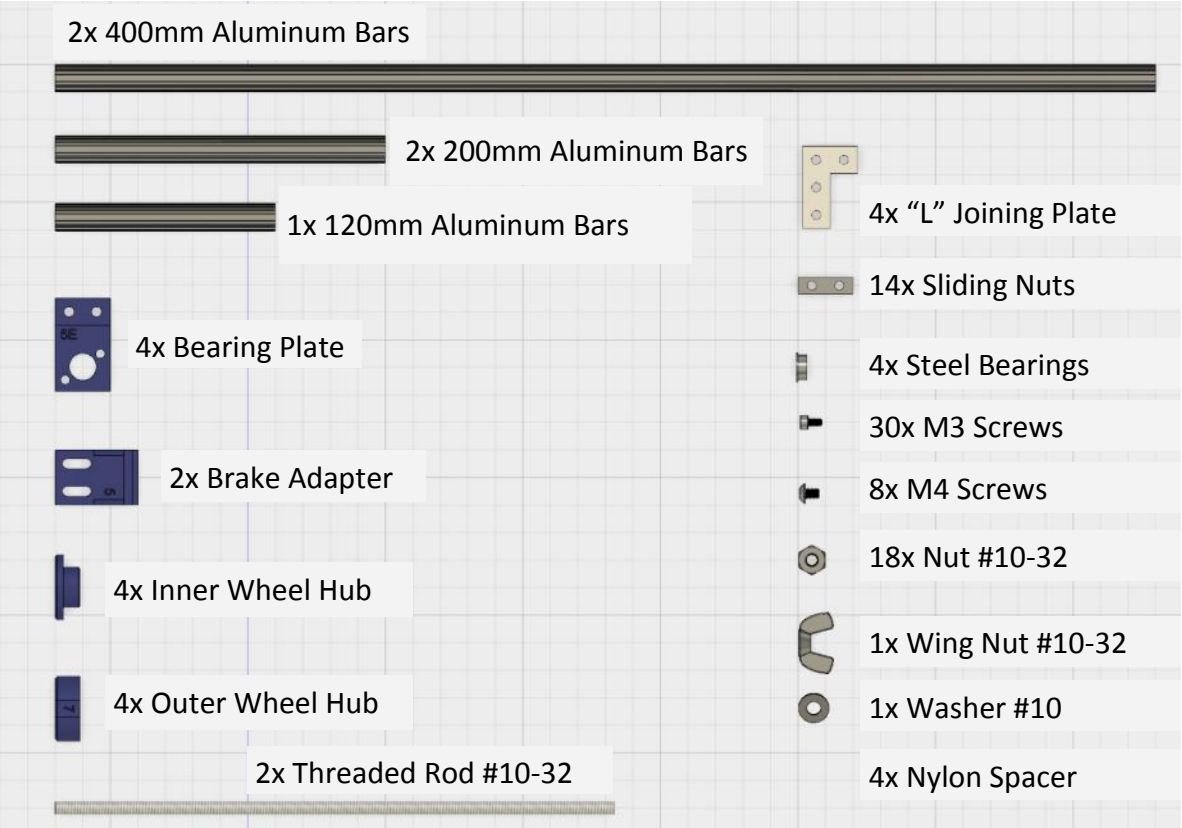
BASIC VEHICLE KIT

ASSEMBLY INSTRUCTIONS

PARTS LIST



Note: The nuts and screws part bags contain extra components in case parts are lost during assembly. The part counts listed above are the required number of parts needed.

TOOLS REQUIRED

- INCLUDED WITH KIT
  - 2.5mm "L" Wrench
- NOT INCLUDED WITH KIT
  - Two 3/8" wrenches or equivalent
  - Ruler
  - Small Square

STEP #1—Place on a table the 400mm and 120mm aluminum bars as shown in the picture below. Insert the slid nuts into each bar. The slide nuts are inserted into the bars as shown in picture to the right. Small burrs may have to be removed to insert the nut. The position of each slide nut is shown in picture below.

NOTE: It is important to install the slide nuts first. During the assembly it can be impossible to add a slide nut without disassembling the frame.

