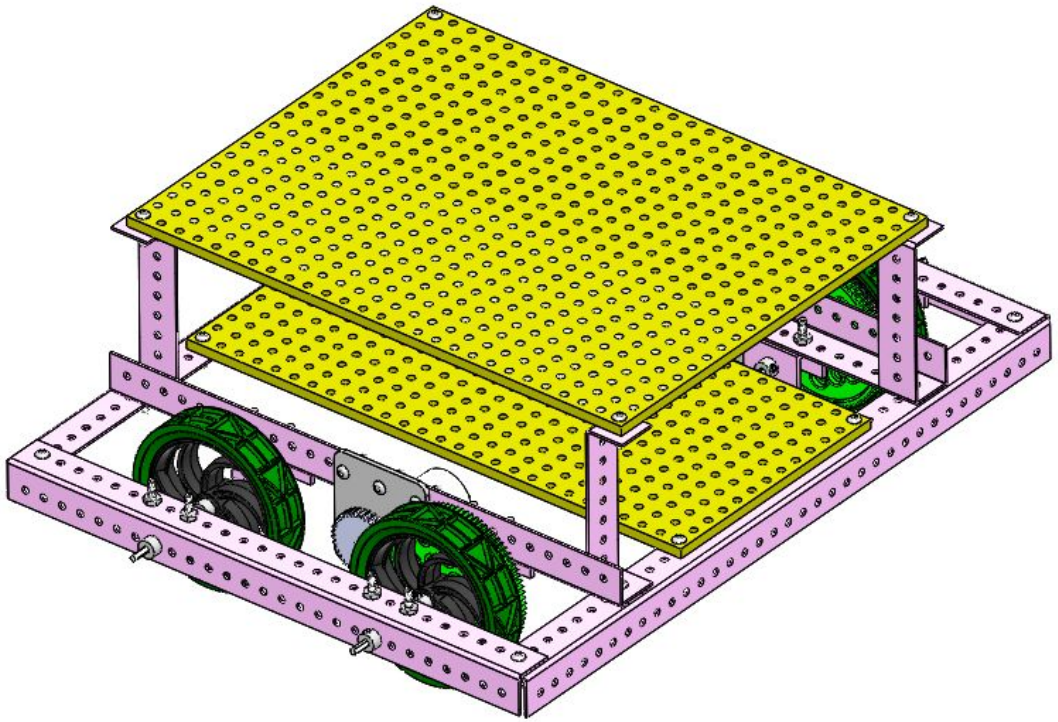
PIONEERS IN ENGINEERING 2018

BASE KIT MANUAL

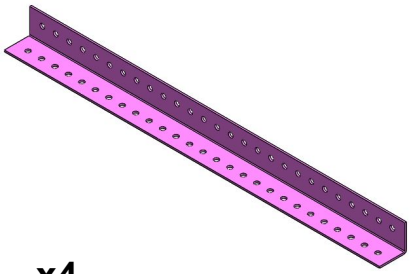


THE BUILD

VERSION 2.2

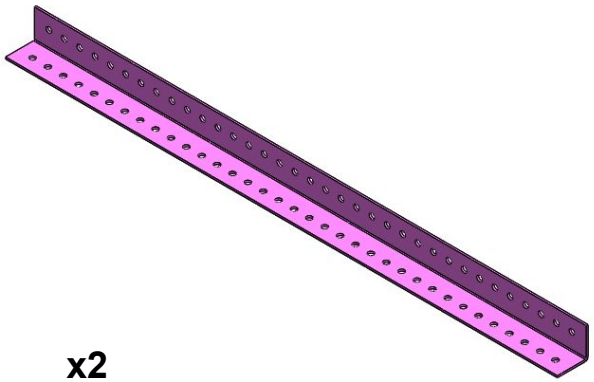
PARTS

*COLORS ARE FOR ILLUSTRATION



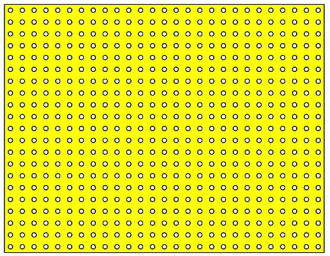
x4

27-Hole PiE Metal



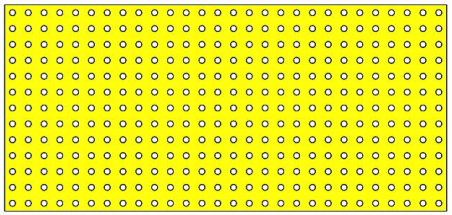
x2

35-Hole PiE Metal



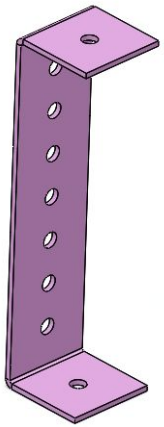
x1

6.5” x 13.5” Plastic



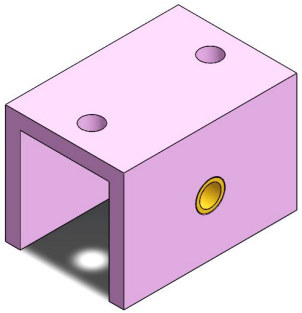
x1

10.5” x 13.5” Plastic



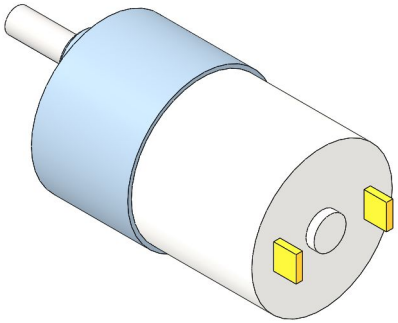
x4

Standoff



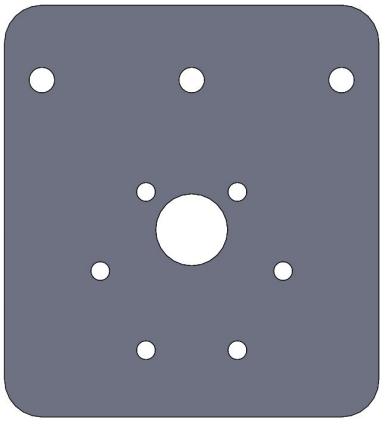
x8

Bearing Block



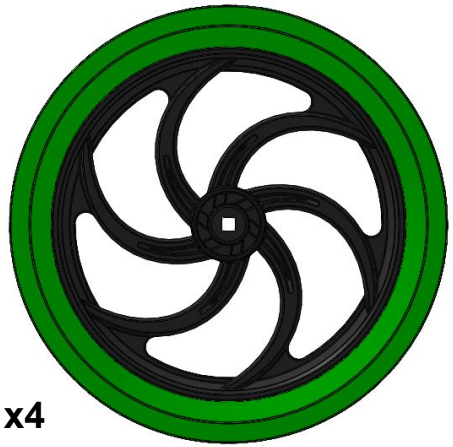
x2

Motor



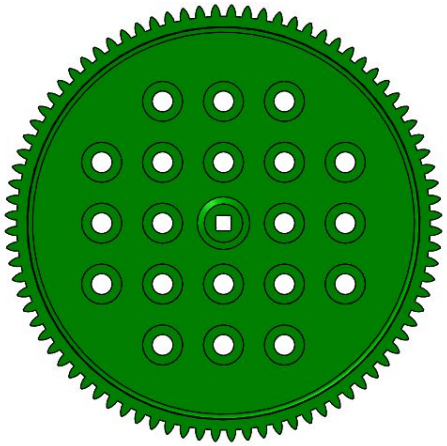
x2

Motor Mount



x4

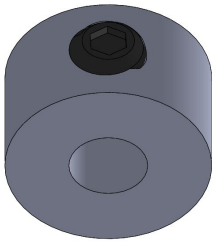
Wheel



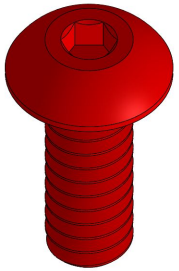
x2

VEX Gear

Shaft Collar



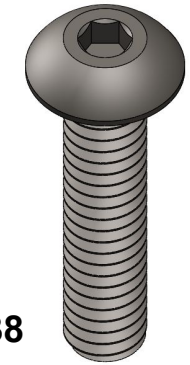
x16



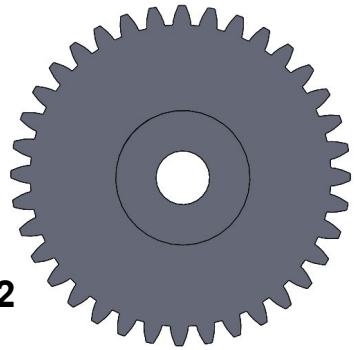
x12

M3 Screws

8-32 Screws

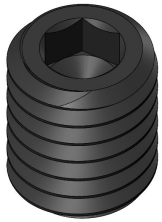


