

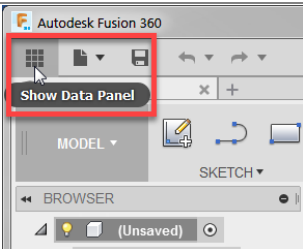
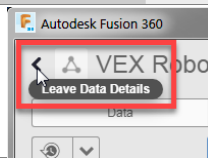
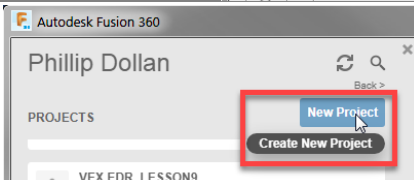
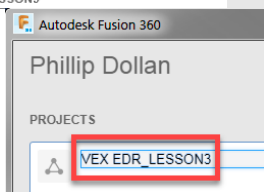
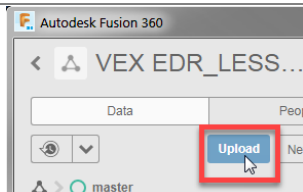
## Lesson 3: Assemble the drive mechanism

In this lesson, you complete the assembly of a VEX EDR Clawbot robot. Using the VEX Guide for Building the Clawbot for reference, you open a partially completed robot assembly then assemble the supplied components onto the robot. At the completion of this lesson, the robot will be ready for the Clawbot arm assembly.

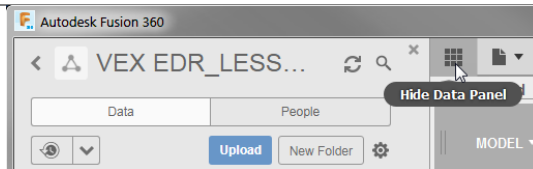
### Learning Objectives:

- Create a new project and upload files to the project.
- Open an existing robot assembly.
- Insert robot components into the current design.
- Assemble the components using the VEX Guide for Building the Clawbot for reference.
- Insert the wheel subassemblies into the design and assemble them to the robot.

### Step 1: Create a new project and upload files to the project

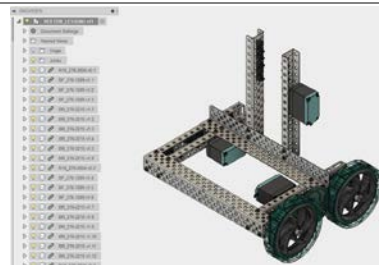
1. Start Fusion 360.	
2. Click Show Data Panel.	
3. Click Leave Data Details.	
4. Click New Project.	
5. Enter VEX EDR_LESSON3 then press Enter.	
<b>Note:</b> You can name the project as noted or use a name provided by your instructor.	
6. Double-click on VEX EDR_LESSON3 to make it the active project.	
7. Click Upload.	
8. Select the supplied file, VEX IQ.f3z, and then click Upload. The robot components are uploaded to the project.	

9. Click Hide Data Panel.



### Step 2: Open an existing robot assembly

1. Open VEX EDR\_LESSON3.



2. Click Show Data Panel then click People. You should be the only person currently in the project.

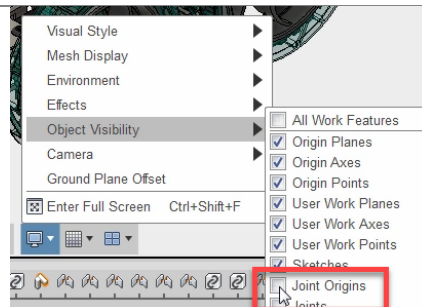


3. Click Data then click Hide Data Panel.

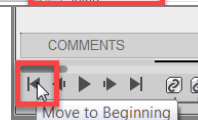
4. Click New Project.

### Step 3: Insert robot components into the current design

1. Click Display Settings > Object Visibility then click Joints Origins to toggle it on. The joint origins are displayed on the model.



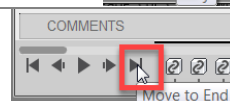
2. Click Move to Beginning.



