

Official Space Derby Rules

CUB SCOUT PACK 88

1. Overview – “Just what is a Space Derby?”

The space derby is similar to the pinewood derby except that the models are miniature "rockets", propeller driven and powered by three rubber bands - that travel along a heavy monofilament fishing line. Please feel free to give guidance and minimal assistance to your Scout as he builds his Space Derby rocket, appropriate to his age. This is a chance for your son to be part of a team (he and you), and to enjoy the spirit of friendly competition with his peers. These “Official Space Derby Rules” are written to help you keep it simple and fun for your child, and to know what to expect when it comes time to race your rocket.

A special note to all parents and scouts: Together, please read the concluding article (Section 8) on sportsmanship. While everyone will be trying to win, it's always a good idea to start out by remembering the Cub Scout Motto, "Do Your Best," and some of the basic ideas behind good sportsmanship.

2. Ground Rules for Participation – “Who can race?”

The leadership of Pack 88 has a few basic participation guidelines:

- a. The race is open to all registered scouts and family members of Pack 88.
- b. Each scout may enter only one rocket in the competition. They should have a significant level of participation in building their rocket (designing, sanding, gluing, painting, decorating, etc.).
- c. The rocket must have been built during the current program year (the school year in which the Derby is held). Rockets that have competed in a previous Derby are not permitted. The Pack provides a new kit to every registered Scout each year to make this easier.

3. Rocket Specifications – “Are there rocket building rules?”

To ensure that the race is as fair as possible, all rockets must be made from the Official BSA Space Derby Rocket Kit (this includes the rubber bands, propeller, front bushings, body, hanger, wire shaft and dowel). Here are some additional rocket construction details to be aware of:

Note: All illegal rockets must be disqualified prior to racing. Please don't cause disappointment and embarrassment to your Scout and insist that it be raced.

- a. The nose cone (propeller assembly) must not be glued in place on the nose of the rocket. A notch or groove should be formed in the tail of the rocket to seat the band holding dowel. The band holding dowel must not be glued in place. (These rules allow band replacement in case of breaks)
- b. The rocket body may be no longer than 7 inches, not including the propeller and fins. The width must be 2.75 inches.
- c. The hanging device supplied in the kit must be used and securely glued in place.
- d. The rockets will be powered by three (3) rubber bands as the motor (this leaves one additional rubber bands from your kit as back ups in case of breakage during a race).
- e. There are no restrictions on the weight or design of the rocket. Rockets may be detailed in any way as long as it does not exceed length restrictions, is flight worthy, structurally sound and does not interfere with another rocket during the race.
- f. Scout may use graphite powder between the propeller and the bushing if desired. Other forms of lubrication are prohibited.
- g. No auxiliary starting devices are allowed.
- h. No loose weights or material allowed.
- i. The hanger will be securely attached with the rounded end forward not protruding in the rubber band chamber. It should be mounted about in the center inch but balance is important in locating the right spot.

- j. Once the rocket is submitted for entry, no further adjustments can be made except in the case of mechanical failure.

4. Rocket Assembly Guidance – “How can I build a ‘winning’ rocket?”

The following assembly guidelines (tips) are provided to help you get the best performance from your rocket, they are not meant to be restrictive. (See **3. Rocket Specifications** above for requirements.)

- a. Use small rubber bands to hold the balsa wood halves together while it dries.
- b. A potato peeler is a good tool to shape the rocket. Sand paper also works to shape the rockets body.
- c. Do not use power tools as the wood is Balsa wood (very soft) not pine wood.
- d. Use a sharp knife to form the grooves in the rocket for the fins and the hanging fixture.
- e. Lighter rockets tend to go faster than heavier ones.
- f. Gently rounded shapes are more aerodynamic than needle pointed shapes. Reduce 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.
- g. **SPRAY PAINT melts fins.**
- h. Rubber bands should be lubricated before the race. They are the motor and should be strong and flexible.
- i. When you start to carve remember that the end with the small hole is the rocket nose. Don't carve away the nose cone area.
- j. Do not remove too much wood from the area where the hanger will be fitted.
- k. Make sure the groove in the rear of the rocket is deep enough so that the plastic dowel isn't forced out by a fully wound rubber band.
- l. To help increase the rockets speed reduce the wall thickness to a minimum of 1/8th of an inch. Do not weaken the area around the hanger or carve away the nose button circle.
- m. Do not apply too much paint unless you sand between coats.
- n. Test the rockets balance by hanging it from a string attached to the hanging fixture adjust the weight by carving or sanding wood from the heavy end.
- o. Make the propeller shaft as short as possible by bending it close to the propeller cut off the excess wire with wire cutters.
- p. The small plastic tube in the kit needs to be placed over the curved portion of the propeller shaft. If you soak the tube in very hot water for several minutes and then slide it onto the straight portion of the shaft using a pair of needle nose pliers you can get the hook end covered. This protects the rubber bands from breaking.
- q. The propeller goes onto the shaft with the rounded edge touching the bushing.
- r. Make sure the propeller shaft is bent properly to hold the propeller in place.
- s. Make sure the cover hook is open enough to accept 3 rubber bands.
- t. Make sure the red plastic liner covers the entire hook. The red plastic sleeve that slips over the metal hook on the inside of the propeller assembly **MUST** be put in place. It is there to prevent the metal hook from cutting through the rubber bands during the winding. It sometimes take a little effort to pull it all the way on but it can be done. You can always grab the end of the wire with some pliers and work on it slowly but make sure it goes all the way to the end of the hook.

