

DERBYS

Almost everyone loves to compete and the Scouting program offers several opportunities for good, clean, friendly, *FUN* competition. The key word that should be emphasized here is ***FUN!*** Boys should be taught, "It's not whether you win or lose that counts, but that you had lots of fun!"

Participation by all Cubs should be stressed and every participant should come away with an award (participation certificate or ribbon, tie slides, medals, specially-made plaques, etc). Parents should feel involved and needed and should also be encouraged to stress the importance of fun to their son.

Most of this chapter is directed to the four most popular pack derbies and races: The Pinewood Derby, the Space Derby, the Raingutter Regatta, and the Cubmobile Race. However there are lots of terrific ideas in the "Cub Scout Leader How-To Book". Be sure to check out Chapter 2, pages 36-42 and **all** of Chapter 9. You could really fill your Scouting year with tons of wonderful fun.

One important hint on how to be certain that everyone has a good time at your derbies and races: Make sure all the parents and Cubs are completely aware of the rules that will be followed by the Pack. *Stick to those rules!!* This will prevent hard feelings and help to ensure that everyone will get treated fairly.

Even the best-made plans can't eliminate all problems. There is always the possibility of conflict when you deal with people. It would be advisable to have a guideline outlined for disputes. Here are some ideas:

1. Any participant (including the parent of the participant) has the right to appeal to the Race Committee for an interpretation of the rules.
2. The Race Committee, by a majority vote, will be the final judge of these rules (there will be an odd number of committee members in order to avoid a tie).
3. All racing will be halted until the Race Committee has made a final ruling on the dispute.

Disputes over rules and their interpretation can become very heated. Just remember to *keep your cool!* You, as a leader, must set the example for your Cub Scouts, *no matter what!!*

If possible, every Pack should have a Helping Hand Committee. There are many parents who have never participated in derbies or races and have no idea what to do to help their son. A Helping Hand Committee is comprised of experienced parents who would be willing to talk to the inexperienced to give pointers and ideas, and, if needed, even help a boy with his project.

Good luck to everyone and LET'S GO TO THE RACES!

PUTTING TOGETHER DERBY KITS

Organize a workshop to assist those who have never constructed a car, boat or rocket, or who might not have the tools or skills to build the kit at home. The workshop can be held at a Pack or Den meeting place, or at someone's home. Have the tools and materials ready to show and use. It might be helpful to have example cars at various stages of construction.

Tools for the workshop should include coping saws or a jigsaw, a hand electric drill, a bench or table, chisels, hammers, hot glue gun, glue sticks, sanding blocks, rasps (wood files), pliers, screwdrivers, punch, and a board to pound on. Materials should include sandpaper, paint, sealer, wax, buffing cloth, weights, hand cleaner and paper towels.

Show a basic design on paper. Show how to put the lines on the block of wood, either by tracing or using carbon paper. Demonstrate how to make the initial cuts with a coping saw or jigsaw. Adults can help with power tools at this stage.

Demonstrate detailed shaping. Instead of using a knife, encourage the use of a wood rasp with both fine and coarse teeth. A potato peeler is good for carving the shape.

Specifically for Pinewood Derby Cars:

Drill and/or chisel out a hole in the block of wood for weight to be added. You will need a bench vise, drill and bits, and possible extension cords. Weights can be purchased at the Scout Center, from hobby stores, or you can use lead fishing sinkers, plumbing solder, or other metal weights.

Weigh the car components (wood block, axles, and wheels) along with the weights. Don't forget to allow for the glue, sealer, paint, and wax coats to come later.

After the weights are in the holes, conceal them with plastic wood.

Specifically for Space Derby Rockets:

Use a sharp knife for cutting the grooves for the hanger fitting and fins. A dull knife will crush and splinter the balsa wood.

When you start to carve, remember that the end with the small hole is the rocket nose.

To help increase the rocket's speed reduce the wall thickness to a minimum of 1/8 inch. Do not weaken the area around the hanger (carrier) or carve away the nose button circle.

Be careful not to get glue on the plastic carrier, especially in the holes through which the monofilament line runs. Glue can interfere with smooth operation.

Make the propeller shaft as short as possible by bending it close to the prop.

Cut off the excess wire with wire cutters.

Test the rocket's balance by hanging it from a string through the hole of the hanger fitting. If the rocket is nose-heavy, carve or sand a little wood off of the end. If it's tail-heavy, remove wood from the tail area.

Specifically for Raingutter boats:

Mast can be tapered with either a hand or electric drill. While you carefully turn the dowel, work a piece of sandpaper back and forth until desired shape is achieved.

