

2008-09



Rules & Regulations

www.gtinschools.co.uk

This pack is intended for teams who wish to enter the Sports Car Education Class
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Getting Started

What is the GT Racing, Sports Car Challenge in Schools?

Working with the workforce of tomorrow.... The GT Racing, Sports Car Challenge in Schools is a competition, open to all UK based Secondary Schools, Colleges and (organised) Youth Groups, to design and manufacture CO₂ powered model GT sports cars. The process will closely follow the real life process that Engineers in automotive companies such as Jaguar follow. i.e. sketching, modeling, scanning/digitising, analysing, prototyping, testing and evaluation. Student teams compete against each other to determine the best engineered sports car in the UK. It is just like being in a real automotive design and engineering team. The Challenge will run alongside the F1 in Schools Challenge as a separate class of entry.

Following the successful pilot of the GT Class, Sports Car Challenge in Schools in 2007-08, this season the challenge is now open to all schools and Key stages 3 - 5. Team Peragon from Carnoustie High School in Scotland have set a very high bench mark for the competition. The team and their car can be seen below.

Below: National Champions 2007-08
Team Peragon at The National Final



Notes



Specification Sheet Part 2

Team Name:.....

	Body Dimensions	Measurement Value (mm)/(g)	None compliance
	Wheel to body dimensions		
5a	Wheels visible from plan view	Yes No	
	Power Plant		
6a	CO2 Cartridge Chamber Diameter		
6b	Lowest Point of Chamber to Track Surface		
6c	Depth of Hole		
6d	Wall thickness around cartridge		
	Screw Eyes/Plastic Guides		
7c	Inside Diameter of Screw Eyes / Plastic Guides		
	Car Body Design		
8a	Dimensions of Passenger Cell Block		
8b	Dimensions of Engine Block		
8c	Body painted to a high gloss finish	Yes No	

Measurement Tolerance Limits + 0.1mm
Weight Tolerance Limits + 0.5g



Getting Started

Why was F1 in Schools introduced?

F1 in Schools exists to raise the profile of engineering across our schools and colleges.

CAD/CAM, CNC and VR systems are now common place in the manufacturing industry, which is why it is so important for the engineers and designers of the future to get to grips with it early on. Students using CAD/CAM, CNC and VR software are able to design, test and manufacture their own creations using a computer. From September 2000, the teaching of CAD/CAM became a compulsory part of the National Curriculum.



Primarily, F1 in Schools provides students with an ideal opportunity to experience the very latest developments in manufacturing technology:

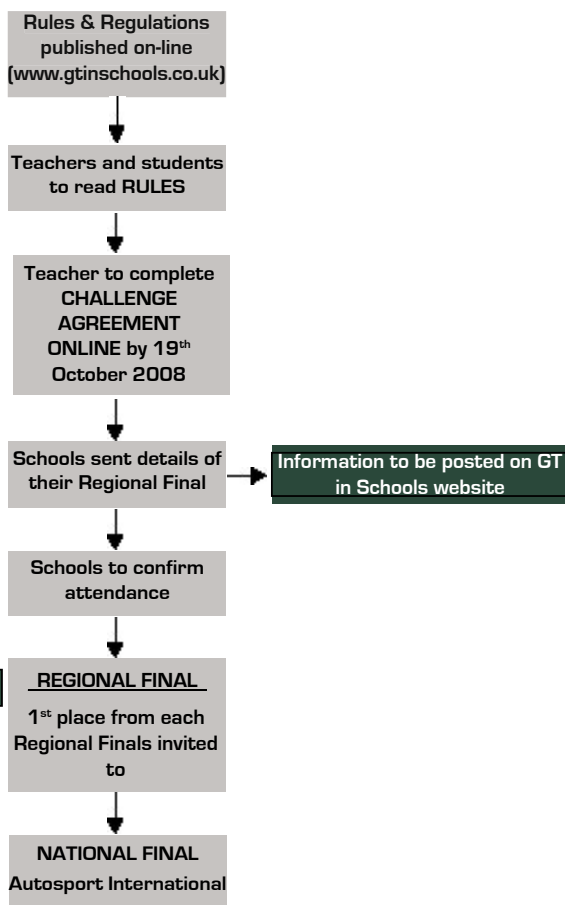
- CNC (Computer Numerically Controlled) Machines, such as the Denford MicroRouter, allow processed CAD drawings to be manufactured to high degrees of accuracy, fit and finish.
- CFD (Computational Fluid Dynamics) packages, such as VWT (Virtual Reality Wind Tunnel) allow computer models of car designs to be analysed, with regard to aerodynamic efficiency, then modified to further increase performance.
- Video Conferencing systems allow students to solve problems in live conferences with experienced professionals, share and develop files on-line and visit manufacturing centres without having to leave their classroom.
- CAD (Computer Aided Design) encourages students to think, explore and visualise their ideas in three-dimensions, using features such as complex curve modelling and surface rendering, alongside more traditional orthographic presentations. Packages such as Solid Edge include many features developed around real industrial applications. Schools can register through F1 in Schools for free copies of Solid Edge, or use design systems already in place at their schools.
- CAM (Computer Aided Manufacturing) packages, create an environment where CAD designs can be developed and prepared for automated manufacturing processes. Most CAM packages include a wizard based interface that allows toolpaths to easily be plotted over complex 3D shapes.
- VR (Virtual Reality) packages allow complicated machining and processing tasks to be practised in real time and total safety. Packages allow CNC machining to be experienced, even when you don't actually own the real CNC hardware!



