

## Simple instructions for the building of a Pinewood Derby Racer

The following instructions are designed to help the scout and his parent to build a competitive (note: I did not say “winning”) Pinewood Derby Racer. To make claims that that a car built following any set of instructions is going to be a winner would be foolish. Winning a Pinewood Derby is as much luck as it is skill. These instructions will, if followed, provide the scout with a car that he can be proud of, and one that stands a chance on Derby day. I have compiled these from my experience of building 9 competitive cars both as a scout and as a Dad. The best I have done is a first place car in the siblings class (non-scout) and the worst I have done is a car that went 2 races, 2 losses, and park it for the day. My son and I learned a valuable lesson about form over function on that day. A pretty paint job is no substitution for the basics! If some of these steps are greater than you or your scout’s abilities, ask one of the other parents in your Den for help. One of them would be happy to help get you over that hurdle. Important: Read the instructions that come in the kit. They will provide you with the dimensions that your car must meet in order to compete.

Let’s get started!

1. The first thing you should do is true the axle slots that are pre-carved into your block. What this means is to make sure that the slots are parallel to one another. It doesn’t matter what shape your car takes after this, as long as you perform this step first. I have seen some slots that are perfect, and I have seen some that are not even close. Without parallel slots, your car will not roll straight, no matter what you do. If it doesn’t roll straight, you stand almost no chance of doing well at the Derby. Truing your slots is best performed on a drill press using a drill the same size as your axle. Run the drill down through the slot, being careful not to alter the position of the factory slots.
2. Draw the desired shape of the car onto the block of wood with a pencil. Everyone wants their car to look like a Dodge Viper, but the simpler the better. Remember my statement about form over function.
3. Cut and sand the body. Try to keep the surface where the wheels meet the body as flat as possible. This prevents the wheels from moving around unnecessarily. A good sanding job hides a multitude of cutting errors. Take your time and do a good job. The appearance of the car has as much to do with the sanding as it does with the shape or the painting. Use multiple grades of coarseness. Start with a 100 grit and work your way up to a 400 grit.
4. Put your wheels and axles into a sandwich baggie. The baggie will simulate the weight of the paint you will apply to your car. Yes, paint has weight. Unless you put on the paint with a mop, the baggie should be heavy enough to give you an accurate weight measurement.
5. Weigh the sanded body and the baggie full of parts. The self-service lobbies of the bigger post offices have a pretty accurate scale. Make sure you bring your weights with you.

6. Add weight to the scale until your scale reads just below 5 ounces. Per Pinewood Derby rules you cannot exceed 5 ounces. The trick is to get your car as close to 5 without going over. Keep it a little below. I have seen some real nightmares on Derby day as beautiful cars have been cut and drilled to eliminate weight, much to the horror of the scouts.
7. Cut a slot in the bottom of your car to accept the weight. Since there is a minimum height requirement for the car, (the specific dimensions for the car are listed on the sheet that came in your kit), it is important to not have the weights hang below that spec. Yes it is true that there have been cars that have won it all by screwing the weight to the top of the car, but I have seen more win that have it located low and towards the back. Besides, who wants to build a cool car, only to slap a weight bar on the top of it? Kind of takes the creativity out of the whole project. Fill the slot with modeling filler that is made for wood, or you may have to add a very small amount of weight to make up for the wood that you removed. After filling, make sure you sand it smooth. All weights must be permanently affixed to the car. No moving or sliding weights are allowed.
8. Put your axles into a drill press. (A standard electric drill and a vice will work). With the drill running, use a small file to remove the flashing from the axle near the head. Be careful only to remove the flashing! Polish the file marks on the axle with varying polishing compounds.
9. If you want, you can get a wheel mandrel at the hobby store and turn the irregularities off of the wheels. I haven't seen a lot of evidence either way as to whether or not this is necessary. Visually inspect the wheels. If you see left over molding material, gently remove it.
10. Put axle graphite in the inside of the wheels and on the axles. Spin them quite a few times to work in the graphite. Once you have an axle and wheel pairing established, it is best to leave them together. Set them aside in a clean area. Note: Oils and other lubricants can damage the plastic wheels. It is best to avoid these substances.
11. Take your sanded body, and spray it with primer. Simple, light gray, auto primer works great. The primer acts as a sealer on the wood and provides for a smooth uniform surface to paint. You also have a chance to sand any area that doesn't look right.
12. After the primer has dried, use an ultra fine sandpaper (400 to 1000 grit) to make sure the primer is as smooth as you can get it.
13. Before painting, use a tack cloth to remove all of the sanding dust from your car. All of your work and effort will be for naught if this step is skipped. Any dust left on the body will stand straight up on the car once you paint it, giving you a rough and uneven surface.
14. Spray paint the car in as dust free an environment as you can. Paint the car with several light coats versus one heavy coat to avoid runs and sags.

15. Weigh your car again, this time without the baggie (be sure to include the wheels and axles on the scale). At this point you're shooting for 4.8 to 4.9 ounces. If you are over, hopefully it is not by much. You can make adjustments to the weight, and repaint. Better to do it now than on race day. If you are too far under, you can add a small amount of weight.
16. Insert the axles into the wheel slots. If you have run the proper size drill through the factory slots (see step one) you should be able to finger push the axles into the body. If you have to use a hammer, do so lightly. If you push the axle in too far, it becomes a challenge to pull it out without damaging the wheel. Insert it far enough to eliminate excessive wheel wobble, but not so tight as to have constant contact between the wheel and body.
17. Make sure the car rolls straight. A smooth kitchen table works the best for this. A gentle push is all it takes to determine if it is going straight or not. Do not let it hit the floor at this point!
18. Once the car rolls the way you want it to, (if you followed step one, it should roll straight!), put a drop of glue on the axles to ensure that the axles stay in place. Keep the glue away from the wheel!!! It should only be placed on the axle. Allow to dry completely.
19. At this point you have now worked your way through the building of a Pinewood Derby racer. Both you and your scout should be proud of your accomplishments and the skills that you have learned.

Remember: The Pinewood Derby is not about winning the race. It is about the building process. So few children today have an opportunity to be exposed to working with their hands and to build something from scratch. Even if you are not a woodworker, have fun with the project! Don't let on to your scout that you would rather be doing anything but this, as it takes away from a valuable learning experience for the scout. Who knows, you might uncover a skill that you didn't know you had. Or better yet, you may introduce your son to a lifelong hobby!

Too often I have seen scouts become distraught when their car does not perform well. My dad used to tell me that winning was a bonus. The real reason we were there was to have fun racing a car that we built and that we were proud of. I have passed this along to my sons. So far they have listened. Let's hope they continue to listen and then pass along this tradition to their sons.