Use tape, a drop of hot glue, or some other stabilizing agent to fix the sail so it does not spin on its mast.

Sand the car/boat/rocket with fine sandpaper. A sanding block could be helpful. Encourage the Scouts to do lots of sanding to get a good finish on their kit. Apply a coat of sanding sealer and two coats of paint to the wood. Do not apply too much paint to the outside unless you sand between each coat. Add stripes, decals, or any detailing. Apply an overcoat of either clear lacquer or wax and buff.

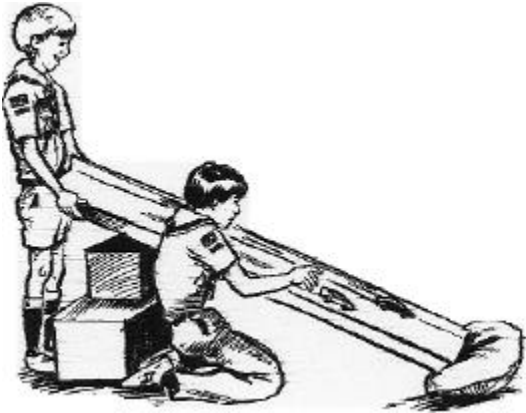
More hints for Pinewood Cars:

Wheels can be sanded to remove burrs or imperfections, but the treads must be left flat. Put the wheel in the chuck of a drill, and sand it lightly with a sanding block. The axles can also be sanded lightly to remove burrs.

Insert the axles (nails) through the wheels and into the grooves in the car body. Cars with crooked wheels don't race too well, so make sure they're straight, and apply a little hot glue to keep them in place.

Squirt some graphite into the wheels at the axle. Spin off the excess onto newspaper. Graphite is pretty messy, but it makes the cars roll much better. You can obtain graphite from the Scout Center or hobby shops.

Pine Wood Derby



What is a Pinewood Derby?

A bunch of fun! On race day it is a Pack of Cub Scouts racing gravity powered wooden cars of various shapes and colors rolling on plastic wheels down a 32' plywood track. But the actual competition is only a small part of it. The building of the car, from coming up with the design to applying the last coat of paint is where the real fun is. Each Cub Scout gets a kit with a block of wood, four nails for axles, and four plastic wheels. He shapes and paints his block of wood into a form to race down the track. This block of wood on wheels may end up looking like a car, a fish, a cartoon character, or even a coffin on wheels! Almost anything!

HINTS:

Assign a Pack Meeting date for the Derby. The entire meeting time should be for the Derby.

Provide adequate indoor facility space for equipment, participants, and spectators.

Schedule with District Derby Coordinator or whomever is in charge if track equipment is to be rented or borrowed.

Purchase kits ahead of time in quantities of eight for price break and distribute at least one month ahead of time.

Determine what Awards will be given and Order or Make ahead of time. The awards should be given out DERBY night to be most effective.

Make sure BSA Council Specific Derby rules are given out to ALL families in Pack to ensure fairness to ALL participants.

Have Den or Pack show and tell workshop on "How to make a car." Suggest tools to use, Do's and Don'ts.

Pre-weigh-in whenever possible prior to official Derby night. This saves lots of time and headaches at the Derby.

Assign helpers in advance or at Derby night.

Thank everyone involved.

Pinewood Derby Registration form

Name: _____

Church: _____

Outpost # _____

Car # _____

Official Use Only

Official Weight		Official Inspection by:
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Registration #		Paid: \$ _____
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Name: _____

Church: _____

Outpost # _____

Car # _____

Official Use Only

Official Weight		Official Inspection by:
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Registration #		Paid: \$ _____
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Space Derby

Personnel Needed

Program Committee

- Plan an opening ceremony, such as a ribbon-cutting.
- Handle all aspects of awards (decorated platform, signs, tables, trophies, ribbons, medals, etc.)
- Plan for crowd control.
- String pennants for decoration.
- Secure public-address system or bull horns, if needed.

Inspection Team

- Check entries for use of official materials.
- Mark a number on each rocket.
- Act as judges for craftsmanship award and other special awards. Report winners to program committee.

Registration Team

- Enter rocket numbers and boys' name on a preliminary heat sheet.
- List heat winners on semifinal sheets.
- Determine final standing of each rocket and report results to program committee for presentation of awards.

Flight Operations Team

- Have two starters with green flags.
- Have two judges with checkered flags.
- Have two gatekeepers to line up boys.
- Set up the space derby raceway.
- Report preliminary winners and final winners to registration team.

Constructing and Operating Rockets

The official space derby kit includes all necessary materials and instructions for building. Decorate the rocket with bright colors. Apply decals furnished in the kit.