Getting Started

GT Class Sports Car Challenge in Schools - 2008-09

Flowchart.



Specification Part 1

Team Name:.....
 Level of Entry (Age Group): - 11-14 - 14-16 - 16-18
 Designed Using:.....
 Manufactured at (venue):.....
 Manufactured on (CNC Machine):.....
 Manufactured from (material):.....

Team Number Sticker	25mm
40mm	

	Body Dimensions	Measurement Value (mm)/(g)	None compliance
3a	Full Body Length		
3b	Body Sill Height Above The Track (measured between axles)		
3c	Body Width 95mm (measured between axles)		
3d	Total Body Width 95mm Including Wheels (measured from outside edge of wheels or body, whichever is widest)	Yes No	
3e	Body Weight Without CO2 Cartridge		
3f	Minimum body thickness		
3g	Max Body Height measured from track surface		
3h	The main car body and bumpers must be machined from low density Polyurethane model board (size 300x100x100) recommended (Sika M80 ISO845g/cm cubed 0.08) or similar	Yes No	
3i	Different colour for:		
	- front, side and rear screens	Yes No	
	- front and rear light clusters	Yes No	
	- front and rear number plate	Yes No	
3j	Front and rear light clusters must be at extremities of the body (when viewed from front and rear)	Yes No	
3k	Number plate panel dimensions		
3l	The underside of the car body is flat between the front and rear axles	Yes No	
3m	Other features that may be included (these can be made seperately) Wing Mirrors, Door Mirrors, Wipers, High Mounted Brake Light, & Side Repeater Lights		
	Wheel Dimensions		
4b	Front Wheel Diameter		
4c	Front Wheel Width (at surface contact point)		
4d	Rear Wheel Diameter		
4e	Rear Wheel Width (at surface contact point)		
4h	Wheel dimensions are consistant with whole circumference of the wheel	Yes No	
4j	Minimum distance between axles		-

Measurement Tolerance Limits + 0.1mm
 Weight Tolerance Limits + 0.5g



Marking Criteria

9. Quality of Manufacture.

- Use of materials and equipment.

Key Features.	Points Awarded.
Final car design is similar to design proposal (final 3D rendering and clay model), symmetrical in form. Reasonable quality finish on the car body, smooth with some areas needing further attention.	LOW: 1-10
Final car design matches the original design proposal (final 3D rendering and clay model), symmetrical in form. Good quality finish of the car body and use of CAD/CAM to produce graphics and decals.	MEDIUM: 11-20
High quality final car design, identical to proposed design, symmetrical in form and excellent finish on the car body and graphics. Two cars that are identical in every detail (at National Final only).	HIGH: 21-30

Total Marks
available = 30.