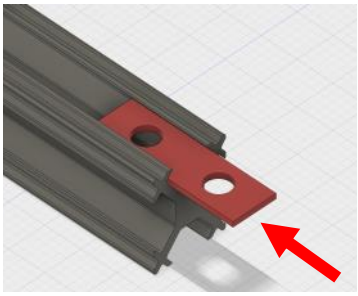


Figure 1

2x 400mm Aluminum Bars
2x 200mm Aluminum Bars
14x Sliding Nuts

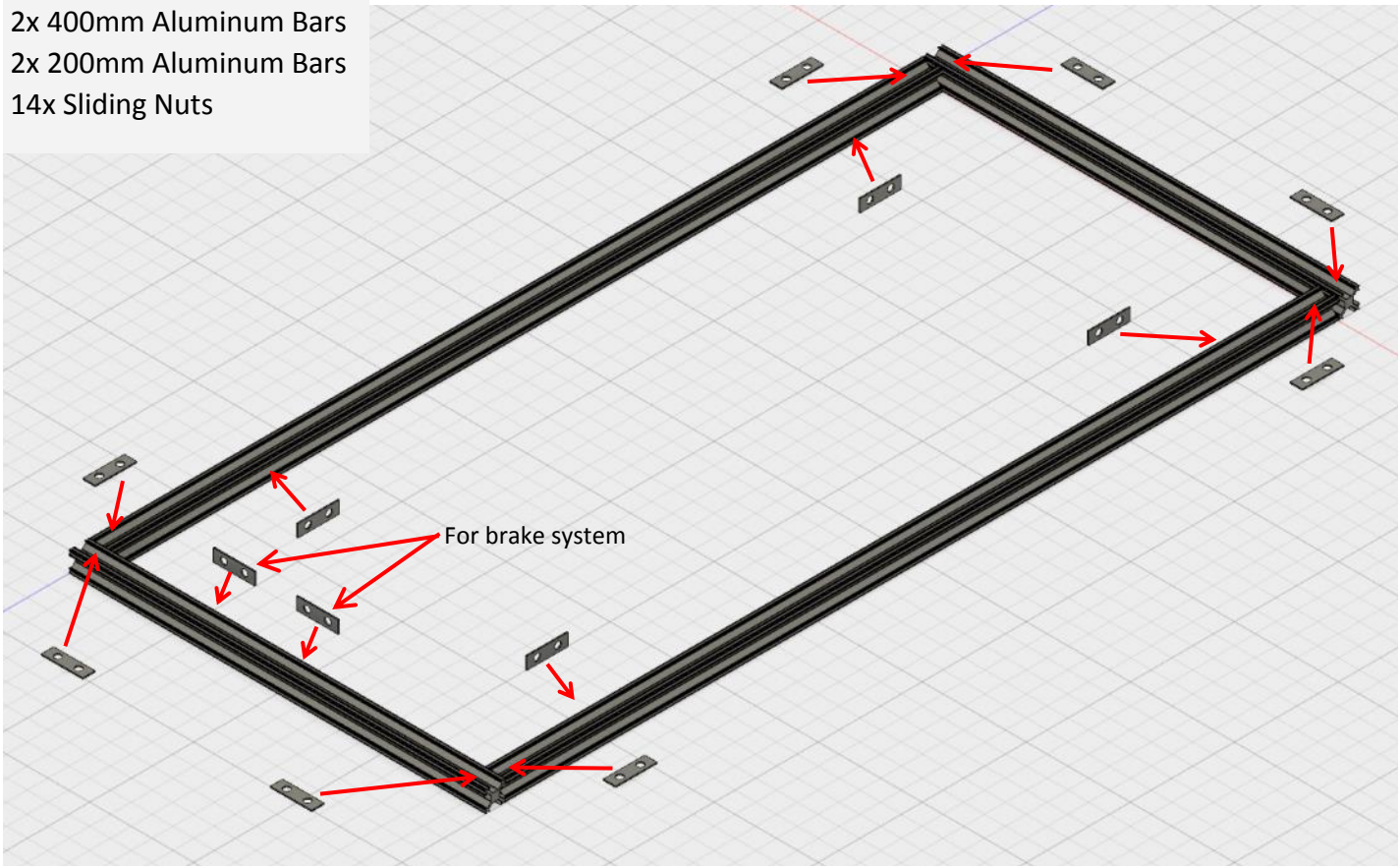


Figure 2

NOTE — The brake system needs two slide nuts on the inside. Depending on your design these have to be put on the front or back of the vehicle. You may want to insert the additional slide nuts used for other kits or options added to the vehicle.