x38



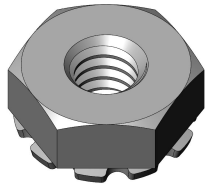
x2

Hub Gear



x2

Gear Set Screw



x38

Hex Nut

x4

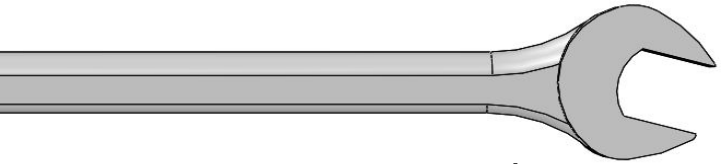
Shaft

Reference

Note: parts and tools are roughly in true size

Used For

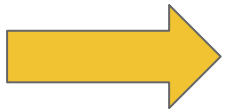
3/32” Hex Key

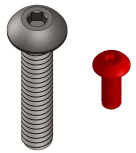


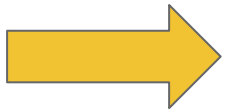
11/32” Wrench

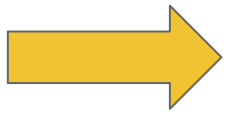
1/16” Hex Key

2-mm Hex Key





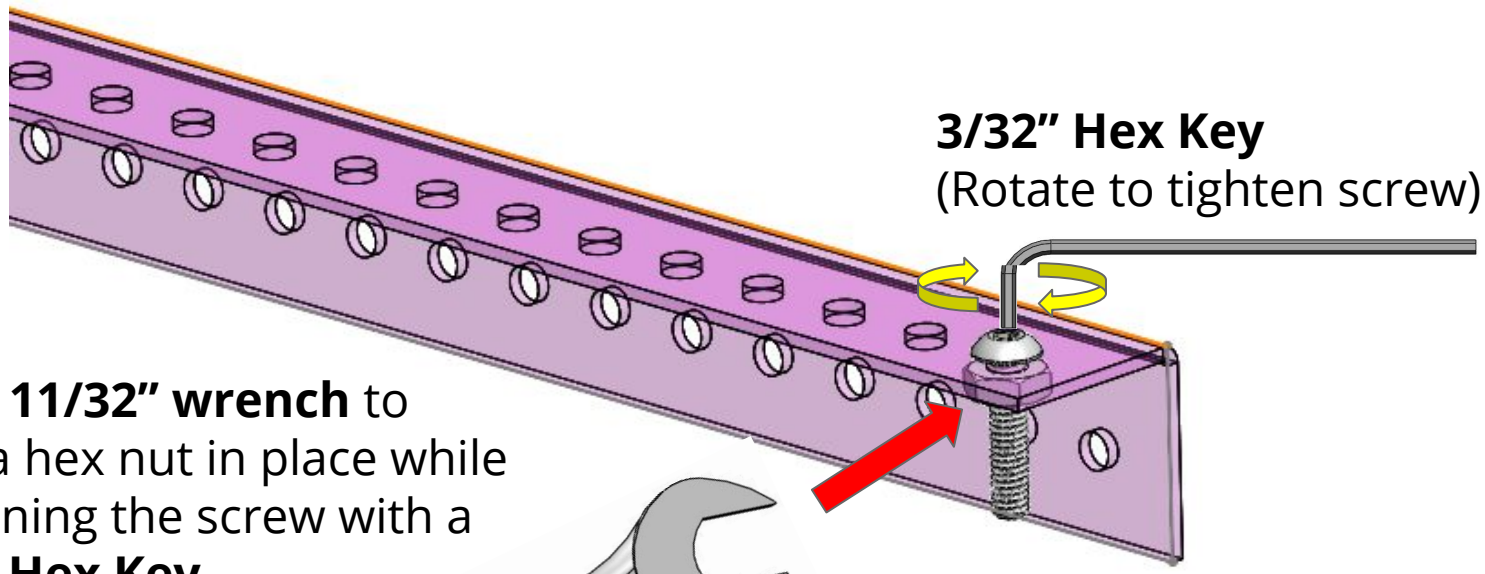




Screw Tightening Technique

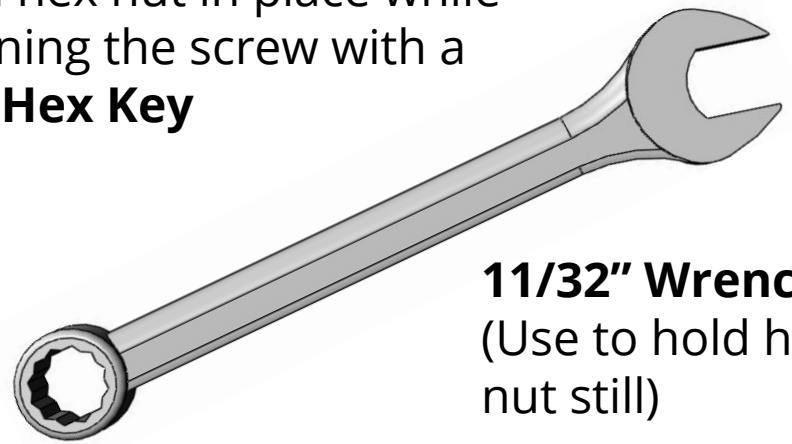
Applied Physics

To tighten the screw extra well, insert the shorter side of the Hex Key into the screw and rotate it by pushing on the longer side. This technique will help you maximize torque!



3/32” Hex Key
(Rotate to tighten screw)

Use a **11/32” wrench** to hold a hex nut in place while tightening the screw with a **3/32” Hex Key**

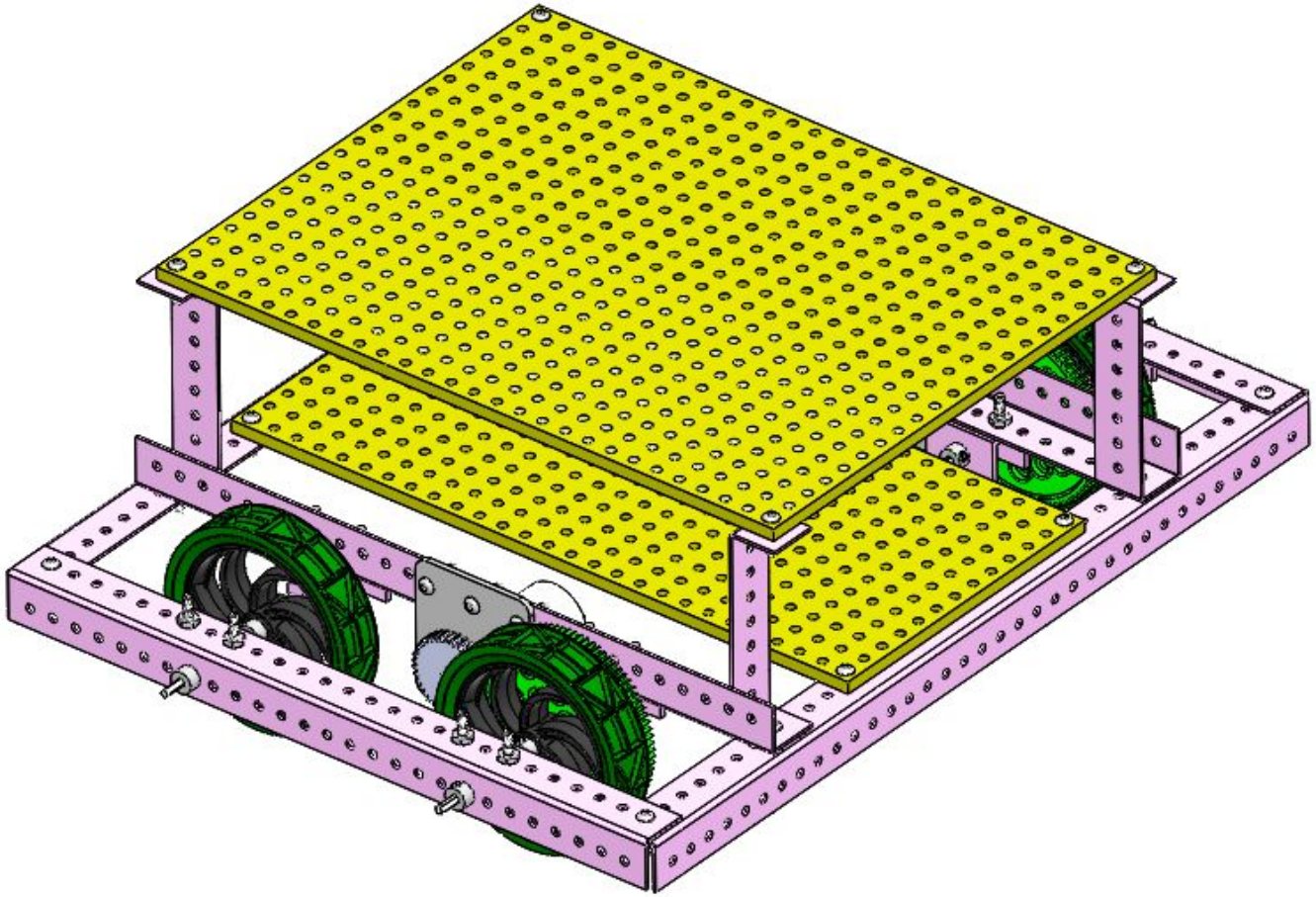


11/32” Wrench
(Use to hold hex nut still)