10. Sales & Marketing Brochure.

- Sales and Marketing

Key Features.	Points Awarded.
Poor explanation of specification and features. Poor quality brochure with few graphics. Little or no performance and economy figures shown. Little or no evidence of colour and trim specification. No cost and warranty details shown. No car name or logo shown.	LOW: 1-6
Basic explanation of specification and features. Average quality brochure with average graphics. Average explanation of performance and economy figures shown. Some evidence of colour and trim specification. Good explanation of cost and warranty details. Little use of name and logo in brochure.	MEDIUM: 7-12
Good definition of specification and features. Very good quality brochure with good graphics. Good explanation of performance and economy figures shown. Good explanation of colour and trim specification. Very good cost and warranty proposals. Very good use of name and logo in brochure.	HIGH: 13-20

Total Marks
available = 20.



Getting Started

How to obtain software, hardware and consumables.

If you would like to purchase any equipment for the challenge please contact:

Denford Limited,
F1 Sales,
Birds Royd,
Brighouse,
West Yorkshire,
HD6 1NB,
United Kingdom.

T: 01484 728000
E: sales@denford.co.uk
W: www.denford.co.uk

Model Scanning Centres, Manufacturing Centres, Test Centres and Race Centres.

For details of accredited model scanning, manufacturing, test and race centres please contact us through the GT in Schools website (www.gtinschools.co.uk).

Enquiries and Questions.

All questions and queries about the GT in Schools CAD/CAM Design Challenge, should be e-mailed to: contactus@f1inschools.co.uk

For the very latest information, visit the GT in Schools Website (www.gtinschools.co.uk).



Getting Started

Awards and Schemes

As well as the certificate that each GT Racing in Schools competitor receives it is also possible to gain other awards, with the work done by students for the Challenge.

Below are a few of the schemes that can be accessed through the GT in Schools Technology Challenge. If you want any more details on the schemes mentioned below then please contact us via e-mail at contactus@f1inschools.co.uk.

Duke of Edinburgh Awards

The Duke of Edinburgh Award is split into five sections: Service, Skills, Physical Recreation, Expedition and Residential Project. The work done for the Challenge can be used as part of the 'skills' section of the Award. For those who enter this scheme think creatively and make sure you keep a record of all your work using an activities log.

AGE RANGE: 14-25

WEBSITE: www.theaward.org

Crest Awards

BA CREST is a nationally recognised accreditation scheme for project work in the fields of science and technology. To receive an award set hours of project work have to be completed and presented. The portfolio work can be used to gain this accreditation.

AGE RANGE: 11-19

WEBSITE: www.the-ba.net

The Year in Industry

The Year in Industry or YINI as it is also known, is a scheme for 'gap year' students who want to spend a year in industry before or during University. So after F1 in Schools students can take a year out in engineering before going to University.

AGE RANGE: PRE-UNIVERSITY **WEBSITE:** www.yini.org.uk



>> The Year in Industry



Marking Criteria

6. Time Trials.

- **Fastest Time (from all races).**

Points awarded for position in time trials relative to other teams competing. Points awarded will depend on the number of teams per final: the total possible points being divided by the number of teams at the event. First place will always be awarded 40 points and so on in descending order

Total Marks available = 40.

Key Features.

7. Reaction Times.

- **Measuring reaction time.**

Key Features.

Points awarded for position in time trials relative to other teams competing. Points awarded will depend on the number of teams per final: the total possible points being divided by the number of teams at the event. First place will always be awarded 20 points and so on in descending order

Total Marks available = 20.

8. Use of CAD and ICT.

- **Use of each application, quality of work produced.**
- **Graphic technique.**

Key Features.	Points Awarded.
Presents sufficient information and satisfies the entry requirements. Limited use of ICT in other areas of the teams work. Adequate use of CAD/CAM showing the process from design through to manufacture.	LOW: 1-10
Presents information in an organised, clear coherent manner, uses ICT appropriately and satisfies the entry requirements. Good use of CAD/CAM showing a detailed step by step process from design through to manufacture.	MEDIUM: 11-20
Presents information in a well organised and logical manner. Used ICT appropriately and skilfully and satisfies the entry requirements. Excellent use of CAD/CAM as above, showing an excellent understanding of CAD/CAM.	HIGH: 21-30

Total Marks available = 30.



