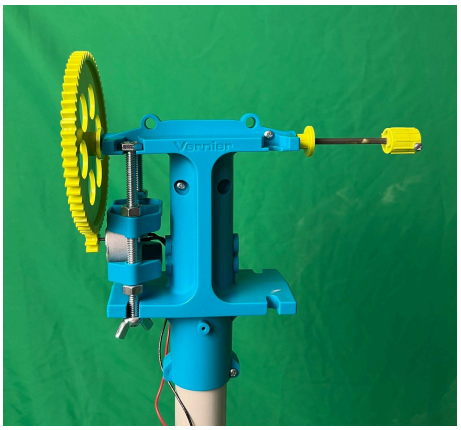
KidWind Gearbox Upgrade Kit Instructions

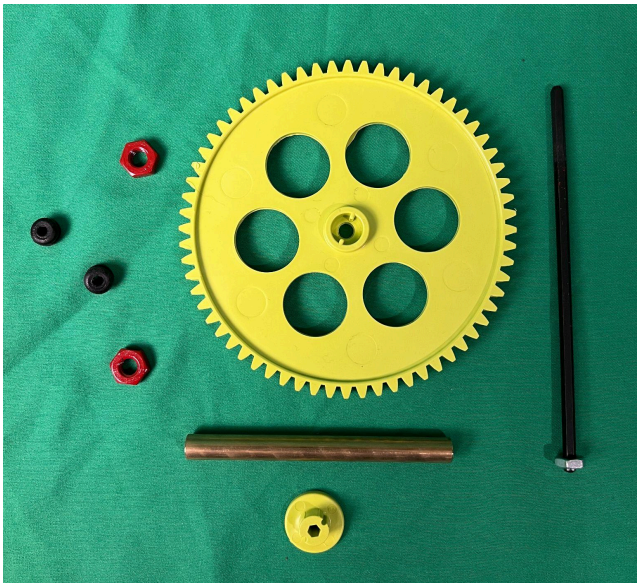
Advanced Nacelle Upgrade: Gear Ratios 1:16 & 1:32

If you have a KidWind Advanced Wind Energy Kit or Advanced Wind Experiment Nacelle, this kit will allow you to increase the gear ratios of your turbine from 8:1 to 16:1 or 32:1. This will allow for greatly increased power production, as long as your students can figure out how to design blades with the proper torque and speed to drive this more complex gearbox.

With your current KidWind Advanced Wind Energy Kit or Advanced Wind Experiment Nacelle, the max gear ratio of this kit is 8:1



The KidWind Gearbox Upgrade Kit will expand your gear ratio to 16:1 and 32:1.



What is in the kit?

- Hex Shaft (1)
- 64 Tooth Gear & Gear Key (1)
- Brass Tube (1)
- Red Colored ½ Nuts (2)
- Black Grommets (2)

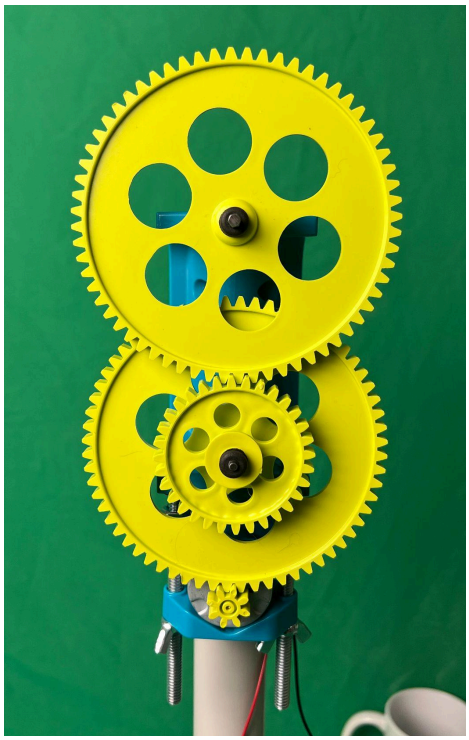
To construct the 16:1 and 32:1 gear boxes you will need all the gears and parts from your Advanced Wind Energy Kit/Advanced Wind Experiment Nacelle and the KidWind Gearbox Upgrade Kit.

