

How to build your Pinewood Derby Car and tips.

First of all read through all the info and rules twice so you understand the rules and what is required. Your car can be quite simply the block shaped and finished or you can be creative with the design and make something Special. The rules have been drawn up to make it fair to everyone and to avoid cars being made that won't run on the track.

Avoid the temptation of fitting the wheels early as this will only make the slot wider and the nails/axles loose fitting. Fitting the wheels should be your last job. By all means you can offer the wheels up in position to visualise the design and you can do this with a fat pin or thinner nail than the ones provided.

There are so many theories as to making a fast car, each has it's own merit and none are perfect, even the atmospheric on the day can effect the way they run. Just do the best you can and above all enjoy it.

Design: Using the template enclosed draw up your design, try to keep the shape fairly simple unless you are really good at handicraft. Your car can face either way and can be shortened or marginally lengthened as per specifications on the rules page. See also images of car designs and some of previous races to explain the event and to get your creative juices flowing. It does not have to be a racing car or even look like a car, any design is permissible, we have had tents, boats and beds in previous derbies though they tend to going for the best design rather than be the quickest!.

You can choose to make a car that will go fast and do well in the races or to be more creative and go for the best looking prizes which are split into 2 age groups. If you choose to make it go fast then aerodynamics come into play so minimise wind resistance and make sure you get a good smooth finish. Also you may wish to add some extra weight to the car as it gives the car momentum along the straight to get across the finish line fast. Weights need to be concealed or covered.

If you want to have a chance at winning both fast and best looking then adding detail such as a steering wheel, cockpits and driver to your car or interesting designs like rockets, tanks, buses, lorries, Batmobile etc may work. Details such as a driver must be hand made though, plasticine is good for this. Don't forget that you can do a lot with painting to enhance.

I have known scouts to spend a week on their car doing a bit each night and others who have done it all in one day. Now make a list of materials you may need and look round for something which can add weight. Check all the items first on scales before you start. You should allow for cutting off bits and also allow about 10 gms for painting and finishing.

Weights: Best ways of adding weights to the car: If the weights are thin or small you can drill/carve out a bit underneath the block or go between the block and any extra piece of wood fixed on top to conceal them. Or if its something like a couple of small batteries or bolts you can cover them to make them look like gas tanks/rockets or make a little cardboard cab to sit over them. If you want to use a few ball bearings or thick washers or screws as weight then it is easy to paint and cover them with something. Another idea is to drill holes in the end and fill with fishing shot. Whatever you do don't forget to glue everything down.

Cutting: First of all mark out lines around the block on both sides where you want to cut and work towards these lines avoiding actually cutting along them. It is easy to sand off up to the line rather than try to some stick wood back on. If you are going to add a bit more wood to the top it is a good idea to rough cut all the wood first and then glue it on (concealing any weights) before you make final cutting and sanding. Using a workbench or wood vice can make the job easier. This is the part where getting help and supervision from an adult is permissible, some scouts arrange to do this at school with the school facilities. Use fine saws or jigsaws for the main cutting. Follow this with a rasp to get close to your marked lines (they come in different shapes and are really good for filing and shaping). You can make the body width narrower except at the wheel positions which must be at these set points. Remember to leave the front middle part of the car flat for the start pin to sit on, if you curve it up then it will not stay in place and the car will have to run backwards.

Adding other materials: You can stick another bit of wood on top and shape the whole or add items onto the block. You can also add side skirting to widen the body or add a spoiler but not to exceed the wheels. Whatever you decide to use it should be from base materials and then cut or shaped by you. For example, you can use wooden poles and metal tubes or plate that you have cut, bolts that you have cut the heads off, screws that are covered, material, paper, card, plasticine, clay, sticks, straws, balsa wood for intricate stuff (not much use for main parts as it is so light), or you can use a piece of lead which is heavy and easy to shape but make sure you wash your hands afterwards.

Sanding and Finishing: Sand the shape down first with a coarse grit and then a finer grit to finish. Power tools such as palm sanders or small bench sanders can be useful if you have a lot of material to sand down. Pay attention to the end grain as well. Especially make sure the local area around the wheel positions are really smooth.

Painting: How to get a good paint finish: All wood once it has a coat of paint or varnish will initially swell and leave the grain raised. So if you intend to paint it then a white primer/undercoat will need to go on first (there are some really good water-based quick drying ones available) and then once it has dried it will require sanding with a fine grit. At this point if there are any mistakes or hollows these can be easily filled with a fine surface filler before a second coat is applied. Your top coat does not have to be a high gloss, it can be acrylics or poster paint, allow each colour to dry separately. Poster paints will need some protection afterwards to avoid damp sweaty hands smudging your work.

Aerosol paints are good too, do these outdoors on a still day or in a garage, make a small booth up with a bank of cardboard around. Tips to get that professional finish: Pop the can in hot water for 10 mins and then give a really good shake. Prop the car up on a block and do sweeping spraying motions from about 30 - 40 cms away, going right across and passed the work building up the paint allowing it to dry for 10 mins before turning round and doing the other side. Don't wiggle the can in the same position or you will be applying too much in the same place and it will run. If you do make a mistake wait till it has fully dried and then lightly sand before doing again.

If you prefer you can colour your car using felt tip pens, this is especially good on card which you may have used to make a cab or other detail.

Number: Now your competitor number must at least appear on the rear of the car. For this you can draw or paint it on or print off a label on your computer. There are a set of numbers below which you can use for this if you choose. There are also a variety of boxes which you use as number plates to place your number in if you wish. Simply position your numbers with a spot of stick glue on a number plate and cover with a strip of selotape.

Varnish or polish: Depending on the type of paint you have used it may require a final finish. There are various types of gloss or matt varnish, watch out using a water based one on poster paints though as they will get wet and run, do a test first. You can also use hair-spray to fix poster paints from smudging or a furniture polish also works very well and is less messy. Repeat as necessary. Always read the instructions on the tin!

Wheels: Yes this really is the last job as you don't want to be messing around putting them in and pulling them out. First check the wheels over and lightly sand off (very fine grit) any raised areas or moulding marks. Give them a good polish. The nails which are the axles should be checked the same to remove any burrs and polish. Fix them in carefully by lightly pushing or tapping them into the slots leaving about 1 mm gap between the wheel and body. Now check the car runs freely on a smooth flat surface to see if it free-wheels nicely, the wheels not rubbing against the body and the car running fairly straight. If you are happy with this, it is advisable to secure the axles so that they don't get moved out of position. This is best done by applying a spot of glue (hot glue gun brilliant for this) to the nail points in the slot, keep well away from the wheels. The car gets it's speed from the momentum gained from going down the start slope before a long flat section. The track is 4 lanes, 40 foot (12 Metres) long with an electronic finish.

Now don't keep playing with it but keep it away from being knocked about, many people park it on a plinth. I look forward to seeing you, a great day of racing and to see all those designs. Taking part in Pinewood Derby will pass some badgework, discuss this with your leader - Creative Challenge Award and the Model Maker Badge.

Checklist:

- Meets specification rules
- Runs freely with all wheels turning
- Has my number on the rear of the car
- Completed form to bring with car



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