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## Sportsmanship

Racing requires participants to learn two main things: the craft skills necessary to make your car and the rules that must be followed. There is also a third part to competition that's very important sportsmanship. This has to do with how you act and behave while participating in the derby.

The first thing to remember about sportsmanship is that everyone's skills are a little different. Some people are better than others at certain skills. You may be good at one thing but not good at another. This doesn't mean you are a good person one time and not good another time. You can always be a good person, whether or not you have good skills for racing. Remember, you and your friends are individuals first and racers second. This idea is sometimes called *having respect for others*.

The second thing to remember is to follow the rules. Without rules, there would be no pinewood derby. You will never know if you are really good at doing something unless you follow the rules. This is sometimes called *being fair and being honest*.

The third thing to remember about good sportsmanship is that there are winners and losers in every competition. You know this when you choose to compete. There are times when you will win and be happy, and times when you will lose and be unhappy. Being a winner is easy but being a loser is sometimes hard. To be a good sportsman, you must be able to say "I did my best" and be satisfied with the results. If you win, you must not gloat.

## Coaching Hints for Parents

- Review with your son the "Getting Started" chapter of this guide.
- Help your son plan a schedule to prevent a last-minute project and allow time for him to do his best.
- Help your son understand the rules and specifications found in the kit and any rules developed by your local pack derby committee.
- As your son chooses his favorite design, help him trace it on the block of wood from the kit.
- Guide him in the use of tools in the shaping of the model and encourage him to sandpaper the model to a smooth finish.
- Help your son feel that this is a joint project, with him doing much of the work.
- Help your son understand that "doing your best" is as important as having the fastest model.
- Feel a sense of pride and satisfaction when the model and race are finished. Share it with your son. You have both earned it.
- Understand that the leaders may need your help. If you have the interest and the time, you might contact the leaders and volunteers to help or judge at the pack's big race.

Spending time with your son, helping him "do his best" will be remembered by both of you long after the race is finished.

# Introduction



## An Instant and Enduring Hit

Every year more than a million boys and parents team up to participate in a pinewood derby. They carve the cars; decorate them; weigh, adjust, readjust, and fret over them; and finally race them. This partnership of parent and son has become a symbol of the event's success.

The first pinewood derby was held in 1953 by Cub Scout Pack 280C of Manhattan Beach, California, operated by the North American Aviation Management Club. The event was publicized in *Boys' Life* in October 1954. The magazine offered plans for the track and car, which featured "four wheels, four nails, and three blocks of wood."

The derby was an instant and enduring hit. It is estimated that more than 35 million parents and sons have participated in actual races. Millions more-parents, den leaders, Cubmasters, and committee members-also have been involved in various ways.

The rules of the very first race stated: "The derby is run in heats-two to four cars starting by gravity from a standstill on a track and run down a ramp to a finish line unaided. The track is an inclined ramp with wood strips down the center to guide the cars."

The cars still roll that way, forty years later, accompanied by shouts of excitement and grins of delight from both participants and spectators.

## Take Your Place in History

Join the ranks of millions of Cub Scouts who have stood in the derby winner's circle. Cub Scouts just like you have been building their own cars and competing in pinewood derbies since the 1950s.

Millions of car kits have been built by Cub Scouts over the years, each one handcrafted to reflect the style of its owner's desire. And on race day across the country, these Cub Scouts pit their entries against the cars championed by fellow den members.

## Pinewood Derby

The pinewood derby is one of the most popular and successful special events in Cub Scouting. Like all successful activities, it requires planning and preparation, but its value in fun and in strengthening family relationships has been proven over the years.

Pinewood derby cars are simply small model cars of specified dimensions, created, carved, and assembled by the boys, under the guidance of their parents or other family members. The cars are gravity powered and run down a regulation track. The race can be run indoors or outdoors.

The pinewood derby committee sets simple, uncomplicated rules and familiarizes each pack family with these rules before the cars are built. The committee should follow the guidelines for planning special pack activities so that nothing important is overlooked.

# Getting Started

## Step 1. Know the Rules

Read the rules and specifications found in your kit. Also read any rules provided by your local derby committee. Discuss your ideas with your parent or adult partner and determine a plan for the construction of your derby entry.