STEP #2—Place a "L" joining plate on each corner as shown in picture below. Use a square to make sure the frame is square. Use the 2.5mm "L" wrench to tight the M3 Screws.

NOTE: The long end is inserted into the M3 screw to tighten as shown in Figure 4. The screws should only be lightly tighten at this point. When the vehicle is fully assembled and working correctly, then the screws can be fully tighten.

4x "L" Joining Plate
16x M3 Screws

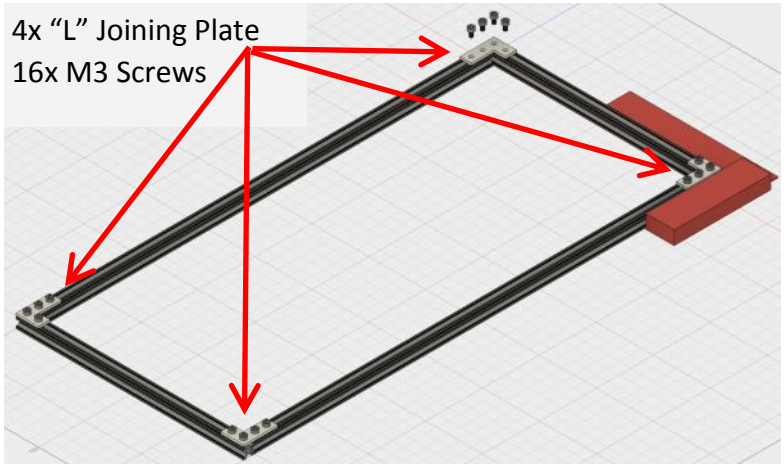


Figure 3

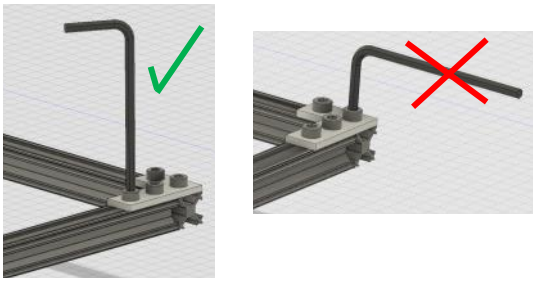


Figure 4

STEP #3— Insert the bearings into the bearing plate by placing the bearing on a hard surface as shown in Figure 5 to the right. Press the bearing plate down on top of the bearing while keeping the bearing plate level to the hard surface. Repeat this four (4) times.

4x Bearing Plates
4x Steel Bearings

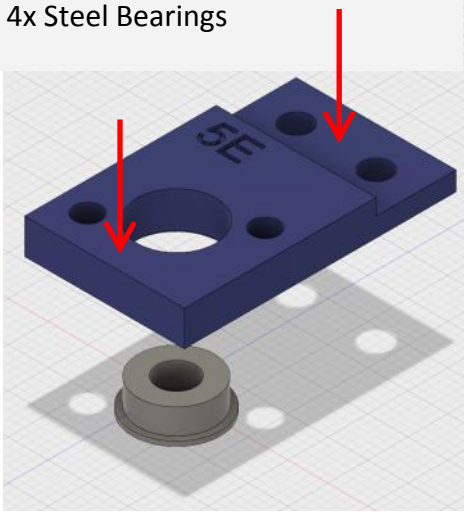


Figure 5

8x M4 Button Head Screws

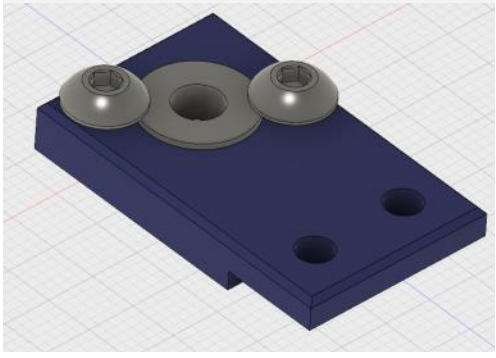


Figure 6

STEP #4— Flip over bearing plate and screw in two (2) M4 button head screws as shown in Figure 6 to the left. Repeat this four (4) times.

