automatically aligns and positions the two beams based on the selected mate connectors.



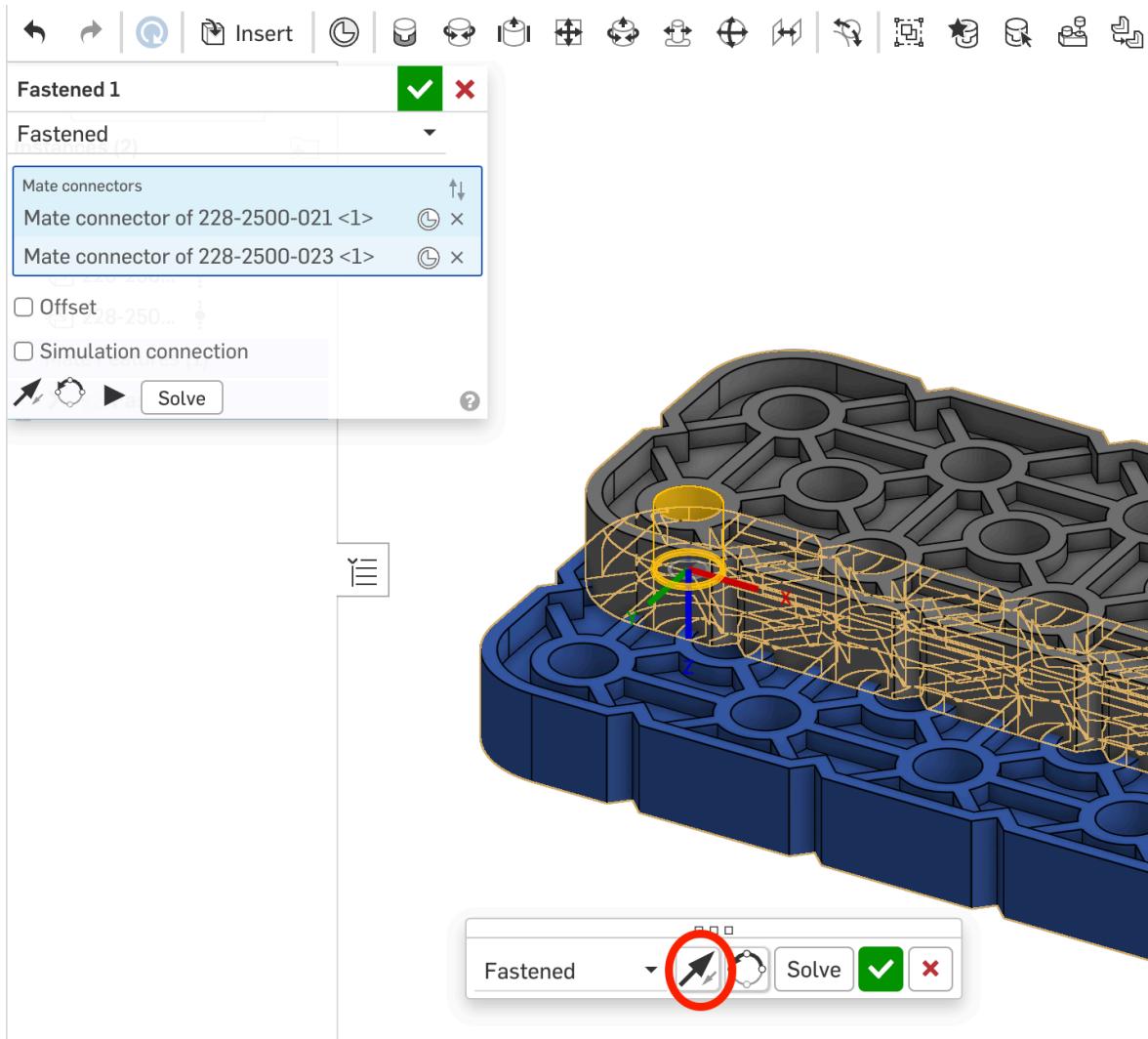
### Step 3: Adjust Alignment (If Necessary)

- **Check the Alignment:**

Verify that the beams are aligned properly and connected as intended. The faces of the beams should be flush and rigidly connected at the selected holes. In the previous step, the **2x6 beam** was immersed into the **2x8 Beam**, which was different from what we wanted.