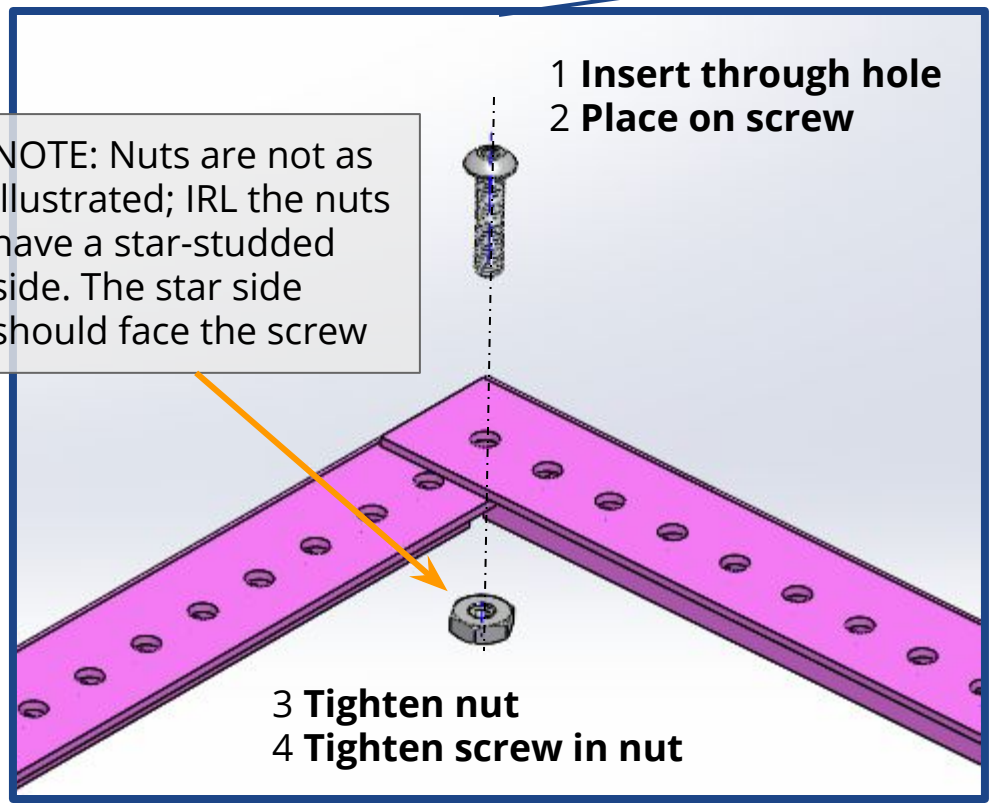
First hand-tighten the screw, and then use the Hex Key to tighten.

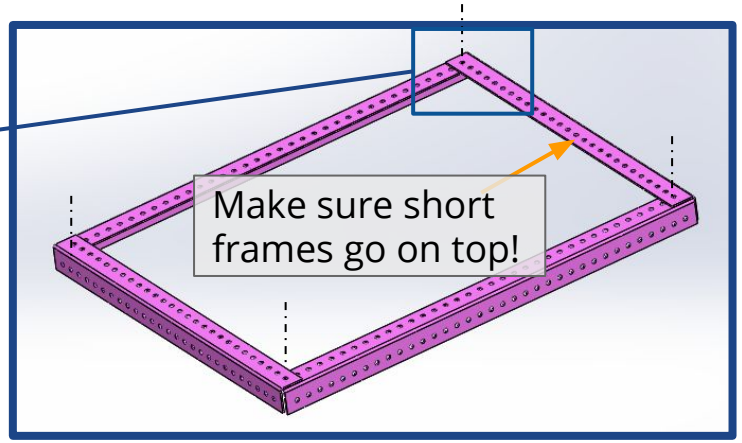
Instructions

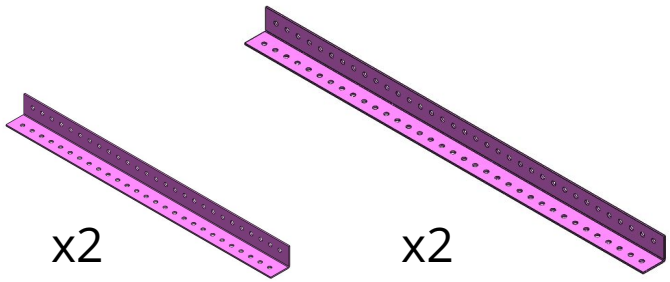
- Read all text on a page before attempting a step.
- First get the “parts” (pictures and quantities of parts on lower right of Assembly pages).
- On the Assembly pages, use the upper right “views” to find where to apply “step instructions”, which are on the left side.
- If you are confused, reference the end page (has views of a completed base kit), the next few Assembly pages, or ask a PiE mentor for help.

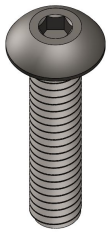


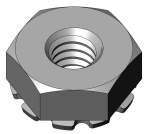
ASSEMBLY











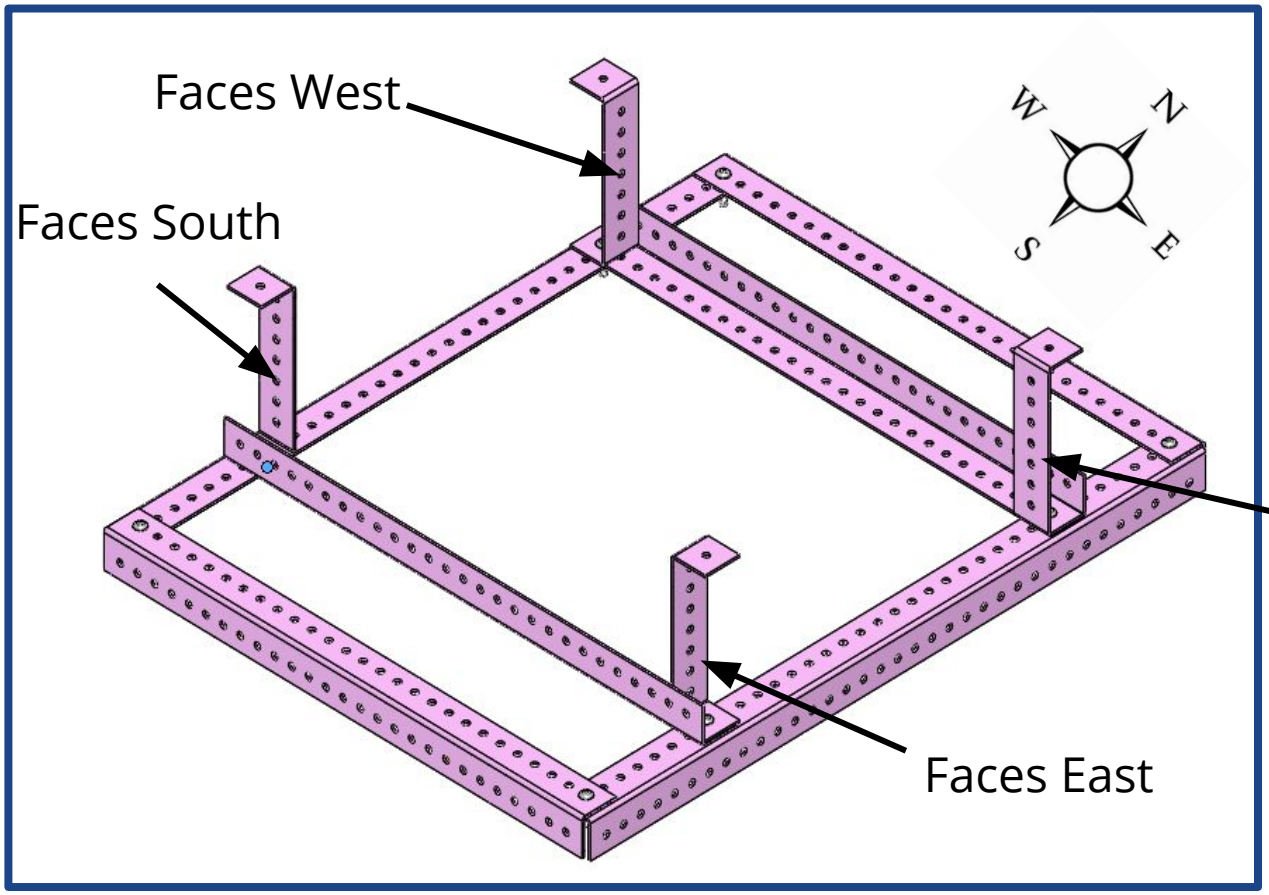
STEP

1

Fasten on all four corners

How to Ideally Orient the Standoffs

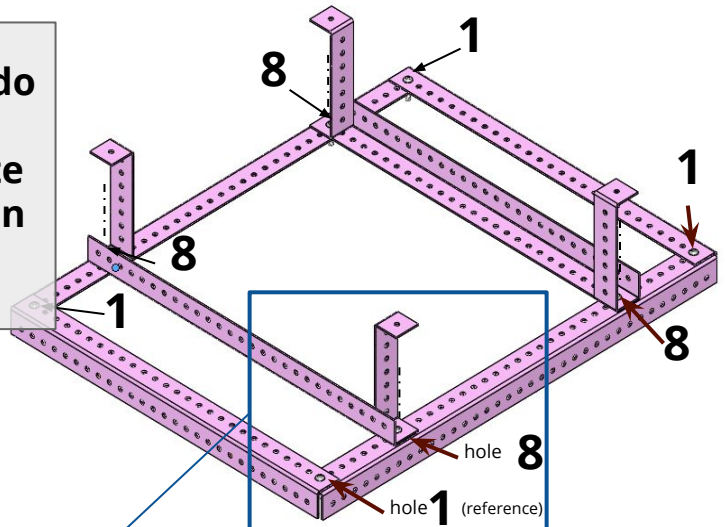
Note: The next slide will go into more detail on how to attach the standoffs.