STEP #5— Flip over bearing plate and screw in two (2) M4 button head screws as shown in the picture to the left. Repeat this four (4) times.

NOTE: Do ***NOT*** tight the M3 screws. The bearing plates will need to be slid to adjust the steering in a future step.

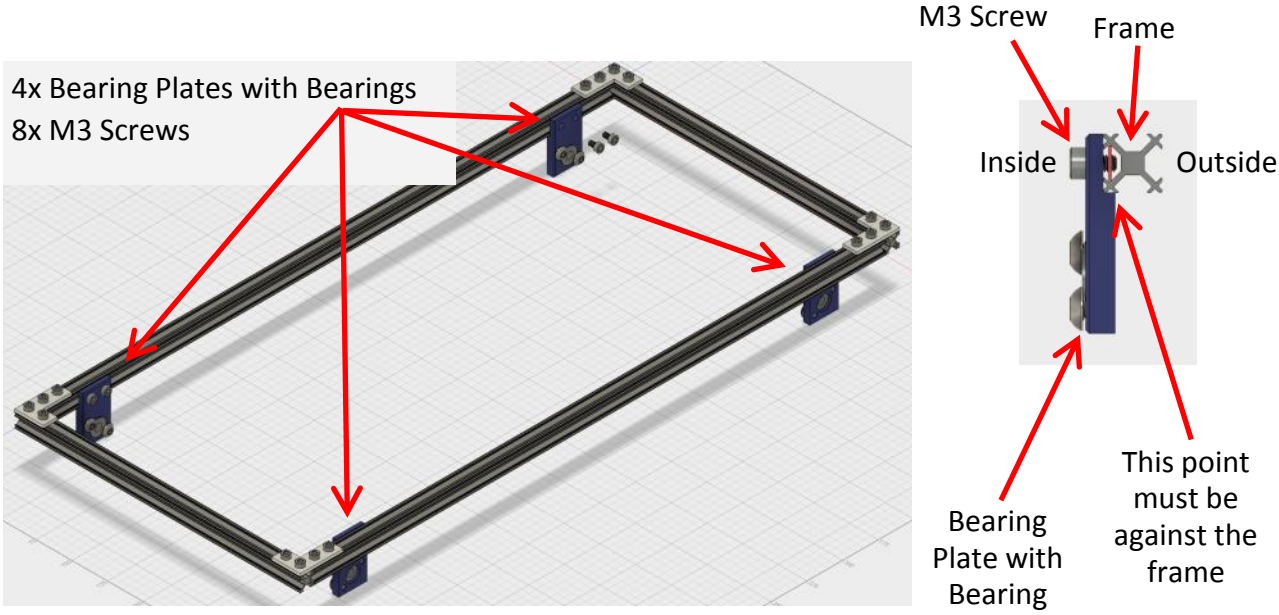


Figure 7

STEP #6a— Axle assembly steps. Before assembling the axle, where are you putting the brake axle? Either front or back of the vehicle? There are pros and cons where the brake axle is. But those are determined by your overall design. Figure 8 show the orientation for components for the brake axle.