3. Click Play then review the first few steps in modeling the robot.



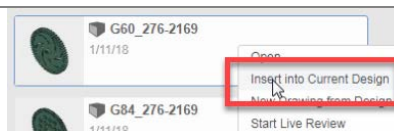
4. Click Move to End.



5. Refer to the VEX Guide for Building the Robot. Move to Step 16.

6. Click Show Data Panel.

7. Right-click G60\_276-2169 then click Insert into Current Design.

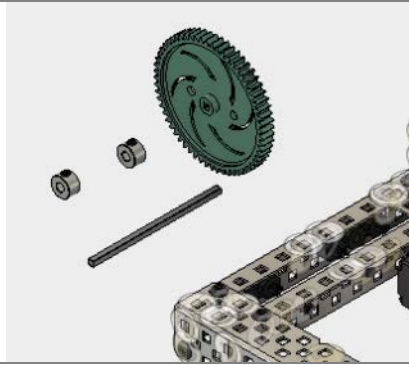


8. Click OK.

9. Repeat the previous workflow for the following components. Drag the components into the position shown before clicking OK.

- COL\_276-2010 (2 required)

- SH3\_276-2011



#### Step 4: Assemble the components using the VEX Guide for Building the Clawbot for reference

1. Hide the data panel.

2. Zoom and pan to view the model as shown.

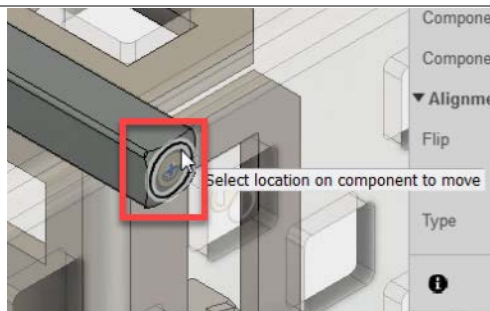


3. On the Assemble panel, click Joint.

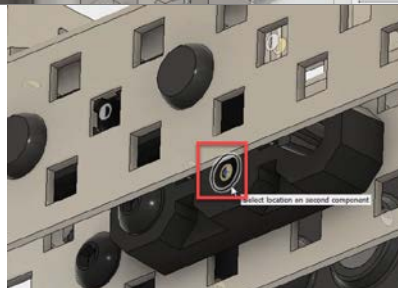


4. In the Joint dialog, from the Type list, select Slider.

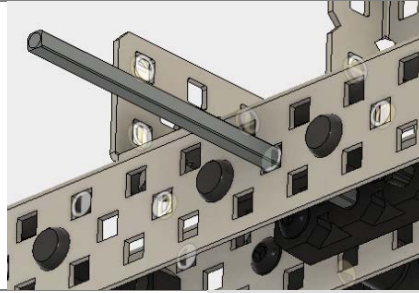
5. Select the circular edge on the end of the shaft as shown.



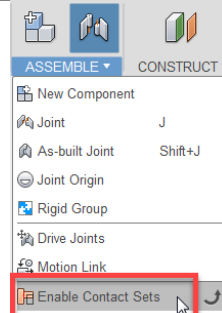
6. Rotate the model then select the edge on the bearing flat as shown.



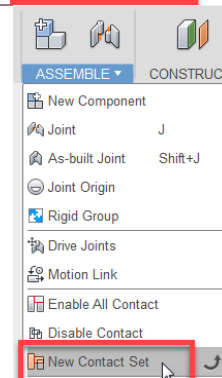
7. In the Joint dialog, click Flip then click OK.



8. On the Assemble panel, click Enable Contact Sets.



9. On the Assemble panel, click New Contact Set.



10. Select the shaft then rotate the model and select the motor component as shown.

**Note:** A new folder named Contact: sets is added to the browser.



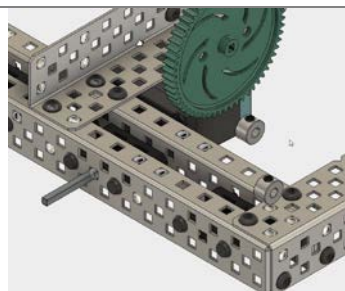
11. Click OK.

