Instructions and Suggestions for the Pinewood Derby Cars

1. Dimensions 2-3/8" wide x 7" long. The maximum weight is 5 oz.

2. The final weight will be on the "official" Ranger scale (which has been calibrated as traceable to NBS.) If the car is overweight on race night, you will be required to remove weight until it is within the limit on the "official scale".

3. The track rails are 1-5/8" apart. The wheels ride on the outside of the rails. So the inside of the wheels must be about 1-7/8" inside-to-inside.

4. Gravity only, no propulsion.

5. Straight axles or molded (hobby shop) cars are acceptable as long as they conform to the rules above.

6. Write your name, age, and phone number on the bottom of the car.

Shaping Your Car

7. You may shape your car and even add height or some width, such as between wheels.

8. Route the bottom of the car to make room for the lead weight.

9. You should use the pre-cut axle grooves. If you cut your own, make very sure that the cuts are exactly perpendicular to the car side. If the wheels are not perfectly aligned, the car will tend to drive into the rails and that friction will dramatically slow the car down.

10. We have found that aerodynamics play little to no effect in the car performance.

11. Sand the car, first with medium grit sandpaper, then with fine grit, and even extra fine grit. A sander will make the job faster.

Painting Your Car

12. You may paint your car anyway you want.

13. Do not paint your car with the wheels on it. The paint will get onto the axles.

14. First use a primer to seal the wood. Make sure the primer is compatible with the finish paint.

15. Lightly sand with fine grit. Wipe with a damp rag and let dry.

16. Then use a finish paint. Read the instructions on the spray can. Not too close or the paint will run.

17. Once dry, you may want to lightly sand and paint again, until you get the finish you want.

18. You may add things like "lego drivers", windshields, spoilers, decals, etc. But remember the weight limit.

Weigh the car

19. Once the car is shaped and painted, weigh the car with the wheels and axles. Take lead fishing shot or other weight and put the additional weight on the scale until you have a little less the 5 ounces. The post office will have a scale. Coins are a good weight and can be glued on the bottom. Once the weights are glued, weight the car again.

20. You should not screw weights to the bottom of the car. Nothing should be lower than the bottom wood surface of the car. You may drill or route out a hole in which to put your weight.

21. We have found that minor weight differences has little to no effect in car performance.

Wheels and Axles

22. We have found that wheel and axles are the key to performance. The nail has forming "flashing" on the underside of the nail head. You need to file this off – carefully. We have found that if you polish the axle with VERY fine grit cloth and then with jewelers rouge buffing, that helps. You may modify the wheels to remove plastic flashing, run in the wheels on the axles, modify the wheel tread profile, if you desire. Be careful to keep the wheels perfectly round.

23. Winners from the past have used graphite powder (hardware store, for use with keys/locks) on the axles.

24. Do not paint your car with the wheels on it. The paint will get onto the axles.

25. Once you have carefully put the axles in place, check to see if the wheels are flat to the table and all are equally touching. You may (elmer's) glue the axles in place after you are satisfied with the axle alignment.

26. After the axles are aligned, put your car in a box surrounded by packing or a towel. Do not play with the car before the race. If you drop the car, it may not be as fast. If you roll it on the carpet, the axles will pickup fuzz and you will have a slow car.

Tips on making a fast Pinewood Derby car.
by Dave Gabriel

Before we begin please understand that there are many methods for "fine tuning" a car for fast competition. The following will be a step by step of the techniques that I have found to be the most beneficial.

THIS SECTION WILL ADDRESS FUNDAMENTALS OF WHEELS AND AXLES.

1. As you remove the car and axles from the box, you must resist the temptation of inserting the nail into the wheel. This is because there are sharp edges at the chiseled point THAT WILL DAMAGE the inside of the wheel hub. These must be filed down so they will easily slide into the hub. Any scraping at all when inserting them will result in scores inside the hub that will reduce your overall speed.

2. Examine the nail carefully and find the two burrs that are located under the head. You will also see a few ridges in the shaft of the nail in the same area. These all occur during manufacturing and must be removed. The best way I know is with the use of a drill. With a small triangle shaped file, carefully work to the corner where the shaft meets the head. Be careful not to gouge that corner. Most of your concern is on the underside of the head. Work the file so that the underside of the head begins to be tapered away from where it would touch the wheel. The size of the head will get smaller but don't worry. The object here is to eliminate any unnecessary friction from the wheel to the axle head. The same file may be used to smoothen over the ridges in the shaft. Remember here, too much filing will give you a smaller diameter axle. This is both good and bad. Good because a reduced size means a smaller curve actually sits on the inside of the hub. Bad because the wheels become rather loose, the car doesn't track very well, and is subject to inconsistent performance.

3. At your local hobby store you will find a tool used to hold the wheel in a drill. I think they're about $5.00. This will be used to remove any "extra" plastic that is often present around the molded edges of the wheel. Begin with a small file, then 400 grit wet/dry sand paper. Finish off with 1000 grit. When putting the paper to the wheel, be gentle and keep moving. If you don't, the plastic that was removed and is now in the paper and begins to heat up and will cause small "re-attachments" to the wheel causing it to become out of round or bumpy. Take care to address the edge of the wheel that would touch the guide strip. This is the part of the track that the car straddles, keeping is in it's lane. Often there are irregularities along this edge that will cause the car to chatter or "fishtail" down the track. Lastly, look where the wheel would touch the car. Very often there are small irregularities here. Take a sheet of 1000 grit paper and put it on a table and very gently, rotate your hand and wheel so that you only sand away the plastic that is on the outer edge of the hub. When done, set it on the table and notice how only the very center of the hub actually touches the table. This represents that portion of the wheel that will touch the car.

Instructions for Unlimited Class Cars

1. Maximum dimensions: 12” long x 2-3/8 wide
2. The track rails are 1-5/8” apart. The wheels ride on the outside of the rails. So the inside of the wheels must be about 1-7/8” inside-to-inside.
3. No weight restriction.
4. Your car may have a propulsion system, except no rocket or released gas propulsion allowed for safety reasons.
5. We will need you to devise a means of “catching” your car at the end of the 50 foot track.
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