

REC for Cortex

1.10 Activity: Drive Train Construction

Name: _____ Class/Period: _____ Date: _____

Overview:

In this activity, you will assemble the drive train of the BaseBot.

Duration:

25 Minutes

Materials:

Qty	Description
1	REC 1 Bundle

Procedures:

1.10.1: Gear Alignment Techniques

All of the components in the Vex robot system are designed with a 1/2"-on-center hole pattern. Each structure member has a mounting hole every half-inch, allowing you to mount any combination of gears on the chassis with the proper center-to-center distance. This ensures gears mesh properly.

When mounting gears:

- Use lock collars to prevent shafts from coming out of the motor modules
- Use spacers and washers to ensure gear alignment
- If possible, use two bearings to support either side of a gear train
- Manually rotate gears and wheels to check for binding and friction
- Manually rotate spacers and washers to check for excess friction
- Make sure all your hardware is tight

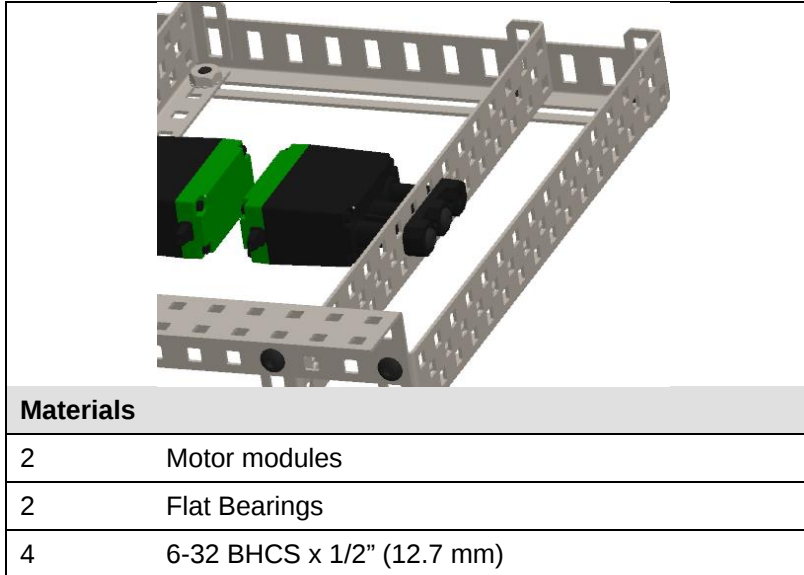
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1.10.2: Assembling the BaseBot Drive Train

Mounting the Motors

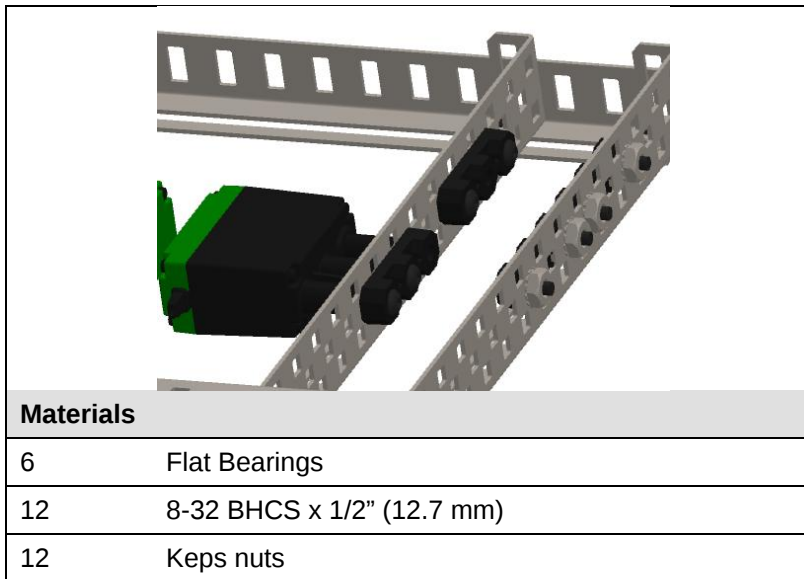
- Mount the motors to the inside chassis rail as shown below. Tighten the hardware.