12. Drag the shaft into the motor until it stops.

13. On the Assemble panel, click Disable Contact.

#### Step 4a: Assemble the gear and collars onto the model

1. Rotate the model to view the gear and collars as shown.



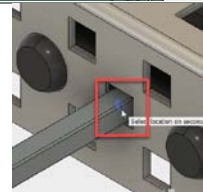
2. On the Assemble panel, click Joint then, if required, click Capture Position.



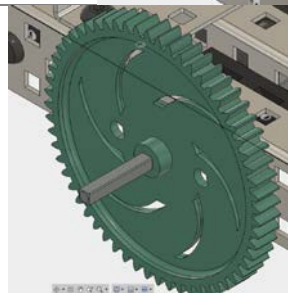
3. Select the circular edge on the gear as shown.



4. Select the joint origin as shown.



5. In the Joint dialog, from the Type list, select Rigid then click OK.



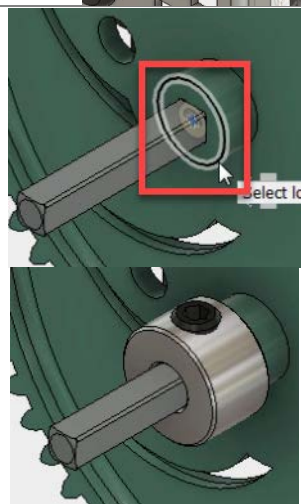
6. In the graphics window, right-click then click Repeat Joint.

7. Select the edge on the collar as shown.

**Note:** There is a small chamfer on the collar hole. Make sure you select the larger circular edge.

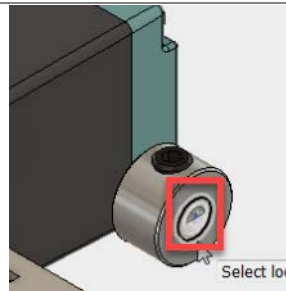


8. Select the edge on the gear as shown then click OK.

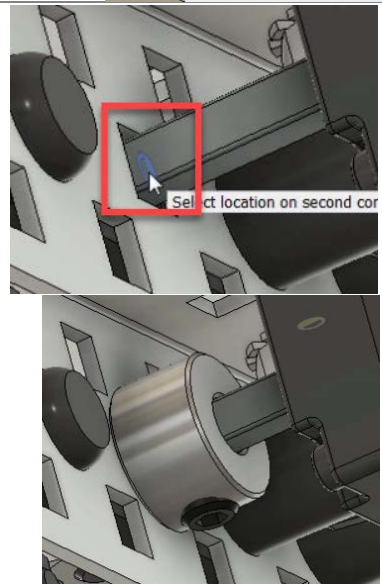


9. In the graphics window, right-click then click Repeat Joint.

10. Select the edge on the second collar as shown.



11. Rotate the model then select the joint origin as shown. If required, click Flip then click OK.

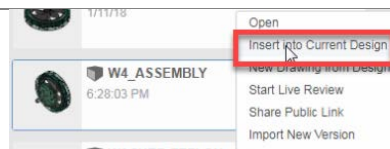


### Step 5: Insert the wheel subassemblies into the design and assemble them to the robot

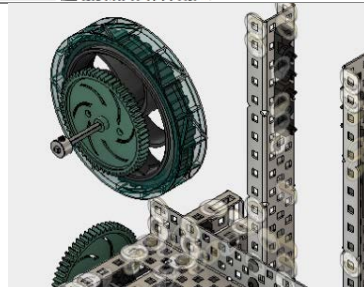
1. Refer to the VEX Guide for Building the Robot. Move to Step 17.