## Racing Specifications from the Kit

1. **Width.** The overall width of the car shall not exceed 2 3/4 inches.
2. **Length.** The overall length of the car shall not exceed 7 inches.
3. **Weight.** The weight of the car shall not exceed 5 ounces.  
No loose materials of any kind are permitted in the car. The car may be hollowed out and built up to the maximum weight by the addition of wood or metal only, provided any additional material is securely built into the body.
4. **Wheel bearings, washers, and bushings are prohibited.**
5. **Springing.** The car shall not ride on any type of springs.
6. **Details.** Details such as the steering wheel, driver, decals, painting, and interior detail are permissible as long as these details do not exceed the maximum length, width, and weight specifications.
7. **Attachments.** The car must be freewheeling, with no starting devices.
8. **Inspection.** Each car must pass inspection by the official inspection committee before it will be allowed to compete. The inspectors have the right to disqualify those cars that do not meet these specifications.

(Each local derby committee provides copies of the rules for that specific race. See the example provided. **Suggestion:** Modify these rules to fit your needs and furnish a copy to every race participant at the same time he is issued his pinewood derby car kit.)

## Pinewood Derby Rules (Pack 378)

1. Cars must pass inspection to qualify for the race. The inspection points are:
  - a) The car must have been made during the current year (year that derby is held).
  - b) The width of the car shall not exceed 2 3/4 inches.
  - c) The length of the car shall not exceed 7 inches (including wheels).
  - d) The weight of the car shall not exceed 5 ounces.
  - e) Axles, wheels, and body wood shall be as provided in the kit.
  - f) Wheel bearings, washers, and bushings are prohibited. Nail "heads" must be visible in wheels. No type of wheel coverings or hubcaps may be used. Only the wheels and the nails that come with the race kit can be used. Check your nails to be sure that there are no burrs that could catch on the wheels.
  - g) Wheel feathering (forming an edge) or wafering (thinning the wheel) is not permitted. Wheels can be sanded to remove surface imperfections, but the treads must be left flat.
  - h) The car shall not ride on any kind or type of springs.
  - i) Any details added must be within length, width, and weight limits.
  - j) The car must be freewheeling, with no starting devices.
  - k) No loose materials of any kind (such as lead shot) are allowed in the car.
  - l) Space for the official number must be available on the car.
  - m) Only "GRAND PRIX" style racers are permitted (not the semi-trucks).
  - n) Council race rules do impose a maximum height of 2 1/2 inches - keep that in mind if you want to build a car that could qualify for the Council race.
  - o) It is permitted to place wheels and nails in a different location than the slots provided on the block in the kit. The reason for this ruling is that many of the provided slots are not centered or straight.
  - p) Only powdered graphite or official Cub Scout Derby lubricants may be used to lubricate the wheels and axles.
2. Each heat will be announced. All racers and spectators must remain behind barriers.
3. The starter will make sure the cars are on the track properly and then start the race.
4. Optical Sensors and electronic finish lines determine 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> place finishers. Results will be recorded at the finish line.
5. If a car leaves the track, runs out of its lane, interferes with another car, loses an axle, etc., the heat will be rerun. If the same car gets into trouble on the second run, the contestant is disqualified and automatically loses that race. If, on the second run, another car is interfered with, the heat will be run a third time but without the disqualified car.
6. Awards will be announced after the heats.

**May the best car win!**

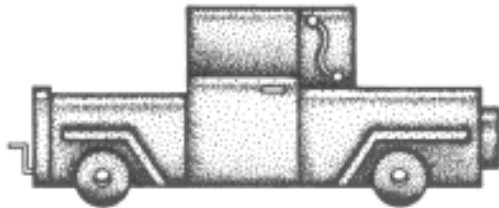
## Step 2. Design the Car's Body

First, choose your favorite design. Outline it onto your paper template. Remember to maintain the 1 3/4-inch width where the metal axle is to be inserted. Then, outline the bare block of wood onto paper as shown below.

This illustration gives you the scale as well as a template to transfer onto the wood.