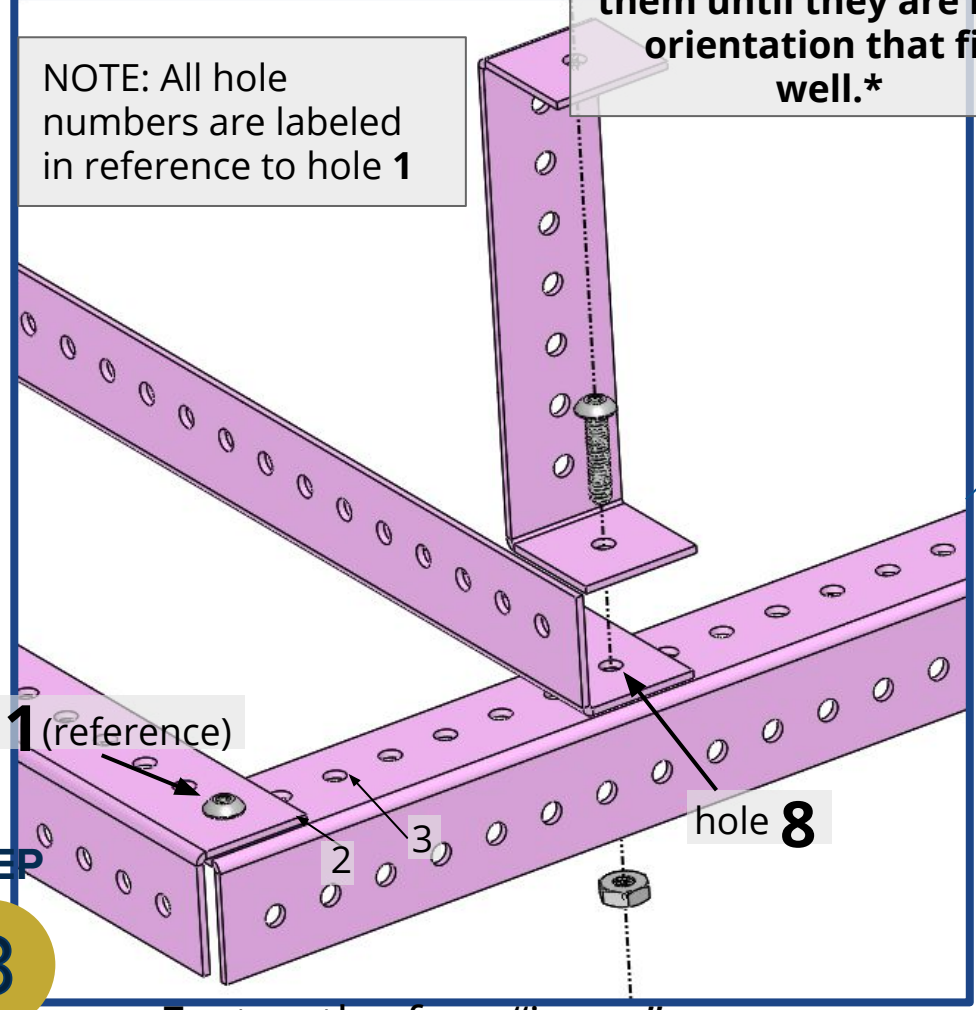


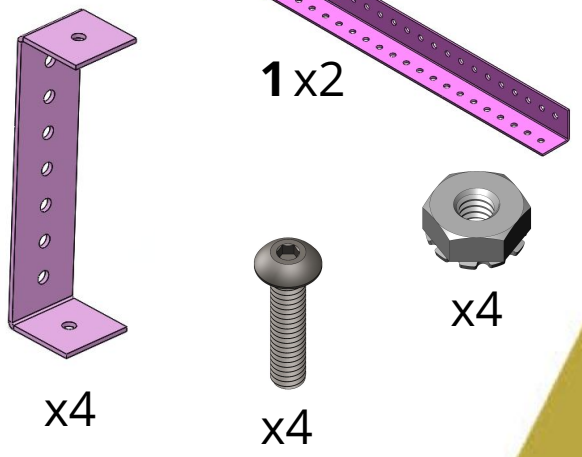
STEP 2

NOTE: If the standoffs do not fit in a certain direction, you can rotate them until they are in an orientation that fits well.