- **Flip or Offset (Optional):**

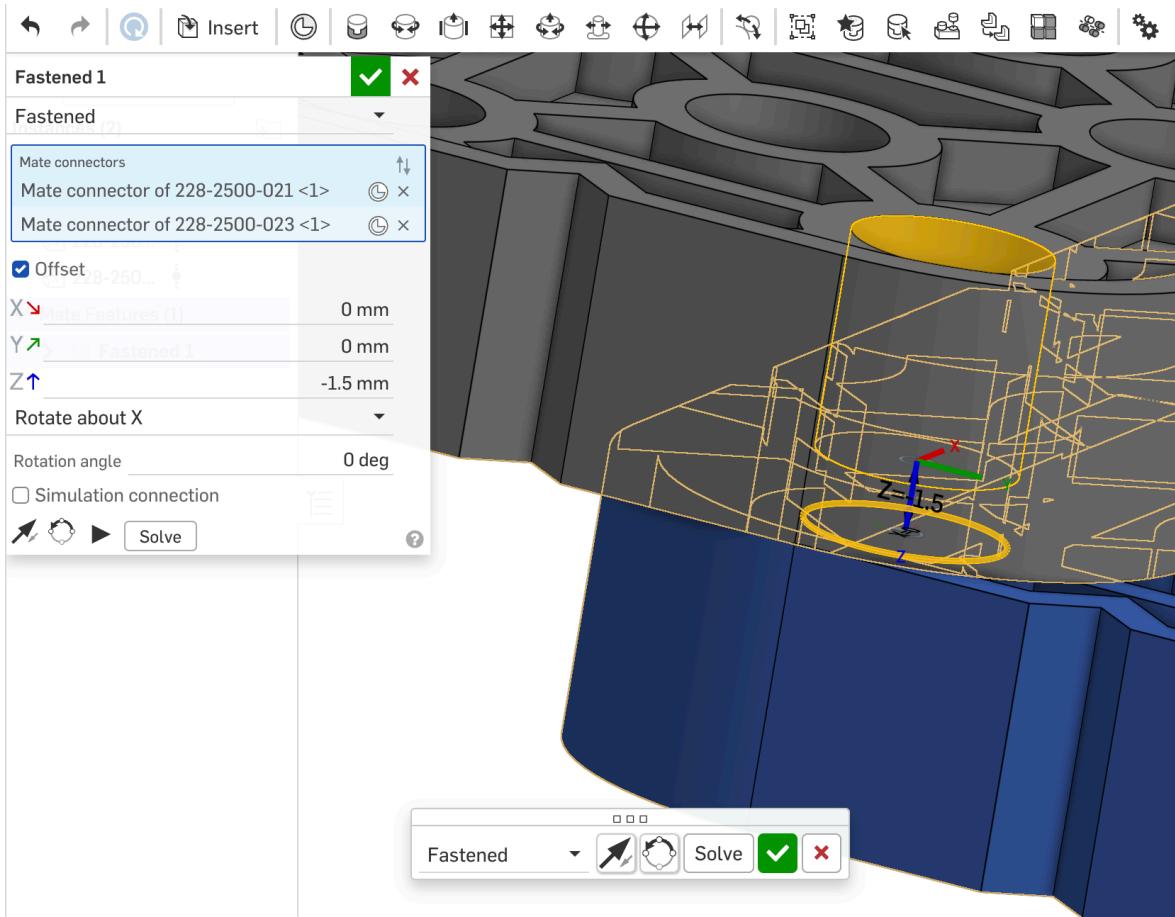
If the beams are not aligned as expected, use the **Flip** option in the Fasten Mate dialog to change the orientation of one beam relative to the other.



If needed, apply an **X, Y, or Z offset** to slightly adjust one beam's position.

For example, after flipping the **2x6 Beam**, the two beams still overlapping.

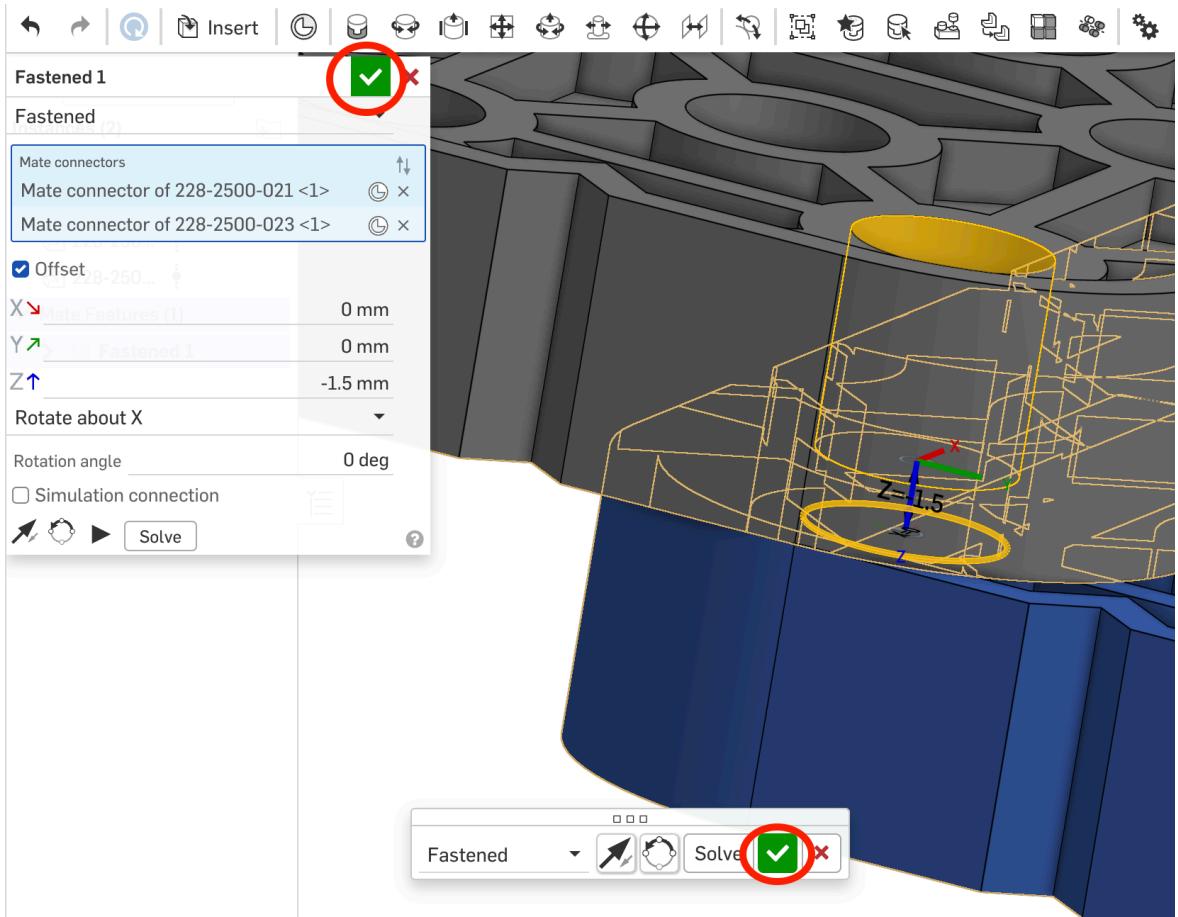
Therefore, we click on the "offset" checkbox and change the **Z offset to 1.5mm**