Feel free to design anything you want. Here are just a few examples. Of course, you are not required to build what is listed here, as long as your car meets local event committee qualifications. According to many experts, wind resistance does not seem to interfere with the car's performance. A car with a flat nose wins as often as a car that is 1/2 inch thick. Some recommend, however, that the underside be kept flat to prevent wind resistance.



Old Model A



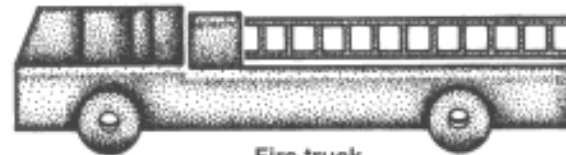
Sleek wedge



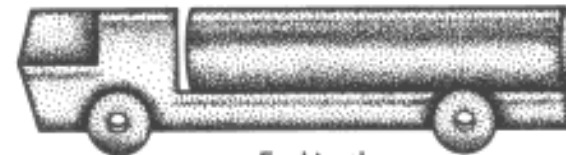
Dragster



Formula one



Fire truck



Fuel truck

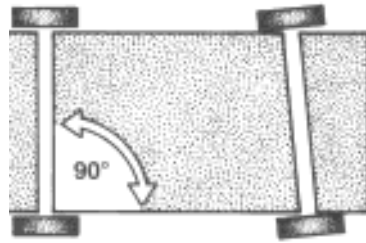
## Step 3. Shape the Car's Body

It is up to the Cub Scout and his partner as to how detailed the car is built. Keep in mind the tools you have available: saws, drills, sanders, etc.

Bear in mind, too, the safety of the Cub Scout. Generally, the adult makes the major cuts with the power tools, and then lets the Cub Scout file and complete the sanding.

**Before cutting out the car, look at the axle grooves that came with your kit.**

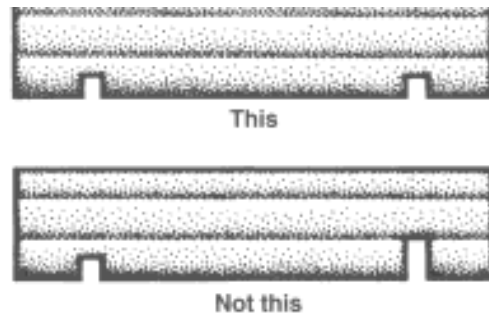
Check the grooves to ensure that each is at a perfect 90-degree angle to the car body. A car with untrue axles tends to steer to one side or the other, causing it to rub up against the side of the lane strip, slowing it down. You can check the groove angles by using a square (the tool achievement in the *Wolf Book*), a protractor, or even a piece of paper. Both axle grooves must be at 90-degree angles. The local rules committee will determine whether you must use the grooves provided.



When placing the axles on the car, not only should the axles be at 90 degrees to the car body, but they should be placed the same depth into the car.

If you want to experiment with racing your car or raising the front and lowering the back, the option is yours. Just make sure you have the proper 3/8-inch vertical minimum clearance above the lane strip.

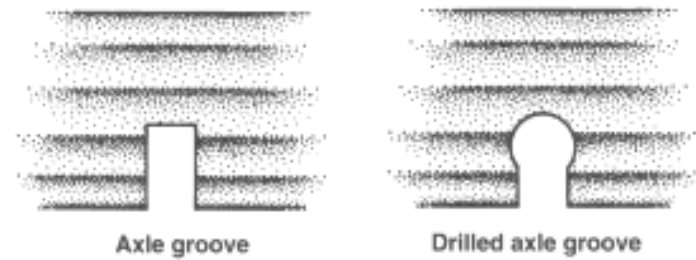
Another area to consider is the car's wheel base, the distance between the wheels. Some say a longer wheel base is better. Your local race committee determines whether you must use the grooves provided with your kit. This theory counteracts the theory about weight behind the rear axle.



Predrill your axle grooves. Get a drill bit, No. 43, just under the size of the axle and drill out the grooves. This will keep the wood from splintering when the axles are driven in, and it will give a better bite on the axle.

It is best to prealign and drill your axle grooves before you shape the body. This gives you a flat and true surface to work from on all sides.

