

Reading 5.1: The Gears

Gears are like wheels with teeth on them. They transfer the energy in the motor to the wheels. There are two different types of gears. The pinion gear and the drive gear. The pinion gear attaches to the motor and is smaller with fewer teeth. The drive gear is attached to the axle and is larger with more teeth.

You have to choose what gears you want to use. The gear ratio makes a big difference in your car's performance. You calculate the gear ratio by dividing the drive gear teeth by the pinion gear teeth.

Most speed cars will use the medium size gear or the gear that is built into the black wheel. You will need to decide which is better. The smaller your gear ratio, the higher your top speed. The downside is that you lose torque.

The gear needs to be tight on the axle! If it is easy to get the gear on, it will likely spin on the axle and you will lose power.

Positioning of the motor is very important. If the gears are too close there will be a lot of extra friction. If they are too far apart they will make a very loud noise and your car will go nowhere.

Never get glue, paint or anything else on the gear teeth. This adds more friction.

You can change the tension between the gears by moving the motor slightly. Start with less glue on the motor and a weak battery.

To calculate the gear ratio, you divide the number of teeth on the drive gear by the number of teeth on the pinion gear.

Friction Alert!

There is always a balance to be had with friction and the gears. If the gears are too close, there is too much friction. Too far apart and there is not enough to make the wheels move. Also, be careful that wires are not rubbing against any wheels or gears!

Torque vs. Top Speed:

Torque is a measurement of **FORCE**. You have a set amount of force from your motor. If you concentrate that force over a short distance, you have more torque. More torque means a faster start off the line, but you will have a lower top speed.