Tips for rocket builders:

- Reduce air friction or "drag" by making all surfaces as smooth as possible. A blunt, rounded nose causes less drag than a sharp nose. A good design has all leading edges rounded and trailing edges tapered to reduce the drag.
- Rubber bands should be lubricated before the race. They are the "motor" and must be strong and flexible.
- Use a sharp knife for cutting the grooves for the hanger fitting and fins. A dull knife will crush and splinter the balsa wood.
- When you start to carve, remember that the end with the small hose is the rocket nose.
- A potato peeler is good for carving the shape.
- To help increase the rocket's speed reduce the wall thickness to a minimum of 1/8 inch. Do not weaken the area around the hanger (carrier) or carve away the nose button circle.
- Do not apply too much paint to the outside unless you sand between each coat.
- Be careful not to get glue on the plastic carrier, especially in the holes through which the monofilament line runs. Glue can interfere with smooth operation.
- Make the propeller shaft as short as possible by bending it close to the prop. Cut off the excess wire with wire cutters.
- Test the rocket's balance by hanging it from a string through the hole of the hanger fitting. If the rocket is nose-heavy, carve or sand a little wood off of the end. If it's tail-heavy, remove wood from the tail area.

Dads may wish to secure a 100-foot length of 50-pound monofilament fishing line for test runs in the backyard before the derby. Tie the line to a tree or post and string the rocket carrier on it. Tie the other end to a tree about 100 feet away. Make the line as tight as possible.

Sample Space Derby Program

- **7:00** Inspection and registration of rockets.
- **7:30** Opening ceremony.
- **7:45** Cut ribbon and start heats. Award ribbons and other prizes to heat winners during the running of the derby.
- **8:30** Recognition ceremony. Recognize champions; then make advancement awards.
- **8:45** Closing ceremony.

Sample Space Derby Rules

All rockets must pass the following inspection to qualify for the race:

- Only basic materials supplied in the kit may be used.
- The rocket body may be no longer than 7 inches, not including the propeller and fins.
- There are no restrictions on the weight or design of the rocket.

Space Derby Procedure

Every boy brings his rocket to the inspection table to have his entry checked and numbered.

Then he goes to the registration table where his name and rocket's number are entered on a heat sheet.

Contestants report to the gatekeepers, who line them up in the order in which they will compete. At this point, each boy starts to wind the rubber-band motor of his ship.

As his name is called, the boy hooks his rocket on the guideline assigned to him, centering the rocket between the vertical dowels and locking the propeller behind the horizontal dowel on the starting gate.

The gatekeeper starts the countdown and fires at zero by lifting the starting gate frame, which releases the rockets.

The race is run in heats, up to four contestants at a time. Each boy gets to try at least twice instead of being eliminated from competition from after the first race. For example, in a six-boy den, try heats of three boys each. The winner of each heat goes into the den finals. Then race the other four again with the winner competing with the other heat winners for the den championship and entry into the pack finals.

The winner takes his rocket to the registration table for recording, then to the awards platform for recognition. He then returns to the spectator area to wait until his name is called again.

Run as many quarter-final and semifinal heats as necessary to determine the contestants for the final.

As ships are eliminated, make sure the contestants are applauded for their efforts.

