

How to Design and Build Your Pinewood Derby Car

Pinewood Derby for Beginners

Building a Pinewood Derby car can be quite simple, taking a few hours, or it can be quite involved taking over a 100 hours. If this is your first time building a car, I suggest starting out with a simple design requiring only a few cuts of the block. Below are a few tips that will help you build your car. Use this as a starting point. If you want help, for a few dollars, there are several very good products that will guide you step by step through the process.

Before building your car, please follow the rules and safety guidelines.

Here are a few simple safety guidelines:

- Wear protective goggles, gloves and a dust mask to protect your eyes, hands and lungs.
- One self-help video recommends melting lead to add for weight. Don't melt lead. It is not only a very dangerous operation, it is toxic.
- Children should not use power tools without adult supervision.

Design your Pinewood Derby Car

First step is to have fun thinking up a car design. Don't limit your imagination, but keep in mind that the more complicated the design, the harder it will be cut the pine block and shape the car.

If you are short on time, consider a very simple design that requires only one or two cuts. For example, the wedge shaped design only requires you to cut the block on a diagonal. Hold the block so you are looking at it from the side, then draw a line with a ruler from the bottom left to the top right. Voila, one cut. The half with the axle slots is the part you are going to use, while the other half can be used for firewood. You are basically going to cut the block in half starting from the top edge to the bottom edge.

From here you can easily see how your car design can be as simple or complex as you want.

Cut your Pine Car Block

There are several ways to cut the block of wood. I recommend securing the block of wood in a vise or bench. This is not only safer, but it will be faster and easier for the saw to go through the wood. For a single, basic cut, any handsaw will do. For more intricate cuts, use a coping saw which can be used to turn corners for detailed cuts. If you have a band saw, you probably aren't reading this. But if you know someone with a band saw, they can cut the block out for you in a jiffy.

Shaping your Pine Car Block

Now that the easy part is done, its time to shape and sand your car to create that "Detroit showroom" look! Your car will look more like a real car if you sand off all the rough

edges, round off the edges of the block, etc. After all, how many cars have you seen where the body comes the sharp points. Sanding and rounding off edges will also give the car a more aerodynamic look. A rasp is a great tool for shaping your car. Once again, be sure to wear protective gloves and a face mask so you aren't breathing in saw dust.

To shape your car, you can use a wood file and different grades of sandpaper. Start with a course grade of sandpaper and finish up with a fine grade. You can also use a sanding block to save your hands.

Adding weights to your Car

Why add weight? Well, since you cut all that wood away, the block is now very light. Your car accelerates down the track by the pull of gravity. More weight, faster it goes. The rules say that your car can weigh no more than 5 ounces. Your goal should be to bring it as close to 5 ounces as you can.

The easiest way to add weight to your car is to purchase a little set of weights from a hobby shop or BSA. These weights come in segments that snap off so you can add just the right amount of weight. The weights can be glued on.

There are many other ways to add weight to your car...you can drill holes in the car and fill it with lead BBs or even glue a stack of pennies to the car. Just be sure that whatever you use, it is secured tightly so it doesn't pop off during the race.

Painting your Car

You are now ready for the final touches...painting, decals, and decorating. This part should be done entirely by the Scout. Let them have fun picking the colors and designs that they want on their car.

The first coat of paint should be a wood primer because it will soak into the wood to create a base for the top coat. After the primer dries, sand it lightly with the very fine grade of sandpaper (200 or 400 grit). Next paint one or two finishing coats to get a clean, polished look.

If you are painting the car with a single color, use spray paint. If you want more than one color, brush it on. Masking tape works well to make straight, sharp lines. Just tape the part of the car that you don't want painted, paint away, then peel off the masking tape. If you buy model paint and a small model paint brush, you can paint intricate designs on the car, like stars, numbers, happy face, scout symbols, etc. Most kids get into this part and really have fun painting their cars.