Marking Criteria

4. Verbal Presentation

- Quality of presentation.
- Team work.
- Use of visual aids.

Total Marks available = 30.

Key Features.	Points Awarded.
Informative presentation covering some aspects of the design process and Sales & Marketing brochure compilation (initial ideas, development of ideas, manufacture and evaluation) and how the team organised themselves. Some members of the team spoke in an enthusiastic way and gave an interesting presentation. Some use of visual aids.	LOW: 1-10
Very informative presentation covering most aspects of the design process and Sales & Marketing brochure compilation (analyse, initial ideas, development of ideas, testing and further development, manufacture, finishing and evaluation) and how the team organised the tasks involved in the design and manufacture of their cars. Most members of the team spoke with enthusiasm and gave a very interesting presentation. Used one or more visual aids within their presentation in an effective way.	MEDIUM: 11-20
Very informative, concise presentation covering all aspects of the design process and Sales & Marketing brochure compilation (analyse, initial ideas, development of ideas, testing and further development, manufacture, finishing and evaluation) and how the team organised the tasks involved in the design and manufacture of their cars.. All members of the team took a turn to speak, they enthused about their achievements and gave an excellent presentation. Used two or more different media/ visual aids in an imaginative way.	HIGH: 21-30

5. Wind Tunnel Testing

- Fastest Time (from all races).

Key Features.

Total Marks available = 10.

10 Points will be awarded to the car that has the lowest CD drag co-efficient, reducing down to 1 point for the car with the highest CD drag co-efficient.



Timeline





The Sports Car Challenge Process

CAD/CAM Design Challenge

The Scenario.

The Sports Car Challenge Process for the design, development and manufacture of the GT model sports car is made up of the following elements:

- Sketching
- Clay model manufacture
- Scanning of the clay model
- CAD analysis
- CAM machining of the model
- Finishing
- Testing
- Racing
- Marketing
- Portfolio Presentation

Design
Analyse
Make
Test
Race



Marking Criteria

1. Clay Model.

Total Marks available = 30.

Key Features.	Points Awarded.
Clay model does not reflect sketch. Only basic shape achieved with little detail of individual features. Poor finish to clay surface.	LOW: 1-10
Final clay matches the original sketch proposal. Some definition of individual features. Good finish to clay surface.	MEDIUM: 11-20
Clay model matches sketch in every detail. Good definition of all individual features. High quality finish to clay surface.	HIGH: 21-30

2. Design Portfolio.

Total Marks available = 30.

• Initial ideas through to design, development, testing and evaluation.

Key Features.	Points Awarded.
Limited ideas, developed one idea, minimal testing and review of the brief and specifications.	LOW: 1-10
Team presents a range of ideas. Developing and modelling some of those ideas. Some evidence of testing. Evaluation at key points in the design process.	MEDIUM: 11-20
Presents a range of ideas from all team members and developed several ideas and models. Evaluation of all aspects of the design process, throughout the design portfolio.	HIGH: 21-30

3. Team Design for Sports Car.

Total Marks available = 30.

• Finished product and team graphic identity.

Key Features.	Points Awarded.
Simple idea with limited graphic identity.	LOW: 1-10
Realistic design with adequate graphic identity, featuring in other areas of the teams work.	MEDIUM: 11-20
Realistic and imaginative idea with a strong graphic identity, featuring in all aspects of the teams work.	HIGH: 21-30

Rules and Regulations

Repair and Maintenance

- 9a** No repair or maintenance is to be carried out after the vehicle has been registered with out the permission of GT in Schools staff.
- 9b** If any entry becomes damaged during the event, teams will be allowed to use their spare car, as long as the judges have determined that the spare is identical to the original. In the unlikely event that the second car becomes damaged, the entry will be evaluated by the event co-ordinator, who will make a ruling as to whether or not the team will be allowed to repair the vehicle. This is the only reason a team should be allowed to tamper with their car after registration.
- 9c** Wheels that come off during the race may be replace as determined by the race co-ordinator.
- 9d** Damaged wheels may only be replaced with the permission of the event co-ordinator.