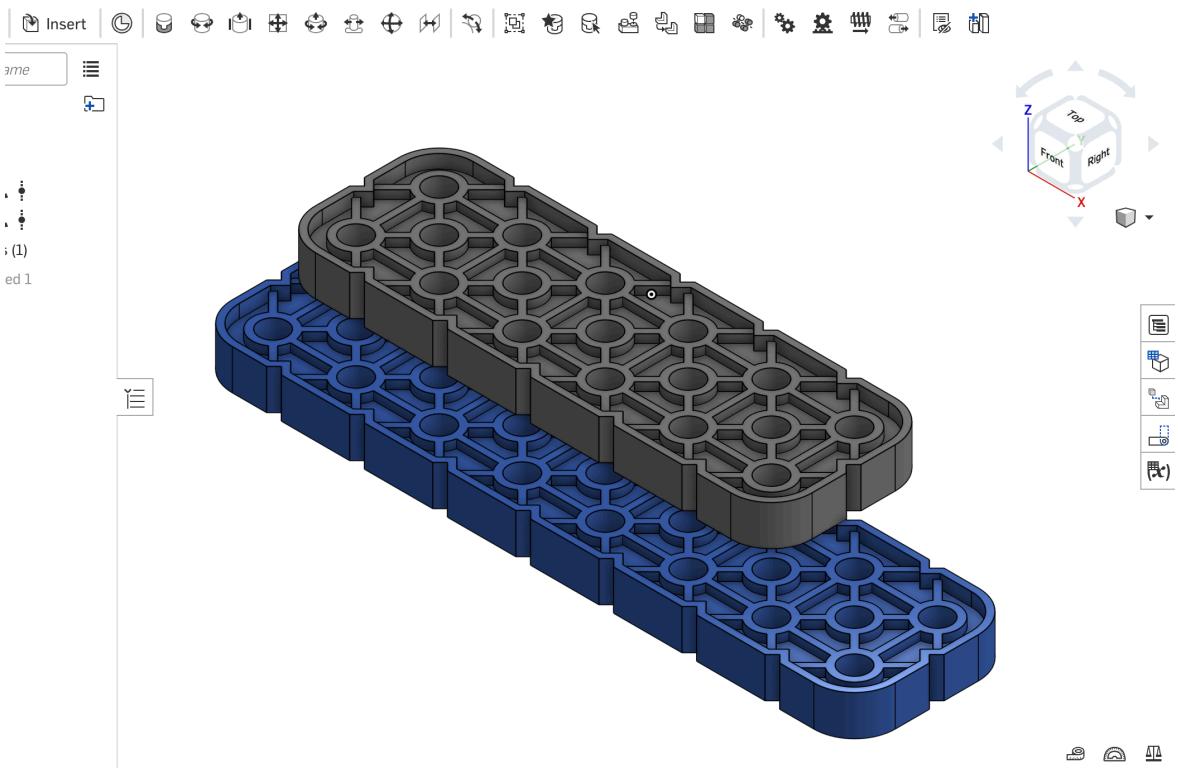
## Step 4: Finalize the Assembly

- **Confirm the Mate:**

Once satisfied with the alignment, click the green checkmark to confirm the Fasten Mate.



The two beams are now rigidly connected and cannot move relative to each other.



## Conclusion:

By following these steps, you have successfully assembled two VEX IQ beams using the **Fasten Mate** function in Onshape. The beams should now be aligned and

rigidly connected at their holes, simulating a real-world connection.