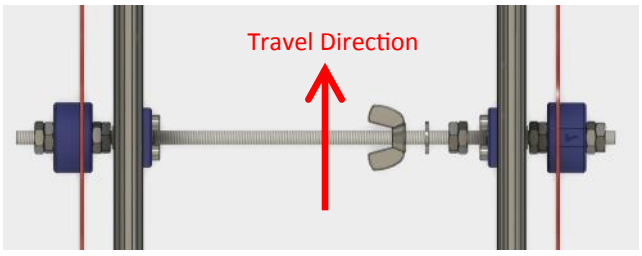


Figure 8

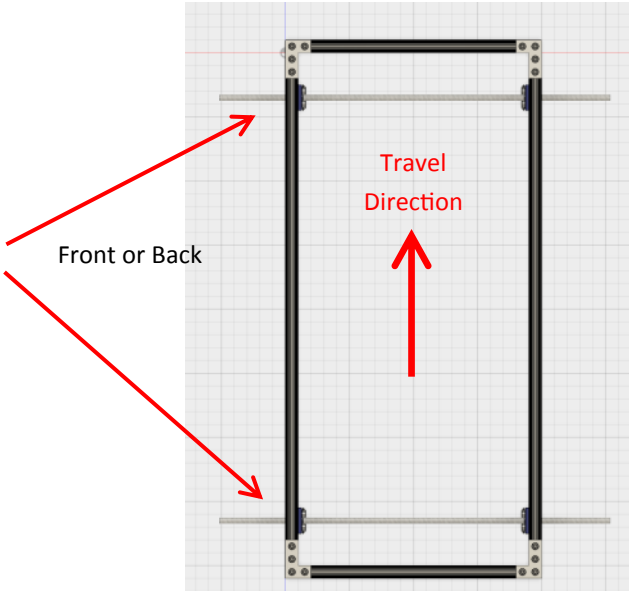


Figure 9

STEP #6b— Insert the threaded rod through one of the bearings part way. Now screw on the wing nut, washer, and two (2) 10-32 nuts as shown in Figure 10.

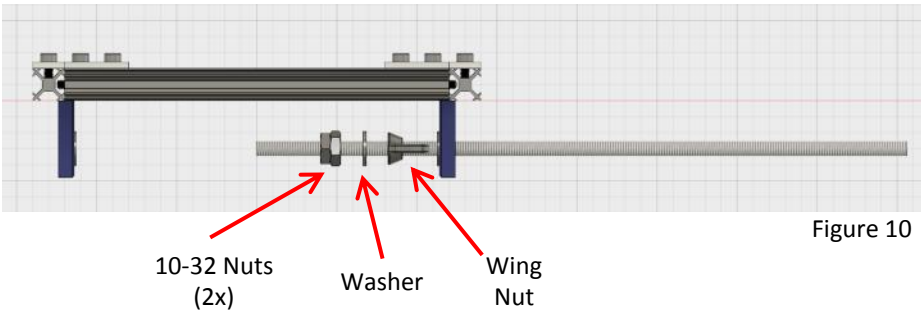


Figure 10

STEP #6c— Insert the threaded rod through the bearings on the other side. The wing nut, washer, and two (2) 10-32 nuts will need to be screwed on farther. Center the threaded rod between the two bearings. Put a plastic spacer on each side with a nut. There must be a small gap between the spacer and the nut to allow the threaded rod to move back and forth a very small amount. Drag will be created if there is no gap which will slow the vehicle. Which is not good. Taking your time on this step will make your vehicle faster and better performing!!!

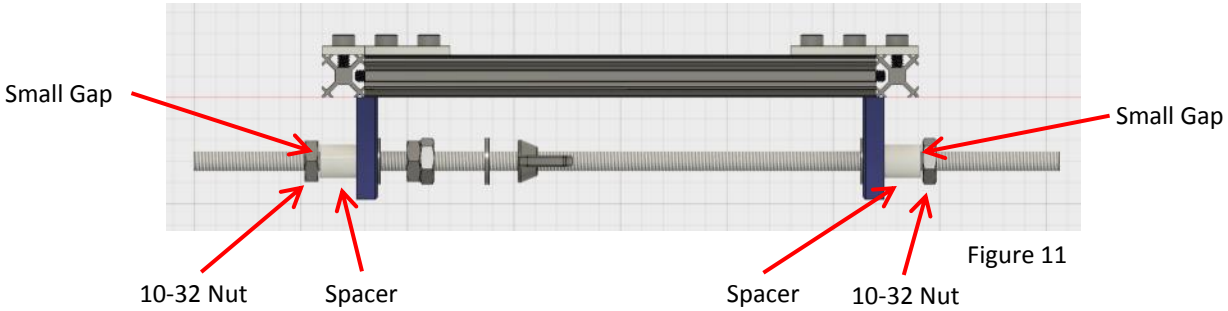


Figure 11

STEP #6d— Put another nut onto the threaded rod on each end. Using two 3/8" wrenches tighten the two nuts against each other to lock them in place. Again there must be a small gap between the spacer and the nut to allow the threaded rod to move back and forth a very small amount. Drag will be created if there is no gap which will slow the vehicle.