CO2 Cartridges

- 10a** The Event Organisers will provide all CO2 cartidges for the event.

Complaints Procedure

- 11a** All complaints regarding racing track marshalling and/or illegal cars should be reported by 15:00 on the day of the final. All other issues/complaints by 12:00 on the same day and all in writing to the event co-ordinator. We cannot consider changes to procedures after these times. Any complaints after this time should be made in writing and given to the event co-ordinator to be dealt with after the close of the event.

Tolerances for all specifications:
Measurement tolerance limits +0.1mm
Weight tolerance limits +0.5g

Important! Read and Check Rules Carefully before Design and Construction

The Brief

The Brief - is simple, you are the GT Racing Team commissioned to design, construct and race the fastest GT car of the Future, driven by new compact CO2 (carbon dioxide gas) power plants.

In order to enter the championship, you must work in a team of a minimum of 3 to a maximum of 6 persons, allocating job roles to members of your group. Ideally, one role should be allocated to each person. However, you may have to double up on your role and responsibilities, depending on the number of people you have available.

The following job roles should be covered by the members of your team:

- **Team Manager** (maximum 1 person).

This person will be responsible for managing the team, ensuring that the primary and back-up cars are ready for the finals. The team manager works closely with all members of the team, offering assistance where necessary.

- **Resources Manager** (maximum 1 person).

This person organises time, materials and equipment for design and making the cars. They are also responsible for developing ideas regarding team marketing (presentation) including the Sales and Marketing Brochure. The resources manager will need to liaise with all members to check tasks are progressing on time and offer additional help, if needed.

- **Manufacturing Engineer** (maximum 2 persons).

These people are responsible for advising team members on the manufacture of the car and the constraints of the machining process. Manufacturing engineers will need to liaise with the design engineers to report and help solve any problems with construction of the car.

- **Design Engineer** (maximum 2 persons).

These people will be responsible for styling the car and for clay model manufacture, taking into consideration the aerodynamic performance of the car design. Design engineers will need to liaise with manufacturing engineers to ensure that their ideas can be realised.

- **Graphic Designer** (maximum 1 person).

This person will be responsible for producing the colour schemes applied to the vehicle. including any special sponsorship decals, together with the final graphic renderings and any additional team marketing materials that should be included in the Sales & Marketing Brochure. The graphic designer engineers will need to liaise with the design engineer(s) to ensure any schemes will fit the shape of the vehicle and also with the resource manager for additional marketing development.

There are so many tasks that must be mastered, in order to design, manufacture, prepare and finally enter a car for racing, that teamwork will be vital to your success. A real GT racing team succeeds because all the people learn to work together and support each other. Remember, no one person is more important than another.



Above:
National Champions - Team Peragon

Design Criteria

Challenge Criteria for team entry into Regional & National Finals

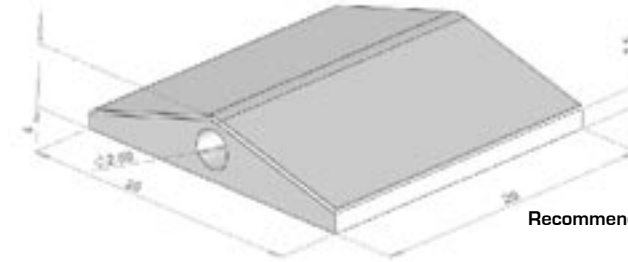
Your team **must** comply to **all** the guidelines outlined below:

