THE CHALLENGE
Custom design your own race course or create multiple course options based on time and terrain. Then design a car that will be launched with CO2 fuel canisters. Engineer your car to master a single course or go for the ultimate challenge and design an all-course winner!

Safety Messages
Please read this instruction manual carefully before you begin.
• Adult supervision and assistance are required.
• This kit contains small parts, intended for children ages 8 and up.
• Wood carving tools required (not included).
• Adult supervision required when using tools.
• Never insert CO2 canisters while carving wood block.
• Never insert CO2 canisters before the race event.
• Never alter the pre-drilled CO2 canister space.

Contents
Wood Block with canister hole
Wheels (4) Axle Screws (4) Axle Tool Eyeblets (2)

SUGGESTED RACE COURSES
DOWNHILL
This course combines gravity with the burst of the fuel canister to speed cars down to the finish line.
Terrain: Downward slope; hard-packed, gravel-free surface
Distance: 100-200 feet
Scoring Options: Heat Winner - fastest head-to-head moves to next round (good for shorter tracks)
Distance – car that travels longest distance – (mark Scout’s name next to distance)
Car Design – Consider: Engineering Principle – Gravity Pull
Overall Weight – Medium to Heavy
Weight Distribution – Front to Back
Wood Profile Advantage – Wide Body

What’s going on here? INERTIA
Property of matter by which an object remains at rest unless acted upon by some external force. Car with lower mass (weight) will accelerate faster.

GRAVITY BATTLE
This course uses aerodynamics to defy gravity.
Terrain: Sharp, upward slope; hard-packed, gravel-free surface
Distance: Up to 50 feet
Scoring:
Distance – car that travels longest distance – (mark Scout’s name next to distance)
Car Design – Consider: Engineering Principle – Defy Gravity
Overall Weight – Light
Weight Distribution – Heavier Toward Back
Wood Profile Advantage – Narrow Dragster

What’s going on here? THRUST
A force that propels an object, sets it into motion, or keeps it moving.
CO2 gas rushing out of canister forces car forward.

What’s going on here? DRAG
A force that resists object’s movement through air. Car with smooth, rounded surfaces will “cut” through the air faster.

SPRINT SPEED
This course is flat and smooth for speed.
Terrain: Flat, smooth, hard-packed, gravel-free surface
Distance: 50-75 feet (Think: “shorter = faster”)
Scoring:
Heat Winner – head winner moves to next heat in multi-run format
Car Design:
Engineering Principle – Light and Aerodynamic
Overall Weight – Extra Light
Weight Distribution – Equal Front to Back
Wood Profile Advantage – Dragster

What’s going on here? VELOCITY
The time rate or change of position of an object in one direction. Velocity = distance/time
Car with lower mass (weight) will accelerate faster.

Scoring Options:
Heat Winner - Fastest head-to-head winner moves to next round (good for shorter tracks)
Distance – car that travels longest distance – (mark Scout’s name next to distance)
Car Design: Engineering Principle – Reduce Friction
Overall Weight – Medium
Weight Distribution – Equal Front to Back
Wood Profile Advantage – Wide Body

DESIGN CAR KIT
Your Engineering Design Process
A great design begins with a great design! Follow these design steps to success:
• Sketch an idea
• Design and lay out a profile
• Construct a car
• Do a trial test
• Make modifications
• Finish the details

Think it Over
Engineering principles to consider (check bullets to indicate the right choices for your car and course styles):
• Overall Weight: Extra Light
• Extra Light
• Medium
• Heavy

Weight Distribution:
• Toward Front
• Toward Back
• Evenly Distributed

Wood Profile:
• Dragger
• Wide Body

Choose the Profile
Each wood block has a pre-drilled CO2 canister hole in back of block. Lay wood block on short side to create a Drag Racer or on long side for Wide Body Racer.

Identify Depth of CO2 Canister Hole
Prep and cut out graphs. Tape to the sides of the block and use as a guide for location and depth of CO2 canister hole. Carve desired design allowing ½” wood around CO2 canister hole.