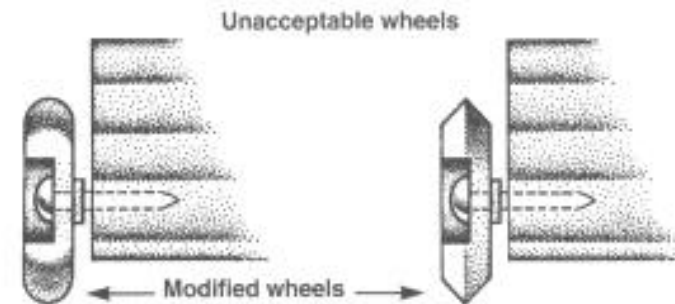
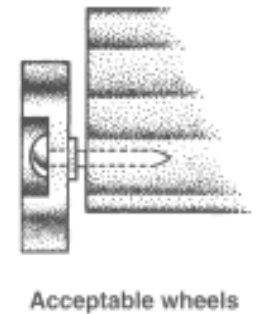
Once the design is transferred to the block of wood and the axles are true, you can continue shaping. As stated previously, you may use power tools, files, planes, etc. Do not forget to have a place for weight if you need it. Weight may be placed anywhere as long as it is not taped on and does not exceed the qualifications. You can even bolt it on if you like. Keep details such as driver, steering wheel, roll bar, etc., for last.



## Step 4. Inspect the Wheels

Only the official wheels are acceptable. Cars with modified or old-style wheels will be disqualified. Modifying the wheels could allow the car to interfere with cars on adjacent lanes. **Wheels can be sanded to remove surface imperfections, but the treads must be left flat.**

Inspecting the wheels is important. Make sure all wheels roll freely and smoothly around the axle. Get a drill bit that fits just inside the wheel where the axle fits. This cleans out the roughness and burrs that could cause the wheels not to spin freely on the axles.



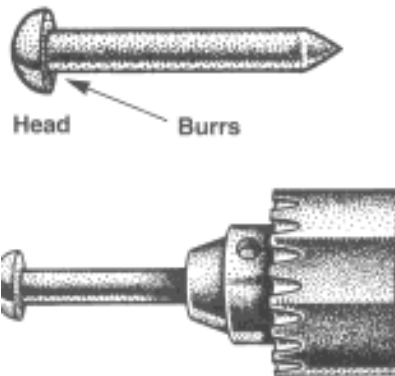
## Step 5. Insert Axles into the Body Block

To insert axles into the body block, use the techniques mentioned in step 3. The axles themselves may need special attention. Check each axle to see if there is a burr on the underside of the head.

**To let the wheels run as freely as possible, place an axle in an electric or hand-drill chuck, then smooth the burr with a fine emery cloth or file.**

To fine-tune your axles, polish them with jeweler's rouge or fine emery paper. These items can be purchased at a local hardware store.

**Do not install the wheels yet.**



## Step 6. Paint

Sanding sealer is one of many types of primers. Use whatever you prefer; most can be found at local automotive parts or hardware stores. After molding and sanding your car to your satisfaction, prime it, sand it with a fine sandpaper, and add additional coats of paint. Do not glue details on it yet.

## Step 7. Install Wheels and Axles

Now, put the axles and wheels on the car, but don't glue the axles on yet. Weigh your car, being sure to place the car and the accessories (driver, steering wheel, roll bar, etc.) on the scale.

## Step 8. Add Weights

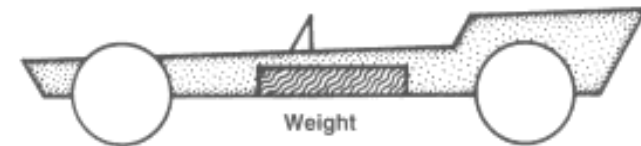
The car may not weigh more than 5 ounces. Get your car as close to 5 ounces as possible. If you do not have a scale, the U.S. Post Office will be happy to weigh your car for you. Official scales need to be identified and available ahead of time.