Figure 12

STEP #6e— Put the remaining parts onto the axle as shown in Figure 12. One to three CDs can be installed on the inner wheel hub. There are pros and cons for using more than one CD. These depend on your final design. There is an order to tightening the outer nuts. The 1st and 2nd nuts must be very tight to prevent the CD from slipping.

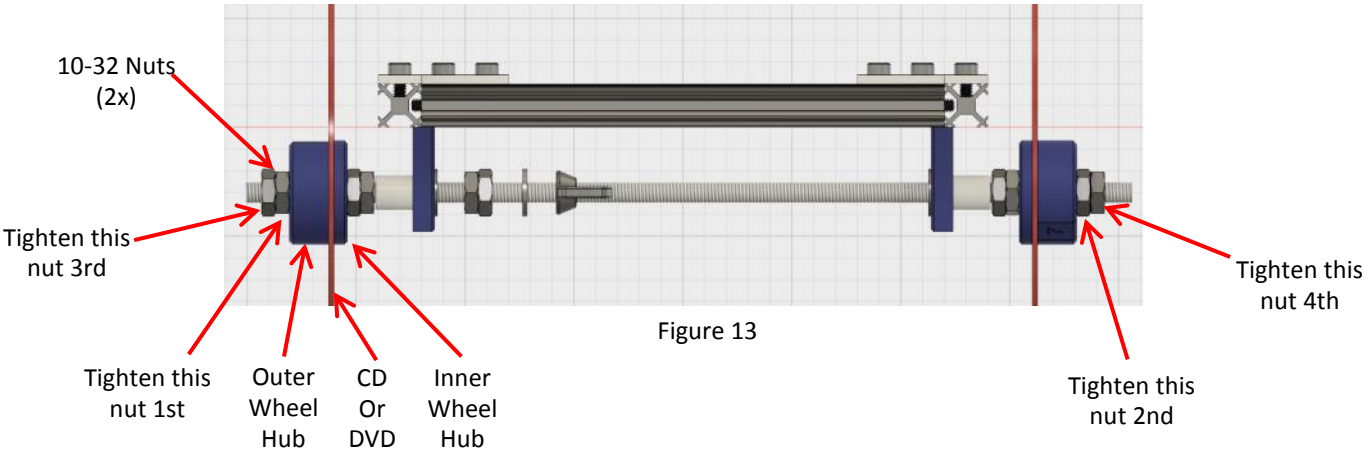


Figure 13

STEP #7— Install the other axle using the same previous steps. Minus the wing nut, washer, and 2 nuts between the bearings. When complete the axle will match Figure 14. Remember to have the small gap between the space and inner nuts. The axle should move left and right a small amount to prevent drag.

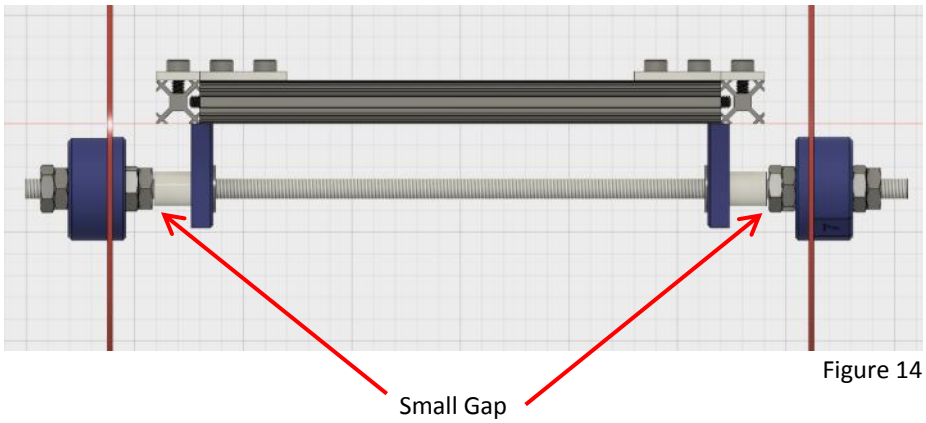


Figure 14

STEP #7— Attached the two Brake Adapters as shown in Figures 15 & 16. The 120mm Bar then attaches to the Brake Adapters. Slide the 120mm bar toward the wing nut until there is a small gap between the wing nut and the 120mm bar. The wing nut and bar should look like Figure 15 when complete.