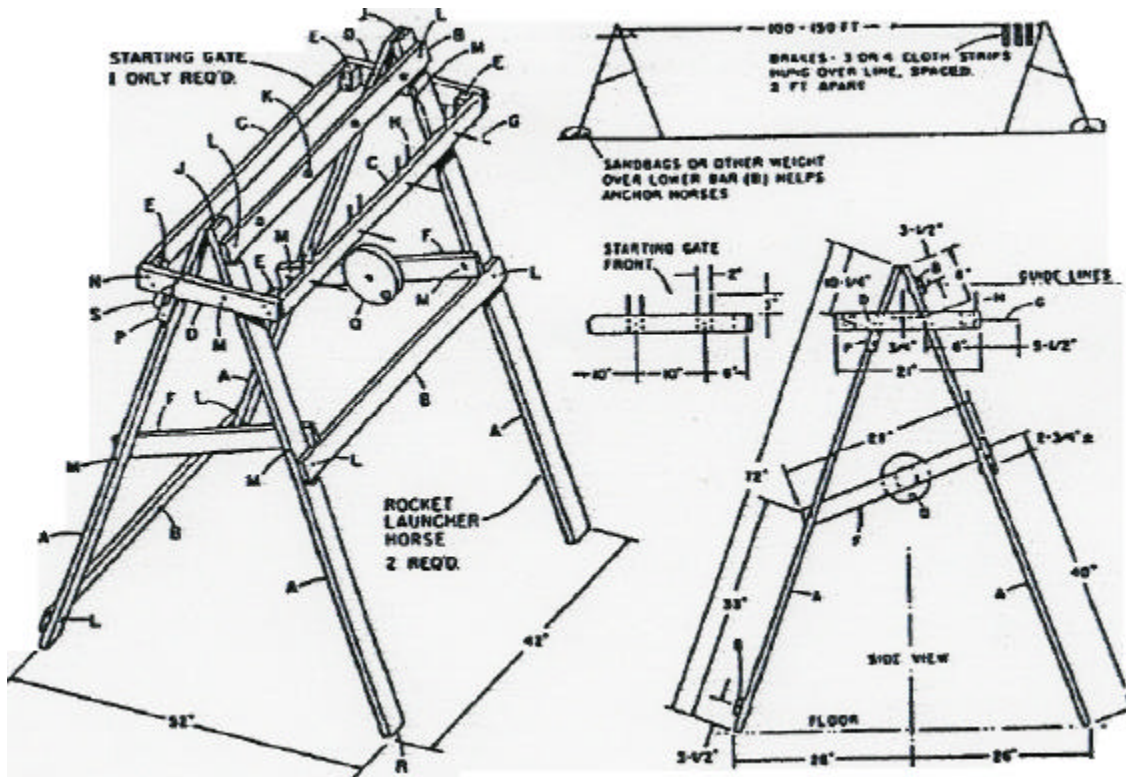
Tips for Preparing for Flight

- Lubricate the rubber bands before the derby. This prolongs the bands' life and power and will help reduce the possibility of breaking during the competition. They can be soaked overnight in castor oil. Or mix two parts green soap, one part glycerin, and one part water and rub the mixture on the rubber band about an hour before racing.
- Have extra boxes of rubber bands on hand. Remember, it takes three rubber bands to fly each ship properly.
- Experienced rocket racers "warm up" their space ships by gradually winding the rubber band motor to its full capacity—first 50 turns, then 100, then 200, etc. Release the propeller between each winding.
- A small hand drill is excellent for winding rubber bands. It also helps speed up the event. Check the ratio of the drill by making one revolution of the crank handle and count the number of times the chuck turns. Most drills average a one-to-four ratio, thus it would take 40 turns of the crank to give 160 winds on the rubber-band motor. When using the hand drill winder, it's best for one person to hold the rocket and propeller while another stretches the bands about 12 to 15 inches beyond the rocket tail and turns the rubber bands, he gradually shortens the distance between him and the rocket.
- For a more evenly matched race, wind all rocket motors the same number of turns. For 100-foot launch lines, 150 to 170 winds should be sufficient.

Special Space Derby Events

- **Speed.** First rocket to reach the finish line wins.
- **Endurance.** Last rocket to reach the finish line wins.
- **Relay.** Use two or more guidelines. Boys form teams of twos. The first boy releases his rocket, and as soon as it reaches the other end of the line, his teammate removes it, rewinds it, puts it back on the guideline, and releases it. The first rocket to return wins.
- **Altitude.** String a guideline which is about 12 inches from the ground at the starting line and 5 feet at the finish line. Gradually, raise the high end of the line until all rockets have been eliminated. The one that climbed the highest wins.
- **Just For Fun.** Have rockets break balloons at the finish line. Do this by inserting several straight pins through a piece of cardboard. Suspend the cardboard from the finish line and place a balloon in front of the pins. The rocket will drive the balloon into the pins.

SPACE DERBY LAUNCHER CONSTRUCTION PLANS



ROCKET LAUNCHER PARTS LIST

PART	QTY	MATERIAL DESCRIPTION	PART	QTY	MATERIAL DESCRIPTION
A	8	5/4" x 3" x 72" Spruce Bridging	K	8	No. 3 Screweye (1" diameter)
B	6	5/4" x 3" x 42" Spruce Bridging	L	12	1/2" x 2 1/2" Carriage Bolts, Wing Nut and Washers
C	2	5/4" x 3" x 42" for Starting Gate Only	M	12	1/2" x 4" Carriage Bolts, Wing Nut and Washers
D	2	5/4" x 3" x 21" for Starting Gate Only	N	9	1/2" x 3" Carriage Bolt for Starting Gate
E	4	2" x 2" x 3" for Starting Gate Only	P	2	Scrap 1" x 2" Rest
F	4	5/4" x 3" x 29" for Starting Gate Only	Q	1	Reel, 1/2" Plywood x 7" Dia. - 5/4" x 3" Dia.
G	4	1/2" Diameter x 6" Dowel	R	8	Rubber Chair Leg Tips (Optional)
H	8	1/2" Diameter x 4" Dowel	S	1	Gate Stop Pin (Coat Hanger Wire)
J	4	1" x 3" hinge with screws			