Weight must not be taped on. The car may be hollowed out and weight inserted to build it up to the maximum weight. Make sure it is securely attached or built into the body of the car. The officials do not want any objects falling off of the cars and onto the track. If your car is not up to or close to the official weight on the day of the race, the race committee may allow washers or coins to be glued onto it.

Weight is one of the biggest factors in building a winning car. There are many opinions on where to place the weight. A few theories are discussed below.

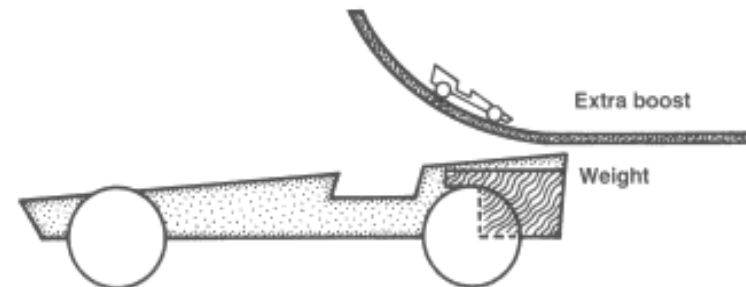
### Theory 1

One theory is to keep the weight low. When placing the weight on the bottom of the car, fill in any holes or grooves. This keeps the bottom of the car flat so that no wind resistance is built up.



### Theory 2

Another theory is to keep the weight toward the rear or behind the rear axle. The idea behind this is that, when the car reaches the curve in the track, the weight pushes down and gives the car an extra boost. The car may start slowly, but its speed will increase on the straightaway. Also, do not add weight that might pull the front wheels up or cause the car to flip over.



### Theory 3

This theory states that it does not matter where you actually put the weight, as long as the car weighs as close as possible to but not exactly 5 ounces. The official scales might be different. It is easier to remove weight than it is to add weight at the race, if drills or knives are available.

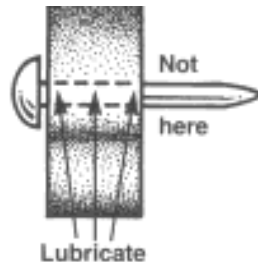
Add weight as needed. Determine how you will weight your car and where you want to mount the weight, if you have not already done so. Now that you know how much you need, go ahead and mount the weight on the car, or remove some if needed. The wheel lubrication and glue do not add enough weight to be concerned with at this time. Before adding weight to or removing weight from your car, you may want to take the wheels off to make sure you do not damage them.

### Step 9. Test the Car

Now that the weight is securely mounted, slip the wheels back on. Place the car on a long, flat surface, such as a floor, and give it a gentle push. The car should travel in a straight line for a reasonable distance (five to ten feet).

### Step 10. Lubricate the Car

Lube and mount the wheels permanently. Dry, fine powdered lube seems to work best. (Liquid and spray graphite mixes with the paint of the car and makes a glue that will slow your car considerably.) Dust a little powdered lube in the hole of the wheel where the axle is inserted and some on the axle where the wheel rides. It also does not hurt to place some at the axle head. Slide the axles and wheels onto the car and glue into place. Use an epoxy or nonresin glue, and make sure you don't get any on the surface of the axle where the wheel rides. Let this dry thoroughly.

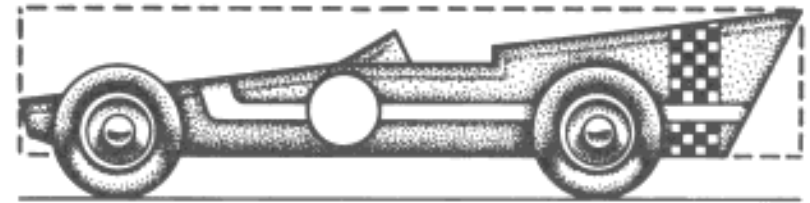


### Step 11. Accessorize the Car

Now is the time to put on all accessories and details. Make sure they are securely mounted on the car. Any stripes, decals, etc., also should be put on at this time. Immediately before the race is a good time to lube your wheels. You might not be able to touch the cars once the race begins.