Concept: The 120mm bar prevents the wing nut from spinning. The rotation of the wheels will stop when the wing nut makes contact with the braking nuts. This creates the braking system which is explained below.

Figure 15

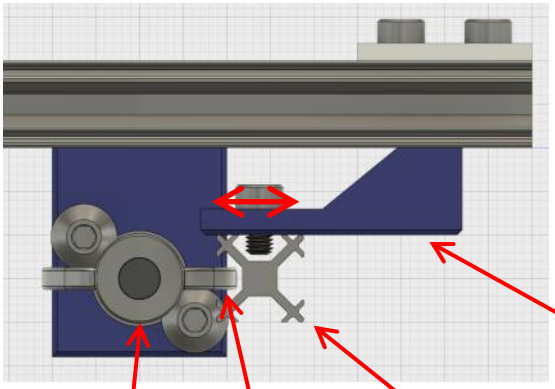
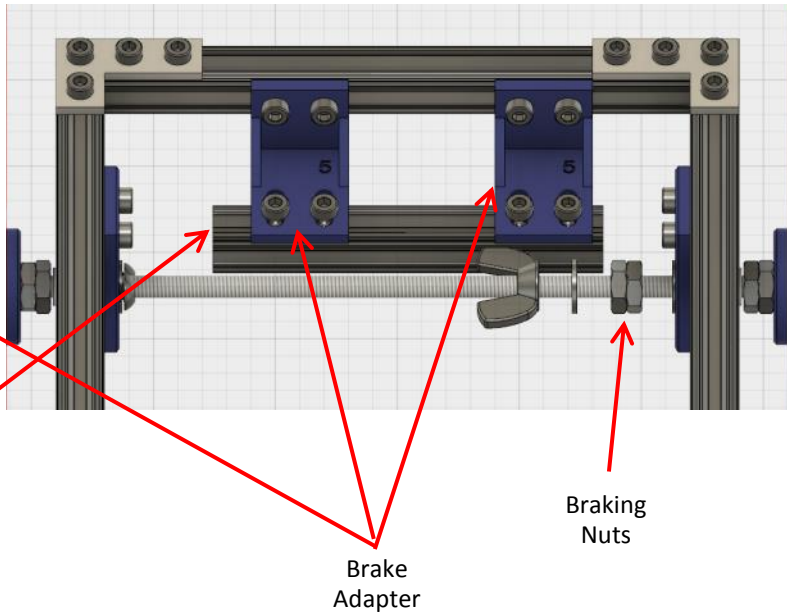


Figure 16



How to use the braking system

The brake system locks the axle and wheels when the wing nut makes contact with the braking nuts as shown in Figure 17. By spinning the wheels backwards, you are setting the number of turns the wheels can make before reaching the locked position. Figure 18 shows the position of the wing nut after the wheels were spun backwards 30 turns. In this case the brakes (locking the wheels) will activate after the wheels make 30 rotations. If you know the circumference of the wheels, you can calculate how far the vehicle will travel before the brakes activate.