COMPLETE INSTRUCTIONS:

Cut all lumber to lengths. Then mark and drill y." hales, as noted on plan. Fasten the hinges in place with 1" screws. Drill the %" dowel holes in starting gate (see front view). Drill holes completely through t- lumber so the dowels can be easily replaced if broken. Assemble the entire launcher, using correct size bolts and wing nuts, as noted on plan. Screw the screweyes in place, as shown. Then open the yes slightly to the line can be hooked on instead of threaded. The line reel can be made of two 1/4" plywood disks, 7" in diameter, with a 1 1/4" x 3" diameter center. Drill hole in center for axle bolt. Hole for drawer-knob is drilled next. Then assemble the entire. reel. A low-priced fShin~ reel can also be used. Screw rubber tips to the bottom of legs "A". Nail gate supports "P" in place. Drill hole for gate pin(s) which is made from a wire coat hanger.

SET -UP:

Stand the launcher racks about 100 -1&J feet apart. Place some weight (sand bags) over the B crossbar. If used outdoors, tent pegs can be driven into the ground and lased to the cross brace "D". Strin9-outtheguide line(OOJb test monofilament fishing line) over the screweyes. Then pull and fasten the line as tightly as possible. Hang several strips of cloth at the Finish Line. The launcher is ready for rockets. Wind the rocket motors (3 or more rubber bands). Then place rockets into Starting

RAINGUTTER REGATTA

The actual "race" will be divided into age categories: Tiger, Wolf, Bear and Webelos. Each age group will race amongst themselves. The race will involve two lanes of "rain gutters". The boys are to blow air on the boats in order to advance them through the water. Hands are only to be used to upright a turned over ship, and are not to be used to advance the boat. In addition, boys should not use their faces, lips, hats, nose or other bodily parts to move the boat - just the air in their lungs!

The Raingutter Regatta is similar to the pinewood Derby except that the models are miniature sail boats. Although the seas are only 10-foot lengths of raingutter filled with water, and the ships a mere 7 inches long, the race is a very exciting event. Each boy will build his own boat with supervision and help from parents and leaders the day of the event. He also provides the wind for the sail with his own lung power.

The regatta boat kit, available from the Scout Shop, has a pre-shaped balsa hull, metal keel and plastic sail. The hulls are sanded and shaped, and are colorfully painted. Hull and sail are then decorated with decal kits (also available at the Scout Shop). The boats race in pairs on raingutter courses propelled by the boys blowing into the sails with a drink straw.

Tips for the Raingutter Regatta:

- The bottom edge of the sail needed to be about 1/2 inch above the deck of the boat. If the sail was too low the corners rubbed against the gutter or dipped in the water. If the sail was too high the boat was top heavy and tended to tip over.
- The boats sailed best if they were balanced with more weight to the rear. This elevated the bow of the boat, and when they were blown, they ran almost even.
- The keels needed to be placed about 3/4 of an inch behind the mast. Don't follow the instructions in the kit.
- The rudder should be placed touching the keel.
- Blow evenly with the straw at a point about 1 inch from the bottom of the sail. Blowing the boat down one edge of the gutter rather than letting it "tack" back and forth seemed to be the fastest.
- Use "Krylon" spray paint -- it dries in about one minute on the balsa wood hulls.
- Try to learn how to make double elimination brackets for odd numbers of boats *before* the race.
- Don't have the race on a 100° day.
- Have fun!!

Rules:

1. Hull may be no longer than 7" or shorter than 6 1/2"
2. Mast should measure 6 1/2" from the deck to the top.
3. The keel, rudder and sail supplied in the kit will be used.
4. Boats must have been made for this race.
5. Pushing the boat will not be permitted. Only lung-power will be used. If boy pushes his boat, he will forfeit the race.
6. Occasionally, a boat will get hung up under the lip of the gutter. The boat may be nudged away, but the boy must be careful not to push the boat in a forward motion.

RAINGUTTER COURSE PLANS

2 - ten foot lengths of 5" diameter half-round gutter

4 - end caps for gutters

2 - end braces -- 1" x 4" x 23"

4 - diagonal braces -- 1" x 2" x 72" 4 -legs -- 2" x 2" x 34"

2 - trough supports 1" x 4" x 36" cut so the gutter will fit snug #10 flat head wood screws for all fastenings (1 1/2")