NOTE: All hole numbers are labeled in reference to hole **1**

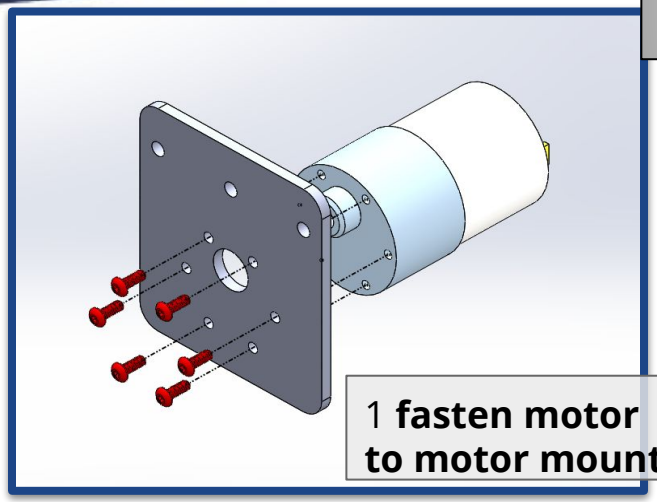






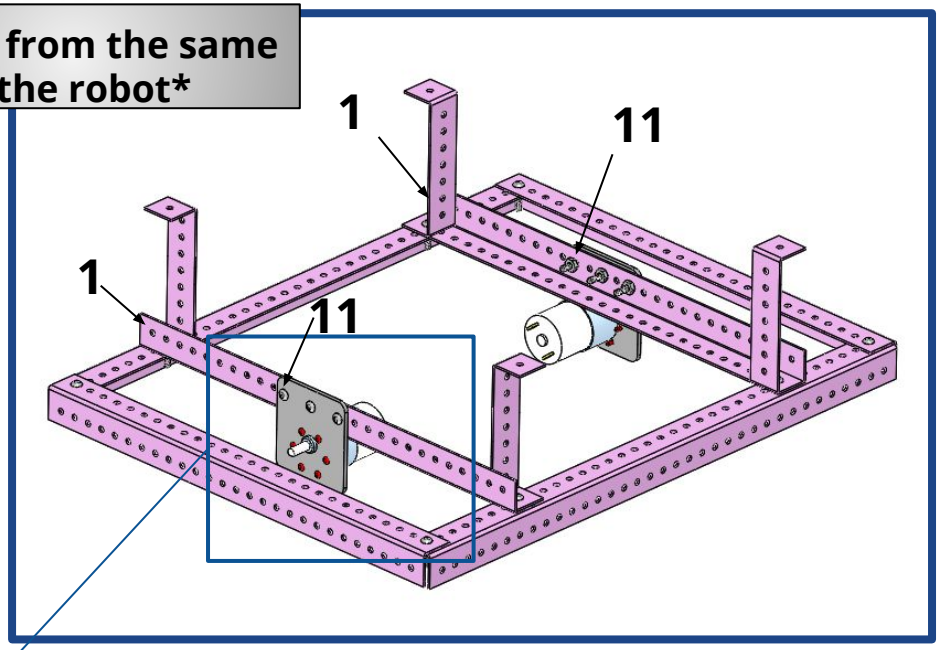
STEP 3

Fasten the four “inner” corners

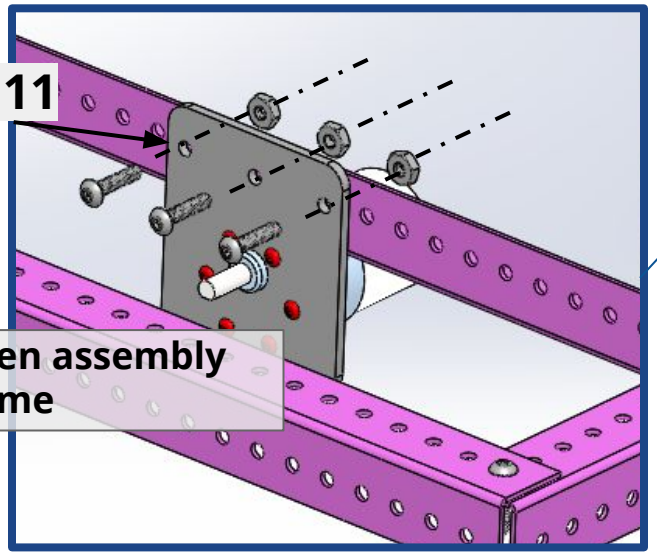


1 **fasten motor to motor mount**

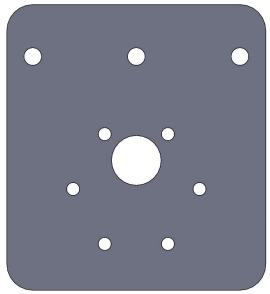
Count from the same side of the robot



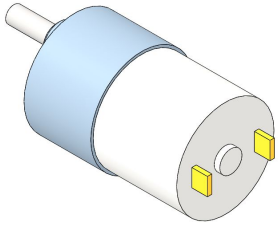
hole **11**



2 **fasten assembly to frame**

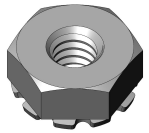


x2

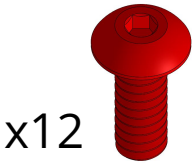


x2

x6



x6

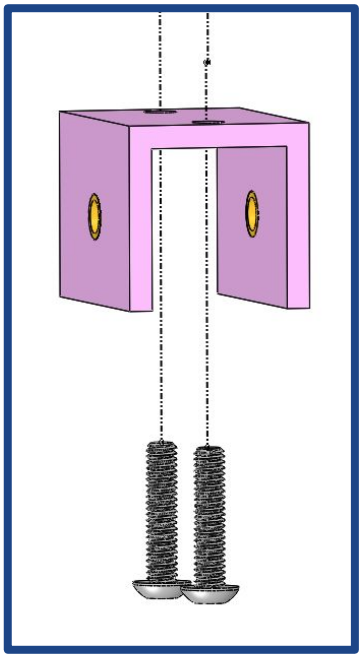


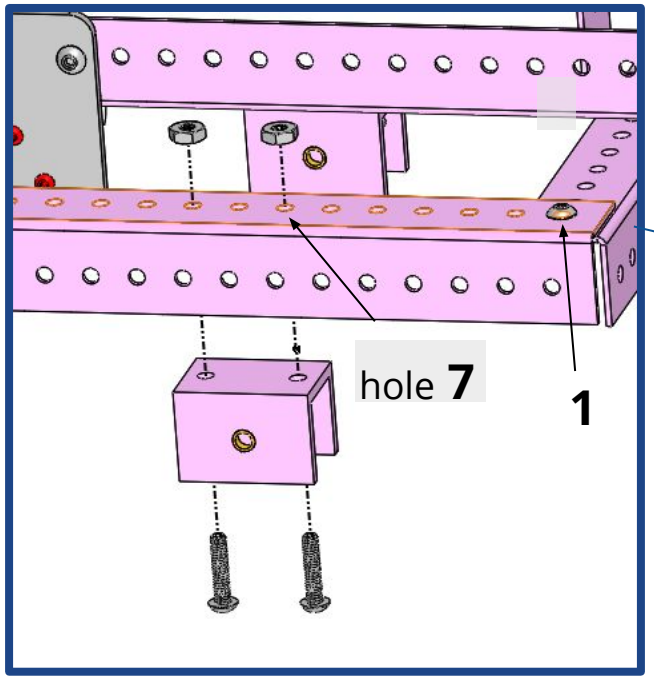
x12

STEP

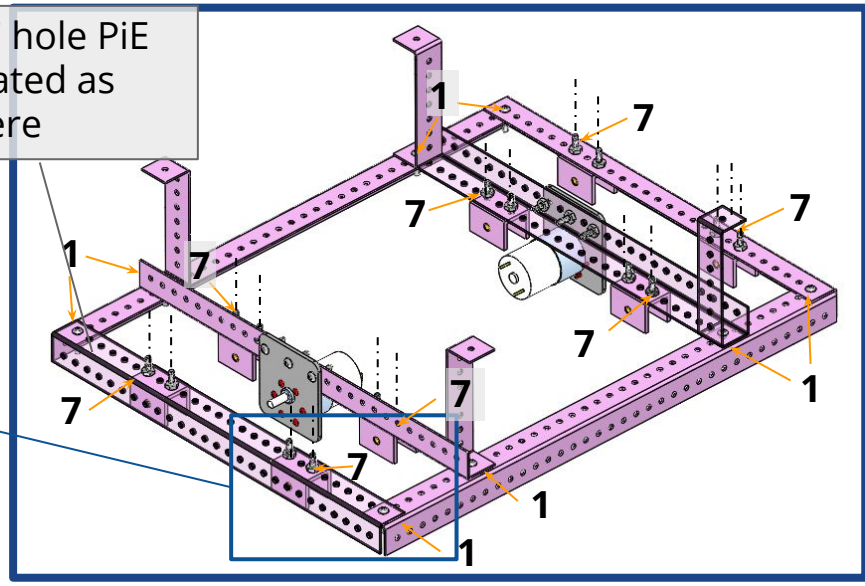
4

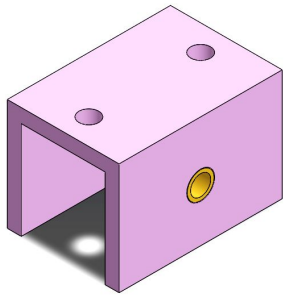
Do fastening for both motors





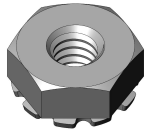
Note: Some 27 hole PiE metal is illustrated as transparent here





x8

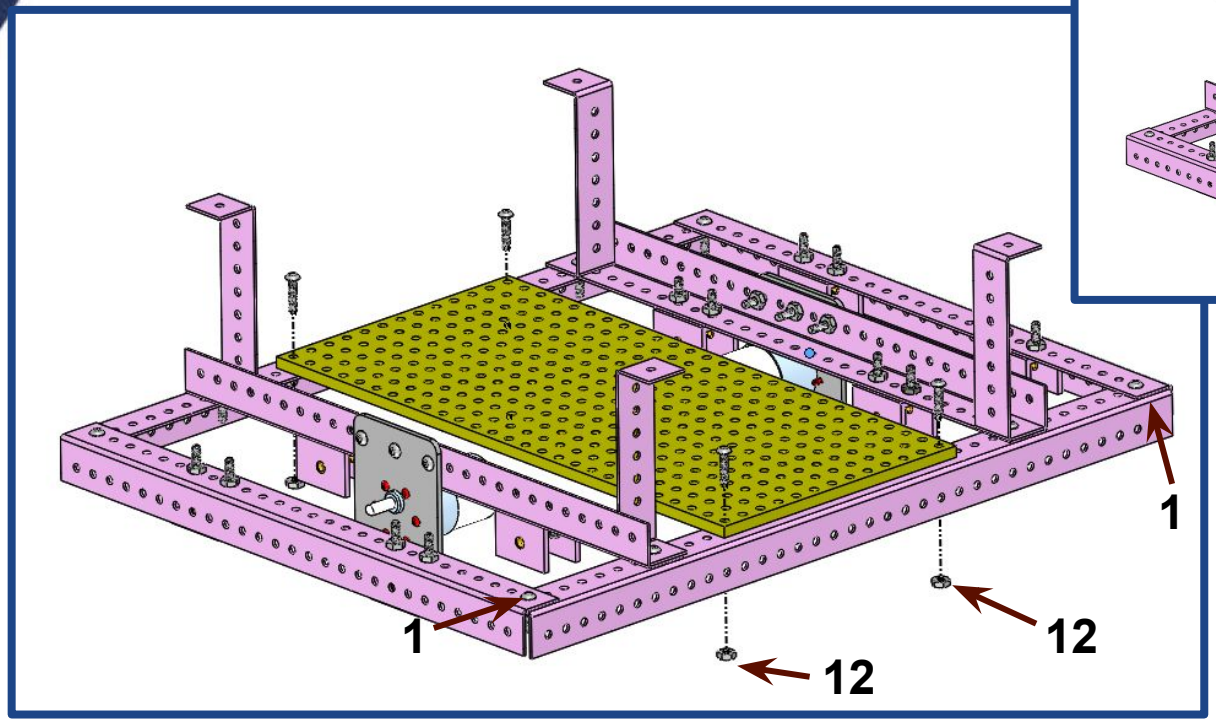
x16

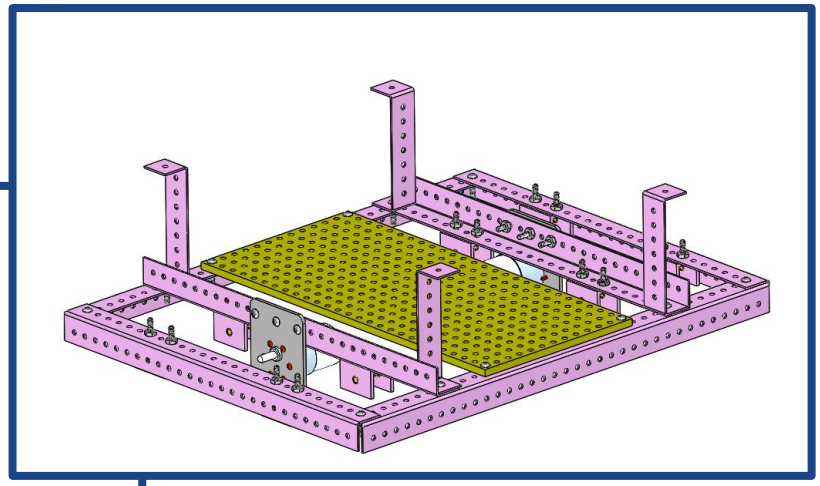


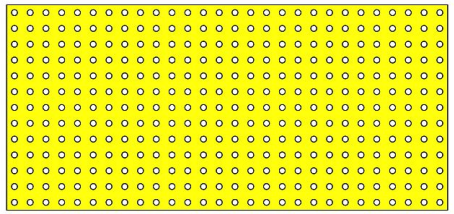
x16

STEP 5

Fasten all eight bearing blocks.
Note: You may have to fasten one screw at a time