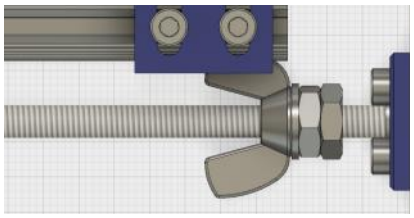


Figure 17— 0 Turns —Wheels Locked

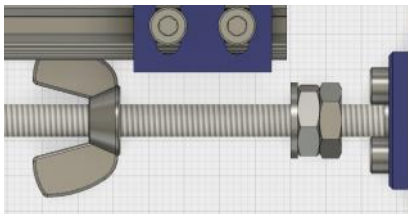


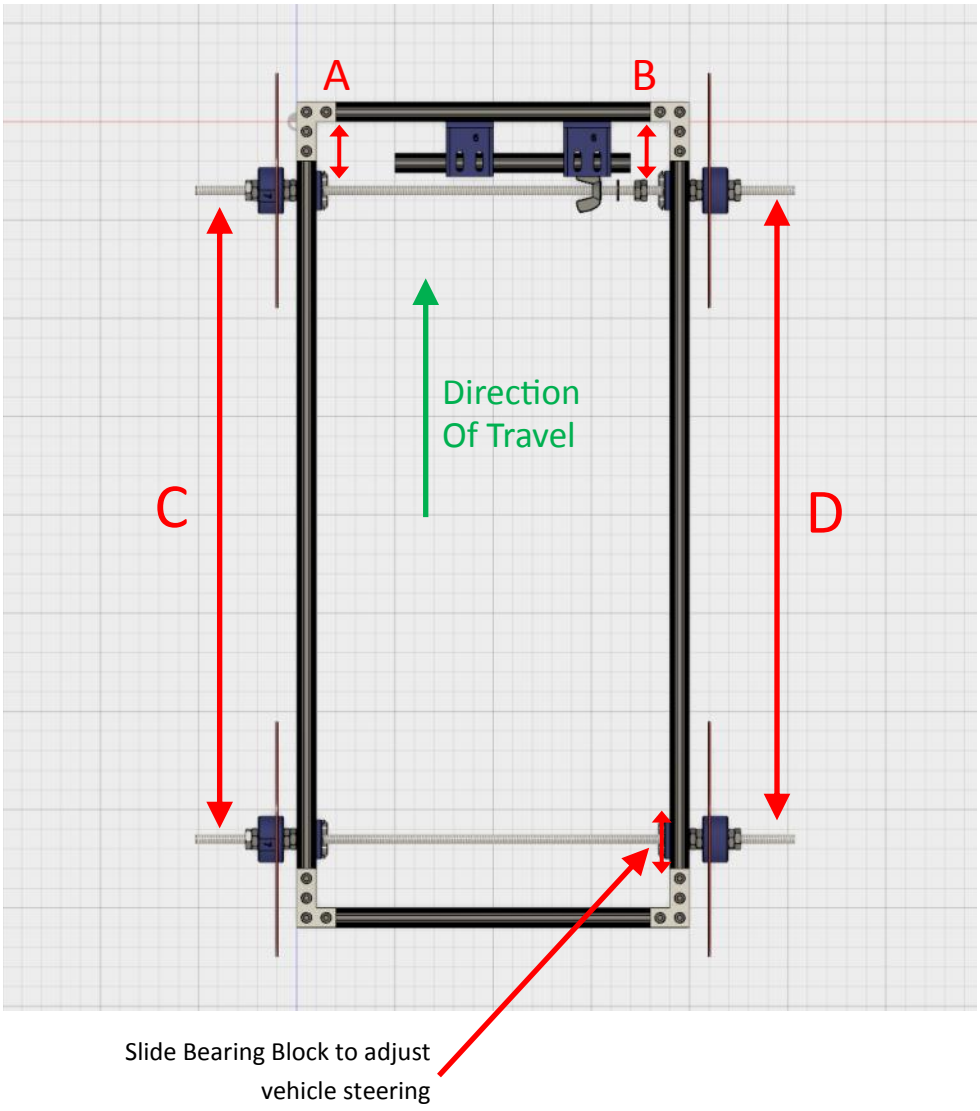
Figure 18— 30 Turns — Wheels Free

STEP #8— Adjusting the steering requires time and several adjustments to make the vehicle go straight. Start by adjusting the "A" and "B" distances to be the same. Once the braking axle is parallel, then adjust the "C" and "D" distances to change the steering.

Note: To make a vehicle travel very straight requires very small adjustments that you may not be able to measure.

Warning: It is possible to warp a small area on the aluminum bars by tighten the screws on the bearing blocks too much. The warp will make it very difficult to make small adjustments.

VEHICLE DIRECTION	DISTANCES
LEFT	"C" < "D"
STRAIGHT	"C" = "D"
RIGHT	"C" > "D"



BASIC VEHICLE DIMENSIONS