- Your team must contain a minimum of 3 to a maximum of 6 students.
- Your team must produce a clay model of the car using the clay model jig provided by Denford and get it scanned to produce an STL cutter path file for the car to be cut on a CNC machine such as the Denford MicroRouter. The clay model must be brought to the event for judging. [Note:- the clay model must be secured to the jig].
- Your team must use CAD (Computer Aided Design) software to analyse the scan data and produce scan pictures for the portfolio.
- Your team must use a CNC machine, such as the Denford MicroRouter, or a GT in Schools approved Manufacturing Centre to produce the car body.
- GT car bodies must be made from a single block of POLYURETHANE FOAM. Recommended Block size 300x100x100mm, weight approx 258 grammes. [Material spec:- Sika M80 ISO845 grams/cm cubed 0.08] or similar.
- The dimensions of your car body, together with the wheels, must fit the dimensions outlined in the rules. Please check these very carefully.
- Wheels may be purchased or, ideally, manufactured by the team, rapid prototype wheels are permissible.
- Each car body must be manufactured either at your school/ college or at a designated manufacturing centre/partner.
- Each car body must be completed with a high quality painted finish. The body can be hand finished to produce a smooth surface all over and should be painted to a high gloss finish. Clear lacquer can be applied over the painted surface if required.
- Each team must bring two identical cars to the National finals - a primary race car and an identical spare back-up. Only one car is required at regional final level.
- Each team must produce a design folder including initial ideas, design development and evidence of testing. Max A3, 20 pages.
- Each team must supply (in the folder) a 3rd angle orthographic projection and a 3D graphic rendering of their final design, both produced using a 3D CAD package. This graphic should show the position of both the passenger cell and the engine block.
- Each team must produce a Sales and Marketing A5 glossy brochure of no more than 6 pages. The brochure should contain the following details: Vehicle specification including dimensions, weight, engine variations, colour and trim package, cost proposals, and any options that would be available for the customer to choose from to personalise their vehicle.
- Teams must prepare a 5 minute verbal presentation to the judges supported by a power point presentation. Each team member should take part in the presentation.

NOTE: Teachers are not allowed to help students at the competition venue. This includes the building of the display stand

Rules and Regulations

Screw Eyes/Plastic Inserts



Recommended plastic guides

7a Each car must have 2 screw eyes/plastic guides firmly secured at the front and rear of the car body, running along the car body underside centreline. The track string must be able to pass through the two screw eyes/plastic inserts.

7b Each plastic guide/screw eye must not make contact with the racing surface.

	Min	Max
7c Inside diameter of screw eyes/plastic inserts. (Teams may construct their own guides if desired.)	2.5	5

7d Minimum distance apart: Front guide forward of front axle, rear guide behind rear axle.

7e Adhesive must be used to secure the plastic guides.

Body Design

All teams must demonstrate that their designs contain a passenger cell and engine block. A drawing of this should be in the portfolio.

8a The passenger cell (representing two occupants) should be no smaller than a block of: width 60mm, height 55mm and length 30mm.

8b The engine block must be no smaller than a box measuring 60 x 32 x 35. This part may be placed anywhere in the body design and in any configuration but must not interfere with the passenger cell.

8c The body can be hand finished to produce a smooth surface all over and should be painted to a high gloss finish. Clear lacquer can be applied over the painted surface if required.

Important! Read and Check Rules Carefully before Design and Construction



Rules and Regulations GT Sports Car Class

Body Dimensions

Structure Min Max

3a Full Body Length (measured between front and rear extremities of body) 230 270

3b Body Sill Height Above The Track (measured between axles) 7 12

3c Body Width 95mm (measured between axles)

3d Total Body Width 95mm Including

Wheels (measured from outside edge of wheels or body,

3e Body Weight Without CO₂ Cartridge 100

3f No part of the body or aerofoil should be less than 3mm thick

3g Max Body Height measured from track surface 80

3h The main car body and bumpers must be machined from low density Polyurethane model board (size 300x100x100)

Recommended (Sika M80 ISO845 g/cm cubed 0.08) or similar

3i The design of the completed 2 or 4 seater Sports car should resemble an actual road going car and shall include the following features (to be identified by different colour from the body - decals may be used for this.)

- front, side and rear screens
- front and rear light clusters
- front and rear number plate

3j Front and rear light clusters must be at extremities of the body (when viewed from front and rear)

3k Number plates must be vertical panels min size 8mm x 30mm incorporated into the front and rear of the design.