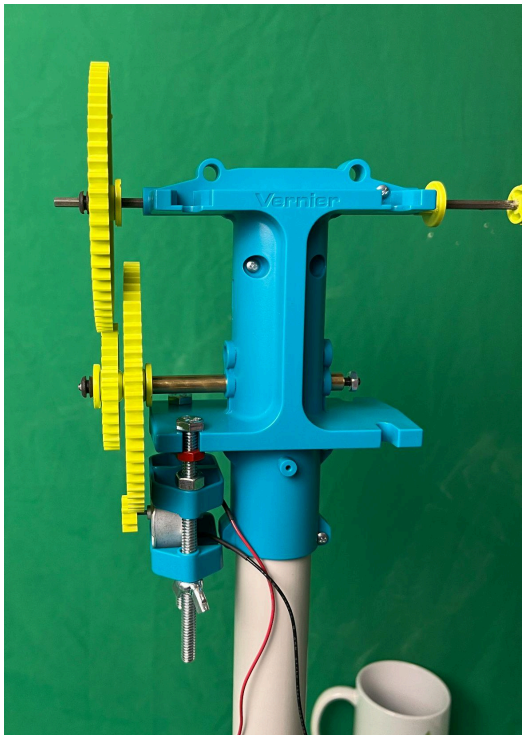
2093 Sargent Ave. Saint Paul, MN
55105 | 651.917.0079 | info@kidwind.org | KidWind.org

Things to keep in mind while working:

- Only (1) brass tube is included; you can move it between holes to get things arranged properly.
- The hex shaft may need sanding to make it fit onto gear key properly - otherwise it can be very tight
- The grommets should be used at the end of the driveshafts to hold things in place.
- It will take some adjusting to get all the parts tight and meshing properly.
- You will notice that you will need to design blades that generate *lots* of torque to move this gearbox.