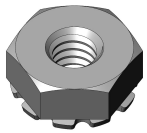






x1

x4

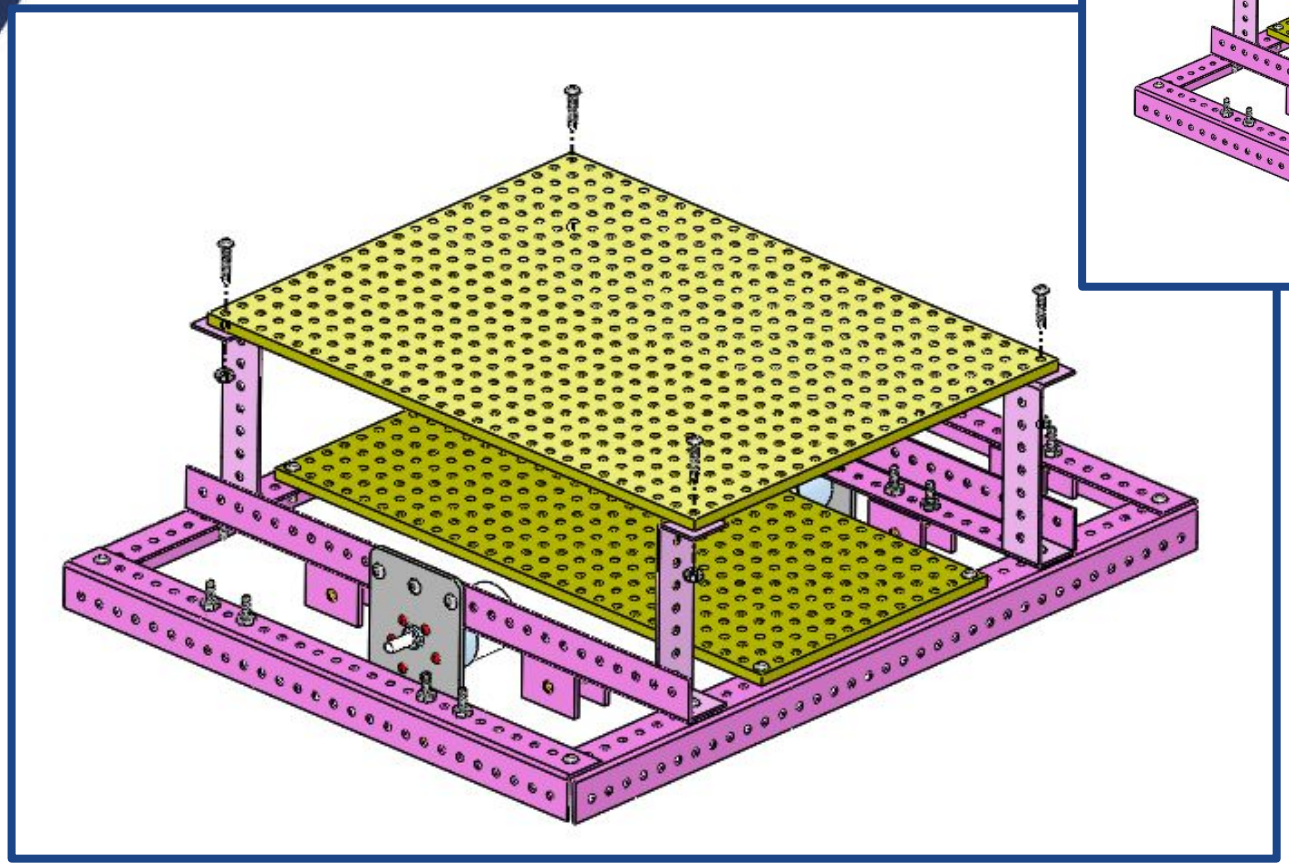


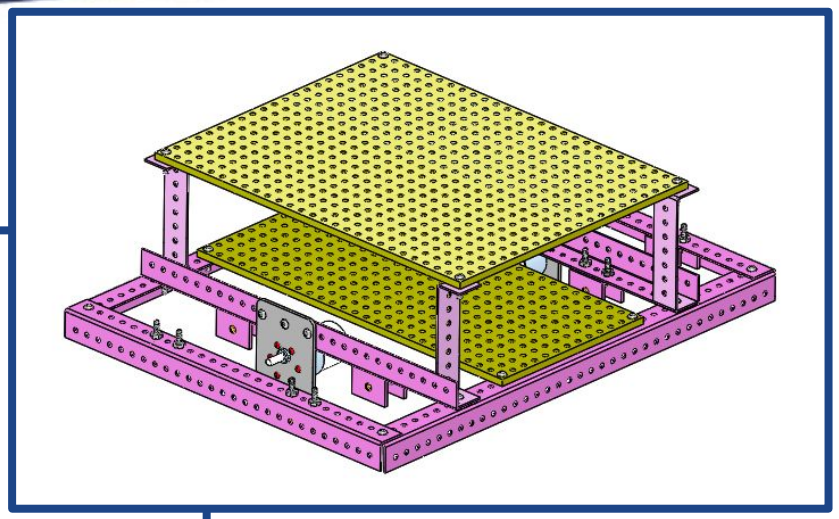
x4

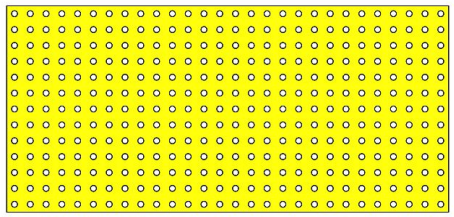
STEP

6

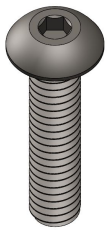
Fasten all four corners of the “bottom” plastic board



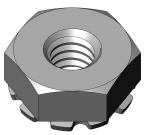




x1



x4



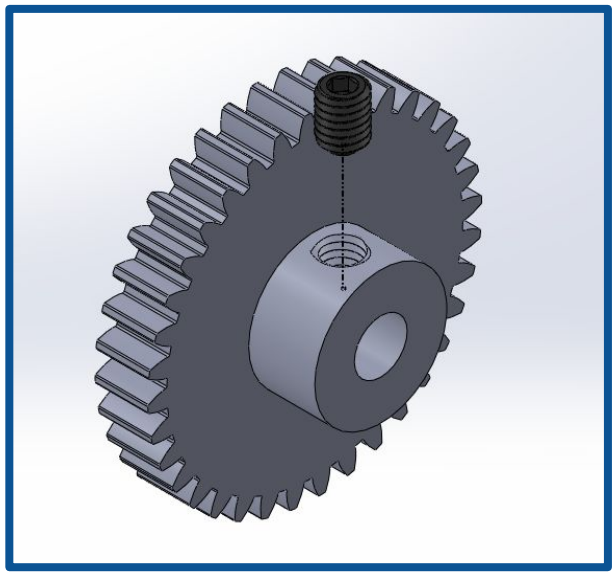
x4

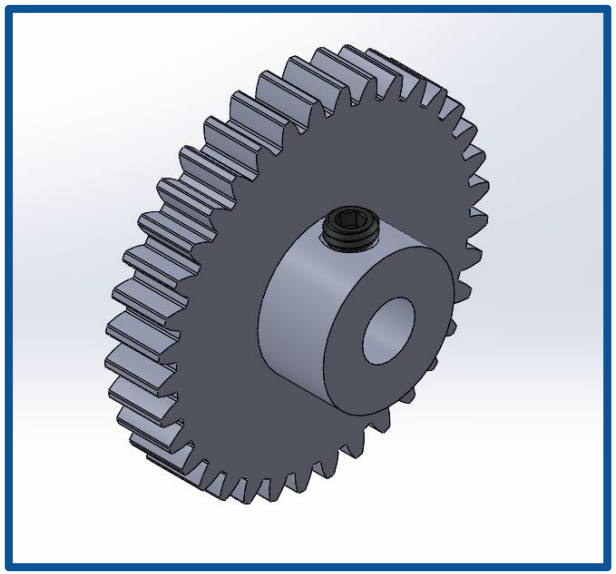
STEP

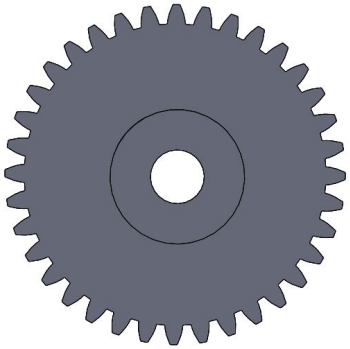
7

Fasten all four corners of the “top” board

NOTE: Your kit should come with set screws already inserted into the hub gears, although it may have to be loosened. But in the case that the set screw comes out, please follow this step.