Wheel Alignment
Wheel alignment is a critical variable in racing. Consistent wheel height and balanced axle insertion make all the difference!
To ensure the most accurate wheel alignment:

1. Measure and mark all axle locations and pre-drill prior to carving.
2. Axle locations should be between 1/8” and 3/8” above bottom of car. Any higher on the car and it will be too low to fit on race line.
3. All axle locations should be at an equal height (all wheels should make contact with surface).
4. Axle screws are self-tapping and will cut the hole. A 3/32” pilot hole can be used for pinpoint placement.

Cut, Carve, Shape Your Vehicle
Wood block can be shaped with hand or power tools. Make the most of your woodcarving by reviewing the following merit badge requirements.

• Merit Badge – Woodcarving
• Merit Badge – Woodworking
• Merit Badge – Model Design and Building

Color! Add-ons!
Unlimited possibilities… wood may be stained, primed, painted, decaled, stenciled, or wrapped. Blastcar® Rules and Regulations prohibit the use of add-ons such as springs, ball bearings, etc.

Axle Screw Preparation
Racing axle screws were developed just for BSA® Blastcar®. The unique design allows wheels to be placed anywhere on the car (racer or wide-body-style). Smooth shaft near axle screw head can be polished, but screw threads should not be altered since they are already designed for easy insertion into wood block. No pilot hole is required as the axle screw has a tap-in feature.
THE EVENT

Cars are fueled by CO₂ canisters. All cars are steel cylinders filled with compressed CO₂ fuel. The CO₂ is removed from the air at the factory and then released at the race event—no new CO₂ is created or added to the atmosphere. This is called a zero event. Blastcar™ cars are designed using principles outlined previously.

The launcher kit has the base launcher, start/finish plates, and race line for tethered head-to-head racing. Set up is easy and fun. Races may be run on a variety of courses.

SAFETY ALONG THE WAY!

• Check race surfaces before using nails, tape, or adhesive with start/finish plates.
• Use only BSA® CO₂ canisters.
• Never insert CO₂ canisters to racer or launcher before assembling and tethering to race line.

PRE-EVENT PLANNING

Materials required – minimum items needed to run a Blastcar™ event:
• Launcher Kit
• Weight Scale
• Car Kit—One per Scout
• Duct Tape
• CO₂ Canisters—10-pack
• 150-foot Measuring Tape

Additional recommended items:
• Heat Schedule for head-to-head racing
• Cushions, pillows, or towels to stop cars at finish
• Hi-Speed Graphite

Heat scheduling will determine the number of CO₂ canisters needed to run all races. You should add 10% above that number to allow for disputes or re-run heats.

RULES OF THE EVENT

Blastcar™ is intended for Boy Scouts only – Tenderfoot to Eagle ranks. Additional racers may be added to the event at the discretion of the troop.

Car Construction

The car is to be constructed from the plans in the BSA® Blastcar™ Car Kit. The original axle screws in the kit must be used for the axles. Only weights, paint, and other purely decorative items may be added to the racer.

Car Dimensions

The total overall length must not exceed 10”. The eyeflies must have 1/4” clearance to the race surface. Car Height

The total weight of the car without CO₂ canister must not be less than five ounces as determined on the official weight scale. Any added weight must be solid in form (no liquid or moveable weight) and everything must be firmly attached to the racer.

Axle Placement

Axle placement may be anywhere on the car. By turning the wood block on its side, a drag-style racer or a wide-body racer can be created. Axle screws are screwed into the wood block, back out, wheel is attached, then screwed in for final placement.

Car Lubrication

Only dry lubricants such as graphite may be used. No liquids may be present when the car is checked in. Scouts may lubricate cars between heats and in the designated areas.

Pre-Race Testing

Any type of spring, wheel bearings, bushings, or washers are not allowed. The car must be freewheeling.

Gravity testing is recommended to test all cars prior to the race. Create a ramp using cardboard, wood, or sloped surface. Check for car alignment, freewheeling, and loose parts on the car.

Car Inspection

Each car must pass inspection by the race judge on the day of the race. See Car Inspection Guide at the end of this guide. The judge has the right to disqualify any car that does not meet the outlined criteria. Cars are checked in, given a race number, and entered on the heat schedule. Each Scout is responsible for bringing his car to the “Car Show” site. Car entry fees are added to the table if they are moving onto another heat. If the car needs repair, the Scout will be allowed to repair the car in the official designated area. Any necessary repairs must be made in a timely manner.