2. Click Show Data Panel.

3. Right-click W4\_ASSEMBLY then click Insert into Current Design.

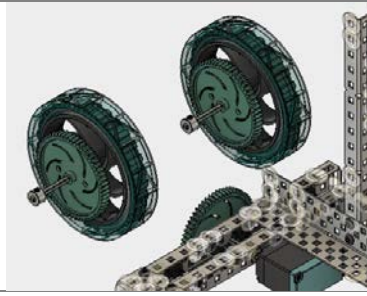


4. Drag the wheel subassembly away from the robot then click OK.



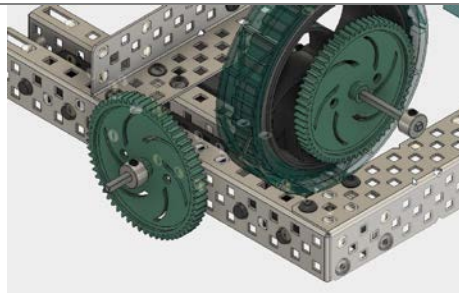


5. Insert a second wheel subassembly as shown.



6. Click Hide Data Panel.

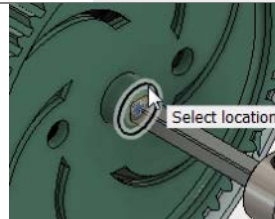
7. Zoom and pan to view the robot as shown.



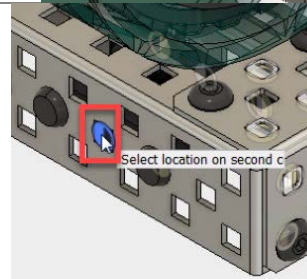
8. On the Assemble panel, click Joint.



9. Select the the edge on the gear as shown.



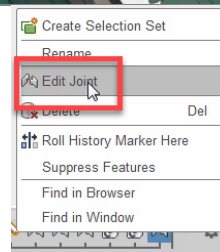
10. Select the joint origin as shown then click OK.



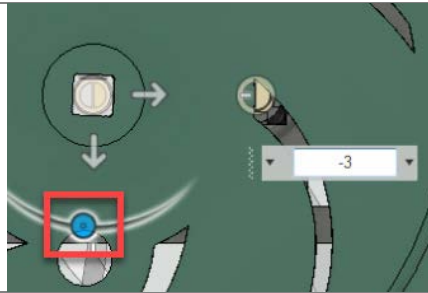
11. View the wheel assembly as shown. Note that the gears are not meshing correctly.



12. On the timeline, right-click the joint you just created. You may have to scroll to the end of the timeline to view the joint.

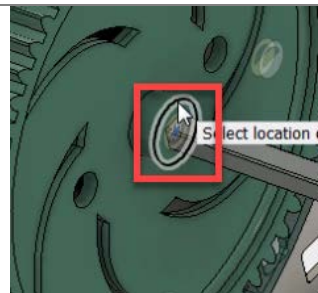


13. Click and drag the rotate manipulator clockwise a small amount as shown then enter **-3**. Review the gear meshing then click OK.

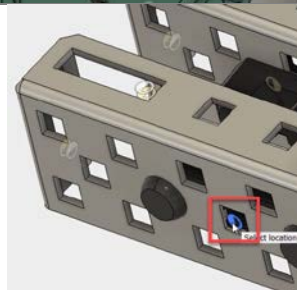


14. On the Assemble panel, click Joint.

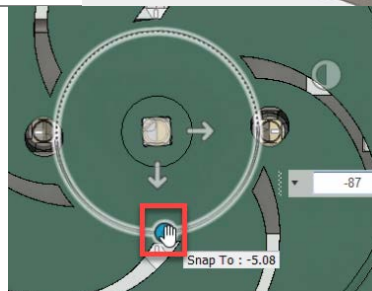
15. Select the the edge on the gear as shown.



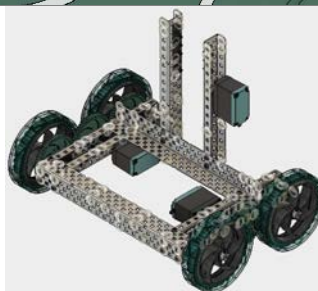
16. Select the joint origin as shown then click OK.



17. Click and drag the rotate manipulator counter-clockwise a small amount as shown then enter **-87**. Review the gear meshing then click OK.



18. On the ViewCube, click Home.



19. Save the file.

**Note:** You can save the current file and use it in the next lesson or use Save As and save the file as *VEX EDR\_Lesson4*.