x2

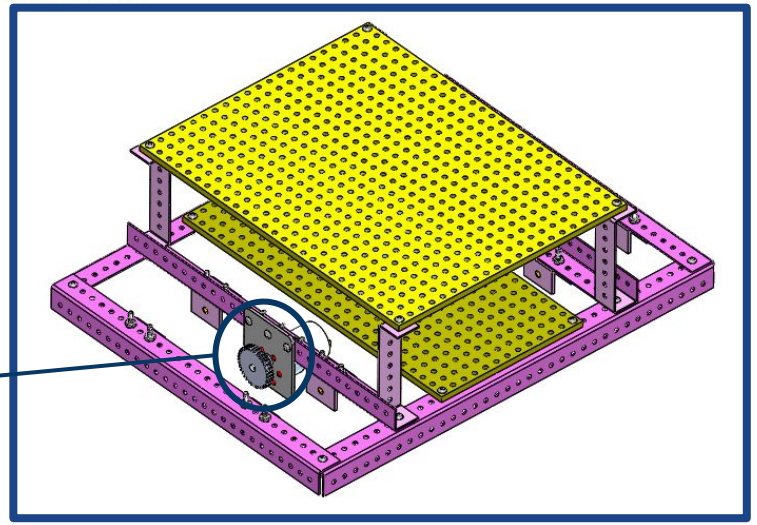
x2

TIP: Screw can be relatively loose; do about four full turns with the hex key on the top of the “set” screw to secure it in the hub gear opening.

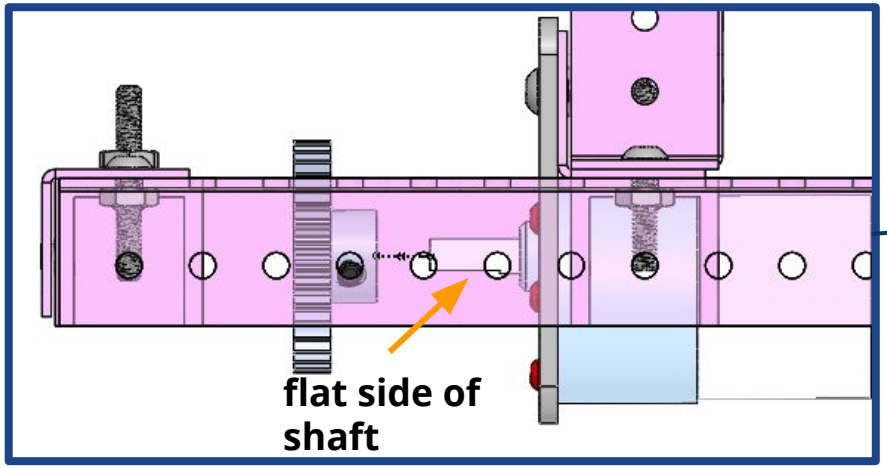
STEP

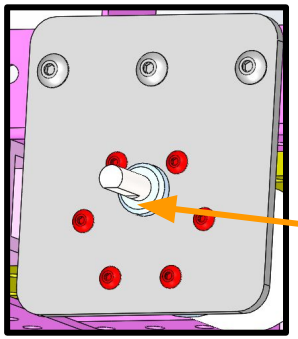
8

Insert set screw. Repeat for other hub gear.



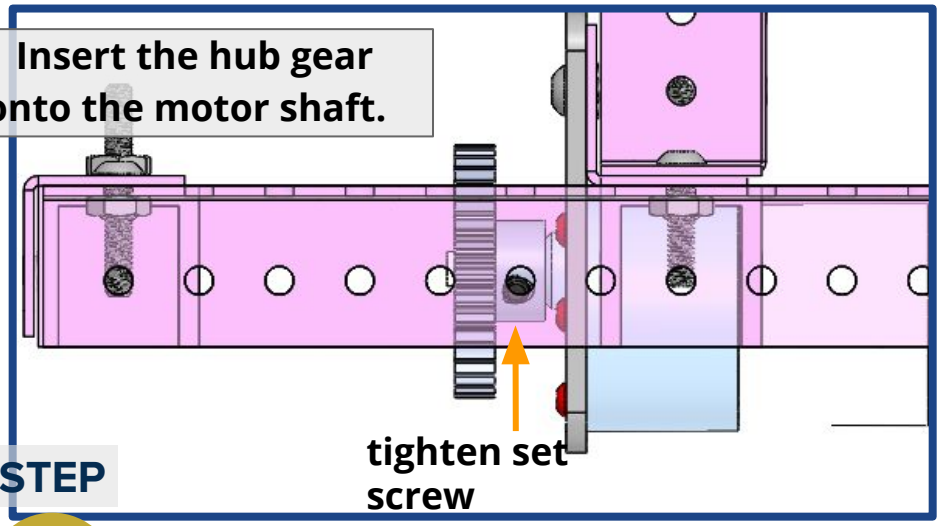
SIDE VIEW





flat side of motor shaft

1 **Insert the hub gear onto the motor shaft.**

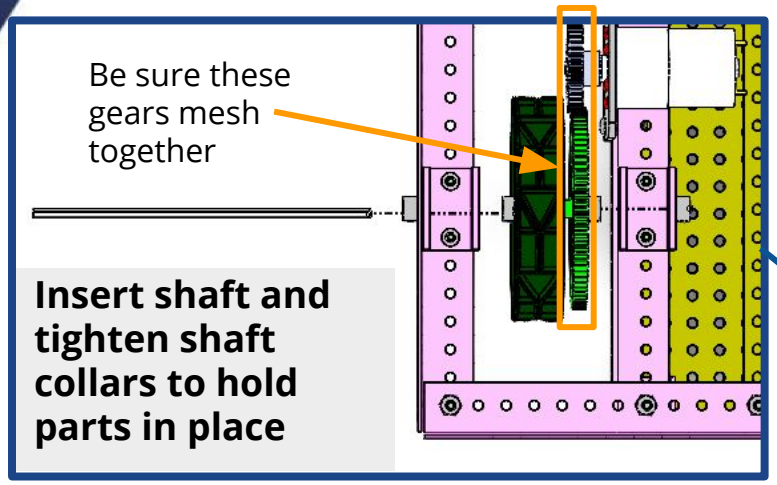


2 **Rotate the gear until the set screw faces the flat side of the motor shaft and tighten the set screw so it stays in place**

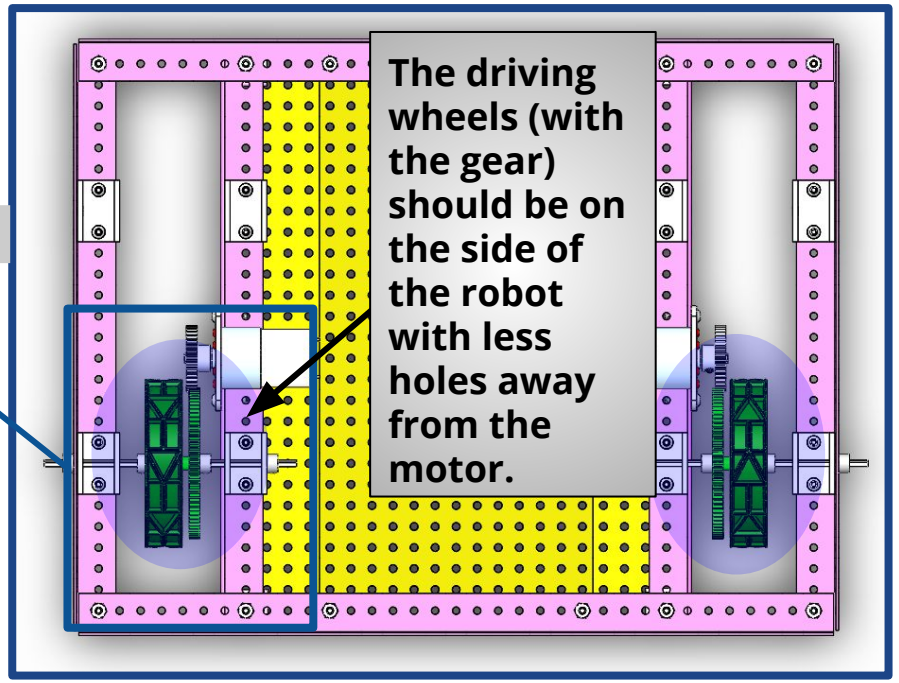
STEP 9

Attach hub gear to motor shaft. Repeat for other side.