Attendance

The Boy Scout must be present to enter his car in the event. Each Scout is responsible for checking his car on the race line, inserting the CO₂ canister, and then backing his car into the launcher.

Sportsmanship

Poor sportsmanship will result in disqualification of the Boy Scout. Boy Scouts are expected to be dignified whether winning or losing.

Previous Year’s Cars

A Scout cannot race a car built in a previous year. A new car is to be built from a Blastcar™ kit.

Fuel Canisters

Only Official BSA® CO₂ canisters may be used in the Blastcar™ event. See CO₂ Canister Safety Rules.

SETTING UP THE TRACK

Start Line

Screw pegs into start line plate. Secure start line plate to race area with duct tape. Make sure start pegs are firmly in place. Make overhead knot in race line (50# test line) and trim excess to 1/2”. Loop around start peg and place pencil, pen, or stick into race line spool. Carefully walk to designated finish line, untie race line cleanly. Make another overhead knot at about 1’ beyond finish. Tighten and trim end of knot to 1/4” tail. Stretch line taut and loop around finish line peg. Now use duct tape to secure finish line plate to race surface. Repeat for second lane. See race line test at end of guide.

Finish Line

Place ten inch just past finish line and before the finish line plate. This will stop the cars before hitting the pegs. Race track length must be a minimum of 66”. Race line should be discarded at the end of the event. A clean, fresh race line should be used at the start of a new event.

Car Entry

Cars are brought to the start line plate. Cars are secured to the race line via the two eyeflies screwed into the bottom of the car. No car is allowed to race without being secured to the race line.

RUNNING THE RACE

Each inspected car is numbered and entered into a Heat Schedule for racing. As each heat is called, Scouts retrieve their cars from the “Car Show” table and bring them to the start line. Starter instructs them as to lane assignment. The boys secure their cars into their assigned lanes by threading the race line through eyeflies under their cars. CO₂ canisters are then inserted by the Scout once in the race lane. Each car is then backed into the launcher. Car is disqualified if the CO₂ canister protrudes from the wood block and can be seen when backed into launcher. Start command is a troop- agreed- upon feature based on course scoring. Visual versus electronic technique will determine the method of start command. Never touch or remove the CO₂ canister from the car until the car has reached the finish line. Cars are removed from the race line at the end of the finish line or walked back to the start line for the second heat. Race results are communicated to the heat scheduler. Additional heats can be set up by the program coordinator as needed.

Race Safety Regulations

• All race participants and spectators must maintain a 10’ clearance around the launcher and race lanes.
• Only BSA® 8-gum CO₂ canisters may be used in cars.
• There is to be no alteration of the pre-drilled canister hole in the wood block.

The launcher is to be activated by a BSA leader. All cars are to be tethered to the race line during all races and on all courses.

CO₂ Car Safety

CO₂ canisters add an element of excitement to the older boys programs, but Scouts must also use care and follow guidelines for safety.

• Each kit includes a template showing the location of the pre-drilled hole.
• Canisters must be kept in an environment under 140 degrees.
• Canisters are never to be used in the car design or construction phase.
• Power tools and sharp hand tools are never to be used around CO₂ canisters.
• Add canisters at the event.
• Adult supervision is required for this program.

CO₂ CAR INSPECTION GUIDE

Note: All inspections are done without CO₂ canisters in place.

Outer Dimensions/Weight

• Maximum Length: 10”
• Maximum Width: 4½”
• Maximum Height: no restriction
• Minimum Height: 5 ounces
• Maximum Weight: no restriction

Official BSA® Components Allowed

• BSA® Official Blastcar™ wheels (Slick, Ath, Monster)
• BSA® Axle Screws
• Wood Block with unaltered canister hole
• Eyeflies—two secured under carriage, centered (race line run front to back)

Prohibited Items

• Liquids
• Moveable Weights
• Moveable Parts
• Loose Parts
• Acceptable Items
  • Dry Carpet
  • Decals

What’s going on here?

SPECIFICATION

Detailed description of requirements, dimensions, and materials.

Car will be weighed and measured at the event for fairness and safety.

What’s going on here?

TOLERANCE

Permissible range of variance in a dimension of an object. Car weight tolerance is a minimum of five ounces with no restriction on maximum weight.


Visit www.scoutstuff.org para obtener instrucciones en espaol.