Finishing Touches

Aside from painting cool designs on your car, consider buying a set of decals. Kids love them and they add a nice finished look to the car. Kids also like to glue on pieces of toys, like toy soldiers, car parts, lizards, you name it and it has been done. If you really want a

professional looking car, car kits are sold that include fenders, exhaust pipes, bumpers, etc.

Wheels

We're almost done. The last step is axle preparation and putting the wheels on. The most important thing to remember is to deburr the nails that you received in your kit. What does that mean? There is a sharp burr on the underside of the nail head that must be removed. If you don't remove the burr, it will dig into the plastic wheels as the wheel turns, severely slowing down your car. The easiest way to remove this burr is to place the nail in a vice so the head is sticking up. Then gently file down the burr with a fine file until it is totally removed. You can also remove it with sandpaper, though this will take longer. Your objective is to make the axle as smooth as possible.

When all four axles have been deburred, insert them into the block. They should be inserted so the wheel is about 1/8" from the car. If the wheel is too tight, the wheels will bind, slowing the car down. If they are too loose, the car will wobble down the track.

How to build a fast Pinewood Derby car

This is by no means a comprehensive list of speed secrets.

There are several experts in this area that have published booklets, one written by an engineer, on the subject. I would consider these tips the basics but they are enough to get your car off to a good start.

General principles of speed

Your car goes down the track from the pull of gravity. Your car is slowed down from friction. Friction is the enemy of speed. Reduce friction and your car will go faster. Here are some ways to reduce friction and increase speed...

Axles

You want to make your axles as smooth as possible. Be absolutely sure that the burr under the nail head is filed or sanded off. Once that is sanded off, polish the nail head to a mirror like finish.

Gravity / weight

This one is simple. Be sure your car weighs as close to 5 oz as possible. The heavier your car, the faster it will go. Find someone with a scale, purchase an inexpensive scale or weigh your car at the post office. Add weights until the car with the wheels and axles is up to 5 oz. Don't wait until race night to get this right.

Making the car go straight

This can be tricky. Roll your car along the kitchen floor. If it veers to the right or left too much, the axles are crooked. Just like steering a car, you need to adjust the steering on your Pinewood Derby Car. To do this, you must adjust one or more of the axles so the car rolls straight. You can do this by re-drilling the axle holes and re-inserting the axles.

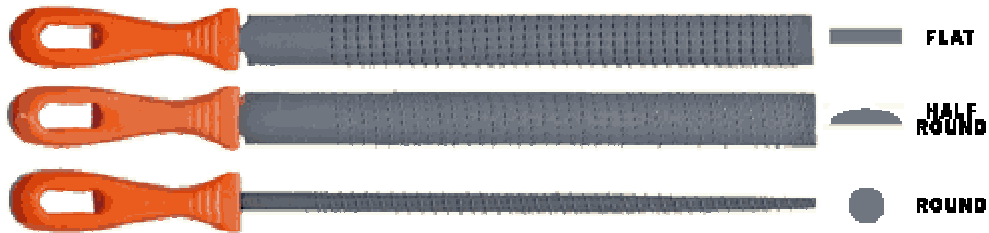
Lubrication

This is essential. Purchase a tube of graphite and sprinkle a little on the axles near the wheel. Spin the wheel so the graphite works in. You will notice a significant improvement in the speed of the wheel as it turns.

To win the race, you'll need to learn the speed secrets from the experts. If you are serious about speed, spend a few dollars to download one of the products from the experts or start the process of trial and error like I did. Either way, have fun and happy racing.

How to Use a Rasp to Build Your Pinewood Derby Car

Rasps look a lot like files but are rougher and are made for removing wood. Rasps come in several shapes including round, half round, and flat.



You might not even need a saw with many Pinewood Derby car designs. Use a rasp to shape the car if no deep cuts are needed. Rasps leave gouges in the wood so you will need to use sandpaper to smooth the wood when you are done with the rasp.

What kind of rasp should you get? All three types have their uses.



A flat rasp can be used to create a variety of notches.



It is also good at rounding corners.



The half round rasp can make smooth grooves.