3l The underside of the car body should remain flat between the front and rear axles (The whole underside should be solid with no holes or voids)

3m Other features that may be included (these can be made separately) Door handles, Wing / Door Mirrors, Wipers, Front fog lights, High mounted rear stop light, Side repeater lights (extra marks may be awarded for these features)

3n Designs will be tested for any implants or voids hidden within the car body.

All cars must comply with the following minimum and maximum dimensions.

Wheel Dimensions

4a All cars must have 4 wheels, two at the front and two at the rear and all wheels must be cylindrical.

All wheels must fit the following criteria:

	Min	Max
4b Front Wheel Diameter	35	45
4c Front Wheel Width (at surface contact)	15	25
4d Rear Wheel Diameter	35	45
4e Rear Wheel Width (at surface contact)	15	25
4f All 4 wheels should touch the racing surface at all times.		
4g A Team may manufacture their own wheels as long as they comply with this specification.		
4h Wheel dimensions should be consistent with the whole circumference/diameter of the wheel.		
4i Axle design is open.		
4j Distance between axles.	120	160

(All wheel measurements are to extreme outer edges)

Wheel to Body Dimensions

5a The wheels are allowed to be inside the car body and none of the wheels must be visible from the plan view.

Power Plant

Structure	Min	Max
6a Cartridge Chamber Diameter	19	20
6b Lowest point of chamber to track surface	15.5	45.5
6c Depth of hole should be 50mm measured from rearmost vertical surface of car		
6d Wall thickness around cartridge. 3		
6e No paint is allowed inside the chamber (Please seal off or protect the chamber during painting)		

(all dimensions stated in millimetres, mm)
(all weights stated in grams, g)



The Design Brief

Design Considerations

Design Preparation:

Before beginning to design your car, you will need:

- Solid Edge or a similar 3D CAD software package at your school/college.
- A design template suitable for the polyurethane blank.
- Hopefully, an endless supply of ideas!

Training:

CAD packages will help you draw and develop your ideas in 3D. Of course, as with most drawing packages, it takes time to learn how to use them. Your technology teacher should be able to show you how the software works, but members of your team will need to spend some time exploring the software, so you can see what it can do and how it can help you design your Sports car.

Research:

Investigate existing Sports car designs. Your teacher may be able to help you use the internet to find out the latest developments occurring in the world of Sports car design. Concentrate your research on areas that could help your team, for example, aerodynamics and car body designs, then try to apply the principles to your own ideas.

Testing:

Your team may want to consider testing a variety of car designs, or car parts, in a wind and/or smoke tunnel to evaluate their aerodynamic performance. At the judging stage your car will be measured in a wind tunnel to determine the CD of the vehicle.

Manufacturing Considerations

Note that your car design template must be **10mm shorter** at both ends, compared to the actual polyurethane block (we have accounted for this in the Rules & Regulations, point 3a). You will not be able to machine to the extreme ends of the foam block, since they are sometimes used for attaching the CNC machine jig fixtures. Damage could occur if the cutting tool hits any of these jig fixtures.

The jig is used to stop the foam block 300x100x100 mm moving whilst being machined. It also allows the block to be accurately repositioned.

Please note however that some machines will require only one cut, others may require two cuts, therefore you will need to take this into account when you are designing the car.

You could also decorate the car body with any sponsorship stickers, advertising or colour schemes.



Rules and Regulations

Requirements For Entry

1a. All cars must be designed using a CAD/CAM package. The CAD/CAM package used must satisfy all the challenge entry criteria and allow students to produce a 3D graphic rendering and 3rd angle orthographic projection. The CAM package should allow students to simulate CNC processes so students can show evidence of the process in their portfolio. We recommend the use of SolidWorks CAD software. Denford QuickCAM 3D is also available free of charge from F1 in Schools. Details of how to obtain your free copy of SolidWorks or QuickCAM 3D software, can be found on our website - www.f1inschools.co.uk. Your Sports car must be manufactured on a CNC machine, such as a Denford MicroRouter, either at your school/college or at a GT in Schools approved Manufacturing Centre. All cars entered into the Regional and National Finals should be constructed from a single Polyurethane foam block.