Mounting the Bearings

- Mount bearings to the chassis as shown below.

Tighten the hardware.



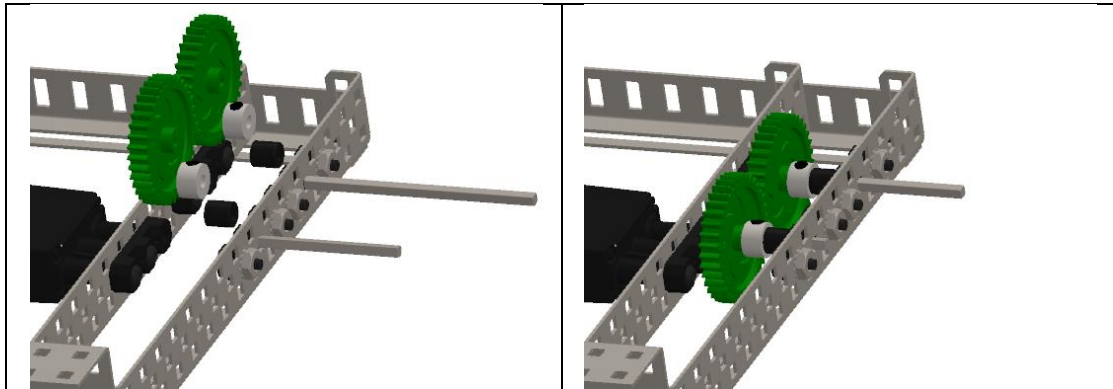
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Mounting the Gears

Note: Before mounting the gears, be sure the motor mounting screws are tight. Once the gears are installed you will not have access to the top of the motor screws to tighten them.

- Mount shafts and gears as shown below.
 - Do not insert the motor shaft all the way into the motor clutch
 - Do not tighten the collars until instructed.



Materials

4	36 tooth gears
4	Collars
4	0.318" (8.1 mm) spacers
2	3" (7.6 mm) square bars
2	2" (5.1 mm) square bars

If you cannot fit the spacers between the bearings, see the next section for instructions.

Checking Gear Alignment

- 1 Rotate the gears by hand and verify that they mesh correctly and do not bind.

If the gears are hard to turn or you cannot fit the spacers in between the bearings:

- Loosen the rear end of the associated inside chassis rail.
- Slide the inside chassis rail toward the center just enough to allow the gears to rotate freely and then retighten the chassis rail

If the gears move side to side on the shaft:

- Slide the inside chassis rail toward the outer rails just enough to keep the gears from sliding.
- 2 Tighten all the chassis hardware.

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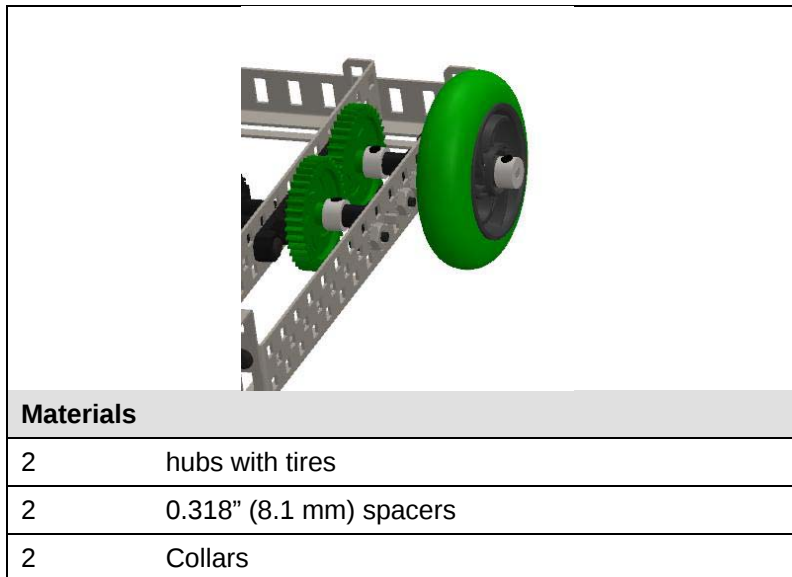
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Checking Motor Engagement