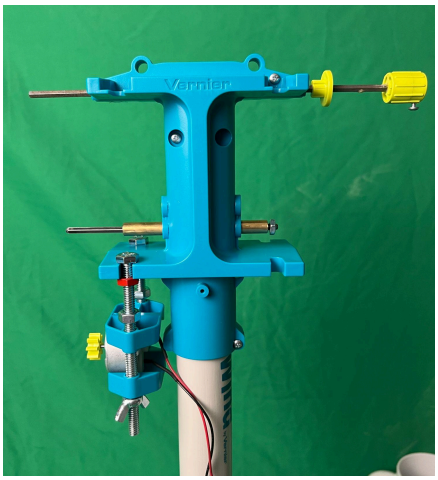
Constructing the 16:1 Gear Ratio

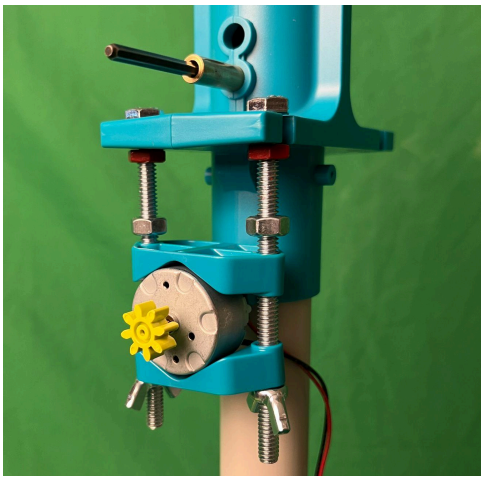




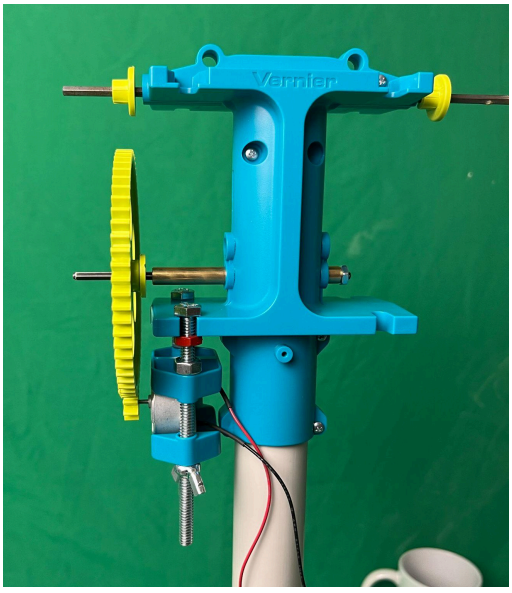
16:1 Gearbox

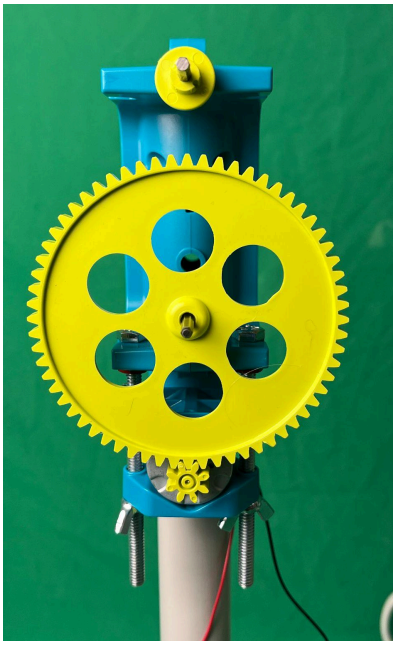
64T gear drives 32T (2 : 1) drives 64T gear drives 8T pinion (8:1) 2 x 8 = 16:1 overall gear ratio



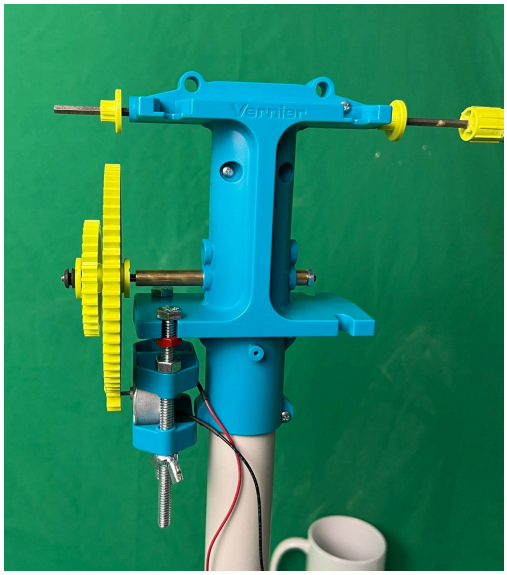


1. The brass tubing needs to be in the bottom holes in the nacelle.
2. You will need to drop the generator lower. To do this you will need to add some additional nuts.
3. It is easiest to build the gearbox from the generator upwards.

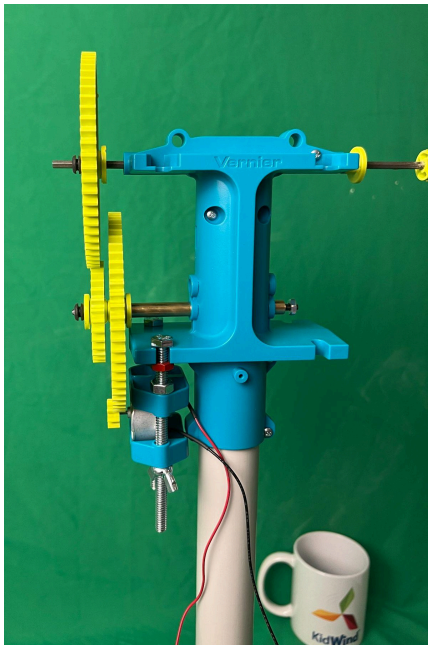


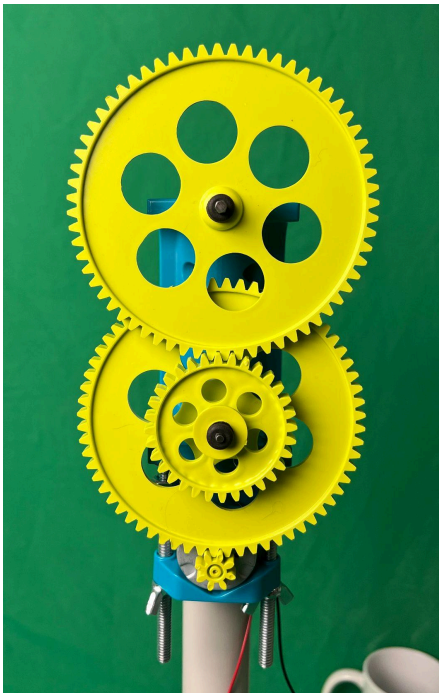


4. Install the 64 tooth gear on the hex shaft in the brass tubing. Make sure this gear meshes well with the pinion gear on the generator. You can adjust the generator height to reduce friction.