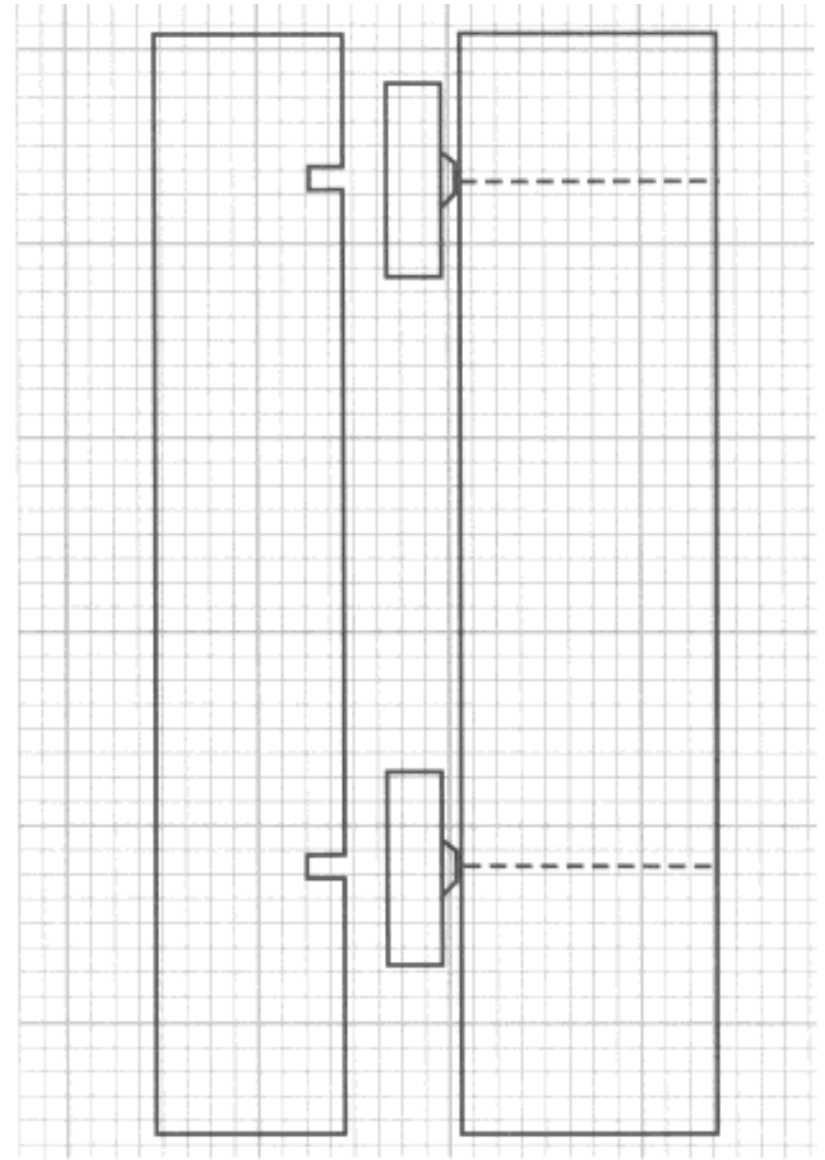
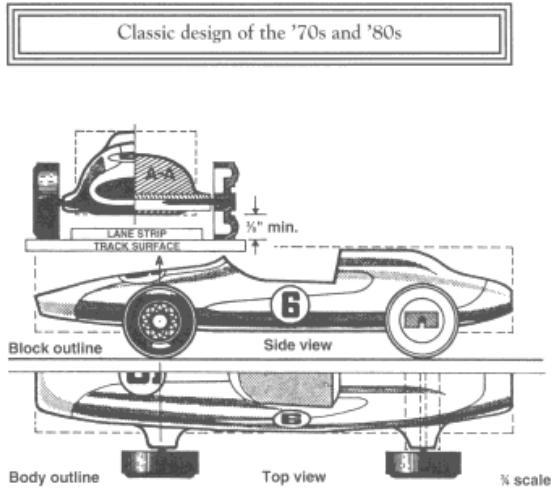
That completes your grand prix pinewood derby racer.

Good luck!



# Classic Designs

For Illustration Only  
(not to scale)



Classic design of the '90s

