

Pinewood Derby 03

Construction Steps:

- \$ If you would like a deeper pilot hole in the wood axle use a 3/32 drill bit
- \$ Prepare wheels and axles
- \$ Draw profile of car on side of block
- \$ Cut car's profile
- \$ Draw top view
- \$ Cut top view (scroll saw is good for this)
- \$ Shape and Sand
- \$ Weigh body, axles, wheels...add lead to total 6 ounces
- \$ Glue lead pieces to car body-(5 minute epoxy works well)
- \$ Trim to weight limit; final sanding
- \$ Paint/Decorate (keep body clean where hubs will touch)
- \$ Install & align wheels
- \$ Add graphite and work into wheels

Design Tips:

- \$ Keep the car the full length if possible. It has to do with the physics of velocity and length of travel of the weights.
- \$ Use the full 3/4 inches (outside wheel to outside wheel) that the rules give you. This will allow the wheels to travel farther before hitting the center strip.
- \$ Leave a lot of wood in the back to put in the weights.
- \$ Do not make the front of the car pointed. It is hard to set up against the starting dowels.
- \$ Be aware of how sensitive your electronic timers are. You want the car to set them off at the end of the race and not before.
- \$ Use your imagination. Be creative. Shape has the least to do with winning. The aerodynamics of a small block of wood doesn't mean much in thirty feet.

The Finish:

- \$ Buy a gloss finish for the car. Its worth it. After all that work, this is the final touch. The more coats that you put on...the shinier your car will be. Be sure the paint is dry before putting on the gloss coat.
- \$ Sand in the direction of the grain when smoothing and against the grain when shaping.
- \$ Use a sandable primer or wood sealer. White is for light colors and grey for dark colors.
- \$ Water based paints dry quicker (1 hour) than oil based paints(24 hours)

Friction Is Your Enemy:

- \$ Debur the wheels. Take off the flashing and seam that was produced when the wheel was molded with a 600 grit or better sandpaper. Inside as well as out. Sand any bumps off the wheel with the sandpaper. Metal polish will restore the gloss. Be careful not to break any rules your race has regarding wheel modification. Don't sand too much or you'll create a flat spot.
- \$ Polish the axles. First with a 400 grit if you have a really bad spot. Then a 600 grit.
- \$ Have only three wheels touching the track. Raise a front one slightly. There is less friction with 3 wheels rolling than 4.
- \$ The head of the axle should be tapered about 15 degrees so it rubs against the wheel less.
- \$ Wax the wheels with furniture polish. Make sure the polish does not contain a solvent of any sort.
- \$ Use graphite . Oil damages the paint and collects dust.
- \$ Break in the wheels by spinning them with lots of graphite.

Weigh In:

- \$ Get the weight as close to the 6 ounce limit as possible. Remember, the official scale may not weigh the same as yours.
- \$ Everyone has an opinion on where to put the weight. One suggestion is that the weight needs to be predominantly in the rear so that gravity can act upon the weight further up the incline and for a longer period of time. A car with more weight to the rear generally grabs more speed down the slope. Many suggest having the center of gravity at 1 to 1 ½ inches in front of the rear wheels. But be careful not to put too much in the rear or you'll pop a wheelie.
- \$ What kind of weight? Melted lead is dangerous and unnecessary., Incremental weights(with pre-marked grooves) are easier to snap off into the size you need. Some folks just use BB's , nuts & bolts, sinkers, etc., but these must be glued so that they can not move. No movable weights or mercury are allowed.
- \$ Keep the weight low on the car and in the center(Left/Right of the car). Put the weight just in front or behind the rear wheels for less wheel chatter.

It's Time To Go Straight!:

- \$ Axles must be in straight front to back. That is square to the body
- \$ After pressing in the axles, test the car for crooked wheels...roll it on the floor. If the wheels are on straight, the car should roll 8-10 feet in a fairly straight line. Should the car turn left or right, you need to tinker with the axle placement without removing them from the car body, until it rolls straight.
- \$ Once you match a wheel and axle together with graphite, keep them together. They wear into each other as a matched set.

Race Day-Be Prepared:

- \$ Transport your car in a shoe box. Dropped cars are unfortunately a too common experience.
- \$ Add LOTS of graphite right before check in
- \$ Running the car along the floor prior to the race will cause it to lose!

Pinewood Derby Websites (design tips):

<http://www.rangerdj.com/pinederby.html>

<http://www.macscouter.com/CubScouts/Pinewood/index.html>