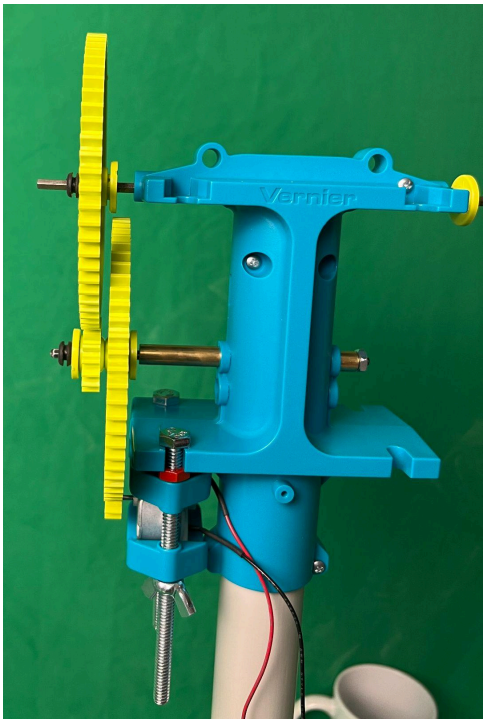
5. Add the 32 tooth gear to this main shaft. Gear key on the outside.
6. Lastly, add the grommet to keep all the parts in place.





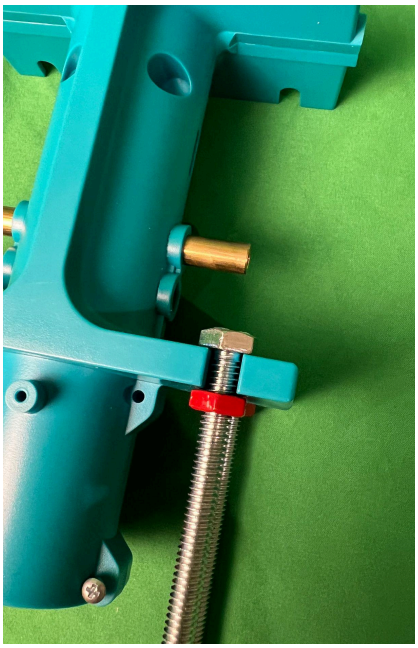
7. Then add the 64 tooth gear to the main drive shaft and mesh with the 32 tooth gear. Use grommet to stabilize.

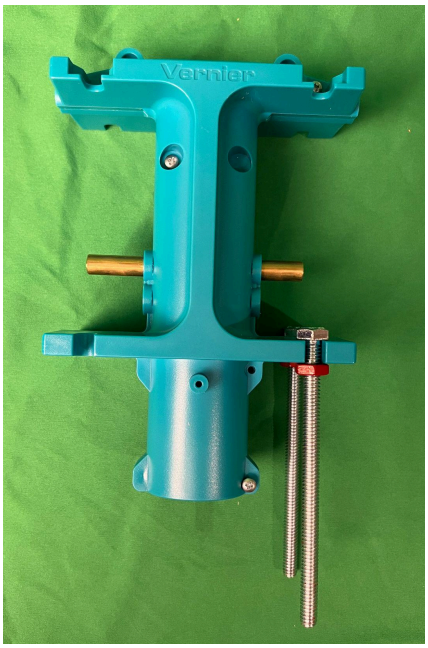
Constructing the 32:1 Gear Ratio

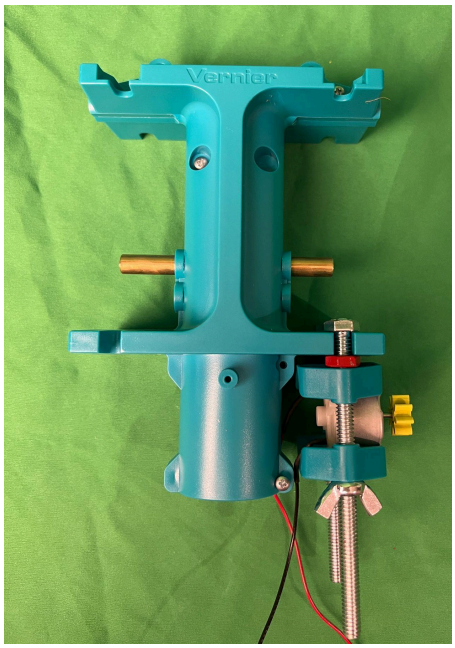


32:1 Gearbox

64T gear drives 16T (4:1) drives 64T gear drives 8T pinion (8:1) 4 x 8 = 32:1 overall gear ratio