5. Inspection and Registration – “What must I do to enter my rocket?”

Before the race begins, all participating “Pilots” must check-in with their rockets. Here are the pre-race check-in details:

- a. Before a rocket may compete in the Derby, it is subject to a technical inspection, to verify that it meets the prescribed specifications (see **3. Rocket Specifications** above for details). If a problem is noted, the Pilot may be asked to correct it before the rocket is registered.
- b. When the rocket passes inspection, it is then registered along with the rocket Pilot's name (the scout's name).
- c. Check-in of rockets is accomplished the morning of the derby from 8:00-9:30 a.m
- d. Registration cutoff will be 9:30 a.m for all participants. Rockets that have not registered by the cutoff deadline will not race, so plan to arrive early enough to get your rocket registered. After registration, the rockets will be held in the Hanger by “Flight Operations” until race time.

6. Competition – “How will the race be run?”

Every race has to have rules, and ours is no exception. Here's what to expect:

- a. Prior to each heat, rocket numbers and lane assignments will be announced. Pilots are to take their rockets from the Hanger and give them to the official winder, “Launch Control”, and then take their position at the finish line. Upon completion of the race, “Mission Control” will give the rocket back to the pilot to place back in the designated position in the Hanger.
- b. Once the rocket has been accepted no further adjustments may be made except in the case of mechanical failure (see Racing Rule c).
- c. Each rocket will be turned manually 100 revolutions.
- d. Any rocket that experiences a mechanical failure will be allowed to race again if the rocket can be repaired within three (3) minutes of their heat being called. A Repair/Maintenance Hanger will be provided with tools and materials. If the rocket cannot be repaired within the allotted time the pilot will be given last place finish for that heat. All repairs must be done with “Flight Operations” observing and certifying the rocket's flight worthiness.
- e. In the event that all rockets do not reach the end of the track, final position by distance will determine the race results.
- f. All rulings by Flight Operations and Mission Control are **FINAL**.

7. Rewards and Recognition – “What can I take home?”

The most important values in the Space Derby competition are parent/son participation, good sportsmanship and learning how to follow rules. The Awards Committee is responsible for recognizing and encouraging these qualities in addition to traditional racing awards. Here are the tangible awards that you may receive:

- a. Rockets from all ranks are eligible to be selected for appearance (static) awards. Judges will reward creativity and workmanship.
- b. Medals will be awarded to the first, second and third-place finishers in each rank.
- c. Trophies will be awarded to the first, second and third-place finishers overall in the Pack.

8. Sportsmanship – “How should I act?”

Two things the Space Derby requires each participant to learn are 1) the craft skills necessary to build a rocket and 2) the rules that must be followed. Even more important, though, is how we act and behave while participating in the Space Derby or any other group activity. This is called sportsmanship.

The first thing to remember about sportsmanship is that everyone's skills are a little different. Your craft skills may be just developing, while someone else may be more experienced. Parents have different skill levels, too. Whether or not you feel that you have good rocket-building or racing skills, remember, you and your friends are individuals first and racers second. This idea is often called having respect for others.

The second thing to remember is to follow the rules. Without rules, there would be no Space Derby. You will never know if you are really good at doing something unless you follow the rules. This is often called being honest.

The third thing to remember about good sportsmanship is that there are winners and losers in every competition. You accept this when you choose to compete. There may be times when you win and feel happy, and times when you lose and feel unhappy. Being a winner is easy, and losing is sometimes hard. If you win, you must not brag or gloat. If you lose, you must not feel jealous or bitter. To be a good sportsman, you must be able to say, “I did my best” and be satisfied with the results. You must also be able to appreciate and feel happy for someone else when he runs a good race or builds a neat rocket.