1b. All cars must fit within the specified dimensions. Hand finishing is permitted. We expect all cars to be complete, finished and painted to a high standard.

1c. Only three teams in total from each school/college/youth group are permitted to attend the Regional Finals (eg. 3 teams all from Key Stage 3 or 1 team from each of the 3 age groups) and National Final (if qualified). The age group is determined from the student ages at regional final event. Should any teams withdraw or become disqualified, reserve teams may be selected from a previously submitted list. These teams will be informed by post/e-mail/telephone call as soon as the organisers are aware of the situation.

1d. The cars should be produced during the academic year preceding the regional finals. The same car design should not be entered more than once.

1e. Each team should consist of a minimum of 3 members to a maximum of 6. Mixed gender teams would be preferred and positively encouraged.

1f. At a regional final only one car is required, however, we recommend that two are manufactured in case of damage. If attending the National Final two identical cars must be provided. Both cars must be registered at the pits on the day of the event. **At the National Finals the event organisers have the right to keep one car for promotional purposes. For this reason it is recommended that a 3rd car should be made and left with the Event Coordinators.**

N.B. THE CLAY MODEL MUST BE BROUGHT TO ALL EVENTS FOR JUDGING.

1g. Each design must leave enough space for an entry number sticker to be applied on each side of the car body. Your number will be given to you at registration and must be in place before racing. The size of the sticker will be a maximum of 30mm (length) by 15mm (height) and must be positioned on the underside of the vehicle on the flat floor between front and rear axles.

1h. Each team must produce a design folder of work including initial ideas, design development and evidence of testing. An orthographic projection (including a plan, side and end elevation including positions of passenger cell and engine block) of their car design and a 3D rendering, both completed using a CAD package, must also be submitted in your design folder. Finally there must be evidence of the use of both CAM and CNC. These documents should be presented in an A3 sized portfolio and displayed in the pits area throughout the duration of the event - NO MORE THAN 20 SHEETS OF A3 PER PORTFOLIO.

1i. The official length of the track, from start to finish, is 20 metres.

1j. All cars will be checked for safety and that the screw eyes are secure. If the Judge / Marshalls are unhappy with the safety of the vehicle or a rule infringement has occurred, teams can submit their spare car. Otherwise the team may be disqualified or points deducted from the overall team score.

Important! Read and Check Rules Carefully before Design and Construction



Rules and Regulations

Requirements For Entry (Continued)

1k. Judging will include categories for safety, aerodynamics, engineering, aesthetics, quality and accuracy of manufacture, race times and team presentation. Please refer to the marking criteria. Overall winners will be determined by combining point scores from each category in the challenge. **PLEASE NOTE THE JUDGES DECISION IS FINAL.**

1l. Cars will be handed into race control 10 minutes before racing commences.

1m. All entries must be registered prior to, or by, any initial racing event. Team registration must be completed by 24th October 2008 online @ www.gtinschools.co.uk

1n. The top teams from each age group will be invited to challenge other teams from around the country at the National Final. Disqualified teams will be replaced with reserve teams from the same region.

1o. Teams that have been invited to the regional final and National Final will be required to explain how they completed their design process to the Judges, in the form of a verbal presentation. The presentation must not last longer than 5 minutes at a Regional Final and 10 minutes at the National Final. Each team member must take part in the presentation.

1p. Following the close of Judging and/or a race event, cars must be collected between the specified times on the programme.

Competition Categories

2a. GT Racing class

Open to 11-18 years [Key Stages 3-5] students.

There will be an award / prize for the overall winner of the challenge based on a points score.

2b. There will be a separate award/prize for:

- GT Class Overall Winning Team
- Fastest Car [GT Class]
- The Best Sketch *
- The Best Design *
- The Best Engineered Car *
- The Best Sales and Marketing Brochure *

Note - * Awards are at the discretion of the judges.

Important! Read and Check Rules Carefully before Design and Construction