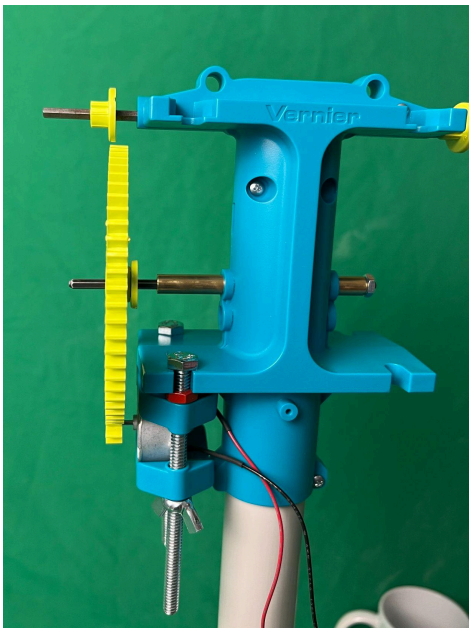


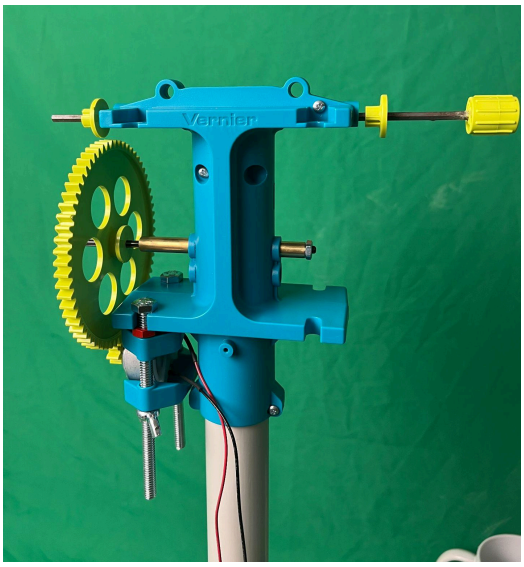




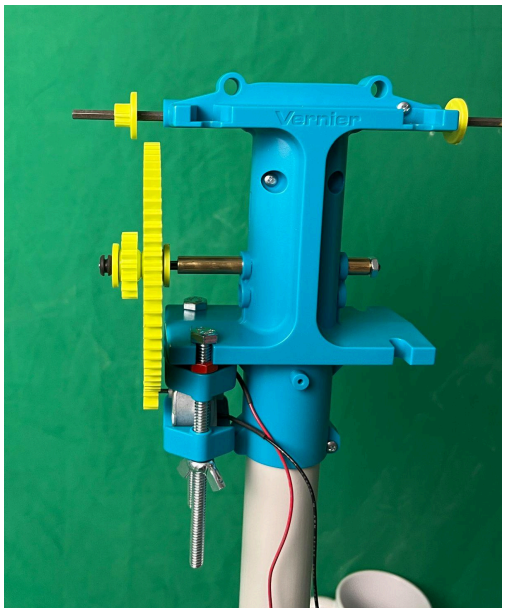
1. Install the motor mounts below the nacelle as pictured above.
2. Install the brass tube in the upper hole on the nacelle.

3. Insert the hex shaft into the brass tube.

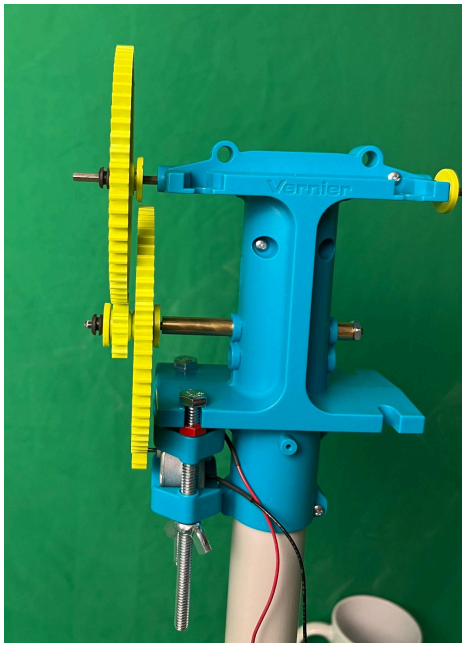




4. Attached the gear key and then the 64 tooth gear. Make sure to mesh the 64 tooth gear and pinon gear well.



5. Install the 16 tooth gear on the same shaft as the 64 tooth gear. Put the gear key on the outside and the grommet at the end.



6. Install the additional 64 tooth gear on the main driveshaft. Secure location with the grommet on the outside.