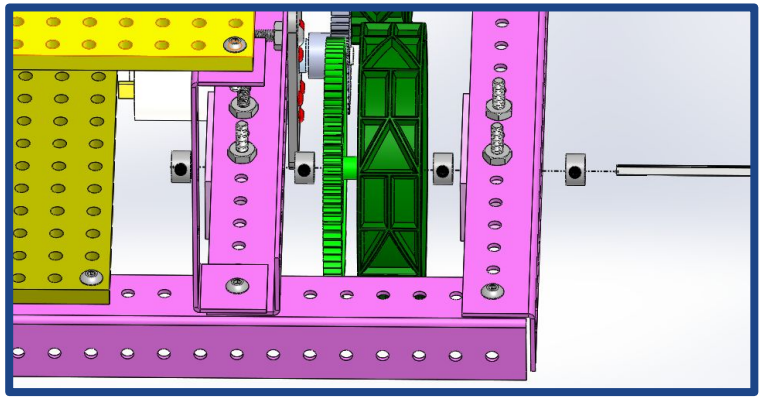
BOTTOM VIEW

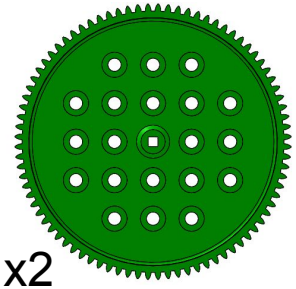


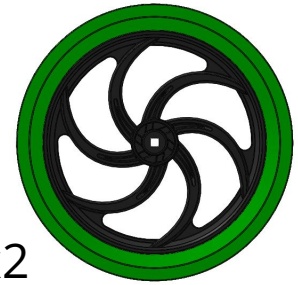
BOTTOM VIEW



FRONT VIEW







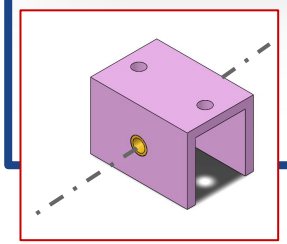
STEP

10

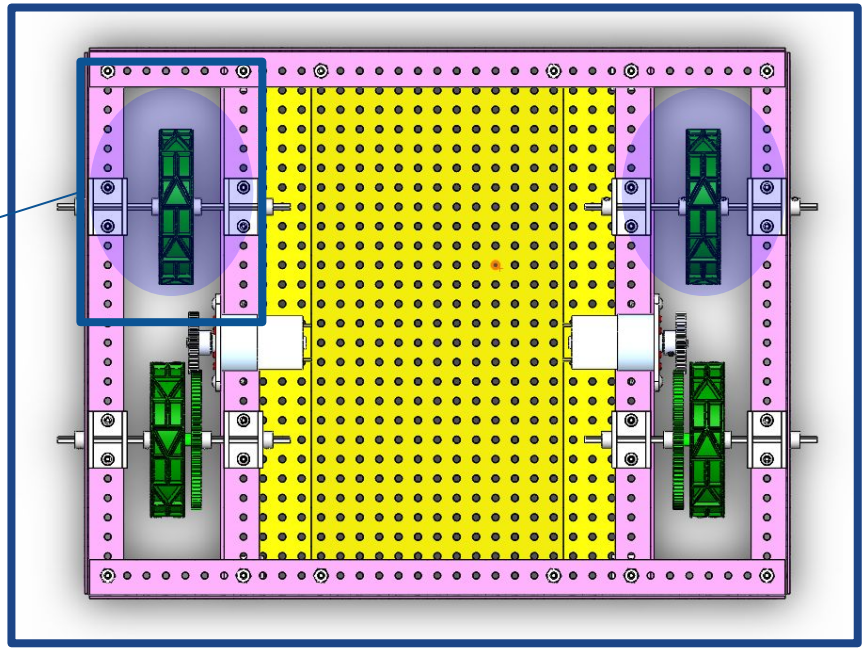
Assemble and fasten “driven” wheels

BOTTOM VIEW

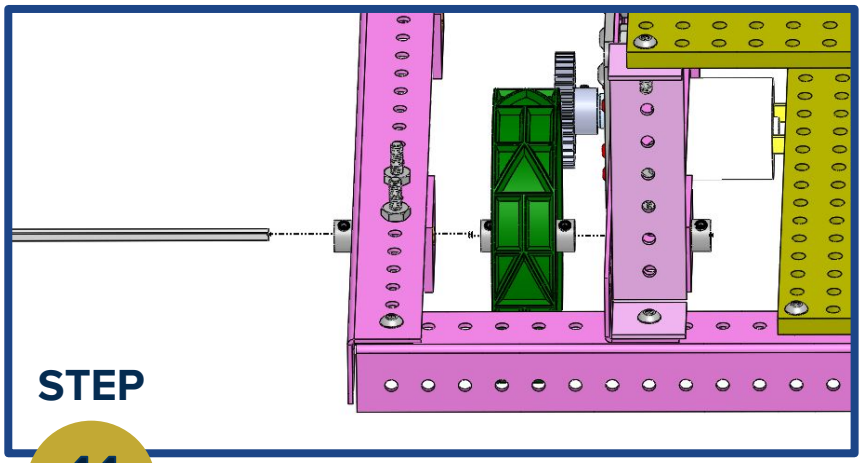
1 **insert shaft through parts and bearing blocks as shown**



BOTTOM VIEW



FRONT VIEW



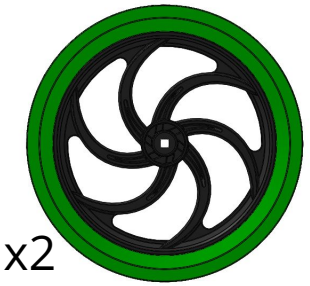
STEP

11

Assemble and fasten front wheels.

2 **tighten set screws in shaft collars to prevent parts from sliding**

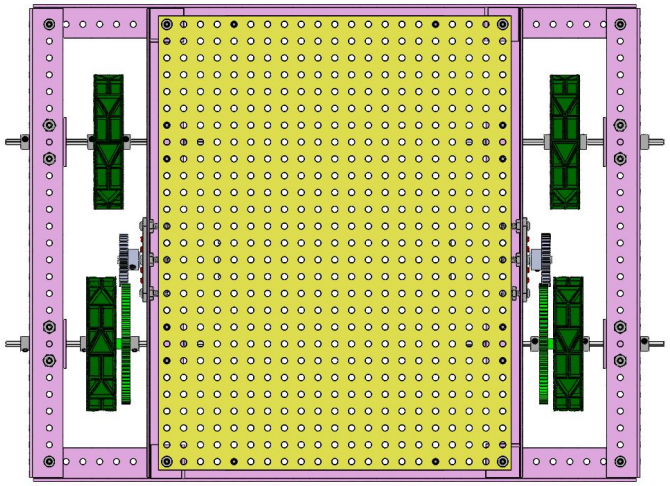
x8



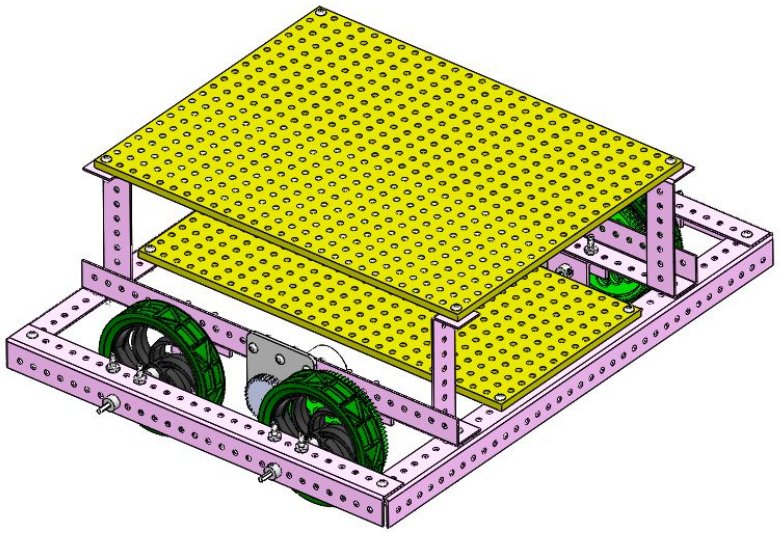
x2

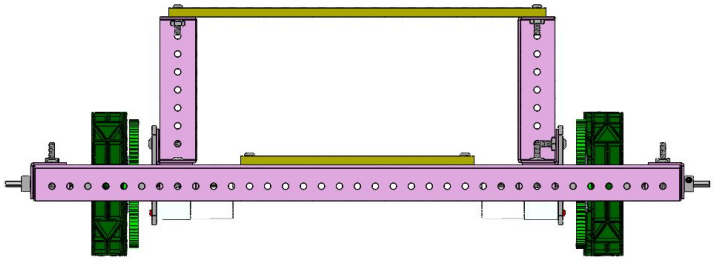
x2

MULTIVIEW

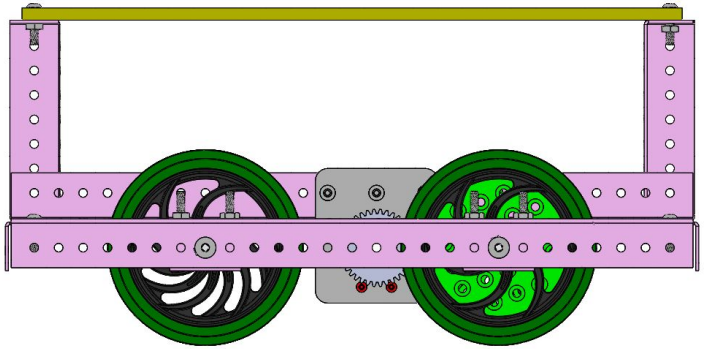


TOP





FRONT



RIGHT