JET CAR DESIGN, BUILD AND RACE:- RULES AND INSTRUCTIONS

GENERAL

Your Team will design and build a "Jet Car" from a kit of parts supplied by the Sidmouth Science Festival. (The propulsion unit itself (the "rocket motor") will be supplied and fitted and ignited only by designated Science Festival personnel (the "Race Officials") on the day of the race.)

The main object of the event is to have fun in the design and build phase, and come to witness your Team's car being fired up and raced along a track at the Norman Lockyer Observatory (NLO). (If you want your car raced on your behalf, but won't be there on the day please hand it to a member of the Committee before the race day. See "Identification" below.)

There will be two competition winners from those who design and build their car on the day and two from those who home-design and build:

1. The Team who enters the fastest car
2. The Team who enters the most interestingly designed and well-built car. It must be capable of traveling at least some way down the track!

The judges' decision is final.

The race track itself is a reasonably flat, straight and level concrete path. There are however some bumps and undulations and your car will have to be robust enough to survive this non-ideal surface. We anticipate a well-designed car will travel at 50-100 km/hr over the measured 50 m. The car will be guided by a guide-wire installed at the race track. This will keep it on course on the track, stopping it from being a danger to contestants/spectators.

Entries will be taken on the day of the competition from those teams who have previously registered and built their jet car before the race day (JET CAR HOME DESIGN AND BUILD). It is also possible to enter a car that has been designed and built at the event itself (with more limited resources). All entries will be checked for compliance with the construction rules below before they can be accepted.

AT THE RACE

SAFETY AT THE RACE

To witness the race, all competitors, along with other spectators, must adhere to any instructions given by Race Officials, and stay behind the track barriers. Children must be supervised.

1. Hand in your completed car to the Race Officials before the race. They will check it for compliance and if compliant formally enter it (by your name) into the Race Record. It will then be displayed on the Entrant's Table. Cars will be raced in the approximate order they appear in the Race Record.
2. The Race Officials will then load the rocket motor into your car, and thread it onto the guide wire.
3. A Race Official will detonate the rocket motor, propelling your car (at break-neck speed!) along the track. Shout and cheer your car on!
4. The time to pass between the "START" and "END" gates (approximately 50 m apart) will be recorded in the Race Record against your car.
5. A Race Official will un-thread your car from the guide wire for you to collect. Cars can only be collected when all racing is completed or on permission of a Race Official. If you want to keep your car but will not be present at the end of the race, please inform a Race Official at time of entry.
6. At the end of the competition prizes will be awarded for the fastest cars and for the best designed and built cars.

DESIGN AND CONSTRUCTION RULES

All entries will be checked for compliance with the construction rules below (**items in BOLD)** before they can be accepted.

These instructions only give the bare minimum of information, allowing you to use your engineering abilities, skill and imagination to build the fastest and / or most interestingly designed and well-built car. They are not intended to be step-by-step prescriptive instructions followed in precise order. Therefore read them through before you start construction, and then plan the detailed design and construction work yourself.

Safety
Car construction requires the use of small hobby / DIY tools. Children should be supervised in the use of these tools.

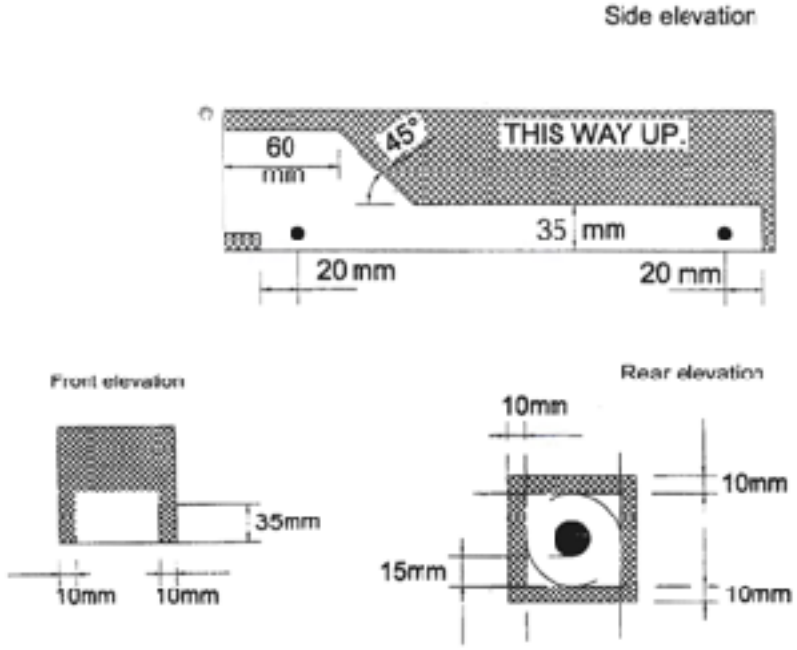
The Kit
Items marked in **bold** must be used. Other items are not compulsory: alternatives can be found.

- **1 x high density pre-drilled Styrene block**
- 1 x 4 mm diameter, 300 mm long dowel to make axels (Home Design and Build)
  or
- 2 x 4 mm diameter, 111 mm long dowels for axels (Build on the Day)
- 4 x 70 mm diameter MDF wheels
- **2 x expanding plastic plugs with screw-in eyelets fitted**

The Basic Concept
The instructions in **bold** must be followed – particularly pertinent to Home Design and Build.

The body of the car is the styrene block. You can cut this into a streamlined and or pleasing shape with sharp knife or junior hacksaw, and get a smooth finish with sand paper. Take care when using these tools.

1. The diagram below shows the maximum extent of any cutting. **Do not cut beyond this**. You need not however cut as far as this area.



One END of the block has a pre-drilled hole (~ 18 mm diameter) to accommodate the rocket motor (not supplied – to be inserted and ignited on the day of the race by the Race Officials). This end of the block will be the rear of the car. (Marked "Rear elevation" on the diagram.)

2. Design and Build on the day:

    a. Two through-holes are pre-drilled in the long sides of the block. These are the intended to take the axles. These holes are drilled close to what will be the underside of the car.

    b. The wheels will be glued to the axels by a Race Official or supervising adult

3. Home Design and Build: The axel holes mentioned in 2a above are omitted, allowing you to choose optimized diameter (perhaps for different sized axels and bushes) and optimized positions – perhaps for different sized wheels. **The underside of the car, once the wheels are fitted, must be 17-25 mm from the ground**.

The car is guided by a taught guide-wire installed at the race track. The wire will be threaded through the two eyelets which must be secured in the plastic plugs which are themselves screwed into the underside of the block. **The use of these eyelets and plugs is compulsory**. It is advisable to screw these in along the centre line of the block, and approximately 60 mm from each end of the block. Avoid the axels!

Additional Items

You may choose to enhance your car with commonly available materials, with the exception of adding any other means of propulsion (other than the rocket itself). Consider gluing items, painting body work etc., adding stickers, flags, spoilers etc. **Flammable items must be kept away from the rear end of the car**. **Any additions to the car must not make it exceed 170 mm at any point in overall height off the ground, and 270 mm at any point in overall width.**

Alternative wheels, alternative axels, use of bushes, aerodynamic shaping, aerofoils, flags etc. are all permissible.

Identification

It is recommended you write your name etc. on the underside of the car. If you will not be present at the end of the race itself (see "At The Race") and want your car to be considered for a prize and / or retained for future collection, it is essential you have your contact details on the car.