- 1 Push the motor shaft into the clutch of the motor.
- 2 Test the motor engagement by hand-turning the attached gear. The motor should provide some resistance before turning.
- 3 Tighten the collars on both shafts to secure them in to place.

Mounting the Rear Wheels

- Mount the wheels and tighten the collars as shown below.



Note: If the portion of the shaft extending from the chassis is too short to mount the collar, loosen the inside collar near the gear and slide the shaft further out.

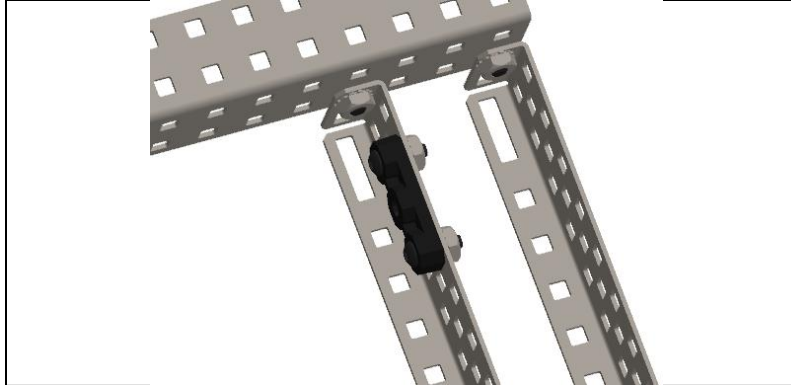
- Once the collar is tightened, verify that the spacer will rotate on the shaft. If the spacer is too tight to rotate:
 - Loosen the outside collar.
 - Adjust the wheel to allow more space between the chassis and wheel assembly.
 - Re-tighten the collar

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Mounting the Caster Bearings

- Mount the caster bearings as shown below. Tighten the hardware.

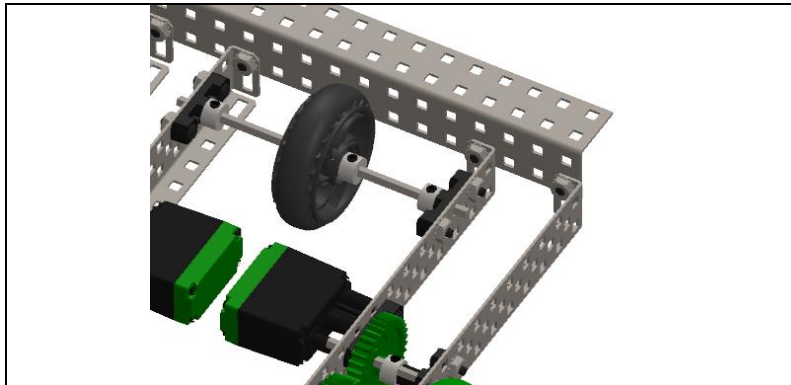


Materials

2	(2) Flat Bearings
4	(4) 8-32 BHCS x 1/2"
4	(4) Keps nuts

Mounting the Caster

- Mount and align the hub as shown below.



Materials

1	5" (12.7 cm) square bar
1	1.895" hub without removable tires
4	Collars

- Tighten the collars to keep the hub centered. The hub should rotate freely without binding.

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1.10.3: Engineering Notebook

- Make a sketch of the BaseBot drive train in your engineering notebook.

Questions:

Write the answers to the following questions on your question sheet. Add the completed question sheet to your robotics binder.

Question 1 What factors could cause your drive train to bind or perform poorly?

Question 2 What steps could you take to prevent these factors from affecting your robot?